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ASCENT ENVIRONMENTAL

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Draft
Environmental Impact Statement

LAKE TAHOE SHORELINE PLAN

Prepared for:

TAHOE REGIONAL PLANNING AGENCY

Draft Environmental Impact Statement
for the

Lake Tahoe Shoreline Plan

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LIST OF ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg	micrograms
µg/m^3	micrograms per cubic meter
2012 RPU EIS	*2012 Regional Plan Update Environmental Impact Statement*
2012 RTP/SCS	*Lake Tahoe Regional Transportation Plan and Sustainable Communities Strategy: Mobility 2035*
2017 RTP/SCS	*Linking Tahoe: Regional Transportation Plan and Sustainable Communities Strategy*
AB	Assembly Bill
ADT	average daily traffic
AIS	aquatic invasive species
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
AMWG	adaptive management working group
APSA	Aboveground Petroleum Storage Act
ATP	Linking Tahoe: Active Transportation Plan
B.P.	before present
Basin Plan	Water Quality Control Plan for the Lahontan Region
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene and xylene (fuel constituents)
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fuel economy
Cal/OSHA	California Occupational Safety and Health Administration
CalEMA	California Emergency Management Agency
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife

CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	U.S. Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
Commission	California State Lands Commission
Compact	Tahoe Regional Planning Compact
Conservancy	California Tahoe Conservancy
CRHR	California Register of Historical Resources
CTLFC	Carson and Tahoe Lumber and Fluming Company
CWA	Clean Water Act
dBA	A-weighted decibels
diesel PM	diesel particulate matter
DTSC	California Department of Toxic Substances Control
EDCAQMD	El Dorado County Air Quality Management District
EIP	Environmental Improvement Program
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCR	Emergency Planning and Community Right-to-Know Act of 1986
ESA	federal Endangered Species Act of 1973
FONSE	Finding of No Significant Effect
$g/m^2/da$	grams per square meter per day
$gC/m^2/year$	grams of carbon per square meter per year
GHG	greenhouse gas
GIS	Geographic Information System
Handbook	TRPA *Best Management Practices Handbook*
HAP	hazardous air pollutant
HOA	homeowner's association
hp	horsepower

IEC	Initial Environmental Checklist
IS/MND	Initial Study/Mitigated Negative Declaration
JFF	Joint Fact-Finding
kW	kilowatts
LCD	Land capability district
LCFS	Low Carbon Fuel Standard
LCT	Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*)
LOS	level of service
LRWQCB	Lahontan Regional Water Quality Control Board
LSA	Lake and Streambed Alteration
LTAB	Lake Tahoe Air Basin
LTBMU	Lake Tahoe Basin Management Unit
LTD	Lake Tahoe datum
LTGRP	Lake Tahoe Geographic Response Plan
MBTA	Migratory Bird Treaty Act
Mm^{-1}	inverse mega meters
MOA	memoranda of agreement
MOU	memorandum of understanding
mpg	miles per gallon
mph	miles per hour
MPO	metropolitan planning organization
MT	metric tons
MTBE	methyl tertiary-butyl ether (fuel additive)
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDSL	Nevada Division of State Lands
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
Nevada SHPO	Nevada State Historic Preservation Office
NHPA	National Historic Preservation Act

NHSTA	National Highway Traffic Safety Administration
NMFS	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NNHP	Nevada Natural Heritage Program
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NTRT	Nevada Tahoe Resource Team
NVCRIS	Nevada Cultural Resource Information System
ONRW	Outstanding National Resource Water
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PAOT	persons at one time
PAS	plan area statements
PCAPCD	Placer County Air Pollution Control District
PCB	polychlorinated biphenyl
PM_{10}	respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1970
PWC	personal watercraft
RCP	Representative Concentration Pathways
RPS	Renewable Portfolio Standard
RPU EIS	Regional Plan Update Environmental Impact Statement
RTP	Lake Tahoe 2035 Regional Transportation Plan
RTP/SCS EIR/EIS	Regional Plan Update Environmental Impact Statement and Lake Tahoe Regional Transportation Plan and Sustainable Communities Strategy Environmental Impact Report and Environmental Impact Statement
RWQCB	regional water quality control board
SANDAG	*San Diego Association of Governments*
SAP	Sustainability Action Plan
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCS	Sustainable Communities Strategy

SERC	Nevada State Emergency Response Commission
SEZ	stream environment zone
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SRA	State Recreation Area
State Parks	California Department of Parks and Recreation
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TAG	technical advisory group
TART	Tahoe Truckee Area Regional Transit
TMDL	total maximum daily load
TMPO	Tahoe Metropolitan Planning Organization
TNF	Tahoe National Forest
TRPA	Tahoe Regional Planning Agency
TRPA Code	TRPA Code of Ordinances
TTD	Tahoe Transportation District
TWW	treated wood waste
TYC	Tahoe yellow cress
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UVR	ultraviolet radiation
VEC	vertical extinction of light
VMT	vehicle miles traveled
VOC	volatile organic compounds
YOY	young-of-the-year

EXECUTIVE SUMMARY

ES.1 BACKGROUND

The Tahoe Regional Planning Agency (TRPA) adopted its first Regional Plan and Code of Ordinances in 1987 to guide resource management and development, and protect the Tahoe Region's natural ecology and unique values. The Regional Plan included a Shorezone Subelement and implementing ordinances that regulated development along the shoreline of Lake Tahoe. The 1987 ordinances recognized that there was uncertainty about the effect of shoreline structures on fisheries. Because of this uncertainty, the ordinances prohibited new structures in areas identified as prime fish habitat and called for further study to evaluate the effects of shoreline structures on fish habitat and spawning. By the early 1990s, the studies had been completed, and they concluded that the placement of piers and buoys in spawning and feed/cover habitat has limited effect on fish populations and that those effects can be mitigated (Byron et al. 1989; Beauchamp et al. 1991, 1994).

In response to the conclusions of the fish habitat studies, TRPA led multiple shorezone planning initiatives to replace the prohibition of structures in prime fish habitat with a comprehensive shoreline plan that would allow for lake access structures while protecting the environment. Any plan that would govern development along Lake Tahoe's shoreline proved to be highly controversial. TRPA prepared multiple plans and environmental analyses, which were released in 1995, 1999, 2004, 2006, and 2008. Each time, controversy centered around fisheries, scenic quality, air quality, water quality, recreation, and other topics that prevented adoption and implementation of a shoreline plan.

To find common ground between stakeholders, TRPA launched a collaborative process to develop a new Shoreline Plan in 2016. TRPA, along with partner agencies and organizations, engaged a third-party mediator to convene stakeholders and develop a consensus-based planning process. As part of this process, a Steering Committee was convened to frame key shoreline issues, identify approaches to address them, and develop policy recommendations. The Steering Committee consisted of senior-level representatives from the California State Lands Commission, Lahontan Regional Water Quality Control Board, Lake Tahoe Marina Association, League to Save Lake Tahoe, Nevada Division of State Lands, Tahoe Lakefront Owners' Association, and TRPA.

TRPA also convened a Joint Fact-Finding (JFF) Committee comprised of technical experts from public agencies, universities, and stakeholder organizations to provide scientific and technical recommendations. The JFF Committee identified the best available scientific studies to inform the Shoreline Plan and Environmental Impact Statement (EIS), oversaw baseline data collection for the 2016 and 2017 boating seasons, developed analytical approaches to estimate boat usage, provided technical recommendations to the Steering Committee, and provided input on the analytical approaches in this EIS. The Steering Committee considered technical recommendations from the JFF Committee and input from the public to develop a recommended set of policies that constitute the proposed Shoreline Plan. The Regional Plan Implementation Committee of the TRPA Governing Board reviewed and endorsed the proposed Shoreline Plan as the preferred alternative, and three other alternatives, described in this EIS.

This EIS evaluates the environmental effects of four alternatives, consistent with the Tahoe Regional Planning Compact, Code of Ordinances, and Rules of Procedure. The four alternatives include different strategies to meet the following objectives of the Shoreline Plan:

- protect and where feasible enhance the environment,
- provide a fair and reasonable system of access,
- adapt to changing lake levels,
- preserve high-quality recreation and public safety, and
- implement predictable and consistent rules.

ES.2 SUMMARY OF THE ALTERNATIVES

Four alternatives are being considered as part of the shoreline planning process, including the existing shorezone policies and ordinances, and three sets of potential modifications. All four alternatives have been developed to meet the objectives of the Shoreline Plan, described above. Each of the alternatives represents a different approach to regulating the number, amount, type, location, and design of shoreline structures and associated resource management provisions, as follows:

- **Alternative 1 – Proposed Shoreline Plan**. The goal of this alternative is to enhance the recreational experience at Lake Tahoe while protecting the environment and responsibly planning for the future. This alternative, developed through a consensus-based approach, incorporates the policies developed by the Steering Committee and was endorsed by the Regional Plan Implementation Committee of the TRPA Governing Board. The Shoreline Plan would mete out new private and public development over time. At buildout, it would allow for up to 2,116 new moorings (buoys, lifts or public slips), 128 new private piers, 10 new public piers, and two new public boat ramps. Some new and existing buoys could be converted to slips, and vice versa, at facilities open to the public (e.g., marinas).

- **Alternative 2 – Maintain Existing TRPA Shorezone Regulations (No Project).** This alternative would retain the existing Regional Plan Shorezone Subelement Goals and Policies and TRPA Shorezone Code (Code of Ordinances Chapters 80–86). The goal of this alternative is to balance access and environmental protection by applying the approach that was developed under the 1987 Regional Plan. This alternative would not include a numeric cap on shoreline structures but would prohibit new structures within TRPA-designated prime fish habitat. This alternative would allow more shorezone structures than any other alternative and is the only alternative that would allow new marinas. At buildout, it would potentially allow for up to 6,936 new moorings, 476 new piers, six new boat ramps, and two new marinas.

- **Alternative 3 – Limit New Development**. The goal of this alternative is to reduce the risk of environmental impacts by limiting new shoreline development. Motorized watercraft access would be more concentrated at marinas and public facilities, and fewer structures would be authorized under this alternative than under Alternative 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. Eighty-six new private piers would be authorized under this alternative, but they would be restricted to multiple-use piers.

- **Alternative 4 – Expand Public Access and Reduce Existing Developmen**t. The goal of this alternative is to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. This alternative would include transfer ratios that would allow some private shoreline structures to be removed and rebuilt in different locations if a project would result in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shoreline structures.

ES.3 AREAS OF CONTROVERSY

The consensus-based planning process incorporated broad public input and led to a plan and alternatives that were agreed upon by the Steering Committee. However, no plan that governs development along the shore of Lake Tahoe will be without controversy. While there are currently no known issues to be resolved, many public comments received during the EIS scoping period (see Appendix B) identified topics of concern. Based on public comments and areas of controversy during previous shoreline planning initiatives, it is anticipated that the following topics may be areas of controversy:

- the number and location of new shoreline structures,
- processes for allocating new shorezone structures,
- effects of structures and boating on non-motorized water recreation,

- visual effects of shoreline structures,
- water and air pollution from boating, and
- effects on public access along the shoreline.

ES.4 SUMMARY OF IMPACTS AND MITIGATIONS

Table ES-1, below, provides a summary of each impact analyzed in Chapters 4 through 17 of this EIS. Where one or more alternatives could result in a significant impact, proposed mitigation measures are described.

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
4 Land Use			
Impact 4-1: Induce substantial new growth Regional growth is capped by the Regional Plan. The Shoreline Plan alternatives would permit development of structures within the shorezone but would not increase the capacity of the region to accommodate an increase in residents or tourists. The addition of new public access facilities (e.g., boat ramps, public slips) under Alternatives 1, 2, and 3 would accommodate an increase in the number of day visitors to the region; however, these additional day visitors would not lead to residential, tourist, or commercial growth because growth is capped by the Regional Plan development rights system.	Alt 1, 2, 3 – LTS Alt 4 – NI	No mitigation required	No mitigation required
Impact 4-2: Consistency with applicable plans, policies, regulations, and the existing pattern of land use Shoreline Plan Alternatives 1, 3, and 4 would result in changes to provisions in the TRPA Code that govern development within the shorezone. The provisions of these alternatives have been developed to implement the Regional Plan Goals and Policies and achieve thresholds, each striking a different balance of environmental protection and recreational access. The shorezone code provisions under all alternatives are intended to augment local TRPA plans by providing a framework for development within the shorezone that is consistent with the land use designations within each of those plans. The pattern of development allowed under each of the Shoreline Plan alternatives would be restricted not only by land use designations identified in local plans, but also by other existing provisions of the code that would remain unchanged, as well as by the requirement for compliance with environmental thresholds. All four Shoreline Plan alternatives would provide for the same types and pattern of land uses that already exist within the shorezone.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
5 Fisheries and Aquatic Biological Resources			
Impact 5-1: Increased risk of AIS introduction or spread The increase in boat launches under Alternatives 1, 2, and 3 could increase the risk of AIS introductions, but this risk would not be substantial because the rigorous and effective prevention programs (including boat inspection, decontamination, outreach, and education) would continue. However, the increases in recreational boating under Alternatives 1, 2, and 3 would increase the risk that invasive macrophytes and Asian clams already in Lake Tahoe would	Alt 1, 2, 3 - S Alt 4 – B	Mitigation Measure 5-1a: Require marina aquatic invasive species management plans (applies to Alts 1, 2, and 3) TRPA will require that all marinas prepare and implement an AIS management plan within 3 years of adoption of the Shoreline Plan. The AIS management plans shall, at a minimum, (1) identify strategies to prevent the establishment of invasive macrophytes and Asian clams within the marina (e.g., improved water circulation), (2) include an AIS monitoring, early	Alt 1, 2, 3 -LTS Alt 4 – B

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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be spread within the lake, creating new populations and increasing the abundance and distribution of AIS. Alternative 4 would result in no increase in boating activity and would not increase the risk of AIS introduction and spread. Alternative 4 would also require that all marinas develop and implement an AIS management plan. This would reduce the risk of AIS introductions at, or spread from, marinas.		detection, and response program within the marina, which could be in partnership with resource management agencies and/or organizations, and (3) include a public education component. For marinas that already contain AIS, the AIS management plan shall identify measures to control or eradicate existing AIS and reduce the potential for spread. <u>Mitigation Measure 5-1b: Promote the development of AIS-resistant boats</u> (applies to Alts 1, 2, and 3) TRPA will continue to regularly communicate with representatives of the watercraft industry, including trade associations and manufactures of watercraft or watercraft components, to promote the development and widespread commercial utilization of technologies that lower the potential for the spread of AIS. Innovations such as ballast tank filters, heated ballast water intakes in engines, and better draining ballast tanks are currently being developed by various manufacturers, but they are not yet commercially available on a widespread basis. Although many of these innovations are not yet commercially viable, they may be by the full buildout of the Shoreline Plan Alternatives. TRPA will regularly coordinate with representatives of the watercraft industry to advocate for and demonstrate a commercial interest in the continued development and adoption of such technologies. TRPA will enact policies to encourage or require the use of such technologies when they become feasible. <u>Mitigation 5-1c: Establish a mitigation fee program to increase AIS control.</u> (applies to Alt 2 only) TRPA will establish an AIS mitigation fee program that will fund increased levels of AIS control. The fee will be used to implement projects that reduce the abundance and distribution of Asian clam, Eurasian watermilfoil, curly-leaf pondweed, coontail and/or other AIS that may be introduced in the future and can be spread by recreational boating. The fee will be assessed on recreational boaters either during AIS inspections or at launch points. The fee per launch or boat will be the same as that proposed under Alternative 1, which will be sufficient to increase existing control efforts commensurate with the projected increase in annual boat trips under Alternative 2.	

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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Impact 5-2: Loss of prime fish habitat The implementation of the Shoreline Plan has the potential to result in a net reduction in the amount of prime fish habitat, as defined by TRPA, due to placement of shorezone structures within this habitat. Alternatives 1 and 3 would require habitat replacement at a 1.5:1 ratio, resulting in no net loss in prime fish habitat. Alternative 2 would prohibit construction of structures within prime fish habitat. Alternative 4 would require habitat replacement at a ratio of 2:1, which would not cause a decrease in the amount of prime fish habitat	Alt 1, 3, 4 – LTS Alt 2 – NI	No mitigation required	No mitigation required
Impact 5-3: Construction-related impacts Construction of new shorezone structures and dredging under all four Shoreline Plan alternatives could affect all species considered, except lake trout because they do not utilize nearshore habitats. Effects on species that could use nearshore habitats would be greatest on native minnow species that spawn in nearshore areas, including Lahontan Lake tui chub. Effects on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, would generally be limited to adults migrating to spawning tributaries and juveniles using nearshore areas for rearing. All of the alternatives would produce a small amount of temporary disturbance relative to both prime fish habitat and marginal fish habitat. Additionally, based on the life history characteristics and habitat use for the species evaluated, construction-related effects would not be adverse for any fish species under any of the alternatives.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
Impact 5-4: Permanent habitat modification Permanent habitat modification could affect all species evaluated except lake trout because they do not utilize nearshore habitats. Impacts on species that could use nearshore habitats would be greatest on native nongame fish, including Lahontan Lake tui chub. Impacts on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, would generally be limited to YOY juveniles using nearshore areas for rearing. Under all Shoreline Plan alternatives, impacts resulting from permanent habitat modification would be small relative to TRPA-designated fish habitat, including prime fish habitat. Additionally, based on the life history characteristics and habitat use for the species evaluated, impacts would be minimal for any fish species.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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Impact 5-5: Recreation-related impacts Recreational activities could affect all species evaluated. Effects on species that could use nearshore habitats would be greatest on native minnow species that spawn in nearshore areas, including Lahontan Lake tui chub. Effects on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, could occur to adults that utilize open waters of the lake and to YOY juveniles using nearshore areas for rearing. Spawning and egg incubation of special-status salmonids and other coldwater game fish species would not be affected since these species spawn in tributary streams or deep in the lake where they would not be affected by increased boating or recreational angling. Effects under Alternative 2 would be greatest because it would allow the largest number of structures and two new marinas. Thus, under Alternative 2 the capacity for recreational activities such as boating and angling would be highest. Effects under Alternative 4 would be the least because it contains the least number of structures and no increases in boating, relative to baseline. Recreation-related effects under Alternative 1 and Alternative 3 would be intermediate between Alternatives 2 and 4. However, under all the alternatives, recreation-related effects resulting from increased recreational angling and/or boating would be small.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
6 Hydrology and Water Quality			
Impact 6-1: Soil erosion and/or release of pollutants to Lake Tahoe from shorezone facility construction or maintenance activities, including dredging All four Shoreline Plan alternatives would allow new construction and dredging within the shorezone. Construction activities could affect water quality by accelerating soil erosion and sedimentation while also releasing pollutants. Dredging for new construction or maintenance dredging for existing facilities could affect water quality by increasing turbidity and releasing nutrients into the surrounding water. Existing state, federal, and TRPA regulations mitigate potential short-term impacts from construction activities in the shorezone. TRPA policies require the implementation and maintenance of temporary BMPs to protect water quality during maintenance dredging within the shorezone. Under Alternatives 1 and 3, TRPA would revise code standards (Section 84.15.3) to be consistent with federal standards for new dredging (nondegradation) under Section 404 of the CWA as regulated by USACE. However, the federal standards under Section 404 are mandatory for dredging in Lake Tahoe regardless of the	Alt 1, 2, 3, 4- LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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TRPA Code provisions and are therefore applicable to all four alternatives. Dredging activities would also need to comply with each state's Section 401 water quality certification requirements.			
Impact 6-2: Sediment resuspension and turbidity associated with the hydrodynamic effects of motorized boating The hydrodynamic effects from motorized boating can disturb and resuspend lakebed sediment through propeller wash and boat wake, potentially leading to increased turbidity and reductions in nearshore clarity. Hydrodynamic effects from propeller wash and boat wake are generally limited to shallower areas, with little or no effects for water depths less than 7 feet and no effects for water depths greater than 10 feet (Beachler and Hill 2003; USACE 1993). TRPA Code Section 84.17.1 requires a no-wake zone within 600 feet of the shore with a 5-mile-per-hour (mph) speed limit. Most of Lake Tahoe's shallower depths are within the existing no-wake zone, with notable exceptions being the nearshore areas adjacent to the City of South Lake Tahoe and Tahoe City. Lake Tahoe's nearshore presents complex environment conditions and factors that may influence nearshore clarity in an interrelated manner that varies by location and with time (Taylor 2002). In addition to natural wind effects generating water movement, wave motion, and natural littoral processes, factors influencing the observed variability in nearshore clarity may include: adjacent land-uses and urban stormwater inputs, other nonpoint pollutant inputs, boating activity, proximity to stream inputs, water depth, substrate type, and localized features of the lake bottom. Among these interrelated factors the potential contribution of boating activities to degrade nearshore clarity is difficult to isolate or quantify. Alternatives 1, 2, and 3 are projected to generate a peak-day increase in boating activity. On peak days, increased boat use could increase wave action and turbulence generated by boat wake. The shallower portions of the nearshore outside existing no-wake zone regulations are likely more susceptible to short-term and temporary declines in clarity because of increased wave action. During summertime periods with low winds and low inputs of streamflow and stormwater runoff, Lake Tahoe waters would typically be quiescent with low wave action in the nearshore. Because Alternatives 1, 2, and 3 would increase boating activity on peak days, the increased potential for boat wake to induce additional wave action in shallow nearshore areas most susceptible to elevated	Alt 1, 3 – LTS Alt 2 – PS Alt 4 - NI	Mitigation Measure 6-2: Study and adaptively manage the effects of boats on nearshore conditions (applies to Alt 2) TRPA will coordinate with partner agencies and research organizations to complete monitoring and studies that evaluate the effects of boat activity on nearshore clarity and water quality. TRPA will then implement management actions, if needed, based on the results of the studies. To ensure the completion of nearshore studies, TRPA will enact a nearshore water quality mitigation fee on recreational watercraft. The fee will be assessed on all recreation watercraft, either during aquatic invasive species boat inspections or at launch points. The fee will remain in place for a period of up to ten years to fund scientific research and nearshore monitoring through a program such as the Nearshore Water Quality Network. Revenue generated from the fee will be directed towards research components of nearshore studies tasked with evaluating potential impacts of boat activity on nearshore clarity and water quality. TRPA will set the fee at an amount that is adequate to fund an assessment of recreational boating effects on nearshore water quality and clarity. If research concludes that the increase in boating activities anticipated under Alternative 2 would contribute to an exceedance of TRPA's nearshore numerical standard of 1 NTU, TRPA will implement management actions to avoid or offset this impairment. Such management actions could include, but are not limited to: ◢ expand the no-wake zone based on the scientific findings and recommendations for nearshore areas identified to be susceptible to reduced clarity from boating activities; or ◢ enact a permanent nearshore water quality mitigation fee on recreational watercraft and use the revenue to fund compensatory mitigation projects that reduce other sources of nearshore water quality impairment.	Alt 1, 3, 4 – No mitigation required Alt 2 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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turbidity would also increase; therefore, the potential frequency of exceeding the nearshore threshold turbidity standard may also increase for limited portions of the nearshore.			
Impact 6-3: Direct entrainment or atmospheric deposition of pollutants from boat exhaust Increased boating activity is projected under Alternatives 1, 2, and 3, which could lead to increased boat emissions. Alternative 4 would not increase boating activity, and therefore would not increase boat emissions. Boat engines emit oxides of nitrogen (NO_X) and particulate matter (PM) during operation, which may be delivered to the lake through direct entrainment in the water column or atmospheric deposition. Total nitrogen and fine sediment particles are pollutants of concern for lake transparency and clarity, and the Lake Tahoe TMDL sets load reduction targets for these pollutants. Therefore, emissions that lead to an increase in loading for these pollutants of concern might extend the timeline needed to achieve the Lake Tahoe TMDL load reduction targets. The approval of additional boating facilities under Alternatives 1, 2, and 3 leading to the increase in boating activity would be phased through a projected buildout date of 2040. Impact 10-1 in Chapter 10, "Air Quality," assesses potential changes in emissions from increased boating activity under Alternatives 1, 2, and 3. Impact 10-1 concludes that a net reduction in boating emissions, including emissions of NO_X and PM, would result under Alternatives 1 and 3 as the increased boating hours are offset by fleet turnover, with older boat engines replaced with cleaner and more fuel-efficient boat engines. Impact 10-1 in Chapter 10, "Air Quality," concludes that under Alternative 2 changes in emissions from increased boat activity will have mixed results, with a net increase in NO_X and a net decrease in PM. Because Alternative 2 would create a net increase in NO_X loading, and potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X, this could extend the timelines needed to achieve the Lake Tahoe TMDL load reduction targets.	Alt 1, 3 – LTS Alt 2 – PS Alt 4 – NI	Mitigation Measure 6-3: Limit the number of moorings and boat ramps to limit emissions from increased motorized watercraft activity (applies to Alt 2 only) TRPA shall implement Mitigation Measure 10-1 as described in Chapter 10, "Air Quality," which limits the number of new moorings and boat ramps (and thus boat emissions) to the maximum number allowed under Alternative 1.	Alts 1, 3, 4 – No mitigation required Alt 2 – LTS
Impact 6-4: Discharge of hydrocarbons or other contaminants into Lake Tahoe from boating activities and boating facilities Elevated levels of hydrocarbons or other contaminants in the lake could result from increased boating activity under Alternatives 1, 2, and 3. Gasoline and	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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diesel fuels contain hydrocarbon contaminants, including the group of volatile organic compounds collectively known as BTEX (benzene, toluene, ethylbenzene, and xylene). While also occurring in raw fuel, polyaromatic hydrocarbons (PAHs) are primarily produced during the combustion process in an engine. Hydrocarbons can enter the water from boating activities via exhaust emissions, fueling spills, and other accidental spills. Most outboard engines exhaust beneath the surface of the water, and consequently, all exhaust must pass through the water column, where some hydrocarbons will remain in solution or sorb to particulates and sediments.			
Impact 6-5: Interference with littoral processes from new or redeveloped shoreline structures All Shoreline Plan alternatives would allow for the addition or expansion of piers that could disrupt existing wave and current circulation patterns near the shoreline. Waves and current motion are the primary agents of littoral drift, the process by which sediment is transported and deposited in the nearshore area. Alternatives 1, 3, and 4 propose revisions to existing pier design standards in the TRPA Code (Section 84), but do not define design standards for public piers. Alternatives 2 and 3 would both allow multiple-use piers to deviate from design standards. Other structures, such as jetties, groins, breakwaters, and fences that could affect littoral processes, are generally not allowed under any of the Shoreline Plan alternatives. Alternative 1 may allow for other structures as part of a habitat restoration project or as part of a marina environmental improvement project. Alternative 2 would allow for these structures along the shoreline outside of prime fish habitat if the applicant demonstrated that the structure would not interfere with littoral processes. Previous analysis (TRPA 2004) demonstrated that significant impacts on littoral drift processes can occur from floating piers. Because Alternatives 1, 2, and 3 do not specify design standards for floating piers such that impacts on littoral drift would be completely avoided, and because none of the Shoreline Plan alternatives define the environmental analysis procedures for assessing littoral drift processes associated with public pier applications or allowable deviations for multiple-use pier applications that include floating pier sections, design standards in their current form could allow for piers that interfere with existing littoral drift processes.	Alt 1, 2, 3, 4 – S	Mitigation Measure 6-5a: Specify floating pier design standards (applies to Alts 1 and 3) TRPA will augment the design standards summarized in Table 2-5 in Chapter 2, "Project Description," to include the following standard for floating piers: ◢ Floating pier sections rigidly moored to the lake bottom shall be prohibited. Mitigation Measure 6-5b: Require littoral drift analyses and incorporate design recommendations for floating piers longer than 25 feet (applies to Alts 1, 2, 3 and 4) TRPA will require all new pier and pier extension applications that include floating pier sections longer than 25 feet submit a site-specific littoral drift and wave analysis. The analysis will assess the dimensions of the proposed floating pier section and the ability of waves to initiate and sustain the movement of sediment along the lake bottom under conditions of low lake level (6,223 feet), mid-lake level (6,226 feet), and high lake level (6,229 feet) Lake Tahoe Datum. The lake level condition with the greatest effect on littoral transport and backshore stability shall be used to design the floating pier section. Floating piers may only be approved if they are designed so that wave heights are not reduced by more than 50 percent and the floating pier section is no greater than 50 percent of the length of the site-specific design wavelength.	Alt 1, 2, 3, 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

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7 Soil Conservation			
Impact 7-1: Increase land coverage beyond the limits allows by the Bailey land capability system All Shoreline Plan alternatives would permit the construction or expansion of structures that would create coverage in the backshore. However, all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b (i.e., backshore) coverage created by the project.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
Impact 7-2: Increase erosion or degrade soil conditions during construction activities Implementation of all Shoreline Plan alternatives would permit construction activities in the shorezone that would create ground disturbance and loss of vegetation and would increase the potential for erosion. However, the potential for increased erosion resulting from future projects implemented under the Shoreline Plan alternatives would be reduced through compliance with county, TRPA, and LRWQCB or NDEP code requirements, permit conditions, and regulations.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
Impact 7-3: Long-term increases in shoreline erosion All Shoreline Plan alternatives would allow development of new facilities in the shorezone; however, the potential for the operation of these facilities to increase shoreline erosion would be controlled through existing TRPA regulations and permit conditions. Implementation of Alternatives 1, 2, and 3 would result in increased watercraft use on Lake Tahoe and would expand access to portions of the shoreline that are undeveloped or difficult to access without watercraft. Alternative 4 would not result in an increase in boating activity. Depending on the location of the 15 public piers allowed by Alternative 4, there could be an increase in public access to areas that are currently difficult to access (e.g., if a public pier and associated upland facilities were constructed in undeveloped parkland). Notwithstanding this potential, there is no evidence to suggest that such increased use of remote areas would occur as a result of future shorezone projects, nor that use of such areas, if more accessible, would result in long-term increases in erosion of the shoreline.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

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Impact 7-4: Potential for damage from liquefaction, settlement, tsunami, and seiche The Shoreline Plan alternatives would permit structures in the shorezone that could be damaged during an earthquake from liquefaction in saturated sand deposits, settlement, tsunami, and seiche. The risk from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code and the International Building Code. Alternatives 1, 2, and 3 would increase the number of boats that could be exposed to inundation by tsunami or seiche; however, while such an event could be catastrophic, the probability of occurrence in any given year, or over the coming decades is very low.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
8 Recreation			
Impact 8-1: Alter the quality of recreational experiences or create user conflicts Alternatives 1, 3, and 4 would result in construction of new shorezone structures, with Alternative 4 structures limited to public piers. These alternatives include density and location standards for moorings and piers that would help preserve scenic areas around the lake and maintain the quality of recreation experience. Alternatives 1, 3, and 4 would not result in a substantial change to quality of recreation experience. Implementation of Alternatives 1, 3, and 4 could result in public piers extending beyond the 600-foot no-wake zone, which could create potential conflicts between nonmotorized recreation (i.e., nonmotorized watercraft and swimmers) and motorized watercraft. Because of the substantial increase in boat launch capacity and overnight mooring provided by the number of new shorezone structures associated with Alternative 2, the increase in the number of motorized watercraft on the lake would be great enough that there would be a substantial adverse change in quality of recreation experience for people using motorized and nonmotorized, swimmers, and other beachgoers and increased potential for conflicts between motorized and nonmotorized recreationists outside the no-wake zone. Alternative 2 could also result in new multiple-use and public piers that extend beyond the no-wake zone, creating the potential for conflicts between nonmotorized recreationists and motorized watercraft.	Alt 1, 2, 3, 4 – PS	Mitigation Measure 8-1a: Maintain nonmotorized navigation within the no-wake zone (applies to Alts 1, 2, 3, and 4) TRPA will revise the pier design standards for piers that extend 600 feet or more from the high-water elevation to provide lateral nonmotorized recreation access within the 600-foot no-wake zone. Lateral nonmotorized recreation access within the 600-foot no-wake zone could be provided by either of the following: ◢ The pier design standards would require public piers (for Alternatives 1, 3, and 4) and multiple-use piers (for Alternative 2) to accommodate lateral nonmotorized access by limiting the pier length to within the 600-foot no-wake zone and providing at least 10 feet between the end of the pier and the no-wake zone boundary to allow nonmotorized recreationists to stay within the no-wake zone. The applicant for a new multiple-use pier that extends to within 30 feet of the no-wake zone would also be required to install one or more navigational buoys to identify the location of the no-wake zone relative to the pier; or ◢ The pier design standards could allow exceptions for public piers (for Alternatives 1, 3, and 4) and multiple-use and public piers (for Alternative 2) that extend beyond the no-wake zone if the pier is designed to allow nonmotorized recreationists to have lateral access underneath the pier during high lake level conditions.	Alt 1, 2, 3, 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

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		Mitigation Measure 8-1b: Implement Mitigation Measure 10-1 to limit the number of moorings and boat ramps (applies to Alt 2 only) TRPA will implement Mitigation Measure 10-1, as described in Chapter 10, "Air Quality," which would revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps. Mitigation Measure 8-1c: Establish buffer area around nonmotorized recreationists outside of the no-wake zone (applies to Alt 2 only) TRPA will amend the no-wake zone section of the Code of Ordinances to include a 200-foot buffer between motorized watercraft in motion and nonmotorized recreationists in areas outside of no-wake zones, which is already in practice by Nevada State Parks.	
Impact 8-2: Affect access or opportunities for motorized watercraft Alternatives 1, 2, and 3 would increase capacity for boat launching and mooring by allowing for additional boat ramps and overnight mooring structures. The design and location standards for all three of these alternatives and expansion of the no-wake zone to include all of Emerald Bay with Alternatives 1 and 3 would not substantially change opportunities for recreation activities on the lake that rely on motorized watercraft, including activities such as fishing and water skiing. Alternatives 1 and 3 also provide standards for shorezone structures to allow for boating access under a range of lake levels. Alternative 4 would allow for additional piers but would not provide additional launch capacity or moorings to increase access or opportunities for recreational users of the lake.	Alt 1, 2, 3 – B Alt 4 – LTS	No mitigation required	No mitigation required
Impact 8-3: Change access to or along the shoreline Each of the proposed alternatives would result in the construction of piers that would extend into the public trust areas in the shorezone and impede, to some degree, lateral access along the shoreline in California. New public piers would be constructed for the benefit of public use; thus, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. Alternative 4 would only allow new public piers to be constructed. Alternatives 1, 2, and 3 would also allow private piers. None of the alternatives include any design standards for private or public piers that prohibit access for the public along the	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

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shore. TRPA and California State Lands Commission would develop a memorandum of understanding (MOU) that would provide a review process that protects public lateral access within the public trust easement in California. In Nevada, no existing public trust easement on private land is recognized; thus, this impact only assesses impacts to lateral access along the shoreline in the California portion of Lake Tahoe. Under the MOU and for all alternatives, TRPA would not be able to approve any shorezone structure that unreasonably interferes with lateral public access where it is otherwise lawfully allowed.			
Impact 8-4: Affect the fair-share distribution of recreation capacity The 2015 Threshold Evaluation found the recreation threshold for fair-share distribution of recreation capacity to be in attainment (TRPA 2016a). The existing distribution of land ownership in the shorezone is approximately half public and half private ownership, with slightly less land in private. Each alternative would change the percent of shorezone structures that are accessible to the public to various degrees, but the distribution between public and private owners around the lake would not change substantially over baseline conditions. All of the new shorezone structures under each alternative in combination with existing shorezone structures would either maintain the same proportion of public and private structures as under baseline conditions or would result in a small increase in the proportion of public structures compared to baseline conditions. At buildout of the alternatives, publicly-accessible shorezone structures would generate between 50 and 52.5 percent, depending on alternative, of all boat trips on the lake, which is similar to baseline conditions.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
9 Scenic Resources			
Impact 9-1: Alter views of the shore from Lake Tahoe The effects Alternatives 1, 2, and 3 on views from Lake Tahoe would vary based on the location, intensity, and other characteristics of future projects. In some scenarios under Alternatives 1 and 3, the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with proposed design standards. In other scenarios under Alternatives 1, 2, and 3, scenic quality could be unchanged or degraded due to additional visible mass associated with new buoys, redeveloped piers that are a contrasting color, or in the case of Alternative 2, from additional visible structures in the shorezone that	Alt 1, 2, 3 – S Alt 4 – LTS	Mitigation 9-1a: Offset the visible mass of buoys (applies to Alts 1, 2, and 3) TRPA will require that all new buoys offset the visible mass associated with the buoy and boat. The average visible mass of a buoy and boat is estimated at 83 square feet. Each new buoy will require removal or screening of a minimum of 83 square feet of existing mass visible from Lake Tahoe. The visible mass of a buoy can be offset through the direct reduction of visible mass or through the payment of an in-lieu fee used to reduce visible mass, as described below. If a buoy applicant chooses to directly remove or screen visible mass as part of the buoy project, then the applicant would comply with the same visible	Alt 1, 2, 3, 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

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are not compensated for with reductions in the visual magnitude of development in the shoreland. Alternative 4 would have a limited number of new shorezone structures that could be developed under Alternative 4, the project-level scenic assessment and mitigation requirements for public piers, and the prohibition of other new or expanded shoreline structures.		mass offset requirements that apply to piers and other structures. The 83 square feet of visible mass associated with the buoy would be offset at the same ratios required for other shoreline structures. The offset would be required as close to the proposed buoy as possible, in the following order of priority: 1) on the same parcel in the shorezone, 2) on the same parcel in the upland area, 3) elsewhere in the shorezone within the same shoreline scenic travel unit, 4) within the same travel unit in the upland, and 5) in another nonattainment scenic travel unit. TRPA will also provide the option to pay an in-lieu fee to offset the additional visible mass of the buoy. TRPA will set a fee amount that is adequate to remove or visually screen 83 square feet of existing visible mass. TRPA will use the fee to acquire and remove or screen existing visible mass visible from shoreline scenic travel units that are not in attainment of threshold standards. The funds will be dedicated to projects that TRPA determines will have the greatest benefit to scenic threshold standards and will be prioritized for use in the following order: 1) in the shorezone, 2) in the shoreland, and 3) to improve background views visible from Lake Tahoe. Funds could be used to implement projects directly or through grants, contracts, or other agreements with partner organizations. TRPA could also authorize mitigation funds for projects that permanently reduce the visual magnitude of shoreland development when the project contributes to the attainment of scenic thresholds and is not otherwise required. Visible mass mitigation projects that could be funded by the in-lieu fee include, but are not limited to: ◢ scenic improvement projects identified in the 2018 update to the SQIP; ◢ lakefront recreation projects with scenic improvements such as replacing dilapidated structures or relocating structures (public gathering areas and waterfront public access scenic improvements); ◢ scenic improvement of existing rip rap and retaining walls along visible roadway cuts (e.g., recoloring of light-colored rip rap); ◢ permanent removal of existing shorezone and shoreland structures;	

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		◢ permanent screening of roadside parking areas, roadways, and infrastructure through the planting of native vegetation and creation of vegetated berms; ◢ undergrounding of utility lines that are visible from the lake; and ◢ improving existing shoreland structures and deed restricting those parcels such that visual magnitude of existing development is permanently reduced. Mitigation 9-1b: Establish color standards for piers (applies to Alts 1, 2, and 3) TRPA will modify the proposed design standards to regulate the color of piers. These standards will be enforced for all new or expanded piers. The standards will require that piers be a matte medium to dark gray. The standards will also allow TRPA to require alternate colors that TRPA determines would better blend into the background view of the project site. Mitigation 9-1c: Require visual magnitude reductions in the shoreland (applies to Alt 2) TRPA will revise the TRPA Code under Alternative 2 to incorporate the same visual magnitude requirements for new or expanded shoreline structures as included in Alternative 1. These Code revisions will require that shoreland properties achieve minimum contrast ratings as part of the approval process for new piers. For new private piers, TRPA would require an initial contrast rating of 21 as part of the pier application. Following permit application submittal, applicants would have 6 months to increase their contrast rating to 25 to offset the visual impact of new or redeveloped piers. TRPA would exempt property owners from the contrast rating of 25, if it is not feasible.	
Impact 9-2: Alter views of Lake Tahoe from the shore The scenic effects on views from the shore would vary based on the location, intensity, and other characteristics of future projects. In some scenarios under Alternatives 1 and 3, the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with design standards. In other scenarios under Alternatives 1, 2, and 3, scenic quality would not substantially change, or the scenic threshold ratings could be reduced. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys, and in the case of Alternative	Alt 1, 2, 3 – S Alt 4 – LTS	Mitigation 9-2a: Implement Mitigation Measure 9-1a to offset the visible mass of buoys (applies to Alt 1, 2, and 3). TRPA will implement Mitigation Measure 9-1a, "Offset the visible mass of buoys," as described above. Mitigation 9-2b: Implement Mitigation Measure 9-1a to require visual magnitude reductions in the shoreland (applies to Alt 2 only). TRPA will implement Mitigation 9-1c: "Require visual magnitude reductions in the shoreland," as described above.	Alt 1, 2, 3 – LTS Alt 4 – No mitigation required

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2, because no reductions in the visual magnitude of the shoreland would be required to compensate for additional development in the shorezone. Alternative 4 would allow for a maximum of only 15 new public piers, which require project-level scenic assessment and mitigation. Alternative 4 would prohibit other new or expanded shoreline structures.			
10 Air Quality			
Impact 10-1: Long-term operational emissions of regional criteria air pollutants and precursors Based on estimates of increased boating activity and emissions modeling and analysis, implementation of the Shoreline Plan under Alternatives 1, 3, and 4 would not result in the long-term increase in emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ in the LTAB and therefore would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standards. Based on estimates of increased boating activity and emissions modeling and analysis, Shoreline Plan Alternative 2 would result in a long-term increase in emissions of NO_X and CO. The long-term increase in NO_X, which is an ozone precursor, would contribute to the nonattainment status of the LTAB with respect to the CAAQS for ozone and/or an exceedance of TRPA's 1-hour ozone threshold standard of 0.08 ppm. The long-term increase in CO would conflict with implementation of the CO maintenance plan and/or contribute to exceedances of TRPA's 8-hour threshold standard of 6 ppm.	Alt 1, 3, 4 – LTS Alt 2 – S	Mitigation Measure 10-1: Limit the number of moorings and boat ramps (Alt 2 only) TRPA will revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps.	Alt 1, 3, 4 – No mitigation required Alt 2 – LTS
Impact 10-2: Short-term construction emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would result in the construction of new piers, boat ramps, marinas, and/or boat houses. Given the number of new facilities that could be developed and the limited construction season in the Tahoe Region (i.e., May 1 to October 15), it is possible that a substantial amount of construction activity could occur at one time. Thus, equipment exhaust and fugitive dust emissions could violate or contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}.	Alt 1, 2, 3, 4 – PS	Mitigation Measure 10-2: Add best construction practices for emissions to the standard conditions of approval for shoreline projects (applies to Alts 1, 2, 3, and 4) TRPA will revise the Standard Conditions of Approval for Shorezone Projects (TRPA Permit Attachment S) to require that minimum construction emission reduction best practices be implemented for all projects within the shorezone. The Standard Conditions of Approval for Shorezone Projects will be amended to add the following best construction practices: ◢ Fugitive dust shall not exceed 40 percent opacity and not go beyond the property boundary at any time during project construction. ◢ No open burning of removed vegetation shall occur during infrastructure improvements.	Alt 1, 2, 3, 4 – LTS

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		◢ Idling time for all diesel-powered equipment shall not exceed 5 minutes. ◢ Water shall be applied as needed to prevent dust impacts from extending off-site. Operational water truck(s) shall be on-site, as required, to control fugitive dust. Construction vehicles leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked off-site. ◢ Existing power sources or clean-fuel generators rather than temporary diesel power generators shall be used wherever feasible.	
Impact 10-3: Exposure of sensitive receptors to toxic air contaminants (TACs) Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would not result in the siting of new stationary sources of TACs, new sensitive receptors, or an increase in TAC emissions generated by recreational watercraft. Construction of new facilities would involve the use of off-road heavy-duty diesel-powered equipment that emits diesel PM. However, because of the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
Impact 10-4: Exposure to excessive odorous emissions Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would not result in the siting of new major sources of odors or new sensitive receptors. Neither construction nor operation of facilities that may be developed because of the Shoreline Plan would create objectionable odors affecting a substantial number of people.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
11 Greenhouse Gas Emissions and Climate Change			
Impact 11-1: Greenhouse gas emissions Implementation of the Shoreline Plan would result in GHG emissions associated with the construction and demolition of boating facilities and on-road motor vehicle trips to and from new boating facilities. Under Alternatives 1, 2, and 3, implementation of the Shoreline Plan would also result in an increase in GHG-emitting boating activity. It is not feasible to know whether the fleet of motorized boats on Lake Tahoe will become more GHG efficient and, if it does, whether the improvement in GHG efficiency would be enough to offset the GHGs associated	Alt 1, 2, 3, 4 – PS	Mitigation Measure 11-1: Develop and implement a GHG reduction policy (applies to Alts 1, 2, 3, and 4) Within 12 months of adoption of the Shoreline Plan, TRPA will coordinate the implementation of a GHG Emission Reduction Policy through TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments addressing Best Construction Practices and ongoing operational efficiencies. Until that time, TRPA will continue its existing practice to require measures developed on a project-by-project basis. The policy will require implementation of measures for the reduction	Alt 1, 2, 3, 4 – SU

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with construction activity, the increase in on-road motor vehicle travel, and the projected increase in boating activity. The development and implementation of a GHG Reduction Policy, as required by Mitigation Measure 11-1, would reduce GHG emissions, but the extent of this reduction depends on participation rates, available funding, and available technology.		of GHG emissions generated by demolition and construction activity in the shorezone and in associated upland areas, by on-road motor vehicles trips directly associated with the operation of boating facilities, and by ongoing operation of recreational watercraft. Where local ordinances already require GHG emission reductions consistent with the policy, no further action is necessary. Where local government ordinances do not adequately address GHG reduction practices, those practices will be implemented through local government and/or TRPA permitting activities or implementation program. Such measures may include, but are not limited to, the following: Minimize Construction-Related GHG Emissions ◢ All diesel-powered construction equipment shall have engines that comply with Tier 4 emission standards or better. ◢ Require all construction contractors to use renewable diesel (RD) fuel for all diesel-powered construction equipment (off-road land- and water-based). Any RD product that is considered for use by the construction contractors shall comply with California's Low Carbon Fuel Standards and be certified by the California Air Resources Board Executive Officer. RD fuel must also meet the following criteria: ◤ Be hydrogenation-derived (reaction with hydrogen at high temperatures) from 100 percent biomass material (i.e., nonpetroleum sources), such as animal fats and vegetables; ◤ Contain no fatty acids or functionalized fatty acid esters; and ◤ Have a chemical structure that is identical to petroleum-based diesel which ensures RD will be compatible with all existing diesel engines; it must comply with American Society for Testing and Materials (ASTM) D975 requirements for diesel fuels. ◢ Use electric powered equipment instead of fossil fuel-based generators. ◢ Purchase mitigation credits from the Climate Action Reserve's GHG Mitigation Credit Program to offset construction-generated GHG emissions. Minimize GHG Emissions Associated with On-Road Vehicle to Watercraft Facilities ◢ Provide charging stations for electric vehicles and bike lockers at parking lots that serve public piers and marinas.	

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		Minimize GHG Emissions Generated by Recreational Watercraft ◢ Require or incentivize businesses that rent motorized watercraft to convert their rental fleet to watercraft with electric engines. ◢ Require or incentivize charging stations at marinas and public piers for electric-motor watercraft. ◢ Require or incentivize the installation of charging stations for electric-motor watercraft at private piers, boat houses, and boat lifts. ◢ Require solar panels on all marina buildings. This measure will apply to new construction occurring under the Shoreline Plan. TRPA will also initiate a funding program to apply these measures to existing facilities within the Tahoe Basin.	
12 Noise			
Impact 12-1: Construction noise impacts Construction activities would occur under all alternatives, including the No Project Alternative. Activities associated with construction of shorezone structures, including new piers, pier modifications, marinas, or new boat ramps would generate varying levels of noise. However, all activities would be carried out in a manner consistent with TRPA's standard permit conditions such that exposure of nearby receptors to construction-related noise is minimized and construction is limited to daytime hours. In addition, the types of activities associated with constructing new boating structures would be relatively minor, localized, temporary, and intermittent, and would not result in a substantial increase in temporary noise levels.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required
Impact 12-2: Construction vibration impacts Construction activates would occur under all alternatives. Construction activities associated with new shorezone structures, including new piers, pier modifications, marinas, and new boat ramps would generate varying levels of vibration. Pile driving would be required for pier construction/modification and marina construction, resulting in vibration levels that could potentially damage existing structures if located within 55 feet. In accordance with TRPA standard construction practices, all construction activity would take place during the day, minimizing the potential for disturbance during noise-sensitive evening and nighttime hours. However, because specific locations of pile driving activity is	Alt 1, 2, 3, 4 – S	Mitigation Measure 12-2: Vibration reduction measures (applies to Alts 1, 2, 3, and 4) To address potential vibration impacts associated with shorezone projects that involve pile driving activity, TRPA shall revise TRPA Permit Attachment S, "Standard Conditions of Approval for Shorezone Projects," to incorporate the following vibration reduction measures: ◢ All construction equipment, including vibration-inducing impact equipment, on construction sites shall be operated as far away from vibration-sensitive uses as reasonably possible.	Alt 1, 2, 3, 4 – LTS

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unknown, there is a potential that existing structures could be exposed to excessive vibration levels that could result in structural damage.		◢ Earthmoving and ground-disturbing operations shall be phased so as not to occur simultaneously in areas close to sensitive uses, to the extent feasible. The total vibration level produced could be significantly less if each vibration source is operated at separate times. ◢ To prevent structural damage, minimum setback requirements for different types of ground vibration-producing activities (e.g., pile driving) for the purpose of preventing damage to nearby structures shall be established based on the proposed pile driving activities and locations, once determined. Factors to be considered include the specific nature of the vibration producing activity (e.g., type and duration of pile driving), local soil conditions, and the fragility/resiliency of the nearby structures. Established setback requirements (i.e., 55 feet) can be breached if a project-specific, site specific analysis is conducted by a qualified geotechnical engineer or ground vibration specialist that indicates that no structural damage would occur at nearby buildings or structures or provides further recommendations (e.g., alternative pile driving methods, site monitoring requirements) to avoid damaging nearby structures.	
Impact 12-3: Increases in operation-related watercraft noise Alternatives 1, 2, and 3 would result in additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would contribute to an overall increase in boating activity over time. Because boating is generally a daytime activity and increases in boating activity would be distributed across the lake, it would have a negligible effect on CNEL, which considers noise levels in a given location over a 24-hour period. Single-event noise levels are affected by individual boater behaviors (e.g., exceeding speed limits in the no-wake zone) and boat/engine type. Under Alternatives 1, 2, and 3, TRPA would increase enforcement of the no-wake zone through additional boat crews, signage, and increased boater education, which would reduce such boater behaviors that contribute to exceedances of single-event noise standards. Further, none of the alternatives would result in a substantial increase (i.e., 3 dBA) in CNEL from increases in boating activity. With Alternative 4, no increases in boating activity would occur.	Alt 1, 2, 3 – LTS Alt 4 - NI	No mitigation required	No mitigation required

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Impact 12-4: Increases in operational-related traffic noise Alternatives 1, 2, and 3 would result in additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would lead to an overall increase in boating activity, and commensurate increases in roadway traffic as compared to existing conditions. With Alternative 4, no increases in boating activity or additional vehicle trips would occur.	Alt 1, 2, 3 – LTS Alt 4 - NI	No mitigation required	No mitigation required
13 Roadway Transportation and Circulation			
Impact 13-1: Roadway and intersection operations Under Shoreline Plan Alternatives 1, 2, and 3 future development of shorezone structures would result in additional vehicular trips being added to the transportation network in the Region. It is not known at this time where any of these structures would be developed; and therefore, the addition of vehicle trips associated with the development of these alternatives (Alternatives 1, 2, and 3) could result in an increase in delay and degradation of LOS at intersections and along roadway segments in the project area if concentrated in such a way that a large portion of the trips affect a single roadway segment or intersection. However, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project, including projects that could result in new trips such as a marina expansion or public boat ramp, to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS. Alternative 4 would not generate any new vehicle trips.	Alt 1, 2, 3 – LTS Alt 4 - NI	No mitigation required	No mitigation required
Impact 13-2: Vehicle miles traveled Each Shoreline Plan alternative would include ordinances that would affect the location and intensity of future shorezone structure development, which would affect travel patterns, the number of new vehicle trips generated, and VMT. Alternatives 1, 2, and 3 would result in an increase in VMT but would maintain VMT levels below the adopted TRPA threshold standard. Alternatives 1, 2, and 3. Alternative 4 would not increase VMT and would maintain summer daily VMT levels below the adopted TRPA VMT threshold.	Alt 1, 2, 3 – LTS Alt 4 - NI	No mitigation required	No mitigation required

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14 Terrestrial Biological Resources (Wildlife and Vegetation)			
Impact 14-1: Disturbances to osprey, bald eagle, and waterfowl from construction and recreational uses Osprey, bald eagle, and waterfowl are designated by TRPA as special interest species and use the shorezone and adjacent locations for breeding and foraging. Potential effects of the Shoreline Plan alternatives on osprey and bald eagle could include construction-related disturbances to nesting activities from new piers and boat ramps, long-term increased disturbance to osprey and bald eagle and suitable habitat from boating and other recreational uses, and habitat degradation within TRPA-designated osprey and bald eagle disturbance zones. Although suitable nesting habitat for waterfowl is limited in the shorezone where new projects would be permitted (e.g., outside of TRPA-designated waterfowl population sites), construction-related activities that may occur within suitable habitat could disturb nesting attempts of waterfowl. The types of potential impacts to osprey, bald eagle, and waterfowl would be similar for Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the locations, amounts, and quality of habitats potentially affected.	Alt 1, 2, 3, 4 – S	Mitigation Measure 14-1a: Avoid construction disturbances to nesting osprey and bald eagle, install interpretive signage, and prepare and implement habitat enhancement plans or other compensatory measures for unavoidable activities within TRPA-designated disturbance zones (applies to Alts 1, 2, 3, and 4) ◢ Surveys for nesting osprey and bald eagle will be conducted prior to construction of new shorezone facilities, to identify active nests that could be disturbed during construction. No construction activities will occur within 0.25 mile of active osprey nests and 0.5 mile of bald eagle nests during the breeding season (approximately April to August), unless surveys confirm that the birds are not nesting. A qualified biologist can amend the start and end dates of this limited operating period (LOP) with concurrence from appropriate agencies if it can be determined that breeding has not started or that fledglings have left the nest. Additionally, with concurrence from appropriate agencies, the LOP could be waived in locations where construction disturbance is not expected to increase ambient levels or disturbance to an active nest through presence of visual screening or other factors. ◢ During project-specific planning, design, and environmental review of new shorezone facilities, avoid siting projects within TRPA-designated disturbance zones for osprey and bald eagle, to the extent feasible. ◢ For projects and uses that may result in unavoidable increased human intrusion into the terrestrial/upland portions of TRPA osprey or bald eagle disturbance zones, signage that describes the sensitivity of the area and discourages users to leave established trails or access routes or otherwise disturb nesting osprey or bald eagle will be designed and installed. ◢ For projects that could cause unavoidable long-term degradation of habitat within TRPA osprey or bald eagle disturbance zones, coordination with TRPA will occur to identify and implement appropriate compensatory measures that are effective and feasible for achieving TRPA's nondegradation standard for disturbance zones. Potential approaches to mitigating adverse effects and enhancing habitat within disturbance zones include preparation and implementation of a	Alt 1, 2, 3, 4 – LTS

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		habitat enhancement and management plan that includes objectives, measures, techniques, performance standards, and adaptive management to enhance osprey habitat. Habitat enhancement would be implemented within the affected TRPA osprey or bald eagle disturbance zones and/or other osprey or bald eagle disturbance zones in the Tahoe Basin where enhancement opportunities and benefits to the regional osprey or eagle population could be maximized. Coordination with TRPA would occur to determine whether more focused measures to achieve habitat enhancement as part of the project could be implemented, or whether the current project design may benefit osprey or bald eagle habitat, in lieu of a formal habitat enhancement and management plan. Mitigation Measure 14-1b: Conduct preconstruction surveys for waterfowl and implement a limited operating period, if necessary (applies to Alts 1, 2, 3, and 4) For construction activities that would occur in suitable habitat during the nesting season (generally April 1–August 31, depending on snowpack and other seasonal conditions), a qualified wildlife biologist shall conduct focused surveys for waterfowl nests no more than 14 days before construction activities are initiated each construction season. If an active nest is located during the preconstruction surveys, the biologist shall notify TRPA. If necessary, modifications to the project design to avoid removal of occupied habitat while still achieving project objectives shall be evaluated and implemented to the extent feasible. If avoidance is not feasible or conflicts with project objectives, a limited operating period shall apply to avoid disturbances during the sensitive nesting season. Construction shall be prohibited within a minimum of 500 feet (or at a distance directed by the appropriate regulatory agency) of the nest to avoid disturbance until the nest is no longer active. These recommended buffer areas may be reduced through consultation with TRPA.	
Impact 14-2: Disturbance or loss of Tahoe yellow cress Tahoe yellow cress (TYC) is a sensitive plant species found only on the sandy beaches of Lake Tahoe. This species is designated as a sensitive plant and threshold indicator species by TRPA, and is state-listed as critically endangered and endangered by the states of Nevada and California, respectively. Alternatives 1, 2, 3, and 4 would result in construction and operation of new	Alt 1, 2, 3, 4 – S	Mitigation Measure 14-2: Conduct preconstruction surveys, avoid potential construction impacts, and avoid potential recreation impacts to Tahoe yellow cress plants (applies to Alts 1, 2, 3, and 4)	Alt 1, 2, 3, 4 – LTS

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shorezone structures within beach habitats. Depending on the specific locations and size of individual projects in relation to TYC occurrences and suitable habitat, construction-related activities that may occur within or adjacent to beach habitat occupied by TYC could result in the direct removal of TYC plants, or other disturbances through inadvertent trampling, soil disturbance, and dust deposition. Over the long term, the additional recreation capacity for motorized watercraft, nonmotorized watercraft, anglers, swimmers, and beachgoers could increase the frequency of recreationists within occupied TYC habitat, which could result in additional trampling, degradation, or loss of existing TYC, and adversely affect current or future TYC habitat suitability. The types of potential impacts to TYC would be similar among Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the amounts and locations of beach habitats potentially affected. Subsection 61.3.6 of the TRPA Code states that "all projects or activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat, shall fully mitigate their significant adverse effects. Those projects or activities that cannot fully mitigate their significant adverse effects are prohibited." Additionally, in California, because TYC is listed as endangered under CESA, any take of TYC would require authorization by CDFW through a California Fish and Game Code Section 2081 incidental take permit.		To avoid potential adverse effects on TYC plants resulting from construction activities and potential increased use of beaches that support TYC, the following actions shall be implemented: (A) During project-specific planning, design, and environmental review of new shorezone facilities, avoid siting projects within areas known to support TYC occurrences, to the extent feasible. (B) For any projects that could affect TYC, a qualified biologist familiar with the vegetation of the Tahoe Basin and identification of TYC shall conduct a focused preconstruction survey for TYC in all beach habitat where construction-related disturbance could occur in the vicinity of TYC populations during that year. Surveys shall be conducted between June 15 and September 30, when TYC is clearly identifiable, and shall follow *Survey Protocols for Tahoe Yellow Cress Annual Surveys* (Stanton and Pavlik 2009). Surveys shall be completed for each year that construction activities could occur in beach habitat. If no TYC stems are found during the survey, the results of the survey shall be documented in a letter report to TRPA and the TYC AMWG that shall become part of the project environmental record, and no further actions shall be required. (C) If TYC stems are documented during the survey in areas potentially disturbed by construction activities, the stems shall be clearly identified in the field and protected from impacts associated with construction activities. Protective measures shall include installing high-visibility fencing around known stem locations during construction. No construction-related activities shall be allowed in areas fenced for avoidance, and construction personnel shall be briefed about the presence of the stems and the need to avoid effects on the stems. (D) To protect TYC plants from potential long-term increased beach use and disturbance as an indirect result of increased recreation activity in the shorezone, protective fencing and educational signage about the need to avoid these areas shall be installed around all TYC clusters. In addition to beaches occupied by TYC where new shorezone facilities would be constructed and operated, other beach areas that support TYC that are likely to receive increased recreation uses as a result of the projects shall be identified and subject to these measures.	

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Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
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		(E) Long-term fencing and signage will be periodically monitored and maintained, as necessary, to ensure that they remain effective and in good working condition. Also, because locations and concentrations of TYC could shift over time, the locations and configurations of fencing relative to TYC distribution shall be evaluated periodically. If necessary, fencing shall be moved or added in response to changes in TYC distribution to ensure that TYC plants are protected over time. The locations of TYC plants and shifts in their locations relative to fencing can be determined by surveys as part of the ongoing AMWG TYC monitoring program. The installation and maintenance of long-term protective fencing and signage will be designed to not interfere with necessary operations and maintenance activities at facilities.	
Impact 14-3: Disturbance or loss of common terrestrial vegetation communities and wildlife habitats Common natural terrestrial habitats within the shorezone and adjacent areas consist primarily of beach and a mix of conifer forest, scattered conifer trees, and snags. Additionally, urban/developed and ruderal (disturbed) areas are distributed throughout the shorezone where existing facilities (e.g., boat ramps, marinas, buildings, trails) and lake access are present. These habitats support several common native wildlife species that use them for nesting, foraging, resting, or wintering. Alternatives 1, 2, 3, and 4 would result in construction and operation of new shorezone structures, and associated increases in recreation use, that could disturb common vegetation and wildlife. The types of potential impacts to common vegetation and wildlife communities would be similar among Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the locations, amounts, and quality of habitats potentially affected. The potential disturbance or removal of terrestrial vegetation from future projects permitted under any of the Shoreline Plan alternatives would be relatively minor and not substantially reduce the quantity or quality of terrestrial vegetation communities and habitats in the region or cause a change in species distributions or diversity. Additionally, none of the alternatives are expected to increase construction-related or recreational disturbance levels in the shorezone above levels that would substantially affect most common species. Accordingly, the alternatives are not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
15 Public Health and Safety			
Impact 15-1: Increase in watercraft accidents due to increased boating and navigational hazards Alternatives 1, 2, and 3 would increase the number of annual and peak day boat trips on the lake, whereas Alternative 4 would retain boating levels consistent with existing conditions. Increased levels of boating activity would add to the factors that contribute to boating accidents, such as more watercraft, higher boating density at popular shoreline areas and lake access points, and greater potential for conflicts between motorized and nonmotorized recreation. While the additional boating activity resulting from Alternatives 1, 2, and 3 would aggravate the factors that contribute to boating accidents, the 600-foot no-wake zone, improved public boating safety education programs, and compliance with California and Nevada boating safety laws would reduce the risks and associated impacts. Alternative 4 would not contribute to such factors. Implementation of any of the four alternatives could lead to public piers extending beyond the 600-foot no-wake zone, which could create navigational hazards and conflicts between motorized and nonmotorized watercraft and swimmers. Additionally, Alternative 2 does not include location standards limiting the length of private multiple-use piers to within the no-wake zone.	Alt 1, 2, 3, 4 – PS	Mitigation Measure 15-1a: Maintain nonmotorized navigation within the no-wake zone (applies to Alts 1, 2, 3, and 4) TRPA will implement Mitigation Measures 8-1a and 8-1c as described in Chapter 8, "Recreation." These mitigation measures require that TRPA revise the pier design standards for piers that extend 600 feet or more from the highwater elevation to provide lateral nonmotorized recreation access within the 600-foot no-wake zone and provide for a 200-foot buffer between motorized watercraft in motion and nonmotorized recreationists in areas outside of no-wake zones. Mitigation Measure 15-1b: Implement Mitigation Measure 10-1 to limit the number of moorings and boat ramps (applies to Alt 2 only) TRPA will implement Mitigation Measure 10-1, as described in Chapter 10, "Air Quality," which would revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps.	Alt 1, 2, 3, 4 – LTS
Impact 15-2: Accidental release of hazardous substances Each of the Shoreline Plan alternatives would temporarily increase the regional transportation, use, storage and disposal of hazardous materials and petroleum products commonly used at construction sites (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals), which could result in accidents or upset conditions that could create hazards to people and the environment. The replacement of older piers may require the disposal of wood treated with preservatives, which could contaminate surface water and groundwater if not properly handled and disposed. Temporary impacts could occur if construction were to affect sites of known contamination or inadvertently disturb hazardous materials or wastes in a manner that could release these materials into the environment, exposing construction workers or nearby sensitive receptors to hazardous conditions. Compliance with all local, state, and federal regulations is sufficient to ensure that any hazardous materials used during construction of future projects would	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
not result in adverse effects. Specific projects implemented in accordance to the adopted Shoreline Plan would be subject to permit processes and conditions pursuant to TRPA regulations and, depending upon location and whether or not there is federal discretion, CEQA and NEPA statutes and implementing regulations. Such review could include site-specific impact analysis and adoption of feasible mitigation measures that must be implemented to assure that standards of the region are met. With the addition of access points to the lake and the increase in navigational hazards in the form of longer piers and additional structures in the water, the Shoreline Plan alternatives could result in a long-term increase in the risk of accidental discharge of fuel and other hazardous materials into the lake. Alternative 1 would require that TRPA consult with water purveyors when evaluating applications and development of permit conditions for any proposed shoreline structure within one quarter mile of a drinking water intake, while Alternatives 2, 3 and 4 would require consultation within 600 feet. Furthermore, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using best management practices (BMPs).			
Impact 15-3: Shoreline emergency access Implementation of the Shoreline Plan Alternatives 1, 2, or 3 would increase boating activity. Increased boat use would aggravate many of the factors that contribute to boating accidents, leading to an increased need for emergency response services. Emergency responders' ability to access boaters and swimmers in the water could be hindered by the increase in activity in the nearshore, foreshore, and backshore. Furthermore, low water conditions during drought years and under future projected climate scenarios would present a challenge for emergency responders, as some existing lake access points are unavailable during low water conditions. Because most of the emergency responders' watercraft are located on the water, lake access is not an issue for a majority of first responders. Alternative 1 would incorporate low lake level adaptation strategies along with the provisions of TRPA Code Section 84.10.2, which establishes a framework to provide essential emergency access and egress to Lake Tahoe. Alternative 2	Alt 1& 2 – LTS Alt 3 & 4 –PS	Mitigation 15-3: Implement low lake level adaptation strategies (applies to Alts 3 and 4) TRPA will incorporate the following low lake level adaptation strategies to provide shoreline emergency access during low water conditions: ◢ Marina buoy fields would be able to include additional rows of lakeward anchors to accommodate low lake levels. Buoy floats could be relocated to the lakeward anchors during low lake levels without increasing the total number of buoys. ◢ Marinas would be allowed to use temporary floating pier extensions to provide access for boats when lake levels fall below 6,225 feet LTD. ◢ Public boat ramps could be expanded to extend farther into the lake, subject to permit conditions.	Alt 1& 2 – No mitigation required Alt 3 & 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
would allow for substantially greater levels of boating activity than Alternative 1. Alternative 2 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet Lake Tahoe Datum (LTD). Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels. Furthermore, TRPA Code Section 84.15.4 allows for temporary structures that extend beyond lake bottom elevation 6,219 feet or the pier headline during low water conditions. Alternatives 3 and 4 would result in different levels of boating activity—a small increase with Alternative 3, and no projected increase from existing levels with Alternative 4. Alternatives 3 and 4 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels, but the alternatives contain no other provisions to allow modifications to facilities or structures to be useable during such conditions.		◢ New dredging could be allowed at marinas and public boat ramps, subject to permit conditions.	
<u>Impact 15-4: Increase demand for on-lake emergency response facilities</u> Implementation of each alternative would result in new shorezone structures, creating potential for an increase in boating accidents and the accidental release of hazardous materials. This would increase the demand for emergency response services. As discussed in Impact 15-1, the 600-foot no-wake zone, improved public boating safety education programs, expanded safety/enforcement patrols, and compliance with California and Nevada boating safety laws would reduce the risk of boating accidents due to increased boating. Impacts associated with increased navigational hazards would be reduced with implementation of Mitigation Measure 15-1a. As described in Impact 15-2, compliance with all local, state, and federal regulations is sufficient to ensure that any hazardous materials used throughout the project area during construction would not result in adverse effects. Thus, the increased demand for emergency services would likely be minor. Emergency response providers that act on lake-related emergencies indicate that they have adequate capacity to handle additional project-generated demand for emergency services. Furthermore, TRPA Code Section 84.10.2, which allows for the designation of up to one Essential Public Safety Facility within each county-jurisdiction plus the U.S. Coast Guard Lake Tahoe Station, would remain unchanged. In drought years, TRPA allows first responder	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
organizations to designate locations for temporary moorings for regional public safety purposes. This would ensure that emergency providers have adequate access points to the lake and reduce the need for construction of new lake-access facilities, the construction of which could result in adverse effects to the environment.			
16 Cultural Resources			
Impact 16-1: Cause the alteration of, or adversely affect a historical site, structure, object, or building Implementation of the four Shoreline Plan alternatives would result in development on properties that could contain known or unknown historic resources, are associated with historically-significant events or individuals, or result in adverse physical or aesthetic effects to a significant historical site, structure, object, or building. Because each alternative would result in some new construction, each has the potential to disturb, disrupt, or destroy historic resources through implementation.	Alt 1, 2, 3, 4 – PS	Mitigation 16-1: Avoid potential effects on historic resources (applies to Alts 1, 2, 3, and 4) Once the exact location of the new piers, boat ramps, and any other land-based development has been determined and before commencement of earth-disturbing activities for construction, applicants shall identify and evaluate all historic-age (over 45-years in age) buildings and structures that are proposed to be removed and/or modified as part of a historic determination application with TRPA or applicable local jurisdiction. This may include preparation of an historic resource assessment and evaluation of resources to determine their eligibility for recognition under state, federal, or local criteria. If required, the assessment shall be prepared by an architectural historian, or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Professional Qualification Standards. If resources are eligible for inclusion in the NRHP, CRHR, or a local register are identified, an assessment of impacts on these resources shall be included in the report, as well as detailed mitigation measures to avoid impacts.	Alt 1, 2, 3, 4 – LTS
Impact 16-2: Cause the alteration of, or adversely affect an archaeological resource Implementation of the Shoreline Plan alternatives would result in development that could take place on properties that contain, be associated with, or result in adverse effects to known or unknown archaeological resources. Because each alternative would result in some new construction over the planning period, each has the potential to disturb, disrupt, or destroy archaeological resources through implementation of specific projects.	Alt 1, 2, 3, 4 – PS	Mitigation 16-2: Avoid potential effects on archaeological resources (applies to Alts 1, 2, 3, and 4) ◢ Once the exact location of the new piers, boat ramps, dredging, or any other ground-disturbing development (excluding buoys) has been determined and before commencement of earth-disturbing activities for construction, applicants shall retain a qualified archaeologist to conduct archaeological surveys of the site as part of a historic determination application with TRPA or applicable local jurisdiction. To ensure that new or expanded facilities and uses do not adversely affect potentially buried archaeological deposits, an underwater archaeological survey shall also be conducted to identify, evaluate,	Alt 1, 2, 3, 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		and protect significant submerged cultural resources prior to activities that would disturb the lakebed. ◢ The applicant shall follow recommendations identified in the survey, which may include activities such as subsurface testing, designing, and implementing a Worker Environmental Awareness Program, construction monitoring by a qualified archaeologist, avoidance of sites, or preservation in place. ◢ All projects shall include the following requirements as a condition of approval: If evidence of any prehistoric or historic-era subsurface archaeological features or deposits are discovered during construction-related earth-moving activities (e.g., ceramic shard, trash scatters, lithic scatters), all ground-disturbing activity in the area of the discovery shall be halted and the appropriate jurisdiction and TRPA shall be notified immediately. A qualified archaeologist shall be retained to assess the significance of the find. If the find is a prehistoric archeological site, the appropriate Native American group shall be notified. If the archaeologist determines that the find does not meet NRHP, NVSRHP, or CRHR standards of significance, as applicable, for cultural resources, construction may proceed. If the archaeologist determines that further information is needed to evaluate significance, a data recovery plan shall be prepared. If the find is determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall work with the project applicant to avoid disturbance to the resources, and if complete avoidance is not feasible in light of project design, economics, logistics, and other factors, follow accepted professional standards in recording any find including submittal of the recordation forms required by the applicable SHPO and location information to the appropriate information center.	
Impact 16-3: Degrade ethnic and cultural values Because the project could result in physical changes to historic and prehistoric sites, unique ethnic cultural values could be affected, and historic or prehistoric religious or sacred uses within the Plan area could be restricted. Consultation with the Washoe Tribe is required by TRPA regulations; however, project activities could still uncover or destroy historic or archaeological resources as identified in Impact 16-1 (historic) and Impact 16-2 (archaeological).	Alt 1, 2, 3, 4 – PS	Mitigation 16-3: Implement Mitigation Measures 16-1 and 16-2 (applies to Alts 1, 2, 3, and 4) TRPA will implement Mitigation Measure 16-1, "Avoid potential effects on historic resources," and 16-2, "Avoid potential effects on archaeological resources," as described above.	Alt 1, 2, 3, 4 – LTS

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance without Mitigation	Mitigation Measures	Significance with Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
17 Cumulative Impacts			
The Shoreline Plan is a long-range plan developed to manage the amount and intensity of recreational use and development along Lake Tahoe's shore in a manner that attains and maintains the environmental thresholds. Together, the Shoreline Plan works with the other elements of the Regional Plan and the Regional Transportation Plan (RTP) to regulate the total amount and type of development within the Lake Tahoe Region. Consequently, this planning framework inherently represents the cumulative condition within the Region. Because the Shoreline Plan considers the cumulative buildout of the shoreline, the analyses contained in Chapters 4 through 16 of this EIS are cumulative in nature. Similarly, the Regional Plan regulates the buildout of portions of the Region that are outside of the shoreline, and the EIS prepared for adoption of the Regional Plan evaluated the cumulative conditions of those portions of the Region. The cumulative analysis identifies: whether an existing significant adverse cumulative condition exists with respect to each resource, whether implementation of the Shoreline Plan alternatives in the context of past, present, and reasonably foreseeable plans, programs and projects, would result in a significant cumulative impact, and whether the Shoreline Plan would represent a considerable contribution to the cumulative impact. In cases in which no existing significant cumulative condition is identified, the analysis addresses whether the incremental contribution of the Shoreline Plan alternatives, combined with those of related region-wide plans, programs, and projects, would create a significant cumulative impact. For each resource topic analyzed, the cumulative analysis presented in Chapter 17 determined that there would be no adverse cumulative condition, or that the Shoreline Plan alternatives would not make a considerable contribution to a significant cumulative impact.	Alt 1, 2, 3, 4 – LTS	No mitigation required	No mitigation required

1 INTRODUCTION

1.1 CONTEXT AND BACKGROUND

Lake Tahoe is world-renowned for its crystal-clear water and stunning scenic quality. The lake and its surrounding watershed exhibit irreplaceable environmental and recreational values. For these reasons, the Lake Tahoe Basin has been recognized as a unique and sensitive region that requires special protection to preserve the values that make it attractive to so many people. Bisected by the California-Nevada state line, Lake Tahoe has been protected by those states and the federal government for more than 40 years through a unique governance model. Rapid development and lax regulatory standards through the 1960s prompted the governors of California and Nevada to create the Joint California and Nevada Interstate Compact Commission in 1968 and to adopt the first Lake Tahoe Regional Planning Compact (Compact). The Compact, which was ratified by the U.S. Congress, created the Tahoe Regional Planning Agency (TRPA) and gave the agency broad powers, authorities, and responsibilities in the planning and regulation of the Lake Tahoe environment.

The Lake Tahoe Region is home to almost 55,000 full-time residents and is a recreational destination with four to six million visitors each year, including many who live in nearby metropolitan centers within a few hours' travel time. Because of the special conditions and unique circumstances of the Tahoe Region's natural ecology, development patterns, population, and human needs, TRPA was formed to guide orderly growth and protection of the Region's resources. The Compact charged TRPA with identifying Environmental Threshold Carrying Capacities, which are standards necessary to achieve certain environmental and other values. Environmental Threshold Carrying Capacities were adopted in 1984 and include a series of standards to protect air quality, water quality, soils, vegetation, fisheries, wildlife, scenic resources, noise levels, and public recreation. The Compact also directed TRPA to prepare and implement a Regional Plan that guides resource management and development to attain and maintain those threshold standards.

TRPA adopted a Regional Plan and implementing Code of Ordinances in 1987. The Regional Plan included a Shorezone Subelement and implementing ordinances that regulated development along the shoreline of Lake Tahoe. The 1987 ordinances recognized that there was uncertainty regarding the effect of shoreline structures on fisheries. Because of this uncertainty, the ordinances prohibited new structures in areas identified as prime fish habitat and called for a study to evaluate the effects of shoreline structures on fish habitat and spawning.

By the early 1990s, the studies called for in the 1987 ordinance had been completed, and they indicated that the placement of piers and buoys in spawning or feed/cover habitat has limited effect on fish populations and those effects can be mitigated (Byron et al. 1989; Beauchamp et al. 1991, 1994). TRPA then initiated multiple shorezone planning efforts to replace the prohibition of structures in prime fish habitat with a comprehensive shoreline plan based on current science that attained the threshold standards while allowing for orderly development and lake access.

Multiple agencies with jurisdiction over Lake Tahoe, including TRPA, U.S. Army Corps of Engineers, Lahontan Regional Water Quality Control Board, California State Lands Commission, and Nevada Division of State Lands, have worked together through multiple iterations of shorezone ordinances, plans, and environmental studies. As a result of these past efforts, TRPA released environmental analyses to the public in 1995, 1999, 2004, 2006, and 2008 in an attempt to update the 1987 ordinances.

This work culminated in 2008 with the certification of the final Environmental Impact Statement (EIS) and adoption of a TRPA shorezone ordinance that incorporated contemporary science and addressed stakeholder concerns. However, the EIS supporting adoption of this ordinance was challenged, and in 2010

the U.S. Ninth Circuit Court of Appeals vacated the adoption of the ordinance and certification of the EIS and remanded the matter back to TRPA.

In 2016, TRPA launched a collaborative process to develop a Shoreline Plan to enhance recreation and protect the 72 miles of Lake Tahoe's shores. TRPA, along with partner agencies and organizations, engaged a third-party mediator to convene stakeholders and develop a consensus-based planning process. As part of this process, a Steering Committee was convened to frame key shoreline issues, identify the approach to address them, and develop policy recommendations. The Steering Committee consisted of senior-level representatives from the California State Lands Commission, Lahontan Regional Water Quality Control Board, Lake Tahoe Marina Association, League to Save Lake Tahoe, Nevada Division of State Lands, Tahoe Lakefront Owners' Association, and TRPA.

TRPA also convened a Joint Fact-Finding (JFF) Committee comprised of technical experts from public agencies, universities, and stakeholder organizations to provide scientific and technical recommendations. The JFF Committee identified the best available scientific studies to inform the Shoreline Plan and EIS, oversaw baseline data collection for the 2016 and 2017 boating seasons, developed analytical approaches to estimate boat usage, provided technical recommendations to the Steering Committee, and provided input on the analytical approaches in this EIS. The JFF Committee meetings were open to the public and interested members of the public were encouraged to participate and submit information.

The shoreline planning process provided opportunities for public involvement in a variety of forums. The intent of this outreach was to provide information, solicit input, and identify key issues to be included in the plan and addressed in the environmental analysis. TRPA staff facilitated public workshops in Kings Beach, California, and in Stateline, Nevada, and provided over 20 organizational briefings with interest groups such as homeowners associations, littoral property owners, realtor associations, chambers of commerce, and boating associations. A Shoreline Plan website (www.shorelineplan.org) was launched to provide the public with convenient access to Steering Committee and JFF Committee meeting materials and minutes, background information, policy memos, technical memos, public feedback, scientific studies, and an interactive Shoreline Plan Map.

The Steering Committee considered technical recommendations from the JFF Committee and input from the public to develop a recommended set of policies that constitute the proposed Shoreline Plan. The Regional Plan Implementation Committee of the TRPA Governing Board reviewed and endorsed the proposed Shoreline Plan as the preferred alternative, and the other alternatives described in Chapter 2 of this document, for consideration in this EIS.

1.2 PURPOSE AND OBJECTIVES OF THE SHORELINE PLAN

The overarching goal of the Shoreline Plan is to enhance the recreational experience along Lake Tahoe's shores while protecting the environment and responsibly planning for the future. As an element of the Regional Plan, the Shoreline Plan, in combination with other elements of the Regional Plan and implementation programs, is intended to attain and maintain the environmental thresholds while allowing for orderly access to the lake consistent with those thresholds. The Shoreline Plan is necessary to manage the use and development of the shoreline consistent with the best available science.

This EIS evaluates four alternatives that include different strategies to meet the objectives of the Shoreline Plan. The specific objectives of the Shoreline Plan are to:

- protect and where feasible enhance the environment,
- provide a fair and reasonable system of access,
- adapt to changing lake levels,
- preserve high-quality recreation and public safety, and
- implement predictable and consistent rules.

General principles of the Shoreline Plan also include respecting the authority of each of the responsible and interested agencies, ensuring safe navigation, and recognizing both public and private interests.

1.3 INTENDED USES OF THIS EIS

The intended use of this EIS is to identify and assess the anticipated environmental effects of implementing the Shoreline Plan alternatives, with a focus on significant and potentially significant impacts. The EIS aims to provide a level of detail and clarity in the environmental review that allows for meaningful comment and participation by public agencies, interest groups, and the public. The EIS must also present a level of environmental information that will allow the TRPA Advisory Planning Commission to recommend a preferred alternative to the TRPA Governing Board and, ultimately, for the Governing Board to render a fully informed decision regarding approval and adoption of a Shoreline Plan alternative.

The widespread geography to which the Shoreline Plan applies, the long horizon over which it will be implemented, and the policy-oriented nature of its guidance are such that the EIS analysis is prepared at a program level—that is, this document constitutes a general analysis commensurate with the level of detail in the plan. As such, the EIS focuses on the potential effects of policies and ordinances, which—because they are to be implemented through yet unknown projects—do not provide a high level of detail or degree of specificity. It is important to understand that assumptions about projects at a general level, such as their broad location, timing, and magnitude, are projected in this EIS, but that individual projects are not identified or assumed. Consequently, this EIS is not intended to replace the project-specific environmental review required to implement site-specific projects that may be proposed in the future consistent with the adopted alternative. All of TRPA's existing procedures requiring environmental review of projects to determine their potential for significant impacts, feasible and effective mitigation to address those impacts, findings pertaining to project effects on threshold attainment, and other environmental safeguards are still in place and will continue to ensure that individual projects are fully evaluated prior to approval and implementation. This EIS, consistent with its program-level purpose, includes a thorough analysis of the environmental implications of the policy direction offered by the alternatives, and the information necessary to select the alternative that would best achieve the objectives identified by TRPA.

1.4 ORGANIZATION OF THE DRAFT EIS

This EIS is organized into the following chapters to help readers obtain information about the Shoreline Plan alternatives and the environmental effects associated with them:

- The **Executive Summary** presents a snapshot of the EIS, including a history and background of the Shoreline Plan, a summary of the alternatives and their comparative features, and an overview of environmental impacts and mitigation measures associated with each alternative.

- **Chapter 1, "Introduction**," provides context and background related to the Shoreline Plan, identifies the objectives for the plan, and provides other material to help readers understand the concepts presented in the Shoreline Plan alternatives and the environmental analysis of them.

- **Chapter 2, "Description of Proposed Project and Alternatives**," describes the features and characteristics of each of the four alternatives. It provides information on the essential concepts that are necessary to understand the Shoreline Plan, identifies related policies and Regional Plan elements that are not subject to change, summarizes key differences among the alternatives, and describes the features of each alternative.

- **Chapter 3, "Approach to the Environmental Analysis**," explains the methodology employed to assess the environmental effects of implementing the Shoreline Plan alternatives, and, where applicable, the consensus-based approach to establishing that methodology.

- **Chapters 4 through 16 (resource analysis chapters)**, contain the technical analysis of the environmental resource areas, including the environmental setting, regulatory framework, environmental effects, mitigation measures, and significance of each environmental impact before and after mitigation.
- **Chapter 17, "Cumulative Impacts**," identifies the cumulative effects of implementing each alternative in combination with past, present, and reasonably foreseeable future projects.
- **Chapter 18, "Other TRPA-Mandated Sections**," lists the effects found not to be significant, the significant environmental effects that cannot be avoided, any irreversible and irretrievable commitment of resources, the relationship between the short-term uses of the environment and maintenance and enhancement of long-term productivity, and the regional growth-inducing impacts that may occur from adopting a Shoreline Plan alternative.
- **Chapter 19, "Report Preparers**," lists the TRPA staff and consultants that prepared the EIS.
- **Chapter 20, "References and Persons Consulted**," identifies sources of information used in the EIS analysis.
- **Appendix A, "Watercraft Use and Build Out Assumptions,"** contains a summary of the data sources, assumptions, and calculations regarding the number of new structures and changes in watercraft use under each alternative.
- **Appendix B, "Scoping Summary Report,"** includes the public, organization, and agency comments received during the environmental scoping period.
- **Appendix C, "Emission Calculations,"** provides calculations of operational air pollutant emissions under each alternative.
- **Appendix D, "Noise Calculations,"** provides calculations of construction noise and vibration levels.

1.5 STANDARD ENVIRONMENTAL REVIEW TERMINOLOGY

This EIS includes the following terminology to denote the standards by which environmental impacts are assessed, the significance of environmental impacts of the Shoreline Plan alternatives, and remedial activities that are proposed to reduce impacts:

- **Significance criteria**: Criteria established to define the level at which an impact would be considered significant (i.e., if an impact exceeds a specified level, it would be considered significant). Criteria are defined for this EIS based on TRPA environmental threshold standards, regulatory requirements, and other applicable information.
- **Beneficial impact**: An impact that would result in improved environmental conditions.
- **Less-than-significant impact**: An impact that would not result in a substantial and adverse change in the physical environment. This impact level does not require mitigation.
- **Significant impact**: An impact that would result in a substantial adverse change in any of the physical conditions within the Region. Potentially feasible mitigation measures or alternatives to the component(s) of the alternative resulting in the impact must be considered in an attempt to substantially reduce significant impacts.
- **Potentially significant impact**: An impact that would be considered a significant impact as described above if it were to occur; however, the occurrence of the impact cannot be immediately determined or there is some uncertainty about its occurrence.

- **Significant and unavoidable impact**: A substantial adverse effect on the environment that cannot be feasibly mitigated to a less-than-significant level or reduced to a less-than-significant level by modifying the component(s) of the alternative that result in the impact.

- **Mitigation measure**: An action that could feasibly minimize a significant impact. Mitigation measures must be fully enforceable through permit conditions, ordinances, agreements, or other legally binding instruments.

1.6 ENVIRONMENTAL REVIEW PROCESS AND PUBLIC INVOLVEMENT

This EIS has been prepared in accordance with Article VII of the Tahoe Regional Planning Compact, Chapter 3 of the TRPA Code of Ordinances, and Article VI of the TRPA Rules of Procedure. The environmental review process for the Shoreline Plan EIS began with efforts to gather information to establish the breadth, or scope, of environmental review. A notice of preparation was issued to inform agencies and the public that an EIS would be prepared for the Shoreline Plan, and to solicit views of agencies and the public regarding the scope and content of the EIS. The notice of preparation was distributed on July 12, 2017, and comments were received through August 16, 2017. Scoping meetings were held at the TRPA Advisory Planning Commission and at the TRPA Governing Board to provide information on the environmental analysis and to obtain oral comments. Both written and oral comments received during EIS Scoping were summarized by TRPA and are included in the Scoping Summary Report (Appendix B). In addition to the public scoping process, public input on the scope of the Shoreline Plan was garnered through the JFF Committee and public engagement process described above.

As required by the Compact, this EIS has been prepared using a "systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and decision-making which may have an impact on man's environment" (Compact Article VII(a)(1)). Throughout the process, TRPA has consulted with federal, state, and local agencies, as well as the scientific community and universities engaged in research and study of the Lake Tahoe Region, to ensure that the most current scientific data have been considered.

During the public and agency review period, this Draft EIS will be made available for further consultation with agencies and organizations, particularly those with "jurisdiction by law or special expertise with respect to any environmental impact involved" (Compact Article VII (b)). The public will also be consulted and their "views shall be solicited during a public comment period lasting not less than 60 days" (Compact Article VII (b)).

Following the public and agency review period, substantive comments relating to the environmental analysis will be reviewed and responses will be prepared. A proposed final EIS will be presented to the TRPA Advisory Planning Commission, which will make a recommendation to the Regional Plan Implementation Committee and TRPA Governing Board with respect to certification of the proposed final EIS. The Governing Board will provide an opportunity for comment on the proposed final EIS at a Governing Board hearing. The Board will then consider taking action to certify the final EIS prior to considering approval of the Shoreline Plan (Rules of Procedure 6.16).

The Shoreline Plan Draft EIS is available for public and agency review online at www.trpa.org and in hard copy at the TRPA offices:

Tahoe Regional Planning Agency
128 Market Street
Stateline, NV 89449

The public review period extends from **May 8** to **July 9, 2018**.

Normal operating hours for TRPA are Monday through Friday, 9 a.m. to 4 p.m. The front counter is closed every Tuesday and from 12 p.m. to 1 p.m. on other business days. TRPA will observe two holiday closures during the comment period, on May 28th and July 4th.

Written comments on the Draft EIS must be sent by July 9, 2018. They can be submitted online at http://shorelineplan.org/shoreline-plan-eis-comment-form/, by email to shorelineplan@trpa.org, or by mail to Rebecca Cremeen at: P.O. Box 5310, Stateline, NV 89449.

Oral comments may be provided at the following TRPA Governing Board and Advisory Planning Commission meetings:

- TRPA Governing Board Meeting, 9:30 a.m. on Wednesday, May 23, 2018 at the TRPA Office, Stateline, NV.
- TRPA Advisory Planning Commission, 9:30 a.m. on Wednesday, June 13, 2018 at the TRPA Office, Stateline, NV.

Written comments may be provided at the following public workshops:

- Public Workshop, 5:30 – 7:30 p.m. on Monday, June 4, 2018 at the TRPA Office, Stateline, NV.
- Public Workshop, 5:30 – 7:30 p.m. on Wednesday, June 6, 2018 at the North Tahoe Event Center, Kings Beach, CA.

2 DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES

2.1 INTRODUCTION

TRPA has prepared a set of policy concepts to guide resource management and development within the shorezone and lakezone of Lake Tahoe. These concepts would be implemented through amendments to the TRPA Code of Ordinances (TRPA Code). These concepts and Code provisions are referred to as the Shoreline Plan. The Shoreline Plan would involve amendments to sections of the TRPA Code that address uses and development in the shorezone of Lake Tahoe (TRPA Code Chapters 80–86), and related amendments to TRPA Code Chapters 2, 10, 14, 50, 63, 66, and 90).

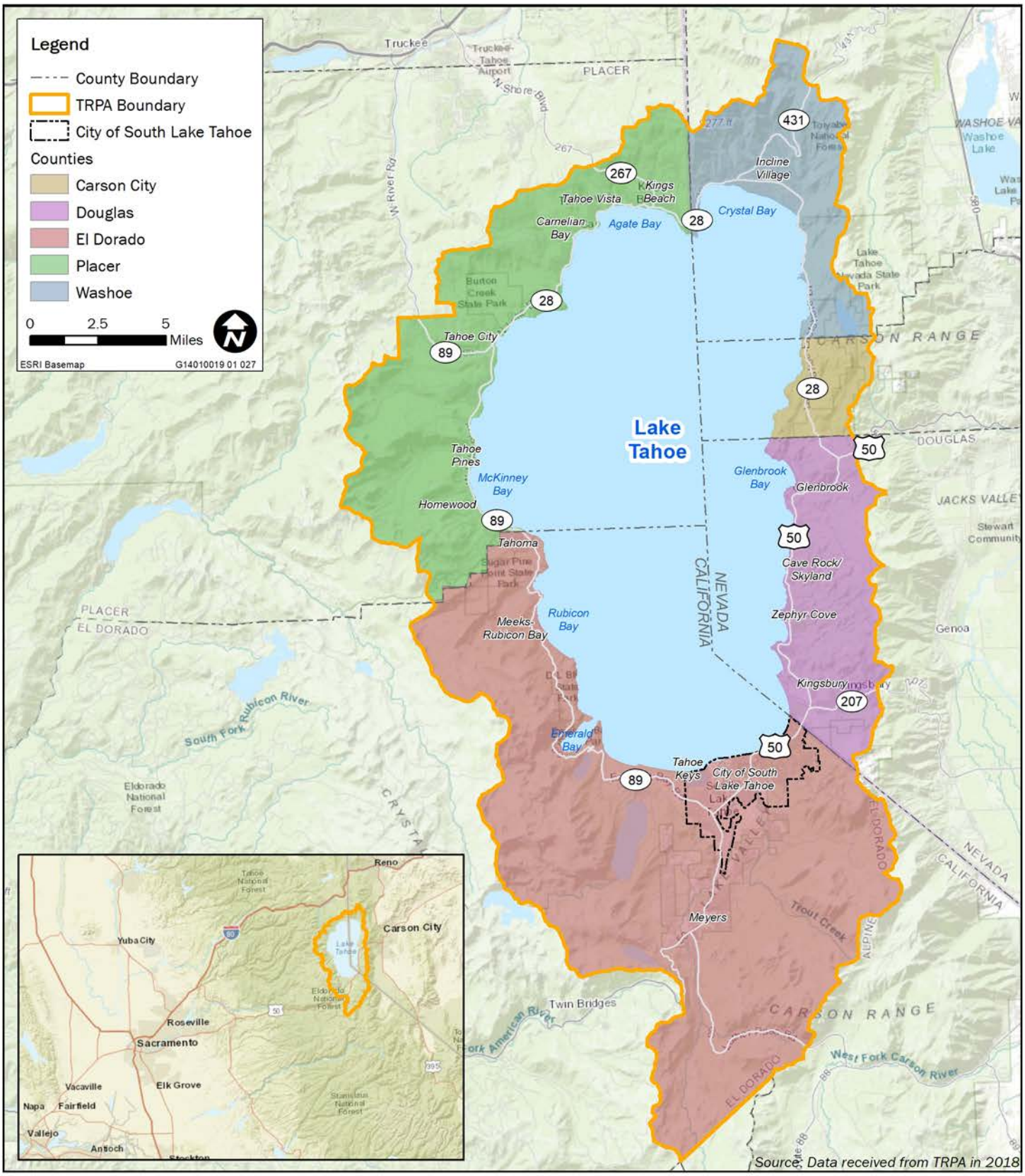
The proposed Shoreline Plan addresses primary policy areas related to boating, access, marinas, piers, and low lake level adaptation. The amendments are focused on structures that support water-dependent recreation in the Lake Tahoe shorezone, as well as resource management policies and regulations intended to accelerate threshold attainment. The overarching goal of the Shoreline Plan is to enhance the recreational experience along Lake Tahoe's shores while protecting the environment and responsibly planning for the future.

This EIS considers four Shoreline Plan alternatives, each of which takes a different approach to supporting recreation along the shoreline and attaining and maintaining thresholds. The alternatives address structures that could be developed or situated in the shorezone, including marinas, piers, buoys, and boat ramps. They involve authorizing new shorezone structures and identify different limits on the total number of structures that could be developed. The Shoreline Plan alternatives also involve refining permitting processes for shorezone structures and standards for the design of new and redeveloped structures, as well as policies and regulations governing watercraft operations.

2.2 LOCATION

The geographic area addressed by the Shoreline Plan alternatives is the 72-mile-long shoreline of Lake Tahoe, which encompasses the incorporated City of South Lake Tahoe, and portions of Placer and El Dorado counties in California, portions of Carson City, including the Carson City Rural Area, and portions of Washoe and Douglas counties in Nevada (Exhibit 2-1). The TRPA Code of Ordinances (Chapter 83) defines the shorezone as the area consisting of the nearshore, foreshore, and backshore (Exhibit 2-2). While not technically defined as a part of the shorezone, the lakezone is critical to understanding the effects of the Shoreline Plan because many of the structures built in the shorezone would affect the lakezone. TRPA Code defines the geographic limits of those areas as follows:

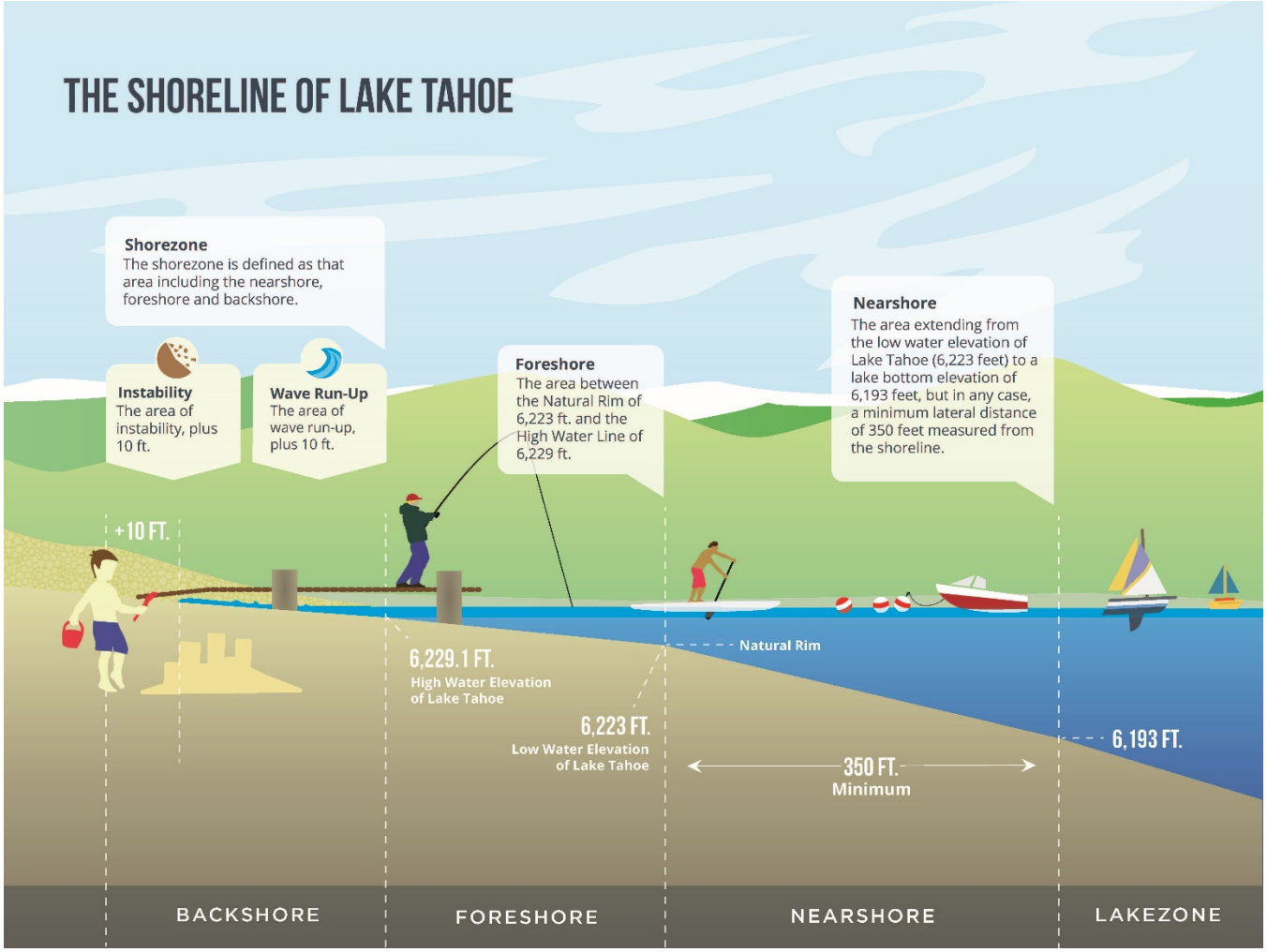
- **Nearshore**: The zone extending from the low-water elevation of Lake Tahoe (6,223.0 feet Lake Tahoe datum [LTD]) to a lake bottom elevation of 6,193.0 feet LTD, but in any case, a minimum lateral distance of 350 feet measured from the shoreline.
- **Foreshore:** The zone of a lake-level fluctuation that is the area between the high- and low-water elevation (for Lake Tahoe, elevations of 6,229.1 feet LTD and 6,223.0 feet LTD, respectively).
- **Backshore:** The land area located between the high-water line of the lake (6,229.1 feet LTD) and either the upland area of instability (as determined by a site assessment) or the wave run-up area plus 10 feet, whichever is greater.
- **Lakezone:** The area of the lake extending beyond the lakeward limits of the nearshore.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-1 Shoreline Location and Jurisdictional Boundaries

SHORELINEPLAN



Source: TRPA 2016

Exhibit 2-2 Shorezone Diagram

2.3 STRUCTURES REGULATED BY THE SHORELINE PLAN

The primary types of shoreline structures addressed by the Shoreline Plan alternatives include piers, moorings for motorized watercraft (i.e., buoys, slips, and boat lifts), boat ramps, and marinas. The distribution of existing shorezone facilities is displayed on Exhibits 4-1 through 4-5 in Chapter 4, "Land Use."

2.3.1 Piers

Piers are defined by TRPA as fixed or floating structures extending from the backshore to beyond the high-water elevation of the lake (Exhibits 2-3 and 2-3B). Piers in the shorezone often allow for temporary boat access but do not allow for overnight mooring unless they are equipped with a boathouse or lift. Piers on Lake Tahoe fall into one of three categories: public, private multiple-use, or individual private:

- **Public piers** are owned and operated by a public agency and provide public access or another public service, or are owned and/or operated by a private organization that provides access to the general public free of charge. There are 24 public piers on Lake Tahoe.

- **Private multiple-use piers** are privately owned and serve either a homeowner's association (HOA) or two or more private littoral parcel owners. There are 191 private multiple-use piers on Lake Tahoe.
- **Individual private piers** are privately owned and serve a single private littoral parcel. There are 547 individual private piers on Lake Tahoe.

2.3.2 Moorings

Moorings are structures used for the long-term storage of boats. They include buoys, slips, and boat lifts. These structures can store boats permanently, seasonally, or overnight.

BUOYS

Buoys are anchored floats for mooring boats (Exhibit 2-3D). On Lake Tahoe, buoys are generally used seasonally for overnight or longer-term mooring. A semi-permanent anchor block is placed on the lakebed and is attached with a tether to a removable float. Although the anchors remain in place year-round, buoy floats are usually removed during winter, when the buoy moorings are not used. Navigational buoys, such as buoys demarcating swim areas or navigational hazards, are not regulated as buoys under the Shoreline Plan alternatives, and all references to buoys in this EIS refer to mooring buoys. There are an estimated 4,690 buoys on Lake Tahoe, approximately 490 of which are believed to have been placed after 1972 without the required governmental permits.

SLIPS

A slip is a mooring location for a boat along a dock or between walkways, pilings, or wharves (Exhibit 2-3E). On Lake Tahoe, slips are typically located in marinas or human-made lagoons or harbors. These moorings are designed for long-term or seasonal boat storage. Slips can be categorized as either public or private:

- **Public slips** are available for rent to the general public and typically located in marinas. There are 1,218 public slips on Lake Tahoe.
- **Private slips** are privately owned and serve a single user. They are typically located in private harbors, private littoral parcels, or HOA facilities. There are approximately 2,887 individual private slips on Lake Tahoe. These include an estimate of 2,443 spaces for boats in slips or docks in the Tahoe Keys subdivision and 444 elsewhere on the lake.

BOAT LIFTS

A boat lift is a mechanism used for storing boats that is capable of raising boats out of the water and lowering them into the water (Exhibit 2-3C). Boat lifts are attached to piers and can store boats out of the water and allow a boat to be launched directly from the pier. Some boat lifts are contained in boat houses, which are described in the following section. There are approximately 261 private boat lifts on Lake Tahoe.

BOAT HOUSES

Boat houses are enclosed structures designed to contain boats (Exhibit 2-3F). They are typically constructed on the end of a pier. While boat houses are not moorings by themselves, they contain either lifts or slips and are considered separately for the purpose of estimating boating use. There are 165 boat houses on Lake Tahoe. The current 1987 Regional Plan does not allow new boat houses and none would be authorized under any of the Shoreline Plan alternatives.

A. Public Pier

B. Private Pier

C. Boat Lifts

D. Buoys

E. Slips

F. Boat House

Source: Provided by TRPA in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-3 Structures Regulated by the Shoreline Plan

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

2.3.3 Boat Ramps

Boat ramps extend from the shore into a water body, allowing boats to be launched into, or retrieved from, the water. They serve as the primary means of boating access to Lake Tahoe. The ramps are used by day users, who launch their boat and remove it from the lake each day, and by seasonal users, who launch their boat once each boating season and store it on a mooring throughout the boating season. Boat ramps are often located adjacent to or as a component of related upland facilities, such as marinas, beaches, and parks. Boat ramps are particularly susceptible to low lake conditions because they are fixed structures and close to shore. They can be categorized as public, quasi-public, or private:

- **Public boat ramps** are owned and operated by a public agency and provide public access or another public service, or ramps owned and operated by a private organization that provide access to the general public. There are 19 public boat ramps on Lake Tahoe.
- **Quasi-public boat ramps** serve an HOA or members of another organization. There are three quasi-public boat ramps on Lake Tahoe, two that serve HOAs and one that serves residents in the Incline Village General Improvement District.
- **Private boat ramps** are privately owned and serve a single littoral parcel. There are an estimated 16 private boat ramps on Lake Tahoe. Private boat ramps typically provide access for a single user, similar to a single mooring (e.g., a buoy or slip).

2.3.4 Marinas

A marina is a specially designed harbor that provides support services for boating and moorings for pleasure craft and other boats. Marinas on Lake Tahoe offer slips, buoys, or onshore racks to store boats long term. They often contain public or private boat ramps, gantry or forklift boat launch equipment, and fueling and maintenance facilities. Marinas are operated by private entities but are generally open to the public and may provide boat rentals and other services for a fee. Marinas are one of the main sources of access to Lake Tahoe. There are 14 marinas on Lake Tahoe, 12 in California and two in Nevada.

2.3.5 Other Structures

Other structures along the shoreline include breakwaters, jetties, floating platforms, and navigational buoys. Under the Shoreline Plan alternatives, the creation of breakwaters and jetties that are not part of habitat restoration projects would be prohibited. Navigational buoys would not be regulated.

2.4 BOAT USE ON LAKE TAHOE

Boat use on Lake Tahoe is seasonal, with virtually all boating activity occurring between May 1 and September 30. Boat use is greatest during summer weekends, with peak boat use occurring during the Independence Day and Labor Day holiday weekends (Appendix A). Boating on Lake Tahoe includes both nonmotorized watercraft such as kayaks, stand-up paddle boards, and peddle boats; and motorized watercraft such as pleasure craft, personal watercraft (including jet skis), ski boats, and fishing boats.

2.4.1 Nonmotorized Watercraft

The types of nonmotorized watercraft typically used on the lake include kayaks, canoes, stand up paddleboards, and dinghies that do not contain motors. Nonmotorized watercraft can be launched by hand from many locations around the lake and stored on beaches or in upland areas when not in use. This decentralized use pattern makes it extremely difficult to estimate levels of nonmotorized boat use. However, nonmotorized boating is clearly popular, with nonmotorized watercraft outnumbering motorized watercraft in many parts of Lake Tahoe. Anecdotal observations indicate that the use of nonmotorized watercraft—and stand-up paddle boards, in particular—has increased over the last decade. Nonmotorized watercraft use appears to be highest near public beaches and undeveloped shoreline with easy public access, such as along state parks. Nonmotorized watercraft typically travel closer to the shore than motorized watercraft. In response to the rising popularity of nonmotorized watercraft, the California Tahoe Conservancy and the volunteer Lake Tahoe Water Trail Association developed the Lake Tahoe Water Trail, a 72-mile water route for kayaks, paddle boards, and other nonmotorized watercraft around the lake. The water trail website guides nonmotorized use by providing information on where to access and exit the lake for day and overnight trips, how to protect Lake Tahoe from aquatic invasive species (AIS), and safety recommendations.

Storage racks are available in many locations around the lake for seasonal or yearly storage of kayaks, paddleboards, and other nonmotorized craft. New and existing storage areas would be regulated under the Shoreline Plan as an accessory use to an existing upland use. Storage racks can be associated with residences, tourist accommodation uses, public recreation areas, or rental concessions. Nonmotorized watercraft do not require shoreline structures for launching, and the use of nonmotorized watercraft, like motorized boat use, would not be directly regulated under any of the Shoreline Plan alternatives. The effects of the alternatives on the safety, navigation, and enjoyment of nonmotorized watercraft are analyzed in the applicable resource sections in Chapters 4 through 17.

2.4.2 Motorized Boat Use

Motorized boat use on Lake Tahoe involves a wide variety of watercraft, including pleasure craft with outboard, inboard, and sterndrive motors; personal watercraft, such as jet skis; and sailboats with auxiliary engines.. A review of boat registration data and boat inspections conducted during 2015 (the most recent year for which data are available), indicated that 13,617 separate motorized watercraft operated on Lake Tahoe during the boating season (Appendix A).

Motorized boats on Lake Tahoe are operated as day-use boats, boats moored on Lake Tahoe, or boat rentals:

- **Day-use boats** are boats launched and removed from the lake on the same day. They include boats transported to the Tahoe Basin and boats stored in upland locations in the Tahoe Basin (e.g., on a boat trailer or in a rack system). Day-use boats are launched at a boat ramp or marina. Based on boater surveys conducted during AIS inspections in 2015, between 50 and 60 percent of all boats that operated on Lake Tahoe during the year were day-use boats (TRPA 2016).

- **Boats moored on Lake Tahoe** are those boats stored for multiple days on a mooring (i.e., a buoy, slip, boat lift, or boat house). Boats moored on Lake Tahoe are typically launched in spring or early summer at a marina or boat ramp, then stored on a seasonal mooring during some or all of the boating season. Based on 2015 boat user survey results, between 40 percent and 50 percent of the boats that operated on Lake Tahoe at any point during the year were moored on Lake Tahoe (TRPA 2016).

- **Boat rentals** are boats that are rented for short-term use (e.g., hourly or daily rentals). Rental boats are owned by private parties and stored at marinas or other facilities around Lake Tahoe. They include boats rented and operated by private parties, as well as charter boats. Approximately 3 percent of the motorized boats on Lake Tahoe are boat rentals. However, they account for a larger proportion of the

boats in use at any time because rental boats tend to be in use more often than personal boats. There are an estimated 463 motorized boats available for rent at Lake Tahoe (TRPA 2017a).

The number of shoreline structures (boat ramps and associated parking, buoys, boat lifts, and slips) limits the total capacity for day-use and moored boats on Lake Tahoe. The Shoreline Plan alternatives identify different numbers of new structures; therefore, the level of potential motorized boat use will be determined by the alternative selected.

2.5 ESSENTIAL CONCEPTS

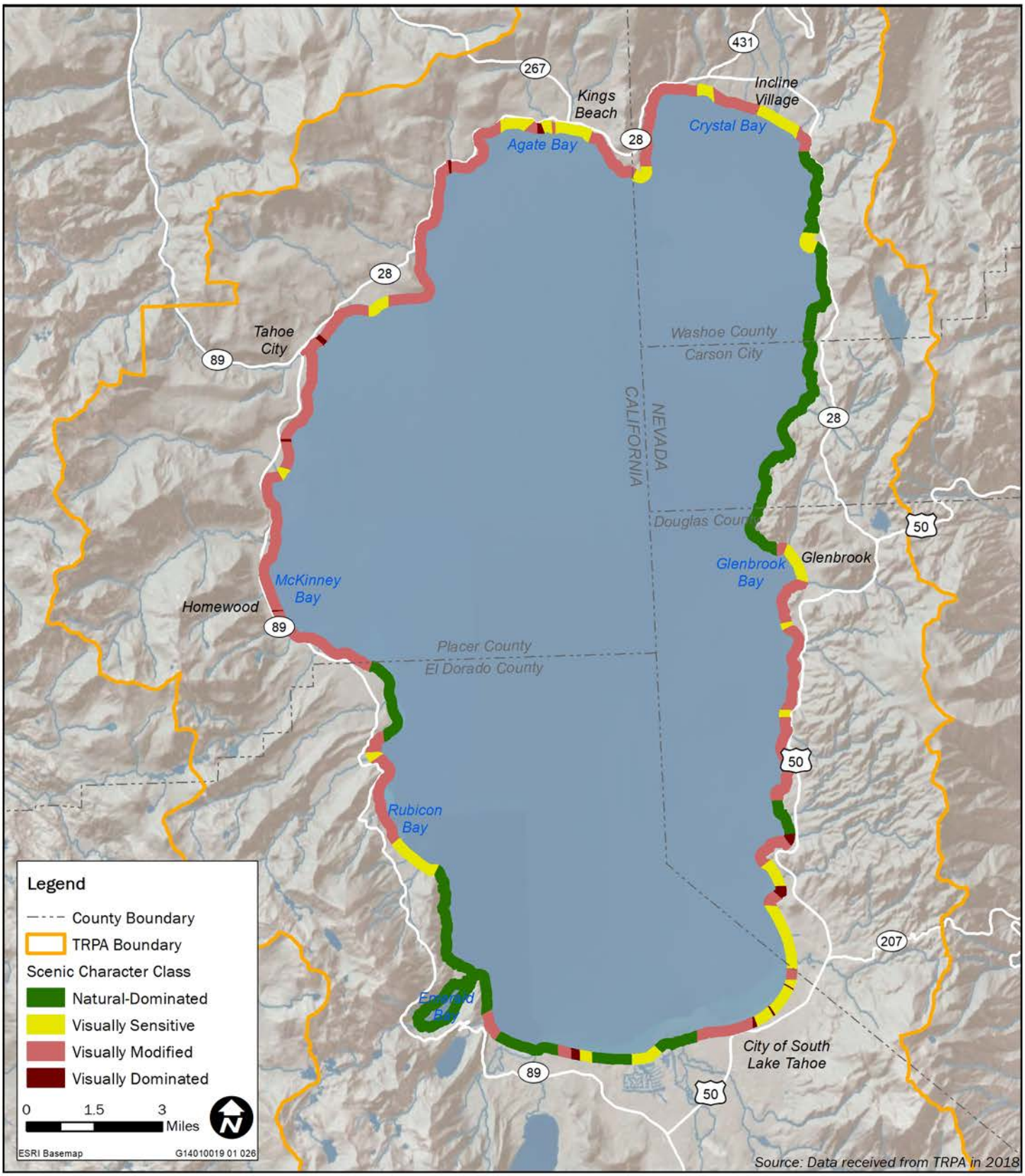
As described in Chapter 1, "Introduction," TRPA has adopted a Regional Plan, Code of Ordinances, and implementation programs to achieve the threshold standards, including those pertaining to scenic quality and fisheries. To that end, TRPA has developed a scenic management system and designated prime fish habitat, as described below.

2.5.1 Scenic Management System

TRPA adopted specific scenic threshold standards to protect and improve scenic quality. The TRPA scenic thresholds most likely to be affected by the Shoreline Plan alternatives are scenic threshold rating scores for shoreline travel routes and individually mapped scenic resources along the shoreline. Long-term, cumulative changes to views of the shoreline from the surface of Lake Tahoe are tracked by the TRPA shoreline travel route ratings, determined every four years based on updated scenic assessments. Lake Tahoe's shoreline is divided into 33 separate travel units. The following visual conditions in each unit are given numerical ratings to determine the overall threshold score for that shoreline travel unit: human-made features along the shoreline, general landscape views from the lake, and the variety of scenery viewed from the lake. Shoreline travel units are determined to be in attainment or not in attainment of the scenic threshold based on the numeric rating. In addition to the scenic shoreline travel units, each portion of the shoreline is classified as one of four shoreline character types, described below based on the level of human development that is visible (Exhibit 2-4):

- **Visually dominated shoreline**: These shorelines have marinas and other areas with large, prominent buildings; high boat density and buoy fields; equipment; and commercial activity. Considerable visual clutter usually is associated with these uses.
- **Visually modified shoreline:** Areas classified with this character type have visually prominent homes and other structures along the shoreline but have considerable vegetation intact. This character type can include limited areas with high intensity clusters of shoreline structures. Most of the developed portions of the shoreline fall into this category.
- **Visually sensitive shoreline**: Shorelines with this classification are highly scenic or vulnerable landscapes exhibiting the influence of human-made modifications within an otherwise natural setting. Visually sensitive areas include long, expansive sandy beaches where shoreline structures are highly visible and difficult to screen from view.
- **Natural-dominated shoreline**: These areas consist of either natural-appearing landscapes (e.g., east shore, Emerald Bay, Upper Truckee Marsh) or historical/traditional locations that include culturally modified landscapes in highly scenic locations (e.g., Thunderbird Lodge, Vikingsholm).

To attain and maintain the scenic threshold standards, TRPA evaluates and regulates the visible mass of shoreline structures. "Visible mass" is defined by TRPA as the total visible area of a shoreline structure, including all elements of the structure. Visible mass is calculated by summing the area (in square feet) of



TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-4 TRPA Shoreline Character Types

SHORELINEPLAN

visible elements of the structure when viewed in profile (i.e., parallel to the shore) and the area of visible elements of the structure when viewed from the end (i.e., perpendicular to the shore). The existing shorezone partial permitting program screening criteria require a pier rebuild project to offset any increase in visible mass at a 1:1 ratio in shoreline travel units that are in attainment of threshold standards, and at a 1.5:1 ratio in units that are not in attainment (TRPA 2011). Additional information on the scenic management system, including maps of the scenic shoreline travel units and shoreline character types, is included in Chapter 9, "Scenic Resources."

2.5.2 Prime Fish Habitat

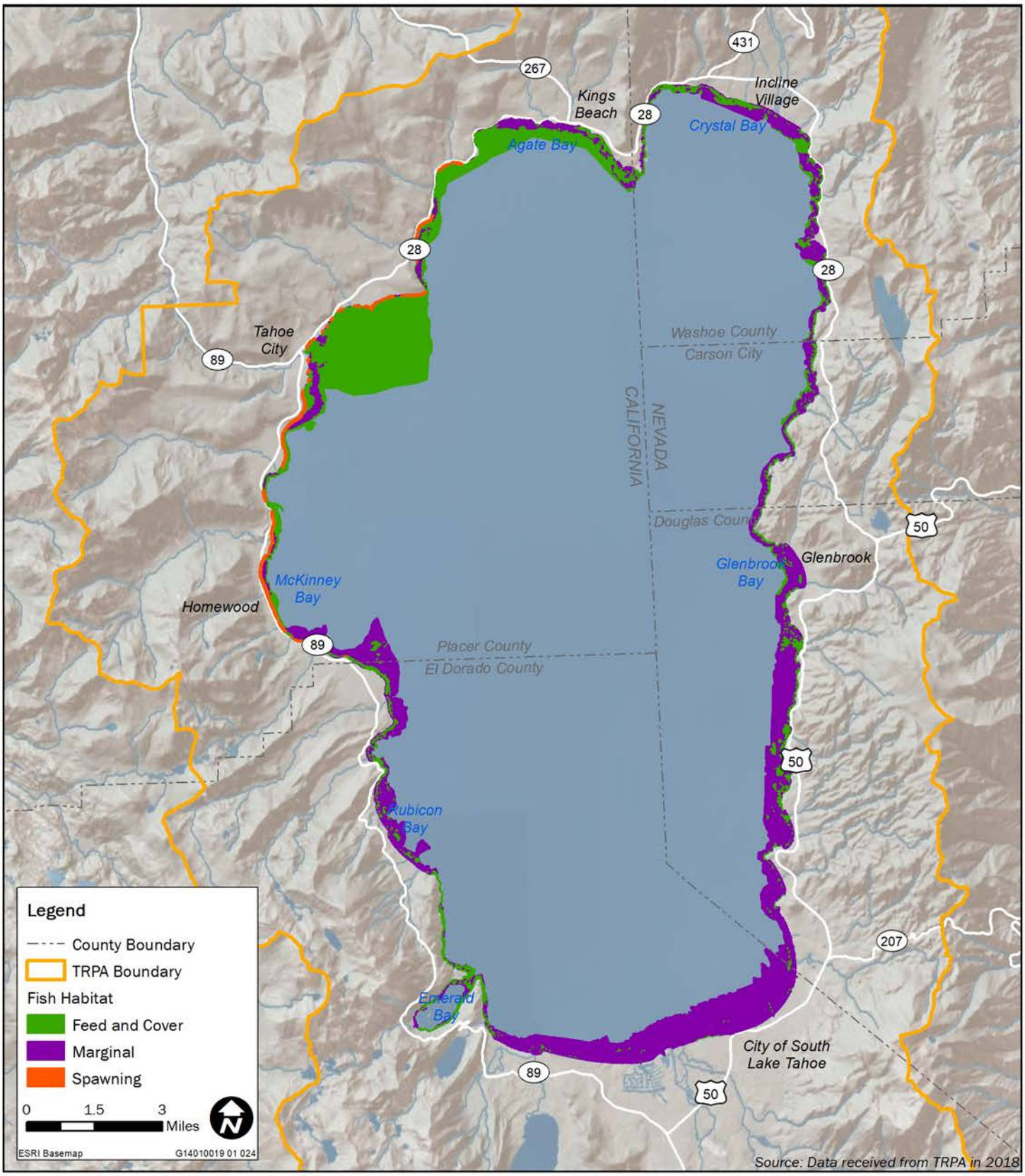
TRPA has designated and mapped different types and qualities of fish habitat in Lake Tahoe and a TRPA threshold standard requires no net loss in the amount of prime fish habitat in Lake Tahoe. "Prime" fish habitat is spawning habitat and feed and cover habitat (Exhibit 2-5), Spawning habitats are composed of relatively small-diameter, rocky or gravel substrates used by native minnows for spawning and rearing fry. Feed and cover habitats are composed of larger diameter cobbles and boulders used by a variety of native and nonnative species as foraging habitat and to provide refuge from predation. TRPA Code Section 84.4 (adopted in 1987) prohibits the placement of new structures in prime fish habitat. It also calls for the completion of a study "to assess the impacts resulting from the construction and use of structures, including mooring buoys, on fish habitat and spawning areas…." In accordance with this code requirement, several studies were completed that evaluated the construction and operation of shoreline structures in prime fish habitat. The results of the studies suggest that the placement of piers and buoys in spawning or feed and cover habitat has limited impact on native fish populations and that the impacts can be mitigated (Byron et al. 1989; Beauchamp et al. 1991, 1994). Spawning habitat (gravel) in the nearshore of Lake Tahoe is naturally limited because of upland geology, and where suitable habitat exists, spawning has been observed in the immediate vicinity of piers and buoys (Allen and Reuter 1996). Empirical observations suggest that boating activity associated with piers and buoys does not appear to adversely affect spawning activity or egg viability (Allen and Reuter 1996). As part of a previous shorezone ordinances adopted in 2008, TRPA developed mitigation approaches for prime fish habitat. These approaches involved the replacement of any prime fish habitat with the same type of substrate elsewhere in the lake. Additional information on Lake Tahoe fisheries, including prime fish habitat and related code provisions, is provided in Chapter 5, "Fish and Aquatic Biological Resources."

2.6 RELATED REGIONAL PLAN PROVISIONS AND POLICY ISSUES NOT SUBJECT TO CHANGE

The Shoreline Plan is limited in scope, addressing the placement and operation of structures that could be developed within the shorezone of Lake Tahoe. The Shoreline Plan alternatives focus on structures to support water-dependent recreation within the shoreline and effective resource management to ensure threshold attainment. Numerous provisions of the TRPA Regional Plan and other shoreline-related policy issues, described in the following sections, would remain unchanged under all alternatives.

2.6.1 Shorezone Tolerance Districts

Eight shorezone tolerance districts are identified along the shoreline of Lake Tahoe. These districts, described in Chapter 83 of the Code of Ordinances, reflect the physical ability of the shoreline to support use and development, with Shorezone Tolerance District 1 being the most sensitive and Tolerance District 8 being the least sensitive. None of the Shoreline Plan alternatives would change the definition, location, process for determining district boundaries, or tolerance district development standards described in the Code of Ordinances. The approximate locations of shoreline tolerance districts are shown in Exhibit 2-6.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-5 TRPA Fish Habitat Designations

SHORELINEPLAN

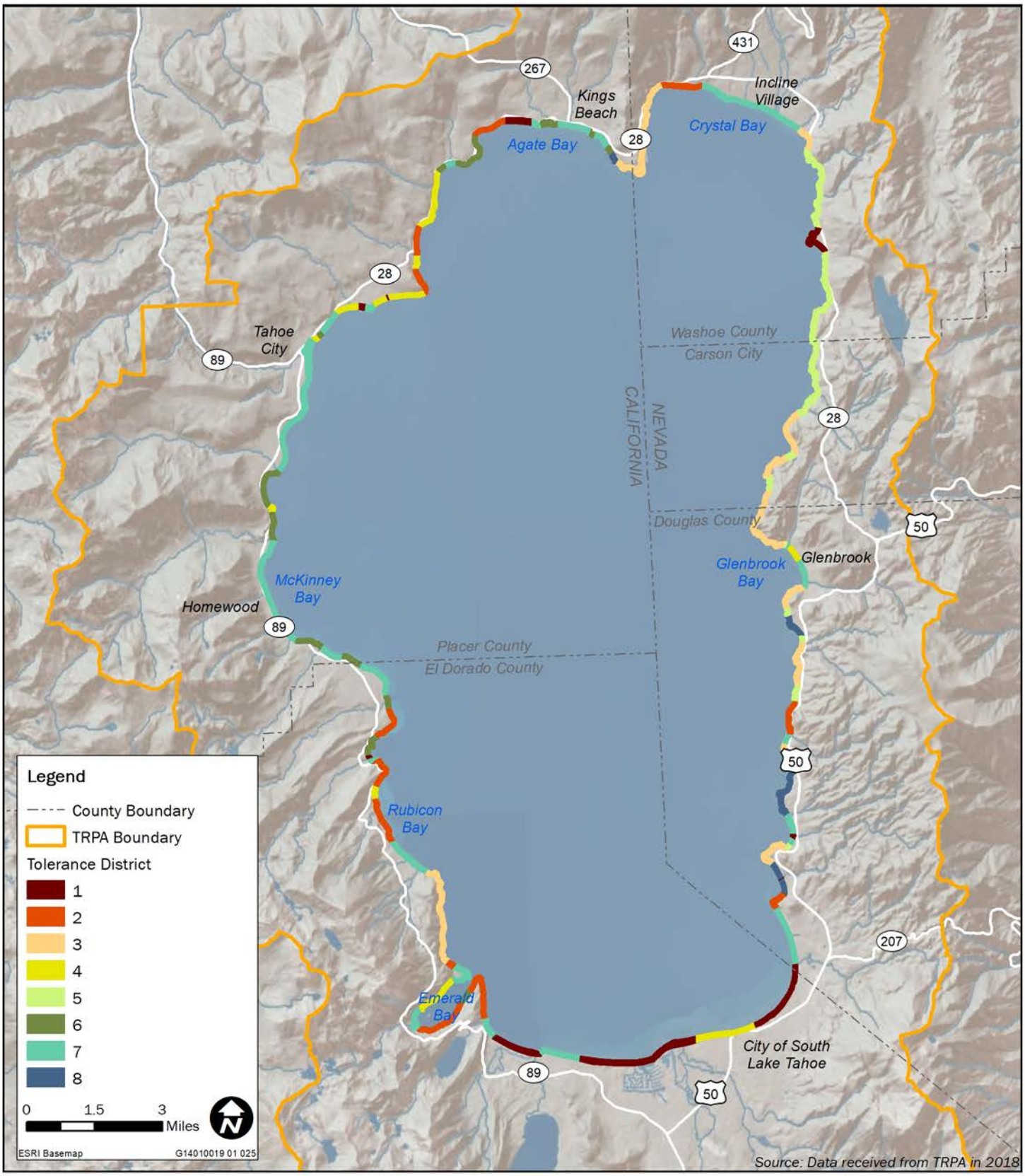


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Exhibit 2-6 Shorezone Tolerance Districts

SHORELINEPLAN

2.6.2 Scenic Shoreland Ordinances

In 2002, Chapter 66 of the Code of Ordinances was amended to include design standards to protect shoreline areas from scenic degradation caused by development. This amendment is known as the Scenic Shoreland Ordinances and is intended to attain and maintain the threshold standards as older development is gradually replaced with newer development that has reduced visual impacts. The shoreland ordinances limit the visual magnitude of upland development adjacent to the shorezone and visible from the lake. Chapter 66 of the Code of Ordinances also establishes procedures for calculating the visible mass of shoreline structures and evaluating the scenic impacts of these structures. None of the Shoreline Plan alternatives would alter the visual magnitude system or the limitations on allowable visual magnitude for upland development adjacent to the shoreline, and none would modify the approach for calculating visible mass and evaluating the visual impact of shoreline structures.

2.6.3 Environmental Improvement Program

The Lake Tahoe Environmental Improvement Program (EIP) is a partnership of federal, state, and local agencies, private interests, and the Washoe Tribe, created to protect and improve the extraordinary natural and recreational resources of the Tahoe Region and attain and maintain thresholds. EIP partners implement projects that fall within on or more of the six EIP areas: (1) watersheds, habitat, and water quality; (2) forest management; (3) air quality and transportation; (4) recreation and scenic resources; (5) applied science; and (6) program support. None of the Shoreline Plan alternatives would modify the EIP. TRPA would continue to identify environmental improvement projects with a nexus with recreational impacts and present them as opportunities to advance expanded recreational access in concert with environmental restoration. Projects under the Shoreline Plan could include public or private projects that result in environmental improvements consistent with one or more of the six EIP areas.

2.6.4 Nearshore Threshold and Policy Development

Compared with mid-lake water clarity, nearshore conditions and the science needed to explain nearshore ecosystem dynamics is an emerging area of scientific inquiry in the Tahoe Region. The nearshore is defined as the area of the lake with a depth shallower than 30 feet or to a minimum distance of 350 feet from the shoreline. The Nearshore Agency Working Group (including representatives of TRPA, the U.S. Environmental Protection Agency, the Lahontan Regional Water Quality Control Board (RWQCB), and the Nevada Division of Environmental Protection) is preparing a nearshore work plan, called the Nearshore Resource Allocation Plan, to guide nearshore monitoring and coordination needed to understand and manage nearshore conditions. The nearshore research needed to answer all the questions that could arise in the context of shoreline planning is unlikely to be available within the timeframe to complete a shoreline plan. The Nearshore Agency Working Group is proceeding on a separate timeline and track from shoreline planning, looking at issues beyond the scope of the Shoreline Plan, such as stormwater runoff, coverage, and fertilizer use. The best available information on nearshore conditions is incorporated into this EIS. None of the Shoreline Plan alternatives would modify the nearshore threshold and policy development process. Results and recommendations from the Nearshore Resource Allocation Plan could be used to inform design, development, and mitigation of projects implemented under the Shoreline Plan.

2.6.5 Upland Development and Growth Control System

Regional Plan and code provisions that govern upland development, including the development of structures along the shoreline but outside of the shorezone, would not be altered by any of the Shoreline Plan alternatives. Standards for development outside of the shorezone would continue to be regulated by sections

of the Code of Ordinances that would not change, and permissible uses outside the shorezone would continue to be established in area plans, plan area statements, and community plans. None of the Shoreline Plan alternatives would alter the land use commodity system that controls growth in the Tahoe Region.

2.6.6 Aquatic Invasive Species Management

The Shoreline Plan alternatives recognize the Tahoe Region's ongoing program addressing AIS as governed and guided by the *Lake Tahoe Region Aquatic Invasive Species Management Plan, California–Nevada* (TRPA 2014). This EIS incorporates information collected at AIS inspection stations and assesses the effects of the Shoreline Plan alternatives on AIS. None of the alternatives would alter existing AIS detection, control, and eradication efforts.

2.6.7 Other Lakes in the Tahoe Basin

The Shoreline Plan alternatives address the shoreline of Lake Tahoe and do not apply to other lakes in the Tahoe basin, such as Fallen Leaf Lake and Cascade Lake. However, the policies and ordinances developed for Lake Tahoe would be used as guidelines for other lakes in the Tahoe basin. Separate plans governing the shoreline of other lakes in the Tahoe basin could be developed in the future if necessary.

2.6.8 Essential Public Health and Safety Facilities

TRPA Code Section 84.10.2 establishes a framework for providing essential emergency access and egress to Lake Tahoe to protect public health and safety. TRPA allows for the designation of up to one essential public health and safety facility in each county-jurisdiction (El Dorado County, Placer County, Washoe County, and Douglas County), plus the U.S. Coast Guard Lake Tahoe Station, which is a second essential public health and safety facility in Placer County. In drought years, TRPA allows first-responder organizations to designate locations for temporary moorings for regional public safety purposes. The permanent locations of the designated essential public health and safety facilities can be an existing facility, such as a marina, pier, or buoy, or a site where a new pier could be constructed under TRPA code. None of the Shoreline Plan alternatives would modify the essential public health and safety provisions.

2.6.9 Tahoe Keys

The development standards in the Shoreline Plan would not apply to the docks and slips located in the lagoons of the Tahoe Keys Property Owners Association (TKPOA) but would apply to the Tahoe Keys Marina. TRPA is not currently permitting new structures in the Tahoe Keys pending adoption of a Memorandum of Understanding between TRPA and the TKPOA. The Shoreline Plan accounts for the anticipated environmental impacts of the Tahoe Keys by including Tahoe Keys lagoon structures and associated boat activity as part of the baseline conditions. The highest priority issue in the Tahoe Keys is AIS management. TRPA and the Lahontan RWQCB are actively working with the TKPOA to develop and implement an invasive species management plan.

2.7 KEY DIFFERENCES AMONG THE ALTERNATIVES

Four alternatives are being considered as part of the shoreline planning process, including the existing shorezone policies and ordinances, and three sets of potential modifications. All four alternatives have been developed according to the following organizing principles: (1) protect and where feasible enhance the environment, (2) provide a fair and reasonable system of access, (3) adapt to changing lake levels, (4)

preserve high-quality recreation and public safety, and (5) implement predictable and consistent rules. Each of the alternatives represents a different approach to regulating the number, amount, type, location, and design of shoreline structures and associated resource management provisions, as follows:

- **Alternative 1 – Proposed Shoreline Plan**. The goal of this alternative is to enhance the recreational experience at Lake Tahoe while protecting the environment and responsibly planning for the future. This alternative, developed through a consensus-based approach, incorporates the policies developed by the Steering Committee and was endorsed by the Regional Plan Implementation Committee (RPIC) of the TRPA Governing Board. The Shoreline Plan would meter out new private and public development over time. At buildout, it would allow for up to 2,116 new moorings (buoys, lifts or public slips), 128 new private piers, 10 new public piers, and two new public boat ramps. Some new and existing buoys could be converted to slips and vice versa at facilities open to the public (e.g., marinas).

- **Alternative 2 – Maintain Existing TRPA Shorezone Regulations (No Project).** This alternative would retain the existing Regional Plan Shorezone Subelement Goals and Policies and TRPA Shorezone Code (Code of Ordinances Chapters 80–86). The goal of this alternative is to balance access and environmental protection by applying the approach that was developed under the 1987 Regional Plan. This alternative would not include a numeric cap on shoreline structures but would prohibit new structures within TRPA-designated prime fish habitat. This alternative would allow more shorezone structures than any other alternative and is the only alternative that would allow new marinas. At buildout, it would potentially allow for up to 6,936 new moorings, 476 new piers, six new boat ramps, and two new marinas.

- **Alternative 3 – Limit New Development**. The goal of this alternative is to reduce the risk of environmental impacts by limiting new shoreline development. Motorized watercraft access would be more concentrated at marinas and public facilities, and fewer structures would be authorized under this alternative than under Alternative 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. Eighty-six new private piers would be authorized under this alternative, but they would be restricted to multiple-use piers.

- **Alternative 4 – Expand Public Access and Reduce Existing Developmen**t. The goal of this alternative is to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. This alternative would include transfer ratios that would allow some private shoreline structures to be removed and rebuilt in different locations if a project would result in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shoreline structures.

2.7.1 Shoreline Structures Comparison

Each alternative includes different provisions that regulate the number of structures that could be built along the shoreline. Regulatory limits and other provisions that limit the maximum number of shoreline structures that could be developed under each alternative are summarized in Table 2-1. Although regulatory and other provisions provide limits on the number of structures that could be allowed under the alternatives, it is useful to consider the practical effects of implementing those provisions and how that could be manifested in terms of the number of structures constructed at buildout. This EIS estimates the maximum number of structures that could exist under each alternative. The estimated maximum number of shoreline structures at buildout of each alternative is presented in Table 2-2 and Exhibit 2-7.

Table 2-1 Shoreline Structures Allowed under Each Alternative

Structure	Type	Baseline Conditions	Alternative 1 – Proposed Shoreline Plan	Alternative 2 – Maintain Existing TRPA Shorezone Regulations (No Project)	Alternative 3 – Limit New Development	Alternative 4 – Expand Public Access and Reduce Existing Development
Piers	Public	24[a]	10 new	No cap; location limited by fish habitat	5 new	15 new
	Private multiple-use	191[a]	128 new		86 new	None; transfers allowed at 2:1 reduction
	Individual private	547[a]			No new	No new
Buoys	All	4,200[b]	10,847 mooring cap, up to 2,116 new	No cap; location limited by fish habitat	365 new, at marinas or public facilities only	No new; transfers to buoy fields allowed at 2:1 reduction
Slips	Public	1,218[c]	Marinas and public agencies could trade for buoys at 1:1	No cap; location limited by fish habitat	Marinas and public agencies could trade for buoys at 1:1	None
	Individual private	2,887[d]	None		None	
Boat ramps[e]	Public	19	2 new	No cap; location limited by fish habitat	1 new	None; transfers allowed at 2:1 reduction
	Individual private	16	No new		No new	No new
	Quasi-public	3	No new		No new	No new
Marinas[g]	All	14	No new marinas, expansions allowed with environmental improvements	New and expanded marinas allowed with a master plan	No new marinas, expansions allowed with environmental improvements	No new or expanded marinas, environmental improvements required at existing
Boat lifts	Individual private[h]	261	Pier owners could trade for buoys at 1:1	Limited by number of piers and 2 moorings per parcel	No new	No new
	Gantry lift[i]	5	Not specified	Not specified	Not specified	Not specified
Boat houses	Private/public[j]	165	No new	No new	No new	No new

[a] Number of existing piers listed in TRPA technical memo "Private Piers" as well as Piers GIS layer. Three categories of structure types have been identified and are defined as follows: "public" facilities are available for unrestricted public use, "private multiple-use" facilities are private facilities that serve more than one landowner, and "individual private" facilities serve only one landowner.

[b] A total of 4,690 mooring buoys were observed during a 2016 buoy inventory. However, an estimated 490 of these were placed after 1972 without permits from TRPA or another agency. These unpermitted buoys are not considered part of the baseline conditions. See Chapter 3 for more information.

[c] Estimated. Total of all counted from TRPA technical memo "Summary of Water Access for Marinas and Public Boat Ramps," dated November 28, 2016.

[d] Taken from SDE. Shorepoints GIS layer (2008 data). These include slips on private properties, in private harbors, and on quasi-public properties such as HOAs, including the Tahoe Keys.

[e] Data sourced from SDE.Boat_Ramp GIS layer. Quasi-public boat ramps include Incline Village General Improvement District, Lakeside Park Association Inc, and a HOA.

[f] Although 53 private parcels are potentially eligible for a boat ramp, because of restrictions on new coverage on the backshore, it is unlikely that any new, individual private boat ramps would be authorized.

[g] From "Summary of Water Access for Marinas and Public Boat Ramps," dated November 28, 2016. Data also located in SDE. Marinas GIS layer.

[h] From SDE. Shorepoints GIS layer plus the four additional lifts permitted since 2002 (Ken Kasman Shorezone Permit Spreadsheet since 2002).

[i] Private gantry lifts counted in "Summary of Water Access for Marinas and Public Boat Ramps," dated November 28, 2016.

[j] From SDE. Shorezone GIS layer minus the three boathouses removed in accordance with permit data since 2002.

Table 2-2 Maximum Number of Shoreline Structures at Buildout of Each Alternative

Structure	Baseline Conditions	Alternative 1 – Proposed Shoreline Plan	Alternative 2 – Maintain Existing TRPA Shorezone Regulations (No Project)[1]	Alternative 3 – Limit New Development	Alternative 4 – Expand Public Access and Reduce Existing Development
Moorings					
Buoys[2]	4,200	6,206	9,071	4,500	4,200
Slips[2]	4,105	4,170	6,002	4,170	4,105
Boat lifts[2]	261	306	429	291	261
Boat houses	165	165	165	165	165
All moorings	8,731	10,847	15,667	9,126	8,731
Other Facilities					
Piers	762	900	1,238	853	777
Public and quasi-public boat ramps	22	24	28	23	22
Private boat ramps[3]	16	16	16	16	16
Marinas	14	14	16	14	14

[1] There is no numeric cap on the number of structures that would be allowed under Alternative 2; however, maximum structure estimates have been derived based on the 2016 TRPA Fish Habitat Survey GIS Layer. Structure eligibility would be based on site verification; therefore, actual buildout numbers could vary from these estimates.

[2] The total number of moorings is capped, but the buoy, slip, and lift numbers for Alternatives 1 and 3 are estimated. Buoys and slips may be exchanged on a 1:1 basis at marinas or by public agencies.

[3] Private boat ramps are structures that are identical in form to public and quasi-public boat ramps but that function more like a mooring in that generally only a single user/boat launches from that location. Nevertheless, although they function as such, private boat ramps are not moorings and are therefore not included in the mooring cap proposed under Alternatives 1, 3, and 4.

Source: Appendix A

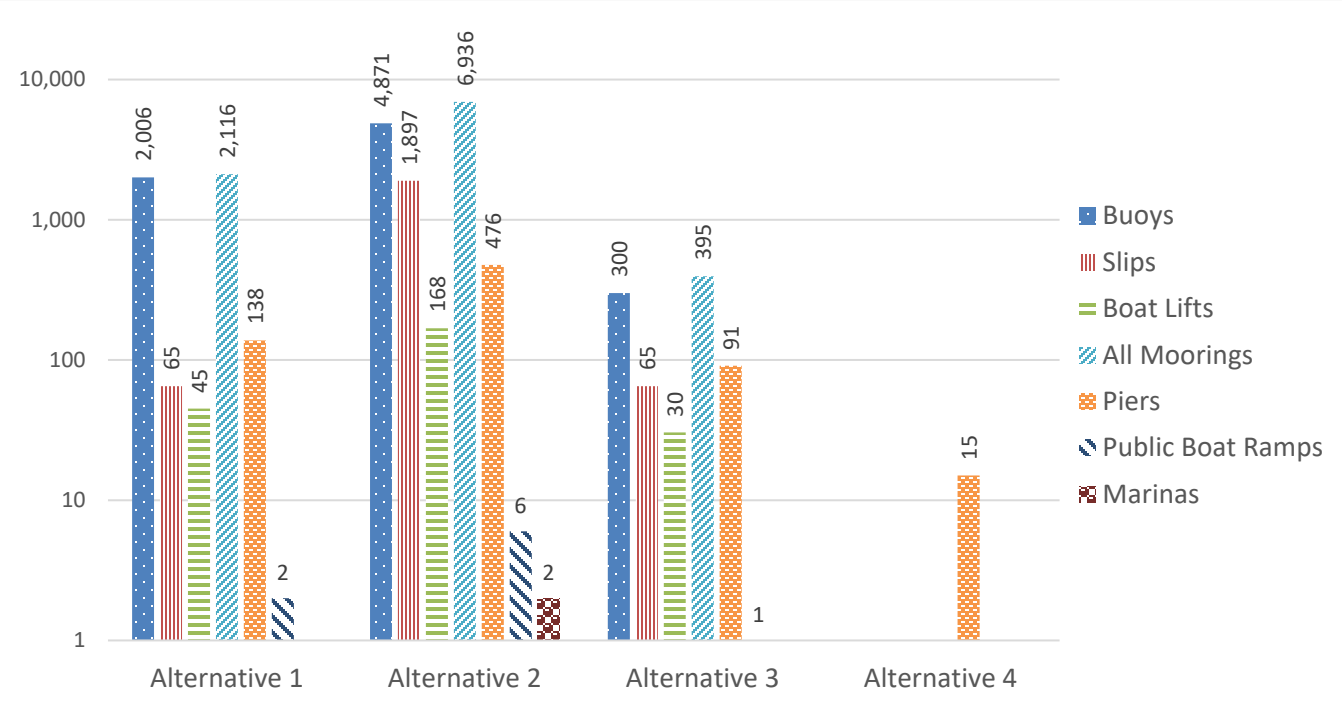


Exhibit 2-7 New Shoreline Structures at Buildout of Each Alternative

New Moorings

Alternatives 1, 2, and 3 would allow different numbers of new moorings (i.e., buoys, slips, and boat lifts). Exhibit 2-8 shows the maximum percent increase in the number of moorings that could be authorized under each alternative.

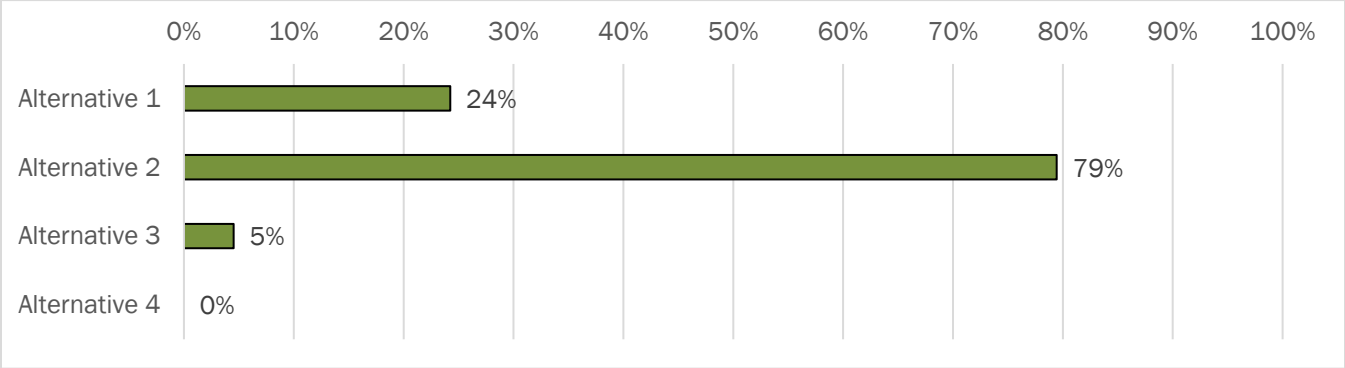


Exhibit 2-8 Estimated Percent Increase in Moorings under Each Alternative

New Piers

Each alternative would authorize a different number of new piers, including single-use, multiple-use, and public piers. The increase in the number of piers under each alternative is shown in Exhibit 2-9.

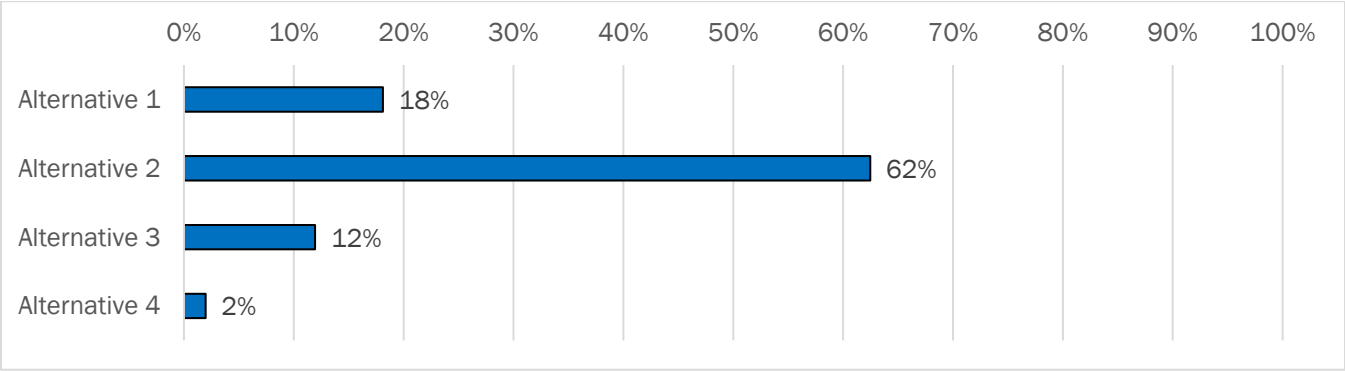


Exhibit 2-9 Estimated Percent Increase in Piers under Each Alternative

New Boat Ramps

Alternatives 1, 2, and 3 would allow new public boat ramps. The maximum percent increase in the number of public and quasi-public boat ramps is shown in Exhibit 2-10.

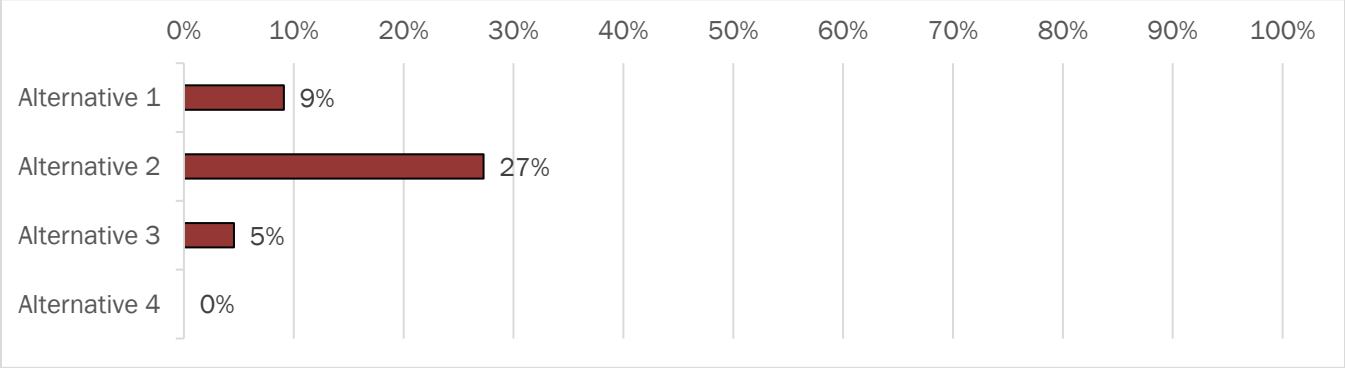


Exhibit 2-10 Estimated Percent Increase in Public or Quasi-Public Boat Ramps under Each Alternative

2.7.2 Projected Boating Activity

Under the Shoreline Plan alternatives, changes in the number of moorings (i.e., buoys, slips, boat lifts, and boat houses) and access points (i.e., boat ramps) would result in changes in the amount of motorized boating activity on Lake Tahoe. To develop a reasonable estimate of changes in boating activity, the Joint Fact-Finding Committee (JFF)—a group of technical experts from public agencies, universities, and stakeholder groups—gathered and assessed available information during a series of public working meetings. The JFF developed estimates of engine-hours (i.e., the amount of time a motorized boat is on the lake with its engine running) and boat trips that would result from each additional mooring or access point developed under a Shoreline Plan alternative. A comparison of the baseline level of boating activity and the boating activity that could result from buildout of each alternative is presented in Table 2-4.

Table 2-4 Projected Boating Activity under Each Alternative

	Project Effects (Peak Day)	Project Effects (Annual)	Buildout (Peak Day)	Buildout (Annual)
Engine-Hours				
Baseline Conditions	12,512	489,155	No change	No change
Alternative 1	+1,584	+77,659	14,096	566,814
Alternative 2	+5,427	+253,105	17,939	742,260
Alternative 3	+469	+18,213	12,982	507,368
Alternative 4	0	0	Same as baseline	Same as baseline
Boat Trips				
Baseline Conditions	5,899	234,102	No change	No change
Alternative 1	+767	+38,257	6,666	272,359
Alternative 2	+2,639	+124,834	8,537	358,936
Alternative 3	+222	+8,820	6,121	242,923
Alternative 4	0	0	Same as baseline	Same as baseline

The estimated increase in boat trips on a peak day (i.e., summer holiday weekend), and on an annual basis is shown in Exhibit 2-11. Additional detail on the data sources, assumptions, and calculations of boating activity is provided in Appendix A.

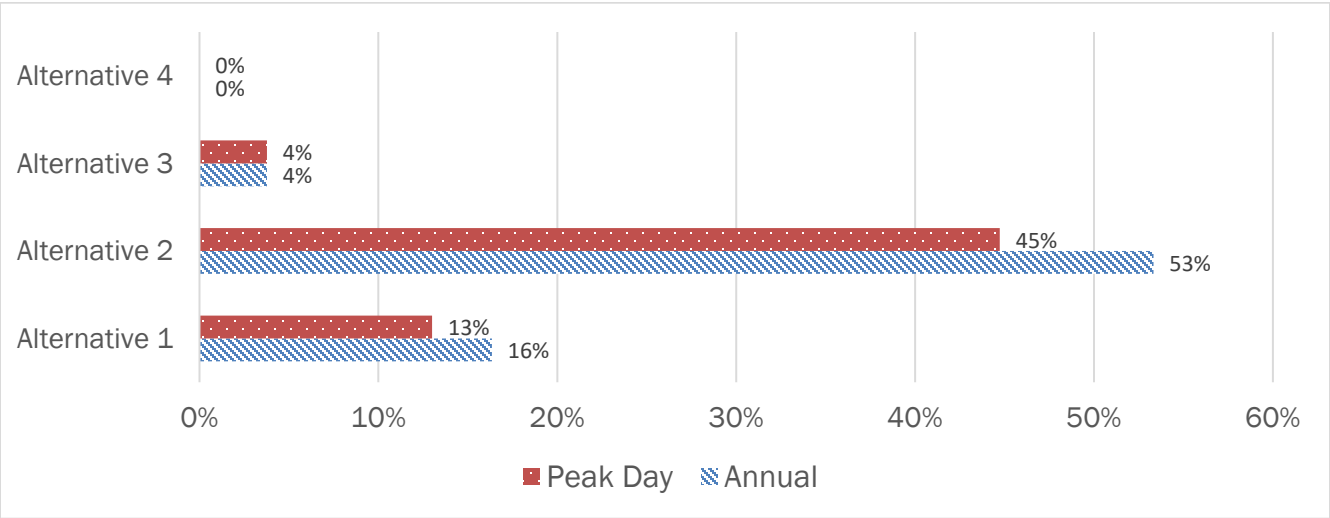


Exhibit 2-11 Estimated Percent Increase in Boat Trips under Each Alternative

2.7.3 Resource Protection Measures

The Shoreline Plan alternatives would include regulatory requirements and management programs that restore and protect natural resources. These provisions are summarized in Table 2-3 and described in greater detail below.

Table 2-3 Resource Protection Measure Comparison

Resource Protection Measures	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Shoreline Protection Areas				
Prohibit placement of new piers within 200 feet of the inlet of the 24 major streams and rivers that drain into Lake Tahoe.	X	X	X	X
Designate shoreline preservation areas that prohibit new private shorezone structures.	X		X	X
Provide incentives for relocation of piers from stream mouths and shoreline preservation areas with multiple-use design standards, and scenic credit for relocated piers.	X		X	
Require consultation with water purveyors for projects within 600 feet of water intakes.		X		
Require consultation with water purveyors for projects within ¼ mile of water intakes.	X		X	X
Marinas				
Require AIS management plans for marina reconfigurations or expansions.	X		X	
Require AIS management plans for all existing marinas.				X
Require marina master plans for expansions of more than 10 moorings		X		
Demonstrate reduction in aquatic invasive species (AIS) habitat conditions and/or reduced need for dredging for marina expansions.	X		X	
Contribute to lake-wide AIS control with marina expansions.	X		X	
Install stormwater best management practices that treat a runoff volume greater than existing TRPA and, if in California, Lahontan RWQCB requirements.			X	X
Require public restrooms, fueling facilities, chemical fire-retardant distribution system, trash receptacles, and pump-out facilities for boat sewage.	X	X	X	X
Connect boat washing facilities, if any, to a sewer system.	X	X	X	X
Piers				
Limit the rate or new pier development.	X		X	
Enforce pier design standards for new and rebuilt piers.	X	X	X	X
Provide incentives for the transfer of piers out of stream mouth protection areas and scenic travel units that are not in attainment of thresholds.	X		X	X
Require minimum of 40-foot setbacks from adjacent pierheads.	X			
Include transfer ratios to allow some shoreline structures to be removed and rebuilt elsewhere with a 2:1 reduction in the number of structures				X
Relocation of Structures				
Allow the relocation or transfer of piers to less sensitive areas as a strategy to attain and maintain environmental thresholds	X		X	X
Allow relocation of existing boat ramps to sites that are better suited to low lake levels	X		X	X
Dredging Requirements				
New dredging only allowed at marinas, public health and safety facilities, and public boat ramps.	X		X	
New dredging only allowed if it is linked to an environmental improvement project.			X	

Table 2-3 Resource Protection Measure Comparison

Resource Protection Measures	Alternative 1	Alternative 2	Alternative 3	Alternative 4
New dredging would only be approved after environmental review and only if significant impacts can be mitigated.	X	X	X	
New dredging could only be allowed if TRPA finds that it is beneficial to water quality.		X		X
Maintenance dredging would be allowed in previously dredged areas where it is necessary to continue an existing use.	X	X	X	X
No-Wake Zone				
Maintain no-wake zone at 600 feet from the water line with a speed limit of 5 mph.	X	X	X	X
Expand the no-wake zone to include all of Emerald Bay.	X		X	X
Increase no-wake zone education and enforcement.	X		X	X
Expand the no-wake zone to 1,200 feet from the water line in front of some parks.				X
Aquatic Invasive Species				
Require that every motorized watercraft be inspected prior to launching on Lake Tahoe.	X	X	X	X
Continue existing aquatic invasive species (AIS) control programs.	X	X	X	X
Include a new funding source to expand AIS control.	X		X	X
Require that all marinas prepare and implement an AIS management plans.				X
Require AIS management plans with marina expansions or reconfigurations.	X		X	
Boater Education Programs				
Provide boater education on no-wake zone, AIS, fueling, bilge, and sewage operations at boat inspections, marinas, and motorized rental concessions.	X		X	X
Require training for marina staff and motorized rental concessions.	X		X	X
Provide information on boater safety, AIS, no-wake zone, and bilge, ballast and fuel practices at all public motorized boat access points.	X		X	X
Prime Fish Habitat Mitigation				
Mitigate prime fish habitat disturbance at a 1.5:1 ratio.	X		X	
Mitigate prime fish habitat disturbance at a 2:1 ratio.				X
Prohibit new structures in prime fish habitat.		X		
Scenic Requirements				
Shoreland areas must achieve minimum contrast ratings as part of a shorezone structure approval	X		X	X
Limits on the maximum visible mass of shorezone structures	X		X	X
Increases in visible mass in the shorezone must be offset, with greater offsets required in shoreline travel units that are not in attainment		X		
Increases in visible mass in the shorezone must be offset, with greater offsets required in more sensitive shoreline character types.	X		X	X
Include a scenic credit banking system to encourage accelerated scenic improvements	X		X	X
Nearshore Water Quality				
Expand monitoring to guide adaptive management of nearshore water quality	X		X	X

2.8 ALTERNATIVES

The following narrative describes the major features of the Shoreline Plan alternatives, including the maximum number, applicable standards, and allocation process for new moorings (i.e., buoys, slips, boat lifts, and boat houses), piers, and boat ramps; low lake level adaptation strategies; designated shoreline protection areas; regulations governing new, expanded, or reconfigured marinas; applicable standards for other shoreline structures; scenic requirements; mitigation strategies; and other features.

2.8.1 Alternative 1 – Proposed Shoreline Plan

Alternative 1 was developed through a collaborative process to obtain consensus from stakeholders, to the extent possible. A steering committee of state, federal, and regional agency leadership representatives and other stakeholders developed the proposed Shoreline Plan through a series of facilitated discussions, incorporating feedback from the TRPA RPIC. The proposed Shoreline Plan includes provisions for most aspects of development within the shorezone, including buoys, piers, marinas, boat ramps, and dredging activities, and aims to adapt shoreline access and use to lower lake levels that are anticipated in the future.

LOW LAKE LEVEL ADAPTATION

The Shoreline Plan would use a tiered approach to adapt to periodic low lake levels over the next 20 years. The approach would authorize different adaptation strategies at each of the following lake level phases:

- **Phase 1:** 6,223 feet LTD. This is the natural rim of Lake Tahoe and the current low lake level used in regional planning.
- **Phase 2:** 6,220 feet LTD. The JFF Committee identified 6,220 feet LTD as an appropriate low lake management level based on a review of the historic low lake levels (an elevation below 6,220 feet LTD has not been observed in 110 years of record keeping) and because it is the lowest lake level expected to occur during the next 20 years based on the average of multiple forecasts included in the U.S. Bureau of Reclamation *Truckee Basin Study: Basin Study Report* (Reclamation 2015). An elevation of 6,220 feet LTD is considered low for planning decisions and policy development, intended to accommodate some access during low lake levels.
- **Phase 3:** Below 6,220 feet LTD. Lake elevations below 6,220 feet LTD would be considered too low to provide access. In some years, the lake surface elevation may drop so low that boating and other access cannot reasonably be provided. When lake levels drop this low, access to the lake would necessarily be restricted, and private shoreline structures would not be expected to accommodate access.

Low lake level adaptation under Phases 1 and 2 would accommodate watercraft up to 30 feet long, which is the approximate average length of boats on the lake. The proposed Shoreline Plan would, to the extent feasible based on site-specific considerations, allow for the reconfiguration of some structures such that they would be operational at Phase 2 lake levels. During periods of Phase 2 lake levels, boats would be directed to marinas and public ramps that are operational at such elevations, clustering access near areas with infrastructure and transportation options. The following list of low lake level adaptation strategies would be included under Alternative 1:

- Marina buoy fields would be able to include an additional row of lakeward anchors to accommodate low lake levels. Buoy floats could be relocated to the lakeward anchors during low lake levels without increasing the total number of buoys.
- Marinas would be allowed to use temporary floating pier extensions to provide access for boats when lake levels fall below 6,225 feet LTD.

- Permits would be streamlined and fees would be reduced for marinas that make accommodations to provide access for private property owners who cannot access private moorings during low lake level conditions (see the section titled "Marina Expansions and Reconfigurations," below, for more details).
- Individual parcels could add an additional buoy block that would allow property owners to relocate a buoy float to deeper water during low lake level conditions without increasing the total number of buoys.
- Public boat ramps could be expanded to extend farther into the lake, subject to permit conditions.
- New dredging could be allowed at marinas, public boat ramps, and essential public health and safety facilities subject to protective findings and permit conditions.

SHORELINE PROTECTION AREAS

Shorezone Preservation Areas

The proposed Shoreline Plan would designate some public lands as Shorezone Preservation Areas (Exhibit 2-11) and would prohibit construction of private shorezone structures in such areas.

Stream Mouth Protection Areas

TRPA Code (Sections 84.5.1.B, 84.6.1.B, 84.7.1.B, 84.8.1.B, and 84.9.2) prohibits the placement of new piers, boat ramps, buoys, floating platforms, and general multiple-use facilities within 200 feet of the inlet of the 24 major streams and rivers that drain into Lake Tahoe (Exhibit 2-12). The proposed Shoreline Plan would maintain the prohibition on these shorezone structures in stream mouth protection areas and would expand the provision to encompass all mooring types. It would also provide new incentives to encourage the relocation of existing piers from these areas, by allowing relocated single-use piers to qualify for multiple-use design standards (i.e., those standards that would apply to a pier serving two parcels; see Table 2-5) and by offering upland scenic credits for relocated piers, as described below.

Water Intake Protection Areas

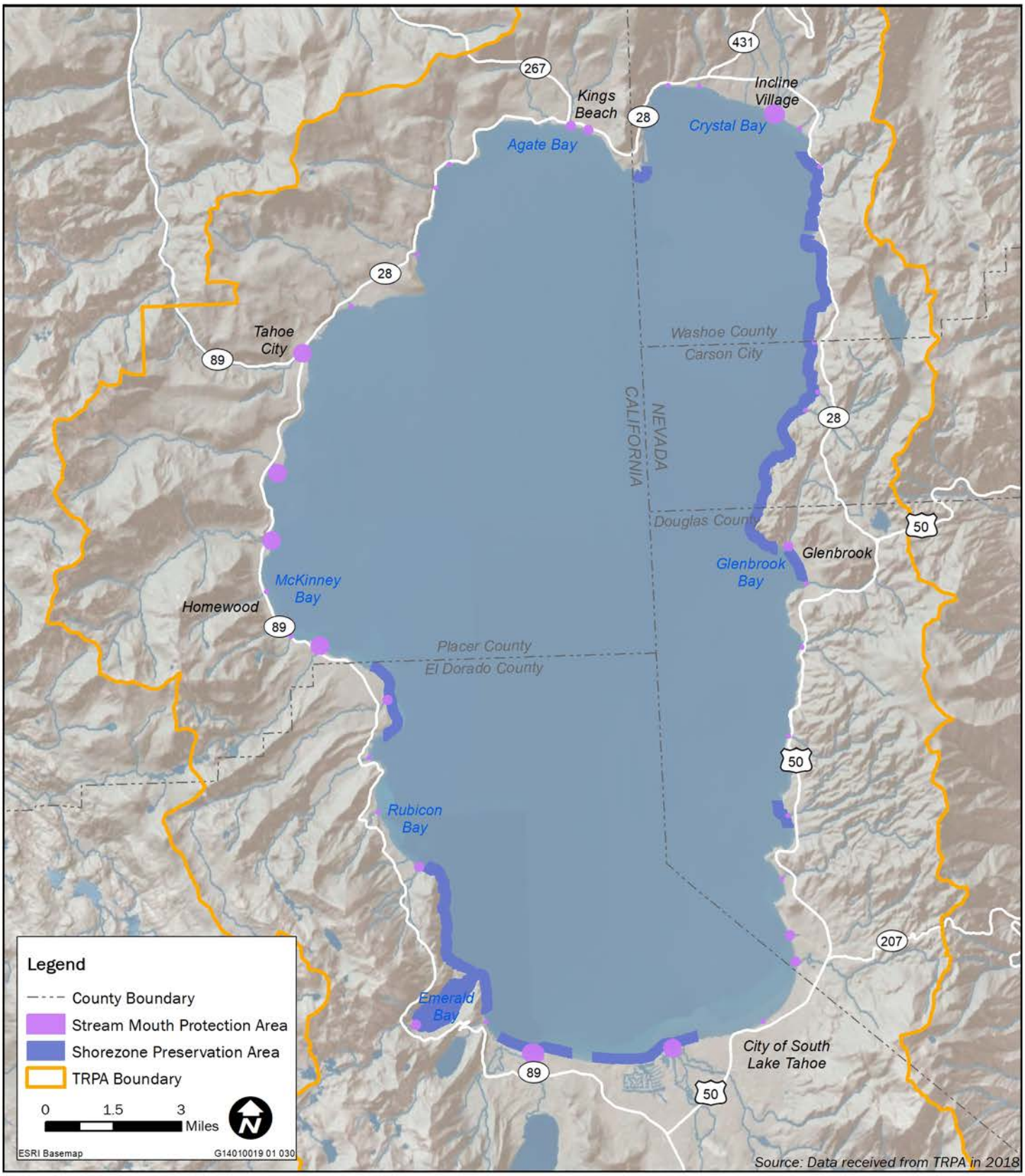
TRPA Code Section 60.3.3 requires that TRPA consult with water purveyors when evaluating applications and development of permit conditions for any proposed shoreline structure within 600 feet of a drinking water intake. The proposed Shoreline Plan would expand this requirement to apply to any proposed shoreline structure within one quarter mile of a drinking water intake.

MOORINGS

The proposed Shoreline Plan would regulate all structures that allow for overnight mooring of watercraft on Lake Tahoe (i.e., buoys, slips, lifts, and boat houses). It would establish a numerical cap of up to 10,847 moorings, of which 2,116 would be new structures allowed by the plan. Most of these new moorings would be buoys. A smaller proportion of the new moorings would be new slips at marinas or public facilities and new boat lifts associated with new or existing piers. Boat houses would be prohibited by way of the prohibition on superstructures and limits on visible mass.

Watercraft moored overnight would be required to moor to legally existing buoys, slips, boat lifts, or other watercraft storage facilities, except in the following cases:

- mooring of construction watercraft for purposes of and use during TRPA-authorized construction activities;
- mooring of public service watercraft for health and safety purposes; or
- mooring of watercraft for occasional overnight purposes, limited to up to 72 hours within a 2-week period.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-12 Shorezone Protection Areas

SHORELINEPLAN

Buoys

The proposed Shoreline Plan would recognize the continued use of legally existing buoys (i.e., those with an existing permit or placed on the lake before 1972) and authorize up to 2,116 new buoys. The actual number of new buoys would likely be less than 2,116 because this figure represents the cap on moorings of all types; the construction of slips or boat lifts would reduce the number of new moorings available for buoys. This alternative would establish a permitting and allocation process intended to limit the pace of new buoy approvals and would provide an equitable distribution of new buoys between marinas, public agencies, private littoral parcel owners, and HOAs. It would establish location standards for the placement of buoys and implement an enforcement program to remove illegal buoys from the lake.

Buoy Permitting and Allocation

The Shoreline Plan would first issue permits to existing buoys that do not have a TRPA permit based on presentation of (a) a valid buoy permit issued by a federal or state agency with appropriate jurisdiction or (b) clear evidence of the existence of the buoy(s) before 1972. The maximum number of existing buoys that could be recognized for a littoral parcel would be:

- up to three buoys allowed for littoral parcels greater than 50 feet in width (approximately 61 parcels fit this criterion) and
- up to two buoys allowed for littoral parcels less than 50 feet in width.

For non-littoral parcels, buoys placed before 1972 would be recognized only after the applicant has received authorization from the applicable California or Nevada state agency with jurisdiction at Lake Tahoe.

All buoys would be required to conform to the location standards for new buoys described below, unless the existing buoy location does not interfere with the buoys of adjacent property owners and relocating them would not create adverse environmental impacts.

TRPA would then announce a second call for new buoy applications. Initially, up to 800 new buoy permits would be issued, and the remainder (up to 1,316) would be held in a reserve pool. Marinas would have sole access to 330 of the reserved buoys, which would be set aside to incentivize environmental improvements at marinas (see the section titled “Marina Expansions and Reconfigurations,” below, for details on environmental improvements). All potential applicants, including public agencies, would have access to the other 986 buoys in the reserve pool. Public agencies would also be provided an allotment from the reserve pool, the number of which would be determined based on current and projected mooring needs at each public facility. Any buoys allotted to marinas and public agencies could be converted to slips, and in that instance, they would be subtracted from the buoy cap such that the conversion would not result in additional moorings.

HOAs would be allowed to apply for new buoys in buoy fields. In the first five years of Shoreline Plan implementation, HOAs that have buoys for 50 percent or more of the applicable housing units would not be eligible to apply for new buoys. For HOAs that are eligible to apply in the first five years, the request for new buoys could be up to a 20 percent increase of the total number of existing TRPA-permitted moorings (buoys, slips, boat lifts, and boat houses). After the first five years, HOAs with buoys for 50 percent or more of the applicable housing units could apply for additional moorings, provided the total number of moorings does not exceed the number of units.

Through an adaptive management review process, allocation of all buoys, including the reserve pool and allocation to associations, would first be revisited the year after the 2019 Threshold Evaluation Report is issued. Future evaluation of buoy allocations would occur at a minimum interval of every 8 years after the first evaluation.

Buoy Location Standards

Buoys may be placed either within a buoy field or outside of a buoy field, lakeward of individual littoral parcels. Buoys outside buoy fields could be located up to 600 feet lakeward from elevation 6,220 feet LTD,

measured perpendicularly to the shore. Buoys would be required to be located a minimum of 20 feet from adjacent property boundaries and a minimum of 50 feet from other legally existing buoys. For properties located within coves, each littoral parcel would be limited to one buoy, if inferred parcel boundary projection lines would prohibit placement of a buoy based on its proximity to adjacent property boundaries. For constricted parcels unable to meet setback or spacing requirements, TRPA may adjust property projection lines on a case-by-case basis.

A parcel outside of a buoy field could have up to three permanent anchor blocks for flexibility in positioning buoys floats as long as there were only two moorings at any one time. Other locational requirements (up to 600 feet lakeward and at least 50 feet from other buoys) would need to be met.

All buoys serving HOAs or commercial or tourist uses would continue to be required to be in a buoy field. Buoy fields would be designed in a grid using the same setback and spacing standards as for littoral parcels (a minimum 20 feet from adjacent property boundaries and a minimum 50 feet from other legally existing buoys) and 300 feet in width. TRPA could approve deviations from these standards based on site-specific considerations, including neighboring uses and structures, state permit requirements, U.S. Coast Guard recommendations, navigational considerations, and bathymetric constraints.

Marina buoy fields would have to comply with the same placement standards as other buoy fields, although they could extend further lakeward (more than 600 feet from 6,220 feet LTD), if consistent with existing authorizations. Marina buoy fields would be able to include additional rows of lakeward anchors to accommodate low lake level adaptation. Buoy floats could be relocated from landward anchors to lakeward anchors during low lake conditions without increasing the total number of buoys.

Buoy Enforcement

After the first call for buoy permits that would allow applications for existing buoys, TRPA, in coordination with state and federal agencies that have jurisdiction over the lake, would implement a buoy enforcement program. This program would prioritize the identification and removal of buoys that were placed on the lake after 1972 and do not have permits from TRPA, state agencies, or the U.S. Army Corps of Engineers.

Slips

No new individual private boat slips would be permitted. Marinas and public agencies could exchange new or existing buoys for slips on a 1:1 basis.

Boat Lifts

New boat lifts could be authorized through a new pier or pier reconfiguration permit. New boat lifts would count toward the total mooring cap (Table 2-1). Single-use piers could be allowed up to one boat lift, and multiple-use piers could be allowed up to four boat lifts. All new boat lifts would be subject to limitations on the total number of mooring per littoral parcel (described above under “Buoys”), and limitations on allowable visible mass (Table 2-5).

PIERS

The proposed Shoreline Plan would allow a maximum of 128 new private piers and 10 new public piers to be constructed along the shoreline. It would include distribution and density standards intended to result in an equitable distribution of new piers around the lake and limit the number of piers within visually sensitive scenic character types. The plan would include incentives for multiple-use piers that provide access to more than one property owner, and it would include provisions that would result in the retirement of pier development potential through deed restrictions. The proposed Shoreline Plan would regulate the rate of new pier approvals and would institute pier design standards intended to protect navigation, recreational access, and limit scenic impacts. It would also include incentives to restore stream mouths and areas with degraded scenic conditions by encouraging the transfer of existing piers out of stream mouth protection areas and scenic travel units that are not in attainment of threshold standards. Private piers could not be used for permanent boat moorage, therefore piers would not directly affect boating levels on Lake Tahoe.

Table 2-5 Alternative 1 Pier Design Standards

Specification	Single Use	Multiple Use[1]			
		Serves One to Two Units	Serves Three to Four Units or Two Littoral Parcels	Serves Five to 20 Units or Three Littoral Parcels	Serves More Than 20 Units or More Than Four Littoral Parcels
Length[2]	To 6,219 feet LTD or pierhead line, whichever is more limiting	Same as single use	To 6,219 feet LTD or 30 feet lakeward of pierhead line, whichever is more limiting	To 6,219 feet LTD or 30 feet lakeward of pierhead line, whichever is more limiting	To 6,219 feet LTD or 30 feet lakeward of pierhead line, whichever is more limiting
Width	Maximum 10 feet	Same as single use	Maximum 15 feet[3]	Maximum 15 feet[3]	Maximum 15 feet[3]
Side setback	Minimum 20 feet from each property edge for new piers, and 5 feet from property edge for existing piers	Same as single use			
Visible mass[4]	Maximum 220 square feet	Same as single use	Maximum 400 square feet	Maximum 460 square feet	Maximum 520 square feet
Location	Minimum 40 feet from any other pier, measured at the pierhead	Same as single use			
Catwalk	Maximum 3 feet wide and 30 feet long	Same as single use	Maximum 3 feet wide and 45 feet long	Maximum 3 feet wide and 45 feet long	Maximum 3 feet wide and 45 feet long
Boat lift	1 allowed	Same as single use	Up to 4 allowed	Up to 4 allowed	Up to 4 allowed

[1] Residential units may have access to a pier structure, even if they are located in the upland. Upland units are eligible for a multiple-use pier at the development standards identified above. Littoral parcels also have access to multiple-use pier structures at the development standards identified above. Note that more than one residential property can be located on a single littoral parcel. These development standards have been identified to limit the size of a pier serving multiple upland units that have only one littoral parcel.

[2] If an applicant (including marinas) needs additional pier length for proper function, TRPA standards would allow up to an additional 15 feet lakeward of the pierhead line, provided that the increase in water depth over the additional 15 feet is a minimum of 0.5 foot, or 6 inches (equal to 3-percent grade).

[3] The visible mass calculations must include catwalks, but a boat lift, boat, and safety railings do not have be included. Visible mass above the limits specified above must be mitigated.

[4] Flexibility in the design of the pierhead is allowed for multiple-use piers to accommodate multiple simultaneous users. The pierhead design must be included in the visible mass calculation.

Public Piers

Up to 10 new public piers could be constructed under the proposed Shoreline Plan. Because public piers provide a public benefit, applications for public piers would be evaluated on a case-by-case basis. Design standards for public piers are not proposed; however, design standards for multiple-use piers (described below) could serve as a guideline for the review of public pier applications. Public piers could exceed design standards that apply to private multiple-use piers to the extent necessary to provide a public service, such as emergency access, public access during low lake conditions, or public transportation. All public pier applications would be subject to environmental review, and the approval of public piers would be based on the proposed location, objectives, public benefit, consistency with adopted plans, and environmental impacts of the proposed pier. Allocation of public piers would not be dependent on jurisdictional boundaries; that is, a valid public pier proposal could occur anywhere on the lake and would not be constrained by the existing density of public piers in the county in which it is proposed.

Private Piers

Up to 128 new private piers could be constructed under the proposed Shoreline Plan, consistent with eligibility criteria. A private littoral parcel could be eligible for a new pier if that parcel is not deed-restricted to prevent pier development, there is not already a pier on the property, and setback and locational requirements could be met. The placement of new private piers would be restricted to areas outside of stream mouth protection areas and shorezone preservation areas.

Littoral parcels in an HOA that already have access to an HOA pier would also be eligible to apply for a new pier, provided that the application would retire pier development potential through a deed restriction on at least one other littoral parcel. Within a visually sensitive shoreline character type, a littoral parcel in an HOA with an existing pier would be required to retire pier development potential on at least two other littoral parcels within the same scenic travel unit.

Private Pier Distribution and Density

The 128 new private piers would be distributed around Lake Tahoe based on jurisdictional boundaries as shown in Table 2-6. The number of piers that would be allocated to each jurisdiction is based on the proportion of parcels eligible for piers within that jurisdiction. To reduce the potential scenic impacts of piers, only multiple-use piers would be allowed in visually sensitive shoreline character types, up to the limits shown in Table 2-6. In addition, each pier would be required to be a minimum of 40 feet from any adjacent pier.

Table 2-6 Private Pier Distribution under Alternative 1

Location	Total	Percent of Allocation[1]	Allowed in Visually Sensitive Character Types
California	**86**	**67**	**13**
Placer County	58	45	7
El Dorado County	28	22	6
Nevada	**42**	**33**	**6**
Washoe County	21	16	3
Douglas County/Carson Rural Area	21	16	3
All	**128**	**100**	**19**

Notes: [1]Percent does not add to 100 due to rounding

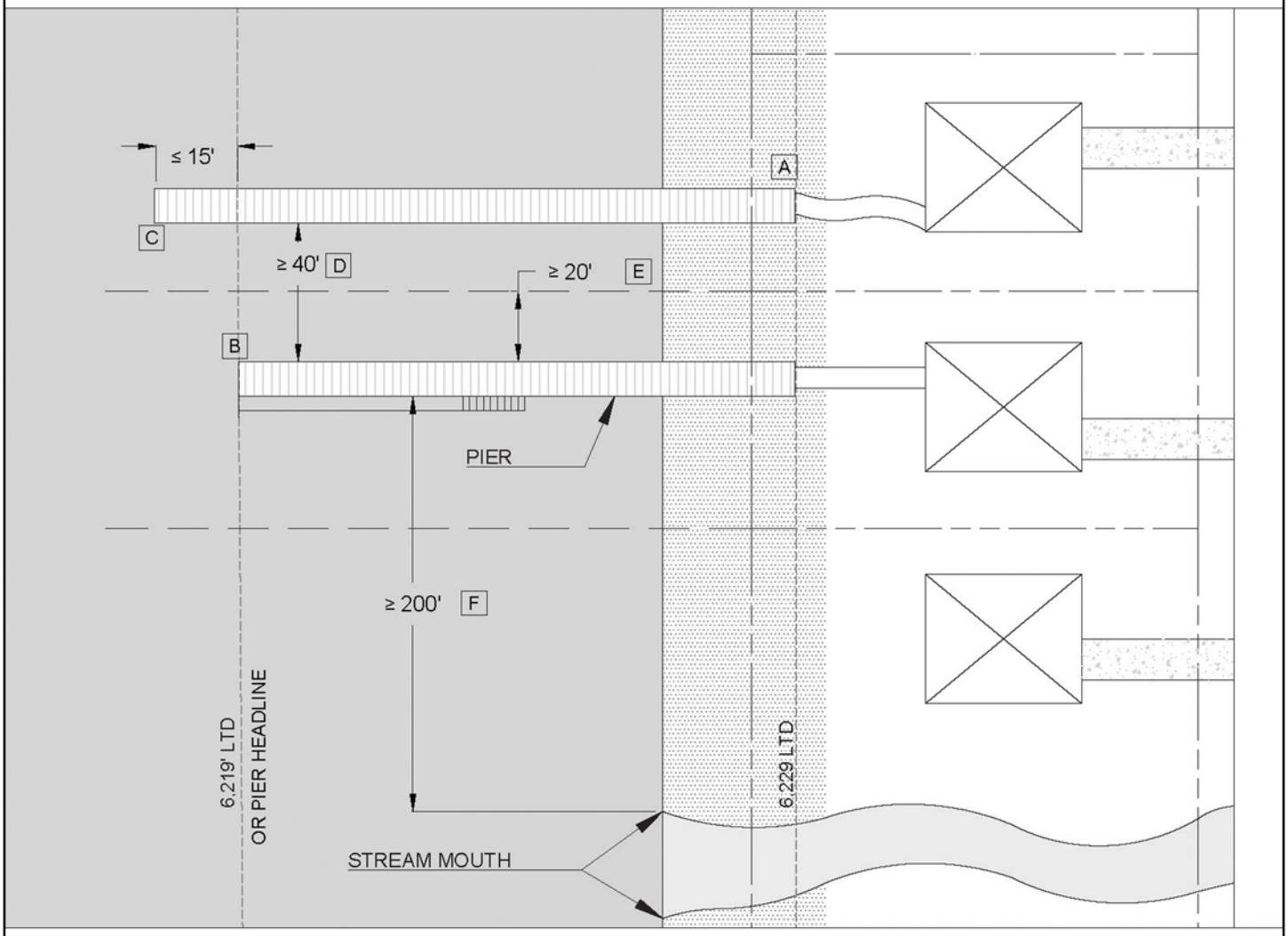
Private Pier Design Standards

All new private piers would have to comply with the applicable design standards shown in Table 2-5 and Exhibits 2-13 and 2-14. To incentivize owners and operators of piers that provide access for more than one littoral parcel owner, multiple-use piers would be allowed to comply with different design standards depending on the number of littoral parcels or HOA units (i.e., residences) served by the pier (Table 2-5).

PIER DESIGN STANDARDS NOTES:

A) PIER DECKS NOT TO EXTEND VERTICALLY ABOVE 6,232' LAKE TAHOE DATUM
B) PIER DECKS SHALL EXTEND NO FARTHER LAKEWARD THAN 6,219' LAKE TAHOE DATUM OR THE PIERHEAD LINE
C) AN ADDITIONAL 15' LENGTH IN PIER MAY BE GRANTED IN SOME CIRCUMSTANCES, REFER TO CODE SECTION 84.4.3.B.2.B
D) 40' MINIMUM SETBACK REQUIRED FROM OTHER PIERS
E) 20' MINIMUM SETBACK REQUIRED FROM ADJACENT PROPERTY
F) 200' SETBACK REQUIRED FROM STREAM MOUTHS

WATER
SHORE
PROPERTY LINE
PROPERTY LINE PROJECTION



Source: Provided by TRPA in 2018

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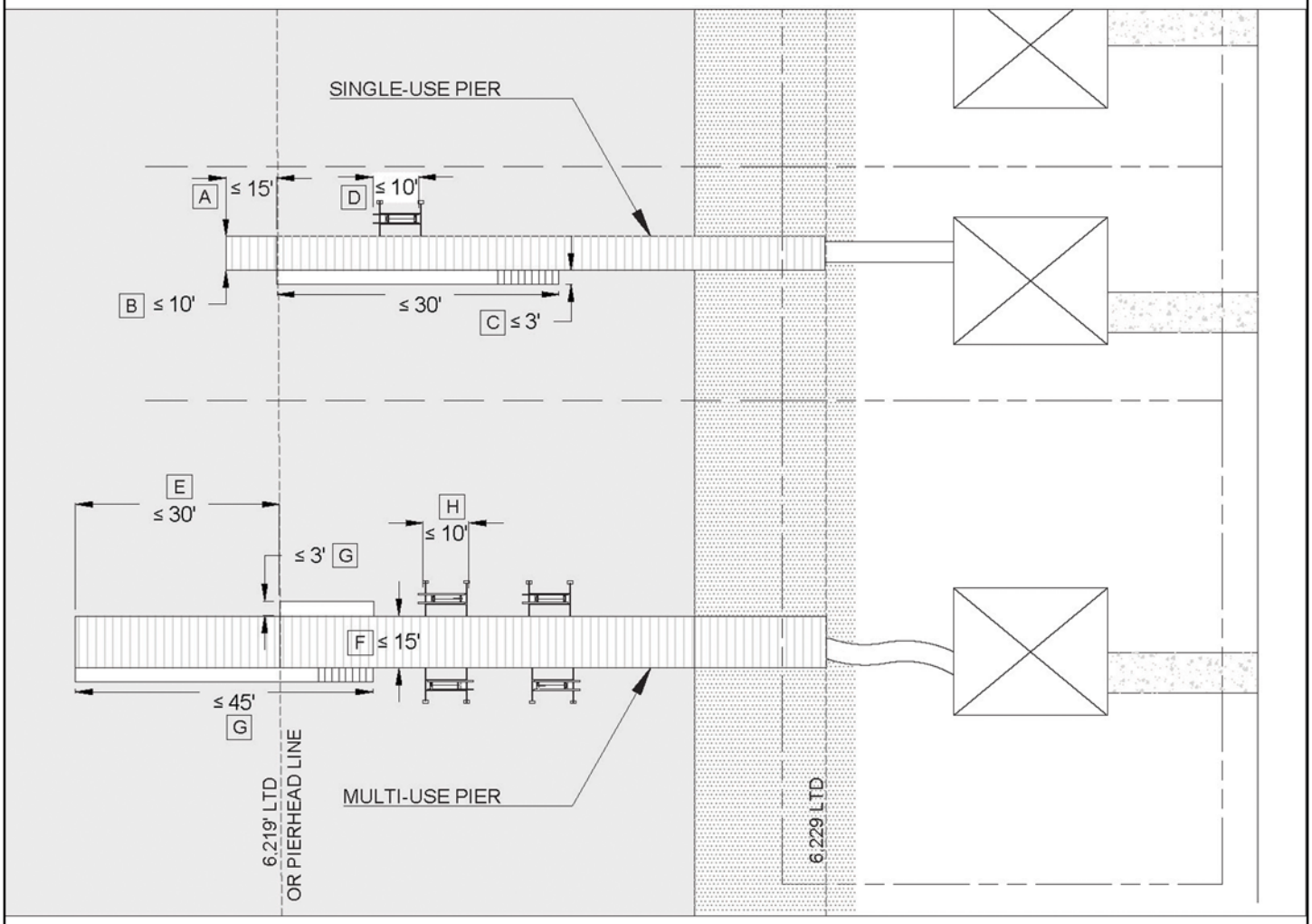
TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-13 Pier Location Standards

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

SINGLE-USE PIER NOTES:

A) PIERS SHALL EXTEND NO FURTHER THAN 6,219 LTD OR PIERHEAD LINE, WHICHEVER IS MORE LIMITING, 15' ADDITIONAL LENGTH MAY BE CONSIDERED
B) PIERS MAY BE UP TO 10' IN WIDTH
C) PIERS MAY HAVE ONE CATWALK, UP TO 3' WIDE AND 30' LONG.
D) PIERS MAY HAVE ONE BOAT LIFT WITH FORKS MAXIMUM 10' LONG



MULTI-USE PIER NOTES:

E) PIERS AND CATWALKS SHALL EXTEND NO FURTHER THAN 6,219 LTD OR PIERHEAD LINE, 30' ADDITIONAL LENGTH MAY BE CONSIDERED
F) PIERS SHALL BE A MAXIMUM OF 15', NOT INCLUDING CATWALK
G) PIERS MAY HAVE UP TO TWO CATWALK,S UP TO 3' WIDE AND 30' LONG FOR PIERS SERVING 2 PARCELS, AND 45' LONG FOR PIERS SERVING 4.
H) PIERS MAY HAVE ONE BOAT LIFT PER PARCEL, UP TO 4, WITH FORKS MAXIMUM 10' LONG

Source: Provided by TRPA in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 2-14 Single- and Multiple-Use Pier Design Standards

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Rate of Private Pier Development

New private piers would be authorized gradually to allow for the periodic assessment of the effects of the proposed Shoreline Plan. Initially, TRPA would allow for the approval of up to 96 of the 128 new private piers over a 16-year period, at a rate of up to 12 approvals every two years. If during a two-year period fewer than 12 piers are permitted, the remaining balance would roll over to subsequent years. TRPA would review the allocation of piers, including monitoring the geographic distribution of new piers and evaluating pier availability. The review of pier allocations would occur as part of the existing four-year TRPA threshold evaluation process and through a new eight-year pier and buoy permitting activity report. Authorization of the remaining 32 new private piers (after the 96 piers authorized in the first 16 years) would depend on the amount of pier development potential retired. Exhibit 2-15 depicts the rate of private pier development and the cumulative number of new piers that could be developed.

Retirement of Pier Development Potential

The proposed Shoreline Plan includes requirements for the deed restriction of littoral parcels in some cases, which would prevent future development of piers on some parcels. Two types of pier applications would be accepted: single-parcel pier applications (i.e., those that do not retire pier development potential) and multiple-parcel (i.e., those that retire pier development potential through deed restricting another parcel). The term "multiple-parcel" in this context means that at least one parcel would become deed-restricted through the permitting process, thereby precluding future pier development on that parcel.

Private pier permit applications would be prioritized and allocated depending on the type of application. Of the 128 private piers that could be approved, 20 percent (or 26) would be allocated to single-use piers, and 80 percent (or 102) would be reserved for multiple-parcel piers. This allocation mix is intended to help reduce overall pier development potential. The process of obtaining and retiring pier development rights could be more time consuming than single-parcel pier applications; therefore, it is expected that in the early years of program implementation, there would be more single-parcel pier applications than multiple-parcel pier applications. After the 26 single-parcel pier allocations have been issued, only multiple-parcel applications would be considered by TRPA. For every eight multiple-parcel pier applications that are approved (which would translate into a minimum of eight new deed-restricted properties), three additional pier allocations would be released starting after the initial 16-year period, until the 128-pier cap is reached. Under this rate defined by this allocation system, the earliest possible buildout year would be 2040.

Prioritization of Private Pier Applications

Under the proposed Shoreline Plan, TRPA would prioritize private pier applications based on how much development potential the application would retire and the number of parcels served by the pier. Pier applications would then be processed according to the priority they receive. If more than 12 pier applications are received during a two-year period, those applications that receive a lower priority would not be processed during that two-year period. Applications would be prioritized in the following order:

1. Private pier applications that deed-restrict other parcels to retire pier development potential (i.e., multiple-parcel applicants) as follows:

    a. Applications that propose to retire the most development potential within the same shoreline character type, within the same scenic travel unit;

    b. Applications that retire the most development potential, regardless of shoreline character type and unit;

    c. Applications in shoreline character types from least to most sensitive (i.e., beginning with "visually dominated," then "visually modified," and finally "visually sensitive"); and then

    d. Multiple-parcel applications that already have access to an HOA pier.

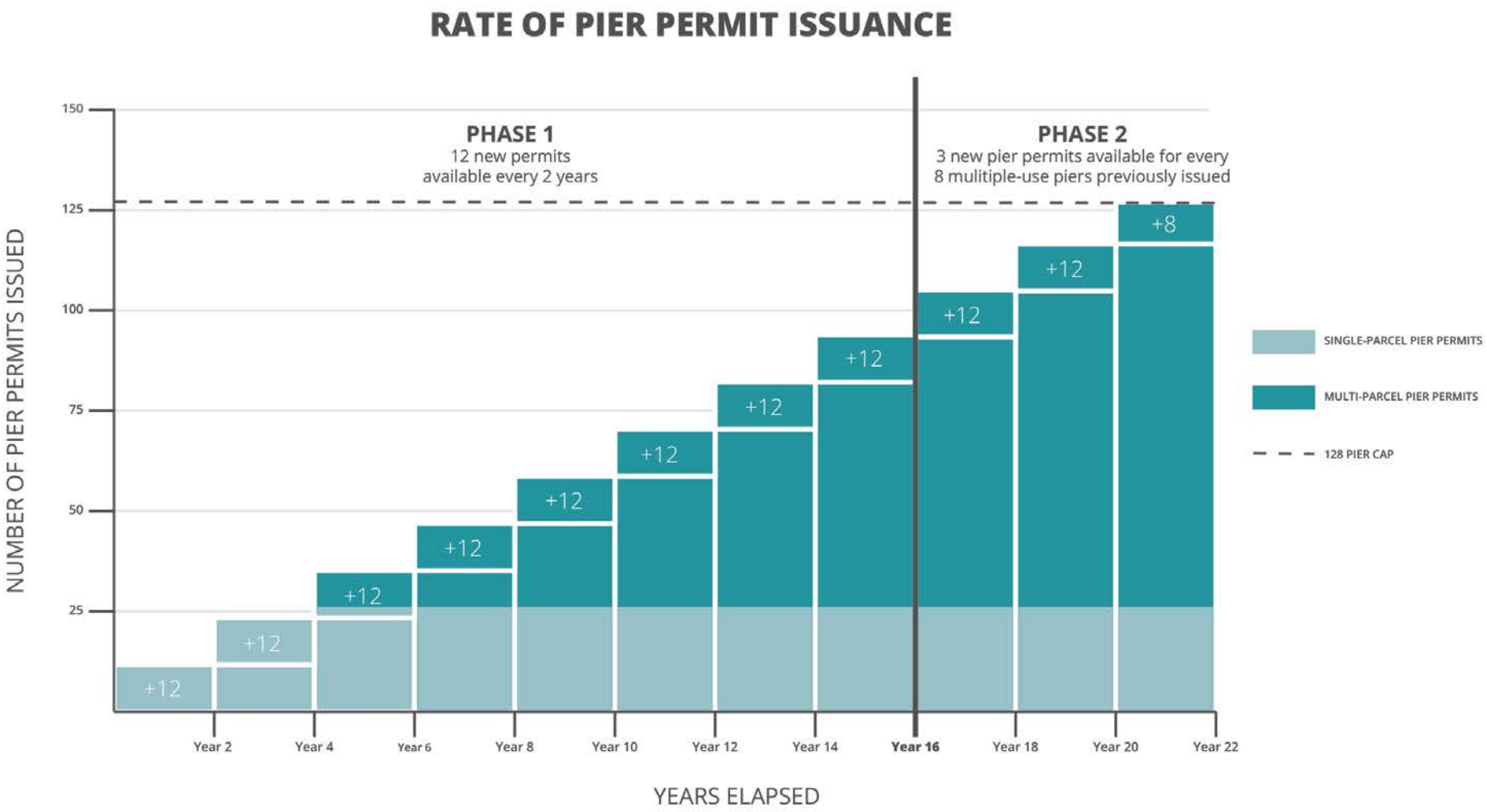


Exhibit 2-15 Rate of Private Pier Development

2. After multiple-parcel applications, the next priority would be given to applications that serve the greatest number of users, to encourage an increase in lake access.

3. Last priority would be given to single-use piers that do not retire pier development potential. Applications would be considered by priority criteria, as identified above. If over the two-year application window, there are more single-use pier applications that do not retire development than there are allotted permits, they would be processed by lottery.

Commercial and Tourist Accommodation Piers

Commercial and tourist accommodation piers would be allocated from the pool of 128 private piers. Applications for new piers associated with commercial or tourist accommodation uses would be prioritized as a part of the private pier application and allotment process, described above, regardless of whether they are proposed as publicly accessible or restricted to patrons or a specific user group. Commercial and tourist accommodation piers would be allowed only when the upland use also includes a commercial use. Eligible piers that do not allow public access would be restricted to single-use design standards, whereas eligible piers that are open to the public could be designed to multiple-use design standards for four or more littoral parcels (20 or more residential units).

Pier Relocations, Transfers, and Conversions

The proposed Shoreline Plan would allow the relocation or transfer of piers to less sensitive areas as a strategy to attain and maintain thresholds. Pier relocation refers to replacement of an existing pier with a new pier in a different location on the same parcel, whereas pier transfer is the construction of a new pier on a parcel that does not currently have one in exchange for removal of a pier on a different parcel. Under the proposed Shoreline Plan, piers could be relocated or transferred within the same scenic unit or to another scenic unit that is in attainment of scenic threshold standards. Piers could not be transferred to a scenic unit that is out of attainment. Relocated or transferred piers would have to meet all location and design criteria for a new pier (Table 2-6). When a pier is transferred or relocated, the old pier would be removed and the area restored to a natural condition. In the case of pier transfers, the sending parcel would become deed-restricted to prevent future pier development. TRPA would encourage pier owners to relocate piers out of stream mouth protection areas through incentives, including offering multiple-use design standards consistent with a two-parcel pier for a single-use pier or providing upland scenic credits. For pier transfers, both the sending and receiving parcels would have to meet scenic requirements for new piers.

For a pier transfer, boat lifts from the sending parcel could be relocated to the receiving parcel, regardless of the number of moorings already located on the receiving parcel. Although a combined pier and boat lift transfer could cause the number of moorings on the receiving parcel to exceed the cap for a littoral parcel (three), the total number of moorings on Lake Tahoe would not change.

“Conversion” refers to the removal of a boat ramp and replacement with a pier. Conversions would continue to be allowed as they are under the existing code. Relocated, transferred, or converted piers would not count as new piers allocated under the plan.

Pier Expansions and Modifications

Existing piers that conform to location and design standards could be expanded under the proposed Shoreline Plan, to the extent allowed for new piers. Existing piers that do not conform to the location and design standards could not be expanded unless (1) the expansion is limited to the scenic improvement of an existing boat house and does not increase the functional capacity of the pier, (2) the effect of the expansion is to increase contrast rating of the structure (described below under “Scenic Requirements”), and (3) the expansion is the absolute minimum necessary to accomplish the scenic quality improvement. Existing piers that do not conform to location and design standards could be modified if the modification results in a material environmental benefit, brings the structure into greater compliance with location and design standards, and does not increase the degree of nonconformance with any location and design standard.

Flexibility in pier design at marinas would be allowed based on site-specific navigation and environmental considerations. Marina pier extensions would be reviewed on a case-by-case basis and subject to the following requirements:

- A marina pier must serve the public.
- A marina pier extension must not adversely affect safe navigation.
- All impacts of a marina pier extension must be mitigated.

A marina pier may be extended 15 feet lakeward if the drop-in substrate (i.e., additional water depth) within the additional 15 feet is a minimum of 6 inches (minimum of 3 percent). Additional extensions may be allowed if the average slope in the area being extended is a minimum of 3 percent. However, the total length of a marina pier may not exceed 1,000 feet. A marina pier extension for the sole purpose of facilitating waterborne transit would be considered during the environmental review of the waterborne transit plan or project.

BOAT RAMPS

Under the proposed Shoreline Plan, up to two new public boat ramps would be allowed. Applications for new public boat ramps would be considered by TRPA based on the merits of the proposed site selected. This review would consider the existing geographic distribution of boat ramp access, the relationship of the proposed ramp to upland development centers and transportation hubs, and the suitability of the site to accommodate access during periods of Phase 2 low lake levels of 6,220 feet (e.g., depth, bathymetry).

TRPA would allow relocation of existing public boat ramps to new sites that are better suited to low lake levels. Where feasible, public ramps may extend farther into the lake to allow operation during fluctuating lake level conditions. TRPA and ramp operators would encourage nonmotorized boaters to use boat ramps that are not functional for motorized boats during periods of low water, provided there is adequate upland facilities for parking and access to the ramp.

MARINA EXPANSIONS AND RECONFIGURATIONS

No new marinas would be allowed under the proposed Shoreline Plan, and the current requirements for marina master plans would be eliminated. Instead, marina reconfigurations or expansions (including adding moorings) would be permitted only if the marina implements a series of environmental improvements.

Marina expansions and reconfigurations would be allowed only if the marina is certified as a “clean marina” by the Clean Marina Program, an organization that educates, assists, and certifies marina compliance with best management practices (BMPs) to reduce the potential for pollution (see www.cleanmarina.org for more information). In addition to being certified as a clean marina, a marina seeking a reconfiguration or expansion would be required to develop and implement an AIS management plan. The plan would incentivize environmental improvements for marinas seeking expansions, such as:

- demonstrating flow improvements/reduction of AIS habitat conditions and/or reduced need for dredging;
- contributing to existing lakewide AIS control efforts;
- providing a boating rental and operations fleet that meets U.S. Environmental Protection Agency and/or California Air Resources Board standards, including electric boats;
- providing boater education of the 600-foot no-wake zone, boater safety, and clean boating practices;
- providing public access to marina fueling and/or pump-out stations;

- installing stormwater BMPs that treat a runoff volume greater than existing TRPA requirements, and, if in California, Lahontan RWQCB requirements;
- providing additional scenic improvements, such as rack or storage screening;
- providing boat ramps for public use, and if a ramp is not functional for motorized boating because of low lake level conditions, providing access for nonmotorized boaters;
- providing dedicated parking for nonmotorized boaters;
- demonstrating a low lake level capacity improvement;
- providing nonmotorized boat storage for public use;
- installing an electric charging station for boats and/or cars; and/or
- reducing on-site coverage.

If marina expansions add capacity or make other provisions to accommodate private property owners who cannot access private moorings during low lake level conditions, they would not be required to provide additional environmental improvements or additional mitigation fees.

As noted above, TRPA would set aside 330 new buoy allocations for marinas. New or existing buoys could be traded for slips at marinas. Additional buoys or slips over the allocated amount, but within the total cap on buoys, may be released to marinas from the reserve pool. Buoy or boat slip allocations could be used immediately or phased over time consistent with a project application.

Marinas would be allowed to use temporary floating structures to provide access for boats when lake levels fall below 6,220 feet LTD. Such structures should be removed when the lake levels rise above 6,220 feet LTD for a period of six consecutive months. Both TRPA and partner agencies would explore new permits and leases that can accommodate marina flexibility for taking these structures in and out of the water.

FLOATING (SWIM) PLATFORMS

Floating platforms or swim platforms would be allowed when tied to a permanent anchor in lieu of a buoy. Floating platforms are not moorings, and motorized watercraft would be prohibited from mooring on floating platforms. The proposed Shoreline Plan would limit floating platforms to no more than 100 square feet, not to exceed 10 feet on any side.

OTHER SHORELINE STRUCTURES

No new public or private breakwaters, jetties, rock crib piers, or sheet pile piers (or other structures of this type) would be permitted along the shoreline except as part of a habitat restoration project or as part of a marina environmental improvement project. No new boat houses or other superstructures on piers would be permitted.

SCENIC REQUIREMENTS

TRPA has an existing contrast rating and visual magnitude system that is used to evaluate and regulate the scenic effects of development in the shoreland (i.e., upland development adjacent to the shorezone). This system establishes a contrast rating for parcels along the shoreline based on the color, texture, articulation, amount of glass, and amount of visible perimeter of structures visible from the lake. Contrast ratings range from 3 to 35, with contrast ratings of 3 signifying parcels with the greatest visual impact and ratings of 35 indicating the least possible visual impact for a developed parcel along the shoreline (TRPA 2004). Currently,

contrast ratings are used to evaluate changes in upland development in the shoreland (i.e., areas along the shoreline that are upland of the backshore). Alternative 1 would expand the use of contrast ratings to ensure that shoreland properties achieve minimum contrast ratings as part of the approval process for new piers. For new private piers, TRPA would require an initial 21 contrast rating as part of the pier application. Following application submittal, applicants would have six months to increase their contrast rating to 25 to offset the visual impact of new or redeveloped piers. TRPA would exempt property owners from the 25-contrast rating if it is not feasible to achieve it.

Scenic offsets, in the form of removing or screening existing visible mass, would be required for any proposed pier that results in a net increase in visible mass, or where any structure would result in nonattainment of a scenic threshold standard. Scenic mitigation and improvement would be required as close to the proposed structure as feasible. TRPA would prioritize the location of scenic offsets as follows: first on the same parcel in the shorezone, then on the same parcel in the upland area, then elsewhere in the shorezone within the same shoreline scenic travel unit, then within the same travel unit in the upland, and lastly in another nonattainment scenic travel unit. Scenic offsets for new visible mass would increase with the scenic sensitivity of the developing parcel's location, as follows:

- for visually dominated areas, the visible mass offset ratio is 1:1.5;
- for visually modified areas, the visible mass offset ratio is 1:2; and
- for visually sensitive areas, the visible mass offset ratio is 1:3.

TRPA would implement a new scenic credit banking program to encourage property owners to implement scenic improvements. The current system encourages the preservation of development that degrades scenic quality, because property owners can use the removal of that development as an offset for a future shoreline structure. Under this program, scenic credits (measured as square feet of visible mass) could be banked on individual parcels in the shorezone and shoreland. Private parcels, public parcels, and marinas would be eligible to participate. Scenic improvements could occur anywhere on the parcel or in the shoreline travel unit, and any credit granted for the improvement would be applied to future projects on the parcel. Scenic credits could not be transferred or sold to other parcels.

DREDGING

TRPA divides dredging at Lake Tahoe into maintenance dredging, where lake bottom dredging has historically occurred, and new dredging, where dredging has not historically occurred. New dredging would be allowed only at marinas, essential public health and safety facilities, and at existing public boat ramps. New dredging would be approved only after environmental review and only if significant impacts can be mitigated. New dredging at public boat ramps could be allowed if increased functionality of the ramp can be demonstrated. Maintenance dredging would continue to be allowed.

TRPA would adopt a performance standard consistent with the U.S. Army Corps of Engineers Section 404 federal standard for new dredging (non-degradation). Applicants would also need to comply with each state's Section 401 permit requirements.

NO-WAKE ZONE

The no-wake zone is an area close to shore that provides navigational safety for boaters and nonmotorized watercraft and shoreline erosion protection from boat wakes. The no-wake zone would be maintained at 600 feet from the water line, and the speed limit within it for motorized watercraft would continue to be limited to 5 miles per hour (mph) lakewide. Within Emerald Bay, the no-wake zone would be expanded from its current extent so that all areas within the bay would be designated as a no-wake zone. There, the speed would be limited to 5 mph for all motorized watercraft except tour boats, which would be limited to 7 mph.

A new boat launch fee would generate funding for an additional TRPA boat crew to expand the no-wake zone education and enforcement program. TRPA and partner enforcement agencies would increase patrols in

areas that receive heavy nonmotorized watercraft use, such as D. L. Bliss State Park, Sugar Pine Point State Park, and Sand Harbor. Navigational signage and/or buoys may also be installed to delineate the no wake zone near marinas or around the state parks. The number and location of these demarcation signs and buoys would be determined by the appropriate land management agency and reviewed by TRPA to ensure that they do not reduce scenic quality. TRPA, in cooperation with these partner agencies, is working with stakeholder groups, marinas, concessionaires and lakefront property owners to develop additional tools to aid enforcement and compliance with the no wake zone regulations.

BOAT INSPECTION PROGRAM

The proposed Shoreline Plan would continue to require that every motorized watercraft be inspected before launching on Lake Tahoe. Stickers or tags would continue to be attached to inspected boats to allow personnel at launch sites to verify that watercraft have been inspected. The existing AIS inspection and decontamination requirements would remain unchanged.

BOATER EDUCATION PROGRAMS

Under the proposed Shoreline Plan, TRPA would coordinate with marinas, boat ramp operators, and other partners to implement boater education programs. These programs would educate watercraft operators about applicable regulations and appropriate watercraft operations to protect natural resources and public safety. The education programs would include the following elements:

- Boat inspectors would educate watercraft owners and operators during boat inspections. Watercraft owners and operators would be educated about the no-wake zone, and appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations to prevent discharges into the lake, and appropriate engine tuning and propeller selection to reduce emissions during high-elevation boating.

- Staff at marinas and motorized watercraft rental concessions would receive training on appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations, and appropriate engine tuning and propeller selection. In addition, staff at marinas and motorized watercraft rental concessions would be required to educate customers about the no-wake zone and appropriate watercraft operations.

- Signs and other public information would be provided at public boat ramps and other public access points along the shoreline. The information would educate boaters and other shoreline users about the no-wake zone, AIS preventions strategies, and public safety considerations.

EXPANDED AIS CONTROL

TRPA would establish a new AIS control fee on recreational boats to fund AIS control projects. The fee would be assessed as an addition to the fee currently collected at the AIS inspection stations. The funding would be used to implement an additional three acres of AIS control each year. It would fund implementation of projects that reduce the abundance or distribution of Asian clam, Eurasian watermilfoil, curly-leaf pondweed, coontail, and/or other AIS that are introduced in the future and that could be spread by recreational boating.

NONMOTORIZED WATERCRAFT

The proposed Shoreline Plan would recognize that nonmotorized boating is an increasing recreational activity at Lake Tahoe and would include policies to support efforts to provide safe access, egress, and navigation. It would provide opportunities for facilities to accommodate nonmotorized boating activities, including paddle boarding and kayaking. The proposed Shoreline Plan would include the following nonmotorized navigation and access provisions:

- Continuation of the no-wake zone (described above) at 600 feet and 5-mph speed limit, with an expanded no-wake zone in Emerald Bay.
- Opportunities for navigational buoys demarcating the no-wake zone near state parks, marinas, and other areas to improve compliance with the no-wake zone.
- Limits on pier length to protect nonmotorized navigation.
- Regulated pier distribution to preserve undeveloped areas of the shoreline
- Facilities for rental concessions in the shorezone.
- Access to public boat ramps for nonmotorized watercraft during periods of low lake conditions when ramps are not accessible for motorized boats.
- Coordinated enforcement of the no-wake zone and boating speed limits to protect nonmotorized boaters.

BOAT RENTAL CONCESSIONAIRES

The proposed Shoreline Plan regulates motorized and nonmotorized boat rental concessionaires. All rental concessions would be required to obtain a TRPA permit, and they could be permitted only if allowed under the applicable area plan, plan area statement, or community plan. The following requirements would apply to both motorized and nonmotorized concessions unless otherwise specified.

- Concessions would be permitted only as an accessory use for applicants that have a permitted upland commercial or public facility/use.
- Concessions would need to consider and demonstrate upland parking availability.
- New motorized boat concessions would be allowed only at marinas.
- Each concession for motorized boating would be allowed one watercraft per permitted mooring except for marinas, which may have two strings with no more than 12 personal watercraft.
- TRPA would issue only permanent permits. The permits would specify the number and type of boats, paddleboards, kiosks, racks, or other structures to support the concession.
- All concessions with a valid permit would be grandfathered to continue operating under their existing permit conditions. All new concessions would be required to meet the requirements of the Shoreline Plan.
- Moorings for concessions would be counted toward the mooring cap.
- When allowed, only one watercraft may be moored per buoy or slip. Use of buoy “trains” are not allowed outside of marinas.
- Storage racks would be allowed. The location of racks would be above high water wherever possible and provide for maximum access and recreational benefit, subject to visual screening requirements.
- All concessions must meet BMPs, including fueling BMPs, fire codes, and local jurisdiction permit(s).

FISH HABITAT MITIGATION

If new structures are proposed in areas designated by TRPA as prime fish habitat, the applicant would be required to mitigate affected fish habitat at a 1.5:1 ratio to ensure no net loss in prime fish habitat.

Mitigation could occur on site or elsewhere adjacent to existing prime fish habitat and would involve the creation of physical habitat by placing gravel, cobble, or boulder substrate. Mitigation would replace the same type of substrate affected by the project.

In addition, the proposed Shoreline Plan would encourage a monitoring program to confirm that placement of new piers and buoys has limited impact (direct or through an interaction with nonnative species) on native fish populations and that impacts are mitigated through design requirements.

NEARSHORE WATER QUALITY ADAPTIVE MANAGEMENT

TRPA would expand the Nearshore Water Quality Network or a similar effort to include monitoring stations located within areas of shallow lakebed but outside the no-wake zone. If the results of this monitoring indicate that boating activities contribute to an exceedance of TRPA's nearshore turbidity thresholds, TRPA would implement management actions to avoid or offset this impairment. Such management actions could include, but are not limited to:

- expanding the no-wake zone based on scientific findings and recommendations for nearshore areas identified to be susceptible to reduced clarity from boating activities; or
- enacting a nearshore water quality mitigation fee on recreational watercraft and using the revenue to fund compensatory mitigation projects that reduce other sources of nearshore water quality impairment, such as stormwater management projects, or fertilizer reduction initiatives.

PUBLIC TRUST EASEMENT IN CALIFORNIA

On the California side of Lake Tahoe, a public trust easement allows for public access between the low- and high-water elevation of Lake Tahoe. The California State Lands Commission manages this public trust easement for the benefit of all citizens of the state. TRPA and California State Lands Commission would adopt a memorandum of understanding (MOU) that details a process to coordinate review of applications for piers. The MOU would specify a review process that protects public trust values (e.g., public lateral access) within the public trust easement in California. Structural components required to maintain lateral public access (e.g., ladders to provide access over a pier) would be exempt from visible mass offset requirements.

2.8.2 Alternative 2 – Maintain Existing TRPA Shorezone Regulations (No Project)

The No Project Alternative would retain the existing shorezone regulations, including the Shorezone Subelement of the Regional Plan goals and policies, and the existing TRPA Shorezone Code (Code of Ordinances Chapters 80–86). The goal of this alternative is to balance access and environmental protection by applying the approach that was developed under the 1987 Regional Plan. This alternative would lift the temporary moratorium on new shoreline structures that has been in place since 2010, and development of shoreline structures would occur in accordance with existing code in Chapters 80–86.

The existing shorezone regulations are largely centered around prohibitions of shoreline structures (piers, boat ramps, and moorings) within TRPA-designated prime fish habitat. The existing TRPA Shorezone Code identifies the mechanism by which development projects in the shorezone are reviewed and defines all permissible uses and types of structures in the shorezone. The major parts of the code that are under consideration for revision with the Shoreline Plan are the development standards for shorezone structures.

LOW LAKE LEVEL ADAPTATION

The No Project Alternative would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Buoy floats and anchors within buoy fields would continue

to be allowed to move farther lakeward during periods of low lake conditions. There are no other provisions to allow modifications to facilities or structures to be useable during low lake conditions.

SHORELINE PROTECTION AREAS

The No Project Alternative would not identify new shoreline protection areas. Existing requirements that address stream mouth protection areas and water intakes would remain. TRPA Code Section 84.5.1.B would continue to prohibit the placement of new piers within 200 feet of the inlet of the 24 major streams and rivers that drain into Lake Tahoe. TRPA Code Section 60.3.3 would continue to require that water purveyors be consulted with in the evaluation of applications and development of permit conditions for any proposed shoreline structure within 600 feet of a drinking water intake.

MOORINGS

Under the No Project Alternative, there would be no numeric cap on moorings. The number of moorings would be limited by the number of eligible parcels that could place moorings consistent with location standards, including the prohibition on structures within prime fish habitat. Existing permitted moorings would be allowed to remain. A maximum of two buoys and one boat lift would be allowed for each littoral parcel. Based on an assessment of the most recent prime fish habitat map and pier eligibility criteria, it is estimated that up to 4,871 new buoys, 1,897 new slips, and 168 new boat lifts could be developed under the No Project Alternative, for a total of 6,936 new moorings (Appendix A). There would be no code provision prohibiting temporary overnight mooring on structures other than buoys, slips, and boat lifts (i.e., no overnight mooring on piers or other structures).

Buoys

Buoy Permitting and Allocation

All buoys would require a TRPA permit. Buoys with clear evidence of existence before 1972, or with a federal or state permit, are eligible for a TRPA permit and would be unconditionally approved. Buoy permits would be issued on a first-come, first-served basis with no allocation process.

Buoy Location Standards

The placement of buoys would be limited to no further lakeward than necessary to provide safe mooring, but not to exceed 350 feet lakeward of the high-water line. Buoy fields would be allowed to deviate from these design standards because of their multiple-use designation. Buoy floats and anchors in buoy fields would be allowed to move lakeward during low water level conditions.

Buoy Enforcement

Under the No Project Alternative, TRPA would initiate an illegal buoy enforcement program. As with Alternative 1, the enforcement program would prioritize the identification and removal of buoys that were placed on the lake after 1972 and do not have permits from TRPA, state agencies, or the U.S. Army Corps of Engineers.

Slips

Under the No Project Alternative, there would be no numeric cap on the number of slips on Lake Tahoe. Slips are primarily within marinas, and the No Project Alternative would continue to require marina master plans and environmental improvements with any marina expansions that add more than 10 new slips (see the section titled “New, Expanded, and Reconfigured Marinas,” below, for more information).

Boat Lifts

Under the No Project Alternative, there would be no numeric cap on the total number of boat lifts. Each littoral parcel with a pier would be allowed one private boat lift with a maximum width of 10 feet, subject to scenic and other mitigation requirements. Multiple-use piers would be evaluated on a case-by-case basis and could include more than one boat lift.

PIERS

All littoral parcels in existence as of July 1, 1987, except for properties served by or eligible to be served by a multiple-use facility (such as an HOA pier), would be eligible for one new pier. No piers would be allowed within TRPA-designated prime fish habitat or stream mouth protection areas. TRPA would continue the current system of permitting, in which permit applications are accepted and processed at any time. There would be no allocation process, prioritization of pier allocations, or provisions to address the distribution of piers in visually sensitive areas.

To incentivize multiple-use piers that serve more than one littoral parcel, TRPA would continue to allow multiple-use piers to deviate from pier design standards that limit the pier length, width, number of piers per parcel, property line setbacks, and number of boat lifts. The extent of deviation from these standards would be based on:

- the reduction in shoreline development potential that would result from the projects (through the deed restriction of other parcels served by the multiple-use pier) and
- the number of people served by the multiple-use pier, or the extent to which the pier is available for public use.

Public piers would be considered multiple-use piers and would be subject to the same evaluation criteria as private multiple-use piers.

Pier Design Standards

All pier applications would be required to comply with applicable design standards shown in Table 2-7.

Table 2-7 Alternative 2 Pier Design Standards

Specification	Single-Use Piers	Multiple-Use Piers
Length	To 6,219 feet LTD or pierhead line, whichever is more limiting	Multiple-use structures allowed to deviate from standards
Width	Maximum 10 feet for pier Maximum of 13 feet with a catwalk	
Catwalk	Maximum 3 feet wide and 45 feet long	
Boat lift	1 allowed, maximum of 10 feet wide	
Side setback	Minimum 20 feet from each property edge for new piers, and 5 feet for existing piers	
Height	Maximum 6,232 feet LTD	Maximum 6,232 feet LTD
Visible mass	Floating or open piling foundation no less than 90% open space	Floating or open piling foundation no less than 90% open space
Location	Outside of prime fish habitat and stream mouth protection areas	Outside of prime fish habitat and stream mouth protection areas

Source: TRPA 2017b

Pier Relocations, Transfers, and Conversions

Under the No Project Alternative, there would be no provisions allowing the relocation or transfer of piers. Existing boat ramps could be converted to a pier, but the pier would be evaluated as a new structure.

Pier Modifications and Expansions

Pier modifications and expansions would continue to be allowed in accordance with TRPA Code Sections 82.4.4 and 82.4.5. Modifications and expansions of piers that currently comply with development standards would be allowed as long as the modified or expanded pier continued to comply with those standards. Existing piers that comply with some but not all design standards could be allowed if the expansion or modification decreases (or does not increase) the extent to which the pier does not comply with design

standards. Expansions or modifications of piers that do not comply with length and setback requirements could be approved in limited cases subject to the findings described in TRPA Code Section 82.4.4.C.

BOAT RAMPS

New public and private boat ramps would be allowed, and there would be no numeric cap on the total number of ramps. Up to one new boat ramp could be allowed per littoral parcel outside of prime fish habitat and stream mouth protection areas. Although the No Project Alternative would not specifically prohibit new private boat ramps, existing land coverage regulations would make it highly unlikely that any new private boat ramps could be authorized because boat ramps, by their very nature, require the placement of coverage within the backshore. TRPA defines the backshore as Land Capability District 1b (the most sensitive land capability district). TRPA Code Section 30.5.2 prohibits the placement of coverage in Land Capability District 1b unless it is for a stream crossing, public recreation facility, public service facility, or water quality improvement structure, none of which is the case with a private boat ramp. New public boat ramps could be authorized under the No Action Alternative. Based on an assessment of site constraints and access for new public boat ramps, it is estimated that up to six new public boat ramps could be developed under the No Project Alternative.

NEW, EXPANDED, AND RECONFIGURED MARINAS

New marinas could be authorized under the No Project Alternative. Based on an assessment of eligible locations and property ownership, it is assumed that up to two new marinas could be authorized. New, expanded, or reconfigured marinas would continue to be governed by TRPA Code Section 84.13. Any new marina or expansion of an existing marina by more than 10 moorings would require the preparation of a marina master plan and EIS.

In addition to the requirement for a Marina Master Plan and EIS, new marinas or additions of more than 10 moorings would require the following improvements:

- public restrooms, fueling facilities, chemical fire-retardant distribution system, trash receptacles, and pump-out facilities for boat sewage;
- boat washing facilities, if any, connected to a sewer system;
- gas pumping facilities that include emergency and standard shut-off systems to avoid gas leakage to the lake;
- adequate parking to accommodate all uses and activities associated with the marina; and
- water treatment system for waters contained within marinas.

FLOATING (SWIM) PLATFORMS

Up to one floating platform per littoral parcel could be authorized, subject to the limitations described in Code Section 84.8. Floating platforms could be in addition to the three moorings allowed per littoral parcel. They could not exceed 100 sq. ft. in area and could not be longer than 15 feet on any one side.

OTHER SHORELINE STRUCTURES

The No Project Alternative would allow for the approval of new private or public jetties, breakwaters, rock cribs, and fences within portions of the shorezone where they are not likely to accelerate erosion. There would be no numeric limit on the number of these structures that could be permitted. New structures would be required to comply with the design standards in Code Section 84.12, which focus on maintaining openings in this type of structure to allow for water circulation.

SCENIC REQUIREMENTS

As described above, TRPA has an existing contrast rating and visual magnitude system that establishes a contrast rating for parcels along the shoreline based on the color, texture, articulation, amount of glass, and amount of visible perimeter of structures visible from the lake. New shoreline projects could not decrease the existing contrast rating for a littoral parcel.

In addition, scenic offsets, in the form of removing or screening existing visible mass, would be required for any proposed pier that results in a net increase in visible mass, or where any structure would result in nonattainment of a scenic threshold standard. As with Alternative 1, scenic mitigation and improvement would be required as close to the proposed structure as feasible. Scenic offsets for new visible mass would be required at a 1:1 ratio for shoreline travel units that are in attainment of threshold standards, and at a 1.5:1 ratio for those that are not in attainment.

DREDGING

Maintenance dredging would be allowed in previously dredged areas where it is necessary to continue an existing use. New dredging could be allowed only if TRPA finds that it is beneficial to shorezone conditions and water quality. All dredging activity would be required to comply with applicable state permit requirements.

NO-WAKE ZONE

Under the No Project Alternative, the no-wake zone would be maintained at 600 feet from the water line and speed would continue to be limited to 5 mph.

BOAT INSPECTION AND STICKER PROGRAM

The No Project Alternative would maintain the existing AIS inspection and decontamination requirements. Every motorized watercraft would be inspected prior to launching on Lake Tahoe. Stickers or tags would continue to be attached to inspected boats to allow personnel at launch sites to verify that watercraft have been inspected.

BOAT RENTAL CONCESSIONAIRES

Water-oriented outdoor concessions could be permitted if allowed under the applicable area plan, plan area statement, or community plan pursuant to TRPA Code, Sec. 81.3.

FISH HABITAT MITIGATION

The No Project Alternative would continue to prohibit new structures in prime fish habitat. No prime fish habitat mitigation program would be established.

PUBLIC TRUST EASEMENT IN CALIFORNIA

As with Alternative 1, TRPA and California State Lands Commission would adopt an MOU that details a process to coordinate review of applications for piers. The MOU would specify a review process that protects public trust values (e.g., public lateral access) within the public trust easement in California. Under Alternative 2, structural components required to maintain lateral public access (e.g., ladders to provide access over a pier), would not be exempt from visible mass offset requirements.

2.8.3 Alternative 3 – Limit New Development

The goal of Alternative 3 is to reduce the potential for environmental impacts by limiting new shoreline development. This alternative would seek to concentrate motorized watercraft access at marinas and public facilities rather than at individual private facilities, and to maximize the number of people served by each new shoreline structure. This alternative would authorize fewer structures than Alternative 1 or 2, with up to 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would authorize 86 new private piers, but they would be restricted to multiple-use piers.

In other respects, Alternative 3 would be the same as Alternative 1, the proposed Shoreline Plan. Alternative 3 would include the same provisions described above for the proposed Shoreline Plan, in respect of the following topics:

- shoreline protection areas;
- recognition of existing buoys;
- buoy enforcement;
- pier relocations, transfers, and conversions;
- marina expansions and reconfigurations;
- floating (swim) platforms;
- other shoreline structures;
- boat inspection and sticker program;
- boater education programs;
- expanded AIS control;
- no-wake zone;
- boat rental concessions;
- nearshore water quality adaptive management;
- fish habitat mitigation; and
- public trust easement in California.

Differences between Alternative 3 and Alternative 1 are described below.

LOW LAKE LEVEL ADAPTATION

Alternative 3 would include the same low lake level adaptation provisions as the No Project Alternative. Buoy floats and anchors within buoy fields would continue to be allowed to move farther lakeward during periods of low lake conditions. Alternative 3 would include no other provisions to allow modifications to facilities or structures to be useable during low lake conditions.

MOORINGS

Alternative 3 would regulate all structures that allow for overnight mooring of watercraft on Lake Tahoe (i.e., buoys, slips, and lifts). It would allow for up to 365 new moorings, all of which would be public buoys or slips (including buoys and slips at marinas that are available to the public). No other new private moorings would be allowed. As with Alternative 1, watercraft moored overnight would be required to moor to legally existing buoys, slips, boat lifts, or other watercraft storage facilities, except in limited cases.

Buoys

As with the proposed Shoreline Plan, Alternative 3 would recognize the continued use of legally existing buoys (i.e., those with an existing permit or placed on the lake prior to 1972). It would authorize a total of 365 new moorings, all of which would be buoys or slips at marinas or public facilities. It would establish the same location standards as the proposed Shoreline Plan for the placement of buoys in buoys fields and would implement an enforcement program to remove illegal buoys from the lake. The 365 new moorings would be allocated to marinas and public facilities on a first-come, first-served basis.

Slips
No new individual private boat slips would be permitted. Marinas and public agencies could exchange new or existing buoys for slips on a 1:1 basis.

Boat Lifts
No new private boat lifts would be permitted. Legally existing boat lifts could remain.

PIERS

Alternative 3 would allow up to 86 new private piers and up to five new public piers to be constructed along the shoreline. All new private piers would be multiple-use piers that provide access to more than one property owner. Alternative 3 would include pier density standards intended to prevent the dense clustering of piers along any portion of the shoreline. It would include provisions that would result in the retirement of pier development potential through deed restrictions. The alternative would regulate the rate of new pier approvals and would institute pier design standards intended to protect navigation, recreational access, and limit scenic impacts. It would also include the same incentives as the proposed Shoreline Plan to restore stream mouths and areas with degraded scenic conditions. No pier would be eligible for use as permanent moorage, and piers would not directly affect boating levels on Lake Tahoe.

Public Piers
Up to five new public piers could be constructed under Alternative 3. Design standards for public piers are not proposed, however design standards for multiple-use piers (described below) could serve as a guideline for the review of public pier applications. As with the proposed Shoreline Plan, public piers could deviate from design standards that apply to private multiple-use piers to the extent necessary to provide a public service, such as emergency access, public access during low lake conditions, or public transportation. All public pier applications would be subject to environmental review, and the approval of public piers would be based on the proposed location, objectives, public benefit, consistency with adopted plans, and environmental impacts of the proposed pier. Allocation of public piers would not be dependent on jurisdictional boundaries; that is, a valid public pier proposal could occur anywhere on the lake. Public piers would be required to comply with the same density limits as private piers.

Private Piers
Up to 86 new private multiple-use piers could be constructed under Alternative 3, consistent with eligibility criteria. A private littoral parcel could be eligible for a new pier if that parcel is not deed-restricted to prevent pier development, there is not already a pier on the property, and setback and locational requirements can be met. The placement of new private piers would be restricted to areas outside of stream mouth protection areas and Shorezone Preservation Areas. As with Alternative 2, littoral parcels that already have access to an HOA pier or other multiple-use pier would not be eligible to apply for a new pier.

Private Pier Distribution and Density
The 86 new private multiple-use piers could be distributed to any eligible littoral parcel regardless of jurisdictional boundaries. To reduce the potential scenic impacts of dense clusters of piers, the following density standards would apply:

- Within Visually Modified and Visually Dominated shoreline character types, an average of no more than one pier per 100 feet of shoreline would be allowed; and
- Within Visually Sensitive shoreline character types, an average of no more than one pier per 300 feet of non-deed-restricted shoreline would be allowed.

Private Pier Design Standards
All new private piers would be multiple-use piers that serve more than one littoral parcel. The pier design guidelines shown in Table 2-8 would apply. TRPA would have discretion to authorize deviations from these

guidelines based on site conditions, the number of people served by the pier, and the amount of development retired by the application.

Table 2-8 Alternative 3 Pier Design Guidelines

Specification	Private Multiple-Use Piers
Length	Up to 300 feet the pierhead line, or 6,219 feet LTD, whichever is less, or the minimum necessary to get to navigable water
Width	Maximum 6 feet for pier Maximum of 10 feet with a catwalk Maximum of 10 feet at pierhead
Catwalk	Maximum of 10 feet wide (total) and 30 feet long
Pierhead	Maximum of 10 feet wide and 30 feet long
Boat Lift	Not allowed
Side Setback	Minimum 20 feet from each property edge
Height	Not specified
Visible Mass	280 square feet for 2 parcels and more visible mass could be allowed for 3 or more parcels to
Location	Outside of stream mouth protection areas, must comply with density standards

Source: TRPA

Rate of Private Pier Development

New private multiple-use piers would be authorized gradually to limit the rate of new pier development and to allow for the periodic assessment of the effects of Alternative 3. Initially, TRPA would allow for the approval of up to 64 of the 86 new private piers over a 16-year period, at a rate of up to eight approvals every 2 years. If during a two-year period there are fewer than eight piers permitted, the remaining balance would roll over to subsequent years. TRPA would review the allocation of piers, including monitoring the geographic distribution of new piers and evaluating pier availability. The review of pier allocations would occur through a new four-year pier and buoy permitting activity report, released following each four-year threshold evaluation report. The authorization of the remaining 22 new private piers (after the 64 piers authorized in the first 16 years) would be dependent on the amount of pier development potential retired.

Retirement of Pier Development Potential

Alternative 3 would make the approval of new private multiple-use piers contingent upon the deed restriction of littoral parcels in some cases. All new private pier applications would be multiple use (i.e., serving more than one littoral parcel). Two types of pier applications would be accepted, single-parcel pier applications (e.g., a multiple-use pier that serves an HOA and does not retire development potential) and multiple-parcel (i.e., those that retire pier development potential through deed restricting at least one other parcel).

Private pier permit applications would be prioritized to encourage retirement of development potential, as described below. After the initial 16-year period, three pier allocations would be released for every eight multiple-parcel pier applications that are approved (which would translate to a minimum of eight new deed-restricted properties), until the 86-pier cap is reached.

Prioritization of Private Pier Applications

Under Alternative 3, TRPA would accept applications for private multiple-use piers, then prioritize pier applications based on the amount of development potential retired, and the number of parcels served by the pier. Prioritized pier applications would be processed first, and if more than eight pier applications are received during a 2-year period, those applications that receive a lower priority would not be processed during that 2-year period.

Private pier applications that deed-restrict other parcels to retire pier development potential (i.e., multiple-parcel applicants) would first be prioritized in the following order:

1. applications that propose to retire the most development potential within the same shoreline character type, within the same scenic travel unit;

2. applications that retire the most development potential, regardless of shoreline character type and unit;

3. applications in shoreline character types from least to most sensitive (i.e., beginning with "Visually Dominated," then, "Visually Modified," and finally, "Visually Sensitive"); and then

4. multiple-parcel pier applications that already have access to an HOA pier.

After multiple-parcel pier applications, the next priority would be given to applications that serve the greatest number of users to encourage an increase in lake access.

Commercial and Tourist Accommodation Piers

No new private piers associated with commercial or tourist accommodation uses would be authorized.

Pier Expansions and Modifications

Modifications and expansions of existing piers at marinas would be regulated in the same manner as the proposed Shoreline Plan. No other expansions of existing piers would be authorized.

BOAT RAMPS

Under Alternative 3, up to one new public boat ramp would be allowed. Applications for a new public boat ramp would be considered by TRPA based on the merits of the proposed site selected. This review would consider the existing geographic distribution of boat ramp access, the relationship of the proposed ramp to clusters of upland development and transportation hubs, and the suitability of the site in terms of depth and bathymetry to accommodate access during periods of Phase 2 low lake levels to6,220 feet.

TRPA would allow relocation of existing boat ramps to new sites that are better suited to low lake levels. TRPA would encourage nonmotorized boaters to use boat ramps that are not functional for motorized boats during periods of low water, when these ramps may be closed to motorized users.

SCENIC REQUIREMENTS

As described above, TRPA has an existing scenic assessment system that establishes a contrast rating for parcels along the shoreline based on color, texture, articulation, amount of glass, and amount of visible perimeter of structures visible from the lake. Currently, contrast ratings are used to evaluate changes in upland development in the shoreland, Alternative 1 would expand the use of contrast ratings to ensure that shoreland properties achieve minimum contrast ratings as part of the approval process for new piers. For new private multiple-use piers, TRPA would require an initial contrast rating of 25 as part of the pier application.

Alternative 3 would include the same requirements for scenic offsets, and the same scenic credit program as the proposed Shoreline Plan.

DREDGING

New dredging would be allowed only at marinas, at essential public health and safety facilities, and at public boat ramps. New dredging would only be approved if it would result in environmental benefits. Maintenance dredging would continue to be allowed.

As with the proposed Shoreline Plan, TRPA would adopt a performance standard consistent with the Army Corps of Engineers Section 404 federal standard for new dredging (nondegradation). Applicants would also need to comply with each state's Section 401 water quality certification requirements.

NONMOTORIZED WATERCRAFT

As with the proposed Shoreline Plan, Alternative 3 would recognize that nonmotorized boating is an increasing recreational activity at Lake Tahoe and would include policies to support efforts to provide safe access, egress, and navigation. It would provide opportunities for facilities to accommodate nonmotorized boating activities, including paddle boarding and kayaking. The proposed Shoreline Plan would include the following nonmotorized navigation and access provisions:

- continuation of the no-wake zone (described above) at 600 feet and 5 mph speed limit, with an expanded no-wake zone in Emerald Bay;
- opportunities for navigational buoys demarcating the no-wake zone near state parks, marinas, and other areas to improve compliance with the no-wake zone;
- limits on pier length to protect nonmotorized navigation;
- regulated pier distribution to preserve areas without piers and distribute piers in areas where piers already exist;
- buoy location standards that create more space and a buffer for nonmotorized access on the landward side of buoy fields by allowing buoy fields to move their landward row of buoys lakeward during low lake levels;
- facilities for rental concessions in the shorezone;
- support for signage associated with the Lake Tahoe Water Trail to identify launch sites, landing locations, and other public access points;
- access to public boat ramps for nonmotorized watercraft during periods of low lake conditions when ramps are not accessible for motorized boats; and
- coordinated enforcement of the no-wake zone and boating speed limits to protect nonmotorized boaters.

2.8.4 Alternative 4 – Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers and reduce existing shoreline development through transfer ratios that would reduce the overall number of shoreline structures on the lake. This alternative would allow 15 new public piers and no other new shoreline structures. The alternative would include transfer ratios that would allow some private shoreline structures to be removed and rebuilt in different locations provided the project resulted in a 2:1 reduction in the number of structures. Because this alternative would authorize no new moorings or boat ramps, it would not result in an increase in boat use.

Alternative 4 includes a combination of elements from Alternative 1, the proposed Shoreline Plan, and from Alternative 3. Alternative 4 would include the same provisions described above for the proposed Shoreline Plan to address the following topics:

- shoreline protection areas,
- recognition of existing buoys,

- buoy enforcement,
- floating (swim) platforms,
- other shoreline structures,
- boat inspection,
- boater education programs,
- expanded AIS control,
- boat rental concessions,
- nearshore water quality adaptive management, and
- public trust easement in California.

Alternative 4 would include the same provisions described above for Alternative 3 to address the following topics:

- low lake level adaptation,
- pier density and design standards,
- scenic requirements, and
- nonmotorized watercraft.

The elements of Alternative 4 that are different from Alternatives 1 and 3 are described below.

MOORINGS

Alternative 4 would prohibit new moorings on Lake Tahoe. Existing public or private moorings could be converted to public moorings and transferred to other locations if the transfer resulted in a 2:1 reduction in moorings (i.e., two existing moorings are removed, and one public mooring is placed in a new location). These transfer ratios would likely result in a net reduction in the number of moorings on Lake Tahoe, and a corresponding reduction in boating activity. However, there would be little incentive for property owners to reduce existing moorings through this transfer program. Therefore, this analysis takes a conservative approach and assumes that the total number of existing moorings on Lake Tahoe would remain the same. As with Alternative 1, watercraft moored overnight would be required to moor to legally existing buoys, slips, boat lifts, or other watercraft storage facilities, except in limited cases.

Buoys

No new private buoys would be permitted. Existing public or private buoys could be transferred for use in marina or other public facilities if the transfer resulted in a 2:1 reduction in the number of buoys. Location standards for buoy fields would be the same as described under Alternative 1.

Slips

No new individual private boat slips would be permitted. Marinas and public agencies could exchange buoys for slips on a 1:1 basis.

Boat Lifts

No new private boat lifts would be permitted. Legally existing boat lifts could remain.

PIERS

Alternative 4 would allow up to 15 new public piers. New multiple-use piers could be allowed if the application involves removal two existing piers (i.e., a 2:1 reduction in the number of piers), but no new private piers would be otherwise allowed. Public pier applications would be considered on a first-come, first-served basis. There would be no allocation or prioritization process. Public piers and multiple-use private piers would comply with the same location and density standards described for Alternative 3, above. The pier design standards described above for the proposed Shoreline Plan would apply to new multiple-use private piers. Parcels with access to an existing multiple-use pier would not be eligible for a new multiple-use pier.

Pier Expansions and Modifications

Modifications of existing piers would only be permitted if the modification reduced the visible mass of the pier. No expansions of existing piers would be authorized.

BOAT RAMPS

Under Alternative 4, no new boat ramps would be authorized. TRPA would allow the relocation of existing public boat ramps to new sites that are better suited to low lake levels, if the relocation resulted in a 2:1 reduction in the number of boat ramps (i.e., two existing boat ramps are removed, and one boat ramp is constructed in a new location). Where feasible, public ramps may extend farther into the lake to allow operation during low lake level conditions. TRPA and ramp operators would encourage nonmotorized boaters to use boat ramps that are not functional for motorized boats during periods of low water, provided there is adequate upland facilities for parking and access to the ramp.

DREDGING

Dredging would be regulated in the same manner as in Alternative 2. Maintenance dredging would be allowed in previously dredged areas where it is necessary to continue an existing use. New dredging could only be allowed if TRPA finds that it is beneficial to shorezone conditions and water quality and clarity. All dredging activity would be required to comply with applicable state permit requirements.

NO-WAKE ZONE

The no-wake zone would be maintained at 600 feet from the water line for all areas of the lake except for D.L. Bliss State Park, Sugar Pine Point State Park, and Sand Harbor, where the no wake zone would be expanded to 1,200 feet. The speed limit for motorized watercraft would continue to be limited to 5 miles per hour (mph) within the no wake zone. Within Emerald Bay, the no-wake zone would be expanded from its current extent so that all areas within the bay would be designated as a no-wake zone. There, the speed would be limited to 5 mph for all motorized watercraft except tour boats, which would be limited to 7 mph.

As with Alternatives 1 and 3, no-wake zone enforcement and education would be expanded, which would be funded through a new launch fee. Priority areas for enforcement of the no-wake zone would be created in areas that receive heavy nonmotorized watercraft use. Navigational signage and/or buoys may also be installed to delineate the no wake zone near marinas or around state parks. The number and location of these demarcation signs and buoys would be determined by the appropriate land management agency and reviewed by TRPA to ensure that they do not reduce scenic ratings or detract from the scenic character.

PROJECTED BOATING ACTIVITY

Because Alternative 4 would not authorize new moorings or boat ramps, it would not increase the existing motorized boating capacity on Lake Tahoe. Implementation of Alternative 4 could reduce boating capacity through transfer ratios that require a 2:1 reduction in shoreline structures. However, as described above, there would be little incentive for property owners to remove existing shoreline structures through the transfer ratios. Therefore, this analysis assumes that the existing boating capacity and levels of boating activity would not be changed by Alternative 4.

FISH HABITAT MITIGATION

Alternative 4 would allow new public piers or transferred structures to be placed within TRPA-designated prime fish habitat. If new structures are proposed in areas designated by TRPA as prime fish habitat, the applicant would be required to mitigate affected fish habitat at a 2:1 ratio (i.e., 2 square feet of prime fish habitat would be created for each square foot lost), to ensure that fisheries are not degraded. Mitigation could occur onsite or elsewhere adjacent to existing prime fish habitat and would involve the creation of

physical habitat by placing gravel, cobble, or boulder substrate. Mitigation would replace the same type of substrate affected by the project.

In addition, Alternative 4 would encourage a monitoring program to confirm that placement of new piers and buoys has limited impact (direct or via an interaction with nonnative species) on native fish populations and that impacts are mitigated through design requirements.

2.9 MINOR VARIATIONS IN IMPLEMENTATION

The TRPA Governing Board could adopt minor refinements to the implementation of the alternatives described in this EIS without resulting in environmental impacts that are different from those analyzed in this EIS. Specific variations that could be consistent with the analysis in this EIS include minor changes to the rate of buildout, minor changes to pier and buoy prioritization systems, and minor changes to the allocation of structures between private littoral parcel owners and HOAs.

This EIS analyzes environmental impacts at full buildout of each alternative (i.e., after the development of all structures potentially authorized by an alternative). As a result, variations in the rate of shoreline structure allocation and development would not alter the analysis in this EIS. In addition, this EIS does not assume that environmental improvements, other than those improvements required by each alternative, would result from implementation of the alternatives. Therefore, pier or buoy prioritization systems and other provisions that encourage, but do not require, environmental improvements could be modified without resulting in additional environmental impacts. Some alternatives include detailed buoy and pier allocation provisions that specify the proportion of structures that could be allocated to private littoral parcel owners and HOAs. In these cases, the structures would result in the same physical effects regardless of whether they are allocated to a private littoral parcel owner or HOA. Therefore, the allocation of structures between private littoral parcel owners and HOAs could be modified. Any minor variation in the implementation of provisions outlined in this chapter would be reviewed to confirm that the variation is consistent with the analysis in this EIS.

2.10 ALTERNATIVES AND FEATURES CONSIDERED BUT DISMISSED FROM FURTHER EVALUATION

During development of the proposed Shoreline Plan, several alternatives or alternative components were considered but eliminated from further study because of the potential for environmental impacts, the infeasibility of the proposals, or other concerns identified by TRPA and the public. These alternatives or alternative elements include the following:

- **Access Development Alternative**: At the September 27, 2017, TRPA RPIC meeting, TRPA staff presented a range of proposed alternatives for consideration in this EIS. Alternatives presented included the four described in this chapter and an additional alternative that would prioritize access development (Access Development Alternative). The Access Development Alternative was intended to increase opportunities for private access and motorized boater access to the lake by increasing the number of allowable shoreline structures. This alternative would have allowed for 7,542 total buoys, 150 new public slips, 318 new private piers, 10 new public piers, and six new public boat ramps. While the RPIC voted to endorse the range of alternatives presented by staff (including the Access Development Alternative), members of the RPIC and public expressed concerns about this alternative. Comments from RPIC members and the public noted that this alternative would not reduce possible environmental effects of the proposed Shoreline Plan, and therefore would not contribute to the reasonable range of alternatives that are required to be analyzed in a TRPA EIS. TRPA staff, the Steering Committee, and technical specialists performed a preliminary evaluation of the Access Development Alternative. This evaluation found that the number of shoreline structures (and associated boating activity) allowed under the Access Development Alternative would likely result in significant environmental impacts related to scenic quality,

air quality, noise, and greenhouse gas emissions. To mitigate these significant impacts, the number of allowable shoreline structures would need to be reduced. Because mitigation measures would reduce the number of shoreline structures in this alternative, the alternative would not meet its intended goal of increasing private and boater access through additional shoreline structures. The Shoreline Steering Committee recommended that the Access Development Alternative be dismissed from detailed analysis in the EIS because it would not reduce significant environmental impacts of the proposed Shoreline Plan, and because anticipated mitigation requirements would make it similar to Alternative 1. On December 13, 2017, the RPIC unanimously voted to remove the alternative for the reasons described above.

- **2008 Shorezone Ordinances**: In 2008 TRPA adopted a shorezone ordinance that incorporated contemporary science and addressed stakeholder concerns. However, the EIS supporting adoption of this ordinance was challenged, and in 2010 the U.S. Ninth Circuit Court of Appeals vacated the adoption of the ordinance and certification of the EIS and remanded the matter back to TRPA. The stakeholder Steering Committee considered the contents of the 2008 Shorezone Ordinances in the development of the proposed Shoreline Plan. Many elements of the 2008 ordinances were incorporated into the proposed Shoreline Plan, including the caps on the total number of buoys and piers. The proposed Shoreline Plan improved upon the 2008 ordinances by incorporating additional environmentally protective provisions, adding measures to allow for low lake level adaptation, and refining elements of the 2008 ordinances based on practical experience in implementing the 2008 ordinance from 2008 through 2010. Other key elements of the 2008 ordinances that were not included in the proposed Shoreline Plan, including pier design standards and density criteria, were incorporated into Alternatives 3 and 4 in this EIS. Because many of the key elements of the 2008 Shorezone Ordinances are already incorporated in to the alternatives in this EIS, and because the proposed Shoreline Plan includes additional environmentally protective measures that were not in the 2008 ordinances, those ordinances were not included as an alternative in this EIS.

- **Nonmotorized Mondays:** Representatives of the Tahoe Area Sierra Club and some members of the public requested an alternative that would prohibit motorized watercraft on Lake Tahoe and helicopter tours on Mondays. The stakeholder Steering Committee considered this proposal, and it was brought before RPIC and endorsed. TRPA staff later met with representatives from the Tahoe Area Sierra Club to discuss specific elements of this proposal. During these discussions, TRPA staff, Steering Committee members, and representatives of the Tahoe Area Sierra Club determined that the proposal would not be enforceable because of the numerous private moorings and access points along the shoreline. The Tahoe Area Sierra Club removed their support for the proposal, and it was removed from consideration in this EIS.

- **Varied Design Standards Based on Zones**. One option that was considered for piers was to develop zones with clear design standards. Under this model, the Shoreline Plan might define three to five types of shoreline areas or zones that address design rather than a single set of design standards that apply everywhere along the shoreline. The zones could consider substrate, bathymetry, and fish habitat. The Steering Committee decided against the zone concept to keep the process simpler and more understandable.

- **Identification of specific nonmotorized access points**. The Steering Committee discussed the formal designation of public nonmotorized recreation access points to the Lake, including public viewing piers. The committee decided this was not necessary given that the Lake Tahoe Water Trail tracks and maps 27 current access points around the Lake, 14 day-use sites, and provides signage and education. The Steering Committee instead recommended focusing on navigation and safety for all users as they relate to shoreline structures to be permitted under the Shoreline Plan.

3 APPROACH TO THE ENVIRONMENTAL ANALYSIS

3.1 PREVIOUS SHORELINE ANALYSIS

This EIS builds on decades of work to develop a comprehensive, fair, and scientifically sound approach to analyze and regulate the development of structures along Lake Tahoe's shoreline. For more than 30 years, TRPA has worked with stakeholders and partners to address the controversial issues surrounding shoreline development. This effort has included numerous technical studies, multiple policy and stakeholder committees, and a series of EISs, the last of which was certified, but challenged and remanded back to TRPA by the Ninth Circuit Court of Appeals. A more thorough history and background of the shoreline planning process, including a description of previous efforts, a summary of involved stakeholders, and a summary of the seven alternatives considered in the most recent supplemental final EIS are provided on pages ES-1 through ES-6 of Volume IV, "Addendum to the EIS for the Lake Tahoe Shorezone Ordinance Amendments" (TRPA 2008), which are incorporated by reference into this EIS.

Each iteration of shoreline planning and environmental review clarified key issues and concerns and presented new technical information. The alternatives described in Chapter 2, "Description of Proposed Project and Alternatives," build upon previous efforts to develop and evaluate alternatives. Similarly, the analysis in Chapters 4 through 17 builds on previous environmental analyses by incorporating elements that are applicable and technically adequate, and reconsidering assumptions and analytical approaches that no longer apply, are insufficient, or where better information is available.

3.2 PROGRAM-LEVEL ANALYSIS

The Shoreline Plan governs the long-term management of Lake Tahoe's shoreline. Because of the broad geography and long timeframe to which the Shoreline Plan applies and the policy-oriented nature of the Plan's guidance, the EIS is prepared at a program level: that is, it contains a general analysis of each resource area with a level of detail and degree of specificity commensurate with that of the Shoreline Plan itself. The EIS focuses on the potential effects of policies and ordinances, which—because they are to be implemented through later site-specific projects over the duration of the Plan—are inherently less precise than analyses that evaluate implementation programs or specific projects.

This EIS is not intended to take the place of project-specific environmental documentation that will be needed to evaluate individual projects proposed following approval of the Shoreline Plan. For future shoreline projects that are not otherwise exempt or qualified exempt, TRPA will review those site-specific projects to determine the appropriate level of environmental review. Specific regulations that pertain to such analyses include Article VII, "Environmental Impact Statements," of the Tahoe Regional Planning Compact; Article V, "Project Review," and Article VI, "Environmental Impact Statements," of the Rules of Procedure; and Chapter 3, "Environmental Documentation," of the TRPA Code. For shoreline projects that have the potential to result in significant effects on the environment, TRPA would—in coordination with other federal, state, or local agency with jurisdiction by law, or specialized expertise with respect to environmental impacts—conduct project-level, site-specific analysis to identify adverse effects and develop feasible mitigation measures that must be implemented to minimize any such effects.

As a separate process and prior to approving any shoreline project subject to environmental review requirements, TRPA would, in accordance with Chapter 4, "Required Findings," of the TRPA Code, make written findings supported by substantial evidence in the record that the project is consistent with, and would not adversely affect, implementation of the Regional Plan, Goals and Policies, plan maps, code, and other plans and programs; that it would not cause threshold standards to be exceeded; and that it would meet or exceed applicable federal, state, or local air and water quality standards.

3.3 BASELINE CONDITIONS

To evaluate the impacts of a proposed action, agencies compare the impacts of that action against the environmental baseline. Federal and state authorities recognize that existing conditions will normally represent the baseline condition. "It is the environment as it is found contemporaneously with an agency's decision to embark upon an action which may change it, not the condition in which it may have been left before, which is the benchmark from which the alteration of the status quo is to be measured in assessing the significance of such action for NEPA purposes." *Overseas Shipholding Group, Inc., v. Skinner*, 767 F.Supp. 287, 299 (D.D.C. 1991) (quoting *Nat'l Res. Defense Council v. Vaughn*, 566 F.Supp. 1472, 1476 (D.D.C. 1983)); *City & County of San Francisco v. U.S., 615 F.2d 498, 501* (9th Cir. 1980) (Navy leasing of temporarily inactive shipbuilding facility did not need to analyze impacts from baseline that assumed no shipbuilding operations; Navy only needed to analyze impacts unique to the new tenant as compared to prior use). An agency has discretion as to how to determine those conditions or to deviate from this norm under appropriate circumstances. See e.g., *American Rivers v. Federal Energy Regulatory Commission*, 201 F.3d 1186, 1194 (9th Cir. 2000).

The CEQA baseline for assessing significance of impacts of any proposed project is normally the environmental condition at the time a Notice of Preparation (NOP) is issued (State CEQA Guidelines Section 15125[a]). This directive was interpreted and applied by the California Supreme Court in *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439 (*Neighbors for Smart Rail*). There, the court reiterated that "[t]he CEQA Guidelines establish the default of an existing conditions baseline even for projects expected to be in operation for many years or decades" (*Id*., 455). According to the court, for such a project, "existing conditions constitute the norm from which a departure must be justified—not only because the CEQA Guidelines so state, but because using existing conditions serves CEQA's goals in important ways" (*Ibid*.). Therefore, while a lead agency has the discretion to deviate from an existing conditions baseline (in favor of a future baseline in the case of *Neighbors for Smart Rail*), "the agency must justify its decision by showing an existing conditions analysis would be misleading or without informational value."

In *Communities for a Better Environment v. South Coast Air Quality Management District* (*CBE*), the California Supreme Court concluded that a project should be compared to "actual environmental conditions existing at the time of CEQA analysis" even if actual development or activity "already exceeded that allowed under the existing regulations." *Communities for a Better Environment v. South Coast Air Quality Management District Dist.*, 48 Cal. 4th 310, 321, 326 (Cal. 2010) ("CBE"); *Association of Irritated Residents v. Kern County Board of Supervisors*, 17 Cal.App.5th 708, 723–731 (1017). Where the project at issue includes elements authorizing existing conditions, lead agencies are given discretion as to how to analyze those existing impacts. For example, in *Fat v. County of Sacramento* (*Fat*), the state court of appeal held that the existing environment was the proper baseline under CEQA regardless of whether existing environmental conditions were the result of unpermitted activity. 97 Cal. App. 4th 1270, 1281 (Cal. Ct. App. 2002). In *Fat*, an airport expanded unlawfully from a dirt strip, one hangar, and four to five planes in 1971 to a 2,000-foot paved runway, a second 19,000-foot gravel runway, twenty-two hangars, a flight school, and an estimated 30,000 annual aircraft operations by 1992. *Id*. at 1273–1274. In 1997, a pilots' organization applied for a conditional use permit for the airport. Id. at 1274. The purpose of the permit was to legalize the existing use at the airport; the permit did not include any planned expansion of the airport except for converting certain parking areas to hangars. *Id*. The court of appeal held that the "norm" is for an agency to use the actual environment as its baseline, regardless of whether the environment is the result of unpermitted activity, and that the plaintiffs had failed to demonstrate that the agency had abused its discretion by not deviating from this norm. *Id*. 1278, 1280–1281.

During the process to develop the 2008 shorezone regulations, TRPA surveys concluded approximately 4,454 buoys existed on Lake Tahoe. These buoys included those permitted by TRPA as well as buoys not permitted by TRPA that were: (1) permitted by the Nevada Division of State Lands, (2) under lease from the California State Lands Commission, (3) permitted by the U.S. Army Corps of Engineers, or (4) not permitted by any agency. The buoys not permitted by TRPA include buoys that were in Lake Tahoe before TRPA began

regulating the shorezone in 1972 and buoys placed thereafter. By using the existing conditions as the environmental baseline, TRPA included a number of unpermitted buoys on the lake during the buoy count. TRPA did so because it could not with a reasonable degree of certainty determine which, how many, or when those buoys were placed.

During litigation over the EIS for the 2008 shorezone regulations, the Ninth Circuit found that TRPA could have used existing conditions as the baseline but that it had not adequately justified its choice. As described above, several CEQA baseline cases have been decided that essentially confirm the Ninth Circuit's reasoning that a lead agency like TRPA has discretion in choosing where to set its baseline for an EIS but should justify its choice with evidence in the record. In light of these authorities, TRPA determines here the baseline conditions and the appropriate scope of the proposed action to measure against the baseline.

For most purposes, the environmental baseline in this EIS reflects conditions in 2016, when the planning process leading to this Shoreline Plan and alternatives was initiated. Where data on the environmental conditions in 2016 is incomplete, this EIS incorporates the most recent available data as a proxy for 2016 conditions.

However, this EIS incorporates an alternative baseline condition related to the number of existing buoys on Lake Tahoe. A 2016 buoy survey conducted by TRPA identified a total of 4,690 mooring buoys on the lake (TRPA 2017), some of which are unpermitted. These unpermitted buoys consist of those which were not already established on Lake Tahoe by 1972 (the year in which TRPA was established) and have not since received a permit from TRPA or a federal or state agency with appropriate jurisdiction (i.e., U.S. Army Corps of Engineers, California State Lands Commission, or Nevada Division of State Lands). TRPA has estimated that there are 490 such buoys on Lake Tahoe. These buoys have not undergone previous environmental review and cannot be "grandfathered" into a permit because they were in place prior to 1972. These existing unpermitted buoys may or may not be eligible to receive a permit under the various Shoreline Plan alternatives. If these buoys were to receive a permit under an adopted Shoreline Plan alternative, they would count toward the maximum number of buoys analyzed in this EIS. If these buoys fail to receive a permit they would be removed through the TRPA buoy enforcement program. Consequently, TRPA has determined that these buoys should not be counted when considering the baseline scenario against which the Shoreline Plan impacts are evaluated in this environmental review. The baseline buoy count is therefore 4,200 buoys. TRPA has vetted the proposed buoy baseline through both the Shoreline Steering Committee and the Regional Plan Implementation Committee and has received endorsement from both of these committees.

3.4 BUILDOUT CONDITIONS

Because the Shoreline Plan would govern implementation and management of shorezone structures over the long term, environmental effects would occur incrementally as structures are developed and redeveloped over time. It is not meaningful to speculate on the exact characteristics, location, or timing of future projects that would be proposed pursuant to the Shoreline Plan, nor on the precise nature or degree of environmental impacts associated with such projects. This analysis makes reasonable assumptions about the environmental effects of the Shoreline Plan at the point at which those effects would be greatest: after construction of all shoreline structures that could be authorized under each alternative.

This analysis assumes that all structures that could be authorized under each alternative would be developed by the year 2040. This reflects an approximately 20-year planning horizon and it is the soonest point at which all piers authorized under the proposed Shoreline Plan (Alternative 1) could be developed based on the pier allocation provisions of that alternative. This analysis presents a "worst-case-scenario" in that it assumes that every structure that would be potentially allowable would be constructed. Factors such as site-specific constraints, property owner desires and financial considerations, and development right retirement programs, would likely result in fewer structures being constructed.

Alternatives 1, 3, and 4 include numeric limits on the number of structures that could be authorized, and the analysis assumes that all potentially authorized structures would be built. Alternative 2 does not include a numeric cap on the number of structures that could be built. Instead, the maximum number of structures would be limited by the number of parcels that meet eligibility criteria for new structures – namely those parcels that can place structures outside of prime fish habitat. To estimate maximum buildout of Alternative 2, TRPA performed a GIS analysis to identify parcels that meet eligibility criteria including being adjacent to areas of shorezone that do not include prime fish habitat based on the most recent fish habitat mapping data (Appendix A).

Because the number of shorezone structures (e.g., boat ramps and moorings) is assumed to directly affect the level of boating activity, the environmental analysis also includes levels of boating activity that correspond to buildout estimates. While precise levels of existing boating activity are not known, a reasonable estimate of boat use typically associated with each type of mooring and access point (i.e., boat ramp or marina) was prepared by the Joint Fact-Finding Committee (Appendix A). This estimate is based on boat use data collected at Lake Tahoe, including boat use monitoring by TRPA, boat inspection and registration data, boat engine-hour meter readings, and boater surveys. When the estimate of typical boat use per mooring or access point (measured in boat trips and engine-hours) is applied to the inventory of existing moorings and access points, it provides an estimate of existing boat trips and engine-hours. This estimate of boat use per mooring or access point was applied to the maximum number of structures that could be developed under each alternative to generate an estimate of boat use at buildout conditions.

3.5 CONTENTS OF ENVIRONMENTAL ANALYSIS CHAPTERS

Discussion of each technical topic is contained in Chapters 4 through 16. Chapter 17, “Cumulative Impacts,” contains a discussion of impacts in the context of other reasonably foreseeable actions in the Region that may contribute to cumulative impacts.

The issues evaluated in Chapters 4 through 17 include environmental topics potentially affected by the Shoreline Plan alternatives. Chapters 4 through 16 of this EIS are organized into the following major subsections:

- **“Introduction”** provides introductory text pertaining to each technical topic.
- **“Regulatory Setting”** presents the applicable regulatory framework and planning context for the specific technical issue.
- **“Affected Environment”** describes the existing regional conditions relevant to the specific technical issue.
- **“Environmental Consequences and Mitigation Measures”** identifies and describes the methods and assumptions used in the analysis, the criteria used to determine the significance of environmental impacts, the potentially significant effects of implementing the Shoreline Plan alternatives, and feasible mitigation measures that could reduce potentially significant impacts.

  Project impacts are numbered sequentially in each chapter. An impact statement provides a summary of the impact and its level of significance for each alternative. This summary statement is followed by a more detailed discussion of each impact topic, organized by alternative, and includes the analysis, rationale, and substantial evidence upon which conclusions are based. Mitigation measures are set forth to reduce any identified potentially significant effects, and the level of significance after mitigation is described.

4 LAND USE

4.1 INTRODUCTION

Land use planning directs the amount, type, and location of land uses; balances land uses with consideration of the social, environmental, and economic well-being of the Lake Tahoe region; and coordinates regional land uses with land uses in surrounding areas.

This section describes existing land uses and land use patterns in the region; identifies the federal, state, and local regulations and policies governing land use; and describes the land use planning structure and approach used by TRPA and the local jurisdictions in the region. It identifies significance criteria for land use impacts, and it assesses the environmental effects of the proposed shoreline plan alternatives with respect to the land use patterns, permissible uses, planning systems, and development potential each is designed to achieve.

The primary issues raised during the scoping period that pertain to land use included:

- concern regarding the level of upland development associated with shorezone structures and development, and
- concern regarding allowances for more development in, and a higher intensity of use of, the shorezone.

All shoreline structures permitted under this program would be associated with existing or new primary uses, such as residences, public beaches, or marinas. The shoreline plan alternatives would not increase or decrease the amount of, or demand for housing, because housing availability and demand are driven by primary land uses. Therefore, this chapter does not provide a detailed analysis of housing.

4.2 REGULATORY SETTING

The Lake Tahoe shorezone encompasses land within two states, five counties (Placer and El Dorado Counties in California and Washoe County, Carson City, and Douglas County in Nevada), and one incorporated city (City of South Lake Tahoe in California). It also includes substantial federal land and lands owned and managed by the states of California and Nevada. The bi-state Tahoe Regional Planning Agency (TRPA) administers an overarching regional plan with land use authority in accordance with the Tahoe Regional Planning Compact (Compact). A description of the TRPA, federal, state, and local regulatory framework and primary land use planning guidance documents is provided below.

4.2.1 Federal

FOREST SERVICE

The U.S. Forest Service (USFS), Lake Tahoe Basin Management Unit (LTBMU) manages more than 75 percent of lands within the Tahoe region. Land management is guided by the LTBMU Land Management Plan. The Land Management Plan (also known as the Forest Plan) sets the groundwork for how the resources of the national forest are managed. The plan translates national laws, policies, and regulations into guidance for activities that occur on the National Forest System lands.

The Land Management Plan includes management direction and explanatory material. The management direction is the content that must be followed in planning and implementing management activities. Within the plan, management direction is organized into three parts—(1) vision, (2) strategy, and (3) design criteria—

that together articulate desired conditions, objectives, management areas and suitable uses, designated and recommended special area guidance, and standards and guidelines.

4.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has established environmental threshold carrying capacities (thresholds) for nine resource areas: water quality, air quality, scenic resources, soil conservation, fish habitat, vegetation, wildlife habitat, noise, and recreation. TRPA thresholds are minimum standards of environmental quality targets to be achieved in the Tahoe region. Every 4 years, TRPA evaluates the status and trends of the thresholds. The most recent threshold evaluation was carried out in 2015.

No threshold applies specifically to land use, and the adopted thresholds do not define the maximum populations, densities, permitted uses, and other land use criteria for the region; however, the thresholds do set performance criteria that influence land use planning considerations such as coverage, restoration-based incentives, and allocations. As mandated by the Compact, the Regional Plan and implementing ordinances are required to achieve and maintain thresholds while providing opportunities for orderly growth and development consistent with the thresholds (Public Law 91-551).

A summary of the current status of affected TRPA thresholds is included in each of the resource chapters in this EIS (Chapters 4–16).

REGIONAL PLAN

Goals and Policies

TRPA's land use planning and use is guided by the TRPA Regional Plan and implementing Code of Ordinances (TRPA Code). In accordance with the Compact, the Regional Plan was created to achieve the balance, or equilibrium, between the natural environment and the built environment articulated in the TRPA thresholds. The first iteration of the Regional Plan, developed in 1987, focused on growth control and on regulating development practices that degrade the natural and built environments. These growth control and environmental best practices, implemented through the development allocation system and code provisions, are standard practice within the Tahoe region. The Regional Plan was updated in 2012. The 2012 Regional Plan update maintained the growth control system and environmental programs from the 1987 plan and added provisions to promote "environmental redevelopment" to replace older, environmentally degrading developments with more sustainable development and restored landscapes. The 2012 update designated areas with existing infrastructure and the most intensive existing development, as Centers that are suitable for pedestrian-friendly redevelopment and concentrated development. The 2012 update also provided incentives for private property owners to restore sensitive land and transfer development from sensitive and outlying areas to the designated Centers.

The foundation of the Regional Plan, the Goals and Policies, are statements of policy to guide decision making as it affects the Region's resources and the ability to maintain or achieve environmental thresholds. The Goals and Policies are addressed in six major elements: land use; transportation; conservation; recreation; public services and facilities; and implementation. The Land Use Subelement of the Regional Plan addresses policies pertaining to growth and development within the region. Goals and Policies of the Land Use Subelement that are most applicable to the Shoreline Plan include:

GOAL LU-1: Restore, maintain, and improve the quality of the Lake Tahoe region for the visitors and residents of the region.

- **Policy LU-1.1**: The primary function of the region shall be as a mountain recreation area with outstanding scenic and natural values.

- **Policy LU-1.3**: The Regional Plan shall seek to maintain a balance between economic/social health and the environment.

GOAL LU-2: Direct the amount and location of new land uses in conformance with the environmental threshold carrying capacities and the other goals of the Tahoe Regional Planning Agency bi-state compact.

- **Policy LU-2.4**: Structures, legally existing as of the effective date of the Regional Plan, but which, by virtue of their design or location, are prohibited, are considered nonconforming, and are subject to the following:

  A. Nonconforming structures may be maintained or repaired. Maintenance and repair shall be defined in implementing ordinances.

  B. Nonconforming structures may not be enlarged, replaced, or rebuilt without the approval of TRPA. Such approval shall occur through direct TRPA review, through the conformance review process for Area Plans, or through Memorandum of Understanding with applicable governments and shall be based on criteria set forth in implementing ordinances to ensure that:

    i. the activity shall not increase the extent of nonconformity; and

    ii. if the structure is subject to a specific program of removal or modification by TRPA, the activity shall not conflict with that program.

- **Policy LU-2.5**: Uses, legally existing as of the effective date of the Regional Plan, but which are now prohibited, are considered nonconforming and are subject to the following policies:

  A. Nonconforming uses may continue as they exist except where specifically subject to a program of removal or modification.

  B. Nonconforming uses may not be modified, expanded, or intensified, nor resumed following a significant interruption without the approval of TRPA. Such approval shall occur through direct TRPA review, through the conformance review process for Area Plans, or through Memorandum of Understanding with applicable governments and shall be based on criteria set forth in ordinances to ensure that:

    i. the activity shall not increase the extent of nonconformity;

    ii. the activity shall not make it more difficult to attain and maintain environmental threshold carrying capacities; and

    iii. the use is otherwise consistent with applicable Plan Area Statements and Community Plans.

  C. Additional rules regarding excess land coverage.

- **Policy LU-2.6**: Uses of the bodies of water within the region shall be limited to the outdoor water-dependent uses required to satisfy the goals and policies of the Regional Plan.

GOAL LU-3: Provide to the greatest possible extent, within the constraints of environmental threshold carrying capacities, a distribution of land use that ensures the social, economic, and environmental well-being of the region.

- **Policy LU-3.1**: All persons shall have the opportunity to utilize and enjoy the region's natural resources and amenities.

GOAL LU-4: Regional Plan goals, policies, and ordinances shall be implemented using an integrated system of regional and local government planning.

Land Use Classification System

The Regional Plan categorizes land in the Tahoe region into one of eight classifications: Wilderness, Backcountry, Conservation, Recreation, Resort Recreation, Residential, Mixed-Use, and Tourist. The classifications are a gross summarization of major land uses that exist in the region and are further supplemented by local TRPA plans. The following provides an overview of each land use classification type.

Wilderness

Wilderness Districts are designated and defined by the U.S. Congress as part of the National Wilderness Preservation System. These lands offer outstanding opportunities for solitude and primitive, unconfined recreation experiences, and they contain ecological, geological, and other features of scientific, educational, scenic and historic value. The wilderness designation is intended to protect and preserve such areas for present and future generations. These lands are managed to prevent the degradation of wilderness character. Natural ecological processes and functions are preserved and restored where necessary. Permanent improvements and mechanized uses are prohibited. Wilderness District lands within the Tahoe region include portions of the Desolation, Granite Chief and Mount Rose Wilderness Areas.

Backcountry

Backcountry Districts are designated and defined by USFS as part of its Resource Management Plans. These lands are roadless areas including Dardanelles/Meiss, Freel Peak and Lincoln Creek. On these lands, natural ecological processes are primarily free from human influences. Backcountry areas offer a recreation experience similar to wilderness, with places for people seeking natural scenery and solitude. Primitive and semi-primitive recreation opportunities include hiking, camping, wildlife viewing, and cross-country skiing, in addition to more developed or mechanized activities not allowed in wilderness areas (e.g., mountain biking, snowmobiling). Management activities that support administrative and dispersed recreation activities are minimal but may have a limited influence. Limited roads may be present in some backcountry areas; road reconstruction may be permitted on backcountry lands where additional restrictions do not apply. Backcountry areas contribute to ecosystem and species diversity and sustainability, serve as habitat for fauna and flora, and offer wildlife corridors. These areas provide a diversity of terrestrial and aquatic habitats, and support species dependent on large, undisturbed areas of land. Backcountry areas are managed to preserve and restore healthy watersheds with clean water and air, and healthy soils. Watershed processes operate in harmony with their setting, providing high-quality aquatic habitats.

Conservation

Conservation areas are nonurban areas with value as primitive or natural areas, with strong environmental limitations on use, and with a potential for dispersed recreation or low-intensity resource management. Conservation areas include:

(1) public lands already set aside for this purpose;

(2) high-hazard lands, stream environment zones, and other fragile areas, without substantial existing improvements;

(3) isolated areas which do not contain the necessary infrastructure for development;

(4) areas capable of sustaining only passive recreation or nonintensive agriculture; and

(5) areas suitable for low-to-moderate resource management.

Recreation

Recreation areas are nonurban areas with good potential for developed outdoor recreation, park use, or concentrated recreation. Lands which this plan identified as recreation areas include:

(1) areas of existing private and public recreation use;
(2) designated local, state, and federal recreation areas;

(3) areas without overriding environmental constraints on resource management or recreational purposes; and
(4) areas with unique recreational resources which may service public needs, such as beaches and ski areas.

Resort Recreation
Resort Recreation areas are the specific Edgewood and Heavenly parcels depicted on Map 1 of the Regional Plan.

Residential
Residential areas are urban areas having potential to provide housing for the residents of the region. In addition, the purpose of this classification is to identify density patterns related to both the physical and manmade characteristics of the land and to allow accessory and nonresidential uses that complement the residential neighborhood. These lands include:

(1) areas now developed for residential purposes,
(2) areas of moderate-to-good land capability,
(3) areas within urban boundaries and serviced by utilities, and
(4) areas of centralized location in close proximity to commercial services and public facilities.

Mixed-Use
Mixed-use areas are urban areas that have been designated to provide a mix of commercial, public services, light industrial, office, and residential uses to the region or have the potential to provide future commercial, public service, light industrial, office, and residential uses. The purpose of this classification is to concentrate higher intensity land uses for public convenience, and enhanced sustainability.

Tourist
Tourist areas are urban areas that have the potential to provide intensive tourist accommodations and services or intensive recreation. This land use classification also includes areas recognized by the Bi-State Compact as suitable for gaming. These lands include areas that are:

(1) already developed with high concentrations of visitor services, visitor accommodations, and related uses;

(2) of good to moderate land capability (land capability districts [LCDs] 4-7);

(3) with existing excess land coverage; and

(4) located near commercial services, employment centers, public services and facilities, transit facilities, pedestrian paths, and bicycle connections.

Code of Ordinances

The TRPA Code implements the Goals and Policies of the Regional Plan. They provide enforceable requirements to achieve the stated goals in the Regional Plan and maintain environmental thresholds. Land use planning provisions are included in Chapter 10, “TRPA Regional Plan Maps”; Chapter 11, “Plan Area Statements and Plan Area Maps”; Chapter 12, “Community Plans”; Chapter 13, “Area Plans”; and Chapter 14, “Specific and Master Plans.”

The TRPA Code also defines eight shorezone tolerance districts for lands adjacent to the Lake Tahoe shoreline. These districts, described in Chapter 83 of the Code of Ordinances, reflect the physical ability of the shoreline to support use and development, with Shorezone Tolerance District 1 being the most sensitive and Tolerance District 8 being the least sensitive. None of the Shoreline Plan alternatives would change the definition, location, process for determining district boundaries, or tolerance district development standards described in Chapter 83 of the Code of Ordinances. The shorezone tolerance districts would not affect land use, but could impact development potential, as described in Chapter 7, “Soil Conservation.” The approximate locations of shoreline tolerance districts are displayed in in Exhibit 2-7 of Chapter 2, “Project Description.”

The Shoreline Plan would involve amendments to sections of the TRPA Code that address uses and development in the shorezone of Lake Tahoe (TRPA Code Chapters 80–86), and related amendments to TRPA Code Chapters 2, 10, 14, 50, 63, 66, and 90), if approved.

Local TRPA Plans

After adoption of the 1987 Regional Plan, over 170 different plans were adopted for individual geographic areas throughout the region. These included what are known as plan area statements (PASs), Community Plans, and Master and Specific Plans. With the update of the Regional Plan in 2012, local, state, federal, and tribal governments were encouraged to adopt Area Plans to supersede these older types of plans – a process which is currently underway. The goal of adopting Area Plans is to more effectively implement the Regional Plan, and to provide a more unified approach to land use under different jurisdictions. Prior to being adopted, Area Plans must be found to be in conformance with the Regional Plan. Local TRPA plans can be accessed and are available at http://www.trpa.org/regional-plan/plan-area-statements/.

Local TRPA plans must be consistent with the land use classifications described above. They also identify permissible uses, developments standards, and other policies that provide more specificity with respect to allowable land uses.

Area Plans

With adoption of the Lake Tahoe Regional Plan in December 2012, TRPA created a new planning instrument, the area plan. Area plans allow local governments to implement the Regional Plan at a smaller scale and with greater flexibility, allowing TRPA to focus on issues of regional environmental significance. Under the new planning system, multiple requirements—TRPA, local, state, and federal—are addressed in a coordinated fashion through the area plans, which are adopted by both the local jurisdiction and TRPA. The result is greater planning and permitting efficiency because TRPA can delegate some permitting authority to local jurisdictions, while retaining oversight by TRPA of large-scale projects and projects in sensitive environments.

Plan Area Statements

PASs provide a detailed guide for planning within discrete areas of the region. Each PAS is assigned a single land use classification and one of three management strategies: development with mitigation, redirection of development, or maximum regulation. Some PASs are designated as community plan areas, receiving areas for transfer of development commodities, or areas targeted for scenic restoration, or development of affordable housing. Additionally, PASs identify planning considerations, special policies, maximum densities for residential and tourist accommodation uses, community noise equivalent levels, allowable and special uses, and the amount of additional recreation capacity permissible. As area plans are adopted, they will replace the older PASs. The area plans will give TRPA and local jurisdictions a more efficient tool for implementing the Regional Plan than the older PAS/community plan system.

Community Plans

Currently, there are six community plans within the Tahoe Basin. The original intent of the community plans under the 1987 Regional Plan was to concentrate commercial uses to reduce the negative effects of “strip” development and to provide incentives to renovate, revitalize, and remove blighted commercial development. Community plan areas contain commercial, tourist, residential, public service, recreation, and resource management land uses. Community plans describe a land use vision, development and coverage incentives, and environmental targets. Community Plans will also be superseded by area plans, as area plans are adopted.

Master Plans and Specific Plans

TRPA Regional Plan and Chapter 14 of the TRPA Code permit the adoption of specific plans and project-oriented master plans to augment PASs, community plans, or area plans. Through more detailed planning, they seek to ensure that projects and activities are consistent with the Goals and Policies, the PASs or adopted Community Plans, and the TRPA Code. In addition, they allow for phasing of development, systematic environmental and project review, and implementation of environmental control measures. Certain land use areas (e.g., airports, ski areas, and marinas) are required to prepare Master Plans if expansion is proposed. TRPA has eight adopted master plans: Tahoe Keys Marina, Tahoe City Marina, Ski

Run Marina, Elks Point Marina, Heavenly Ski Resort, Diamond Peak Ski Resort, Lake Tahoe Community College, Bijou Community Park, and Homewood Mountain Resort.

REGIONAL TRANSPORTATION PLAN

The Lake Tahoe 2035 Regional Transportation Plan (RTP), also known as Mobility 2035, includes a list of transportation projects and strategies to improve mobility in the region and provide the opportunity for environmental gains related to a reduction in personal vehicle travel and associated greenhouse gas (GHG) emissions, improved air quality, improved water quality, and enhanced recreation opportunities related to bicycle, pedestrian, and transit improvements. The RTP also includes a sustainable communities strategy, pursuant to California Senate Bill 375, Statutes of 2008, for the California portion of the Lake Tahoe region. The sustainable communities strategy is a strategy that links land use patterns with transportation systems to enable attainment of GHG reduction targets.

Linking Tahoe: Active Transportation Plan

The Linking Tahoe: Active Transportation Plan (ATP), formerly the Lake Tahoe Bicycle and Pedestrian Plan, presents a guide for planning, designing, constructing, and maintaining a regional active transportation network that includes innovative infrastructure, support facilities, and awareness programs. The infrastructure network includes on-street bicycle lanes and bicycle routes, and off-street paths and sidewalks. The ATP depicts existing and planned, shared-use paths, bicycle lanes, bicycle routes, and sidewalks within the Tahoe Basin. The existing network includes 120 miles of bicycle and pedestrian shared-use paths, bicycle lanes, bicycle routes, and sidewalks and proposes another 68 miles of new bicycle and pedestrian facilities. The built-out bicycle and pedestrian network is estimated to reduce vehicle miles traveled by 8,500 miles on a peak summer day. The ATP also identifies goals, policies, actions, and performance measures for local governing bodies and transportation agencies.

ENVIRONMENTAL IMPROVEMENT PROGRAM

TRPA launched the Environmental Improvement Program (EIP) in 1997 to better implement the Regional Plan and accelerate attainment of thresholds. Recognizing that capital investments, research, and monitoring were essential components of the Regional Plan, the EIP called for a substantial investment in capital projects, and research and monitoring. The EIP also identified hundreds of specific projects and programs to be undertaken by more than 50 funding partners, including federal, state, and local agencies and the private sector. The projects are focused on improving air, water, and scenic quality, forest health, fish and wildlife, and public access and recreation. Since its initiation, over a billion dollars have been invested and hundreds of EIP projects have been completed.

4.2.3 California

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

The California Department of Parks and Recreation (State Parks) defines its mission as “to provide for the health, inspiration, and education of the people of California by helping to preserve the state’s extraordinary biological diversity, protecting its most valued natural and cultural resources, and providing opportunities for high-quality recreational experiences based on those resources.” State Parks manages the California State Park System, including Emerald Bay, D.L. Bliss, and Sugar Pine Point State Parks in the Tahoe region. Long-range development and management of each state park is directed by a general plan, which provides broad policy and program guidance. Each California state park must have an approved general plan before any major park facilities can be developed.

CALIFORNIA TAHOE CONSERVANCY

The California Tahoe Conservancy (Conservancy) is a California state agency, created in 1984, with a mission to preserve, protect, restore, enhance and sustain the unique and significant natural resources and recreational opportunities of the Lake Tahoe region (California Government Code Title 7.42 Sections 66905 to 66908.3). The Conservancy's jurisdiction extends throughout the California side of the Lake Tahoe region, as defined in California Government Code Section 66905.5. The Conservancy has the authority to acquire, hold, and manage property in the Tahoe region. Since 1984, the Conservancy has acquired more than 4,800 parcels of land, comprising more than 6,500 acres, for the purposes of protecting the natural environment and promoting public recreation and Lake access. The Conservancy manages and implements restoration and other projects on these lands. It has also provided approximately 170 grants to local governments and nonprofit organizations for erosion control, public recreation and access, land acquisition, and other projects. Since 1997, the Conservancy's programmatic efforts have been focused on California's commitment to the implementation of the EIP for the Tahoe region and to address declining resource values at Lake Tahoe.

4.2.4 Nevada

NEVADA DIVISION OF STATE PARKS

The Nevada Division of State Parks manages the Lake Tahoe-Nevada State Park. The Lake Tahoe-Nevada State Park Master Development Plan with Resource Analysis (also called the General Management Plan) describes the basic principles for the use, preservation, and operation of Lake Tahoe-Nevada State Park. The goal of the plan is to provide a long-range management and development strategy based on current visitation, needs, and conditions, as well as projections for future use and needs. The plan describes operational, resource management, and facility development guidance for Sand Harbor Management Area, Cave Rock Management Area, Spooner Lake/Backcountry Management Area, and Van Sickle Bi-State Park Management Area. The plan is currently being updated.

NEVADA DIVISION OF STATE LANDS

The Nevada Division of State Lands (NDSL) provides land and land use planning services to the State and its agencies. One of the division's four program areas is the Nevada Tahoe Resource Team (NTRT), an interagency team coordinated by NDSL and dedicated to preserving and enhancing the natural environment in the Lake Tahoe Basin. NTRT is responsible for implementing Nevada's share of the EIP and is coordinating and implementing a wide range of projects designed to improve water quality, control erosion, restore natural watercourses, improve forest health and wildlife habitat, and provide recreational opportunities. Through the excess coverage mitigation program, the agency has acquired and retired about 500 parcels of sensitive land, which are managed for the purposes of protecting Lake Tahoe and its watershed. Management goals include clean water, healthy forests, the reduction of excess fire fuels and hazardous forest conditions, good wildlife habitat, and reasonable public access. NDSL also manages land in the public trust on the Nevada side for submerged land below an elevation of 6,223 feet Lake Tahoe datum.

4.2.5 Local

Lands within the Tahoe region fall within the boundaries of four counties, one incorporated city, and the Carson City Rural Area. Planning documents for local governments include:

- City of South Lake Tahoe General Plan,
- El Dorado County General Plan,
- Placer County General Plan,
- Washoe County Master Plan,
- Carson City Master Plan, and
- Douglas County Master Plan.

The Compact also allows local jurisdictions to develop, adopt, and implement regulations so long as they are consistent with the Regional Plan or address issues not covered in the Regional Plan (Compact Article VI(a)). These local regulations must be consistent with all aspects of the Regional Plan, including requirements that they do not preclude the attainment or maintenance of thresholds.

4.3 AFFECTED ENVIRONMENT

Lake Tahoe and the surrounding area are a unique among regions in the Sierra Nevada. The Lake Tahoe region lies on the border between California and Nevada—approximately two-thirds of the region lies in California and one-third in Nevada. The total acreage of the land area under TRPA jurisdiction is almost 202,000 acres, with about 85 percent of this land in public ownership and preserved as open space. The geographic area addressed by the Shoreline Plan alternatives is the 72-mile-long shorezone of Lake Tahoe, which includes portions of Placer and El Dorado Counties in California, and Carson City, Washoe, and Douglas Counties in Nevada (Table 4-1).

Table 4-1 Percentage of Shoreline in Each Jurisdiction

County	Percentage of Shoreline
California	
El Dorado County	43
Placer County	23
Nevada	
Douglas County	15
Washoe County	13
Carson Rural Area	6
Total	100

Source: Data provided by TRPA in 2018

4.3.1 Land Use Pattern

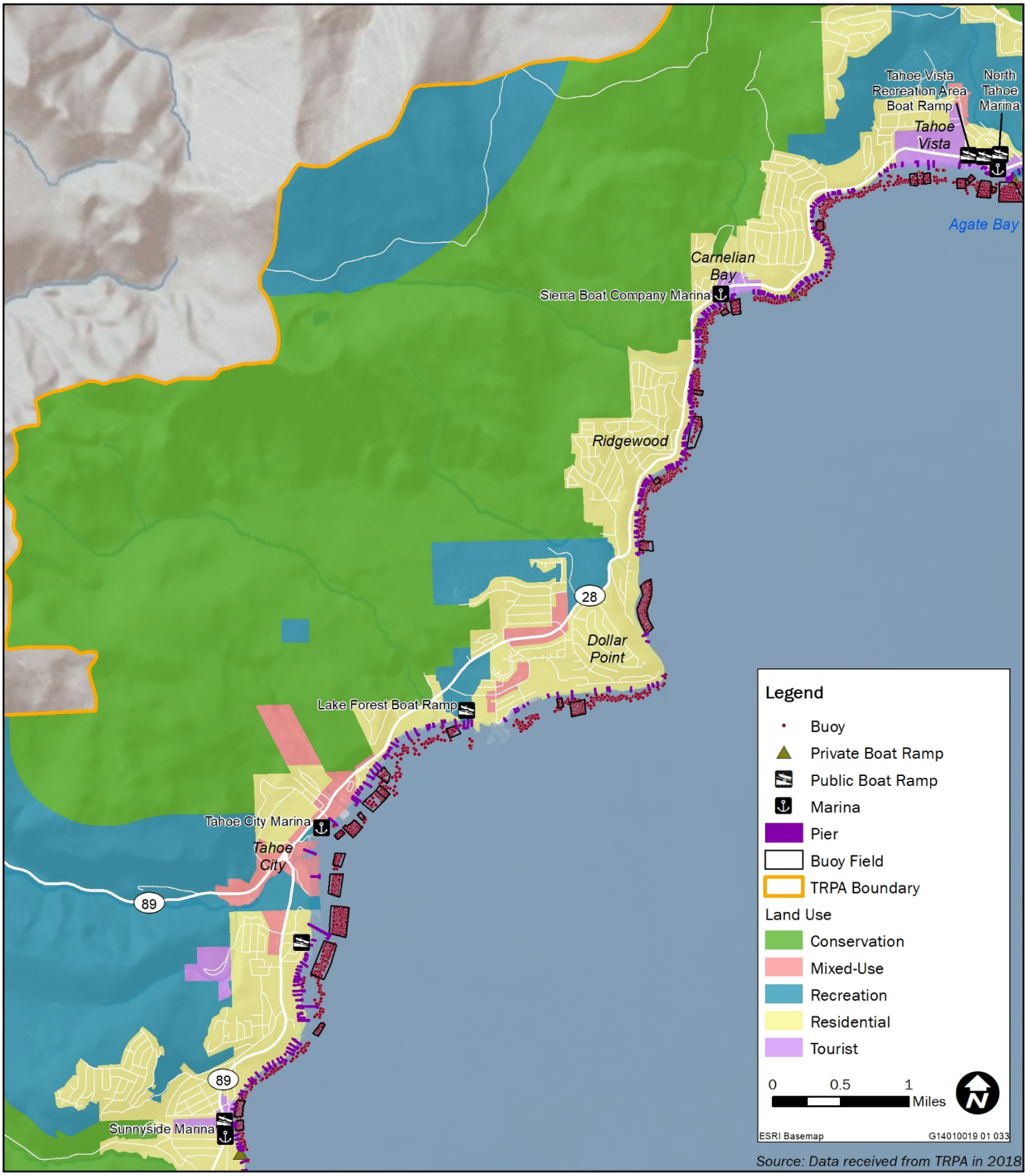
REGIONAL LAND USE AND SHORELINE DEVELOPMENT

As described above, land in the Tahoe region is assigned to one of eight classifications: wilderness, backcountry, conservation, recreation, resort recreation, residential, mixed-use, and tourist (see Table 4-2). The geographic distribution of these land use classifications in relation to existing shoreline development is depicted in Exhibits 4-1 through 4-5.

Table 4-2 Acreage of Land in the Lake Tahoe Basin, by Land Use Classification

Land Use Classification	Acreage	Percentage
Conservation	88,396	44
Backcountry	38,376	19
Tourist	867	<1
Residential	20,268	10
Mixed-Use	2,409	1
Recreation	26,244	13
Resort Recreation	306	<1
Wilderness	24,714	12
Total	201,579	100

Note: Total acreage includes all water bodies except Lake Tahoe
Source: Data provided by TRPA Regional Land Use GIS layer in 2018

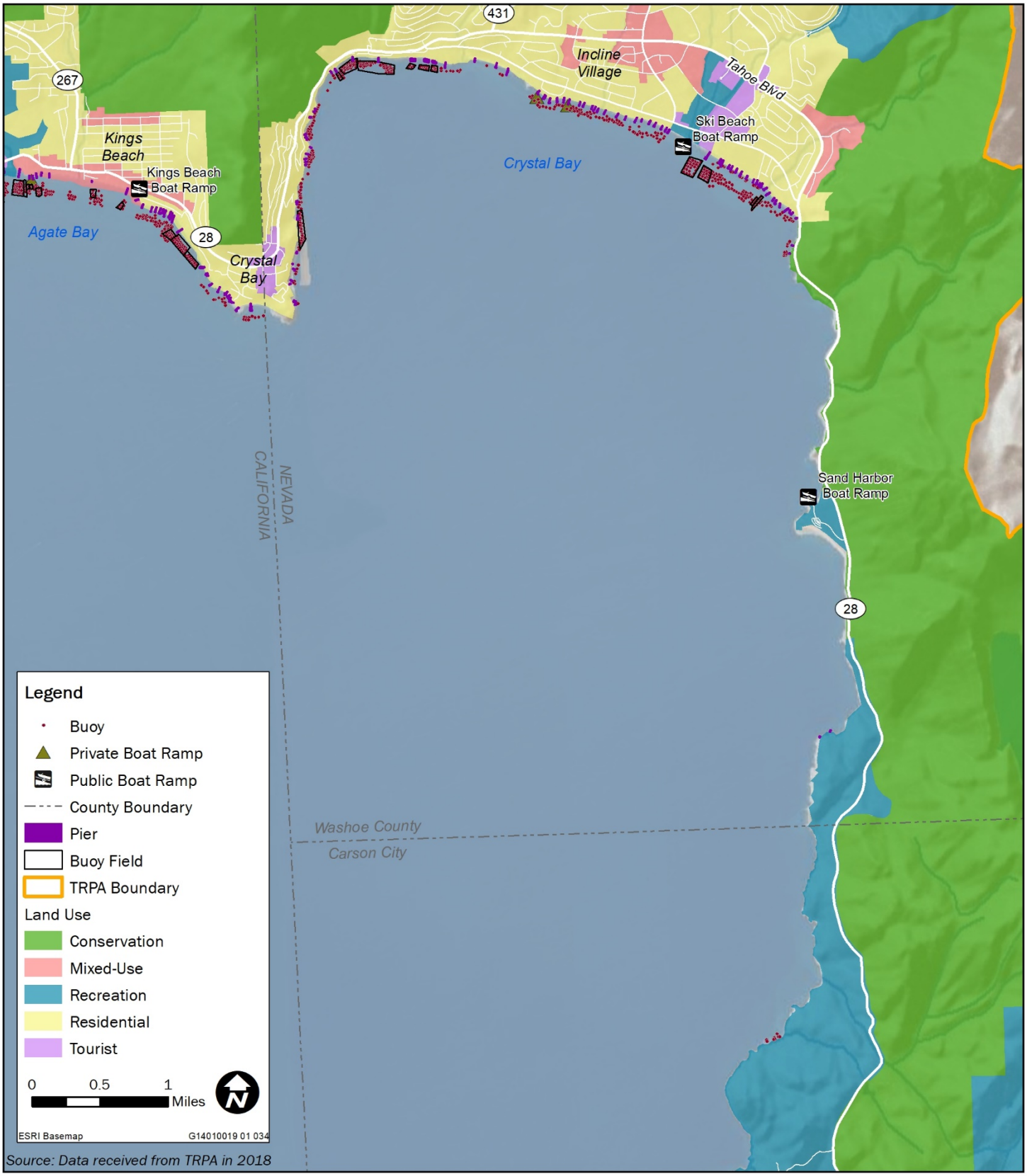


Source: Data received from TRPA in 2018

TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-1 **Land Use Classifications and Existing Shoreline Structures (1 of 5)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

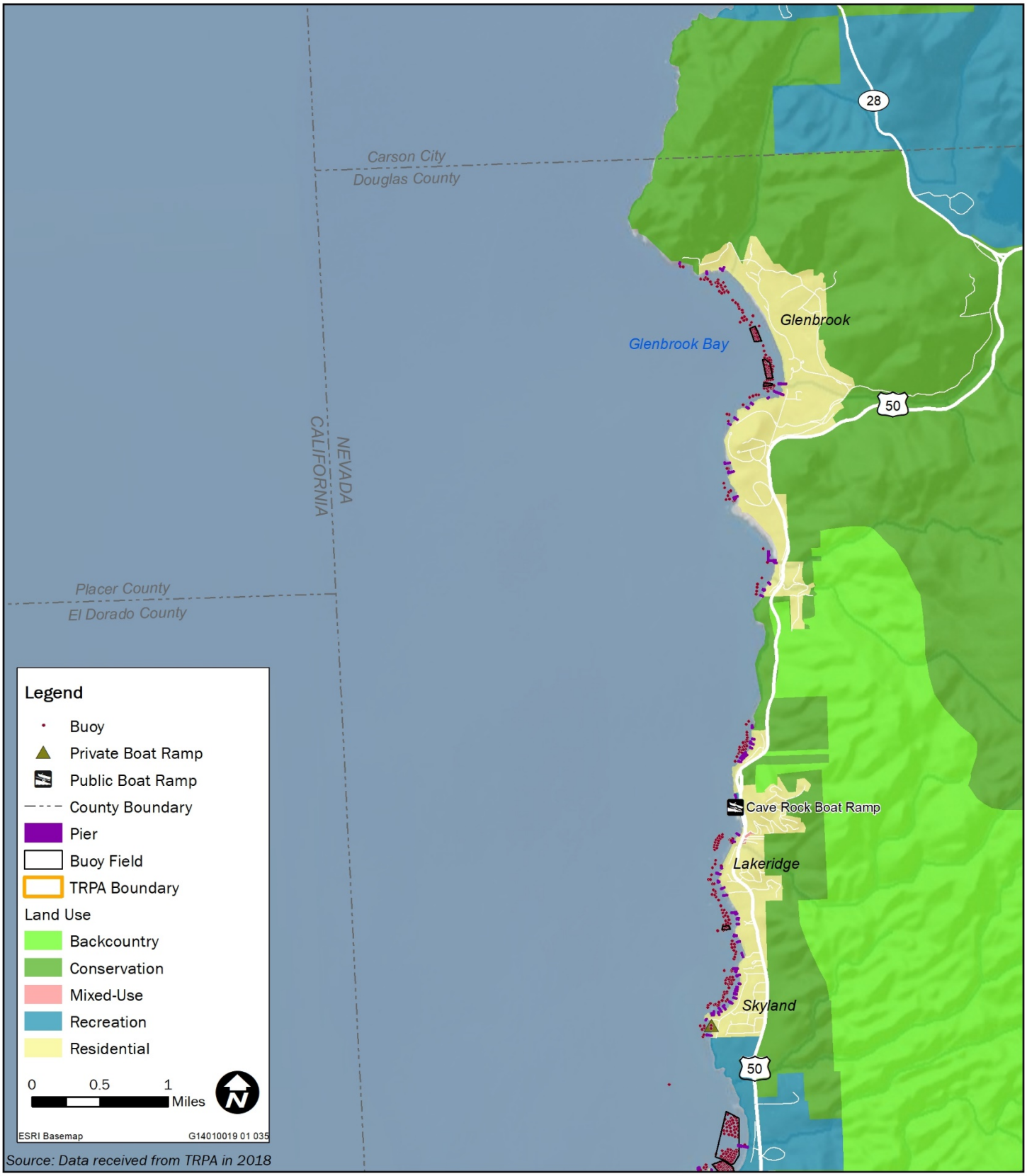


Source: Data received from TRPA in 2018

TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-2 **Land Use Classifications and Existing Shoreline Structures (2 of 5)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

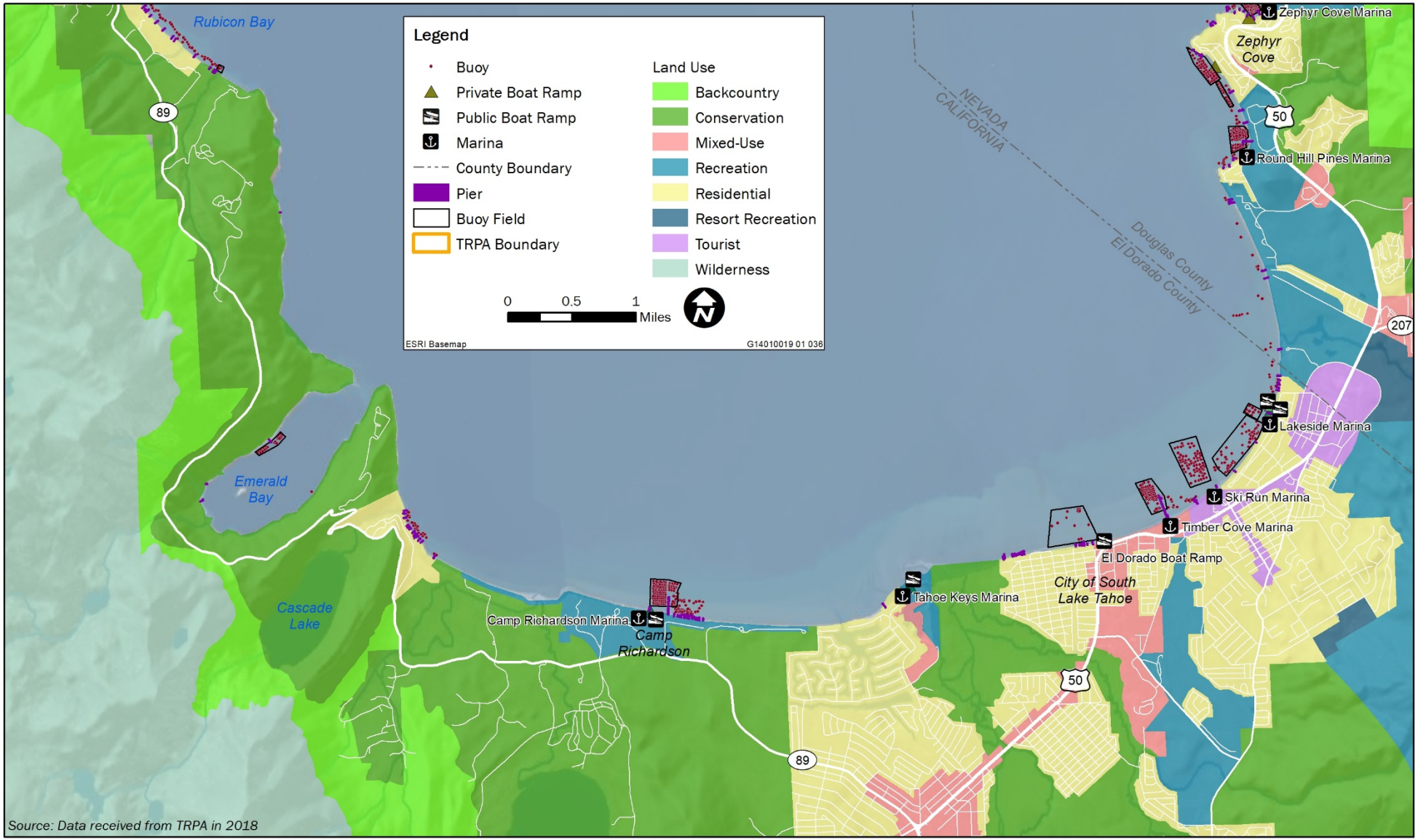


Source: Data received from TRPA in 2018

TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-3 **Land Use Classifications and Existing Shoreline Structures (3 of 5)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

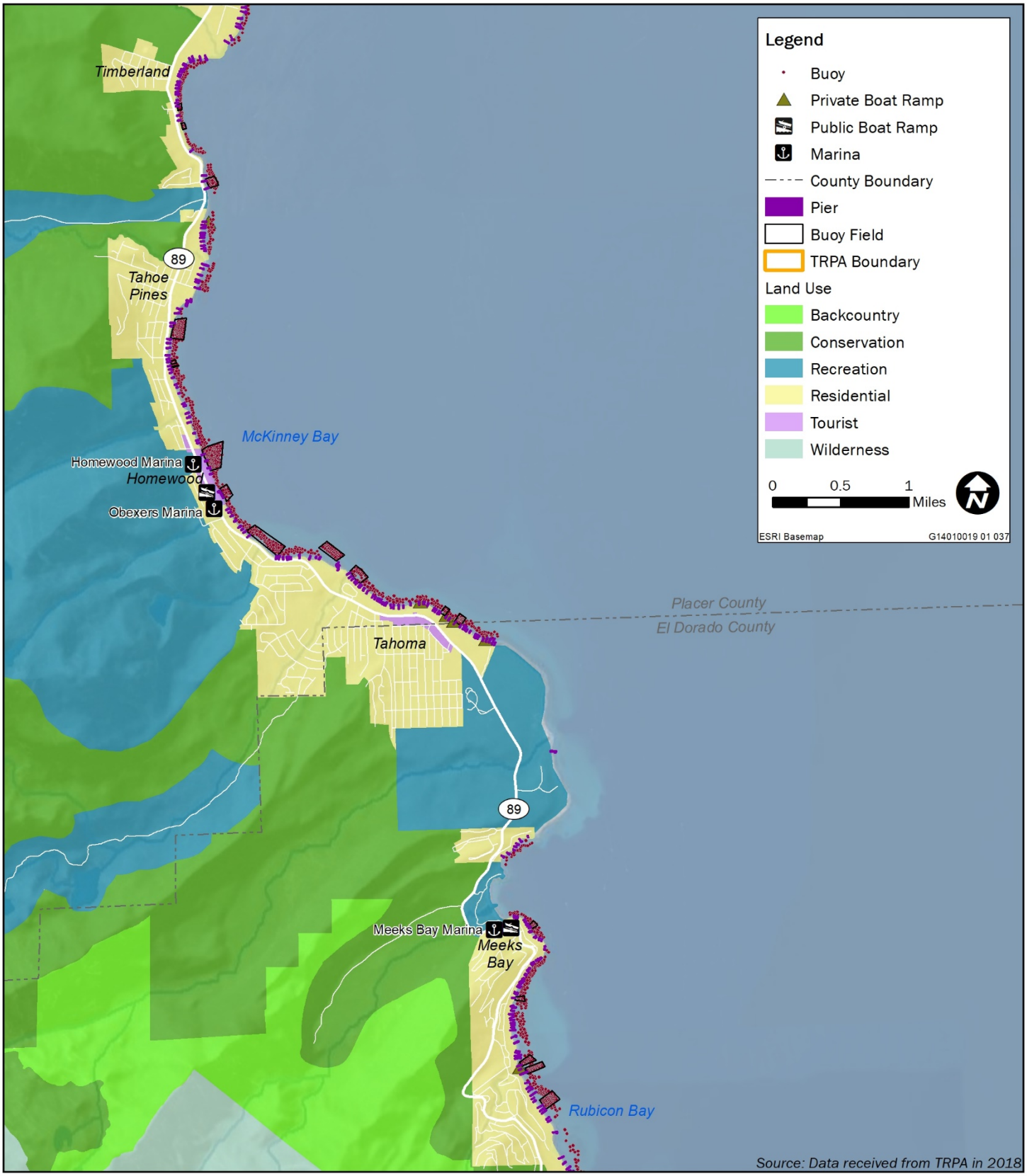


Source: Data received from TRPA in 2018

TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-4 Land Use Classifications and Existing Shoreline Structures (4 of 5)

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-5 **Land Use Classifications and Existing Shoreline Structures (5 of 5)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Within the developed portion of the region (residential, mixed-use, tourist, and resort recreation), most land is zoned for residential uses and is built out with primarily detached single-family residences. TRPA has estimated that there is a minimum of approximately 2,440 residential units in the Tahoe region with direct lake access (i.e. with property frontage on the shoreline) (Bettinger, pers. comm., 2018a). Residential development in the Lake Tahoe region is concentrated in established communities around the shoreline of the lake. Residential land consists of approximately 40 percent of the shoreline (Bettinger, pers. comm., 2018b), which is roughly aligned with the amount of private land around the shoreline (Table 4-3). Mixed-use and tourist-related land uses make up a small portion of the developed areas around the lake and are concentrated along the major transportation routes (U.S. 50 and State Routes 28 and 89), and within established communities around the lake.

The pattern of ownership along the shoreline is roughly evenly split between private and public, with a small majority of lands held by public agencies (Table 4-3). Public land uses are largely state parks and USFS lands, while private lands are generally single-family residences and resort accommodation. Land ownership is shown in Exhibit 4-6.

Table 4-3 Percent of Shoreline in each Ownership Category

Land Ownership	Percentage of Shoreline
Federal	27
State	25
Local	3
Private	44
Total	**100**

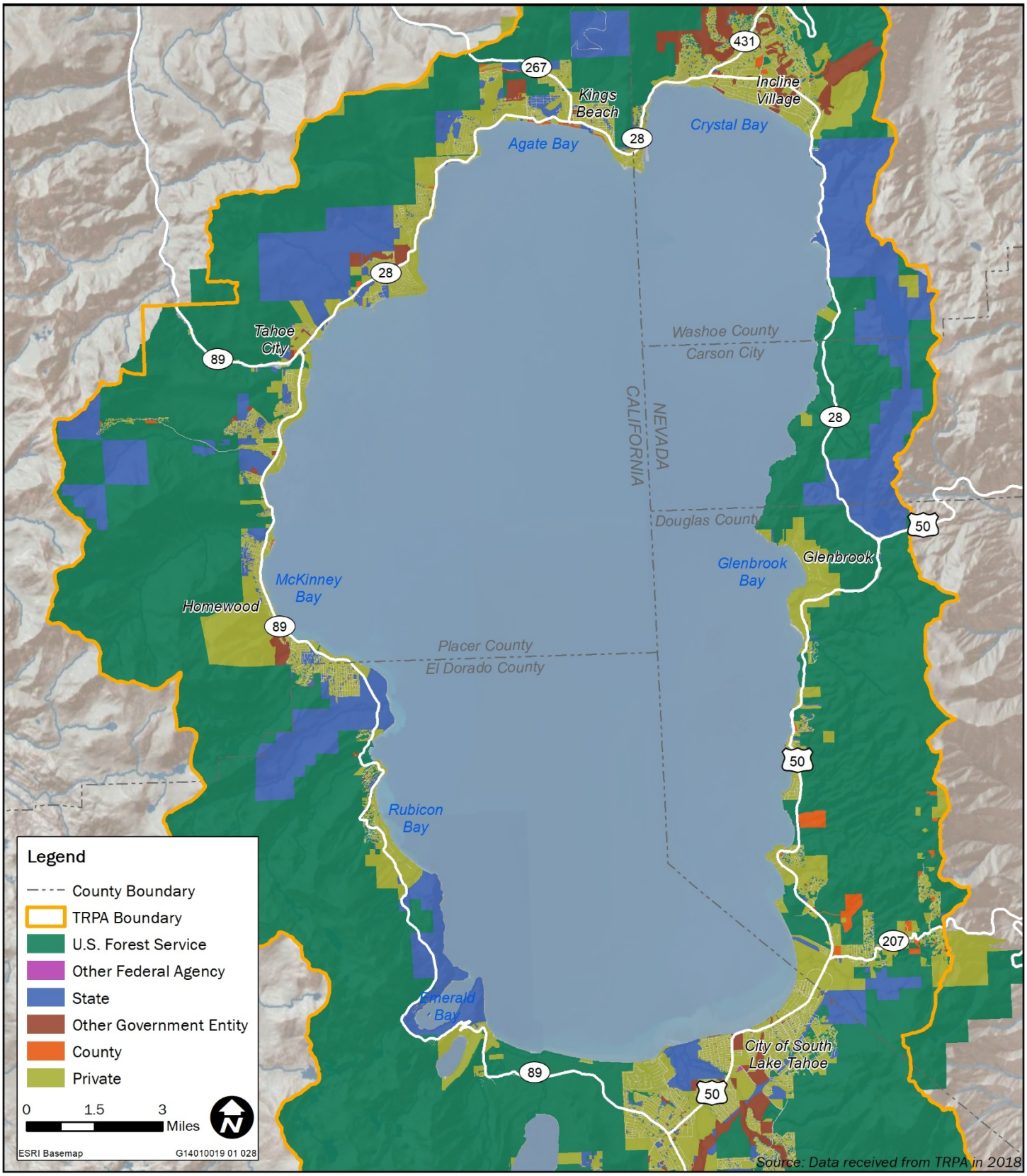
Source: Data provided by TRPA in 2018

4.3.2 Visitation

Lake Tahoe measures 12 miles wide and 22 miles long, with a maximum depth of 1,645 feet, making it one of deepest lakes in the world, and one of the largest by volume. Visitors in the area are attracted to the recreation opportunities and scenic and natural resources, including the clarity of the lake. The Lake Tahoe Region is home to almost 55,000 full-time residents and is a recreational destination with four to six million visitors each year (TRPA 2017), including many who live in nearby metropolitan centers within a few hours' travel time. The shoreline of Lake Tahoe is one of the major tourist draws of the area, and many residents and visitors frequent the lake shoreline to participate in recreational activities. Visitation in the Tahoe region is seasonal, with heavy periods of visitation in the summer and winter, and substantially less visitation during the spring and fall. The peak period for shoreline visitation is during the summer, especially July and August. The most intensive shoreline visitation occurs during the Independence Day and Labor Day weekends.

4.3.3 Regional Growth

In the early part of the 20th century, development around Lake Tahoe consisted of a few scattered vacation homes. The post-World War II building boom, the establishment of the gaming industry through construction and expansion of casinos on the Nevada side of the Lake, and the completion of interstate highway links to support the 1960 Winter Olympics in Squaw Valley resulted in a dramatic increase in development in the region. This building boom and the resultant concern for environmental values led to the adoption of the Tahoe Regional Planning Compact in 1969 and the formation of TRPA. The Regional Plan, first adopted in 1987, established environmental regulations and a growth control system. The combination of pre-TRPA development and the subsequent regulations and growth control have led to the land use pattern seen today.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-6 Land Ownership

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

DEVELOPMENT RIGHTS

Development within the Lake Tahoe basin is controlled by land use mapping and zoning, and by development rights, which are TRPA-regulated commodities required for any new residential, commercial, or tourist accommodation development. These development rights limit the total amount of development that can occur in the region, and they allow TRPA to regulate the rate of growth and provide incentives for environmentally beneficial redevelopment. Chapters 50–52 of the TRPA Code sets forth the requirements for regulating the rate, location, and type of growth in the region in a manner intended to distribute allocations for growth and development in an orderly fashion to meet and maintain thresholds. For a development or redevelopment project to be permitted, the project must meet both the land use and zoning requirements of TRPA and the applicable local jurisdiction; and the development rights requirements of TRPA.

The Regional Plan provides for moderate growth and sets maximum allocations for residential, commercial, and tourist-related development. Allocations are used as a growth management tool to ensure that development is consistent with progress toward meeting environmental thresholds. Residential allocations are awarded to local jurisdictions annually based on the performance of each jurisdiction in implementing environmental improvement projects, monitoring of project permit conditions, and increasing transit operations.

4.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.4.1 Methods and Assumptions

The following analysis assesses the environmental effects of the proposed changes to the TRPA Code under each Shoreline Plan alternative with respect to the level of shorezone development each has the potential to achieve. This analysis is based on review of existing land use documents, policies, ordinances, and other regulations. The following impact discussions relate to direct land use impacts (changes to the built form and consistency of land use plans and policies) resulting from the proposed Shoreline Plan alternatives.

4.4.2 Significance Criteria

Significance criteria relevant to land use are summarized below. The applicable TRPA threshold standards, the land use and housing criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- result in a development pattern (type and intensity of land use) that would be incompatible with established land uses;
- induce substantial growth in an area, either directly (e.g., by proposing new residential development) or indirectly (e.g., through extension of infrastructure, removing obstacles to development, or by setting a precedent for additional growth); or
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Tahoe region, adopted for the purpose of avoiding or mitigating an environmental effect.

4.4.3 Environmental Effects of the Project Alternatives

Impact 4-1: Induce substantial new growth

Regional growth is capped by the Regional Plan. The Shoreline Plan alternatives would permit development of structures within the shorezone but would not increase the capacity of the region to accommodate an increase in residents or tourists. The addition of new public access facilities (e.g., boat ramps, public slips) under Alternatives 1, 2, and 3 would accommodate an increase in the number of day visitors to the region; however, these additional day visitors would not lead to residential, tourist, or commercial growth because growth is capped by the Regional Plan development rights system. Therefore, the impacts on growth associated with Alternatives 1, 2, and 3 would be **less than significant**. There are no public access features that would be expected to generate new visitors under Alternative 4, and there would be **no impact** associated with that alternative.

The TRPA Regional Plan and Code of Ordinances together represent a single, enforceable set of region-wide goals, policies, and implementation measures that serve as the blueprint for growth within the region. The Regional Plan includes a growth control system that caps growth in the region at sustainable levels. The *2012 Regional Plan Update Environmental Impact Statement* (2012 RPU EIS) considered the effects of complete buildout of the growth and pattern of land use allowed under the adopted Regional Plan. The 2012 RPU EIS and TRPA's associated findings determined that the land use pattern and growth allowed for under the Regional Plan would attain and maintain thresholds. The Shoreline Plan alternatives would not alter the amount of growth and land use pattern forecasted for the region under the Regional Plan. Additionally, new private structures at residences would not induce growth because they would be associated with an existing primary use. Rather, the four Shoreline Plan alternatives would, to varying degrees, allow for enhanced recreational access along the shore of Lake Tahoe for the residents and tourists projected under the Regional Plan, and would establish provisions for the development of shoreline structures to protect the environment and public safety.

Alternative 1: Proposed Shoreline Plan

The proposed Shoreline Plan would result in new public access points (e.g., public boat ramps, public slips, or public buoys) to Lake Tahoe. While many individuals served by these public amenities would be residents or tourists that are already in the region and are therefore accounted for under the cap set by the Regional Plan, these amenities would create an increased capacity for day users that was not considered in the 2012 RPU EIS. Day users include individuals within reasonable driving distance of the Lake Tahoe basin that could frequent day use areas at the lake and return home on the same day. The proposed Shoreline Plan would allow up to two new boat ramps and 330 public slips or buoys, which would increase the capacity for day use boaters, thereby allowing more boat launches. However, this increase in day use visitors would not result in new growth beyond levels analyzed in the 2012 RPU EIS, because growth is limited by the Regional Plan. The effects of new day users on the transportation system is addressed in Chapter 13, "Automotive Transportation and Circulation," of this EIS. Because the Regional Plan caps growth in the region, and the Shoreline Plan would therefore not induce an increase in new residential, commercial, or tourist accommodation growth beyond the levels authorized by the Regional Plan, the impact on new growth in the region would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

While Regional growth is capped under the Regional Plan, Alternative 2 would allow for up to six new public boat ramps and an estimated 1,897 new public slips. It would, therefore create increased capacity for day users that was not accounted for in the 2012 RPU EIS. However, as described above, the Regional Plan caps growth in the region. Therefore, Alternative 2 would not induce an increase in new residential, commercial, or tourist accommodation growth beyond the levels analyzed in the 2012 RPU EIS. The impact on new growth in the region would be **less than significant**.

Alternative 3: Limit New Development
Similar to Alternatives 1 and 2, Alternative 3 would allow for up to one new public boat ramps and up to 365 new public buoys or slips. It would, therefore create increased capacity for day users that was not accounted for in the 2012 RPU EIS. However, as described above, the Regional Plan caps growth in the region. Therefore, Alternative 2 would not induce an increase in new residential, commercial, or tourist accommodation growth beyond the levels analyzed in the 2012 RPU EIS. The impact on new growth in the region would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development
Because the growth in the region is capped by the Regional Plan, Alternative 4 would not induce an increase in new residential or overnight visitors. Additionally, there would be no new boat ramps, public buoys, or public slips under Alternative 4; consequently, there would be **no impact** on growth in the region with implementation of Alternative 4.

Mitigation Measures

No mitigation is required.

Impact 4-2: Consistency with applicable plans, policies, regulations, and the existing pattern of land use

Shoreline Plan Alternatives 1, 3, and 4 would result in changes to provisions in the TRPA Code that govern development within the shorezone. The provisions of these alternatives have been developed to implement the Regional Plan Goals and Policies and achieve thresholds, each striking a different balance of environmental protection and recreational access. The shorezone code provisions under all alternatives are intended to augment local TRPA plans by providing a framework for development within the shorezone that is consistent with the land use designations within each of those plans. The pattern of development allowed under each of the Shoreline Plan alternatives would be restricted not only by land use designations identified in local plans, but also by other existing provisions of the code that would remain unchanged, as well as by the requirement for compliance with environmental thresholds. All four Shoreline Plan alternatives would provide for the same types and pattern of land uses that already exist within the shorezone. As a result, all four of the Shoreline Plan alternatives would have a **less-than-significant** impact on land use patterns and consistency with land use plans that guide development within the region.

As described above, the Regional Plan Goals and Policies provide goals that describe desired conditions and values for the region, and policies that articulate specific strategies to achieve those goals. These goals and policies are aimed at achieving the balance between the natural and built environments to attain and maintain the thresholds. The Goals and Policies of the Land Use Element provide specifics on upland buildout, densities, permitted uses, and other land use criteria for the built environment, which are intended to be used to meet established thresholds.

The four Shoreline Plan alternatives are intended to complement the Regional Plan in that they provide for implementation and design requirements for shorezone structures designed to assist in achieving the Regional Plan goals and meeting TRPA thresholds. The topic areas addressed by the alternatives augment the Regional Plan and provide standards for development of structures within its framework. Development under the any of the Shoreline Plan alternatives would be required to conform with all other provisions in the TRPA Code and all existing land use designations, as specified by local TRPA plans and implementing policies. Plans, policies, and regulations associated with non-TRPA entities at the federal, state, or local level that govern the placement of shorezone structures would be adhered to, including any standards that are more stringent than the provisions of the Shoreline Plan.

Alternative 1: Proposed Shoreline Plan
The Shoreline Plan would involve amendments to sections of the TRPA Code that address uses and development in the shorezone of Lake Tahoe (TRPA Code Chapters 80–86), and related amendments to

TRPA Code Chapters 2, 10, 14, 50, 63, 66, and 90), based on the consensus developed through the steering committee, technical input from the Joint Fact-Finding Committee, and TRPA staff revisions for consistency, streamlining, and environmental adequacy. The general goal of Alternative 1 would be to enhance the recreational experience at Lake Tahoe while simultaneously protecting the environment. The details of this alternative were developed with a view to the five organizing principles of the plan, to (1) protect and where feasible enhance the environment; (2) provide a fair and reasonable system of access; (3) adapt to changing lake levels; (4) preserve quality recreation and public safety; and (5) implement predictable and consistent rules.

The proposed Shoreline Plan would not amend the permissible uses within the shorezone or lakezone of Lake Tahoe (TRPA Code Section 81.3). It would, however, eliminate location criteria requiring that shorezone structures be situated outside of prime fish habitat as depicted on the 1987 TRPA prime fish habitat geographic information systems (GIS) layer (and as amended by field verification). It would also introduce new design standards for single-use and multiple-use piers and uniform standards for moorings, to ensure structures adequately serve their users while being sufficiently protective of scenic and safety standards. The proposed Shoreline Plan would also maintain the restriction on locating structures in stream mouth protection areas and expand the requirement for consultation with drinking water purveyors for structures from within 600 feet, to within one quarter mile. Additionally, the scenic management system including scenic threshold standards and shoreline character types would remain intact under Alternative 1.

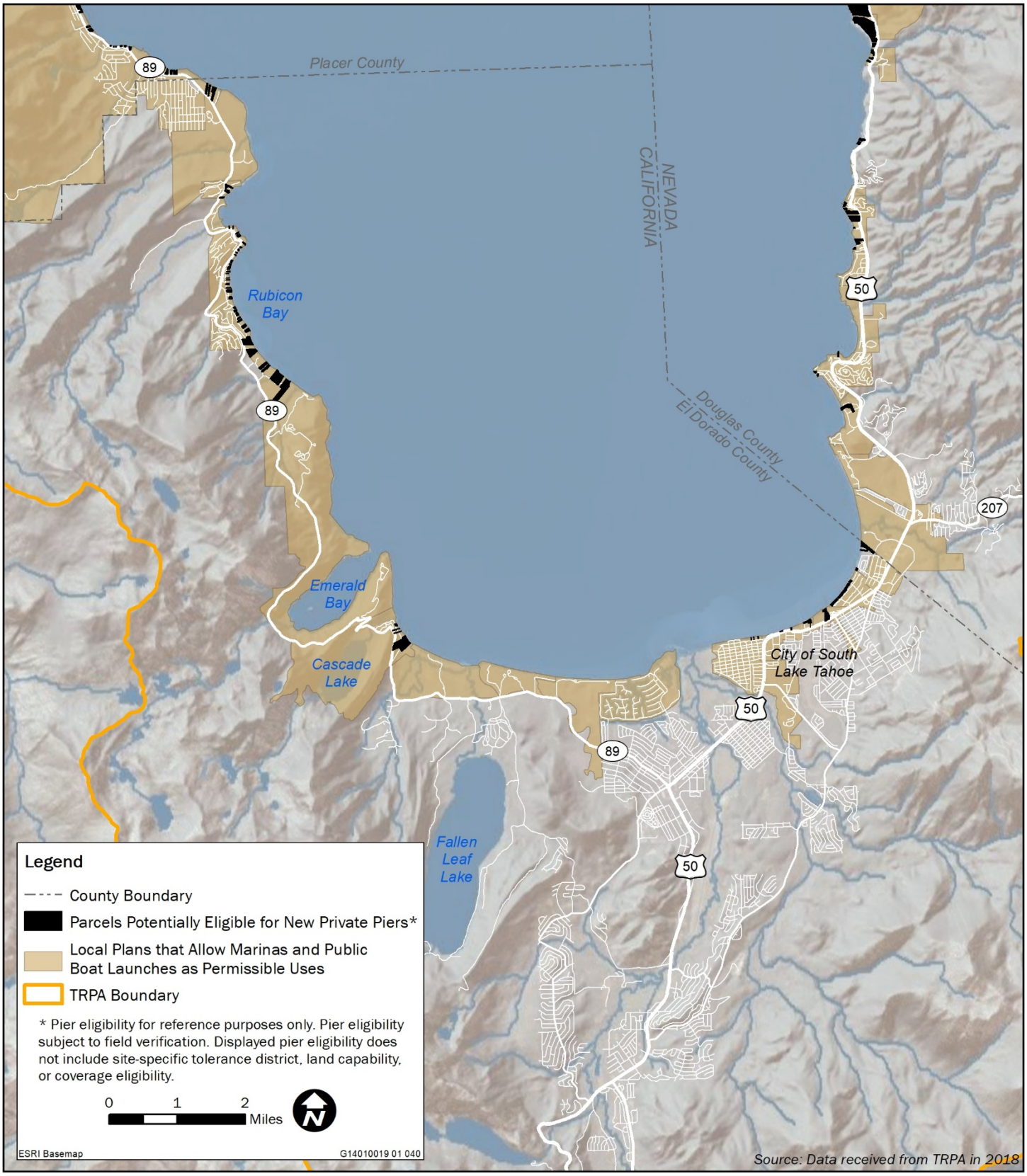
A total of 2,116 new moorings, 138 new piers, and two additional boat ramps could occur under this alternative at full buildout in the year 2040. New marinas and boat houses would be prohibited under this alternative. Any new structures would be required to be consistent with the permissible uses identified within local TRPA plans (i.e., area plans, community plans, PASs, and master and specific plans). For example, expansion of marinas would be allowed only within local TRPA plans that identify marinas as a permissible use, and public boat ramps would be allowed only within local TRPA plans that allow boat ramps as permissible uses. Exhibits 4-7 and 4-8 show those areas that could be eligible for new private piers under the eligibility criteria described in Chapter 2, “Description of Proposed Project and Alternatives,” and areas where existing local TRPA plans would allow marina expansions and public boat ramps.

In addition to restrictions on and conformance with local TRPA plans, the placement and design of structures would be required to adhere to other code provisions regulating coverage, scenic protection, and stream mouth protection areas. The proposed Shoreline Plan would also maintain other Regional Plan provisions and related policy issues including shorezone tolerance districts and the system of upland development and growth control implemented by the Regional Plan.

The proposed Shoreline Plan intends to amend and clarify provisions regarding placement and eligibility of structures within the shorezone. The proposed Shoreline Plan would not result in inconsistencies with the Regional Plan or adopted local TRPA plans because applicable provisions of the Regional Plan would continue to apply to shorezone structures and all shorezone structures would be required to be consistent with the permissible uses identified in the applicable local plan. Therefore, Alternative 1 would result in a **less-than-significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

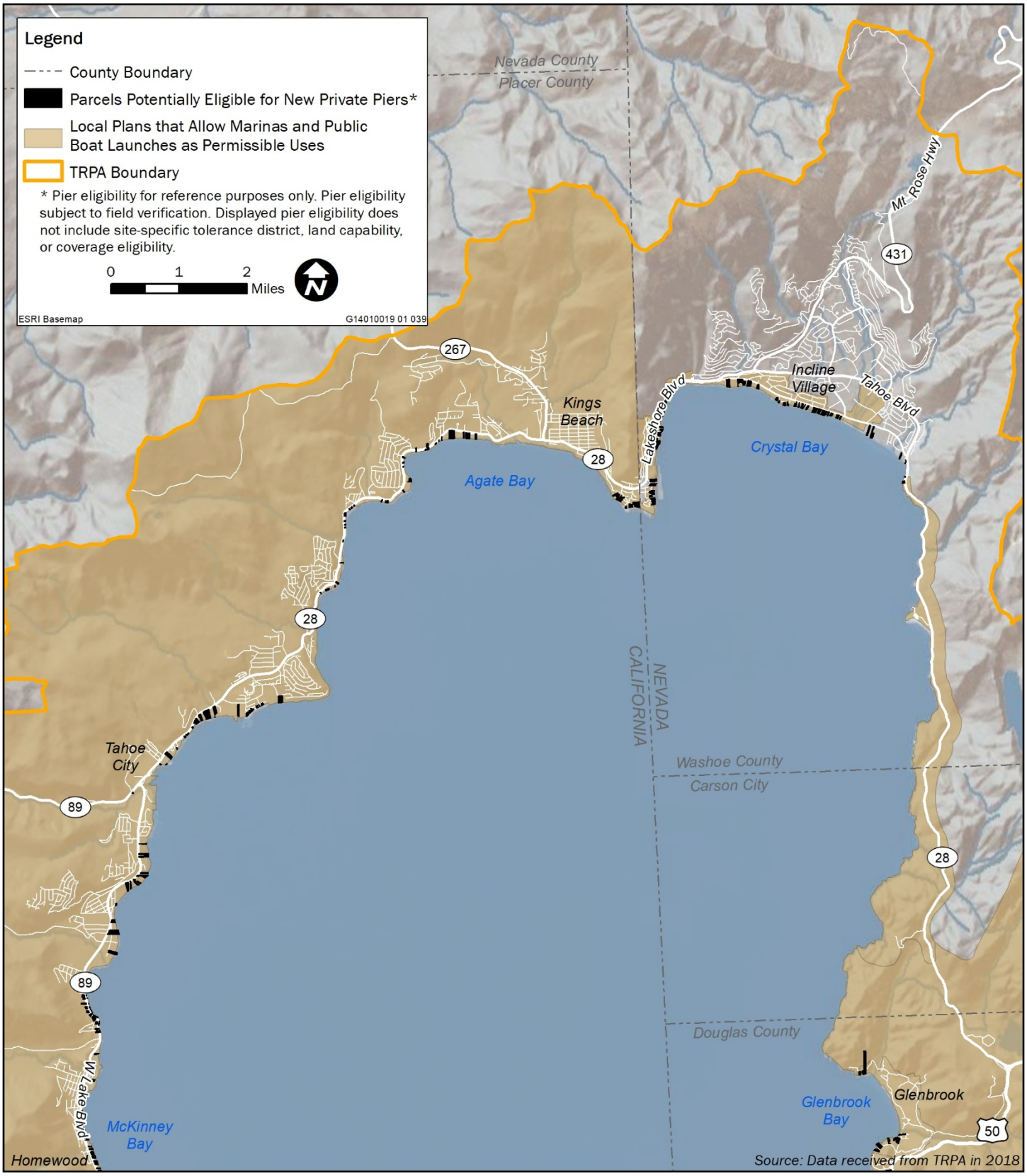
Like Alternative 1, Alternative 2 would allow development of new structures within the shorezone. Unlike Alternative 1, Alternative 2 would not amend the provisions in the current TRPA Code but would lift the temporary moratorium on construction of new shorezone structures. This would result in the placement or construction of up to 6,936 new moorings, 476 new piers, six additional public boat ramps, and two new marinas. New development and placement of new structures would be consistent with the permissible uses identified within existing local TRPA plans, however the main restriction on the placement of structures within the shorezone would continue to be the prohibition on structures in prime fish habitat.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-7 Pier Eligibility, Alternative 1, South

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 4-8 Pier Eligibility, Alternative 1, North

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

As with the proposed Shoreline Plan, Alternative 2 would be required to adhere to other provisions of the code that regulate the placement and design of structures including coverage restrictions, scenic protection, and stream mouth protection. Alternative 2 would not result in inconsistencies with the Regional Plan or adopted local TRPA plans and would not allow new land uses or create nonconforming uses. Alternative 2 would therefore result in a **less-than-significant** impact.

Alternative 3: Limit New Development

The land use effects of Alternative 3 would be similar to those discussed for Alternative 1 above but would involve fewer shoreline structures. Alternative 3 would implement similar code revisions including eliminating the location criteria requiring that shorezone structures be situated outside of prime fish habitat, introducing new design standards for single-use and multiple-use piers and uniform standards for moorings. It would also maintain the restriction on locating structures in stream mouth protection areas and expand the requirement for consultation with drinking water purveyors for structures from within 600 feet, to within one quarter mile. Other elements including permissible uses, shorezone tolerance districts, the scenic management system, and the system of upland development and growth control implemented by the Regional Plan would all remain unchanged.

For the same reasons as Alternative 1, Alternative 3 would not result in inconsistencies with the General Plan or adopted local TRPA plans and would not allow new land uses or create nonconforming uses. Alternative 2 would therefore result in a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 is unique in that it is the only alternative that would reduce the amount of development within the shorezone. The small number of new shoreline structures allowed under Alternative 4 (15 public piers) limits the potential for the alternative to result in inconsistencies with adopted plans. Furthermore, for the same reasons as Alternative 1, Alternative 4 would not produce inconsistencies with the Regional Plan or adopted local TRPA plans, or allow new land uses or create nonconforming uses. Therefore, Alternative 4 would have a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

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5 FISH AND AQUATIC BIOLOGICAL RESOURCES

5.1 INTRODUCTION

This chapter describes the existing conditions in the shorezone area with respect to fisheries and aquatic biological resources and identifies the potential environmental impacts that could result from implementation of each of the four Shoreline Plan alternatives. The fisheries and aquatic biological resources of the Tahoe Region are an integral part of Tahoe's natural environment. This chapter evaluates the effects of implementing the Shoreline Plan alternatives on prime fish habitat, disturbance during spawning, substrate removal, obstructions to fish migration, native riparian vegetation removal, introduction of invasive aquatic weeds related to boating activity, and disruption of littoral drift processes.

Relevant comments received during public scoping included concerns about native fish population decline and loss of fish habitat.

The evaluation of fisheries and aquatic biological resource impacts were based on a review of documents pertaining to the Lake Tahoe shorezone and lakezone, including scientific studies and TRPA regulations and planning documents.

5.2 REGULATORY SETTING

5.2.1 Federal

U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service (USFWS) is charged with the responsibility to protect, preserve and, if possible, enhance the nation's fish, wildlife, and related ecological resources for the benefit and utilization of the people of the United States. In fulfilling this responsibility, one of the USFWS functions is to review proposals for the erection of structures in navigable waters of the United States to ensure that fish and wildlife resources and their habitats receive due consideration in the decision-making process and the public's interest in fish and wildlife resources, and in the uses of these resources, are protected. Authority for USFWS review of such proposals originates from the Fish and Wildlife Coordination Act (16 U.S. Code 661 et seq.). USFWS is also responsible for the status of wild populations of flora and fauna and for the identification of those that are in danger of extinction, pursuant to the federal Endangered Species Act of 1973 (ESA), as amended (16 U.S. Code 1533). Permits from, or consultation with, USFWS is required for most actions that may affect listed threatened or endangered species.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The Clean Water Act (CWA) gives the U.S. Environmental Protection Agency the authority to implement programs to protect surface water quality in the United States. The statute employs a variety of regulatory and nonregulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.

U.S. FOREST SERVICE

The Lake Tahoe Basin Management Unit (LTBMU) manages approximately 75 percent of the land area within the Tahoe Region including approximately 14 shoreline miles (approximately 19 percent of the shoreline). In total, approximately 45 percent of the shorezone is managed by government agencies (federal, state, county, and city). The LTBMU Forest Plan (2016) guides the management of U.S. Forest Service (USFS) lands. The purpose of the Forest Plan is to direct the use and protection of resources, fulfill legislative requirements, and address local, regional, and national issues. USFS annually updates a sensitive species list that identifies additional plants and animals that are not federally listed as threatened or endangered but require additional consideration. USFS manages these species to prevent the federal listing of such species. USFS abides by Section 7 of the ESA. This act directs federal agencies to ensure that actions authorized, funded, or carried out by the federal government are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of their "critical habitat."

U.S. ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers is responsible for compliance with Section 404 of the CWA. Section 404 establishes a requirement for a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill materials into waters of the United States, including wetlands. The ESA directs all federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the act. Section 7 of the act, called "Interagency Cooperation," is the mechanism by which federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species.

5.2.2 Tahoe Regional Planning Agency

THRESHOLDS

Fisheries Resources

The goal of TRPA-adopted threshold standards for fisheries resources is to improve aquatic habitat important for the growth, reproduction, and perpetuation of existing and threatened fish resources in the Lake Tahoe Basin. TRPA has adopted four indicator reporting categories in the fisheries threshold category, three numerical standards for stream habitat condition, one management standard without a numeric target for instream flow, one management standard with a numeric target for lake habitat, and two policy statements for instream flow and Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) (LCT).

Stream Habitat Condition

The stream habitat threshold is a numerical standard to achieve 75 miles of "excellent," 105 miles of "good," and 38 miles of "marginal" stream habitat for streams. Stream habitat condition is assessed by percent of stream habitat in different condition classes (excellent, good, and poor). Results from 92 stream sampling events at various locations throughout the basin between 2009 and 2014 indicate that:

- 55 percent of streams are in excellent condition (considerably better than the target of 34 percent),
- 19 percent of streams are in good condition (considerably worse than the target of 48 percent), and
- 26 percent of streams are in marginal good condition (considerably worse than the target of 17 percent).

Instream Flow

Instream flow is addressed by two threshold standards: (1) a nondegradation standard for instream flow and (2) a policy statement to divert stream intakes to lake sources, both of which are in attainment. TRPA and other agencies have instituted regulatory actions and restoration projects that support the nondegradation management standard and policy statement under the instream flow indicator reporting category. A review

of available TRPA permit data indicates that TRPA has permitted temporary stream flow diversion/alterations only when the ultimate project objective was stream enhancement and/or restoration.

Lake Habitat

The lake habitat threshold standard is a management standard with a numeric target to achieve the equivalent of 5,948 acres of "prime" fish habitat within the nearshore of Lake Tahoe - defined by substrate size. Prime fish habitat includes spawning habitat and feed and cover habitat. The indicator for lake habitat showed that the status is "at or somewhat better" than the adopted management targets with an "unknown" trend. Analysis of remotely sensed data collected in August 2010 and 2015 estimated that there are about 6,135 acres of "prime" fish habitat in Lake Tahoe's nearshore/littoral zone (O'Neil-Dunne et al. 2016:19), suggesting that TRPA is meeting the adopted management target of 5,948 acres.

Lahontan Cutthroat Trout

The LCT policy statement, which states that it shall be the policy of the TRPA Governing Board to support, in response to justifiable evidence, state and federal efforts to reintroduce Lahontan cutthroat trout, has been implemented and determined to be in attainment with the adopted policy statement. Support for the basin's attainment status includes a population of LCT established in the Upper Truckee River including a recently expanded restoration area. Additional restoration is underway to re-establish populations in Fallen Leaf Lake.

Vegetation Preservation

The vegetation preservation threshold is a numerical standard without numeric targets that states that the TRPA must "[p]rovide for the non-degradation of the natural qualities of any plant community that is uncommon to the Region or of exceptional scientific, ecological, or scenic value. The threshold applies to the deep-water plants of Lake Tahoe which include macroalgae, filamentous algae, mosses, and liverworts that are typically found in depths from 200–350 feet. Three indicators are used to assess the status of deepwater plant communities: 1) absolute and relative plant composition determined from (plant dry mass per unit area), 2) plant community production measured using change in dissolved oxygen with incubations in the laboratory, and 3) the depth and spatial extent of plant beds on the lake bottom as determined by divers. The indicator status is unknown due to insufficient data.

Aquatic Invasive Species

The TRPA aquatic invasive species (AIS) threshold is a management standard that states that TRPA must "[p]revent the introduction of new aquatic invasive species into the region's waters and reduce the abundance and distribution of known aquatic invasive species" and "[a]bate harmful ecological, economic, social and public health impacts resulting from aquatic invasive species." The standards include one management standard with a numerical target, and six management standards without numerical targets:

- Prevent the introduction of new aquatic invasive species into the region's waters. No new aquatic species have been documented in Lake Tahoe since the standard was adopted in 2012. This part of the standard is in attainment.
- Reduce the abundance of known aquatic invasive species. There is no established baseline against which to assess reductions in abundance. The status of this standard is unknown due to insufficient data.
- Reduce the distribution of known aquatic invasive species. The status of this standard is unknown due to insufficient data.
- Abate harmful ecological impacts resulting from aquatic invasive species. The status of this standard is unknown due to insufficient data.
- Abate harmful economic impacts resulting from aquatic invasive species. Because the harmful impacts of all AIS have not been studied or measured, the status of this standard is unknown due to insufficient data.

- Abate harmful social impacts resulting from aquatic invasive species. Because the harmful impacts have not been studied or measured, the status of this standard is unknown due to insufficient data.
- Abate harmful public health impacts resulting from aquatic invasive species. Because the harmful impacts have not been studied or measured, the status of this standard is unknown due to insufficient data.

GOALS AND POLICIES

The following describes goals and policies of the Regional Plan that relate to protection of water quality and aquatic species:

GOAL WQ-3: aims to reduce or eliminate nonpoint sources of pollutants which affect, or potentially affect, water quality in the Tahoe Region in a manner consistent with the Lake Tahoe TMDL [total maximum daily load], where applicable.

- Policy WQ-3.3: states that the implementing agencies shall restore 25% of the SEZ lands that have been disturbed, developed, or subdivided in accordance with the Environmental Improvement Program. SEZs have beneficial effects on the fisheries thresholds.

GOAL FI-1: seeks to improve aquatic habitat essential for the growth, reproduction, and perpetuation of existing and threatened fish resources in the Lake Tahoe Region.

- Policy FI-1.1: Development proposals affecting streams, lakes and adjacent lands shall evaluate impacts to the fishery.
- Policy FI-1.2: Unnatural blockages and other impediments to fish movement shall be prohibited and removed, wherever appropriate.
- Policy FI-1.3: An instream maintenance program should be developed and implemented.
- Policy FI-1.4: Standards for boating activity shall be established for the shallow zone of Lake Tahoe.
- Policy FI-1.5: Habitat improvement projects are acceptable practices in streams and lakes.
- Policy FI-1.6: Instream flows shall be regulated, when feasible, to maintain fishery values.
- Policy FI-1.7: Existing points of water diversion from streams shall be transferred to lakes, whenever feasible, to help protect instream beneficial uses.
- Policy FI-1.8: Support, in response to justifiable evidence, state and federal efforts to reintroduce Lahontan cutthroat trout in appropriate remote locations.
- Policy FI-1.9: Prohibit the release of nonnative aquatic invasive species in the region in cooperation with public and private entities. Control or eradicate existing populations of these species and take measures to prevent accidental or intentional release of such species.

CODE OF ORDINANCES

Chapter 63, “Fish Resources,” of the TRPA Code of Ordinances (TRPA Code), includes provisions to ensure the protection of fish habitat and to provide for the enhancement of degraded habitat. The chapter applies to all projects and activities that could interfere with the health of fish populations in Lake Tahoe, its tributaries, and other lakes in the region. Provisions for the protection or enhancement of fish habitat shall be included for all new uses, projects and activities within fish habitat as identified by TRPA fish habitat

maps or a qualified biologist. Fish habitat consists of a complex set of elements, such as spawning and nursery areas, food supply, and escape cover.

Lake habitat is protected in Chapter 63.3.1. Projects and activities conducted in the shorezone may be prohibited, limited, or otherwise regulated in prime habitat areas, or in areas and/or at times found by TRPA to be vulnerable or critical to the needs of fish. Special conditions of project approval such as restoration of physically altered substrate or limitation of construction to designated periods may be required for development in the shorezone to mitigate or avoid significant adverse impacts on habitat or normal fish activities. Habitat restoration projects may be permitted in the nearshore or foreshore. Certain activities, such as construction, swimming, or boating, may be restricted temporarily in areas where spawning activity is occurring. The physical alteration of the substrate in areas of prime fish habitat is prohibited unless approved by the TRPA. Projects and activities affecting lake fish habitat shall be referred to state and federal fisheries agencies for review and comment.

Chapter 63.4, "Aquatic Invasive Species," discusses that AIS pose a serious threat to the waters of the Tahoe Region and can have a disastrous impact on the ecology and economy of the region. The following provisions are necessary to prevent the introduction and spread of AIS. Chapter 63.4.1 prohibits the transport or introduction or AIS into the Tahoe Region; the launching of any watercraft or landing of any seaplane contaminated with AIS into the waters of the region; the launching, or attempting to launch, of any motorized watercraft into the waters of the region without an inspection by TRPA or its designee, to detect the presence, and prevent the introduction of, AIS (nonmotorized watercraft and seaplanes are subject to inspection and are included in this provision if determined necessary by TRPA or its designee); the provision of inaccurate or false information to TRPA or persons designated to conduct inspections; and the alteration, modification or unauthorized use of any inspection seal or other device used by TRPA or its designee to indicate that a watercraft or seaplane last entered the waters of the Tahoe Region.

5.2.3 California

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

CDFW manages California's diverse fish, wildlife, and plant resources and the habitats upon which they depend. These resources are to be managed for their ecological values and for their use and enjoyment by the public. CDFW is the lead agency in California for safeguarding and regulating the uses of fish and wildlife. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFW without first notifying CDFW and obtaining a lake alteration agreement.

The California Endangered Species Act (CESA) prohibits the taking of state-listed endangered or threatened species, as well as candidate species being considered for listing. Project proponents may obtain a Section 2081 incidental take permit if the impacts of the take are minimized and fully mitigated and the take would not jeopardize the continued existence of the species. A "take" of a species, under CESA, is defined as an activity that would directly or indirectly kill an individual of a species. The CESA definition of take does not include "harm" or "harass" as is included in the federal ESA. As a result, the threshold standard for a take under CESA may be higher than under ESA.

CALIFORNIA STATE LANDS COMMISSION

The California State Lands Commission (Commission) is responsible for sovereign lands of the state and protection of the public trust over submerged land. The Commission is a leasing agency for structures lakeward of elevation 6,223 feet, the area which is subject to the public trust doctrine. The Commission is involved with the protection of California's rare and endangered wildlife and plant species through the review and analysis of discretionary projects under the California Environmental Quality Act and CESA. During the review of projects, the Commission is required to consult with CDFW. The Commission administers the

state's fee ownership of the bed of Lake Tahoe from elevation 6,223 feet lakeward, and a public trust easement between elevations 6,223.0 and 6,228.75 feet Lake Tahoe datum (LTD). This easement serves the people of the State of California for the purpose of fishing, navigation, swimming, and other water-related recreation.

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

Under Section 401 of the CWA, any project that proposes dredging or filling activity in Lake Tahoe must obtain a certificate stating the at the activity is consistent with the state's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board to the local Regional Water Quality Control Board.

5.2.4 Nevada

NEVADA DIVISION OF STATE LANDS

The Nevada Division of State Lands (NDSL) maintains the public trust on the Nevada side of Lake Tahoe for submerged land below 6,223 feet LTD. NDSL is a leasing agency that requires applications for structures lakeward of permanent high water, lake elevation 6,229.1 feet. NDSL request comments from the Nevada Department of Wildlife (NDOW) regarding any impacts on recreational access and fish habitat.

NEVADA DEPARTMENT OF WILDLIFE

NDOW exercises responsibilities for the management of fish and wildlife resources and their habitats for the Nevada portion of the Tahoe region. In addition, NDOW is also responsible for boating and safety on navigable waters. NDOW's navigational safety and recreational access program (e.g., angler access along shoreline) protects boaters from navigational obstacles and ensures recreational access along the shoreline. NDOW is a reviewing and commenting agency that supplies NDSL with comments recommending approval or denial of Shorezone projects within their jurisdiction; however, NDOW does not issue permits for Shorezone construction. They do issue citations for boating violations and can remove hazards to navigation within the waters of Lake Tahoe.

5.3 AFFECTED ENVIRONMENT

The Shoreline Plan has the potential to affect fish and aquatic biological resources in Lake Tahoe. The plan does not include actions or activities within the 63 tributaries to Lake Tahoe and thus would not affect tributary streams to Lake Tahoe. Therefore, discussion of fish and aquatic biological resources is limited to Lake Tahoe and does not include tributaries to the lake.

5.3.1 Ecology

Lake Tahoe is classified as ultra-oligotrophic because it contains low nutrients levels, low levels of phytoplankton, high dissolved oxygen, and excellent water clarity. The average depth of the lake is approximately 1,000 feet, with a maximum depth of 1,645 feet and surface area of 123,553 acres (Ngai et al. 2013). Since the mid-1850s, numerous anthropogenic activities such as grazing, logging, urban development, introduction of nonnative species, and dam construction have caused ecological changes to Lake Tahoe. These alterations have caused a loss of biological integrity, decreased water quality, and a shift in food web structure and composition. The lake has been intensively studied since the mid-1960s because of concerns regarding progressive eutrophication (i.e., exhibiting an increase in nutrient levels) and loss of water clarity. Although Lake Tahoe remains oligotrophic, the trophic condition is changing as evidenced by

the growth and spread of aquatic plants and the increase in phytoplankton primary productivity (Heyvaert et al. 2013).

Prior to the 1800s, the food web of Lake Tahoe was limited to one predatory fish, the native LCT. Moyle (2002) reported that LCT remained abundant in Lake Tahoe and its tributary waters until the early 1930s, but by 1939 the species was extirpated from the lake. Others suggest that extirpation occurred earlier. TRPA (2016) reported that extirpation occurred around 1860. Numerous factors were responsible for the decline of LCT, including (1) unrestricted commercial and sport fishing; (2) logging, which led to degraded spawning streams; (3) diversions of water flows from spawning streams; and (4) competition, predation, and diseases from introduced lake trout (*Salvelinus namaycush*) (Moyle 2002). Lake trout, which were first introduced in 1888, have a large self-sustaining population and now occupy the historical niche of LCT (Zanden et al. 2003).

Other nonnative introductions have also affected Lake Tahoe's biological composition and caused changes to the food web. Between 1963 and 1965, approximately 333,000 mysid shrimp (*Mysis diluviana*), commonly referred to as *Mysis*, from Waterton Lake, Alberta, Canada, were introduced at various locations around Lake Tahoe in an effort to improve the food supply for lake trout (TERC 2015). The introduction of mysid shrimp has caused the decline of two native pelagic taxa (*Daphnia* and *Bosmina* spp.) (Wittman and Chandra 2015). It is also hypothesized that mysid shrimp have caused alterations to the lake's benthic invertebrate assemblages (Caires et al. 2013). Other invasive species such as Asian clams (*Corbula fluminea*) and signal crayfish (*Pacifastacus leniusculus*) have altered nutrient cycling, which has affected algal and benthic invertebrate production, and diversity with the result that crayfish dominate the benthic community (Heyvaert et al. 2013).

Nearly 30 nonnative aquatic species are now established in the Lake Tahoe Watershed (Wittmann and Chandra 2015). Although several of these nonnative species have affected the food web, the most profound food web changes are due to lake trout and mysid shrimp. Since the introduction of these species, the food web has become increasingly reliant on pelagic resources (Zanden et al. 2003). This restructuring of the food web has caused a decline in pelagic forage fish populations and development of two distinct seasonal food webs; "a near-shore food web with few top predators and an offshore/deep profundal food web" (Wittman and Chandra 2015).

Combined with habitat alteration, increased predation pressure from nonnative fishes (e.g., kokanee [*Oncorhynchus nerka*]) has caused a decrease in the number of native fish that utilize shallow water habitat near the shoreline (Zanden et al. 2003; Lemmers and Santora 2013). Predation pressure is expected to increase as climate change and local land use changes expand the amount of thermally suitable habitat for warmwater fishes (Kamerath et al. 2008). Furthermore, the establishment and expansion of nonnative aquatic plants continue to increase habitat and refugia for these nonnative warmwater fishes (e.g., bass and bluegill [*Lepomis macrochirus*]). Thus, nonnative warmwater fishes are expected to expand their distributions throughout the lake (Ngai et al. 2013).

5.3.2 Fish Species

In the mid-1800s Lake Tahoe supported eight fish taxa. As a result of introductions and extirpations, Lake Tahoe currently supports a total of 20 native and introduced fish species. The shallow water, near-shore (i.e., less than approximately 33 feet deep), assemblage of fish comprises six species; Lahontan speckled dace (*Rhinichthys osculus robustus*), Lahontan redside shiner (*Richardsonius egregious*), Paiute sculpin (*Cottus beldingi*), Tahoe sucker (*Catostomus tahoensis*), rainbow trout (*Oncorhynchus mykiss*), and brown trout (*Salmo trutta*) (Moyle 2002). However, many other young-of-the-year (YOY) fish are also found in shallow waters throughout the year. In the midwater zone of the lake, kokanee, *pectinifer* tui chub, and rainbow trout dominate the assemblage (Moyle 2002). The deep-water assemblage is comprised of lake trout, Paiute sculpin, *obesa* tui chub, Tahoe sucker, and mountain whitefish (*Prosopium williamsoni*). Although they inhabit the midwater and deep-water areas of the lake for the majority of the year, several species generally

ascend tributary streams to spawn, including kokanee, rainbow trout, brown trout, and brook trout (*Salvelinus fontinalis*).

Table 5-1 Native and Introduced Fish Species Currently Found in Lake Tahoe

Common Name	Scientific Name	Native or Introduced[1]	Status[2]
Black crappie	*Pomoxis nigromaculatus*	Introduced	—
Bluegill	*Lepomis macrochirus*	Introduced	—
Brook trout	*Salvelinus fontinalis*	Introduced	—
Brown bullhead	*Ameiurus nebulosus*	Introduced	—
Brown trout	*Salmo trutta*	Introduced	—
Common carp	*Cyprinus carpio*	Introduced	—
Goldfish	*Carassius auratus*	Introduced	—
Golden shiner	*Notemigonus crysoleucas*	Introduced	—
Kokanee (sockeye salmon)	*Oncorhynchus nerka*	Introduced	—
Lahontan cutthroat trout[3]	*Oncorhynchus clarkii henshawi*	Native	FT
Lahontan redside shiner	*Richardsonius egregious*	Native	—
Lahontan speckled dace	*Rhinichthys osculus robustus*	Native	—
Lahontan Lake tui chub	*Siphateles bicolor (pectinifer* and *obesa)*	Native	SSC
Lake trout (mackinaw)	*Salvelinus namaycush*	Introduced	—
Largemouth bass	*Micropterus salmoides*	Introduced	—
Western mosquitofish	*Gambusia affinis*	Introduced	—
Mountain whitefish	*Prosopium williamsoni*	Native	SSC
Paiute sculpin	*Cottus beldingi*	Native	—
Rainbow trout	*Oncorhynchus mykiss*	Introduced	—
Smallmouth bass	*Micropterus dolomieu*	Introduced	—
Tahoe sucker	*Catostomus tahoensis*	Native	—

[1] Indicates whether the species is native or introduced into California water bodies.

[2] Status Codes:
FT = federally listed as threatened.
SSC = California Department of Fish and Wildlife Species of Special Concern.
"—": no special-status designation.

[3] Lahontan cutthroat trout are extirpated from Lake Tahoe. However, 22,000 Lahontan cutthroat trout were planted in Lake Tahoe in 2011. There is no information available indicating if any of these fish are still present in the lake.

NATIVE SPECIAL-STATUS SPECIES

Lahontan Cutthroat Trout

LCT is an inland subspecies endemic to the physiographic Lahontan basin in northern Nevada, eastern California, and southern Oregon. Once widespread throughout the basin, LCT was the top predator in Lake Tahoe's aquatic ecosystem (TRPA 2016a). However, the species now occupies a fraction of its historical habitat. LCT occur in 10.7 percent of their historic stream habitat and 0.4 percent of their historic lake habitat (USFWS 2014). In 1970, LCT were listed as endangered under the federal ESA, but in 1975, the listing was downgraded to threatened to allow for more flexible management.

As described in Section 5.3.1, LCT were extirpated from Lake Tahoe due to overfishing, habitat degradation, and the introduction of nonnative aquatic species (TRPA 2016a). Moyle (2002) reported that LCT remained abundant in Lake Tahoe and its tributary waters until the early 1930s, but by 1939 the species was extirpated from the lake. Others suggest that extirpation occurred earlier. TRPA (2016a) reported that extirpation occurred around 1860. Efforts to reintroduce LCT into the Tahoe Basin, including Lake Tahoe, are currently underway. CDFW has successfully reintroduced LCT into the headwaters of the Upper Truckee River and this population is now the only self-sustaining population in the Tahoe Basin. In 2011, the Nevada Department of Wildlife stocked approximately 22,000 LCT into Lake Tahoe as part of an effort to restock native species for recreational anglers. LCT population dynamics, seasonal habitat utilization, growth rates, and interactions with nonnative species in Lake Tahoe remain unknown (TRPA 2016a). No additional information is available regarding the persistence of these introduced fish. Thus, this impact assessment is conducted to consider impacts if reintroduction efforts result in a persistent population of LCT or if future monitoring confirms the presence of the species from the 2011 stocking effort.

LCT are open water fish and typically remain in the pelagic (open water) zone of lakes. LCT require temperatures below 22°C, pH values of 6.5 to 8.5, and dissolved oxygen greater than 8 milligrams per liter (Moyle 2002). Large LCT feed pelagically on small fish, especially tui chubs, but tend to stay close to the bottom. Smaller LCT feed on insects from the water's surface or on zooplankton. However, if neither is abundant they will feed on benthic insect larvae, crustaceans, and snails (Moyle 2002). Like other cutthroat trout, LCT is a stream spawner which spawns between February and July (USFWS 2014). LCT typically return to the same stream from where they hatched and spawn in gravel riffles. Although each fish may spawn up to five times, most females spawn only once or twice. Spawning behavior is similar to that of rainbow trout, with females digging redds and then depositing eggs into the red as the eggs are fertilized by attending males. Embryos hatch in 6–8 weeks, then fry emerge and begin feeding within 2 weeks of hatching (Moyle 2002).

Mountain Whitefish

Once one of the most abundant fish in the eastern Sierra, the Lake Tahoe mountain whitefish population is now a fraction of its historic numbers (Caltrout 2017). Large numbers were harvested by Native Americans and then commercial harvesting further affected the population. By the 1950s, populations were low in Lake Tahoe (Moyle 2002) and today, predation pressures from invasive trout and bass further threaten the population (Caltrout 2017).

Mountain whitefish move into small tributaries to spawn from October through early December at water temperatures under 11°C. Spawning generally takes place in riffles in depths greater than 2 feet where substrates are primarily coarse gravel, cobble and rocks. However, some spawning may take place in gravel in shallow water areas of Lake Tahoe (Caltrout 2017). Fertilized eggs fall in between gravel and rocks, then hatch after 6–10 weeks. Newly hatched fish spend their first few weeks in shallow backwaters but move into the lake shortly thereafter where they seek cover in aquatic plants (Moyle 2002). As adults, mountain whitefish generally live close to the bottom in fairly deep water and swim around in schools of 5–20 fish (Moyle 2002). They also remain closely associated with beds of aquatic plants and seldom move into areas devoid of aquatic vegetation (Moyle 2002). Mountain whitefish feed on benthic invertebrates such as snails, dragonfly larvae, chironomid midge larvae, mayfly larvae, caddisfly larvae, crayfish, and amphipods, and to a lesser extent zooplankton and surface insects (Moyle 2002).

Lahontan Lake Tui Chub

Lake Tahoe's Lahontan Lake tui chub population is declining. It is thought that the numerous physical and chemical changes related to the introduction of excess nutrients, sediments and pollutants entering the lake from surrounding developments, water diversions, wastewater treatment, and wetlands destruction have adversely affected the Lake Tahoe tui chub population. The introduction of kokanee and *Mysis* also have depleted zooplankton populations, an important food source to the chubs (Moyle 2002). Largemouth bass (*Micropterus salmoides*) also have contributed to the tui chub decline by preying on juveniles in nearshore rearing areas (Moyle 2002). Although actual abundances remain unknown, the population is likely quite

small relative to historic numbers. The Lahontan Lake tui chub is a California Species of Special Concern because of the uncertain, but potentially declining status of the Lake Tahoe population (UC Davis 2017).

Lake Tahoe supports two subspecies of the Lahontan Lake tui chub; the pelagic form (*pectinifer*) that schools well off the bottom and the benthic form (*obesa*) that utilizes bottom waters (Moyle 2002). The benthic population feeds primarily on benthic invertebrates, whereas the pelagic population relies on zooplankton and small terrestrial insects (Moyle 2002). Tui chub spawning occurs at night, primarily in May and June, but can continue until the end of July (Moyle 2002; UC Davis 2017). Females are serial spawners, with high fecundities (Moyle 2002). Lake Tahoe tui chubs spawn in nearshore shallow waters (i.e., less than 5 feet deep) over sandy bottoms or in the mouths of streams (Moyle 2002; UC Davis 2017). Spawning activity includes large swirling aggregations, with multiple males surrounding each female (Moyle 2002). Eggs adhere to aquatic vegetation or the substrate and embryos hatch within 3–6 days. Larvae seem to concentrate in shallow, weedy nursery areas. As they grow, tui chubs spread out along the shore over both rock and sandy areas. YOY chubs of both subspecies remain in shallow water throughout the summer (Moyle 2002) then migrate into deeper waters offshore in the winter (UC Davis 2017).

NATIVE NONGAME SPECIES

Although the native nongame species that remain in Lake Tahoe have declined since the mid-1800s small minnow populations are still supported in the lake. The primary nearshore fish community in Lake Tahoe consists of Lahontan tui chubs, Lahontan redside shiners, and Lahontan speckled dace (Beauchamp et al. 1994a). These minnows represent the bulk of fish biomass in the lake (Beauchamp et al. 1994a). Nonetheless, in certain areas of the lake, such as the Tahoe Keys area, there has been a large reduction in native fish abundances (Wittmann and Chandra 2015), presumably as a result of predation by nonnative bass and sunfish.

Minnows

Lahontan speckled dace are common in the rocky benthic zone that is stirred by wave action (less than 3 feet deep) but can utilize areas down to about 80 feet deep (Moyle 2002; Ngai et al. 2010). It is rare for speckled dace to occur singly, but they avoid forming schooling aggregations except during breeding season. Lahontan speckled dace become inactive in winter and remain in rocky areas (Moyle 2002). In contrast to dace, Lahontan redside shiners are diurnal and surface oriented. Lahontan redside shiners are nearshore species that swim about in large schools close to the surface (Moyle 2002). Once water temperatures drop below 10°C the species spends the colder months inactive deep in the lake (Moyle 2002). Both species migrate to nearshore areas to spawn during early summer periods (Wittman and Chandra 2015). Some overlap in diet between Lahontan speckled dace and Lahontan redside shiner occurs, with both feeding on diptera larvae/pupa, zooplankton, and in summer months terrestrial insects. However, benthic feeding Lahontan speckled dace also rely on benthic invertebrates for their diet (Ngai et al. 2010).

Lahontan redside shiners and Lahontan speckled dace have similar spawning characteristics. Both species spawn in gravel or small rock substrate, after dark, in very shallow water (less than 8 inches deep) when temperatures are 11°C or warmer (Allen and Reuter 1996). Redsides and dace typically spawn in the shallows of the lake itself, but also use tributaries such as Taylor Creek for spawning (Moyle 2002). Lahontan redside shiners form tight swirling aggregations of 20–100 spawning fish close to the bottom (Moyle 2002). When spawning in tributary streams, both species exhibit similar behavior, swimming over the spawning gravels and releasing eggs and milt. The fertilized eggs become lodged in the substrate where they will incubate and later hatch. The newly hatched young swim down to slow water at the mouth of the spawning stream and hide in schools under cover (UC Davis 2018). Both species spawn from June through August; however, Lahontan redsides typically go through two spawns per year (Evans 1969 and Miller 1951, cited in Allen and Reuter 1996). For Lahontan redside shiners spawning typically begins in early June and a second spawning peak occurs in August (Allen and Reuter 1996). By mid-August, YOY are abundant for both species.

Sculpin and Suckers

Paiute sculpin and Tahoe suckers remain abundant in Lake Tahoe. However, their use of the lake has changed over time. Paiute sculpin were historically abundant in the nearshore environment, but recent surveys have not detected sculpin in nearshore zones (Heyvaert et al. 2013). A diet study revealed Paiute sculpin demonstrated greater reliance on pelagic food sources and reduced food web position compared to historical conditions (Heyvaert et al. 2013). As bottom feeders, Tahoe suckers feed on midge larvae, amphipods, and annelid worms from sandy environments (Moyle 2002). Those Paiute sculpin that use shallower areas of the lake also primarily feed on benthic organisms, such as chironomid midge larvae (UC Davis 2017). In contrast, deep water dwelling Paiute sculpin feed on mostly detritus and algae (UC Davis 2017). Both sculpin and suckers form a large part of trout diets in Lake Tahoe (Moyle 2002).

Paiute sculpin are generally found near aquatic macrophyte beds in deep water less than about 200 feet deep but have been collected down to about 690 feet deep (Moyle 2002; UC Davis 2017). The species is sedentary and live under rocks during the day but come out at night when it is easier to ambush and capture their prey (Moyle 2002; UC Davis 2017). The species reach sexual maturity in their second or third year, and then spawn in rocky or gravelly substrates from May to late August. However, peak spawning occurs from May to early June (Moyle 2002). Females build nests in wave-swept nearshore areas or just off the mouths of streams (Moyle 2002). After females deposit their eggs, males fertilize the eggs, then tend the nests to defend the embryos from predation (Moyle 2002). After fry hatch they remain in their nests for 1–2 weeks.

Tahoe suckers are generally found at depths less than about 50 feet, but occasionally have been found as deep as about 985 feet (Moyle 2002). Two spawning populations of Tahoe suckers occur in Lake Tahoe, one that spawns in streams and one that spawns within the lake. Lake-spawning Tahoe suckers choose rock and gravel substrate, typically at depths of about 15–60 feet, although some may spawn in shallower areas (Moyle 2002). Spawning takes place between March and August when temperatures range from 12 to 23°C (Moyle 2002; UC Davis 2017). Males first appear on spawning beds, with two to eight males attending each female (Moyle 2002). Intense spawning activity leads to creation of shallow nestlike depressions and adhesive eggs become buried in the gravel (Moyle 2002).

COLDWATER GAME FISH SPECIES

Coldwater game fish, including several species of trout, have been planted in Lake Tahoe beginning in the mid-to-late 1800s for recreational angling purposes. Lake trout and kokanee are the two most popular species among recreational anglers. Other coldwater species popular with recreational anglers include rainbow trout and brown trout. A small population of brook trout also inhabits the lake (Heyvaert et al. 2013). Sixty-three tributary creeks enter Lake Tahoe and provide permanent spawning and rearing habitat for all coldwater game species, except lake trout, which spawns in the lake (NDW 2014, 2016).

Lake trout are one of the introduced species that have most dramatically restructured the pelagic food web in Lake Tahoe (Zanden et al. 1993), but they are also an important component of the recreational fishery. The *Mysis* introduction during the 1960s corresponded with a feeding shift for lake trout, from native fishes across habitats to a primarily pelagic diet consisting of *Mysis* and pelagic forage fish (Chandra et al. 2009). During summer months, most lake trout utilize the hypolimnion (cold, deep areas of the lake), but move into more shallow waters (131–197 feet deep) for spawning during September–November (Beauchamp et al. 1992). Unlike most lake trout populations, which spawn over rocky shoals such as cobble, boulder, or broken angular rock, the population in Lake Tahoe spawns on deep-water mounds over beds of the macrophyte *Chara delicatula*. Although it is unusual for lake trout to spawn on macrophytes, strands of *C. delicatula* provide the necessary requirements for successful egg incubation and protection from predation (Beauchamp et al. 1992).

Kokanee were accidentally introduced into Lake Tahoe in 1944, but the population remained small until about 1960. Today, the State of California still regularly stocks kokanee, which remain an important summer sport fishery in Lake Tahoe. Prior to the establishment of *Mysis*, kokanee fed primarily on zooplankton. Today, the kokanee diet in Lake Tahoe is dominated by midge pupae, copepods, and terrestrial insects.

Most natural reproduction occurs in Taylor Creek (greater than 90 percent) from mid-September through mid-November (Beauchamp et al. 1994b). However, in some years spawning occurs in beds of gravel close within the shorezone (Byron et al. 1989; Moyle 2002; Allen and Reuter 1996). Eggs and alevins incubate in gravel nests (redds) until spring, when they emerge and migrate to the lake. Kokanee are widely distributed in open waters and remain close to the surface except when temperatures become too warm in August and September (Moyle 2002). When water temperatures are too warm for the fish to utilize surface waters, large schools are found at depths of 49–131 feet (Cordone et al. 1971, cited in Moyle 2002).

Rainbow trout and brown trout are widely distributed in open waters, but in the evenings, they move into shallower nearshore waters to feed on native minnows (Moyle 2002). Rainbow trout and brown trout are the primary piscivores in nearshore areas where they capture mostly Tahoe sucker and Lahontan redside, and to a lesser extent speckled dace, Paiute sculpin, and tui chub (Moyle 2002). Brook trout primarily feed on terrestrial insects, aquatic insect larvae, and zooplankton, but larger trout can become piscivorous (Moyle 2002). Although brown trout, rainbow trout, and brook trout generally spawn in creeks, in large lakes they can also successfully spawn on gravel bars close to shore (Moyle 2002). However, anecdotal evidence suggests rainbow trout spawning primarily occurs in Lake Tahoe's tributaries (CDFG 1965; NDW 2016). Available literature indicates that spawning surveys occur only in these tributaries (NDW 2016). Therefore, it is assumed that most rainbow trout spawning occurs in these tributaries.

Brown trout spawning typically takes place in October but may extend into December (CDFG 1965; Moyle 2002), brook trout spawn from mid-September to mid-January (Moyle 2002), and rainbow trout spawn from April to May (NDW 2016). All species prefer cool, clear, well-oxygenated water for spawning (depending on the species, anywhere from 4°C to 15°C). Females construct redds with their tails and deposit eggs as males fertilize them (Moyle 2002). Brook trout can spawn in a variety of environments ranging from sandy bottomed areas to piles of boulders, whereas brown trout and rainbow trout prefer coarse gravel (Moyle 2002).

WARMWATER FISH SPECIES

Generally, warmwater game fish species include nonnative fish species that are popular among recreational anglers. A variety of nonnative warmwater game fish species were illegally introduced in the mid1970s to late 1970s and again in the late 1980s (Reuter and Miller 1999). More recently, in the Tahoe Keys, smallmouth bass (*Micropterus dolomieu*) were discovered in 2011 and common carp (*Cyprinus carpio*) were found in 2012 (Wittman and Chandra 2015). Additionally, warmwater nongame fish species, including golden shiner (*Notemigonus crysoleucas*) and western mosquitofish (Gambusia affinis), also are found in the lake.

The most common nonnative warmwater species in Lake Tahoe generally, and Tahoe Keys specifically are largemouth bass and bluegill. Control efforts have been implemented to reduce nonnative warmwater fish species, but generally they continue to persist (Wittmann and Chandra 2015). Nonnative warmwater fishes primarily occur in the Tahoe Keys and Taylor Creek. However, snorkel surveys show satellite populations of bluegill and largemouth bass occur in other areas of the lake (Chandra et al. 2009, Kamerath et al. 2008). The extent of warmwater fishes in areas outside of the Tahoe Keys remains unclear, but research suggests suitable habitat has increased due to warming water temperatures and the expansion of aquatic weed beds (Kamerath et al. 2008, Chandra et al. 2009, Ngai et al. 2013). Although suitable spawning habitat for warmwater fish is available in a number of areas around the lake, the south shore provides the most overall suitable spawning habitat followed by the east shore, north shore, and west shore (Chandra et al. 2009).

Largemouth bass begin spawning when temperatures reach 15.9°C (Kramer and Smith 1960, cited in Chandra et al. 2009), and bluegill spawning begins when temperatures reach 18°C (Moyle 1976, cited in Chandra et al. 2009). Minimum spawning temperatures for largemouth bass and bluegills are generally met or exceeded between May and August (Chandra et al. 2009). Because smallmouth bass have only recently been observed in Lake Tahoe there is little available information on their life history within the lake. However, in northern California, smallmouth bass typically build nests then spawn in shallow waters (less than 3 feet) from May through June or July (Moyle 2002; Ngai et al. 2010). In Lake Tahoe, black crappie

(*Pomoxis nigromaculatus*) typically spawn from March to late June and brown bullhead (*Ameiurus nebulosus*) (a species of catfish) spawn in late April or May (USFS 2017).

Nonnative warmwater fish feed on a variety of food types. Top predators such as bass feed on native minnows (family Cyprinidae) and trout. Bass also feed on juvenile tui chub when they are rearing in nearshore areas (Moyle 2002). Brown bullhead are bottom feeders that feed on mollusks, insects, leeches, crustaceans, fish and fish eggs (USFS 2017). Common carp also scavenge bottom sediments, grubbing for zooplankton, crayfish and benthic worms. The diet of black crappie consists of zooplankton, insects, larvae, and small fish (USFS 2017). The diet of bluegill and golden shiner overlaps with native fish species and they feed primarily on mollusks, plant material, and invertebrates (Chandra et al. 2009). Western mosquitofish also compete with native species for food and are wide spectrum omnivores.

5.3.3 Aquatic Habitat

The geographic area addressed by the Shoreline Plan alternatives is the 72-mile-long shorezone of Lake Tahoe. The TRPA Code (Chapter 83) defines the shorezone as the area consisting of the nearshore, foreshore, and backshore (see Exhibit 2-2 in Chapter 2, "Description of Proposed Project and Alternatives"). Beyond the shorezone (i.e., deeper/farther from the shoreline than the nearshore) is the lakezone, which is defined as any part of the lake that is deeper than 6,193.0 feet LTD.

Because the backshore consists of land located between the highwater line of the lake and the upland area, it is not considered fish habitat because it is only intermittently wet (i.e., during wave action). Further, the foreshore is defined as the area between the high and low water lake levels, and also is only intermittently wet. However, while the backshore is intermittently wet when wave action is occurring, the foreshore is wet whenever lake levels are high.

The nearshore, foreshore, and backshore areas are defined by TRPA based on lake elevations or distances from the shoreline for planning purposes and are not necessarily based on aquatic habitat characteristics or use by aquatic species. Therefore, the areas within the shorezone that can be utilized by fish and serve as aquatic habitat are collectively referred to as nearshore fish habitat. Specifically, the nearshore (as defined by TRPA), along with the foreshore when it is wet during the higher water periods of the year are considered nearshore habitat.

Three primary habitats are utilized by Lake Tahoe fishes; nearshore habitat, tributary streams, and pelagic habitat. Nearshore fish habitat and tributary stream mouths are both located within the shorezone, whereas pelagic habitat is located within the lakezone. TRPA has implemented policies and regulations designed to protect fish habitat while also maintaining high quality recreational experiences. Habitat types and the regulations associated with them are described below.

NEARSHORE HABITAT

Although TRPA defines the nearshore specifically based on depth and distance from the shoreline, no consistent definition of a nearshore fish habitat is readily available (Heyvaert et al. 2013). The generic definition of the nearshore zone or nearshore habitat as it relates to aquatic species is to consider it equivalent to the littoral zone. A littoral zone, as it is typically used in scientific literature, is defined as the shallow area of a lake that supports macropyhte (i.e., aquatic plant) growth with "the deepest extent of the littoral zone considered that depth at which one percent or less of surface light penetrates to the bottom sediments (i.e. photic zone)" (Heyvaert et al. 2013). Due to Lake Tahoe's extreme water clarity, the 1 percent light level is very deep. Conditions in the nearshore fluctuate with precipitation, wind, and lake levels.

Nearshore habitat provides rich spawning, nursery, and rearing habitat for native fish species and is the location of the lake where highest fish densities are found. This narrow strip of lake also receives the greatest concentration of human activity, which includes intense recreation, commercial interests, and

private development (Allen and Reuter 1996). Introduction of nonnative aquatic species, overharvesting (of native LCT), and other disturbances have caused irreversible changes to the nearshore fish assemblage (Heyvaert et al. 2013). Over the past 50 years a large increase in human population within the Tahoe Basin and a concomitant increase in shoreline development and alterations have occurred. For example, as a result of low water conditions, shorezone property owners have cleared their beaches of gravel, cobble, rock and boulders down to and beyond the water line to expose sandy beach. Removed substrate is usually piled along property lines, reducing the area of fish habitat when Lake Tahoe returns to "normal" levels. Construction of piling-supported piers and rock-crib piers have further altered nearshore habitat (Beauchamp et al. 1994a).

Based on concerns that increasing boating and presence of structures (i.e., piers) were affecting fish habitat, a multiphased fish study investigated the distribution of fish communities, as well as their interactions with littoral structures and habitat features, the results of which are generally described below (Byron et al. 1989; Beauchamp et al. 1991, 1994a; Allen and Reuter 1996).

Nearshore fish densities are highest during the summer and then decrease during fall as fish move to deeper parts of the lake. This occurs, in part, due to thermal stratification that restricts many fish to shallower depths (Byron et al. 1989). In addition to the permanent inhabitants of nearshore environments, YOY of most other fish also utilize the nearshore zone. In general, shallow (i.e., less than 30 feet deep) areas with large boulders or other complex environments support substantially more fish than simple (i.e., sandy substrate) littoral zone habitats (Byron et al. 1989). Yearling and older littoral fish generally do not use shallow, nearshore sandy substrate unless is it is less than 7 feet from complex rocky cover (Beauchamp et al. 1991). Rocky habitat is thought to provide important refuge from predation (Beauchamp et al. 1994a) and is considered good spawning habitat for many lake-dwelling species by TRPA. Allen and Reuter (1996) found nearly every gravel substrate location surveyed showed evidence of spawning. In contrast, higher densities of underyearling littoral fishes are associated with sandy substrates, likely because they take advantage of the warmest available temperatures located in shallow waters and their small size and transparency protect them from predators (Beauchamp et al. 1991). As underyearlings grow and gain more pigment they form schools to protect themselves from predation. Large aggregations of juveniles are prevalent along the marshy shore where they are able to take refuge in emergent aquatic vegetation (Moyle 2002).

The warm spring and summer months are the peak spawning period for many nearshore fish species in Lake Tahoe. The peak recreational boating period, which occurs from May 1 to September 30, corresponds with utilization of nearshore habitat by native fishes (Beauchamp et al. 1991) and warmwater game species. However, most native fish spawn during the night hours when shorezone activities decrease (Allen and Reuter 1996). Beauchamp et al. (1991) found that underyearlings, which generally use shallow areas did not occupy areas deep enough to be frequently disturbed by normal boat traffic. Nevertheless, boat traffic in marinas and around piers caused fish schools (i.e., yearlings and older fish) to retreat to cover, although they usually returned to normal activity patterns within 30 seconds (Beauchamp et al. 1991). Due to the short disturbance period, the study concluded that, even frequent encounters (e.g., 100 boat passages) would not impinge on foraging time enough to affect growth. To further investigate potential anthropogenic impacts on nearshore fishes, Allen and Reuter (1996) studied boating impacts on spawning. The researchers reported that boating occurring during maximum night spawning activities had no negative impact on spawning behavior. Further, artificial lighting associated with boating and other shorezone activities did not affect spawning behavior. Spawning became adversely affected only when shorezone disturbances reached an extreme level. A significant drop in egg survival occurred at one spawning site during Independence Day weekend at a location where boating activity was unusually high. Many boats parked along the nearshore and were subjected to wakes from boats coming and leaving the area, which caused beached boats to rock and bounce on eggs incubating in the nearshore substrate. It was recommended that this practice not be allowed for all boat types (including personal watercraft) (Allen and Reuter 1996).

Other human activities associated with shorezone recreation were also studied to determine how they may affect spawning fish during nighttime and daytime hours. Spawning fish were subjected to dogs swimming

and people wading in the nearshore environment (Allen and Reuter 1996). Fish responded by swimming just far enough from the disturbance that they would not be physically harmed. Spawning aggregations showed a similar response by reestablishing themselves within 1 minute of disturbance (Allen and Reuter 1996).

The most common anthropogenic alteration to Lake Tahoe's nearshore is the construction of piling-supported piers (piers) and rock crib piers (cribs) (Beauchamp et al. 1994a). Piers in Lake Tahoe consist of 20- to 30-centimeter-diameter steel or wood pilings, spaced in approximately 16-foot intervals with mean dimensions of 75 feet long and 7 feet wide (Beauchamp et al. 1994a). Piers provide simple submerged structures that lack habitat complexity. Beauchamp et al. (1994a) studied piers and cribs to determine if these structures affected fish densities. The researchers reported that piers had no significant effect on littoral fish density, but that piers may positively affect fish abundance when the lake level is higher because some species may utilize the shaded areas under docks as cover. Allen and Reuter (1996) conducted another study to determine if piers and/or cribs affected fish spawning success. The researchers reported that substrate was more important than pier presence for littoral fish spawning success (Allen and Reuter 1996). The study concluded that areas of gravel replaced by pier piles should be mitigated to ensure no loss of spawning habitat.

Loss of habitat, from boat ramps and marinas was found to adversely affect spawning. During the spawning season, fish were observed in very shallow water (less than 10 inches deep) on boat ramps (Allen and Reuter 1996). The study authors concluded fish on the boat ramps were looking for suitable spawning substrate. Although no spawning was observed on ramps, at the same time fish were on the boat ramps the researchers observed spawning fish several feet away from the ramps (Allen and Reuter 1996). Sheet piles installed around rock cribs also eliminated spawning habitat. Although holes had been cut into the sheet piles to provide access to spawning habitat, the holes did not provide adequate access. This suggests structures that cover or remove spawning habitat have a negative impact on nearshore fishes (Allen and Reuter 1996).

TRPA Nearshore Fish Habitat Definitions

Findings from the studies discussed above have been used by TRPA to establish regulations for shorezone structures and the activities associated with them. TRPA, in coordination with CDFW, NDOW, and the Tahoe Environmental Research Center also considered these studies when defining prime fish habitat locations around the lake.

Prime Habitat maps were originally adopted in 1984 to classify the amount of habitat available to nearshore fish. Since then, the maps have been updated several times and were most recently updated in 2015. As newer mapping techniques and technology have become available, and the fish studies such as those described above have taken place, the maps have been refined to more accurately define available fish habitat. The most recent habitat inventory was conducted by O'Neil-Dunne et al. (2016). Based on the habitat inventory, TRPA's Geographic Information System database reported 37 acres of spawning habitat, 6,099 acres of feeding and/or cover habitat, and 7,706 acres of marginal habitat in Lake Tahoe, which equates to approximately 6,136 acres of prime habitat (sum of spawning and feeing/cover habitat) that is limited in distribution to distinct areas around the lake. Note that this analysis does not exclude mapped habitat that occurs above the highwater elevation, so the actual area of prime fish habitat is slightly less.

TRPA classifies nearshore habitat into three types based primarily on substrate size and characteristics, including (1) marginal habitats that correspond to nearshore areas dominated with sand and silt substrates, (2) feed and cover habitats that are areas dominated with cobble and boulder substrates, and (3) spawning habitats that are limited to areas of gravel (Byron et al. 1989; TRPA 1996). Naturally occurring cobble/boulder and gravel habitats (i.e., "spawning" and "feed and cover") are considered excellent or prime habitat and have been used to judge compliance with the adopted lake threshold standard, which is a no net loss standard (i.e., TRPA's goal is to prevent any loss of prime fish habitat). Exhibit 5-1 shows the distribution and quantity of marginal, feed and cover, and spawning habitats in Lake Tahoe.

Spawning Habitat

TRPA recognizes spawning habitat as an area that attracts, or can attract, fish for reasons of producing and fertilizing eggs. Spawning habitats are composed of relatively small diameter gravel substrates used by native minnows for spawning and rearing fry (TRPA 2016a). Shorezone substrate was classified as spawning habitat if most of the gravel within an area measured between 2 and 64 millimeters (mm) in diameter. Gravel beds used for spawning are dynamic (Osborne et al. 1985). Littoral currents and wave energy constantly move and redistribute spawning gravel and sands. Spawning areas occur in both sheltered and more open stretches of shoreline and may be enhanced by the presence of underwater springs (TRPA 2004:4-11). Furthermore, fluctuations of the lake level can affect the amount of gravels that are available for fish spawning (Ngai et al. 2010). Spawning habitats are randomly distributed along the shorezone, but all are located along the California shoreline (Exhibits 5-1 and 5-2).

Nearshore spawning habitat is used by several fish species during the warm spring and summer months (Exhibit 5-3). Generally, little information is readily available describing spawning habitat requirements or behavior for native fishes in Lake Tahoe. However, available information generally suggests that native fish species spawn in gravelly areas where eggs can develop relatively safely and remain oxygenated by wave action. The Tahoe Keys area supports highest densities of nonnative warmwater fish species in Lake Tahoe. The Tahoe Keys area generally would not be considered spawning habitat based on the TRPA definition which is defined by native fish spawning habitat requirements. Some populations of nonnative warmwater species utilize other areas of the lake, which may be considered spawning habitat based on the TRPA definition.

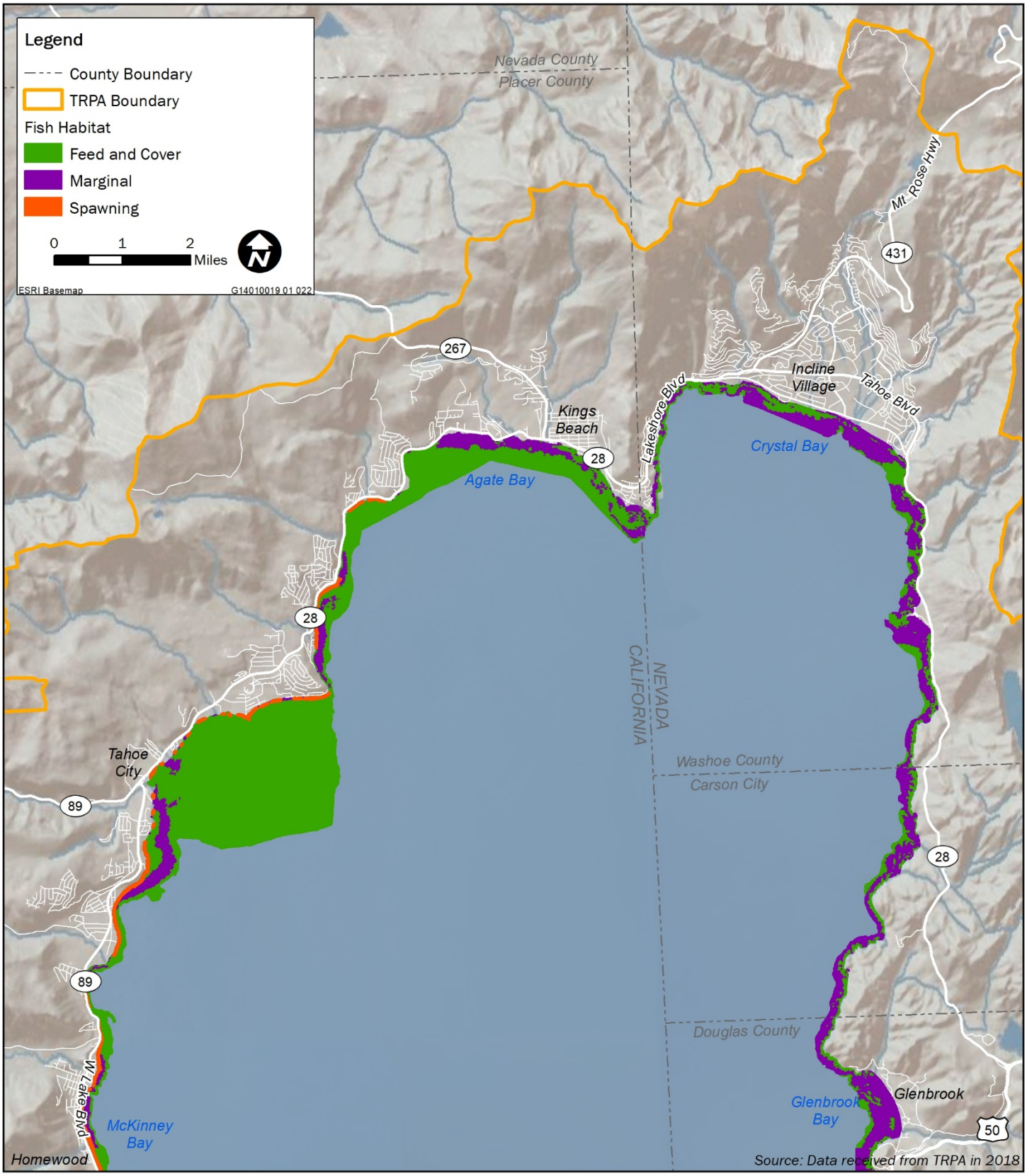
Feed and Cover

Larger rocky substrates (e.g., cobble, boulder) represent feed and cover habitats and are used by fish as foraging habitat and to provide refuge from predation (TRPA 2016a). Overhanging riparian vegetation is also important for providing shade to minimize rapid fluxes in stream and lake temperatures. In addition, some species of larval and postlarval fish often use shallow, sandy portions of the shorezone because high water temperatures provide for optimal growth (e.g., the South Shore Shelf, Lake Forest/Tahoe City Shelf).

As described in Section 5.3.2, preferred food items of fish vary between species. Food selection also varies within species, depending on the size of the fish and its stage of development. Young fish use calm water to find food and hide from predators. Suitable nursery habitats in Lake Tahoe are located in marshes and wetlands, in areas with sand substrate that supports vegetation, and in deep-water vegetation. Vegetation in these areas also provides excellent cover and provides favorable habitat for invertebrates needed for food by young fish. Feed and cover habitat occur everywhere except the south shore (Metz et al. 2006) (Exhibit 5-1).

Marginal

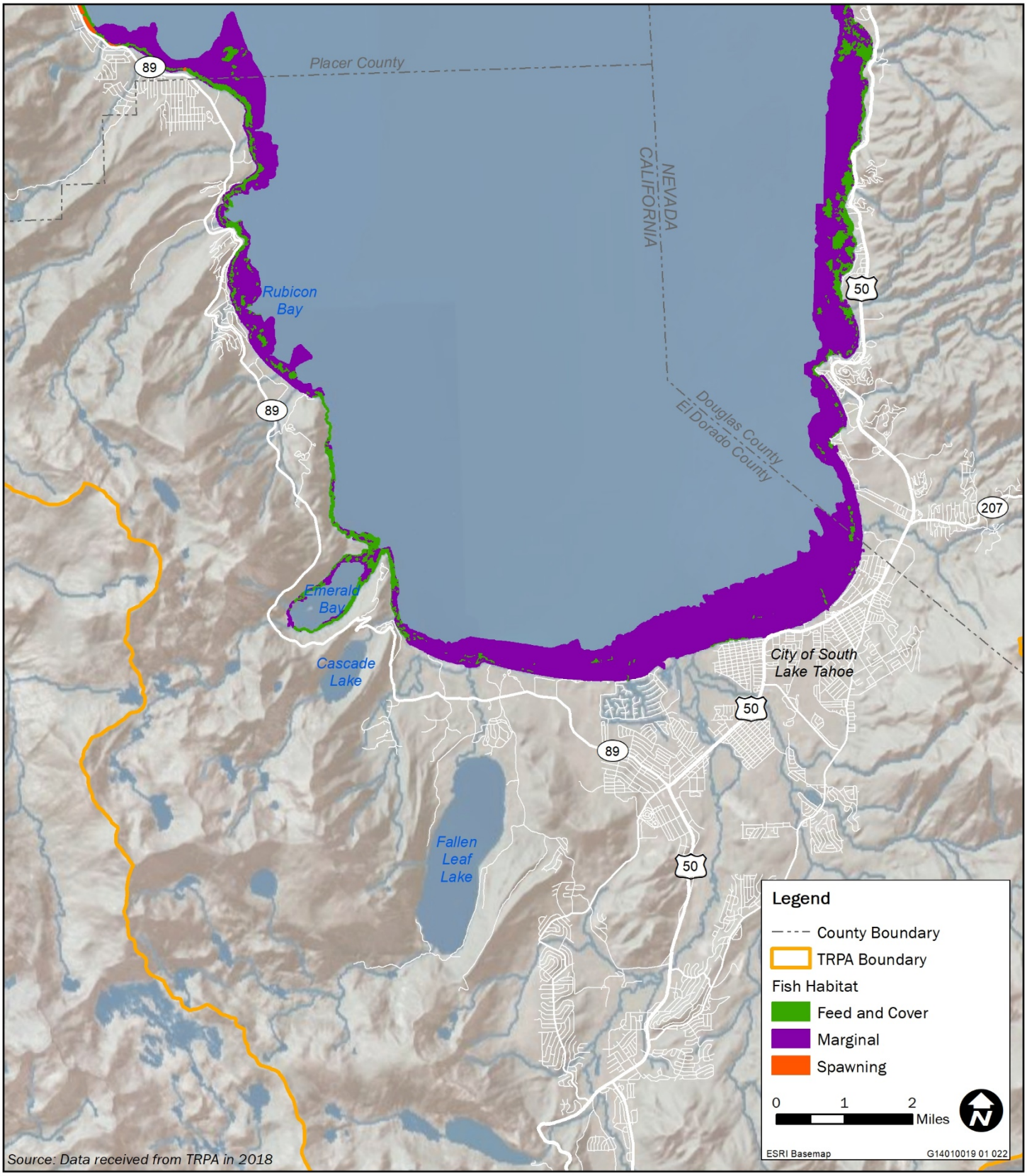
According to TRPA (2016a) marginal habitats are dominated by sand and silt substrates interspersed with occasional willow thickets that establish during low lake levels. When the TRPA Prime Fish Habitat maps were originally produced in 1984, shoreline areas that consisted of sand and silt substrates (less than 2 mm in diameter) were designated as marginal habitat. Although that terminology is still used today the term “marginal” habitat may be misleading because it implies that this habitat is of poor quality to fish. However, Beauchamp found that these substrates provided important nursery habitat for the underyearling littoral fish (Beauchamp et al. 1990, 1991). Furthermore, this type of habitat is used for spawning by tui chub. Marginal habitats are characterized by a predominance of sand and silt substrates that often are interspersed with vegetation, such as willow. Marginal habitat locations are depicted in Exhibit 5-1.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 5-1 **Distribution and of Habitat Types in Lake Tahoe (North)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 5-2 **Distribution and of Habitat Types in Lake Tahoe (South)**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nonnative Warmwater Game Fish[1]												
Black crappie												
Bluegill												
Brown bullhead catfish												
Largemouth bass												
Smallmouth bass												
Native Fish												
Lahontan Lake tui chub												
Lahontan redside shiner												
Lahontan speckled dace												
Paiute sculpin												
Tahoe sucker												

[1] Spawning for many warmwater game fish species is initiated when water temperatures are appropriate. Therefore, these spawning periods should be considered generalized spawning periods for evaluation purposes in this EIS. Because water temperatures in Lake Tahoe could change over time as a result of climate change and other factors these generalized spawning periods also could change.
For references and details see species descriptions in the text.

Period of peak spawning
Period of spawning

Exhibit 5-3 Spawning Periods for Native and Nonnative Fish That Spawn in the Nearshore Zone of Lake Tahoe

TRIBUTARY STREAMS

Sixty-three tributary streams are known to provide suitable habitat necessary for Lake Tahoe coldwater game fish reproduction (with the exception of lake trout). Some nongame species also use tributaries for spawning, but the proportion of the native fish species using the tributaries for spawning is unknown. The Shoreline Plan will not affect tributary streams and thus, these areas are not discussed further.

Although the Shoreline Plan will not construct structures in tributary streams, shorezone structures generally can have impacts on stream mouths. Therefore, TRPA has implemented stream mouth protection zones to ensure new structures do not impede access to spawning habitat in lotic environments.

Marshes and wet meadows once commonly occurred where streams entered Lake Tahoe but, due to residential and commercial development, are now largely restricted to the South Shore (notably Taylor Creek and the Upper Truckee Marsh). Stream outlets serving as entrances to spawning stream habitats are found at numerous locations around Lake Tahoe, although most lie along the California shoreline. In addition, these stream mouths are known to possess foraging habitat used by several game and nongame fishes. Prohibiting construction of shorezone structures (such as piers) within the zone of a stream mouth is necessary because debris can become entangled with shorezone structures and create barriers to fish migratory movements during storm events. Additionally, stream mouths naturally meander, moving laterally along the shoreline, and over time may align itself directly in line with a shorezone structure. Building structures within the influence of the natural meander pattern of a stream mouth also interferes with the streams ability to meander naturally. Currently, TRPA recognizes 24 stream mouths from which shore development is prohibited within 200 feet on either side of the stream.

PELAGIC HABITAT

The pelagic zone of the lake provides important habitat to numerous fish species. In the summer months, when the lake is more heavily used for recreation, many of the pelagic fish species utilize the hypolimnion

(i.e., deeper portions of the lake) where temperatures remain cool. Because the Shoreline Plan elements will be implemented along the 72-mile-long shorezone of Lake Tahoe, little if any impact on the pelagic environment will occur as a result of placing structures in the nearshore areas of the lake. Furthermore, TRPA does not have any pelagic standard for fish protection.

5.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

5.4.1 Significance Criteria

Significance criteria relevant to aquatic biological resources are summarized below. The applicable TRPA threshold standards, the aquatic biological resource criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- result in a net decrease in the amount of TRPA-designated prime fish habitat;
- result in harmful ecological economic, social, or public health impacts from the introduction or spread of invasive species;
- substantially change the diversity or distribution of aquatic species;
- substantially reduce the number or reduce the viability of special-status fish species;
- result in a barrier to fish movement that would block access to spawning habitat; or
- substantially reduce the suitability of habitat for native or game fish species.

5.4.2 Methods and Assumptions

The assessment of impacts on fish and aquatic biological resources consists of three primary elements: (1) temporary and localized impacts associated with construction, (2) permanent impacts on habitat associated with structures, and (3) impacts associated with increased recreational activities.

The evaluation of fisheries and aquatic biological resource impacts were based on a review of documents pertaining to the Tahoe Basin shorezone, including scientific studies and TRPA regulations and planning documents. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section.

The analysis of impacts assumes that all proposed shorezone structures for Alternatives 1, 3, and 4 would be placed in prime fish habitat; however, the relative size of structures in marginal and all fish habitat types has also been provided for reference. In addition, it was assumed that all proposed shorezone structures under Alternative 2 would be constructed in marginal fish habitat due to the prohibition on placing structures in prime fish habitat associated with that alternative. The analysis further considers that all piers under all four alternatives would be constructed to the largest multiple-use design standards.

To calculate substrate displacement for prime fish habitat, it was assumed that piers would each have 20 pilings, with each piling displacing 0.8 square feet (sq. ft.) of prime fish habitat lakebed substrate. This yields a disturbance footprint of approximately 15 sq. ft. of prime fish habitat that would be displaced for each pier. Buoy and slip anchors were assumed to disturb approximately 4 sq. ft. of prime fish habitat. Boat ramps were assumed to be 10 feet wide and 75 feet long, each therefore resulting in a disturbance footprint of

approximately 750 sq. ft. For impacts associated with construction disturbance of substrate (which would generally be larger than the permanent footprint of these structures), it was assumed that the affected area would be:

- for piers, one and a half times the footprint of pier pilings;
- for buoys, equal to the bottom footprint of anchors; and
- for boat ramps, twice the size of the boat ramp footprint.

Impact 5-1: Increased risk of AIS introduction or spread

The increase in boat launches under Alternatives 1, 2, and 3 could increase the risk of AIS introductions, but this risk would not be substantial because the rigorous and effective prevention programs (including boat inspection, decontamination, outreach, and education) would continue. However, the increases in recreational boating under Alternatives 1, 2, and 3 would increase the risk that invasive macrophytes and Asian clams already in Lake Tahoe would be spread within the lake, creating new populations and increasing the abundance and distribution of AIS. This would be a **significant** impact for Alternatives 1, 2, and 3. Implementation of the required mitigation measures would reduce the risk of AIS spread by requiring AIS management at marinas, promoting technologies that reduce the risk of AIS transport, and, for Alternative 2, increasing the control of existing AIS infestations. These mitigation measures would reduce the impact to a **less-than-significant** level for Alternatives 1, 2, and 3.

Alternative 4 would result in no increase in boating activity and would not increase the risk of AIS introduction and spread. Alternative 4 would also require that all marinas develop and implement an AIS management plan. This would reduce the risk of AIS introductions at, or spread from, marinas. Therefore, Alternative 4 would have a **beneficial** effect related to AIS introductions and spread.

Each alternative would result in the construction and placement of new structures in Lake Tahoe, which would allow for increased recreation levels associated with boating and angling. Recreational activities involving watercraft (motor boats, personal watercraft, kayaks, canoes and float tubes) and/or fishing are the most likely vectors for new AIS introductions into Lake Tahoe (USACE 2009). The alternatives could affect the introduction and spread of aquatic invasive plants and aquatic invasive macroinvertebrates.

Aquatic Invasive Plants

There are two known species of nonindigenous aquatic plants in Lake Tahoe: Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*). These species adversely affect recreational activities, navigation, and ecosystem dynamics. In addition, coontail (*Ceratophyllum demersum*), a native species, is also considered a nuisance in some areas of the lake due to excessive growth. Because most Eurasian milfoil populations are within marinas or other protected nearshore areas, dispersible fragments can easily be created by boat propellers or from mechanical harvesting (Wittmann et al. 2015). Although increased boating may increase the risk of invasive macrophytes spreading, a study by Wittmann et al. (2015) reported that no correlation between the presence of Eurasian watermilfoil and recreational boater visitation was identified. Thus, while recreational boats may be a dispersal vector, Eurasian watermilfoil distribution may be more dependent on advective transport such as wind-driven surface currents, transport by birds, habitat limitations, or variations in temporal scales (Wittmann et al. 2015). Although the study by Wittmann et al. (2015) was focused on Eurasian watermilfoil, data from their work suggests the abrupt appearance of curly-leaf pondweed in Emerald Bay may have occurred as a result of recreational boating. Thus, while there is some uncertainty with respect to the role recreational boating has on the spread of aquatic invasive plants, it is possible that increases in recreational boating could increase the spread of aquatic invasive plants.

Efforts are currently underway to control invasive aquatic plants in Lake Tahoe and other lakes in the Region. In 2015 a plan was finalized, and feasible control strategies for specific invasive species in specific locations began to be implemented. Nonetheless, invasive plants continue to spread throughout the lake and continue to adversely affect native fishes.

Aquatic Invasive Macroinvetebrates

Since the 1960s *Mysis*, signal crayfish, and Asian clams have been introduced and have spread in Lake Tahoe. Introduction of these nonnative species has corresponded with a significant decrease in native benthic invertebrates, with substantial declines in density of most taxa (Caires et al. 2013). Because crayfish have already been introduced and are well-established in the lake, increased recreational activities are not expected to increase their population size or location within the lake.

Asian clams are the first and, to date, only molluscan AIS in Lake Tahoe. Asian clams are the only AIS macroinvertebrate, currently present, that could possibly be spread around Lake Tahoe due to human activities. Asian clams are small (less than 1.5 inches) and can spread rapidly. A single clam can reproduce alone and release hundreds of juveniles a day. Asian clams can be found in any substrate, but prefer fine clean sand, clay, coarse sand, or gravels in shallow warm water (USACE 2009). fishes. Asian clams can spread by pediveliger (i.e., a stage in its life cycle where it is able to crawl using its foot) dispersal, generation of viscous-mucous threads, anthropogenic and animal transport, and passive hydraulic transport (Wittman et al. 2013). Because Asian clams can be spread passively by wave action they could also spread by passive movement in the waves created by boat wakes. However, this potential dispersion method has not been identified in review of available literature. Nonetheless, the continuation of no-wake zones under all the alternatives would reduce potential for the species to spread as a result of boat wake generation. Asian clams can also be transported via boat ballast water or the juvenile byssal attachment to boat hulls (Kramer-Wilt 2008; Sousa et al. 2008). The 2017 State of the Lake Report discusses the implications of boat use on the spread of Asian clams (TERC 2017:6.17) and speculates that transport via boat ballast water may have led to the establishment of new populations of Asian clams in Lake Tahoe.

Other AIS species, such as quagga and zebra mussels, New Zealand mudsnails, and hydrilla, are not yet present in the lake but are present in other water bodies in California and Nevada (USACE 2009). Suitable habitat for species is potentially present in Lake Tahoe, and increased recreational activity has the potential to increase the risk of introductions.

AIS Inspection Program

Under the TRPA AIS inspection program, every motorized boat accessing Lake Tahoe is inspected per TRPA Code 63.4.2. From 2015 through 2107, an average of 15,377 boats were inspected annually (Zabaglo, pers. comm., 2018). Boats are decontaminated with 140 degrees Fahrenheit (°F) water if AIS are encountered through visual and tactile inspections, if there is water present in any section of the boat, or if the boat had previously been in a lake with known AIS. Out of the 15,377 annual inspections, an average of 3,735 are decontaminated annually. On average, 38 vessels are positively identified as carrying AIS each year (Zabaglo, pers. comm., 2018). This is the equivalent to a positive AIS identification on approximately 1 out of every 400 boats entering Lake Tahoe. Boat ramp and marina inspectors have never caught a boater trying to enter the lake while intentionally trying to avoid an AIS inspection.

The AIS program is funded through the collection of watercraft inspection and decontamination fees and through grant funding from the States of Nevada and California. The collected fees cover approximately half of the program cost and the other half is funded by state funds. The AIS program costs are largely due to static operational costs such as inspector salaries, decontamination equipment, and administration. Therefore, the program costs do not increase in proportion to the number of inspections (Zabaglo, pers. comm., 2018). The cost of supplies (stickers, seals, hot water) is covered by the collected inspection and decontamination fees; therefore, an increase in inspections would generate additional fees and would cover the additional supply costs. Based on the projected increases in boat launches under each alternative, no additional funding would have to be obtained to maintain the AIS inspection program at existing levels (Zabaglo, pers. comm., 2018).

Alternative 1: Proposed Shoreline Plan

Under Alternative 1, up to 2,116 new moorings and two new boat ramps could be constructed. These structures would result in an estimated 7,300 additional annual boat launches and approximately 38,200 additional boat trips, which would increase the potential for the introduction and spread of AIS. Alternative 1 includes the second highest number of boat launches and boat trips of all the alternatives considered.

Therefore, the likelihood of introduction and spread of nonnative aquatic weeds under Alternative 1 is greater than Alternatives 3 and 4, but less than Alternative 2. AIS inspection and decontamination requirements currently in place would continue under Alternative 1, including compliance with TRPA Code 63.4.1 C, which states that "the launching, or attempting to launch, of any motorized watercraft into the waters of the Lake Tahoe region without an inspection by TRPA or its designee, to detect the presence, and prevent the introduction of, aquatic invasive species" is prohibited. Additionally, nonmotorized watercraft and seaplanes are subject to inspection and are included in this provision, if determined necessary by TRPA or its designee. Further, TRPA Code 63.4.2 B states that "all watercraft and seaplanes subject to inspection and/or decontamination pursuant to subparagraphs 63.4.1.C and 63.4.2.B shall be permitted to enter the waters of the Lake Tahoe region only if: (a) the inspection and/or decontamination is performed and completed by an individual trained and certified pursuant to TRPA standards and requirements for aquatic invasive species inspection and decontamination, and (b) following inspection and/or decontamination, the launch or landing, as appropriate, is authorized by an inspector trained and certified pursuant to TRPA's standards and requirements for aquatic invasive species inspections."

Although the increased number of boat launches under Alternative 1 could increase the risk of AIS introduction, the additional risk would not be substantial because Lake Tahoe has one of the nation's most rigorous AIS prevention and recreational boat inspection programs, which would continue under Alternative 1. As described above, this program includes a mandatory boat inspection program and mandatory decontamination for all high-risk boats. This program has functioned effectively since its inception and no new species of AIS have been introduced. The inspection program would continue to function under the existing funding system, which would be adequate to accommodate the expected increase in inspections (Zabaglo, pers. comm., 2018). In addition, TRPA and partner organizations would continue to implement AIS prevention efforts that include outreach, education, and voluntary action by the boating public, and would expand these efforts through new education programs at inspection stations and marinas, as described in Chapter 2, "Description of Proposed Project and Alternatives,"

While introduction of AIS from additional boat launches would not be expected because of the highly effective existing program, it is possible that increases in recreational boating could increase the spread of Eurasian watermilfoil, curly-leaf pondweed, and coontail (a native nuisance species), which are already found in Lake Tahoe. Increases in recreational boating could also increase the spread Asian clams, via ballast water. The risk of AIS spread would be offset by ongoing and expanded control efforts guided by the Lake Tahoe AIS Management Plan for CA and NV (TRPA 2014). As control efforts reduce the extent of existing populations, the risk that these populations will be spread by recreational boating decreases. Between 2009 and 2015, approximately 40 acres of lakebed were treated for AIS, or an average of 6.7 acres per year. As described in Chapter 2, "Description of Proposed Project and Alternatives," Alternative 1 would develop a new fee program that would fund additional AIS control projects. The fee would be assessed on recreational boaters and would be sufficient to fund an additional 3 acres of invasive macrophyte or Asian clam control each year, which would represent an increase of approximately 45 percent in the areal extent of lakebed treated annually for AIS control. As described in Chapter 2, Alternative 1 would result in an estimated 16 percent increase in the annual number of boat trips. While the additional boat trips would increase the risk of AIS spread, the additional AIS control would decrease this risk.

Alternative 1 would require that marinas seeking reconfiguration or expansion develop and implement AIS management plans. Because marinas include areas where invasive macrophytes are most dense and where recreational boating tends to be concentrated, such AIS management plans would be highly effective at reducing the risk that invasive macrophytes would be spread by recreational boating. However, marinas that do not expand or reconfigure would not be required to prepare and implement AIS management plans. Because marinas contain fueling facilities, the increase in boat trips under Alternative 1 would increase boat traffic in marinas as the additional boats visit marinas to refuel or use other marina amenities. This increase in boat traffic at marinas would occur at all marinas regardless of whether the marina added additional mooring or launching capacity. Thus, the approximately 16-percent increase in recreational boating would increase the potential for AIS spread at marinas, and this risk would not be fully offset by existing and proposed control programs.

The increase in boat launches under Alternative 1 could increase the risk of AIS introductions, but this risk would not be substantial because the rigorous and effective prevention programs would continue and new educational programs would be implemented. The new fee and expanded AIS control would offset the increased risk that invasive macrophytes and Asian clams would be spread within the lake itself. However, the increased boat traffic at marinas, where AIS can be most dense, would increase the risk that boats would spread AIS, creating new populations and increasing AIS abundance and distribution. This would be a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under Alternative 2, an estimated 4,871 new buoys, 1,897 new slips (including slips within two new marinas), six new public boat ramps, and 168 new private boat lifts could be constructed. These structures would result in an estimated 22,600 additional annual boat launches and approximately 124,800 additional annual boat trips, which would increase the potential for the introduction and spread of AIS. This would result in an estimated 53-percent increase in the number of annual boat trips; more than any other alternative. As with Alternative 1, existing AIS inspection and decontamination requirements would remain in place.

Although the increased number of boat launches under Alternative 2 could increase the risk of AIS introduction, the additional risk of AIS introduction would not be substantial because of the rigorous AIS prevention and recreational boat inspection program, described above, which would continue under Alternative 2. The inspection program would continue to function under the existing funding system, which would be adequate to accommodate the expected increase in inspections under Alternative 2 (Zabaglo, pers. comm., 2018).

As described above, increases in recreational boating could increase the spread of Eurasian watermilfoil, curly-leaf pondweed, and coontail (a native nuisance species), and Asian clams already in Lake Tahoe. Under Alternative 2, existing AIS control programs would remain, but they would not be expanded by a new AIS control funding source. Because Alternative 2 would result in an increase in boat trips but no increase in AIS control, it would increase the risk of AIS spread.

Alternative 2 would not require marina AIS management plans and would therefore not reduce the risk that invasive macrophytes would be spread from marinas by recreational boating. Thus, the approximately 53-percent increase in recreational boating would increase the potential for AIS spread, and this risk would not be fully offset by existing control programs. The approximately 53-percent increase in boat trips would substantially increase the risk the invasive macrophytes and Asian clams would be spread within the lake, creating new populations and increasing the abundance and distribution of AIS. This would be a **significant** impact.

Alternative 3: Limit New Development

Under Alternative 3, up to 365 new public buoys and one new public boat ramp could be constructed. These structures would result in an estimated 3,000 additional annual boat launches and approximately 8,600 additional annual boat trips, which would increase the potential for the introduction and spread of AIS. This would result in an estimated 4-percent increase in the number of annual boat trips; fewer than Alternatives 1 and 2, but more than Alternative 4. As with Alternative 1, existing AIS inspection and decontamination requirements would remain in place.

Although the increased number of boat launches under Alternative 3 could increase the risk of AIS introduction, the additional risk of AIS introduction would not be substantial for the same reasons described above for Alternatives 1 and 2.

Increases in recreational boating could increase the spread of Eurasian watermilfoil, curly-leaf pondweed, and coontail, and Asian clams. However, Alternative 3 would include the same new AIS control funding source and increased AIS control as Alternative 1. For the reasons described above, the expanded control efforts would offset the increased risk of AIS spread.

As with Alternative 1, Alternative 3 would require marina AIS management plans, but only for marinas that expand or reconfigure. The approximately 4-percent increase in recreational boating would increase boat traffic at all marinas. It is possible that the additional 8.600 annual boat trips would result in a very limited increased risk of AIS spread from marinas. However, it would result in some increased potential for AIS spread at marinas.

The increase in boat launches under Alternative 3 could increase the risk of AIS introductions, but this risk would not be substantial due to the continuation of rigorous and effective prevention programs. The approximately 4-percent increase in boat trips would be offset by increases AIS control. However increased boat traffic at marinas, where invasive macrophytes tend to be most dense, could increase the risk the invasive macrophytes would be spread from marinas to the lake, creating new populations and increasing the abundance and distribution of AIS. This would be a **significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would not allow for new structures that could increase boating capacity. It would result in no increase in the number of boat launches and no increase in the number of boat trips. Therefore, Alternative 4 would not increase the risk of AIS introduction and spread. Alternative 4 would also require that all marinas develop and implement an AIS management plan. This would reduce the risk of AIS introductions at, or spread from, marinas. Therefore, Alternative 4 would have a **beneficial** effect related to AIS introductions and spread.

Mitigation Measures

Mitigation Measure 5-1a: Require marina aquatic invasive species management plans

This mitigation measure would be required for Alternatives 1, 2, and 3.

TRPA will require that all marinas prepare and implement an AIS management plan within 3 years of adoption of the Shoreline Plan. The AIS management plans shall, at a minimum, (1) identify strategies to prevent the establishment of invasive macrophytes and Asian clams within the marina (e.g., improved water circulation), (2) include an AIS monitoring, early detection, and response program within the marina, which could be in partnership with resource management agencies and/or organizations, and (3) include a public education component. For marinas that already contain AIS, the AIS management plan shall identify measures to control or eradicate existing AIS and reduce the potential for spread.

Mitigation Measure 5-1b: Promote the development of AIS-resistant boats

This mitigation measure would be required for Alternatives 1, 2, and 3.

TRPA will continue to regularly communicate with representatives of the watercraft industry, including trade associations and manufactures of watercraft or watercraft components, to promote the development and widespread commercial utilization of technologies that lower the potential for the spread of AIS. Innovations such as ballast tank filters, heated ballast water intakes in engines, and better draining ballast tanks are currently being developed by various manufacturers, but they are not yet commercially available on a widespread basis. Although many of these innovations are not yet commercially viable, they may be by the full buildout of the Shoreline Plan Alternatives. TRPA will regularly coordinate with representatives of the watercraft industry to advocate for and demonstrate a commercial interest in the continued development and adoption of such technologies. TRPA will enact policies to encourage or require the use of such technologies when they become feasible.

Mitigation 5-1c: Establish a mitigation fee program to increase AIS control.

This mitigation measure would be required for Alternative 2.

TRPA will establish an AIS mitigation fee program that will fund increased levels of AIS control. The fee will be used to implement projects that reduce the abundance and distribution of Asian clam, Eurasian watermilfoil,

curly-leaf pondweed, coontail and/or other AIS that may be introduced in the future and can be spread by recreational boating. The fee will be assessed on recreational boaters either during AIS inspections or at launch points. The fee per launch or boat will be the same as that proposed under Alternative 1, which will be sufficient to increase existing control efforts commensurate with the projected increase in annual boat trips under Alternative 2.

Significance after Mitigation

With implementation of Mitigation Measure 5-1a each marina would implement measures to reduce the risk of new infestations and control or eradicate existing infestations. This would reduce the risk of AIS spread because marinas can contain the densest infestations of invasive macrophytes and can serve as a vector source when recreation boats launch or visit marinas. Mitigation Measure 5-1b would encourage the eventual widespread adoption of ballast tank filters, heated ballast water intakes in engines, better draining ballast tanks, and/or other technologies that reduce the potential for recreational boats to spread Asian clams or other AIS. Mitigation Measure 5-1c would institute a fee that fund increased AIS control efforts under Alternative 2. The increase in AIS control efforts would be proportional to the increase in boating activity anticipated under Alternative 2, which would reduce the extent of AIS infestations and thereby reduce the risk that recreational boats would spread AIS. Taken together, these mitigation measures would substantially reduce the potential for the increase in recreational boating to increase the spread of AIS lake-wide under Alternative 2, and from marinas under Alternatives 1, 2, and 3. This impact would be reduced to a **less-than-significant** level for Alternatives 1, 2, and 3.

Impact 5-2: Loss of prime fish habitat

The implementation of the Shoreline Plan has the potential to result in a net reduction in the amount of prime fish habitat, as defined by TRPA, due to placement of shorezone structures within this habitat. Alternatives 1 and 3 would require habitat replacement at a 1.5:1 ratio, resulting in no net loss in prime fish habitat, which would be a **less-than-significant** impact. Alternative 2 would prohibit construction of structures within prime fish habitat and would therefore have **no impact**. Alternative 4 would require habitat replacement at a ratio of 2:1, which would not cause a decrease in the amount of prime fish habitat, and therefore would result in a **less-than-significant** impact.

In Lake Tahoe, parts of the nearshore are utilized by both nonnative and native fish species as feed and cover habitat, as well as seasonally for spawning and rearing young (Beauchamp et al. 1994a:385). As described above, TRPA classifies nearshore fish habitat into marginal, feed and cover, and spawning habitat types (TRPA 2016a:7-24):

TRPA considers cobble/boulder and gravel substrates as “excellent” or “prime” fish habitat, and it is acreage measurements of these substrates that have been used to judge compliance with the adopted lake habitat threshold standard. The threshold for fisheries requires nondegradation of fish habitat and maintenance of 5,948 acres of “excellent” fish habitat in Lake Tahoe. O’Neil-Dunne et al. (2016:19) determined that the threshold was in attainment with approximately 6,136 acres of “prime” fish habitat in Lake Tahoe’s nearshore/littoral zone. Any loss of prime fish habitat would conflict with the nondegradation threshold standard and constitute a potentially significant effect.

The placement of piers and buoys in spawning or feed/cover habitat has limited impact on native fish populations and the impacts can be mitigated (Beauchamp 1994a:6). Spawning habitat (gravel) in the nearshore is naturally limited because of upland geology, and where suitable habitat exists, spawning has been observed in the immediate vicinity of piers and buoys (Allen and Reuter 1996). Empirical observations suggest that boating activity associated with piers and buoys does not appear to adversely affect spawning activity or egg viability (Beauchamp 1994a:6). With this information in mind, TRPA has developed Alternatives 1, 3, and 4 to allow new structures to be placed within prime fish habitat. To comply with the nondegradation threshold, Alternatives 1, 3, and 4 would require replacement of any prime fish habitat with the same type of substrate elsewhere in the lake. Table 5-2 shows the amount of fish habitat affected by each alternative.

Table 5-2 Fish Habitat Affected by Placement of Shorezone Structures for All Alternatives

	Footprint in Substrate (sq. ft.)	Prime Fish Habitat Replacement (sq. ft.)	Prime Fish Habitat Affected by Structures (%)	Marginal Fish Habitat Affected by Structures (%)	All Fish Habitat Types Affected by Structures (%)
Alternative 1					
Piers (138)	2,084	3,126	0.001	0.0009	0.0005
Buoys (2,116)	8,422	12,633	0.005	0.004	0.002
Boat ramps (2)	1,500	2,251	0.0008	0.0007	0.0004
Total disturbance	**12,006**	**18,009**	**0.004**	**0.004**	**0.002**
Alternative 2					
Piers (476 multiple-use)	7,173	10,760	n/a	0.003	0.002
Buoys (4871)	19,484	29,226	n/a	0.0087	0.0048
Boat ramps (4)	4,500	6,750	n/a	0.0020	0.0011
Total disturbance	**31,157**	**46,736**	**n/a**	**0.009**	**0.005**
Alternative 3					
Piers (91)	1,371	2,057	0.0008	0.0006	0.0003
Buoys (365)	1,454	2,181	0.0008	0.0006	0.0004
Boat ramps (1)	750	1,125	0.0004	0.0003	0.0002
Total disturbance	**3,575**	**5,363**	**0.001**	**0.001**	**0.001**
Alternative 4					
Piers (15 public)	226	452	0.0002	0.0001	0.0001

Alternative 1: Proposed Shoreline Plan

The Shoreline Plan would allow new shorezone structures and repairs and modifications to existing structures. These projects would require prime fish habitat replacement at a 1.5:1 ratio. Using the assumptions described above, the Shoreline Plan would result in the loss of a total of 0.28 acre of prime fish habitat from the construction of 138 piers (2,084 sq. ft. of prime fish habitat loss), 2,116 buoys/slips (8,422 sq. ft. of prime fish habitat loss), and 2 boat ramps (1,500 sq. ft. of prime fish habitat loss). With a 1.5:1 replacement ratio, this would result in the creation of 18,009 sq. ft. or 0.41 acre of prime fish habitat, ensuring no net decrease. The effects of habitat disturbance and restoration and habitat replacement activities on fisheries are addressed in Impact 5-4, Permanent Habitat Modification, below. Because Alternative 1 would result in no net decrease in the extent of TRPA-designated prime fish habitat, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

TRPA Code Section 84.4 (adopted in 1987) prohibits the placement of new structures in prime fish habitat. This would be maintained with the implementation of Alternative 2; therefore, this alternative would result in **no impact** as there would be no change to prime fish habitat.

Alternative 3: Limit New Development

Alternative 3 would allow new shorezone structures and repairs and modifications to existing structures that would rely on habitat replacement at a 1.5:1 ratio. Using the assumptions described above, Alternative 3 would result in the loss of a total of 0.08 acre of prime fish habitat from the construction of 91 piers (1,371 sq. ft. of prime fish habitat loss), 365 buoys/slips (1,454 sq. ft. of prime fish habitat loss), and one boat ramp (750 sq. ft. of prime fish habitat loss). With a 1.5:1 replacement ratio, this would result in the creation of 5,363 sq. ft. or 0.12 acre of prime fish habitat, resulting in no net decrease. Because Alternative 3 would result in no net decrease in the extent of TRPA-designated prime fish habitat, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would authorize 15 new public piers and allow repairs and modifications to existing structures. These projects would rely on prime fish habitat replacement at a 2:1 ratio. Using the assumptions described above, Alternative 4 would result in the loss of 226 sq. ft. of prime fish habitat from the placement of 15 piers, which would be replaced at a 2:1 ratio, creating 452, or 0.01 acre of new prime fish habitat. Because Alternative 4 would result in no net decrease in the extent of TRPA-designated prime fish habitat, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 5-3: Construction-related impacts

Construction of new shorezone structures and dredging under all four Shoreline Plan alternatives could affect all species considered, except lake trout because they do not utilize nearshore habitats. Effects on species that could use nearshore habitats would be greatest on native minnow species that spawn in nearshore areas, including Lahontan Lake tui chub. Effects on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, would generally be limited to adults migrating to spawning tributaries and juveniles using nearshore areas for rearing.

All of the alternatives would produce a small amount of temporary disturbance relative to both prime fish habitat and marginal fish habitat. Additionally, based on the life history characteristics and habitat use for the species evaluated, construction-related effects would not be adverse for any fish species under any of the alternatives. Therefore, implementation of any of the alternatives would be **less than significant**.

Suspended Sediment and Turbidity

Construction activity permitted under the Shoreline Plan alternatives could adversely affect water quality in the shorezone by accelerating soil erosion and sedimentation, increasing turbidity, and releasing pollutants. A detailed discussion of water quality impacts from construction and dredging, and regulatory programs pertaining to water quality protection, is presented in Impact 6-1 in Chapter 6, “Hydrology and Water Quality.”

Increased suspended sediments and turbidity potentially could affect nearshore fish and their habitat by reducing egg and larva survival, interfering with feeding activities, causing breakdown of social organization, clogging the gills and digestive tract, and by reducing primary and secondary productivity. The magnitude of potential impacts on fish would be dependent upon the fish species, timing and extent of increased suspended sediment, turbidity and sedimentation, and environmental conditions (e.g., wind, waves) in the lake during and immediately following construction (Reardon et al. 2016). Pulses of increased suspended sediment can displace fish as they seek clearer water causing physical and behavioral changes that may induce physiological stress, reduce feeding efficiency (Madej et al. 2004), increase susceptibility to predators and reduce respiratory efficiency (Waters 1995). Deposition of finer sediments such as, clay, silt and sand can also bury macroinvertebrates and other food sources.

At higher turbidities, rainbow trout have been shown to shift from stationary feeding to actively searching for prey (Sweka and Hartman 2001b, cited in Hazelton and Grossman 2009). Similarly, creek chub and brook trout have been shown to be more active in turbid conditions compared to fish in clear water (Grandall and Swenson 1982, cited in Hazelton and Grossman 2009). This may translate into a greater energetic cost per prey item captured. Increases in turbidity significantly reduce foraging success of rosyside dace, possibly due to the increased energy expended to capture each prey item (Hazelton and Grossman 2009). In contrast, Lahontan redsides were found to be slightly better at capturing prey in turbid conditions (Vinyard and Yuan 1996). Turbidity has been correlated to decreased juvenile salmonid growth rates due to decreased foraging success, decreased prey availability and disturbance of normal social behavior (Bash et al. 2001).

Because increases in suspended sediment and turbidity can cause negative physiological impacts on fish, most fish avoid areas of increased suspended sediment and turbidity. Juvenile salmonids may alter their

migratory behavior by moving laterally or downstream to avoid turbid areas (Sigler et al. 1984). Larger fish tend to be more tolerant of high concentrations of suspended sediment than smaller fish, although migrating adult salmonids may avoid areas with high silt loads (Bjorn and Reiser 1991).

Because of the sensitivity of fish to turbid conditions, fish in an area of construction would be expected to swim to an unaffected portion of the lake in response to elevated suspended sediment and turbidity. Therefore, temporary increases in suspended sediment and turbidity would not be expected to affect fish species.

Hazardous Materials and Chemical Spills

Because construction of new shorezone structures and dredging could require heavy equipment to operate near the edge of the lake and barges to operate within the lake, the potential for inadvertent spills of fuels and other hazardous materials to enter Lake Tahoe exists. The potential magnitude of biological effects on fishes resulting from accidental or unintentional contaminant spills depends on a number of factors, including the proximity to the water body; the type, amount, concentration, and solubility of the contaminant; and the timing and duration of the discharge into the water body. A detailed discussion of impacts from construction activities, and regulatory protections, is presented in Impact 15-2 in Chapter 15, "Public Health and Safety." This analysis found a less than significant risk of spills of fuels and other hazardous materials.

Hydrostatic Pressure Waves, Noise, and Vibration

Construction equipment used to install piers and buoys, and construct marinas, as well as dredging could result in temporary periods of elevated pressure waves and create underwater noise and vibration in the lake that could affect fish near construction activities. New piers would be installed from a floating or amphibious barge. In pier reconstruction projects (i.e., the replacement of an existing pier), existing piles would be pulled from the lakebed using a crane or jack mechanism mounted to the barge. Pile installation for each pier would be completed by hand driving or use of a mechanical pile driver on board the floating or amphibious barge. In areas with especially rocky substrate, drilling would be required. If drilling is the method used to install pier piles, a caisson would be used to isolate and dewater the drilling site, which would allow dry pile installation and would minimize hydrostatic pressure-related effects on fish. Bubble curtains would also be used during pile driving activities to keep fish away from the noise source, if required by resource agencies during the permitting process (Ragan, pers. comm., 2018).

Fish use sound for communication, to seek prey, to avoid predators, to orient with certain environmental features, to locate appropriate habitats, and for navigation (Hawkins and Popper 2016). Construction-related noise and particle motion could disrupt fishes' use of sound, which would also disrupt communication, feeding, predator avoidance, and navigation.

The range of potential effects from noise exposure includes impacts on communication, interference to feeding, auditory tissue damage, temporary or permanent hearing loss, physiological stress and immediate or delayed mortality. However, it is also possible that there is no effect to exposure to noise (Popper and Hastings 2009). Studies have shown anthropogenic noise can induce startle and alarm responses in fish (Scholik and Yan 2002) causing fish to flee an area (Boussard 1981; Sabet et al. 2016). Thus, increased noise from construction equipment may temporarily disrupt essential behavior patterns such as feeding and predator escapement. Abiotic and biotic sounds are important to fish and many use acoustic signals to communicate. Noise emanating from construction activities may temporarily reduce auditory sensitivity of some fish species (Scholik and Yan 2002) and interfere with signals that affect communication, behavior and fitness (Popper and Hastings 2009; Purser and Radford 2011).

The noise, vibrations, and pressures produced from pile driving would be much louder than that generated by other construction equipment. Table 5-3 describes the noise thresholds in terms of sound exposure level and root mean square pressure, which are used by the National Marine Fisheries Service (NMFS) and USFWS to determine whether fish may be affected by pile driving. Information utilized by NMFS and USFWS was developed and presented as guidance for use in effects analyses during 2010 (NMFS 2010). However, based on more recent research, it is likely that it takes substantially more acoustical energy to damage fish tissues than those levels proposed in Table -3 (Dahl et al. 2015).

Table 5-3 Underwater Noise Thresholds in Decibels for Fish Exposed to Elevated Levels of Underwater Sounds Produced during Pile Driving

Effect	Metric	Fish Mass	Threshold
Onset of physical injury	Peak pressure	N/A	206 dB (re: 1 μPa)
	Accumulated sound exposure level	≥ 2 g	187 dB (re: 1μPa2•sec)
		< 2 g	183 dB (re: 1μPa2•sec)
Adverse behavioral effects	Root mean square pressure	N/A	150 dB (re: 1 μPa)

Source: NMFS 2010

Sites and Reclamation (2017) suggest that adverse effects to fish resulting from hydrostatic pressure waves and vibration primarily are a function of species morphology and species physiology. Hydrostatic pressure waves could potentially rupture the swim bladders and other internal organs of all life stages of fish in the immediate construction area (as cited in Sites and Reclamation 2017). Additionally, noise and vibration generated by pile driving activities could potentially have sublethal effects on individual fish by causing movement into lower quality habitats (as cited in Sites and Reclamation 2017). Evidence also suggests that lethal effects can occur from pile driving, but accurately analyzing and addressing these impacts, as well as sublethal impacts (e.g., injury, temporary hearing threshold shifts, stress, and behavioral disturbance) is complicated by several factors. Sound levels and particle motion produced from pile driving can vary depending on pile type, pile size, substrate composition, and type of equipment used.

Single strike levels associated with different pile materials ranges in sound from 177 to 212 dB at 33 feet from pile driving (Caltrans 2015). Noise from installation of the anchor posts may cause fish to temporarily avoid the area immediately adjacent to the pile-driving activity. The mostly likely response is that fish would swim away from the area of noise. However, if a fish were to remain immediately next to an area with repeated pile driving, the noise has been found to affect oxygen uptake of fish and increase blood cortisol levels (e.g., Bruintjes et al. 2016). A recent laboratory study found as few as eight pile strikes caused swim bladder injuries to Striped Bass (Casper et al. 2017). Although these studies suggest noise can affect certain fish species, there are clearly species-specific differences concerning acoustical impacts.

<u>Alternative 1: Proposed Shoreline Plan</u>

Under Alternative 1, 2,116 new moorings; 10 public piers; 128 private piers; and two public boat ramps would be allowed, along with new dredging under specific circumstances. Construction activity could occur in areas of prime or marginal fish habitat, which are areas of the lake that fish individuals are most likely to occur and therefore areas where fish would be most likely to experience the effects from construction. Alternative 1 would continue the prohibition on new structures in stream mouth protection areas and would phase implementation of piers according to a schedule of permitting. Phased implementation of pier buildout would limit construction-related effects by preventing spatial or temporal clustering of construction activities. Similarly, it is expected that allocation of other shoreline structures, redevelopment of structures, and expansion of marinas would be naturally phased as the plan is implemented through buildout in year 2040.

Construction activities could result in behavioral and physiological effects on fish species, as well as mortality of individual fish. Specific construction-related effects on fish are dependent on the proximity of individuals to construction locations, the duration of construction activities, and the type of activity. Although construction locations, timing, and durations are not currently known, individual construction efforts would occur in a small area and over a short period. The construction footprint of a pier within the lakezone is relatively small due to pilings being placed by pile drivers which push the piling into the substrate but do not substantially disturb the substrate around the piling. A very conservative construction footprint was estimated to be an additional two-thirds of the area of the pilings. Under Alternative 1, approximately 12 piers would be constructed during each 2-year period. Conservatively, this would result in a likely maximum of 12 simultaneous pier constructions along the 72-mile shoreline. The construction footprint of structures would be exceedingly small relative to the

approximately 6,136 acres of prime fish habitat, and 7,706 acres of marginal fish habitat. Construction disturbance footprints for all shorezone structures can be measured in square footage of disturbance, while the amount of fish habitat is best measured in acres. Buoy placement would require almost no disturbance of substrate and would be almost entirely limited to the size of the anchor systems. Altogether, construction associated with full buildout of the Shoreline Plan would account for an estimated 0.005 percent of prime fish habitat, 0.004 percent of marginal fish habitat, and 0.002 percent of the total fish habitat (Table 5-4). This level of disturbance would be minor for all species considered.

Table 5-4 Construction Footprints for Piers and Ramps under Alternative 1

	Structure footprint (sq. ft.)	Estimated construction footprint (sq. ft.)	Construction in prime habitat (%)	Construction in marginal habitat (%)	Construction in all habitat types (%)
Piers (138)	2,084	3,126	0.0012	0.0009	0.0005
Buoys (2,006)	8,024	8,024	0.0030	0.0024	0.0013
Boat ramps (2)	1,500	3,001	0.0011	0.0009	0.0005
Total disturbance	**11,608**	**14,151**	**0.0053**	**0.0042**	**0.0023**

Note: Methodology for determining the construction footprint is described in Section 5.4.2, "Methods and Assumptions."

Source: Compiled by Ascent Environmental in 2018

Even though the overall construction footprint of buildout would be small, and would therefore have little impact on fish located in these areas, TRPA has provided resource protection provisions associated with the Shoreline Plan (Table 2-3), and requires regulatory resource protection measures per the *TRPA Best Management Practices Handbook* and the Standard Conditions of Approval for Shorezone Projects, including the following:

- implement pier design standards, to limit the size of piers and corresponding construction footprint;
- maintain stream mouth protection zones and establish shoreline preservation areas to help minimize disturbance in migration and rearing habitat;
- require use of turbidity curtains and caissons during pier pile installation; and
- require barges to carry a spill containment kit to minimize impacts associated with accidental chemical spills.

Lahontan Cutthroat Trout

Nearshore construction activities under Alternative 1 have little to no potential to adversely affect adult and subadult LCT because they occupy habitats near the lake bottom in deep waters through the year. Adult LCT occurrence in nearshore habitat would primarily occur during spawning migrations into tributary streams, which generally occurs from February through July. However, TRPA regulations require a 200-foot buffer limiting construction near stream mouths which would provide protection from potential construction impacts for migrating LCT.

Alternative 1 may affect YOY LCT, because YOY move into the vegetated nearshore environment of the lake after hatching in tributary streams. Construction-related effects to migrating YOY LCT would be minimal because: 1) they would move laterally along the shoreline, away from construction disturbance (i.e., turbidity or noise), to nearshore areas of the lake that are unaffected, and construction disturbance would be temporary in nature. Because LCT typically do not use nearshore habitats and because any construction-related impacts on LCT that may occur would be minor, construction activities in Lake Tahoe under Alternative 1 would not alter TRPA's threshold standard for LCT.

Mountain Whitefish

Adult and subadult mountain whitefish generally occupy habitats near the lake bottom in deep waters, with adults moving into nearshore habitat primarily during spawning migrations, which generally occurs from October through early December (outside the typical May 1 through October 15 construction period). YOY mountain whitefish move into the vegetated nearshore environment of the lake within several weeks of hatching. Construction-related effects to mountain whitefish would be minimal for the reasons effects on LCT would be minimal.

Lahontan Lake Tui Chub

Nearshore construction activities under Alternative 1 have the potential to affect Lahontan Lake tui chub. Adult Lahontan Lake tui chub spawn in nearshore environments and all life stages of the *pectinifer* subspecies spend time foraging in the nearshore environment. The *obesa* Lahontan Lake tui chub spends most of its life in the pelagic zone of the lake. Therefore, the *obesa* Lahontan Lake tui chub occurs only in the nearshore environment for spawning and for rearing during their first summer after hatching. Lahontan Lake tui chub egg incubation occurs in nearshore areas where eggs adhere to aquatic vegetation or the substrate, and thus construction activities here could result in mortality of a very small percentage of Lahontan Lake tui chub eggs. However, construction-related effects that could occur to Lahontan lake tui chub would be minimal because (1) adult and subadult *obesa* Lahontan Lake tui chub generally feed outside of the nearshore environment; (2) adult *pectinifer* Lahontan Lake tui chub forage in nearshore areas at night when construction activities would not coincide with foraging; (3) spawning generally occurs at night and in stream mouths, which would not be affected by construction; and (4) YOY fishes utilizing nearshore areas under construction would be expected to move laterally along the shoreline, away from construction disturbance (i.e., turbidity or noise).

Native Nongame Fish (Minnows, Sculpins, Suckers)

Native nongame fishes include Lahontan speckled dace, Lahontan redside shiner, Paiute sculpin, and Tahoe sucker. Although these species are native to Lake Tahoe, none are considered special-status species. Nearshore construction activities under Alternative 1 have the potential to affect native nongame fishes. Adult native nongame fishes all spawn in the nearshore environment and all, except for adult Paiute sculpin, spend most of their life in the nearshore environment. YOY Paiute sculpin feed in the nearshore environment, but as adults and subadults the species is more often associated with deep water aquatic macrophyte beds. Native nongame fish egg incubation occurs in nearshore areas, and thus construction activities here could result in mortality of a very small percentage of native nongame fish eggs. However, these effects would minimal because they would be temporary and affect a very small amount of the available habitat, and for the following reasons:

- Adult and subadult Paiute sculpin generally feed in deeper portions of the lake, outside of the nearshore environment.
- Adult Lahontan redside shiners, Lahontan speckled dace, and Tahoe suckers utilizing nearshore areas under construction would be expected to move laterally along the shoreline, away from construction disturbance.
- Adult Lahontan redside shiners and Lahontan speckled dace spawning typically occurs at night when construction activities would not occur.
- Adult Paiute sculpin and Tahoe suckers can spawn in stream mouths and tributaries, which would not be affected.

Coldwater Game Fish

Coldwater game fishes include lake trout, kokanee, brown trout, rainbow trout, and brook trout. Although these species are not native to Lake Tahoe and are not special-status species, they are important to recreational anglers. Adult coldwater game fish spawning and egg incubation would not be affected because these species spawn in tributary streams. Lake trout exclusively inhabit the pelagic, deep water areas of the lake year-round and would not be affected by nearshore construction activities.

Nearshore construction activities have little to no potential to adversely affect adult and subadult coldwater game fish because they generally occupy habitats in deep waters. Kokanee and brook trout occurrence in the nearshore habitat would primarily occur during spawning migrations into tributary streams and construction activity would not occur within 200 feet of stream mouths. Adult rainbow trout and brown trout use the nearshore environment at night for feeding and during their spawning migrations into tributary streams. These times and locations would not coincide with construction activities.

YOY coldwater game fish move into the vegetated nearshore environment of the lake after hatching in tributary streams and rear in nearshore habitats prior to moving into deeper water as they grow larger. However, these effects would minimal because YOY fishes would move away from construction disturbance, construction disturbance areas in fish habitat are very small (Table 5-4), and construction disturbance would be temporary in nature.

Warmwater Game Fish

Warmwater game fishes include largemouth bass, smallmouth bass, bluegill, crappie, and brown bullhead. These species are not native to Lake Tahoe and are popular recreational species in some areas of the lake (e.g., Tahoe Keys). Nonetheless, warmwater game fish are generally considered undesirable invasive species in Lake Tahoe and eradication programs are in effect and would continue under Alternative 1. Construction disturbance to warmwater game fish would not be considered an adverse environmental impact.

Summary of Alternative 1 Effects

All species evaluated could be susceptible to construction-related impacts under Alternative 1, except lake trout, which are not found in the nearshore. However, based on life history characteristics, habitat use for the species evaluated, resource protection provisions associated with the Shoreline Plan, additional avoidance and minimization measures implemented for the protection of fish and aquatic biological resources, significant adverse impacts would not be expected to occur to any of the lake's fish populations. Moreover, construction activities associated with placement of shorezone structures would be required to implement resource protection provisions (Table 2-3 in Chapter 2, "Description of Proposed Project and Alternatives"), and to adhere to the provisions of the Standard Conditions of Approval for Shorezone Structures and the *TRPA Best Management Practices Handbook*. The impacts from construction activities resulting from implementation of Alternative 1 would be **less than significant** for all species and guilds evaluated.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under Alternative 2, there would be no cap on the number of structures permitted; however, structure placement would be limited to areas outside of prime fish habitat and stream mouth protection areas. Estimated numbers of new structures include: 4,871 buoys; 1,897 slips; 476 piers; six boat ramps; two marinas, and 168 private boat lifts. Alternative 2 would maintain existing development standards.

Construction-related impacts under Alternative 2 would be similar to those identified under Alternative 1; however, impacts would likely occur more frequently and with greater intensity because more structures would be allowed. Additionally, Alternative 2 would not provide provisions for phased implementation of pier projects, which could result in many piers being constructed during a single season.

Estimated construction-related disturbance under Alternative 2 is presented in Table 5-5. The maximum area of disturbance estimated from construction of shorezone structures under Alternative 2 is 39,244 sq. ft. or about 0.01 percent of TRPA-designated marginal habitat, which constitutes 0.007 percent of all fish habitat.

Shorezone construction activities under Alternative 2 would have minimal potential to adversely affect the species considered in this impact for the same reasons discussed under Alternative 1. This would lead to a **less-than-significant** impact from construction-related activities on aquatic species.

Table 5-5 Construction Footprints for Piers and Ramps under Alternative 2

	Structure Footprint (sq. ft.)	Estimated Construction Footprint (sq. ft.)	Construction in Prime Habitat (%)	Construction in Marginal Habitat (%)	Construction in All Habitat Types (%)
Piers (476 multiple-use)	7,173	10,760	n/a	0.0032	0.0018
Buoys (4,871)	19,484	19,484	n/a	0.0058	0.0032
Boat ramps (6)	4,500	9,000	n/a	0.0027	0.0015
Total disturbance	**31,157**	**39,244**	**n/a**	**0.0117**	**0.0065**

Note: Methodology for determining the construction footprint is described in Section 5.4.2, "Methods and Assumptions."

Source: Compiled by Ascent Environmental in 2018

Alternative 3: Limit New Development

Under Alternative 3, new structures to be constructed include: 365 additional moorings, five new public piers; 86 additional private piers; and one new boat ramp. Like Alternative 1, marina expansion would be allowed under Alternative 3 if coupled with environmental improvements. Under Alternative 3, new structures would be allowed within TRPA-designated prime fish habitat but would be prohibited in stream mouth protection areas. The alternative would regulate the rate of new pier approvals to eight every 2 years, limiting the temporal and spatial effects from construction. While construction activities would occur in multiple areas and at different times, local increases in construction-related turbidity and noise could occur within the shorezone.

Construction-related impacts under Alternative 3 would be similar to those identified under Alternative 1. However, under Alternative 3 construction of shorezone structures would occur less frequently, and likely with less intensity than under Alternative 1 because Alternative 3 would permit fewer structures. Estimated construction-related disturbance under Alternative 3 is presented in Table 5-6. The maximum area of construction disturbance estimated from construction of shorezone structures under Alternative 3 is 4,757 sq. ft., or a maximum of 0.002 percent of prime fish habitat, 0.001 percent of marginal fish habitat, and 0.0008 percent of the total fish habitat.

Table 5-6 Construction Footprints for Piers and Ramps under Alternative 3

	Structure Footprint (sq. ft.)	Estimated Construction Footprint (sq. ft.)	Construction in Prime Habitat (%)	Construction in Marginal Habitat (%)	Construction in All Habitat Types (%)
Piers (91)	1,371	2,057	0.0008	0.0006	0.0003
Buoys (300)	1,200	1,200	0.0004	0.0004	0.0002
Boat ramps (1)	750	1,500	0.0006	0.0004	0.0002
Total disturbance	**3,322**	**4,757**	**0.0018**	**0.0014**	**0.0008**

Note: Methodology for determining the construction footprint is described in Section 5.4.2, "Methods and Assumptions."

Source: Compiled by Ascent Environmental in 2018

Shorezone construction activities under Alternative 3 would have minimal potential to adversely affect the species considered in this impact discussion for the same reasons discussed under Alternative 1. This would lead to a **less-than-significant** impact from construction-related activities on aquatic species.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers, and to reduce the overall number of existing shoreline structures. This alternative would allow 15 new public piers and no other new shoreline structures. The alternative would include transfer ratios that would allow some private shoreline structures to be removed and reconstructed in different locations with a 2:1 reduction in the number of structures (e.g., a new private pier could be constructed if two existing piers are removed). Alternative 4

would include the same pier construction timing, density, and design requirements as Alternative 3. Although only reconstruction projects and 15 new piers would be allowed under Alternative 4, it would be possible for increased turbidity and noise to occur within the shorezone during construction.

Construction-related impacts under Alternative 4 would be similar to those identified under Alternative 1. However, under Alternative 4 construction of shorezone structures would occur less frequently, and with less intensity than under Alternative 1 because Alternative 4 would permit fewer structures. Estimated construction-related disturbance under Alternative 4 is presented in Table 5-7. The maximum area of disturbance estimated from construction of shorezone structures under Alternative 4 is 339 sq. ft. or a maximum of 0.0001 percent of prime fish habitat, 0.0001 percent of marginal fish habitat, and 0.0006 percent of total fish habitat.

Table 5-7 Construction Footprints for Piers and Ramps under Alternative 4

	Structure Footprint (sq. ft.)	Estimated Construction Footprint (sq. ft.)	Construction in Prime Habitat (%)	Construction in Marginal Habitat (%)	Construction in All Habitat Types (%)
Piers (15 public)	226	339	0.0001	0.0001	0.00006

Note: Methodology for determining the construction footprint is described in Section 5.4.2, "Methods and Assumptions."

Source: Compiled by Ascent Environmental in 2018

Shorezone construction activities under Alternative 4 would have minimal potential to adversely affect the species considered in this impact discussion for the same reasons discussed under Alternative 1. This would lead to a **less-than-significant** impact from construction-related activities on aquatic species.

Mitigation Measures

No mitigation is required.

Impact 5-4: Permanent habitat modification

Permanent habitat modification could affect all species evaluated except lake trout because they do not utilize nearshore habitats. Impacts on species that could use nearshore habitats would be greatest on native nongame fish, including Lahontan Lake tui chub. Impacts on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, would generally be limited to YOY juveniles using nearshore areas for rearing. Under all Shoreline Plan alternatives, impacts resulting from permanent habitat modification would be small relative to TRPA-designated fish habitat, including prime fish habitat. Additionally, based on the life history characteristics and habitat use for the species evaluated, impacts would be minimal for any fish species. Therefore, implementation of the Shoreline Plan alternatives would be **less than significant** for all species evaluated.

The Shoreline Plan alternatives would result in the construction and placement of new shorezone structures, and redevelopment of existing structures in the shorezone. These new structures, including piers, buoys, boat slips, boat lifts, boat ramps, and marinas could cause permanent habitat modification, which could result in impacts on fish and aquatic resources. The primary impact mechanisms that could result in permanent habitat modification and result in impacts on fish and aquatic resources are direct habitat alteration, improved conditions for AIS, and changes to predator-prey interactions, as described below.

Direct Habitat Alteration

Placement of new structures, including piers, marinas, boat ramps, and mooring buoys would permanently alter the nearshore habitat of Lake Tahoe. Some new structures would result in the permanent loss of habitat (e.g., buoy anchors, boat ramps, and pier pilings) and some new structures would result in the permanent alteration of the habitat, such that habitat conditions would be expected to change from baseline conditions (e.g., overwater shading from piers).

Marina development would alter habitat by creating artificial channels that could reduce circulation, increase water temperatures, and create habitat for invasive species. Marinas in Lake Tahoe experience elevated water temperatures and changes in water quality due to a lack of mixing with open water, which results in habitat conditions that are suitable for nonnative warmwater invasive fishes and other invasive aquatic organisms.

Over-water structures, such as piers and docks, generally limit light available to phytoplankton and submerged aquatic vegetation, and thereby reduce primary productivity (Bryan and Scarnecchia 1992). Reduced available light is a beneficial effect for preventing the spread of invasive plants such as Eurasian Milfoil but could negatively affect the native macrophyte community. Additionally, native fish species, including Lahontan redside shiners are well adapted to ultraviolet radiation (UVR) intensities present in most of Lake Tahoe's nearshore area (Gevertz et al. 2012). Over-water structures introduce additional shade to the nearshore area, and thus could decrease optimal habitat in the immediate location of a shade-generating structure for native species such as Lahontan redside shiners that prefer clear nearshore waters for spawning.

Studies have shown that piers can result in a reduction in macroinvertebrate abundance (Garrison et al. 2005). Additionally, bass and other nonnative warmwater game fish species generally demonstrate an affinity for structural elements and utilize docks and piles for cover, in addition to vegetation (Kahler et al. 2000). If piers are installed in areas where water temperature conditions are suitable for warmwater game fish species, such as those found in marinas, warmwater species could colonize piers, docks, slips, and other structures and prey on native species using adjacent areas.

In many lakes, extensive macrophyte beds provide complex habitat for nearshore species. However, in Lake Tahoe rocky substrates also provide important habitat. Pier piles would remove substrate immediately where they are installed but would not broadly permanently remove large areas of substrate, so this complex habitat would still be available for nearshore fish species. Nonetheless, studies have shown that piers have limited to no impact on spawning by Lake Tahoe's native fish populations and that impacts can be mitigated by placing suitable substrates in other areas (Beauchamp et al. 1994a; Allen and Reuter 1996). Additionally, Beauchamp et al. (1994a) found that piers had no effect on densities of native nearshore fishes and that the shaded areas provided cover for some species.

Improved Conditions for AIS

Placement of new structures associated with the Shoreline Plan and alternatives could alter habitat such that it would provide improved conditions for AIS, which could result in permanent alterations to native species and recreationally important coldwater game fish species habitat use.

New surface areas and pilings would create shade and structural habitat for nonnative warmwater game fish, including largemouth bass and other sunfishes in Lake Tahoe's nearshore zone. Warmwater game fish in Lake Tahoe have less natural UVR protection than native fish such as Lahontan redside shiners (Gevertz et al. 2012; Tucker and Williamson 2014). A substantial nesting colony of bluegill occurs in the Tahoe Keys where extensive macrophyte growth and turbid waters provide nest shading. Researchers hypothesize that bluegill and bass need this type of shading to protect their larvae from UVR (Gevertz et al. 2012; Tucker and Williamson 2014). Structural features (natural or artificial) are also important for spawning bass (Kahler et al. 2000). For example, in Lake Sammamish, Washington, smallmouth bass were found to build nests close to piers or other artificial structures (Kahler et al. 2000). Additionally, structures provide cover that allows bass and other warmwater game fish to ambush prey. Specifically, these warmwater game fish are ambush predators, which utilize extensive cover to hide and attack unsuspecting prey.

Overall, placing structures in Lake Tahoe provides suitable shade and ambush habitat for warmwater game fishes if they would be located in areas where water temperatures are suitable for these species. However, warmwater game fish populations are primarily located in the Tahoe Keys where additional structures likely would not appreciably increase available habitat. Nonetheless, structures located near the smaller satellite populations of warmwater game fishes in other parts of the lake could provide additional suitable habitat for these species.

Because of their locations, design layouts, and the number and types of structures, marinas generally experience elevated water temperatures during the summer months. Additionally, water does not mix well between marinas and other parts of the lake. Marinas also experience higher densities of recreational boating use than many areas of the lake. Thus, marinas can facilitate the invasion of nonnative plants, crayfish, and other shellfish, which provide food and habitat for warmwater fish species (Chandra et al. 2009).

Lake Tahoe warmwater game species are currently supported by elevated temperatures and nonnative macrophytes, which occur more often in marinas than in other parts of the lake (Chandra et al. 2009). Tahoe Keys exemplifies how marinas lead to increased AIS. Largemouth bass, bluegill, and nonnative aquatic plant species, including Eurasian milfoil and curly leaf pondweed dominate the Tahoe Keys. The prevalence of these nonnative AIS has reduced the abundance and distribution of native species in the Tahoe Keys. Specifically, native minnows that were widespread in the Tahoe Keys have decreased substantially in abundance due to the expansion of suitable habitat for warmwater fishes (Chandra et al. 2009).

Construction of new marinas under Alternative 2, or expansion of existing marinas under alternatives 1 and 3 would be expected to promote increases in the abundance and distribution of warmwater game species by increasing thermal suitability of nearshore habitat for nonnative warmwater game fishes, reducing water circulation in the area, and allowing the colonization and spread of nonnative aquatic vegetation and shellfish. These effects would be reduced because existing AIS detection, control, and eradication efforts for warmwater predators would continue under all alternatives.

Altered Predator-Prey Interactions and Predation Potential

Shoreline development, including placement of piers, can alter predator-prey dynamics (Lange 1999) and reduce biological diversity (Garrison et al. 2005). Overwater manmade structures modify the behavior of both predator and prey species and, therefore, foraging and associated growth and survival can also be affected. Shade cast from over-water structures limits light available for photosynthesis, which could affect primary productivity that supports the food-web of nearshore fish species. For example, a study evaluating fishing pier impacts in lakes found that insect numbers were three times lower under piers compared to open sites away from piers (Garrison et al. 2005). Shade and other habitat changes created by piers can also alter the composition of invertebrate species by reducing abundances of larger species (Duffy-Anderson and Able 2001). Species such as salmonids can modify their prey choices based on prey abundance (Rondorf et al. 1990) but decreases in food sources due to shoreline development may reduce juvenile growth (Sobocinski et al. 2010). Reduced light also affects fishes' ability to detect prey (Munsch et al. 2014). For visual predators, such as salmonids, poor quality habitats under manmade structures can inhibit feeding and may suppress salmonid growth (Abel and Anderson 2005).

In-water structures offer multiple benefits for predatory fishes. Artificial structures placed within a lake's littoral zone can benefit ambush or habituation foraging strategies for warmwater game fishes. New surface areas and pilings would create shade, which provides overhead cover and allows predatory fish to remain hidden. Shaded areas increase a predator's capture efficiency by creating a light/dark interface that allows ambush predators to remain in a darkened area and watch for prey to swim against a bright, highly visible background. Predators are able to see sunlit prey more than 2.5 times as far as a sunlit fish are able to see into a shaded area (Helfman 1981). Therefore, juvenile salmonids and small native fishes face increased predation pressures when swimming around these structures (Kahler et al. 2001). Furthermore, native predators such as piscivorous birds can also benefit from the overwater structures, which creates additional predatory pressures on native fishes and coldwater game species.

Alternative 1: Proposed Shoreline Plan

Under Alternative 1, two boat ramps 2,116 moorings; and 138 piers could be constructed in the shorezone. While the total number of allowed moorings is 2,116, it is estimated that approximately 100 of these would be slips and boat lifts, which would be installed in existing marinas (boat slips) and on piers (boat lifts), reducing potential impacts on fish habitat. New structures would be allowed within TRPA-designated prime fish habitat; however, the prohibition on new structures in stream mouth protection areas would be maintained. Alternative 1 would also provide incentives to encourage the relocation of existing piers from

stream mouth protection areas, by allowing relocated single-use piers to qualify for multiple-use design standards and offering upland scenic credits.

Structures would increase shaded habitat by 0.77 acre, which is approximately 0.01 percent of available TRPA-designated prime fish habitat or 0.005 percent of all available TRPA-designated habitat types. Substrate loss would be limited to the area of the piles for each pier, anchors for each buoy, and area of each boat ramp. These areas of permanent disturbance are very small (Table 5-4) and would have an extremely small effect in terms of the overall habitat acreage for all fish species considered below.

If new structures are proposed in areas designated by TRPA as prime fish habitat, an applicant would be required to replace affected substrate at a 1.5:1 ratio. Substrate replacement could occur on-site or elsewhere, adjacent to existing prime fish habitat and would involve the creation of physical habitat by placing gravel, cobble, or boulder substrate. Replaced substrate would be of the same type as that affected by the Shoreline Plan.

Lahontan Cutthroat Trout

Nearshore structures under Alternative 1 have little to no potential to adversely affect adult and subadult LCT because they occupy deep, open water habitats except during spawning migrations to tributary streams. Alternative 1 may affect YOY LCT, because YOY move into the vegetated nearshore environment of the lake after hatching in tributary streams. These effects to migrating YOY LCT would be minimal because the area of habitat disturbance would be very small relative to the available habitat and for many of the same reasons that construction-related effects would be minimal (see Impact 5-3).

Mountain Whitefish

Nearshore structures under Alternative 1 have little to no potential to adversely affect adult and subadult mountain whitefish because they occupy deep, open water habitats except during spawning migrations to tributary streams. Alternative 1 may affect YOY mountain whitefish, because YOY move into the vegetated nearshore environment of the lake after hatching in tributary streams. These habitat modification-related effects to YOY mountain whitefish would be minimal because the area of habitat disturbance would be very small relative to the available habitat and for many of the same reasons that construction effects would be minimal (see Impact 5-3).

Lahontan Lake Tui Chub

Nearshore structures under Alternative 1 have the potential to affect Lahontan Lake tui chub. Adult Lahontan Lake tui chub spawn in nearshore environments and all life stages of the *pectinifer* subspecies spend time foraging in the nearshore environment. The *obesa* tui chub spends most of its life in the pelagic zone of the lake. Therefore, the *obesa* tui chub occurs only in the nearshore environment for spawning and as foraging and rearing YOY. Nearshore structures could affect rearing YOY Lahontan Lake tui chub These habitat modification-related effects to Lahontan Lake tui chub would be minimal because the area of habitat disturbance would be very small relative to the available habitat and for many of the same reasons that construction effects would be minimal (see Impact 5-3).

Native Nongame Fish (Minnows, Sculpins, Suckers)

Native nongame fishes include Lahontan speckled dace, Lahontan redside shiner, Paiute sculpin, and Tahoe sucker. Although these species are native to Lake Tahoe, none are considered special-status species. These fish species are part of the nearshore assemblage and spend portions of their life cycle in the nearshore environment, including spawning. Adult native nongame fishes all spawn in the nearshore environment and all but adult and subadult Paiute sculpin spend most of their life in the nearshore environment. YOY Paiute sculpin feed in the nearshore environment, but as adults and subadults the species is more often associated with deep water aquatic macrophyte beds. Nearshore structures could affect native nongame fish species but these effects would be minimal because the area of habitat disturbance would be very small relative to the available habitat and for many of the same reasons that construction effects would be minimal (see Impact 5-3).

Coldwater Game Fish

Coldwater game fishes include lake trout, kokanee, brown trout, rainbow trout, and brook trout. Lake trout exclusively inhabit the pelagic, deep water areas of the lake year-round and would not be affected by nearshore structures. Nearshore structures generally have little to no potential to adversely affect adult and subadult coldwater game fish because they generally occupy habitats in deep waters. Kokanee and brook trout occurrence in nearshore habitat would primarily occur during spawning migrations into tributary streams. Adult rainbow trout and brown trout use the nearshore environment at night for feeding and during their spawning migrations into tributary streams.

YOY coldwater game fish move into the vegetated nearshore environment of the lake after hatching in tributary streams and rear in nearshore habitats prior to moving into deeper water as they grow larger. Nearshore structures could affect foraging adult rainbow trout and brown trout, and other coldwater game fish rearing YOY, Overall, these habitat modification-related effects to coldwater game fish would not be substantially adverse to the lake's coldwater game fish populations because the area of habitat disturbance would be very small relative to the available habitat and for many of the same reasons that construction effects would be minimal (see Impact 5-3).

Summary of Alternative 1 Impacts

Permanent habitat modification under Alternative 1 could affect all species evaluated except lake trout, which do not utilize nearshore areas where shoreline structures would occur. However, based on the relatively small amounts of permanently modified habitat, a 1.5:1 habitat replacement for prime fish habitat, life history characteristics and habitat use for the species evaluated, significant adverse impacts would not be expected to occur to any of the lake's fish populations. Effects resulting from permanent habitat modification under Alternative 1 would not:

- reduce the ability to attain or maintain TRPA threshold standards for LCT, lake habitat, or AIS;
- substantially change the diversity or distribution of any fish species in Lake Tahoe;
- reduce the number or viability of any fish species in Lake Tahoe;
- result in a barrier to any fish species movement in Lake Tahoe; or
- substantially reduce the suitability of available habitat for any fish species in Lake Tahoe.

Based on the findings above, Alternative 1 would result in a **less-than-significant** impact for all fish species and guilds evaluated.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under Alternative 2, new structures would include an estimated 4,871 buoys; 1,897 slips; 476 piers; six boat ramps; two marinas, and 168 private boat lifts, all of which would be placed outside of prime fish habitat and stream mouth protection areas.

The effects of permanent habitat modification associated with structures constructed under Alternative 2 would be similar to those identified under Alternative 1. However, under Alternative 2, placement of structures in TRPA-designated prime fish habitat would not be allowed. Nonetheless, under Alternative 2 impacts associated with permanent habitat modification would be greater than under Alternative 1 because Alternative 2 includes more structures and does not include many of the resource protection provisions included under Alternative 1.

Some effects resulting from permanent habitat modification under Alternative 2 could occur to all species evaluated except lake trout, which do not utilize nearshore areas where shoreline structures would occur. Effects resulting from permanent habitat modification under Alternative 2 would be largely the same as those listed in the summary of Alternative 1, above; therefore, Alternative 2 would be **less than significant** for all species and guilds evaluated.

Alternative 3: Limit New Development

Under Alternative 3, new structures would include: 365 additional moorings, five new public piers; 86 additional private piers; and one new boat ramp. Like Alternative 1, marina expansion would be allowed if

coupled with environmental improvements. Under Alternative 3, new structures would be allowed within TRPA-designated prime fish habitat. However, there would continue to be a prohibition on new structures in stream mouth protection areas.

Impacts associated with placement of structures in the nearshore would be minimized because all piers would be required to comply with pier design and density standards. Additionally, new structures would be prohibited in stream mouth protection areas and Alternative 3 would provide new incentives to encourage the relocation of existing piers from stream mouth protection areas by allowing relocated single-use piers to qualify for multiple-use design standards, and by offering upland scenic credits for relocated piers.

Structures would increase shaded habitat by 0.77 acre, which is approximately 0.01 percent of available TRPA-designated prime fish habitat or 0.005 percent of all available TRPA-designated habitat types. Substrate loss would be limited to the area of the piles for each pier, anchors for each buoy, and area of each boat ramp. These area of permanent disturbance is very small (Table 5-6) and would have an extremely small effect in terms of the overall habitat acreage for all fish species considered.

If new structures are proposed in areas designated by TRPA as prime fish habitat, an applicant would be required to replace affected substrate at a 1.5:1 ratio. Substrate replacement could occur on-site or elsewhere adjacent to existing prime fish habitat and would involve the creation of physical habitat by placing gravel, cobble, or boulder substrate. Replaced substrate would be of the same type as that affected by the structure.

Some effects resulting from permanent habitat modification under Alternative 3 could occur to all species evaluated except lake trout, which do not utilize nearshore areas where shoreline structures would occur. Effects resulting from permanent habitat modification under Alternative 3 would be the same as those listed in the summary of Alternative 1; therefore, the impact of Alternative 3 would be **less than significant** for all species and guilds evaluated.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow 15 new public piers and no other new shoreline structures. The alternative would include transfer ratios that would allow some private shoreline structures to be removed and reconstructed in different locations, as long as the project resulted in a 2:1 reduction in the number of structures.

Although specific locations of structures are not currently known, new structures including piers would generally be distributed around the lake and not located closely together in specific areas. No new buoys, boat ramps, boat slips, boat lifts, or marinas would be placed in Lake Tahoe under Alternative 4.

Structures would increase shaded habitat by 0.77 acre, which is approximately 0.01 percent of available TRPA-designated prime fish habitat or 0.005 percent of all available TRPA-designated habitat types. Substrate loss would be limited to the area of the piles for each pier, anchors for each buoy, and area of each boat ramp. These area of permanent disturbance is very small (Table 5-7) and would have a vanishingly small effect in terms of the overall habitat acreage for all fish species considered. Impacts associated with placement of piers in the nearshore would be minimized because all piers would have to comply with pier design and density standards. Additionally, new piers would be prohibited in stream mouth protection. If new piers are proposed in prime fish habitat, an applicant would be required to replace affected substrate at a 2:1 ratio.

Some effects resulting from permanent habitat modification under Alternative 4 could occur to all species evaluated except lake trout. Effects resulting from permanent habitat modification under Alternative 4 would be the same as those listed in the summary of Alternative 1; therefore, the impact associated with Alternative 4 would be **less than significant** for all species and guilds evaluated.

Mitigation Measures

No mitigation is required.

Impact 5-5: Recreation-related impacts

Recreational activities could affect all species evaluated. Effects on species that could use nearshore habitats would be greatest on native minnow species that spawn in nearshore areas, including Lahontan Lake tui chub. Effects on special-status salmonids, including LCT and mountain whitefish, as well as other coldwater game fish species, could occur to adults that utilize open waters of the lake and to YOY juveniles using nearshore areas for rearing. Spawning and egg incubation of special-status salmonids and other coldwater game fish species would not be affected since these species spawn in tributary streams or deep in the lake where they would not be affected by increased boating or recreational angling. Effects under Alternative 2 would be greatest because it would allow the largest number of structures and two new marinas. Thus, under Alternative 2 the capacity for recreational activities such as boating and angling would be highest. Effects under Alternative 4 would be the least because it contains the least number of structures and no increases in boating, relative to baseline. Recreation-related effects under Alternative 1 and Alternative 3 would be intermediate between Alternatives 2 and 4. However, under all the alternatives, recreation-related effects resulting from increased recreational angling and/or boating would be small. Based on the life history characteristics and habitat use for the species evaluated, recreation-related effects would be **less than significant** for all alternatives.

The Shoreline Plan alternatives would result in an increased number of shoreline structures, relative to the baseline. These new structures could increase the number of people that utilize the lake for recreational activities such as angling and boating. The number of shoreline structures (boat ramps and associated parking, buoys, boat lifts, and slips) limits the total capacity for day-use and moored boats on Lake Tahoe. As such, implementation of the Shoreline Plan alternatives would result in differing levels of increased motorized boat use and angling depending on the number of new structures authorized by each alternative. These increases in recreational angling and boating activity could potentially result in affects to fish and aquatic resources in Lake Tahoe. The primary impact mechanisms that could result in recreation-related impacts from increases in boating are increased polycyclic aromatic hydrocarbon (PAH) generation from burning of fuel in boat motors, noise disturbance, propeller strikes and entrainment of fishes, lake bed disturbance, and shoreline parking. The primary impact mechanisms that could result from increased recreational angling are direct harvest, hooking mortality, and water quality effects associated with increased trash and contaminants. In addition, increased boat usage on the lake would result in increased occurrence of boat propellers cutting invasive aquatic macrophytes into fragments that then drift with surface currents to become established elsewhere in the lake. However, this potential impact of the project was assessed separately under Impact 5-1. Each of these impact mechanisms are described in detail below.

Boating

Boat use on Lake Tahoe is seasonal, with nearly all boating activity occurring between May 1 and September 30. Boat use is greatest during summer weekends, with peak boat use occurring during the Independence and Labor Day holiday weekends. Motorized watercraft generally includes powerboats, fishing boats, pontoon boats, and jet skis (Alexander and Wigart 2013). Nonmotorized watercraft generally includes kayaks, stand-up paddle boards, and peddle boats. Along most of Lake Tahoe's nearshore there is no restriction on the size or number of boats allowed. Based on a review of boat registration data and boat inspections conducted during 2015 (the most recent year for which data is available), an estimated total of 13,617 separate motorized watercraft operated on Lake Tahoe at some point during the 2015 boating season (TRPA 2016b).

Polyaromatic Hydrocarbon Generation

Motorized boating can lead to release of petroleum products into the water. Byproducts, from fuel combustion in powered recreational watercraft, can enter the water column through exhaust fumes and other petroleum products can enter the water through direct spills. These petroleum products and combustion byproducts can cause effects to aquatic biota when present at sufficiently high concentrations. The gaseous and particulate phase of exhaust contains hundreds of harmful chemical compounds, including hydrocarbons, carbon oxides, sulfur oxides, nitrogen oxides, and particulate matter. Even at concentrations as low as 1 microgram per liter (Jacobson and Boylan 1973) these chemicals can affect fish by causing liver damage, internal and external lesions, suppression of the immune system, reduction in oxygen uptake

efficiency, and, disruption in digestive functions (Balk et al. 1994; Arkoosh et al. 1998; Rudolph et al. 2002; Whitfield and Becker 2014). Tjarnlund et al. (1995, 1996) reported that rainbow trout exposed to low levels of engine exhaust faced sublethal interferences of cellular and physiological processes.

Some of the most significant polluting contaminants of petroleum are the known carcinogens and mutagens, PAHs. PAHs are a group of hydrophobic organic compounds released during the incomplete combustion of fossil fuels, an inherent problem with commonly used two-stroke engines (Mastran et al. 1994). To reduce noise and odor from two-stroke engines, most engine exhaust is emitted directly into the water, thereby efficiently transferring PAHs into the water column. Several studies have linked PAH increases to summertime boat activity (Miller et al. 2003; Lico 2004).

Prior to 1999 most two-stroke vessel engines were carbureted. These high-emission engines have since been replaced with direct fuel injected engines which release much lower levels of gasoline and PAHs into the water. TRPA enacted an ordinance to reduce PAHs, and the only engines currently allowed on Lake Tahoe are four-stroke and direct fuel injection two-stroke engines that meet the U.S. Environmental Protection Agency 2006 emission standards (Lico 2004). However, while the newer direct fuel injected engines offer some benefit with PAH release compared with the older two-stroke engines, significant PAH's are still released by fuel injected two stroke engines. Kado et al. (2000) compared particulate matter emissions from four-stroke engines, direct injection (2-stroke/DI), and carbureted (2-stroke/C) engine during a 67-minute test period. The total amount of PAHs released during the test period was less than 27 micrograms (µg), 3,600 µg, and 1,900 µg for the 4-stroke, 2-stroke/DI and 2-stroke/C engines, respectively. Further, Lico (2004) found PAH concentration and distribution in Lake Tahoe waters were comparable before and after the ban of carbureted two-stroke engines.

Compared to their solubility in water, PAHs are significantly more soluble in organic materials (Klaassen 1996, cited in Miller et al. 2003). Further PAHs have a very short half-life, most less than a day, so they are unlikely to accumulate in the water column. Thus, PAHs tend not to be found in open water and primarily accumulate in sediments, particulate organic matter and bioaccumulate in living organisms, or experience chemical and biological degradation (Rand and Petrocelli 1985, cited in Miller et al. 2003; Meador et al. 1995; van Metre et al. 2000). PAH exposure has been shown to affect the early life stages of many organisms. Due to the accumulation of PAHs in sediment, fish nesting in substrates and sediments may be exposed to PAHs when spawning, as are their eggs.

Because PAHs are easily and rapidly absorbed by organisms, chronic input of PAHs in the same locale, even in low concentrations, may have detrimental effects to juvenile fish (Moles and Marty 2005). Dietary exposure to PAHs has been found to cause liver stress and tumors in rainbow trout (Hyötyläinen and Oikari 1999; Black et al. 1988; Laycock et al. 2000). Bioaccumulation of PAHs have also been found to cause an altered energy balance and reduction in fish weight (Meador et al. 2006; Blanc et al. 2010). The main route of PAH exposure for salmonids is through contaminated prey sources that accumulate PAHs from sediments (i.e., benthic macroinvertebrates, plankton, and other fishes; Johnson et al. 2007). Because PAHs are strongly correlated with sediments, the planktonic pathway may be less of a PAH vector than benthic food sources. Benthic feeders such as the Tahoe sucker, the *obesa* tui chub, and speckled dace frequently come in contact with sediments that contain sediment-adsorbed hydrophobic pollutants and consume benthic invertebrates that may have bioaccumulated PAHs over time. Thus, benthic feeders and piscivorous fish may be at higher risk of PAH exposure than planktonic feeders.

In Lake Tahoe, PAH compounds and their concentrations were found to be highest during summer in areas where boat activity is highest (Lico 2004). Thus, increased PAH inputs are expected with increased boat activity. However, several studies have found that PAHs occur in Lake Tahoe only in extremely low concentrations, except in the Tahoe Keys area, when compared to state and federal standards (Lico 2004; Rowe et al. 2009). Lico (2004) concluded that even with PAHs continuing to enter the lake from boating and other activities, the concentrations are sufficiently low as to pose no toxicity threat to organisms, except potentially in the Tahoe Keys area (Lico 2004). Even with increased future boating activity, PAHs are expected to remain low in Lake Tahoe due to a greater percentage of powered watercraft changing to the lower emission four-stroke engines over time.

Noise Disturbance

TRPA has strict laws on powerboat noise levels, requiring engines to have a maximum noise of 90 A-weighted decibels (dBA) (i.e., the relative loudness of sounds in air pressure as perceived by the human ear) for boats manufactured before January 1, 1993 and 88 dBA for boats manufactured after January 1, 1993 (TRPA 2016a). As discussed above for construction-related impacts, the effects of noise on fish remains poorly studied. Nonetheless, studies suggest that motorboat noise can affect certain fish species. For example, in one study, motorboat noise elevated stress and reduced anti-predator responses of small fish (Simpson et al. 2016). Boat noise may also affect foraging efficiency and energy expenditure (Bracciali et al. 2012). Noise emanating from powerboats also can temporarily reduce auditory sensitivity of some fish species (Scholik and Yan 2002) and interfere with signals that affect communication, behavior, and fitness (Popper and Hastings 2009; Purser and Radford 2011).

Boat noise-related responses vary by species. For example, during the onset of boat noise, smallmouth bass demonstrated a startle response, where they moved from a stationary position to swimming (Pucylowski 2013). Motorboats caused Roach to have higher swimming speeds and to increase their use of the central part of a lake during boating disturbances (Jacobsen et al. 2014). In contrast, in the same study, motorboat noise did not change the behavior of Perch or Pike. Repeated boating noise also did not affect hatching success, fry survival, or growth of the cichlid fish *Neolamprologus pulcher* (Bruintjes and Radford 2014). Studies suggest repeated exposure to noise increases the noise tolerance of certain fish species (Nedelec et al. 2016). As concluded above in the discussion of construction-related impacts (i.e., Impact 5-3) species-specific differences in noise responses exist. Nonetheless, boat noise-related effects on fish in Lake Tahoe could potentially occur.

Propeller Strikes and Entrainment

Increased boating could result in effects to fishes as a result of propeller strikes and entrainment (i.e., capture of organisms in a turbulent flow). Changes in pressure, shear forces, acceleration or deceleration, and direct impacts have the potential to cause injury or mortality to fishes if they encounter boat propellers. Fish mortality caused by physical contact with boat hulls and propellers of small powerboats is rare, but recreational boats operated at high speeds can kill fish (USACE 2004). There have been some reports of fish wounds from powerboat collisions, yet few studies on this topic have been published. It is assumed larger fish are more at risk of direct strikes (Killgore et al. 2011), but it has not been determined how different size classes of fish may be affected (Whitfield and Becker 2014).

Boat propellers may also entrain fish eggs, larvae, invertebrates, phytoplankton and zooplankton, and as a result have more potential to affect fishes indirectly via impacts on food resources than direct propeller strikes (Miranda and Killgore 2013). Therefore, increased boating activity could increase the potential for adverse effects to fish through entrainment of their forage species, such as zooplankton and *Mysis* (Wolter and Arlinghaus 2003; Bickel et al. 2011). However, entrainment from boat propellers is difficult to measure because organisms killed or injured in this manner show no visible scars. The amount of water entrained by a propeller is related to the propeller diameter, the pitch and the slip. Larger boats (Table 5-8) entrain more water and are more dangerous to aquatic biota than smaller boats.

Table 5-8 Characteristics of Recreational Boats

Boat Class	Typical Power	Average Speed (mph)	Typical Propeller Diameter (in)	Typical Propeller Pitch (in)	Typical Propeller Slip	Water Entrained (m^3/mile traveled)	Water Entrained (m^3/s)
Fishing boat	50-hp outboard	16.6	12.25	15	0.3	174	0.08
Pontoon	50-hp outboard	12.3	13	11	0.35	212	0.72
Medium powerboat	100- to 300-hp inboard/outboard	22.8	14	19	0.26	216	1.37
Large cruiser	200- to 500-hp inboard	20	17	17	0.28	329	1.83

Lake Tahoe has an existing 600-foot no-wake zone from the shore around the entire lake and includes a posted speed limit of 5 miles per hour (mph) within the no-wake zone. Boats traveling at a low speed (e.g., ≤5 mph) reduce potential for propeller strikes and entrainment of fish (USACE 2004; Killgore et al. 2011). Fish, such as salmonids and minnows that utilize surface waters may be at higher risk of collision with a propeller than benthic dwelling fish such as *obesa* tui chub, suckers, and catfish. Yet, boats would be moving slowly (less than 5 mph) when utilizing nearshore waters, therefore, direct contact or entrainment in nearshore areas is expected to occur infrequently. However, when boating occurs away from the restricted speed zones, direct hits and entrainment have increased probability of occurrence due to higher rates of speed, but fish densities near the surface away from the nearshore zone are generally lower than that within the nearshore zone. Hence, direct contact or entrainment in open water areas of the lake also are expected to occur infrequently.

Bed Disturbance

Powerboat activity can cause resuspension of bed sediments from boat wakes or direct boat contact. Re-suspension of lake bottom sediments creates turbidity, which decreases water clarity and causes direct effects on fishes in the vicinity of the disturbance. However, this effect usually occurs only in the short term.

Resuspension allows sediments to release nutrients and exposes previously buried sediments and pore water (i.e., water held in interstitial spaces between sediment particles). The exposure of deeper sediments, suspension of fine sediments, and release of pore water results in discharges of nutrients to the waters of Lake Tahoe that often exceed water quality objectives for the lake, and sometimes exceed water quality surface discharge standards (TRPA 2004:5-11).

If bed sediments are contaminated, bed disturbance can cause toxins adhering to sediments to enter the food chain as the toxins become available to benthic organisms. Toxins that are disturbed and become resuspended in the water column also become directly available to pelagic organisms. Thus, disturbance of bottom sediments is a potential pathway for toxins to enter the food chain. Exposure to toxins through food resources has potential to cause bioaccumulation of toxins in fish species. Effects of toxins would depend on types and concentration of the toxins in disturbed sediments. Toxins that may potentially occur in sediments within Lake Tahoe include metals, PAHs, PCBs, and other anthropogenic contaminants (Datta et al. 1998; Heyvaert et al. 2000).

Shoreline Parking

There are numerous piers, slips, marinas, and docks along the lake that provide boat parking. However, some boaters choose to park their boats along the shoreline. Shoreline parking occurs more frequently on busy boating days (i.e., summer holiday weekends) when boat parking structures are full. When parking on the shoreline, boaters generally prefer parking on sandy areas instead of gravel or rocky substrate. Parking on the shoreline can potentially crush eggs or disrupt juveniles or spawning adults. Tui chub are the only fish that spawn in shallow water sandy habitats; however, they are night spawners. Further, tui chub do not build nests and their eggs are not necessarily concentrated into one area (Moyle 2002). Therefore, the likelihood of any given boat crushing numerous fish eggs when it parks in sandy areas is generally low. Nonetheless, tui chub eggs would be subject to movement by wave and wake motion created by boats.

Although sandy beach areas are the most likely shoreline location for boaters to park, on busy days boats may park in high demand areas with rocky substrates. A study in Lake Tahoe on Lahontan redside shiners and Lahontan speckled dace found that shoreline boat parking affected fish only during extreme disturbance days (i.e., Independence Day or Labor Day) (Allen and Reuter 1996). Although Lahontan redside shiners and Lahontan speckled dace typically spawn after dark, the study found that fish occasionally spawn during daytime hours. Thus, boat parking may occasionally disrupt spawning Lahontan redside shiners and Lahontan speckled dace. Allen and Reuter (1996) found a significant drop in egg survival occurred at one spawning site during the Independence Day weekend at a location where boating activity was unusually high. Many boats were parked along the nearshore and were subjected to wakes from boats coming and leaving the area, which caused beached boats to rock and bounce on eggs incubating in the nearshore substrate.

Recreational Angling

Increased recreational angling could occur directly from placement of new shoreline structures, as well as from boats and other watercraft. The placement of piers and increased boating in Lake Tahoe is expected to lead to increased fishing pressure on warmwater game fish, coldwater game fish, and native nongame species. Current fishing regulations would continue to apply the daily limit of five game fish harvested per day, two of which can be lake trout, to anglers. Anglers can have up to 15 mountain whitefish in possession per day. Increased angling may also increase effects on native nongame fish populations such as Lahontan Lake tui chub and Lahontan redside shiners because these fish are used as bait. Increased fishing pressure may also benefit species of concern and coldwater game species through increased harvest of predatory warmwater sport fishes (e.g., largemouth bass and sunfishes).

Increases in fishing pressure may cause increased hooking mortality of coldwater and warmwater game species. Catch-and-release of gamefish is a common recreational practice in Lake Tahoe. Catch-and-release fishing, using hook and line, releases live fish back to waters where they were captured and assumes fish will survive the event unharmed (Arlinghaus et al. 2007). However, significant mortality can result from catch-and-release fishing. Two predominant factors cause hooking mortality: 1) physiological stresses caused by struggle, landing time, handling time, and exposure to air during hook removal and release and, 2) injuries caused by the hook. Hook wounds may appear minor to anglers but damage to gills, throats, eyes or internal organs can be fatal. Hooking injuries, such as eye damage can affect feeding because visually impaired fish could lose the ability to forage competitively and avoid predators (Wright 1972). Infection from pathogens also can occur in hook wounds and lead to reduced immune function and eventual mortality. Mortality from physiological stresses is difficult to identify, but stress can cause fish to become vulnerable to disease, parasites, and predators (Snieszko 1974; Esch et al. 1975).

Estimates of hooking mortality rates are based primarily on immediate or short-term mortality. Because it is difficult to correlate latent mortality to hooking-related physiological stresses, rates are likely higher than those in published studies. A number of factors affect hooking mortality such as the size of a fish, lure type, temperature, hooking location on the fish, and environmental conditions. Use of artificial lures, rather than bait, consistently lowers mortality rates because fish are almost always hooked in areas of the mouth or jaws not contacted by blood vessels (Hooten 2001). Because larger fish are more difficult to handle, higher handling related mortality would be expected with larger fish (Muoneke and Childress 1994).

Warmer water leads to higher activity levels, resulting in longer hooked periods (i.e., longer time to land a hooked fish), energy expenditures, and subsequent build-up of lactic acid and stress hormone levels. For example, rainbow trout hooking mortality rose nearly 50 percent in water temperatures greater than 21°C (Titus and Vanicek 1988). Similarly, cutthroat trout hooking mortality increased as temperatures rose from 3 to 17°C (Titus and Vanicek 1988). Because higher water temperatures are directly correlated with increased hooking mortality (Titus and Vanicek 1988; Wilkie et al. 1996), and nearshore fish are exposed to warmer temperatures in summer months, nearshore species may be more vulnerable to hooking mortality than estimates from previously published studies. Coldwater game fish typically utilize the hypolimnion during the summer, and thus, they would not be exposed to warmer temperatures in the nearshore. However, coldwater game species residing deep within the lake that, once hooked, may be brought to the surface rapidly can also experience adverse physiological effects. Such effects are due to the rapid changes in pressure experienced by the fish as it is reeled from the depths to the boat over a short period of time.

Although studies have investigated fish hooking mortality, none have been conducted in Lake Tahoe. However, hooking mortality studies have been conducted for many fish species that occur in Lake Tahoe. Among salmonids, hooking mortalities range from 0 to 57 percent for brook trout, 0 to 28 percent for brown trout, 0.3 to 48.5 percent for cutthroat trout, 6.98 to 14 percent for lake trout, and 1 to 95 percent for rainbow trout (Muoneke and Childress 1994). Hooking mortality is similar for warmwater species. Studies have found hook mortalities range from 0 to 77 percent for crappies, 0 to 88 percent for bluegill, 3.2 to 40.5 percent for largemouth bass, and 0 to 47.3 percent for smallmouth bass (Muoneke and Childress 1994; Alumbaugh 1996).

Water Quality Effects Associated with Increased Trash and Contaminants

When piers are used for recreational purposes, pollutants, such as liquid and solid waste, could be introduced into the lake. It is also possible that this increased use of the near-shore environment by recreational anglers and boaters would lead to trash entering the surrounding waterways. Potential pollutants may include fish carcasses, food scraps, and plastics. Increased boating can also lead to increased trash and contaminants entering the open waters of Lake Tahoe. The magnitude of potential biological effects resulting from the intentional or unintentional release of pollutants and trash into nearshore and pelagic environments depends the type, amount, concentration, and solubility of the contaminant; and the timing and duration of the waste entering the water body.

There is also the possibility of plastics entering water bodies adjacent to piers or from boating either through intentional discard or accidental release. Plastics are the most common litter in U.S. water bodies, so it is reasonable to assume an increase in plastics entering Lake Tahoe could occur due to increased recreation. Plastic cups, plastic bags and wrapping materials, fast-food wrappers, bottles, and other containers can harm fish through strangulation or consumption. Under environmental conditions larger plastic items can also degrade to microplastics (fragments typically smaller than 5 mm in diameter). Microplastics can then be ingested by aquatic organisms such as fish and may act as vectors for organic pollutants commonly found in plastics (Zarfl et al. 2011). It is reasonable to assume any pollutants or trash would be locally constrained and the volume of the contaminants resulting from spills or dumping would be very small, relative to the amount of surrounding water.

Alternative 1: Proposed Shoreline Plan

Under Alternative 1, new structures would increase recreational activities such as boating and angling in Lake Tahoe. Boating activity would increase by an estimated 16 percent annually. Compared to baseline conditions this would include approximately 765 additional boat trips on a peak day (i.e., summer holiday weekend) and approximately 38,200 additional annual boat trips. Because recreational activities would primarily occur in the summer, impacts would be limited to summer months (May 1 through September 30). Increased boating and other recreational activities could result in behavioral and physiological effects, as well as mortality of individual fish.

Because the specific relationship between increased boating and recreational angling is not known, it is not possible to quantify the amount of additional recreational angling that would occur from increased boating-related activity. Additional recreational angling associated with increased structures also could occur, but the amount of increased angling that could occur due to greater access from shoreline structures is also is not known.

Specific recreation-related effects are dependent on the proximity of individual fish to recreational activities and species-specific responses to increased watercraft activity and recreational angling. Although specific locations of structures are not currently known, new structures including piers, buoys, and boat ramps would generally be distributed around the lake, and not located closely together in specific areas. Thus, new locations for recreational angling would be distributed around the lake, and increased recreational angling resulting from the alternatives would not be concentrated in a specific area of the lake.

Impacts associated with increased boating and recreational fishing would be minimized because of the resource protection measures associated with the Shoreline Plan (Table 2-4 in Chapter 2, “Description of Proposed Project and Alternatives”), which would include the following:

- Boat inspectors would educate watercraft owners and operators during boat inspections about the no-wake zone and appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations to prevent discharges into the lake, and appropriate engine tuning and propeller selection to reduce emissions during high-elevation boating.

- Staff at marinas and motorized watercraft rental concessions would receive training on appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations, and appropriate engine tuning and propeller selection.

- Staff at marinas and motorized watercraft rental concessions would be required to educate customers about the no-wake zone and appropriate watercraft operations.
- Signs and other public information would be provided at all public boat ramps and at other public access points along the shoreline to educate boaters and other shoreline users about the no-wake zone, AIS prevention strategies, and public safety considerations.
- The no-wake zone would be maintained at 600 feet from the water line and boat speed would continue to be limited to 5 mph lake wide within the no-wake zone.
- Additional funding for nearshore turbidity monitoring and adaptive management actions associated with boat traffic is included in the Shoreline Plan.
- Prohibition of boat beaching in spawning habitat during the spawning season.

Lahontan Cutthroat Trout

Adult LCT inhabit deep water areas of the lake, except during spawning migrations to tributary streams and, thus, would not be affected by nearshore boating activity or angling that occurs from shorezone structures. YOY move into the vegetated nearshore environment of the lake after hatching in tributary streams and rear in nearshore habitat prior to moving into deeper water as they grow larger. Nearshore recreation-related activities under Alternative 1 may affect YOY LCT, because YOY occur in the nearshore environment of the lake for rearing. Open water recreation-related activities under Alternative 1 may affect adult and subadult LCT, because greater open water boating and open water angling would occur under Alternative 1.

Recreation-related effects to LCT would be limited because adult and subadult LCT are open water species that do not generally use nearshore habitat where increased angling from piers and direct contact from boating is anticipated to occur. In addition, adult and subadult LCT generally use the colder hypolimnion in the summer and would not be susceptible to entrainment or propeller strikes. Adult and subadult LCT utilizing open water areas would not be exposed to substantially higher PAH concentrations because increased boating and resulting PAHs would be dispersed throughout the lake, limiting the potential for PAHs to concentrate in specific open water locations. Further, PAHs have a very short half-life and would continue to rapidly disappear from the water column (see Impact 6-4 in Chapter 6, “Hydrology and Water Quality”). Recreational effects on LCT would also be limited for the following reasons:

- LCT spawning occurs in tributary streams. Recreation-related activities in nearshore habitat would not affect spawning activities, spawning habitat, or egg incubation.
- Because YOY LCT would not be expected to use nearshore habitats within marinas, and PAHs from increased boating would be expected to increase mostly in marinas where boat traffic is concentrated and engines do not run at an efficient level, potential increases in PAHs in marinas would not affect YOY LCT.
- YOY LCT utilize vegetated nearshore habitats for rearing during their first summer, but due to their small size, these fish would not be targeted by recreational anglers.
- YOY LCT utilizing nearshore areas would be expected to move laterally along the shoreline, away from recreation-related disturbances (e.g., bed disturbance associated with boat parking), to nearshore areas of the lake that are unaffected.
- Boat noise and disturbance would be temporary in nature.
- Nearshore boating-related propeller entrainment and substrate disturbance effects to LCT are currently believed to be minimal, and would be expected to remain minimal, and not affect population size.
- Current fishing regulations would continue to apply and continue to be evaluated by fish management agencies to maintain recreational fisheries.

- A no-wake zone would be maintained at 600 feet from the water line and speed would continue to be limited to 5 mph in the no-wake zones. This would minimize wake-related disturbances of fish and substrates from increased boating activity.

- Existing AIS detection, control, and eradication efforts for macrophytes and macroinvertebrates would continue.

- New public structures would be equipped with sufficient numbers of trash receptacles to minimize inadvertent disposal of trash in the lake.

Mountain Whitefish

Adult mountain whitefish inhabit deep water areas of the lake, except during spawning migrations to tributary streams and, thus, would not be affected by nearshore boating activity or angling that occurs from shorezone structures. YOY mountain whitefish move into the vegetated nearshore environment of the lake after hatching in tributary streams and rear in nearshore habitats prior to moving into deeper water as they grow larger. Nearshore recreation-related activities under Alternative 1 may affect YOY mountain whitefish, relative to baseline conditions, because YOY occur in the nearshore environment of the lake for rearing. Open water recreation-related activities under Alternative 1 may affect adult and subadult mountain whitefish, because open water boating and open water angling would increase under Alternative 1. Recreation-related effects to mountain whitefish populations would be limited for the same reasons that recreation-related effects to LCT would be limited.

Lahontan Lake Tui Chub

Increased recreation-related activities under Alternative 1 have the potential to affect Lahontan Lake tui chub. Adult Lahontan Lake tui chub spawn in nearshore environments and all life stages of the *pectinifer* subspecies spend time foraging in the nearshore environment. The *obesa* Lahontan Lake tui chub spends most of its life in the pelagic zone of the lake. The *obesa* Lahontan Lake tui chub occurs only in the nearshore environment for spawning and for rearing during their first summer after hatching. Recreation-related effects to Lahontan Lake tui chub populations would be limited for many of the same reasons that effects on LCT and mountain whitefish would be limited. In addition, effects on Lahontan Lake tui chub populations would be limited for the following reasons:

- Adult and subadult *obesa* Lahontan Lake tui chub generally feed in deeper portions of the lake, away from where the increased angling from piers and substrate contact from boating could occur. Thus, adult and subadult Lahontan Lake tui chub feeding would not be affected by nearshore recreational activities (i.e., bed disturbance or boat parking).

- Adult and subadult *obesa* Lahontan Lake tui chub would not be targeted by bait fisherman since bait fishing typically occurs in the nearshore environment.

- Adult and subadult *pectinifer* Lahontan Lake tui chub forage in nearshore areas. Foraging generally occurs at night when recreation-related activities would not coincide with foraging activity.

- Adult Lahontan Lake tui chub spawn in nearshore areas less than 5 feet deep, over sandy bottoms and in stream mouths, primarily during May and June. Spawning generally occurs at night when recreation-related activities would not coincide with spawning activity.

- Because all life stages of Lahontan Lake tui chub would not be expected to use nearshore habitats within marinas, and PAHs from increased boating would be expected to increase mostly in marinas where boat traffic is concentrated, and engines do not run at an efficient level, potential increases in PAHs in marinas would not affect Lahontan Lake tui chub.

- Spawning adult Lahontan Lake tui chub do not build nests, so their eggs are not concentrated into one specific area. Therefore, even during peak boat use days, such as Independence Day or Labor Day, likelihood of a boat crushing numerous eggs when parking on sandy shorelines or entraining large

numbers of eggs is low. As such, the anticipated level of increased boating activity (and boat shoreline parking) would not be expected to substantially increase the percent of all eggs spawned in a given year that are lost due to boat parking on sandy shorelines, and thus would not adversely affect annual production of this species.

- Nearshore boating-related propeller entrainment and substrate disturbance effects to Lahontan Lake tui chub are currently believed to be minimal, and would be expected to remain minimal, and not affect population size.

Native Nongame Fish (Minnows, Sculpins, Suckers)

Native nongame fishes include Lahontan speckled dace, Lahontan redside shiner, Paiute sculpin, and Tahoe sucker. Although these species are native to Lake Tahoe, none are considered special-status species. These fish species are part of the nearshore assemblage and spend portions of their life cycle in the nearshore environment, including spawning. Adult native nongame fishes all spawn in the nearshore environment and all but adult Paiute sculpin spend most of their life in the nearshore environment. YOY Paiute sculpin feed in the nearshore environment, but as adults and subadults the species is more often associated with deep water aquatic macrophyte beds. Recreation-related effects to native nongame fishes would be limited for many of the same reasons described above, and for the following reasons:

- Adult and subadult Paiute sculpin generally feed in deeper portions of the lake, outside of the nearshore environment and would not be expected to be affected by increased open water recreational angling because they are not a targeted game species or a species captured by anglers and used as bait.

- Adult Lahontan redside shiners and Lahontan speckled dace spawning typically occurs at night when recreation-related activities would not occur.

- Native nongame fish egg incubation occurs in nearshore areas and incubating eggs could be affected. However, recreation-related disturbance of eggs could potentially occur for a very small percentage of native nongame fish eggs spawned in the lake's nearshore habitat because the area of potential spawning is large relative to the area of anticipated disturbance from increased recreation and boating.

- Because all life stages of native nongame fish would not be expected to use nearshore habitats within marinas, and PAHs from increased boating would be expected to increase most in marinas where boat traffic is concentrated, and engines do not run at an efficient level, potential increases in PAHs in marinas would not affect native nongame fish.

- Nearshore boating-related propeller entrainment and substrate disturbance effects to native nongame are currently believed to be minimal, and would be expected to remain minimal, and not affect population size.

Coldwater Game Fish

Coldwater game fishes include lake trout, kokanee, brown trout, rainbow trout, and brook trout. Lake trout exclusively inhabit the pelagic, deep water areas of the lake year-round and would not be affected by nearshore boating activity or angling that occurs from shorezone structures. However, increased deep water fishing from boats could affect lake trout.

Kokanee and brook trout inhabit deep water areas of the lake, except during spawning migrations to tributary streams and thus would not be affected by nearshore boating activity or angling that occurs from shorezone structures. Adult rainbow trout and brown trout use the nearshore environment at night for feeding and during their spawning migrations into tributary streams. YOY coldwater game fish move into the vegetated nearshore environment of the lake after hatching in tributary streams and rear in nearshore habitats prior to moving into deeper water as they grow larger. Increased nearshore boating and angling activities under Alternative 1 may affect YOY coldwater game fish, because YOY move into the nearshore environment of the lake for rearing. Based on the studies cited above, the incremental increases in open water recreation-related boating and angling activities under Alternative 1 are not anticipated to result in substantial adverse effects on adult and

subadult coldwater game fish. A range of recreation-related effects from boating and angling that could occur to YOY coldwater game fish. However, the effects on YOY coldwater game fish would be limited for many of the same reasons described above, and for the following reasons:

- Lake trout, adult kokanee, and brook trout generally use the colder hypolimnion in the summer so would not be susceptible to entrainment or propeller strikes from open water boating.
- Brown trout and rainbow trout adults generally utilize open water areas but do use the nearshore environment at night for foraging, when temperatures are suitable. Foraging generally occurs at night when nearshore recreation-related activities would not coincide with foraging activity.
- YOY coldwater game fish (except for lake trout) utilize vegetated nearshore habitats for rearing during their first summer, but due to their small size these fish would not be targeted by recreational anglers.
- Nearshore boating-related propeller entrainment and substrate disturbance effects to coldwater game fish are currently believed to be minimal, and would be expected to remain minimal, and not affect population size.

Increased boating and angling under Alternative 1 could have effects to all species evaluated. However, based on life history characteristics, habitat use for the species evaluated, and resource protection measures that would be implemented, substantial adverse effects would not occur to any of the lake's fish populations. Based on the assessment above, Recreational-related impacts under Alternative 1 would not:

- reduce the ability to attain or maintain TRPA threshold standards for LCT, lake habitat, or AIS;
- substantially change the diversity or distribution of any fish species in Lake Tahoe;
- reduce the number or viability of any fish species in Lake Tahoe;
- result in a barrier to any fish species movement in Lake Tahoe; or
- substantially reduce the suitability of habitat for any fish species in Lake Tahoe.

Based on these findings, Alternative 1 would result in a **less-than-significant** impact for all fish species and guilds evaluated.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under Alternative 2, there is no cap on the number of structures permitted. However, because structure placement is limited by fish habitat designations, the maximum number of new structures are estimated as: 4,871 buoys; 1,897 slips; 476 piers; six boat ramps; two marinas, and 168 private boat lifts. Changes in the number of moorings and access points would result in an estimated annual increase in motorized boating of 53 percent. Compared to baseline conditions this would include approximately 2,600 additional boat trips on a peak day (i.e., summer holiday weekend) and approximately 124,800 additional annual boat trips. Because recreational activities would primarily occur in the summer, impacts would be limited to summer months (May 1 through September 30). Additionally, no new boater education measures would be enacted under Alternative 2.

Recreation-related impacts under Alternative 2 would be similar to those identified under Alternative 1. Under Alternative 2, however, recreation-related impacts would occur more frequently than under Alternative 1 because Alternative 2 includes a greater number of structures and a commensurate increase in boating. However, based on the same life history characteristics and habitat use for the species evaluated under Alternative 1, impacts from Alternative 2 would be **less than significant**.

Alternative 3: Limit New Development

Under Alternative 3, 365 buoys, 5 public piers; 86 private piers; and one new boat ramp would be developed. Like Alternative 1, marina expansion would be allowed if coupled with environmental improvements. Under Alternative 3, annual boating activity would increase by an estimated 4 percent. Compared to baseline conditions this would include roughly 200 additional boat trips on a peak day (i.e., summer holiday weekend) and approximately 8,600 additional annual boat trips.

Recreation-related impacts under Alternative 3 would be similar to those identified under Alternative 1. However, under Alternative 3 recreation-related impacts would occur less frequently than under Alternative 1 because Alternative 3 includes construction of fewer structures and less boat activity. As with Alternative 1, impacts associated with increased boating and recreational fishing associated with Alternative 3 would be minimized because of the resource protection measures included as part of the alternative. Based on the same reasons identified in Alternative 1, Alternative 3 would result in a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow 15 new public piers and no other new shoreline structures. Because this alternative would authorize no new moorings or boat ramps, it would not result in increased boat use. However, recreational angling, and trash and contaminants from use of piers could increase. Increased angling could benefit native fish species by increasing pressure on nonnative warmwater fish species. However, piers could also increase angling pressure on any coldwater game species that occur in the nearshore environment. Increased angling and trash and contaminants from piers could result in a suite of sublethal effects, as well as mortality of individual fish.

Recreation-related impacts under Alternative 4 would be similar to those identified under Alternative 1. However, under Alternative 4 recreation-related impacts would occur less frequently than under Alternative 1 because Alternative 4 involves construction of fewer structures and no new boat activity. As with Alternative 1, impacts associated with increased boating and recreational fishing associated with Alternative 4 would be minimized because of the resource protection measures included as part of the alternative. Based on the same reasons identified in Alternative 1, Alternative 4 would result in a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

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6 HYDROLOGY AND WATER QUALITY

6.1 INTRODUCTION

The Shoreline Plan will regulate new and redeveloped boating facilities on Lake Tahoe, which may result in increased boat use on Lake Tahoe. This chapter evaluates the effects of both new structures and the subsequent increase in boating activity on Lake Tahoe's water quality from the Shoreline Plan alternatives. The primary issues raised during scoping efforts and coordination meetings with the Shoreline Plan's Joint Fact-Finding Committee regarding potential boating impacts are grouped into the following categories:

- sediment resuspension and turbidity,
- air pollutant deposition on the lake, and
- direct contamination from hydrocarbon and other contaminants.

In addition to potential impacts related directly to boat use, construction and maintenance of shoreline facilities under the different Shoreline Plan alternatives (e.g., new pier construction, dredging) could adversely affect water quality. Construction of new shoreline facilities or the modification of existing shoreline facilities could alter wave and current patterns within the shorezone and disrupt littoral drift processes. This chapter evaluates the potential effects on Lake Tahoe water quality from construction and maintenance of shoreline facilities, and potential alterations on littoral drift processes by shoreline facilities.

Section 6.2, "Regulatory Setting," describes the existing regulations that protect Lake Tahoe's water quality. Section 6.3, "Affected Environment," discusses the existing conditions and status of Lake Tahoe water quality and pollutant load reduction efforts relative to regulatory requirements and standards. The potential water quality and hydrodynamic impacts (e.g., littoral drift) resulting from implementation of a Shoreline Plan alternative are identified and assessed in Section 6.4, "Environmental Consequences and Mitigation Measures." Mitigation measures are recommended in Section 6.4 for any significant or potentially significant impacts on water quality or littoral drift processes.

6.2 REGULATORY SETTING

6.2.1 Federal

FEDERAL ANTIDEGRADATION POLICY

The U.S. Environmental Protection Agency (EPA) has designated Lake Tahoe an Outstanding National Resource Water (ONRW). ONRWs are provided the highest level of protection under the EPA Antidegradation Policy, stipulating that states may allow temporary and short-term changes to water quality but that such changes should not adversely affect existing uses or alter the essential character or special uses for which the water was designated an ONRW. EPA interprets this provision to mean that no new or increased discharges to ONRWs shall be permitted if that discharge would result in lower or poorer long-term water quality.

CLEAN WATER ACT

The federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Applicable sections of the CWA are summarized below.

Section 404

Section 404 of the CWA prohibits the discharge of fill material into waters of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and EPA. To discharge dredged or fill material into waters of the United States, including wetlands, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through USACE. Waters of the United States are generally defined as "waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters." Under Section 404 of the CWA, Lake Tahoe is considered waters of the United States.

Section 401

Section 401 of the CWA requires certification of activities through a federal license or permit for discharges of a pollutant into waters of the United States. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with Section 401. Water quality certification requires evaluation of potential impacts considering water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. EPA delegates water pollution control authority under Section 401 to the states.

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point source discharges of pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. EPA delegates water pollution control authority under Section 402 to the states.

Section 303(d)

Section 303(d) of the CWA requires states to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that a state develop a total maximum daily load (TMDL) for each of the listed pollutants. A TMDL is the amount of an identified pollutant that a water body can receive and still comply with water quality objectives. A TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. EPA must either approve a TMDL prepared by a state or disapprove a state's TMDL and issue its own. A TMDL represents a goal that may be implemented by adjusting pollutant discharge requirements in individual NPDES permits or by establishing nonpoint source controls. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of a TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

6.2.2 Tahoe Regional Planning Agency

TRPA was designated as an areawide planning agency under Section 208 of the CWA in 1974. Under the Tahoe Regional Planning Compact, TRPA has established environmental threshold standards, goals and policies, and ordinances directed at protecting and improving water quality in Lake Tahoe and the Tahoe region. The focus of water quality enhancement and protection is to minimize the effects of human-made disturbances to the watershed and reduce or eliminate pollutants that result from existing and proposed development. The Tahoe Regional Planning Compact includes the following statements and direction related to water quality:

- The waters of Lake Tahoe are threatened with deterioration or degeneration, which endangers the natural beauty and economic productivity of the Region (Article (I)(a)(1));
- TRPA shall develop an enforceable land use plan for, among other purposes, the uses of water and other natural resources within the Region (Article (V)(c)(1));
- The Regional Plan shall provide for attaining and maintaining federal, state, or local water quality standards, whichever are the strictest, in the respective portions of the Region for which the standards are applicable (Article (V)(d)); and
- The Regional Plan shall, by ordinance, identify the means and time schedule by which water quality standards will be attained (Article (V)(d)).

THRESHOLDS

The TRPA Governing Board adopted Resolution 82-11, which established water quality threshold standards for six indicator categories: (1) Lake Tahoe pelagic (deep) waters, (2) Lake Tahoe littoral (nearshore) waters, (3) tributaries, (4) direct surface runoff and stormwater discharge to surface waters, (5) stormwater discharge to groundwater, and (6) other lakes (i.e., lakes in the Tahoe basin other than Lake Tahoe). Resolution 82-11 sets numerical and management standards for water quality. Some of these threshold standards are referenced to state standards, and in other cases, target reference conditions related to specific time periods are noted. The following value statements are used in setting the threshold standards and targets for water quality:

- Attain levels of water quality in the lakes and streams within the Tahoe Region suitable to maintain the identified beneficial uses of Lake Tahoe.
- Restrict algal productivity (rate of growth) to levels that do not impair beneficial uses or deteriorate existing water quality conditions in the Tahoe Region.
- Prevent degradation of the water quality of Lake Tahoe and its tributaries to preserve the lake for future generations.
- Restore all watersheds in the Tahoe Region so that they respond to runoff in a natural hydrologic function.

Water quality threshold standards adopted by TRPA set a target to return the lake to the transparency observed in the late 1960s. Within the six major indicator categories, TRPA uses seven water quality standards to assess the water quality of Lake Tahoe and its tributaries. Table 6-1 lists indicator categories and associated threshold standards applicable to the analysis of Shoreline Plan alternatives. In 2012, the TRPA Governing Board adopted a new standard in the nearshore environment to address attached algae, which is included in Table 6-1. The status and trend of each threshold relative to the associated numerical standard or management standard is described in Section 6.3, “Affected Environment.”

Table 6-1 Applicable TRPA Water Quality Threshold Standards for Shoreline Plan Alternatives

Indicator Category	Standard	Numerical Standard and/or Management Standard
Pelagic Lake Tahoe (deep water)	Annual average transparency	Annual average deep-water transparency as measured by a Secchi disk shall decrease below 29.7 meters (97.4 feet).
Pelagic Lake Tahoe (deep water)	Phytoplankton primary productivity	Annual mean phytoplankton primary productivity shall not exceed 52 grams of carbon per square meter per year.
Littoral Lake Tahoe (nearshore)	Turbidity	Decrease sediment load as required to attain turbidity values not to exceed 3 Nephelometric Turbidity Units (NTUs) in littoral Lake Tahoe. In addition, turbidity shall not exceed 1 NTU in shallow waters of Lake Tahoe not directly influenced by stream discharges.
Littoral Lake Tahoe (nearshore)	Attached algae	Implement policy and management actions to reduce the areal extent and density of periphyton (attached algae) from Lake Tahoe's nearshore.
Stormwater runoff quality	Surface discharge to surface water	Pollutant concentrations in surface runoff discharged to surface water shall not exceed the following concentrations at the 90th percentile: ◢ 0.5 mg/L dissolved inorganic nitrogen as N ◢ 0.1 mg/L dissolved phosphorus as P ◢ 2.0 mg/L grease and oil ◢ 0.5 mg/L dissolved iron ◢ 250 mg/L suspended sediment

Note: mg/L = milligrams per liter.

Source: TRPA 2016

GOALS AND POLICIES

TRPA has established goals and policies related to water quality. Goals include the reduction of sediment and nutrients to Lake Tahoe and the elimination or reduction of other pollutants. The existing goals and policies for water quality protection and shorezone conservation encompass the following regulatory framework (TRPA 2012a):

- Support the Lake Tahoe TMDL program (see Section 6.2.5) in California and Nevada and local government pollutant/stormwater load reduction planning and implementation.
- Regulate developed properties to install and maintain best management practices (BMPs) that reduce erosion and control stormwater runoff.
- Prohibit the discharge of wastewater, toxic waste, and solid waste into Lake Tahoe, its tributaries, and groundwater resources.
- Regulate the placement and design of shorezone structures to avoid degradation of fish habitat and interference with littoral drift.

CODE OF ORDINANCES

The TRPA Code of Ordinances (TRPA Code) contains the requirements and standards intended to achieve water quality thresholds, and the goals and policies of the TRPA Regional Plan Chapter 60 of the TRPA Code is directed specifically at water quality protection. Chapters 80–85 of the TRPA Code contain provisions related to permissible uses, activities, and placement of structures within the shorezone (Table 6-2).

Table 6-2 Code Requirements Related to Water Quality Protection and Shorezone Structures

Code Section	Requirements
Chapter 33	Sets standards for grading and excavation.
Chapter 60.1	Sets discharge standards for runoff to surface water and groundwater.
Chapter 60.2	Sets requirements that new residential, commercial, and public projects completely offset their water quality impacts.
Chapter 60.3	Contains regulations pertaining to recognition of source water, prevention of contamination to source water, and protection of public health relating to drinking water.
Chapter 60.4	Sets standards for installation of BMPs for the protection or restoration of water quality.
Chapter 80	Sets forth findings that must be made by TRPA prior to approving a project in the shorezone.
Chapter 81	Identifies permissible uses and accessory structures in the shorezone.
Chapter 82	Sets requirements for maintenance, repair, or expansion of existing structures in the shorezone.
Chapter 84	Regulates the placement of new piers, buoys, and other structures in the shorezone to avoid interference with littoral drift; sets BMP compliance standards for new marinas or marina expansions; sets conditions for permittable filling and dredging activities; and sets standards for operation of motorized watercraft.
Chapter 85	Sets standards and policies for projects and activities in the backshore.

Note: BMP = best management practice.

Source: TRPA 2012b

BMP HANDBOOK

The TRPA Best Management Practices Handbook (BMP Handbook, 2014) provides guidance for selecting and implementing water quality BMPs that reduce or prevent the pollutants of concern identified in the Lake Tahoe TMDL program (see Section 6.2.5) and other pollutants from entering surface and ground waters. Chapter 8 of the BMP Handbook defines the standards and criteria for the planning, design, and expected performance of potential shorezone projects and activities, which include:

- dredging;
- turbidity curtains;
- boating discharge control and marina maintenance; and
- boat ramp construction and vehicle source control methods and design.

The guidance in Chapter 8 of the BMP Handbook was developed to be consistent with industry standards represented in the U.S. Army Corps of Engineers (USACE) Coastal Engineering Manual (2008), which is the USACE's most up to date and comprehensive guidance for coastal and lake shore engineering.

6.2.3 California

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) created the California State Water Resources Control Board (SWRCB) and nine regional water quality control boards (RWQCBs) in California. The SWRCB protects water quality by setting statewide policy, coordinating and supporting RWQCB efforts, and reviewing petitions that contest RWQCB actions. The RWQCBs issue waste discharge permits, take enforcement action against violators, and jointly administer federal and state laws related to water quality in coordination with EPA and USACE.

The Tahoe Region is located within the jurisdiction of the Lahontan Regional Water Quality Control Board (Lahontan Water Board). On the California side of the Tahoe Region, the Lahontan Water Board implements

the CWA, the California Water Code (including the Porter-Cologne Act), the California Lake Tahoe TMDL, and a variety of laws related to control of solid waste and toxic and hazardous wastes. The Lahontan Water Board has authority to set and revise water quality standards and discharge prohibitions. It issues federal permits, including NPDES permits and Section 401 water quality certifications, and state waste discharge requirements or waivers of waste discharge requirements. Its planning and permitting actions require compliance with the California Environmental Quality Act.

Water Quality Control Plan for the Lahontan Region

Water quality standards and control measures for surface water and groundwater within the Lahontan Region are contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The Basin Plan designates beneficial uses for water bodies. It establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. Chapter 5 of the Basin Plan, "Water Quality Standards and Control Measures for the Tahoe Region," summarizes a variety of control measures for the protection and enhancement of Lake Tahoe.

The Basin Plan was first adopted in 1975 and was most recently updated in 2016. It contains both narrative and numeric water quality objectives for the region. The Basin Plan amendments include additional language related to "mixing zones" for dilution of discharged water, compliance schedules for NPDES permits, discharge prohibition exemptions, simplification of existing prohibition exemptions, and the removal of language describing programs administered by TRPA (Lahontan Water Board 2016).

Both the Basin Plan and TRPA Code prohibit new construction of shorezone structures in prime fish habitat. If the selected Shoreline Plan alternative resulted in an amendment to location standards for shorezone structures under the TRPA Code, a similar amendment would be necessary for the Basin Plan to retain consistency with the TRPA Code.

6.2.4 Nevada

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning is responsible for several water quality protection functions, including collecting and analyzing water data, developing standards for surface waters, publishing reports, providing water quality education, and implementing programs to address surface water quality. The Bureau of Water Quality Planning is divided into the water quality standards branch, monitoring branch, Nonpoint Source Pollution Management Program, and Lake Tahoe Watershed Program unit. The branches are responsible for the following duties and responsibilities:

- The water quality standards branch is responsible for developing and reviewing water quality standards, determining wasteload allocations from point sources, and determining TMDLs and load allocations from nonpoint sources.
- The monitoring branch is responsible for administering the state's water quality monitoring program. This branch maintains and updates water quality data for the national water quality database (Water Quality Exchange Network) and is responsible for preparing Nevada's Water Quality Assessment Report, which is required under Section 305(b) of the CWA.
- The Nonpoint Source Pollution Management Program leads the control of nonpoint sources of pollution in Nevada. Nonpoint source pollution results from a variety of diffuse and dispersed human activities.
- The Lake Tahoe Watershed Program unit developed and manages the Nevada Lake Tahoe TMDL (see Section 6.2.5).

6.2.5 Lake Tahoe TMDL

The Lake Tahoe TMDL was developed in a partnership between the Lahontan Water Board and NDEP to address the declining transparency and clarity of Lake Tahoe, which results from light scatter from fine sediment particles (primarily particles less than 16 micrometers in diameter) and light absorption by phytoplankton (algae). The addition of phosphorus and nitrogen to Lake Tahoe contribute to phytoplankton growth. Because fine sediment particles, phosphorus, and nitrogen are responsible for the decline in lake transparency and clarity, Lake Tahoe is listed under Section 303(d) of the CWA as impaired by the input of these three pollutants of concern.

California and Nevada must comply with, administer, and enforce their own state laws and policies. In addition, each state has separate Section 303(d) filings with EPA for the Lake Tahoe TMDL that vary as follows:

- California's Lake Tahoe TMDL, dated November 2010 and approved by EPA in 2011, requires attainment of the California transparency objective for Lake Tahoe over a 65-year implementation period. California has identified Lake Tahoe's lack of transparency as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. To comply with California's Lake Tahoe transparency standard, a Secchi disk would need to be visible 29.7 meters (97.4 feet) below the surface of Lake Tahoe on an average annual basis.

  Based on California law, the Lahontan Water Board has the obligation to implement and enforce the California Lake Tahoe TMDL through NPDES discharge permits (over which EPA has jurisdiction) issued to California government entities that include Placer County, El Dorado County, the City of South Lake Tahoe, and the California Department of Transportation.

- Nevada's Lake Tahoe TMDL, dated August 2011 and approved by EPA in 2011, is a modified version of the California Lake Tahoe TMDL. The Nevada Lake Tahoe TMDL clarifies Nevada's regulatory structure and approach to implementation and emphasizes that the proposed implementation timelines may need to be adjusted for a variety of reasons, but particularly based on the availability of future funding. NDEP's stated plan for implementing the Lake Tahoe TMDL for Washoe County and Douglas County is through memoranda of agreement (MOA) with each jurisdiction. MOAs are a collaborative, legally nonbinding approach to implementing a TMDL. NDEP regulates the Nevada Department of Transportation and the Stateline Stormwater Association with NPDES discharge permits (over which EPA has jurisdiction).

  Nevada has identified Lake Tahoe's lack of clarity as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. Clarity is the quantitative measure of the vertical extinction of light (VEC) per meter of depth. A lower VEC reading indicates more clarity to the water. To comply with Nevada's Lake Tahoe clarity standard, a VEC of 0.08 per meter is necessary.

6.3 AFFECTED ENVIRONMENT

The Tahoe basin was formed approximately 2–3 million years ago by geologic faulting and volcanic activity. Geologic faults running in a north-south direction allowed the formation of a valley between the uplifting Sierra Nevada and the Carson Range. The northern portion of the valley was blocked and dammed by volcanic activity that created the 506-square-mile basin that lies along the California-Nevada border. Precipitation and runoff eventually filled a portion of the basin to create Lake Tahoe, which has a water surface area covering nearly two-fifths of the total basin area (191 square miles).

Lake Tahoe is fed by 63 tributary streams and intervening zones that drain directly to the lake. The largest tributary is the Upper Truckee River, which accounts for 25 percent of the annual inflow to Lake Tahoe. The Truckee River is the lake's only outlet, flowing to Pyramid Lake in Nevada. A dam constructed at Tahoe City in the early 1900s regulates water flow to the Truckee River from the natural rim at 6,223.0 feet above sea

level to the maximum legal lake level of 6,229.1 feet (Lake Tahoe Datum). The lake is 12 miles wide and 22 miles long with 72 miles of shoreline.

Regional topography is characterized by steep mountain slopes at higher elevations, transitioning to more moderately sloped terrain near the lakeshore. A notable precipitation gradient exists from the western boundary of the Tahoe Region along the crest of the Sierra Nevada to the eastern boundary at the crest of the Carson Range. The west shore of Lake Tahoe averages about 35 inches per year of precipitation, while the east shore averages about 20 inches per year. Most precipitation in the Tahoe Region falls between October and May as snow at higher elevations and as a mixture of snow and rain at lake level. In the higher elevations, peak stream runoff from snowmelt occurs in May or June, while the snowpack near lake level melts a few weeks earlier.

The Shoreline Plan alternatives have the potential to affect the quality and movement of Lake Tahoe's waters. The affected environment described below summarizes the conditions of Lake Tahoe waters separated into discussions of Lakezone Water Quality (Section 6.3.1) and Nearshore Water Quality (Section 6.3.2). The shorezone diagram (Exhibit 2-2) illustrates the boundaries of each zone as defined by TRPA Code (Chapter 83). Shorezone structures are typically located within the backshore and foreshore zones, although some structures, such as piers, extend into the nearshore. Shorezone structures have the potential to adversely affect littoral draft, which is a potential impact analyzed in this chapter. Chapter 2 of this EIS, "Project Description," provides a discussion of existing shorezone facilities and structures.

6.3.1 Lakezone Water Quality

The TRPA Code defines Lake Tahoe's lakezone as all waters lakeward of a bottom elevation of 6,193 feet (Lake Tahoe Datum), or more than 350 feet from the shoreline (Exhibit 2-2), whichever is further. The lakezone encompasses Lake Tahoe's deeper waters, also referenced herein and by TRPA Code as the lake's pelagic waters. TRPA threshold standards for pelagic waters strive to attain and then maintain exceptional transparency and clarity.

The Lake Tahoe TMDL was developed collaboratively by the Lahontan Water Board and NDEP as the framework for comprehensive water quality restoration planning to address identified pollutant sources and ultimately achieve the Lake Tahoe transparency and clarity water quality objectives for pelagic waters (Lahontan Water Board and NDEP 2010:1-1).

The following subsections summarize the identified sources of pollutants of concern for lake transparency and the status of Lake Tahoe TMDL planning and implementation for pelagic waters.

POLLUTANTS OF CONCERN FOR LAKE TRANSPARENCY

Lake Tahoe is classified by limnologists as an oligotrophic lake, which means the lake has very low concentrations of nutrients that can support algal growth, leading to clear water and high levels of dissolved oxygen (TERC 2011:6.15). The exceptional transparency of Lake Tahoe results from naturally low inputs of nutrients and sediment from the surrounding watershed.

Scientific research points to inorganic fine sediment particles (defined as particles less than 16 micrometers in diameter) as the primary pollutant of concern impairing the lake's transparency. This finding is based on the ability of inorganic fine sediment particles to efficiently scatter light and decrease observed transparency. Swift et al. (2006) determined that light scattering by inorganic particles for the period between 1999 and 2002 was responsible for roughly 55–60 percent of measured light attenuation in the lake. Organic particles (algae) were responsible for about 25 percent of measured light attenuation, primarily through adsorption of light. The remaining 15–20 percent of measured light attenuation was attributable to natural absorption of light by water molecules.

The addition of the nutrients phosphorus and nitrogen to Lake Tahoe can stimulate algal growth in the lake's nutrient-poor waters, which can increase light absorption by algae and degrade Lake Tahoe transparency. Presently, scientific research indicates that algal growth may be dependent on the availability of both phosphorus and nitrogen, but in many months of the year, algal growth is predominantly controlled by the availability of phosphorus (TERC 2011:10.7).

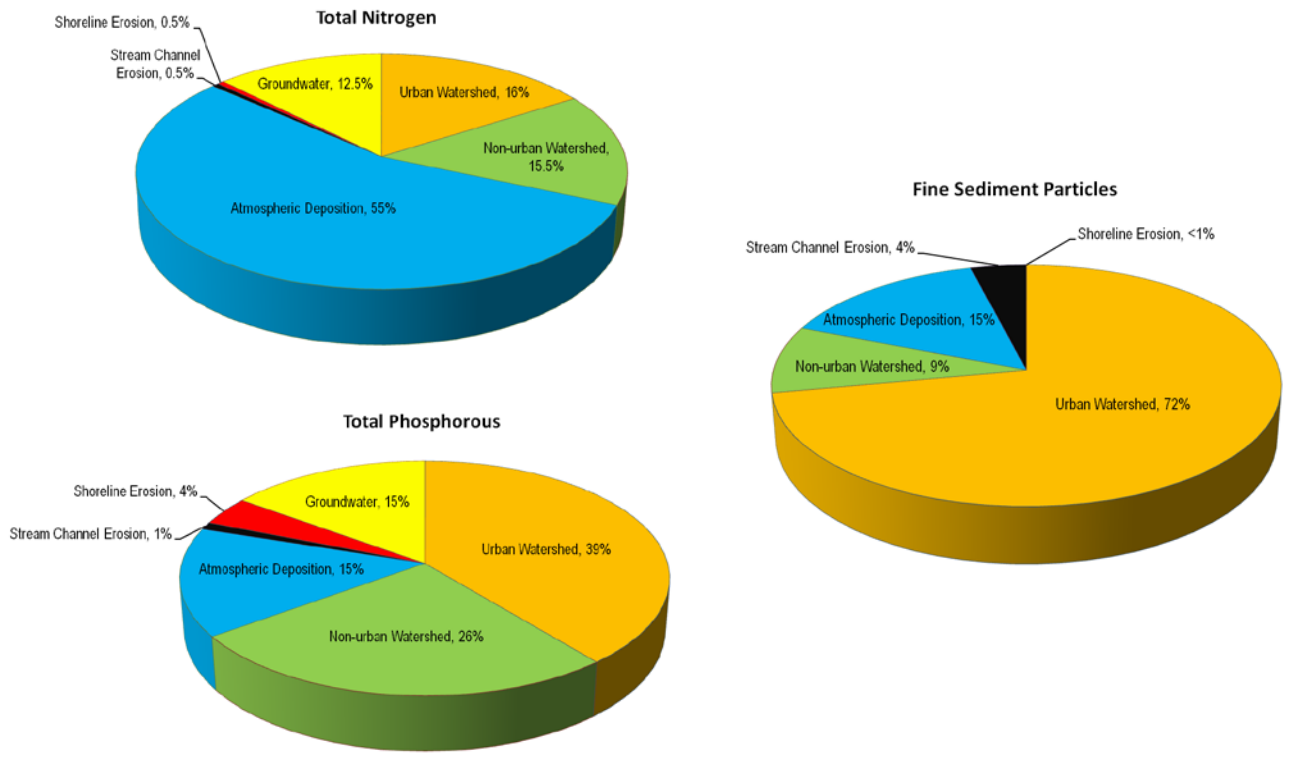
LAKE TAHOE TMDL QUANTIFICATION OF SOURCES FOR POLLUTANTS OF CONCERN

The science and analysis supporting the Lake Tahoe TMDL was a collaborative, multiagency, multiyear effort that developed an extensive body of scientific research that (1) identifies the load, or mass, of pollutants of concern responsible for the decline in Lake Tahoe's transparency (fine sediment particles, phosphorus, and nitrogen); (2) quantifies the sources of pollutants of concern to the lake; and (3) establishes load reduction milestones that can be used to develop policies and stormwater/pollutant load reduction plans to progress toward achievement of water quality objectives. The collection, analysis, and interpretation of information supporting the Lake Tahoe TMDL included the following actions (Lahontan Water Board and NDEP 2010:14-3 to 14-4):

- analysis of data sets on:
  - 1) long-term lake clarity and transparency and related limnological characteristics;
  - 2) stream hydrology and nutrient and sediment concentrations/loading;
  - 3) stormwater runoff concentrations;
  - 4) atmospheric deposition;
- assessment of numerous scientifically accepted documents on Lake Tahoe and the Tahoe Region; and
- development, calibration, and validation of models using Tahoe-specific data.

The Lake Tahoe TMDL research included an analysis of pollutant sources to identify the magnitude of pollutant loads to Lake Tahoe from various source categories. These pollutant sources are defined as surface runoff from developed lands (urban watershed), atmospheric deposition, forested runoff (nonurban watershed), stream channel erosion, groundwater, and shoreline erosion.

Exhibit 6-1 displays the relative distribution of average annual pollutant loading to Lake Tahoe for each pollutant of concern among the source categories (Lahontan Water Board and NDEP 2010:7-2 to 7-3). As shown in Exhibit 6-1, the Lake Tahoe TMDL identifies surface runoff from developed lands (urban watershed) as the most significant source of pollutant loading for fine sediment particles (the primary pollutant of concern) and phosphorus. Surface runoff from developed lands is estimated to deliver more than 70 percent of the average annual fine sediment particle load and roughly 40 percent of the average annual phosphorus load to the lake. For nitrogen, atmospheric deposition is identified as the most significant source of loading to the lake, contributing 55 percent of the average annual load.



Source: Adapted from Lahontan Water Board and NDEP 2010:7-2 and 7-3

Exhibit 6-1 Sources of Pollutants of Concern to Lake Transparency

Stormwater/Pollutant Load Reduction Milestones

The Lake Tahoe TMDL indicates that to achieve TRPA's transparency standard, total basinwide loads of fine sediment particles, phosphorus, and nitrogen need to be reduced by 65 percent, 35 percent, and 10 percent, respectively (Lahontan Water Board and NDEP 2010:10-4). Load reductions are expressed as a percentage of baseline pollutant loads calculated for conditions in the year 2004.

Through the Lake Tahoe TMDL, Lahontan Water Board and NDEP have established 5-year load reduction milestones to help assess progress toward meeting overall load reduction goals. The Lake Tahoe TMDL sets an interim goal for the year 2026, termed the Clarity Challenge, to reduce basinwide loading from all sources for fine sediment particles, phosphorus, and nitrogen by 32 percent, 17 percent, and 4 percent, respectively. Attainment of the Clarity Challenge is estimated to return the lake to an average annual transparency of 78.7 feet, or 24 meters (Lahontan Water Board and NDEP 2010:8-7).

Given that the majority of pollutant loads for fine sediment particles and phosphorus are delivered to the lake from developed lands (urban watershed), the Lahontan Water Board and NDEP have prioritized this source category as the greatest opportunity for pollutant control. Pollutant load allocations and load reduction targets are specified for each jurisdiction in the Tahoe Region through NPDES permits for El Dorado County, Placer County, the City of South Lake Tahoe, and the California Department of Transportation. For local jurisdictions in Nevada (Washoe County and Douglas County), NDEP has developed MOAs that set load reduction goals and guide the implementation of projects and actions to achieve Lake Tahoe TMDL milestones. NDEP defines pollutant load allocations and load reduction targets for the Nevada Department of Transportation through an NPDES permit. Through either an NPDES permit or an MOA, each jurisdiction has developed stormwater/pollutant load reduction plans that prioritize water quality projects and actions to reduce loading from developed lands to meet Lake Tahoe TMDL milestones. Upcoming milestones are provided in Table 6-3.

Table 6-3 Upcoming Load Reduction Milestones from Developed Lands[1]

Pollutant of Concern	2021 Target	2026 Clarity Challenge	Standard Attainment
Fine sediment particles	21%	34%	71%
Total phosphorus	14%	21%	46%
Total nitrogen	14%	19%	50%

[1] Load reductions are expressed as percent reductions of baseline pollutant loads calculated for conditions in 2004. Percent reductions shown are for the developed lands source category (i.e., stormwater runoff), which differs from load reductions expressed as percent reductions for basinwide loads from all sources.

Source: Adapted from Lahontan Water Board and NDEP 2010:10-4

Stormwater/Pollutant Load Reduction Progress (2016 Milestone Reporting)

The Lake Clarity Crediting Program (Crediting Program) was developed by Lahontan Water Board and NDEP as an accounting system to track progress toward load reduction milestones defined by the Lake Tahoe TMDL (Table 6-3). Lake Clarity Credits (credits) are obtained by using a set of tools and protocols to estimate stormwater/pollutant load reductions achieved by implementing and maintaining water quality improvements or pollutant controls. Credits are calculated and awarded based on the mass of fine sediment particle reduction relative to a defined baseline condition in the year 2004. While credits are currently awarded and tracked based on fine sediment particle reduction, each jurisdiction reports on progress for reducing total loads for all three pollutants of concern (fine sediment particles, total phosphorus, and total nitrogen).

The seven jurisdictions identified above work through the Crediting Program to register pollutant controls to attain credits. The 2016 target for each jurisdiction, corresponding with the first 5-year milestone enumerated in the Lake Tahoe TMDL for developed lands, required the following baseline load reduction:

- 10 percent reduction in fine sediment particles,
- 7 percent reduction in total phosphorous, and
- 8 percent reduction in total nitrogen.

Through the 2016 water year, 23 registrations have been submitted through the Crediting Program by the jurisdictions and have been reviewed and certified by either the Lahontan Water Board or NDEP. In total, the seven jurisdictions have accrued 1,340 credits, which is 205 credits (18 percent) over the total requirement of 1,135 credits to achieve the 2016 load reduction milestone (Lahontan Water Board and NDEP 2017:4).

Table 6-4 shows the published load reductions through water year 2016, expressed as a mass (pounds per year) and as a percent relative to the baseline condition, for each pollutant of concern.

Table 6-4 2016 Milestone for Developed Lands Source Category: Pollutant Load Reduction Progress Reporting

Pollutant	2016 Milestone Load Reduction Target (lbs/year)	Water Year 2016 Certified Load Reduction (lbs/year)	2016 Milestone Load Reduction Target Relative to Baseline (%)	Water Year 2016 Certified Load Reduction Relative to Baseline (%)
Fine sediment particles	227,896	268,508	10	12
Total phosphorus	629	768	7	8.5
Total nitrogen	2,825	2,150	8	6

Note: lbs/year = pounds per year.

Source: Lahontan Water Board and NDEP 2017:5

Load reductions achieved from Crediting Program registrations exceeded the 5-year fine sediment particle and total phosphorus milestones. Registration of load reductions for total nitrogen fell short of the 2016 milestone, but attainment of the Clarity Challenge focuses on fine sediment particle reductions and long-

term strategies for attaining total nitrogen objectives will rely more heavily on atmospheric source reductions (Lahontan Water Board and NDEP 2017:4).

6.3.2 Nearshore Water Quality

The TRPA Code defines Lake Tahoe's nearshore as the low-water elevation of 6,223 feet to a lake bottom elevation of 6,193 feet (Lake Tahoe Datum), but in any case, a minimum lateral distance of 350 feet measured from the shoreline (Exhibit 2-2). The nearshore is the portion of the lake that residents and visitors to the Tahoe Region interact with most, and nearshore conditions have received increased attention and scrutiny over the last decade. The increased focus on nearshore conditions is primarily driven by perceived, anecdotal changes to nearshore clarity, periphyton growth (attached algae), and the presence of invasive species.

Compared to long-term data collection and the science supporting the Lake Tahoe TMDL, which focuses on understanding Lake Tahoe's pelagic waters, the scientific approaches and long-term data sets for investigating and understanding the factors that influence Lake Tahoe's nearshore conditions are still under development. A collaboration between the Desert Research Institute, University of California at Davis, and the University of Nevada at Reno produced the Lake Tahoe Nearshore Evaluation and Monitoring Framework Report (Heyvaert et al. 2013). The report presents a conceptual understanding of nearshore processes, identifies deficiencies in the data available to characterize the status of the nearshore, and proposes a set of monitoring metrics. The report emphasizes the heterogenous and inherently complex environment of the nearshore and highlights the spatial variability of observed environmental conditions through review of available data. Factors influencing the observed variability are hypothesized based on literature review and available data assessments to include adjacent land uses and urban stormwater inputs, nonpoint pollutant inputs, boat activity, proximity to stream inputs, water movement and wave action, water depth, substrate type, and localized features of the lake bottom.

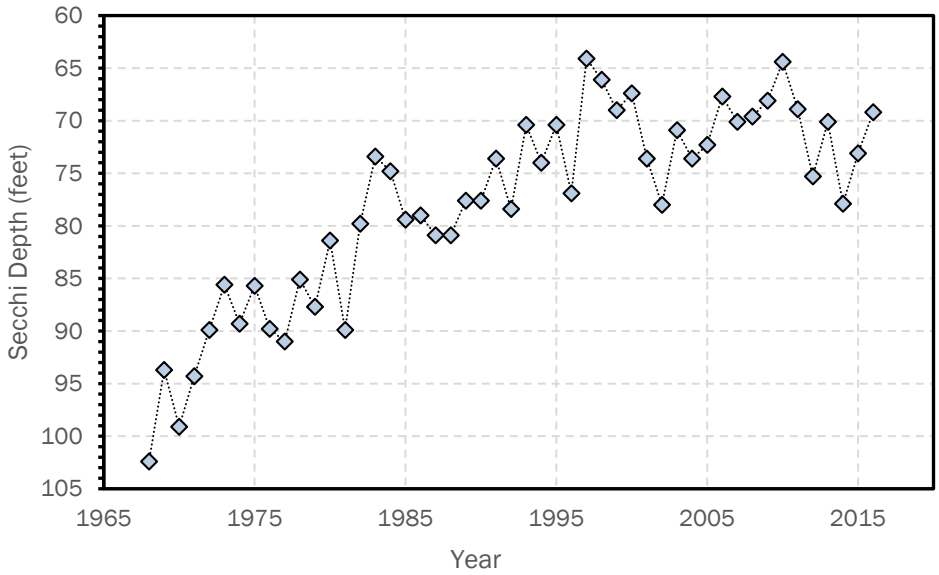
The Lake Tahoe Nearshore Evaluation and Monitoring Framework Report notes that pollutant sources affecting the nearshore conditions are generally the same as those identified in the Lake Tahoe TMDL. Therefore, management actions resulting in pollutant load reductions associated with the Lake Tahoe TMDL will also provide benefits to clarity and related characteristics to nearshore conditions (Heyvaert et al. 2013:55–56).

6.3.3 Status of Relevant Lake Tahoe Water Quality Thresholds

This section summarizes the status and trends of indicator categories and associated standards applicable to Lake Tahoe water quality and the analysis of Shoreline Plan alternatives.

PELAGIC LAKE TAHOE WATER QUALITY: SECCHI DEPTH TRANSPARENCY

Transparency in the lake is measured every 7–10 days by submerging a Secchi disk, a 10-inch white, circular plate, and recording the depth at which the plate is no longer visible to the human eye. These readings, or Secchi depths, suggest the relative transparency of the lake increases with deeper measurements of Secchi depth. Lower readings of Secchi depths occur as the plate's visibility is impaired by the light-scattering effects of inorganic particles (e.g., sediment) and the light absorption of organic particles (e.g., algae) in the lake. The TRPA numerical standard for average annual Secchi depth is 97.4 feet (29.7 meters). Researchers from the Tahoe Environmental Research Center (TERC) have collected measurements of Secchi depth since 1968. Average annual values for Secchi depth from 1968 through 2016 are presented in Exhibit 6-2.



Source: Adapted from TERC 2017

Exhibit 6-2 Average Annual Secchi Depth

The 2016 value of 69.2 feet (21.1 meters) is 5.1 feet greater than the lowest average annual Secchi depth (64.1 feet, 19.5 meters) recorded in 1997. The 2016 value is approximately 28 feet below attainment of the TRPA numerical standard. The 2015 TRPA Threshold Evaluation (TRPA 2016) reports the status of Secchi depth for the TRPA numerical standard as somewhat worse than the target, with the trend categorized as having little or no change. Statistical analysis of the data shown in Exhibit 6-2 indicates that the decline in Lake Tahoe's transparency has slowed in recent years. For over a decade, the average annual transparency has hovered around 70 feet, but sizable interannual and seasonal variability is observed.

PELAGIC WATER QUALITY: RATE OF PHYTOPLANKTON GROWTH

Phytoplankton (i.e., algae) decreases water clarity by absorbing light; thus, the growth rates of algal blooms in the lake indicate the progress of efforts to improve transparency. An algal growth rate, or phytoplankton primary productivity, of 52 grams of carbon per square meter per year ($gC/m^2/year$) was set by TRPA in 1982 as the numerical threshold standard, based on data collected from 1968 through 1971. Samples collected by TERC continuously since 1968 show that phytoplankton primary productivity has remained well above the standard since its adoption.

In 2016, primary productivity was 225 $gC/m^2/year$, or 4.3 times greater than the standard. The 2015 TRPA Threshold Evaluation (TRPA 2016) reports the status of phytoplankton primary productivity as considerably worse than the target, and the trend as rapidly worsening. However, one contributor to the accelerated productivity may be a long-term shift toward smaller algal species that can process nutrients faster (TERC 2015).

LITTORAL WATER QUALITY: TURBIDITY

The quality of water in the nearshore area is tracked by measuring turbidity, which is an indication of the cloudiness of water expressed in Nephelometric Turbidity Units (NTUs). Higher turbidity measurements indicate cloudier water. TRPA maintains standards for nearshore turbidity of 3 NTU in areas influenced by stream discharge and 1 NTU in areas not influenced by stream discharge.

Pilot-scale implementation of optical (clarity and transmissivity) monitoring protocols recommended in the Lake Tahoe Nearshore Evaluation and Monitoring Framework Report (Heyvaert et al. 2013) were conducted

in 2014 and 2015 (Heyvaert et al. 2016). The pilot monitoring effort completed five nearshore surveys from November 2014 through November 2015, using flow-through (in-situ) sensors mounted to a research vessel that followed a consistent path-line around the nearshore at approximately the 7-meter depth contour. The following findings and observations were reported (Heyvaert et al. 2016:iii–iv):

- No single turbidity measurement exceeded the existing TRPA threshold standard of 1 NTU. However, the measurements were conducted during non-storm periods, and elevated turbidity would likely be expected during times of increased stormwater runoff.
- The highest turbidity, while still below the existing TRPA threshold standard, was typically observed near urban areas along the south shore, northeast shore, and northwest shore. However, attempts to correlate the density of urban development to turbidity measurements within the nearshore produced a weak correlation (R2 = 0.214). The weak correlation could be influenced by a lack of notable stormwater runoff from urban areas during the monitoring period.
- Transmissivity measurements used to identify the status and trend of nearshore clarity are theoretically promising given the near linear relationship between transmissivity and clarity. However, the collected transmissivity data demonstrated disparate results in certain areas from unknown factors.

Based primarily on the data summarized above, the 2015 TRPA Threshold Evaluation reports the status of turbidity as somewhat better than the target, with insufficient data to determine a trend attributable to a lack of a long-term monitoring program and associated data (TRPA 2016).

LITTORAL WATER QUALITY: NEARSHORE ATTACHED ALGAE

In 2012, the TRPA Governing Board adopted a new standard in the nearshore environment to address attached algae (periphyton) growing to submerged surfaces in the lake such as lake substrate, rocks, buoys, and piers. The adopted TRPA standard for nearshore attached algae is qualitive and focuses on supporting policy and management actions to reduce the areal extent and density of attached algae in the nearshore. The 2015 TRPA Threshold Evaluation reports the status and trend for attached algae could not be assessed due to insufficient data given the lack of defined numerical targets (TRPA 2016).

6.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

6.4.1 Methods and Assumptions

The evaluation of potential water quality and hydrodynamic impacts from the Shoreline Plan alternatives is based on a review of documents pertaining to Lake Tahoe and the shorezone, including previous Lake Tahoe water quality studies, previous environmental impact statements/reports, existing regulations and ordinances, and published and unpublished literature focused on the water quality effects of motorized boating. The information obtained from these sources was reviewed and summarized to understand existing conditions and to identify potential environmental effects, based on the significance criteria defined below. In determining the level of significance, the analysis assumes that the Shoreline Plan alternatives would comply with relevant federal, state, and local laws and regulations and TRPA regulations and ordinances.

ENVIRONMENTAL EFFECTS ANALYZED ELSEWHERE

The following potential environmental effects have linkages to water quality but are analyzed in other sections of this EIS and are not discussed or analyzed in this chapter:

- Aquatic Invasive Species: Increased boat use could introduce and spread aquatic invasive species, which could lead to alterations in the water quality of Lake Tahoe. This chapter assesses possible direct

effects on water quality from the Shoreline Plan alternatives. Effects on related resources, such as the potential introduction or spread of aquatic invasive species from Shoreline Plan alternatives, are evaluated in other chapters of this EIS.

- Boat Emissions Affecting Air Quality: The Shoreline Plan will regulate new and redeveloped boating facilities on Lake Tahoe, which may result in increased boat use. Emission estimates from changes in boating activity under the Shoreline Plan alternatives are developed and presented in Chapter 10, "Air Quality." This chapter uses the emission estimates to estimate and assess the proportion of emissions that enter Lake Tahoe's water through direct exchange at the water surface and atmospheric deposition. However, the methods and assumptions used to derive estimated emissions from boating activities are not discussed in this chapter.

6.4.2 Significance Criteria

Significance criteria relevant to hydrology and water quality are summarized below. The applicable TRPA threshold standards, the water quality and hydrology criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. Implementation of a Shoreline Plan alternative would result in a significant adverse effect on water quality or hydrodynamics (e.g., littoral drift) if new or redeveloped boating facilities and associated changes in boating activity would:

- cause substantial short-term accelerated soil erosion and/or release of pollutants to water bodies associated with construction or maintenance of a shoreline facility,
- substantially increase fine sediment resuspension and turbidity,
- increase atmospheric deposition of pollutants onto the surface of Lake Tahoe,
- substantially increase pollutant discharges of hydrocarbons or other contaminants into Lake Tahoe, or
- cause substantial interference with or adverse effects on littoral processes.

6.4.3 Environmental Effects of the Project Alternatives

Impact 6-1: Soil erosion and/or release of pollutants to Lake Tahoe from shorezone facility construction or maintenance activities, including dredging

All four Shoreline Plan alternatives would allow new construction and dredging within the shorezone. Construction activities could affect water quality by accelerating soil erosion and sedimentation while also releasing pollutants. Dredging for new construction or maintenance dredging for existing facilities could affect water quality by increasing turbidity and releasing nutrients into the surrounding water. Existing state, federal, and TRPA regulations mitigate potential short-term impacts from construction activities in the shorezone. TRPA policies require the implementation and maintenance of temporary BMPs to protect water quality during maintenance dredging within the shorezone. Under Alternatives 1 and 3, TRPA would revise code standards (Section 84.15.3) to be consistent with federal standards for new dredging (nondegradation) under Section 404 of the CWA as regulated by USACE. However, the federal standards under Section 404 are mandatory for dredging in Lake Tahoe regardless of the TRPA Code provisions and are therefore applicable to all four alternatives. Dredging activities would also need to comply with each state's Section 401 water quality certification requirements. Because construction and dredging activities associated with any proposed or existing facility under all four Shoreline Plan alternatives would be required to conform to applicable state, federal, and TRPA regulations for the protection of water quality, this impact would be **less than significant**.

Alternative 1: Proposed Shoreline Plan

Construction activity permitted under Alternative 1 could adversely affect water quality in the shorezone by accelerating soil erosion and sedimentation, increasing turbidity, and releasing pollutants. Use of heavy equipment in and adjacent to the water's edge could produce dust and temporarily disturb and resuspend lake sediments in the water column, thus increasing turbidity in the immediate vicinity of the construction site. Additionally, operating heavy equipment such as pile drivers and their associated barges could cause sediment plumes during in-water construction. Construction equipment operating in the nearshore zone can also destroy native aquatic plants and disrupt the natural layering of sand and surface armor, which contributes to turbidity. Alternative 1 would allow for the construction of 138 new piers (10 public, 128 private) and two new boat ramps. Construction would also occur at locations where TRPA allows the relocation of existing boat ramps to new sites that are better suited to low lake levels, or where public ramps may be extended farther into the lake to allow for operation over a wider range of water level conditions. Relocation or extension of boat ramps would be subject to environmental review and applicable permit conditions. For relocated boat ramps, this would include removal of all derelict structures at the existing site and restoration to predevelopment conditions.

No new marinas would be allowed under the proposed Shoreline Plan. However, marina reconfigurations or expansions would be allowed if the marina is certified as a "clean marina" by the Clean Marina Program, an organization that educates, assists, and certifies marina compliance with BMPs to reduce the potential for pollution. Existing marinas must also demonstrate compliance with water quality and BMP requirements under TRPA Code Section 60.4.

The TRPA Code defines dredging as the rearrangement of any material below elevation 6,229.1 feet (Lake Tahoe Datum). Dredging in Lake Tahoe is performed to facilitate the maintenance and continued use of shorezone facilities. TRPA differentiates between maintenance dredging and new dredging. Maintenance dredging is most commonly performed to maintain lake access and is defined as the dredging of areas that have been previously dredged to maintain legally established lake bottom elevations and dimensions. Under Alternative 1, maintenance dredging would continue to be allowed. New dredging would be allowed at the following general locations:

- marinas,
- five county-designated and U.S. Coast Guard public health and safety facilities (see Chapter 2, "Project Description," Section 2.6.9), and
- public boat ramps where increased functionality of the ramp can be demonstrated.

Existing state, federal, and TRPA regulations mitigate potential short-term impacts from construction activities in the shorezone. In the case of marina expansions, TRPA may require applicants to demonstrate that the expanded project would result in a reduced need for dredging.

TRPA's Standard Conditions of Approval for Shorezone Projects (TRPA Permit Appendix S) would be implemented prior to and during construction in the shorezone, including placement of erosion control devices and sediment barriers. The BMP Handbook (TRPA 2014) details required steps and procedures for dredging applications. Before approval of a dredging activity, the dredging application must demonstrate that environmental conditions have been evaluated and the best set of feasible management practices have been selected for the setting and activity. This includes analysis of lake bed material, locations of spawning habitats, and assessment of any seasonal limitations imposed by severe weather or spawning. Based on this information, potential BMPs are then ranked according to criteria such as their effectiveness, logistical feasibility, and cost. For example, turbidity curtains may be used during pile driving and other lakebed disturbing activities. A turbidity curtain is a floating barrier consisting of relatively impervious fabric, used to prevent the transport of fine and coarse suspended sediment away from areas of water-based construction activities. Additionally, depending on site-specific conditions, use of caissons (i.e., watertight retaining structures that isolate piers during construction) during pier construction may be warranted. These retaining

structures would allow water to be removed from the pile installation location, allowing pile installation to occur in the dry during pier construction. Other best management practices for shorezone construction include:

- checking turbidity curtains frequently and repairing or replacing them if necessary,
- for periods of high wind and wave action, ceasing construction activities causing degraded water quality within the curtained area under weather conditions improve,
- defining limits on the extents of turbid waters permitted to escape the dredging area or co-mingle with the nearshore water of Lake Tahoe (typically 20 NTU),
- using water trucks or baker tanks used to transport dredging spoils, if they are not properly dewatered, to prevent discharge of sediment-laden water to roadways,
- providing oil booms on-site for use in cleanup in case of spills,
- providing training to construction personnel for response procedures to address spills, and
- requiring specialized dredging equipment designed to reduce impacts on water quality if necessary.

In addition to implementation of project-specific BMPs, water quality monitoring is required for all shorezone dredging activities. The frequency and duration of measurements are defined on a project-specific basis by the responsible state and federal authorities and TRPA. A water quality monitoring plan must be developed and approved prior to dredging activities with clear quality assurance/quality control protocols and contingency plans in the case of adverse weather (TRPA 2014:8-61).

TRPA dredging standards under Alternative 1 would be revised to include performance standards consistent with those of Section 404 of the CWA, which are standards that all facilities must comply with, regardless of whether TRPA revises TRPA Code standards under Section 84.15.3. Under the terms of Section 404, USACE is charged with reviewing applications for dredging to determine that steps have been taken to avoid or minimize impacts on waters of the United States. Dredging activities would also need to comply with each state's Section 401 water quality certification requirements. Because implementation of best management practices, including TRPA's standard conditions, would avoid or minimize suspended sediment and turbidity-related impacts near construction areas, and construction and dredging associated with any project in the shorezone would be required to conform to all applicable state, federal, and TRPA regulations pertaining to protection of water quality from construction-related discharges, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would retain the existing shorezone regulations of the TRPA Code (Code Chapters 80–86). Under Alternative 2, all littoral parcels in existence as of July 1, 1987, would be eligible for one new pier, except for properties that are served by or eligible to be served by a multiple-use facility (such as a homeowners association [HOA] pier). However, no piers would be allowed within TRPA-designated prime fish habitat or stream mouth protection areas. Maintenance dredging would be allowed in previously dredged areas where it is necessary to continue an existing use. New dredging would be allowed only if TRPA finds that it is beneficial to shorezone conditions, water quality, and clarity.

Alternative 2 assumes that up to two new marinas could be authorized based on an assessment of eligible locations and property ownership. Any proposal for a new marina would require the preparation of a marina master plan and a project-specific environmental analysis. Because any new marina proposal would require its own analysis of environmental effects relative to federal, state, and local laws and regulations, as well as TRPA regulations, and because mitigation measures would be required to address identified impacts as a condition of project approval, the continued allowance for new marina applications under Alternative 2 would not result in an adverse impact on the environment.

Any construction or maintenance dredging associated with a proposed project under Alternative 2 would be subject to existing state, federal, and existing TRPA regulations pertaining to protection of water quality from construction-related discharges as described for Alternative 1. For the same reasons described above for Alternative 1, this impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize five new public piers, one new public boat ramp, and 86 new private, multiple-use piers. As with Alternative 1, TRPA would allow the relocation of existing boat ramps to new sites that are better suited to low lake levels. Expansions of existing marinas would be allowed under the same stipulations as Alternative 1. Maintenance dredging would continue to be allowed. New dredging would be allowed only at marinas, at five essential public health and safety facilities, and at previously approved public boat ramps. New dredging could be approved as a component of an environmental improvement project.

Construction associated with proposed shoreline structures under Alternative 3 would be subject to the same requirements and regulations described for Alternative 1. As with the proposed Shoreline Plan under Alternative 1, TRPA would adopt regulations for new dredging performance standards that are consistent with Section 404 of the CWA for new dredging (nondegradation). Dredging activities would also need to comply with each state's Section 401 water quality certification requirements. For the same reasons described above for Alternative 1, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for the construction of 15 new public piers. Any construction associated with a proposed project under Alternative 4 would be subject to the same requirements and regulations described for Alternative 2.

Under Alternative 4, dredging would be regulated in the same manner as in Alternative 2. Maintenance dredging would be allowed in previously dredged areas where it is necessary to continue an existing use. New dredging would be allowed only if TRPA finds that it is beneficial to shorezone conditions, water quality, and clarity. For the same reasons described above for Alternative 2, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 6-2: Sediment resuspension and turbidity associated with the hydrodynamic effects of motorized boating

The hydrodynamic effects from motorized boating can disturb and resuspend lakebed sediment through propeller wash and boat wake, potentially leading to increased turbidity and reductions in nearshore clarity. Hydrodynamic effects from propeller wash and boat wake are generally limited to shallower areas, with little or no effects for water depths less than 7 feet and no effects for water depths greater than 10 feet (Beachler and Hill 2003; USACE 1993). TRPA Code Section 84.17.1 requires a no-wake zone within 600 feet of the shore with a 5-mile-per-hour (mph) speed limit. Most of Lake Tahoe's shallower depths are within the existing no-wake zone, with notable exceptions being the nearshore areas adjacent to the City of South Lake Tahoe and Tahoe City.

Lake Tahoe's nearshore presents complex environment conditions and factors that may influence nearshore clarity in an interrelated manner that varies by location and with time (Taylor 2002). In addition to natural wind effects generating water movement, wave motion, and natural littoral processes, factors influencing the observed variability in nearshore clarity may include: adjacent land-uses and urban stormwater inputs, other nonpoint pollutant inputs, boating activity, proximity to stream inputs, water depth, substrate type, and localized features of the lake bottom. Among these interrelated factors the potential contribution of boating activities to degrade nearshore clarity is difficult to isolate or quantify.

Alternatives 1, 2, and 3 are projected to generate a peak-day increase in boating activity. On peak days, increased boat use could increase wave action and turbulence generated by boat wake. The shallower portions of the nearshore outside existing no-wake zone regulations are likely more susceptible to short-term and temporary declines in clarity because of increased wave action. During summertime periods with low winds and low inputs of streamflow and stormwater runoff, Lake Tahoe waters would typically be quiescent with low wave action in the nearshore. Because Alternatives 1, 2, and 3 would increase boating activity on peak days, the increased potential for boat wake to induce additional wave action in shallow nearshore areas most susceptible to elevated turbidity would also increase; therefore, the potential frequency of exceeding the nearshore threshold turbidity standard may also increase for limited portions of the nearshore. This would be a **potentially significant** impact under Alternative 2. With Alternatives 1 and 3, TRPA would increase boater education and enforcement of the no-wake zone, expand the existing nearshore monitoring network to assess whether boating activity has adverse impacts on water clarity from the anticipated increase in boating activity attributable to these alternatives, and implement management actions informed by research to avoid or offset potential impairments to nearshore clarity from the anticipated increase in boating, if necessary. For these reasons, this impact would be **less than significant** for Alternatives 1 and 3.

Alternative 4 would not increase boating activity. Consequently, Alternative 4 would have **no impact** on sediment resuspension and short-term clarity declines in the nearshore.

Alternative 1: Proposed Shoreline Plan

The hydrodynamic effects from motorized boating can disturb and resuspend lakebed sediment, potentially leading to increased turbidity and reductions in nearshore clarity. Lakebed sediment can be disturbed from boating activities in two ways: propeller wash and boat wake.

Propeller wash is created from the thrust of a boat propeller that transfers energy to the water column, which in turn creates turbulence. When a propeller is operating at a high speed in shallow waters, the turbulence created can interact with the lakebed and scour and resuspend sediments. The specific water depth at which propeller wash will resuspend lakebed sediments is dependent on boat dimensions, applied motor power, and sediment grain size (Yousef 1974). Lab and field tests have found that the energy from propeller wash rapidly diminishes beyond a situation-specific threshold (Gucinski 1982) and for recreational watercraft, has limited impacts below 7 feet and generally no effects for water depths greater than 10 feet (Beachler and Hill 2003; USACE 1993). Hoverson and McGinley (2007), in their experiments on marl-dominated sediments, found that impacts from recreational boats operated at no-wake speeds were undetectable.

Boat wake is the pattern of waves generated as a boat moves and displaces surrounding water. The size and associated energy of boat wake depend on boat dimensions, motor power, and boat speed. Gucinski (1982) highlights that the combined constructive and destructive interference from multiple boat wakes makes predicting cumulative effects difficult. Hydrodynamic effects from boat wake are limited to shallower areas of a lake, such as the nearshore of Lake Tahoe, where boat wake can either contribute to the resuspension of lakebed sediment or contribute to shoreline erosion.

Increased boat use is projected to occur under Alternative 1. By the buildout year of 2040, average annual boat engine hours under Alternative 1 would increase by roughly 77,600 hours with a peak-day increase of roughly 1,600 hours (Table 6-5). On peak days, increased boat use could increase wave action and turbulence generated by boat wake and propeller wash.

Table 6-5 Alternative 1 – Projected Change in Boat Engine Hours

	Baseline Condition	Alternative 1 Incremental Effect	Alternative 1 Baseline plus Project
Peak-day boat engine-hours	12,512	1,580	14,093
Annual boat engine-hours	489,155	77,638	566,793

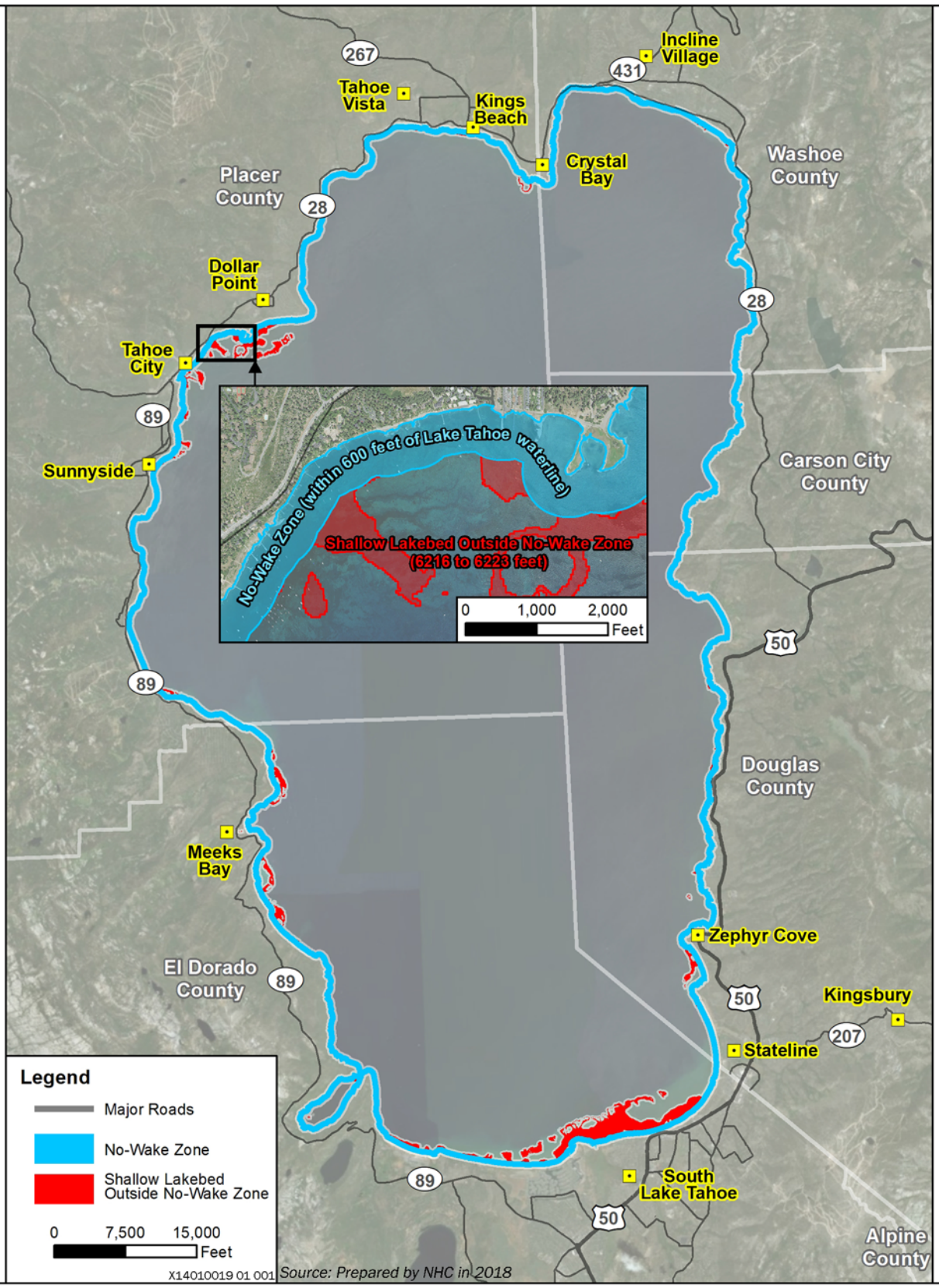
Source: Boat use estimates compiled by the Joint Fact-Finding Committee (Appendix A)

TRPA Code Section 84.17.1 requires a no-wake zone within 600 feet of the shore with a 5-mph speed limit. Under Alternative 1, the existing no-wake zone would be expanded so that all areas within Emerald Bay would be designated a no-wake zone. The speed limit in Emerald Bay would be limited to 5 mph with an exception of 7 mph for tour boats. Alternative 1 also includes provisions for increased boater education and enforcement of the no-wake zone, for example:

- Enforcement of the no-wake zone would be increased with a new boat launch fee generating funding for an additional TRPA boat and crew to expand the amount of no-wake zone education and enforcement patrols.
- Boat inspectors would educate watercraft owners and operators during boat inspections. Watercraft owners and operators would be educated about the no-wake zone, and appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations to prevent discharges into the lake, and appropriate engine tuning and propeller selection to reduce emissions during high-elevation boating.
- Signs and other public information would be provided at public boat ramps and other public access points along the shoreline. The information would educate boaters and other shoreline users about the no-wake zone, AIS preventions strategies, and public safety considerations.
- Staff at marinas and motorized watercraft rental concessions would receive training on appropriate watercraft operations and maintenance, including fueling practices, bilge and sewage operations, and appropriate engine tuning and propeller selection. In addition, staff at marinas and motorized watercraft rental concessions would be required to educate customers about the no-wake zone and appropriate watercraft operations.

To assess the effects that the current no-wake zone regulations have on potential impacts from propeller wash, a geographic information system (GIS) analysis of the shoreline and bathymetry was conducted (Exhibit 6-3). A buffer zone was created 600 feet from the shoreline to represent the current no-wake zone. Next, lakebed elevations from 6,223 feet to 6,216 feet (Lake Tahoe Datum) were identified to determine the maximum spatial extents of lakebed that could be affected by high-speed boating activities outside the current no-wake zone, assuming potential impacts could occur to water depths up to 7 feet (Beachler and Hill 2003; USACE 1993). A lakebed elevation of 6,223 feet was used as the upper limit because this elevation corresponds to the natural rim of Lake Tahoe and the lake level is typically higher than 6,223 feet. Based on analysis of lake elevation data from USGS gage 10337000 at Tahoe City, Lake Tahoe's water surface elevation has been above 6,223 feet roughly 87.5 percent of the time since daily recording began in 1957. Furthermore, Reardon et al. (2016:142) concluded that the maximum areal extent of shallow nearshore area susceptible to lakebed sediment resuspension occurs at a lake level equal to the natural rim.

The GIS analysis shown in Exhibit 6-3 produced similar results to the work of Alexander and Wigart (2013, Figure 1), which identifies nearshore areas most at risk of elevated turbidity attributable to the shallow lakebed. Specifically, the GIS analysis identified the following areas outside the no-wake zone but shallow enough to be at risk for propeller-generated resuspension of lakebed sediment during periods of low lake level: (1) the south shore nearshore area from the Upper Truckee River mouth east to Stateline Marina, (2) the Tahoe City nearshore area, (3) Marla Bay, and (4) a small portion of Rubicon Bay. These shallow lakebed locations also generally match regions of the nearshore identified by Taylor (2002) to have elevated turbidity. Taylor (2002) found higher turbidity along the shoreline in South Lake Tahoe, Tahoe City, and, to a lesser degree, Kings Beach.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 6-3 **Lakebed Elevations Potentially Affected by Propeller Wash**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Scientific approaches for investigating and understanding the factors influencing Lake Tahoe's nearshore conditions are still emerging. TERC's Nearshore Water Quality Network was recently deployed and currently comprises 11 stations around the shore of Lake Tahoe and Cascade Lake. Each station measures water quality variables every 30 seconds at a water depth of approximately 7 feet and at a location several inches above the lake bed (TERC 2017). However, the data collection effort is a relatively new endeavor and long-term data sets are not available to assess trends for nearshore clarity (TRPA 2016:4-40).

Under Alternative 1, TRPA will support research to assess the effectiveness of the current no-wake zone boundaries by expanding the Nearshore Water Quality Network or other efforts to include monitoring stations located within areas of shallow lakebed but outside the no-wake zone. If research concludes that the increase in boating activities attributable to Alternative 1 would contribute to an exceedance of TRPA's nearshore thresholds, TRPA would implement management actions to avoid this impairment. Such management actions could include:

- expanding the no-wake zone based on scientific findings and recommendations for nearshore areas identified to be susceptible to reduced clarity from boating activities; or,
- enacting a nearshore water quality mitigation fee on recreational watercraft and using the revenue to fund compensatory mitigation projects that reduce other sources of nearshore water quality impairment.

Previous studies of Lake Tahoe turbidity have shown differing and sometimes inconclusive relationships between decreased water clarity and potential drivers for observed nearshore conditions.

- Based on turbidity data collected along the lake perimeter throughout 2001, Taylor (2002) identified spatial and temporal variability in turbidity levels, with a correlation identified between elevated turbidity in the summer and shoreline development. Taylor suggested that while boating activity may be one factor for increased turbidity, algal density could also be a key factor stimulated by the influx of nutrients from overland flow, groundwater, or leached from lake sediments. Taylor et al. (2004) conducted further research in the nearshore, finding shallow areas of low turbidity adjacent to areas of high turbidity.
- Alexander and Wigart (2013) conducted a turbidity study from two piers on the south shore during the summer of 2012 to assess the influence of boating activity on nearshore clarity. The study used registered daily boat launches as an indicator of daily boat activity. Alexander and Wigart consistently found lower turbidity in the morning (average of 0.41 NTU) and higher turbidity in the evening (average of 0.84 NTU). With higher evening turbidity levels returning to background levels by the next morning. Alexander and Wigart (2013:253) concluded that the median daily change associated with increasing turbidity correlated with increasing registered boat launches.
- Reardon et al (2016) monitored and modeled the potential for wind waves to resuspend sediment in the nearshore of Lake Tahoe. The study identified a strong summertime diurnal pattern with wind intensity peaking around mid-afternoon each day. Conversely, no regular wind pattern was detectable in the winter with low-wind and high-wind periods sustained for days at a time. The study found that wind-driven surface waves have the potential to resuspend sediment up to a water depth of 9 meters (~30 feet). However, the authors determined that wind waves did not frequently disturb the sediment-water interface at their study site, which was located on the south end of Lake Tahoe at a water depth of 5 meters (~16 feet). Study results suggest that wind-driven nearshore sediment resuspension does not increase particle loading for the size class identified to most negatively impact Lake Tahoe's pelagic deep-water transparency (fine sediment particles with a diameter of 1 to 16 microns). The authors noted that this finding may be related to a lack of fine sediment material available for resuspension as the nearshore is dominated by coarse and granular lakebed sediment.
- While not a study conducted on Lake Tahoe, Asplund (1996) found that although boating appeared to lead to some decrease in water clarity for 10 different Wisconsin lakes, the magnitude of change was small compared to observed differences between sites and seasons. Asplund suggests that boating

impacts are localized and short term and should be assessed in the context of other water quality impacts on lakes.

- After conducting clarity surveys throughout Lake Tahoe and deploying a nearshore autonomous water clarity buoy, Susfalk et al. (2009), echoing suggestions proposed by Taylor et al. (2004), recommended using near-continuous data to observe short- and long-term trends to examine the impact of water-based activities, such as boating, on the nearshore.

- Heyvaert et al. (2016) completed a pilot monitoring effort of five nearshore surveys from November 2014 through November 2015. From that pilot monitoring effort, no single turbidity measurement exceeded the existing TRPA nearshore numerical standard of 1 NTU.

Lake Tahoe's nearshore presents complex environmental conditions and factors that may influence nearshore clarity in an interrelated manner that varies by nearshore location and with time (Taylor 2002). Besides natural wind effects generating water movement, wave motion, and natural littoral processes, factors influencing the observed variability in nearshore clarity may include: adjacent land-uses and urban stormwater inputs, other nonpoint pollutant inputs, boating activity, proximity to stream inputs, water depth, substrate type, and localized features of the lake bottom. Among these interrelated factors the potential contribution of boating activities to degrade nearshore clarity relative to existing standards is difficult to isolate or quantify.

Increased boating activity on peak days has the potential to generate and alter wave action within the shallower portions of the nearshore adjacent to South Lake Tahoe and Tahoe City, the most susceptible locations for short-term and temporary declines in clarity due to sediment resuspension – if such sediments were locally available. Alternative 1 would increase boating activity on peak days (estimated 13 percent increase – see Table 6-5). Because the potential for an incremental increase in boating activities under Alternative 1 to alter existing hydrodynamics of the lake in a manner detrimental to nearshore water clarity cannot be quantified with available data and research, there is no definitive evidence to suggest that the increased boating activity proposed under Alternative 1 would lead to any exceedances of TRPA nearshore threshold standards for clarity; nevertheless, it is possible that the increased boating could produce more turbidity and negatively affect lake clarity to some degree. However, because TRPA would increase boater education and enforcement of the current no-wake zone, expand existing nearshore monitoring to assess drivers of nearshore water clarity conditions and their potential relationship to boating, and implement management actions informed by research to avoid impairments to nearshore clarity from the increase in boating activity from the Shoreline Plan, if necessary, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 is projected to generate a peak-day increase of roughly 5,400 boat engine hours, or a 43 percent increase compared to the baseline condition by the projected buildout year of 2040. For the same reasons discussed in Alternative 1, the increased peak-day boat activity under Alternative 2 would increase the potential for boat wake to induce additional wave action in the shallow nearshore areas most susceptible to elevated turbidity. Alternative 2 includes no provisions for expanded no-wake zone education or enforcement, or additional study of nearshore turbidity effects and adaptive management; therefore, the potential frequency of exceeding the nearshore threshold turbidity standard may also increase for limited portions of the nearshore under Alternative 2, which constitutes a **potentially significant** impact.

Alternative 3: Limit New Development

Alternative 3 is projected to generate a peak-day increase of roughly 460 boat engine hours, or a 4 percent increase compared to the baseline condition, by the projected buildout year of 2040. As with the proposed Shoreline Plan under Alternative 1, TRPA would under Alternative 3 increase boater education and enforcement of the current no-wake zone, expand the existing nearshore monitoring network to assess the effects of boating activity on nearshore turbidity, and would implement management actions informed by monitoring and research to avoid or offset potential impairments to nearshore clarity from boating, if necessary. For the same reasons described above for Alternative 1, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would not increase boating activity. Consequently, Alternative 4 would have **no impact** on sediment resuspension and short-term clarity declines in the nearshore.

Mitigation Measures

Mitigation Measure 6-2: Study and adaptively manage the effects of boats on nearshore conditions

This mitigation measure would be required for Alternative 2.

TRPA will coordinate with partner agencies and research organizations to complete monitoring and studies that evaluate the effects of boat activity on nearshore clarity and water quality. TRPA will then implement management actions, if needed, based on the results of the studies.

To ensure the completion of nearshore studies, TRPA will enact a nearshore water quality mitigation fee on recreational watercraft. The fee will be assessed on all recreation watercraft, either during aquatic invasive species boat inspections or at launch points. The fee will remain in place for a period of up to ten years to fund scientific research and nearshore monitoring through a program such as the Nearshore Water Quality Network. Revenue generated from the fee will be directed towards research components of nearshore studies tasked with evaluating potential impacts of boat activity on nearshore clarity and water quality. TRPA will set the fee at an amount that is adequate to fund an assessment of recreational boating effects on nearshore water quality and clarity.

If research concludes that the increase in boating activities anticipated under Alternative 2 would contribute to an exceedance of TRPA's nearshore numerical standard of 1 NTU, TRPA will implement management actions to avoid or offset this impairment. Such management actions could include, but are not limited to:

- expand the no-wake zone based on the scientific findings and recommendations for nearshore areas identified to be susceptible to reduced clarity from boating activities; or
- enact a permanent nearshore water quality mitigation fee on recreational watercraft and use the revenue to fund compensatory mitigation projects that reduce other sources of nearshore water quality impairment.

Significance after Mitigation

Mitigation Measure 6-2 would provide for a scientific study to determine if hydrodynamics effects of motorized boating lead to short-term and temporary decreases in nearshore water clarity, among potentially other contributing factors. Based on the results of this study, TRPA would implement necessary management actions to avoid or offset the effects of motorized boating on nearshore water quality. This mitigation would reduce the impact to a **less-than-significant** level for Alternative 2.

Impact 6-3: Direct entrainment or atmospheric deposition of pollutants from boat exhaust

Increased boating activity is projected under Alternatives 1, 2, and 3, which could lead to increased boat emissions. Alternative 4 would not increase boating activity, and therefore would not increase boat emissions. Boat engines emit oxides of nitrogen (NO_X) and particulate matter (PM) during operation, which may be delivered to the lake through direct entrainment in the water column or atmospheric deposition. Total nitrogen and fine sediment particles are pollutants of concern for lake transparency and clarity, and the Lake Tahoe TMDL sets load reduction targets for these pollutants. Therefore, emissions that lead to an increase in loading for these pollutants of concern might extend the timeline needed to achieve the Lake Tahoe TMDL load reduction targets.

The approval of additional boating facilities under Alternatives 1, 2, and 3 leading to the increase in boating activity would be phased through a projected buildout date of 2040. Impact 10-1 in Chapter 10, "Air Quality," assesses potential changes in emissions from increased boating activity under Alternatives 1, 2,

and 3. Impact 10-1 concludes that a net reduction in boating emissions, including emissions of NO_X and PM, would result under Alternatives 1 and 3 as the increased boating hours are offset by fleet turnover, with older boat engines replaced with cleaner and more fuel-efficient boat engines. Because potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X and PM, and a net reduction in atmospheric emissions would occur under Alternatives 1 and 3, the additional boating activity would be a **less-than-significant** impact on lake transparency and clarity.

Impact 10-1 in Chapter 10, "Air Quality," concludes that under Alternative 2 changes in emissions from increased boat activity will have mixed results, with a net increase in NO_X and a net decrease in PM. Because Alternative 2 would create a net increase in NO_X loading, and potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X, this could extend the timelines needed to achieve the Lake Tahoe TMDL load reduction targets. Therefore, the level of additional boating activity allowable under Alternative 2 represents a **potentially significant** impact. With implementation of Mitigation Measure 6-3, the impact on lake transparency and clarity from Alternative 2 would be **less than significant**.

Alternative 4 would not increase boating activity and would be subject to the same fleet turnover. Consequently, Alternative 4 would have **no impact** on lake transparency and clarity.

Alternative 1: Proposed Shoreline Plan

Oxides of nitrogen (NO_X) and fine particulate matter (PM) are byproducts of exhaust generated from boat engines (see Chapter 10, "Air Quality"). Total nitrogen and fine sediment particles are pollutants of concern for lake transparency and clarity because of the potential for nitrogen to stimulate algal growth and the light scattering properties of fine sediment particles. Phosphorus is also a pollutant of concern for lake transparency and clarity because of its potential to stimulate algal growth, but phosphorus is not a combustion byproduct of boat engines (see Chapter 10, "Air Quality"), and as such, is not analyzed within this impact analysis.

The Lake Tahoe TMDL (Lahontan Water Board and NDEP 2010:10-4) sets load reduction targets of fine sediment particles, total nitrogen, and total phosphorus for in-basin sources, including targets associated with atmospheric deposition of pollutants to the lake surface. The Lake Tahoe TMDL estimates that attainment of load reduction targets will achieve the lake transparency and clarity standards of Lahontan Water Board, NDEP, and TRPA. An action or policy that would increase loading to the lake for pollutants of concern might extend the timeline needed to achieve the Lake Tahoe TMDL load reduction targets or require implementation of additional pollutant controls to offset the increase in loading.

Exhaust from boat engines can introduce NO_X and PM to the surface of the lake through two pathways: (1) entrainment in the water column; and (2) atmospheric deposition:

- Entrainment of NO_X and PM can occur as combustion byproducts pass through the water column after being exhausted from a boat engine at or below the water line. Lab experiments conducted by Hare and Springer (1973) demonstrated that a fraction of both NO_x and PM from boat exhaust remain in solution after the bulk of the exhaust gases bubble into the air. In those tests, the percentage of emissions entrained depended on the applied motor power, and the engine make and model. Hallock and Falter (1987) also observed increases in total inorganic nitrogen after operating powerboats in open-air lake experiments, though no attempt was made to separate contributions from air deposition relative to direct entrainment of exhaust gases.

- Atmospheric deposition of NO_X and PM can occur after boat gases and particulates exhausted into the atmosphere return to the water surface through dry deposition or through entrainment and delivery from a precipitation event (wet deposition). Because the surface area of Lake Tahoe is large (191 square miles) and accounts for two-fifths of the total basin area, atmospheric deposition onto the lake surface for pollutant of concerns can contribute a notable portion of the total loading to the lake. As shown in Exhibit 6-1, the Lake Tahoe TMDL estimates that atmospheric deposition contributes 55 percent of the

total nitrogen and 15 percent of the fine sediment particle loads to the lake annually. Research by Gertler et al. (2006:58) concluded that out-of-basin sources are not major contributors to observed levels of air pollutants in the basin. This finding is supported by Lake Tahoe TMDL science, which found that pollutant loading rates from atmospheric deposition directly to the lake for nitrogen and fine particulate matter are dominated by in-basin sources (Lahontan Water Board and NDEP 2010:B-12).

Average annual boat engine hours under Alternative 1 would increase by roughly 77,600 hours or 16 percent compared to baseline conditions (Table 6-5). The approval of additional boating facilities leading to the estimated increase in boating hours will be phased through a projected buildout date of 2040. Impact 10-1 in Chapter 10, "Air Quality," assesses potential changes in emissions from boating activities under Alternative 1 with the phased implementation approach. Impact 10-1 concludes that peak-day boating emissions of NO_X and PM will decrease under Alternative 1 as the increased boating hours are offset by fleet turnover, by which older boat engines are retired over time and replaced by cleaner and more fuel-efficient models that meet increasingly stringent California and federal emission standards for recreational watercraft as summarized in Table 10-3 of Chapter 10, "Air Quality". Projected decreases in emissions from the year 2017 to 2035 for boats registered in California and active in the Lake Tahoe Air Basin are summarized in Table 10-5 within Chapter 10 (CARB 2017).

Table 6-6 applies the emission rates used in Impact 10-1 to estimate changes in annual boat emissions under Alternative 1 for NO_X and PM_{10} (particulate matter with a diameter of 10 microns or less), which demonstrates a decrease in annual total loading for these pollutants of concern to lake transparency and clarity from boat emissions.

Table 6-6 Alternative 1 – Estimated Change in Annual NO_X and PM_{10} Loading from Boat Emissions

	Baseline Condition	Alternative 1 Incremental Effect	Alternative 1 Baseline plus Project
Annual Boat Engine-Hours	489,155	77,638	566,793
Annual NO_X load (lbs)	12,589	-1,730	10,859
Annual PM_{10} load (lbs)	3,519	-1,789	1,729

Because potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X and PM, and a net reduction in atmospheric emissions is estimated under Alternative 1 as described in Impact 10-1, the additional boating use under Alternative 1 would be a **less-than-significant** impact on lake transparency and clarity.

<u>Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)</u>

Alternative 2 is projected to generate an annual increase of 253,000 boat engine hours, or 52 percent compared to the baseline condition, by the projected buildout year of 2040. Impact 10-1 concludes that under Alternative 2 changes in emissions from increased boat activity will have mixed results, with a peak-day increase in NO_X and a peak-day decrease in PM. Table 6-7 applies the emission rates used in Impact 10-1 to estimate changes in annual boat emissions under Alternative 2 for NO_X and PM_{10} (particulate matter with a diameter of 10 microns or less), which demonstrates an increase in annual total loading of NO_X from boat emissions and a decrease in annual total loading for PM_{10} from boat emissions .

Table 6-7 Alternative 2 – Estimated Change in Annual NO_X and PM_{10} Loading from Boat Emissions

	Baseline Condition	Alternative 2 Incremental Effect	Alternative 2 Baseline plus Project
Annual Boat Engine-Hours	489,155	253,026	742,182
Annual NO_X load (lbs)	12,589	1,631	14,219
Annual PM_{10} load (lbs)	3,519	-1,254	2,265

Because Alternative 2 would create a net increase in NO_X loading from boat emissions, and potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X, this could extend the timelines needed to achieve the Lake Tahoe TMDL load reduction targets, therefore, the level of additional boating activity allowable under Alternative 2 represents a **potentially significant** impact.

Alternative 3: Limit New Development

Alternative 3 is projected to generate an annual increase of 17,850 boat engine hours, or 4 percent compared to the baseline condition, by the projected buildout year of 2040. For the same reasons discussed in Alternative 1, and because Impact 10-1 concludes that a net reduction in boating emissions, including emissions of NO_X and PM, will result under Alternative 3 as the increased boating hours are offset by fleet turnover, the additional boating use under Alternative 3 is considered a **less-than-significant** impact on lake transparency and clarity.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would not increase boating activity and would be subject to the same fleet turnover as described above and in Impact 10-1. leading to a net decrease in emissions relative to baseline conditions. Consequently, Alternative 4 would have **no impact** on lake transparency and clarity.

Mitigation Measures

Mitigation Measure 6-3: Limit the number of moorings and boat ramps to limit emissions from increased motorized watercraft activity

This mitigation measure would be required for Alternative 2.

TRPA shall implement Mitigation Measure 10-1 as described in Chapter 10, “Air Quality,” which limits the number of new moorings and boat ramps (and thus boat emissions) to the maximum number allowed under Alternative 1.

Significance after Mitigation

Because potential impacts on lake transparency and clarity from boat exhaust would be proportional to changes in atmospheric emissions of NO_X and PM, and implementation of Mitigation Measure 10-1 described in Chapter 10, “Air Quality,” would ensure that boat emissions for NO_X do not exceed baseline condition loads, the impact after mitigation would be **less than significant** for Alternative 2.

Impact 6-4: Discharge of hydrocarbons or other contaminants into Lake Tahoe from boating activities and boating facilities

Elevated levels of hydrocarbons or other contaminants in the lake could result from increased boating activity under Alternatives 1, 2, and 3. Gasoline and diesel fuels contain hydrocarbon contaminants, including the group of volatile organic compounds collectively known as BTEX (benzene, toluene, ethylbenzene, and xylene). While also occurring in raw fuel, polyaromatic hydrocarbons (PAHs) are primarily produced during the combustion process in an engine. Hydrocarbons can enter the water from boating activities via exhaust emissions, fueling spills, and other accidental spills. Most outboard engines exhaust beneath the surface of the water, and consequently, all exhaust must pass through the water column, where some hydrocarbons will remain in solution or sorb to particulates and sediments. Given the rapid rate of biodegradation of hydrocarbon compounds, the low levels measured in the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities, the increased amount of boating activity projected under Alternatives 1, 2, and 3 would have **less-than-significant** impact associated with hydrocarbon and contaminant discharge. Under Alternative 4, no increased boat activity is projected and current TRPA regulations pertaining to control of contaminant discharge from boating facilities and activities would remain in place, resulting in a **less-than-significant** impact.

Alternative 1: Proposed Shoreline Plan

Increased boating activity could result in elevated levels of hydrocarbons or other contaminants in Lake Tahoe from two primary pathways: 1) exhaust of hydrocarbons from motorboat engines; and 2) direct discharge of contaminants from boating activities and facilities, such as fueling spills or accidental leaks.

Exhaust from motorboat engines typically contacts or passes through the surface of the water. While most exhausted hydrocarbons volatize quickly and leave solution, some fraction of both soluble and nonsoluble components remains in the water column (Balloffett and Quinn 2004). Historically, two general classes of motor fuel-related hydrocarbons have been a concern within the lake environment: volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). In terms of threats posed to water quality from VOC contamination, most attention has been paid to the following compounds:

(1) MTBE – methyl tertiary-butyl ether (fuel additive)
(2) BTEX – the group of benzene, toluene, ethylbenzene and xylene (fuel constituents)

MTBE was historically added to gasoline, particularly during the years 1992–2005, as an oxygenate to promote more complete combustion to reduce emissions and improve air quality (EPA 2013). MTBE was found to create water quality concerns due to its high solubility in water and persistence in the environment. Due to these concerns, MTBE was phased-out of use in California by December 31, 2003 by California Executive Order (D-5-99). Research and water quality sampling from 1998 to 2011 summarized by Rowe (2012:29) demonstrates that MTBE concentrations in the lake have declined to near nondetect levels for samples collected since 2007.

BTEX compounds are part of the chemical make-up of motor fuel. Irwin et al. (1997) cataloged a variety of negative effects linked to BTEX, ranging from toxicity to aquatic life to organ damage in humans. All four BTEX compounds (benzene, toluene, ethylbenzene and xylene) are regulated in drinking water at both the state and federal levels (Table 6-8), but currently there are no numerical standards set for the lake.

Table 6-8 BTEX Maximum Contaminant Levels for Drinking Water (EPA vs California)

Pollutant	EPA Maximum Contaminant Level (mg/L)	California Maximum Contaminant Level (mg/L)
Benzene	0.005	0.001
Toluene	1	0.15
Ethylbenzene	0.7	0.3
Xylene	10	1.75

Source: California EPA 2014

PAH compounds consist of two or more fused benzene rings, and as such, they make up a class of thousands of different molecules. The PAH compounds of concern for the lake are produced during high-temperature pyrolytic reactions, such as those in internal combustion engines (Lico 2004).

Direct discharge of contaminants from boating activities and facilities can occur from several sources, including but not limited to: fueling spills, accidental leaks, bilge water discharges, illicit sewage discharges, and boat washing. Fuel discharges may occur during fueling activities as the result of human error (e.g. overflow) or mechanical malfunction (e.g. malfunction of an automatic shutoff). Marinas are likely the largest potential source of direct discharge of contaminants and have an elevated risk for impaired water quality given the high concentration of boating activities, fueling and washing facilities, and generally poor water circulation patterns.

Alternative 1 would potentially increase the loading of VOCs into the lake but projected additions to current levels would fall well below EPA and California maximum contaminant levels. The presence of VOCs has diminished in the lake since regulations were implemented to reduce the amount of unburnt fuel entering the water directly from boat use. Specifically, carbureted two-stroke engines were banned by TRPA from use

on the lake beginning in October 2001 (TRPA Code 60.1.3E). Lico (2004) found reductions of 40-78 percent in the median concentrations of VOCs in the two years following the two-stroke engine ban. Using toluene as an indicator for BTEX, Rowe et al. (2009) found a steady decline in mean annual concentrations in sampling data from 20 sites around the lake perimeter for the years 2002–2009. This finding was extended by additional monitoring data collected by Rowe in 2010 and 2011 (Rowe 2012). Even during peak boating season (Memorial Day – Labor Day), mean concentrations did not exceed 0.2 ppb (approximately 0.0002 mg/L). These values fall well below California's maximum drinking water contaminant level for toluene of 0.15 mg/L. Rowe (2012) ascribed the decline partly to the greater efficiency of the 4-stroke and direct-injection 2-stroke engines entering the Tahoe boat fleet after the ban on carbureted two-stroke engines.

Increased boating activity under Alternative 1 would lead to an increase in peak daily and annual loading of hydrocarbons, such as PAH. Miller et al. (2003) calculated typical loading rates of PAH for marine engine types (i.e. four-cycle and direct-injection two-cycle) that are currently allowed on the lake. From that data and a contemporary estimate of the fraction of total boat usage represented by four-cycle and direct-injection two-cycle engines on the lake, a composite emission factor of 0.1 g/hour of boat use for PAH was estimated. Table 6-9 shows the results of incremental and total increase in PAH loading that may occur with Alternative 1 resulting directly from increased boating activity. The estimated increases in PAH calculated in Table 6-9 may be overly conservative (high) given the likely possibility that by the buildout date of boating activity allowed under Alternative 1 most boats on Lake Tahoe will be comprised of more fuel-efficient and cleaner motors. Nevertheless, the estimates in Table 6-9 provide context for the magnitude of potential increase in hydrocarbons (PAH) for Alternative 1.

Table 6-9 Alternative 1 – Estimated Change in Annual and Peak Daily PAH Loading

	Baseline Condition	Alternative 1 Incremental Effect	Alternative 1 Baseline plus Project
Peak-day boat engine-hours	12,512	1,580	14,093
Annual boat engine-hours	489,155	77,638	566,793
Peak-day PAH load (lbs)	2.8	0.3	3.1
Annual PAH load (lbs)	108	17	125

The PAH generated by boat traffic from Alternative 1 is an estimated increase of 13 percent during a day of peak boat activity and a nonpersistent annual increase of 16 percent at buildout. PAH is nonpersistent in the environment as surface PAH molecules break down in the presence of natural light, so their potential toxicity is eliminated in less than 24 hours (Miller et al. 2003). Unlike BTEX compounds, PAH concentrations do not appear to have decreased since the ban on carbureted two-stroke engines. However, the levels at which they are found in the lake pose no threat of toxicity to organisms (Lico 2004). Miller et al. (2003) found no phototoxic PAH compounds in any open water areas of Lake Tahoe at concentrations that would be expected to harm aquatic organisms. One sampling site in the Tahoe Keys Marina had concentrations of PAH high enough to potentially cause toxicity to zooplankton and fish larvae (Miller et al. 2003:28).

Under Alternative 1, TRPA Code Section 84.13 and BMP Handbook Section 8.11, Boating Discharge Control and Marina Maintenance, would still apply to marinas requesting an expansion, requiring equipment and BMPs to minimize the possibility of contaminant discharge, including but not limited to:

- pump-out facilities for boat sewage,
- boat washing facilities connected to a sewer system or an acceptable alternative,
- gas pumping facilities including both emergency and standard shut-off systems,
- management and containment procedures for engine oil, transmission fluid, hydraulic oil, and gear oil,
- water treatment systems for waters contained within marinas, and
- trash receptacles.

Furthermore, marina expansions and reconfigurations under Alternative 1 would be allowed only if the marina is certified as a "clean marina" by the Clean Marina Program, an organization that educates, assists, and certifies marina compliance with BMPs to reduce the potential for pollution. Clean Marina certification requires an inspection by an industry review team selected by the Clean Marina Program in the following certification categories: (1) Emergencies; (2) Petroleum Containment; (3) Topside Boat Maintenance; (4) Boat Hull Cleaning; (5) Marina/Yacht Club Operations; (6) Marina/Yacht Club Debris; (7) Boat Sewage Discharge; (8) Solid Waste; (9) Liquid Waste; (10) Fish Waste; (11) Hazardous Materials; (12) Storm Water Runoff; and (13) Environmental Programs. Successful completion of the inspection and "clean marina" status is granted upon receiving 75 percent of the possible inspection points.

Under Alternative 1, TRPA would coordinate with marinas, boat ramp operators, and other partners to implement boater education programs. These programs would educate watercraft operators about applicable regulations and appropriate watercraft operations. Program elements related to water quality include the following:

- Boat inspectors would educate watercraft owners and operators during inspections about appropriate watercraft operations and maintenance including fueling practices, bilge, and sewage operations to prevent discharges into the lake.

- Staff at marinas and motorized watercraft rental concessions would receive training on appropriate watercraft operations and maintenance including fueling practices, bilge and sewage operations, and appropriate engine tuning and propeller selection.

Given the rapid rate of biodegradation of PAH compounds and measured nontoxic levels of PAH in the lake (Miller et al. 2003); low levels of BTEX measured and associated with current boating activity using four-cycle engines (Rowe 2012); nearly nondetect levels measures for MTBE in the lake (Rowe 2012); and current TRPA regulations and Clean Marina certification requirements designed to control discharges of contaminants from boating facilities using BMPs and environmental education; the increased amount of boating activity projected under Alternative 1 associated with hydrocarbon and contaminant discharge would create a **less-than-significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 is projected to increase hydrocarbon discharges to the lake for the same reasons cited under Alternative 1. The PAH generated by boat traffic from Alternative 2 is estimated to increase by 43 percent (1.2 pounds) during a day of peak boat activity and a nonpersistent annual increase of 52 percent (54 pounds) by the buildout date of boating activity. Estimated increases in hydrocarbon (PAH) discharges are higher relative to Alternative 1 because of the greater number of boats and consequently greater number of operational hours projected under Alternative 2.

Alternative 2 could allow for the authorization of new marinas. However, the provisions for contaminant-prevention facilities in TRPA Code Section 84.13 and BMP Handbook Section 8.11, described under Alternative 1, would still apply.

Given the reasons explained under Alternative 1 regarding current hydrocarbon levels in the lake that the fate of hydrocarbons in the lake, and current TRPA regulations designed to control discharges of contaminants from boating facilities using BMPs; the increased amount of boating activity projected under Alternative 2 associated with hydrocarbon and contaminant discharge would result in a **less-than-significant** impact.

Alternative 3: Limit New Development

Alternative 3 is projected to increase hydrocarbon discharges to the lake for the same reasons cited under Alternative 1. The PAH generated by boat traffic from Alternative 3 is estimated to increase by 4 percent (0.1 pound) during a day of peak boat activity and a nonpersistent annual increase of 4 percent (3.8 pounds) by the buildout date of boating activity. Estimated increases in hydrocarbon (PAH) discharges are lower in

Alternative 3 relative to Alternative 1 and Alternative 2 because of fewer operational hours estimated for boating activities under Alternative 3.

Like Alternative 1, Alternative 3 allows for the expansion of existing marinas, but there would be no requirement to seek certification under the Clean Marina program. However, the provisions for contaminant-prevention facilities in TRPA Code Section 84.13 and BMP Handbook Section 8.11, described under Alternative 1, would still apply.

Given the reasons explained under Alternative 1 regarding current hydrocarbon levels in the lake and current TRPA regulations designed to control discharges of contaminants from boating facilities using BMPs, the increased amount of boating activity projected under Alternative 3 associated with hydrocarbon and contaminant discharge would create a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would not increase boating activity or allow for the expansion of existing marinas. Alternative 4 would have **no impact** on hydrocarbon and other contaminant discharges into the lake.

Mitigation Measures

No mitigation is required.

Impact 6-5: Interference with littoral processes from new or redeveloped shoreline structures

All Shoreline Plan alternatives would allow for the addition or expansion of piers that could disrupt existing wave and current circulation patterns near the shoreline. Waves and current motion are the primary agents of littoral drift, the process by which sediment is transported and deposited in the nearshore area. Alternatives 1, 3, and 4 propose revisions to existing pier design standards in the TRPA Code (Section 84), but do not define design standards for public piers. Alternatives 2 and 3 would both allow multiple-use piers to deviate from design standards. Other structures, such as jetties, groins, breakwaters, and fences that could affect littoral processes, are generally not allowed under any of the Shoreline Plan alternatives. Alternative 1 may allow for other structures as part of a habitat restoration project or as part of a marina environmental improvement project. Alternative 2 would allow for these structures along the shoreline outside of prime fish habitat if the applicant demonstrated that the structure would not interfere with littoral processes.

Previous analysis (TRPA 2004) demonstrated that significant impacts on littoral drift processes can occur from floating piers. Because Alternatives 1, 2, and 3 do not specify design standards for floating piers such that impacts on littoral drift would be completely avoided, and because none of the Shoreline Plan alternatives define the environmental analysis procedures for assessing littoral drift processes associated with public pier applications or allowable deviations for multiple-use pier applications that include floating pier sections, design standards in their current form could allow for piers that interfere with existing littoral drift processes, which could constituent a **significant** impact. With implementation of Mitigation Measures 6-5a and 6-5b, this impact would be reduced to a **less-than-significant** level for all four Shoreline Plan alternatives.

Alternative 1: Proposed Shoreline Plan

Littoral drift refers to the transportation of sediments along the shoreline, where wave and current actions can affect sediment transport and sediment deposition in the nearshore. Disruption of these actions by shoreline structures can alter the natural process of sediment movement and sediment redistribution along the lakebed and shoreline of Lake Tahoe. Interference with existing littoral drift processes by new or redeveloped shoreline structures would be considered a significant impact.

Alternative 1 would allow for construction along the shoreline of up to 128 new private piers, up to 10 new public piers, and up to 2 new public boat ramps. No new public or private breakwaters, jetties, rock crib piers, or sheet pile piers (or other structures of this type) would be permitted along the shoreline from

Alternative 1, except as part of a habitat restoration project or as part of a marina environmental improvement project. Alternative 1 would allow marinas to use temporary floating pier extensions to provide access for boats when lake levels fall below 6,225 feet (Lake Tahoe Datum).

Public pier design standards are not proposed at part of the project description (Chapter 2). Design standards could deviate from current design standards for public piers under Alternative 1, to the extent necessary to provide a public service, such as for emergency access, public access during low lake conditions, or public transportation. All public pier applications would be subject to environmental review.

Private piers would be required to comply with the applicable design standards presented in Table 2-5 of the project description (Chapter 2). Multiple-use piers would be allowed to comply with varying design standards that relate the number of littoral parcels or HOA units (i.e., residences) served by the pier as shown in Table 2-5. The design standards in Table 2-5 do not specify limitations or conditions for floating piers/platforms/docks (called "floating piers" in this analysis). The placement of new private piers would be restricted to areas outside of stream mouth protection areas and Shorezone Preservation Areas. Boat ramps would be located and designed per Section 84.6 of the TRPA Code or Ordinances. Boat ramps constructed to TRPA standards would not present obstructions to wave and current actions.

The 2004 Lake Tahoe Shorezone Ordinance Amendments Draft EIS (TRPA 2004) evaluated the effects of open pile piers and floating piers on littoral drift processes by reviewing other studies on wave attenuation and floating piers, as well as through review of field observations of effects at three Lake Tahoe locations with existing floating piers: Camp Richardson; Tahoe Vista; and the Hyatt Pier in Incline Village, NV. The 2004 TRPA study concluded that open pile piers constructed to TRPA design standards have no significant adverse impacts on littoral transport or backshore stability (TRPA 2004:3). The study further concluded that floating piers can affect littoral transport if the floating section of the pier is at least 50 percent the length of a wavelength sufficient in size to cause littoral drift. Based on the 2004 TRPA study findings, the shortest wavelength that could cause littoral drift in Lake Tahoe is 50 feet, so a floating pier that is 25 feet or less in length would have no effect on littoral drift along the shoreline. Floating pier sections longer than 25 feet may be acceptable, but the specific wave characteristics along the shoreline would need to be assessed relative to the proposed pier design to determine the acceptable maximum floating pier section that would not affect littoral drift processes (TRPA 2004:13).

The 2004 TRPA littoral drift study further concluded that floating piers rigidly moored to the lake bottom have greater impacts than floating piers allowed to move with wave action (TRPA 2004:15). This conclusion is supported by a technical memorandum prepared by Moory (2012), which found for conditions where a floating pier was attached firmly to the lake bottom that wave heights could be reduced by 50 percent or more when the draft of the floating pier was 20 percent of the incoming wave height, or the length of the floating pier was 20 percent of the wave length. Conversely, floating piers allowed to move with the wave heave reduced wave heights much less. For example, reduction of the wave height by 50 percent did not occur until the draft of the floating pier was 50 percent of the wave height or the length of the floating pier was 50 percent of the wave length.

Under Alternative 1, the design standards for private piers do not specify limitations and provisions for approving floating pier sections. Public pier designs are not subject to specific design standards under Alternative 1 but would be subject to project-level environmental review. The project description (Chapter 2) does not indicate whether the allowance for marinas to extend piers during low lake elevations with floating pier sections would be subject to TRPA environmental review.

Previous analysis developed for the 2004 Lake Tahoe Shorezone Ordinance Amendments Draft EIS (TRPA 2004) demonstrated that significant impacts on littoral drift processes can occur from floating piers. Because Alternative 1 does not specify design criteria for floating piers or limitations and does not define the environmental analysis procedures for assessing littoral drift processes associated with public pier applications, TRPA may not be able to effectively regulate and oversee approval of pier applications that maintain existing littoral drift processes, which could constituent a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)
Alternative 2 would retain the existing shorezone regulations in the TRPA Code (Chapters 80–86). All littoral parcels in existence as of July 1, 1987 would be eligible for one new pier, except for properties that are served by or eligible to be served by a multiple-use facility (such as an HOA pier). No piers would be allowed within TRPA designated prime fish habitat or stream mouth protection areas. Section 84.8 of the TRPA Code specifies current location and design standards for floating single-use piers. Among other requirements, single-use pier design standards for floating piers would include the following specifications that would act to reduce changes to the littoral drift regime:

- Floating docks and platforms (floating piers) shall not exceed an area of 100 square feet or a dimension along any side of 15 feet.
- Floating docks and platforms (floating piers) shall not project more than three feet above the surface of a lake or other body of water.

To incentivize multiple-use piers that serve more than one littoral parcel, TRPA would continue to allow multiple-use piers to deviate from single-use pier design standards. Public piers would be considered multiple-use piers and would be subject to the same evaluation criteria as private multiple-use piers. New public and private boat ramps would be allowed and there would be no numeric cap on the total number of ramps. Up to one new boat ramp could be allowed per littoral parcel outside of prime fish habitat and stream mouth protection areas.

Alternative 2 would allow for the approval of other new structures (jetties, breakwaters, rock cribs, and fences). New structures would be required to comply with the design standards in TRPA Code Section 84.12, which requires analyses demonstrating that a proposed structure will not interfere with littoral processes.

Like Alternative 1, Alternative 2 would not prohibit floating piers that are rigidly attached to the lakebed, nor would it define the environmental analysis procedures for assessing littoral drift processes associated with multiple-use and public pier applications with floating pier sections; therefore, TRPA may not be able to effectively regulate and oversee approval of pier applications that maintain existing littoral drift processes, which could constituent a **significant** impact.

Alternative 3: Limit New Development
Alternative 3 would allow for construction along the shoreline of up to 86 new private piers, up to 5 new public piers, and up to 1 new public boat ramp. All new private piers would be multiple-use piers that serve more than one littoral parcel and would be subject to the pier design guidelines in Table 2-7 of the Project Description. TRPA would have discretion to authorize deviations from design guidelines in Table 2-7 based on site conditions, the number of people served by the pier, and the amount of development retired by the application. The placement of new private piers would be restricted to areas outside of stream mouth protection areas and Shorezone Protection Areas. As with Alternative 1, public piers could deviate from design standards that apply to private multiple-use piers to the extent necessary to provide a public service, such as emergency access, public access during low lake conditions, or public transportation. All public pier applications would be subject to environmental review.

Similar to Alternative 1, Alternative 3 does not specify design criteria for floating piers or limitations and does not define the environmental analysis procedures for assessing littoral drift processes associated with public pier applications. Therefore, TRPA may not be able to effectively regulate and oversee approval of pier applications that maintain existing littoral drift processes, which could constituent a **significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development
Alternative 4 would allow up to 15 new public piers to be constructed along the shoreline. No additional private piers or boat ramps would be authorized, however new multiple-use piers could be constructed if they result in the removal of two existing piers (2:1 reduction in the number of piers). As with Alternative 1, public piers could deviate from design standards that apply to private multiple-use piers to the extent

necessary to provide a public service, such as emergency access, public access during low lake conditions, or public transportation. All public pier applications would be subject to environmental review.

Similar to Alternative 1, Alternative 4 does not specify design criteria for floating piers or limitations and does not define the environmental analysis procedures for assessing littoral drift processes associated with public pier applications. Therefore, TRPA may not be able to effectively regulate and oversee approval of pier applications that maintain existing littoral drift processes, which could constituent a **significant** impact.

Mitigation Measures

Mitigation Measure 6-5a: Specify floating pier design standards

This mitigation measure would be required for Alternatives 1, 2, and 3.

TRPA will augment the design standards summarized in Table 2-5 in Chapter 2, "Project Description," to include the following standard for floating piers:

- Floating pier sections rigidly moored to the lake bottom shall be prohibited.

Mitigation Measure 6-5b: Require littoral drift analyses and incorporate design recommendations for floating piers longer than 25 feet

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

TRPA will require all new pier and pier extension applications that include floating pier sections longer than 25 feet submit a site-specific littoral drift and wave analysis. The analysis will assess the dimensions of the proposed floating pier section and the ability of waves to initiate and sustain the movement of sediment along the lake bottom under conditions of low lake level (6,223 feet), mid-lake level (6,226 feet), and high lake level (6,229 feet) Lake Tahoe Datum. The lake level condition with the greatest effect on littoral transport and backshore stability shall be used to design the floating pier section. Floating piers may only be approved if they are designed so that wave heights are not reduced by more than 50 percent and the floating pier section is no greater than 50 percent of the length of the site-specific design wavelength.

Significance after Mitigation

Implementation of Mitigation Measure 6-5a would prohibit piers with floating sections from being rigidly fixed to the lakebed, and Mitigation Measure 6-5b would require that pier applications allowed to deviate from those design standards would need to demonstrate no effect on littoral drift along the shoreline through a defined and site-specific analysis. This would avoid the risk of floating pier designs that impeded littoral drift processes. Therefore, the impact after mitigation would be **less than significant** for Alternatives 1, 2, 3, and 4.

7 SOIL CONSERVATION

7.1 INTRODUCTION

This chapter discusses soil conservation impacts associated with the implementation of all four alternatives of the TRPA Shoreline Plan. The section includes discussion regarding existing shorezone conditions and applicable soil conservation regulations for the portion of the shorezone above the Lake Tahoe high water mark. The potential effects to the portion of the shorezone below the high-water mark are discussed in Chapter 6, "Hydrology and Water Quality." While this chapter addresses TRPA regulated land coverage, impacts to stream environment zone habitat are described in Chapter 15, "Terrestrial Biological Resources." The primary soil conservation issues raised during public scoping regarding implementation of the Shoreline Plan included concerns about increased soil erosion and rock removal due to increase access to the shorezone.

The evaluation of potential soil conservation impacts in this section is based on a review of documents pertaining to the Lake Tahoe shorezone, including California Geologic Survey and U.S. Geologic Survey technical guides and maps; the Natural Resource Conservation Service (NRCS) 2007 Soil Survey; TRPA regulations and planning documents that evaluate impacts to the stream environment zones (SEZs) and land coverage changes; existing TRPA land coverage and land capability documentation; background reports prepared for plans and projects in the vicinity; and published and unpublished shorezone, soil, and geologic literature. The information obtained from these sources was reviewed and summarized to understand existing conditions and to identify potential environmental effects, based on the significance criteria identified below in Section 7.4.2. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant, federal, state, and local laws, regulations, and ordinances.

7.2 REGULATORY SETTING

7.2.1 Federal

U.S. ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers has jurisdiction over navigable bodies of water and other waters of the United States, including Lake Tahoe and its tributaries. Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States. The basic premise of the program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. The U.S. Army Corps of Engineers also reviews the navigational safety of structures placed below elevation 6,229.1 feet Lake Tahoe Datum to ensure no more than minor individual and cumulative impacts would occur to the aquatic environment.

U.S. BUREAU OF RECLAMATION

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Truckee River outlet dam at Tahoe City, California has been regulated since 1874 and has been under federal control since 1915. The maximum water level was set at 6,229.1 feet and the minimum lake elevation was set at 6,223.0 feet (Lake Tahoe Datum) in 1935 pursuant to the Truckee River Operating Agreement. The federal water master, as needed to maintain court-decreed rates of flow for the Truckee River, can release the six feet between the minimum level and the top of the dam. The Truckee-Carson-Pyramid Lake Water Rights

River Settlement Act (Public Law 101-618) and the Truckee River Operating Agreement control use of the lake's waters.

7.2.2 Tahoe Regional Planning Agency

THRESHOLDS

Through adoption of Resolution 82-11, TRPA has established threshold standards and indicators for nine resource areas including soil conservation. TRPA threshold standards are minimum standards of environmental quality to be achieved in the Tahoe Region. Every 4 years, TRPA evaluates the attainment status of all TRPA threshold standards. The latest TRPA Threshold evaluation was completed in 2015. There are two TRPA threshold indicator reporting categories related to soil conservation which direct development towards less sensitive lands and establish restoration goals to reverse impacts of existing development in SEZs.

Land Coverage

Impervious cover (or land coverage) is an indicator of land disturbance. Impervious coverage alters surface hydrology and modifies groundwater recharge regimes. There are two types of coverage defined by TRPA: hard and soft coverage which are distinguished by their degree of imperviousness. Hard coverage is completely impervious to infiltration of water into the soil (e.g. roofs, asphalt pavement, concrete sidewalks, etc.). Soft coverage may allow limited infiltration into the soil (e.g. dirt walking trails, unpaved dirt driveways, etc.). The TRPA impervious cover threshold is guided by the *Land-Capability classification system for the Lake Tahoe Basin, California-Nevada* (Bailey 1974). Land capability districts (LCDs) are based on soil type, erosional hazard, soil drainage, and other features. The nine separate land capability classes reflect the amount of development an area can support without soil or water quality degradation. Under this system, TRPA allows landowners to cover 1, 5, 20, 25, or 30 percent of their parcel with impervious surfaces, depending on its environmental sensitivity as defined by the Bailey classification system. Land coverage is not calculated for development below the high-water mark of Lake Tahoe. The remainder of the shorezone (the backshore) is treated as LCD 1b, with a coverage limit of one percent.

For the 2015 Threshold evaluation, estimates of impervious coverage were produced by land capability type using high-resolution Light Detection and Ranging (LiDAR) data compared with the TRPA land capability map. This analysis showed that all land capability classes are in attainment of the threshold except for land capability class 1b and 2 (Table 7.1).

The LCD 1b target is not expected to be attained soon, given the magnitude of change and funding that would be needed to achieve this threshold. The rate of coverage removal from LCD 1b lands from 2011-2015 averaged 2.5 acres annually. At this rate the 1b target would not be attained for 264 years. Impervious coverage in LCD 2 lands is currently 43 acres above the target level. Removing 43 acres of coverage is potentially achievable within 10 to 15 years if sufficient funding is available and focused on attainment of the Class 2 target.

Stream Environment Zones

SEZs are defined by hydrology, soil, and water-associated vegetation. SEZs only constitute a small portion of the total land area in the Lake Tahoe Region but perform many ecosystem services such as nutrient cycling and sediment retention, flood attenuation, infiltration and groundwater recharge, open space, scenic and recreational enjoyment, wildlife habitat, and wildfire abatement (Roby et al., 2015:11). The SEZ threshold includes preserving existing functioning SEZ lands in their natural hydrologic condition, restoring all disturbed SEZ lands in undeveloped, unsubdivided lands, and restoring 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided, to attain a 5 percent total increase in naturally functioning SEZ lands.

Table 7-1 Soil Conservation Threshold Status

Indicator Reporting Category	Threshold Standard and Estimated Status	Status Determination
SC-1 Land coverage (impervious cover) with a threshold standard to comply with allowable land coverage limitations established in the Land-Capability Classification of the Lake Tahoe Basin, California-Nevada: A Guide to Planning (Bailey 1974). This threshold indicator reporting category consists of nine separate standards for nine separate land capability classes.	Land Capability District:	
	1a (1% allowable cover) – 0.7% estimated impervious cover	Considerably better than target
	1b (1% allowable cover) – 6.8% estimated impervious cover	Considerable worse than target
	1c (1% allowable cover) – 0.9% estimated impervious cover	At or somewhat better than target
	2 (1% allowable cover) – 1.2% estimated impervious cover	Somewhat worse than target
	3 (5% allowable cover) – 2.1% estimated impervious cover	Considerably better than target
	4 (20% allowable cover) – 3.9% estimated impervious cover	Considerably better than target
	5 (25% allowable cover) – 10.7% estimated impervious cover	Considerably better than target
	6 (30% allowable cover) – 9.1% estimated impervious cover	Considerably better than target
	7 (30% allowable cover) – 23.3% estimated impervious cover	At or somewhat better than target
SC-2 Stream Environment Zone (SEZ) threshold to restore 25% of the SEZ lands that have been identified as disturbed, developed or subdivided to attain a 5% increase in the area of naturally functioning SEZ lands.	Preserve existing naturally functioning SEZ lands in their natural hydrologic condition: Overall region-wide policies and programs are in place that recognize and protect the myriad of critical functions of SEZs. This standard is in attainment. Restore 25% of the SEZ lands that have been identified as disturbed, developed, or subdivided: If only SEZ restoration inside urban areas is used to assess standard attainment, the target is about 50 percent achieved; thus, the threshold standard status is designated "considerably worse than target." If all SEZ restoration contributes to target attainment, the target is 83 percent achieved; thus, the threshold standard status is designated "somewhat worse than target." Restore all disturbed SEZ lands in undeveloped, un-subdivided lands: The status is "unknown due to insufficient data." Attain a 5% total increase in the area of naturally functioning SEZ lands: Since the standard was adopted, 924 acres of SEZ have been restored. This standard is "at or somewhat better than target" and is in attainment.	Overall: Considerably worse than target

Source: TRPA 2016

The status of this threshold indicator is considerably worse than target. The standards for SEZ restoration are evaluated individually below (Table 7-1). The standards include a management standard and three numerical standards for SEZ restoration. The numeric SEZ restoration standards are written as percentage-based targets that have historically been evaluated against an estimate of the extent of SEZ in the Basin from 1991. There have been numerous attempts to develop maps of SEZ in the Basin (Roby et al., 2015:34), but TRPA has not formally adopted an SEZ map. Basin wide maps of SEZ are often referred to as "potential" SEZ areas because many of the mapped SEZ lands have not been field verified. The lack of a detailed uniformly accepted SEZ map or potential SEZ map for the region means that the percentage targets are subject to change as the estimated extent of SEZ in the region is revised based on new information. The individual subparts of the standard are numbered and evaluated in Table 7.1.

GOALS AND POLICIES

Goals and Policies of the TRPA Regional Plan that relate to soil conservation play a critical role in contributing to the water quality, vegetation, and wildlife goals of the region and generally:

- direct the location of impervious cover and limit its extent,
- prevent soil erosion from the region's watersheds by focusing development on more suitable soil types and requiring that construction activities occur when soils are less susceptible to erosion, and

- protect existing SEZ and restore modified SEZ.

A condensed list of the Regional Plan goals and policies that relate to soil conservation are included below:

GOAL LU-2: Direct the amount and location of new land uses in conformance with the environmental threshold carrying capacities and the other goals of the Tahoe Regional Planning Agency Bi-State Compact.

- **Policy LU-2.9** Allowable land coverage in the Tahoe Region shall be set forth in accordance with the land capability district classification methodology and district based land coverage limitations set forth in "the Land Capability Classification of the Lake Tahoe Basin, California - Nevada, a guide for planning, bailey, 1974."

- **Policy LU-2.10** Allowed base land coverage for all new projects and activities shall be calculated by applying the bailey coefficients to the applicable area within the parcel boundary.

GOAL NH-1: Risks from natural hazards (e.g., flood, fire, avalanche, earthquake, seiche) will be minimized.

- **Policy NH-1.2** Prohibit additional development, grading, and filling of lands within the 100-year flood plain and in the area of wave run-up except for public recreation facilities, public service facilities, necessary crossings, restoration facilities, and as otherwise necessary to implement the goals and policies of the plan. Require all facilities located in the 100-year flood plain and area of wave run-up to be constructed and maintained to minimize impacts on the flood plain.

GOAL VEG-2: Provide for the protection, maintenance and restoration of such unique eco-systems as wetlands, meadows, and other riparian vegetation.

- **Policy VEG-2.1** Riparian plant communities shall be managed for the beneficial uses of passive recreation, groundwater recharge, and nutrient catchment, and as wildlife habitats.

GOAL S-1: Minimize soil erosion and the loss of soil productivity.

- **Policy S-1.1** Allowable impervious land coverage shall be consistent with the threshold for impervious land coverage.

- **Policy S-1.2** No new land coverage or other permanent disturbance shall be permitted in LCDs 1-3. This policy provides exceptions for certain public recreation and public service facilities where LCDs 1-3 cannot be avoided; impacts are fully mitigated; and LCD 1-3 lands are restored in the amount of 1.5 times the area of LCD 1-3 lands that are disturbed. Special provisions are also allowed for nonmotorized pubic trails.

- **Policy S-1.4** TRPA shall develop specific policies to limit land disturbance and reduce soil and water quality impacts of disturbed areas.

- **Policy S-1.5** Prioritize watersheds or other areas impaired by excess land coverage and incentivize the removal and transfer of coverage from appropriate locations within priority watersheds.

- **Policy S-1.6** Maintain seasonal limitations on ground disturbing activities during the wet season (October 15 to May 1) and identify limited exceptions for activities that are necessary to preserve public health and safety or for erosion control.

- **Policy S-1.7** All existing natural functioning stream environment zones shall be retained as such and disturbed stream environment zones shall be restored whenever possible and maybe treated to reduce the risk of catastrophic wildfire.

GOAL SZ-1: Provide for the appropriate shorezone uses of Lake Tahoe, Cascade Lake, and Fallen Leaf Lake while preserving their natural and aesthetic qualities.

- **Policy SZ-1.1** All vegetation at the interface between the backshore and foreshore zones shall remain undisturbed unless allowed by permit for uses otherwise consistent with the shorezone policies.
- **Policy SZ -1.2** Construction activity should be set back to ensure no disturbance of the interface between high capability backshore and unstable cliff areas.
- **Policy SZ -1.3** The use of lawns or ornamental vegetation in the shorezone shall be discouraged.
- **Policy SZ -1.4** Class 1 capability shorezones shall be managed consistent with the goals and policies of the stream environment zone subelement.
- **Policy SZ -1.5** Disturbance of class 2 and class 3 capability shorezones shall be minimized to avoid accelerated backshore erosion or cliff collapse.
- **Policy SZ -1.6** Low to moderate intensity dwelling and recreational uses should be allowed in the stable and high capability backshore areas of class 4 and 5 capability shorezones.
- **Policy SZ -1.7** Water dependent recreational facilities and residential buildings are acceptable uses in class 6, 7, and 8 capability shorezones so long as such uses (1) provide for the natural equilibrium of the shoreline interface, (2) do not accelerate nearshore shelf erosion, (3) minimize disturbance of vegetation, (4) consider visual amenities, and (5) comply with other relevant policies of this subelement.
- **Policy SZ -1.8** Stream channel entrances to the lake shall be maintained to allow unobstructed access of fishes to upstream spawning sites.
- **Policy SZ -1.9** The agency shall regulate the placement of new piers, buoys, and other structures in the foreshore and nearshore to avoid degradation of fish habitats, creation of navigation hazards, interference with littoral drift, interference with the attainment of scenic thresholds, and other relevant concerns.
- **Policy SZ -1.10** Provisions should be made to allow multiple-use piers when such uses are intended to reduce the number of single-use piers existing on adjoining properties.
- **Policy SZ-1.11** The agency shall regulate the maintenance, repair, and modification of piers and other structures in the nearshore and foreshore.
- **Policy SZ -1.13** allow public access to the shorezone where lawful and feasible on public lands.
- **Policy SZ-1.15** TRPA may designate shorezones as man-modified.

GOAL SEZ-1: Provide for the long-term preservation and restoration of stream environment zones.

- **Policy SEZ -1.1** Restore all disturbed stream environment zone lands in undeveloped, unsubdivided lands, and restore 25 percent of the SEZ lands that have been disturbed, developed, or subdivided.
- **Policy SEZ -1.2** SEZ lands shall be protected and managed for their natural values.
- **Policy SEZ -1.5** No new land coverage or other permanent land disturbance shall be permitted in stream environment zones except for those uses as noted in a, b, c, d, e and f. SEZ-1.6 replacement of existing coverage in stream environment zones may be permitted where the project will reduce impacts on stream environment zones and will not impede restoration efforts.

- **Policy SEZ-1.7** Where feasible, encourage and incentivize the removal or retrofitting of existing stream corridor impediments to help reestablish natural conditions and allow for the evolution of natural fluvial processes (such as stream migration) within SEZ lands.

- **Policy SEZ-1.8** Encourage and support public acquisition of SEZ lands by land banks and public entities in order to restore, retire coverage on, and deed restrict SEZ lands for protection from future development and disturbance.

CODE OF ORDINANCES

Standards listed in the TRPA Code of Ordinances (TRPA Code) that relate to soil conservation include the following:

- backshore stabilization requirements;
- pedestrian and vehicular access restrictions;
- drainage and/or modification to wetlands prohibitions;
- land coverage and disturbance restrictions in the backshore (including restrictions on coverage and disturbance of Be (beach) soils, and other areas of SEZ)
- protection and management of SEZ vegetation and habitat at the mouths of rivers and creeks within the backshore;
- preservation and replanting of native backshore vegetation;
- permeability requirements in the nearshore and foreshore*;*
- plan area/tolerance district regulation of uses and structures; and
- placement standards for shorezone facilities and marinas.

Chapter 30: Land Coverage Standards

The chapter sets forth regulations for the permissible amount of land coverage in the region. It implements provisions of the Goals and Policies concerning the land capability system, land capability districts, prohibition of additional land coverage in certain land capability districts, and transfer and mitigation of land coverage.

30.4.1 Base Allowable Land Coverage

The base allowable land coverage shall be determined by using the coefficients set forth in Land Capability Classifications of the Lake Tahoe Basin (Bailey 1974). The backshore area is treated as LCD 1b, high hazard land, which has a base allowable coverage percent of one percent.

30.5. Prohibition of Additional Land Coverage in LCDs 1a, 1c, 2, 3, And 1b (Stream Environment Zones)

No additional land coverage or other permanent land disturbance shall be permitted in Land Capability Districts 1a, 1c, 2, 3, and Land Capability District 1b (Stream Environment Zone), with some exceptions provided for public recreation and public service facilities.

Chapter 33: Grading and Construction

Chapter 33 describes the various standards and regulations that protect the environment against significant adverse effects from excavation, filling, and clearing due to such conditions as exposed soils, unstable earthworks, or groundwater interference.

33.6. Vegetation Protection During Construction

33.6.9. Standards for Soil and Vegetation Protection:

a) The location and type of protective fencing shall be shown on approved plans.

b) No material or equipment shall enter or be placed in the areas protected by fencing or outside the construction areas without prior approval from TRPA.

c) Protective fencing for soil and vegetation shall be constructed with metal posts and industry-standard mesh fencing that is least four feet tall, unless an alternative protection method is approved by TRPA.

d) All protective fencing shall be adequately maintained and provide a functional barrier during construction.

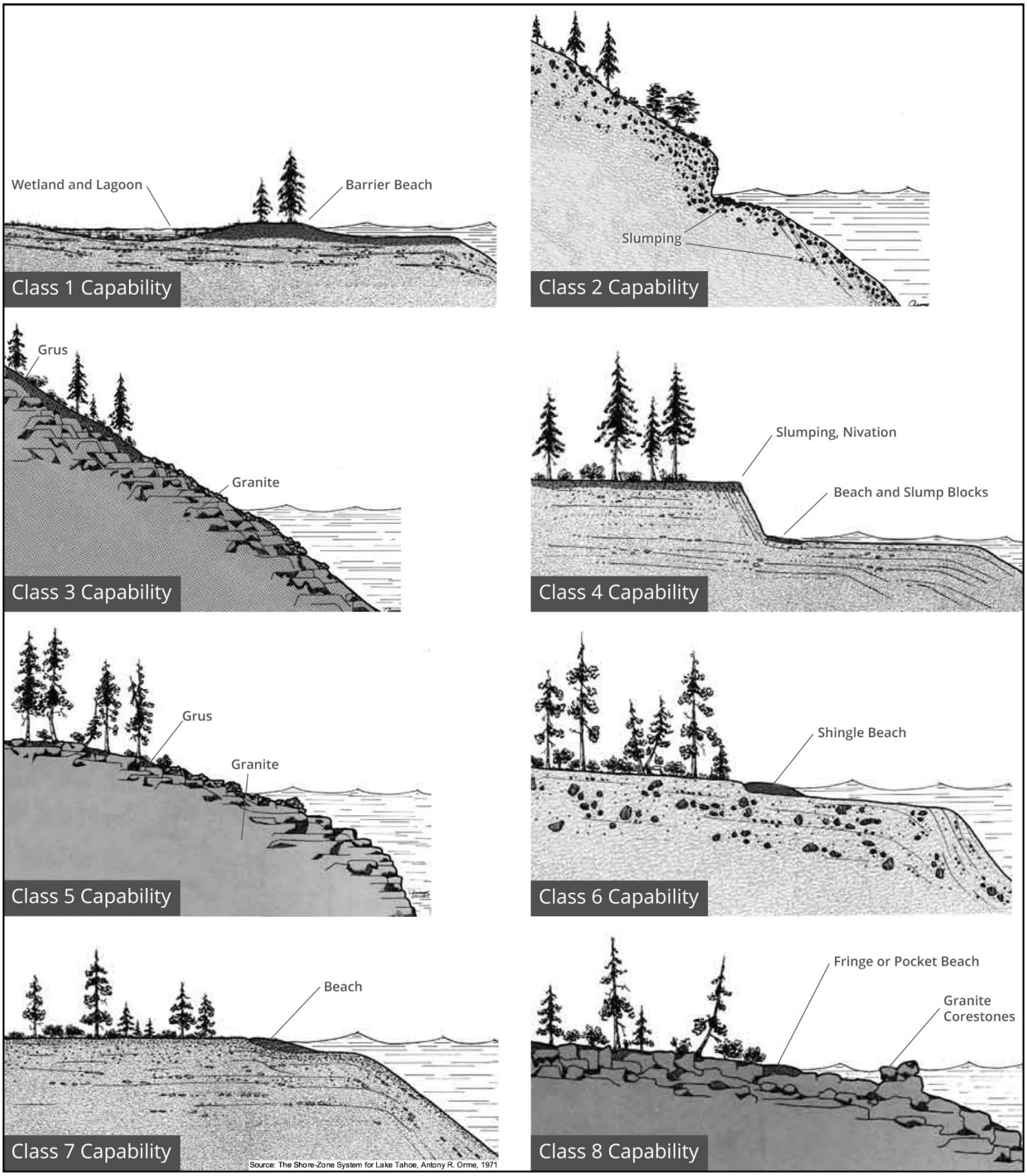
Chapter 83: Shorezone Tolerance Districts

The shorezone tolerance district classification was developed based on evaluation of the shorezone's sensitivity to physical, biological, and visual disturbance, specifically focusing on how human activities have altered the shorezone (Orme 1972). The shorezone was divided into four generalized geologic units where 34.4 percent of the shorezone is classified as armored granitic (east shore except for pocket beaches), 6.8 percent as volcanic, 23.8 percent as glacial moraines and similar rock debris, and 35.0 percent as alluvial, colluvial, lakebed, and glacial outwash deposits (south shore) (Adams 2002:638). These units were again divided based on slope and erosivity. Eight shorezone tolerance districts are defined in Chapter 83 of the TRPA Code of Ordinances. The districts reflect the physical ability of the shorezone to support use and development. District 1 is the most sensitive to use and development and district 8 is the least sensitive. The typical landforms associated with the eight shorezone tolerance districts are illustrated in Exhibit 7-1, and their mapped locations along the shores of Lake Tahoe are shown on Exhibit 7-2. Table 7-2 provides a definition for each of the eight districts. As described in Chapter 2, "Description of the Proposed Project and Alternatives," provisions related to shorezone tolerance districts would remain unchanged under all alternatives.

Table 7-2 Shorezone Tolerance Districts

Shorezone Tolerance District	Characteristics
1	Barrier beach shorezone with low, narrow ridges of mobile sand backed by wetlands. This District is considered SEZ in the TRPA Code.
2	Volcanic and morainic shorezone with slopes over 30 percent and alluvial shorezone of 9–30 percent slope.
3	Armored granite shorezone with slopes exceeding 30 percent.
4	Volcanic and morainic shorezone with 15–30 percent slopes and alluvial shorezone with slope of 0–9 percent.
5	Armored granite shorezone with slopes of 15–30 percent.
6	Shorezone of volcanic rock and morainic debris with 5–15 percent slopes.
7	Shorezone of morainic and alluvial materials of 0–9 percent slope.
8	Gently sloping (0–9 percent) armored granite shorezone.

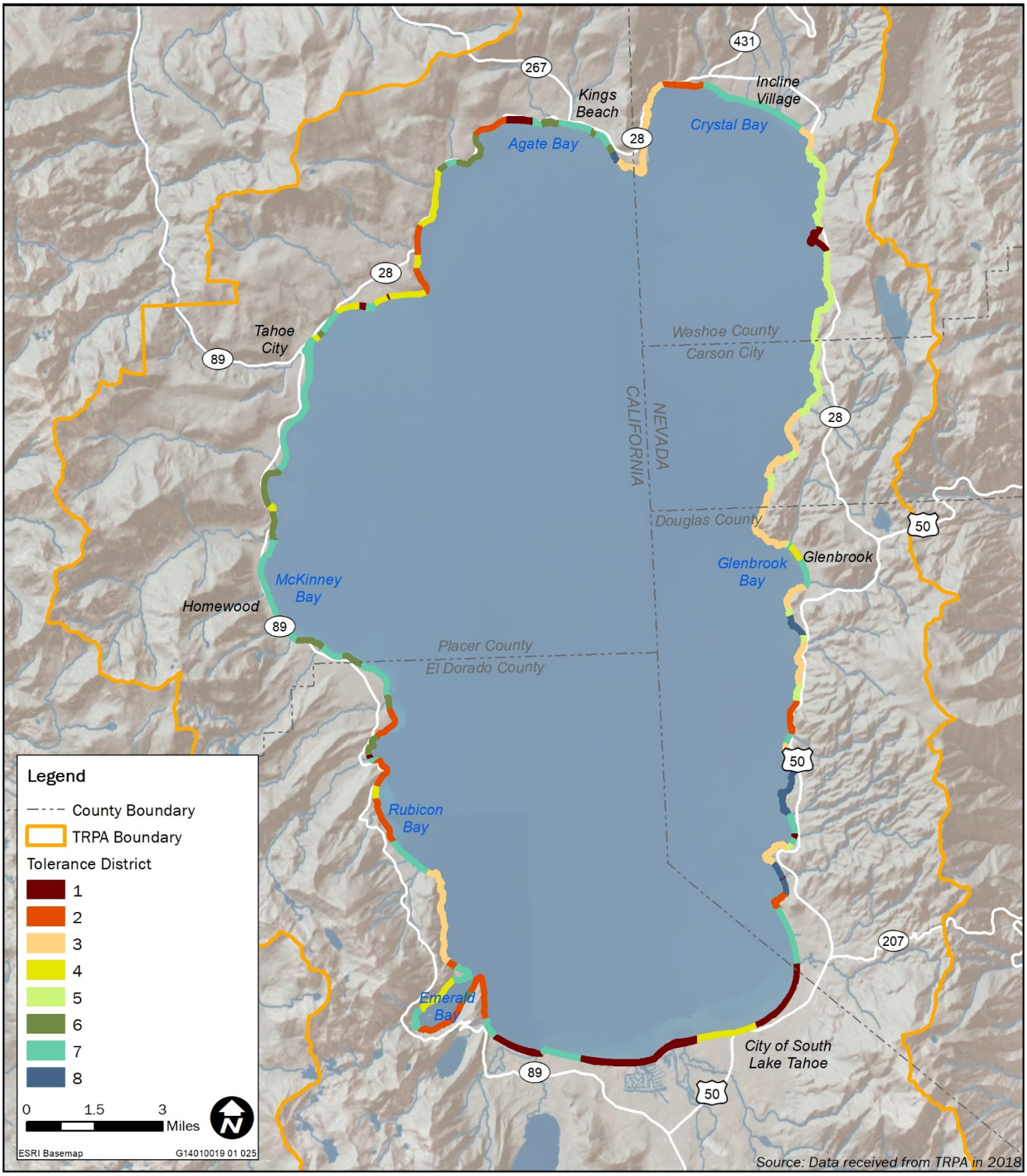
Source: TRPA 2004



TAHOE REGIONAL PLANNING AGENCY

Exhibit 7-1 Shorezone Tolerance District Landforms

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 7-2 Shorezone Tolerance Districts

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

7.2.3 California

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Fish and Game Code Section 1602 requires an entity to notify the California Department of Fish and Wildlife prior to commencing any activity that may:

- substantially divert or obstruct the natural flow of any river, stream or lake;
- substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or
- deposit debris, waste or other materials that could pass into any river, stream or lake.

The California Department of Fish and Wildlife requires a Lake and Streambed Alteration Agreement when it determines that the activity may substantially adversely affect existing fish or wildlife resources. A Lake and Streambed Alteration Agreement includes measures necessary to protect existing fish and wildlife resources. The primary focus is the protection of fish habitat from suspended sediments, turbidity, and alteration of the lakebed.

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

The Lahontan Regional Water Quality Control Board (LRWQCB) is a regulatory agency with the mission to preserve, enhance, and restore the quality of California's water resources and drinking water. The Clean Water Act Section 401 program regulates discharges of fill and dredged material to all waters of the state, including waters of the U.S. under the Clean Water Act of Section 401 and the Porter-Cologne Water Quality Control Act. Lahontan sometimes serves as the lead agency for CEQA compliance. TRPA has a Memorandum of Understanding with LRWQCB for maintenance dredging projects.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Sections 2621–2630) (Alquist-Priolo Act) was passed in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as "Earthquake Fault Zones" around the surface traces of active faults and to issue appropriate maps. The maps are used by jurisdictions for planning purposes.

SEISMIC HAZARDS MAPPING ACT

The Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) addresses earthquake hazards from nonsurface fault rupture, including liquefaction and seismically induced landslides. The Act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The Act also specifies that he lead agency for a project may withhold development permits until geologic or soils investigation are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

7.2.4 Nevada

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

The Nevada Division of Environmental Protection (NDEP) is the regulatory agency with responsibilities for water quality on the Nevada side of the Lake Tahoe Basin. Pursuant to the Nevada Revised Statues, NDEP

may issue general or temporary (Working in Waterways) permits for the discharge of pollutants to waters of the State. Additionally, activities requiring a federal permit must "certify" that the proposed work will not violate state water quality standards under Section 401 of the Clean Water Act.

NEVADA DIVISION OF STATE LANDS

The Nevada Division of State Lands administers the excess coverage mitigation program for the Nevada portion of the Lake Tahoe Region, which is funded by excess coverage mitigation fees disbursed from TRPA. The objective of this program is to improve soil functions and the water quality of Lake Tahoe through the retirement of land coverage and restoration of disturbed lands. This program acquires land and land coverage. Acquired lands are protected and are not available for development or disposal. Other Nevada Division of State Lands management goals include clean water, health forests, the reduction of excess fire fuels and hazardous forest conditions, wildlife habitat, and reasonable public access.

7.3 AFFECTED ENVIRONMENT

REGIONAL GEOLOGY

The geologic history of the Lake Tahoe Basin provides an important context for studying the shore zone of the Lake. The Lake Tahoe Basin is located in the Sierra Nevada geomorphic province in eastern California and a small portion of western Nevada. The Sierra Nevada is a tilted fault block with a gradual western slope and a steep eastern escarpment. The Range extends 400 miles from the Mojave Desert in the south to the Cascade Range and Modoc Plateau in the north and is between 50 and 80 miles wide.

Lake Tahoe is located in the northern Sierra Nevada, between the Sierra crest to the west and the Carson Range to the east (Saucedo 2005). Faulting and volcanism created the Tahoe Basin over 2 million years ago, and as a result, the basin contains granitic, metamorphic, and volcanic rock (Saucedo 2005). The predominant bedrock in the Tahoe Basin is Cretaceous granodiorite of the Sierra Nevada batholith. Cretaceous rock formed during the later period of the Mesozoic Era, characterized by the development of flowering plants and ending with the sudden extinction of the dinosaurs and many other forms of life. Pre-Cretaceous metamorphic rocks are found in localized areas.

Over the past 1.5 million years, the Tahoe Region has been altered by glacial activity, and most of the landforms surrounding the lake are a result of glaciation. During glacial activities, valley glaciers dammed the Truckee River Canyon, raising the water level of Lake Tahoe. Lakebed sediments were deposited in the bays and canyons around the lake as a result of the rising lake levels. The faulting, folding, and in some cases overturning of rock formations that has taken place during various periods of geologic activity, in combination with erosion, deposition, and subsequent cementation of rock materials that occurred during relatively quiet periods, have left a complex arrangement of geologic rock types and structures in the area. However, the extraordinary clarity of Lake Tahoe is related to the prevalence of resistant granitic bedrock in the Tahoe Basin and the unusually small drainage basin relative to the size of Lake Tahoe.

SOILS

NRCS Soil Survey of the Lake Tahoe Basin (NRCS 2018) describes many soil map units around the shorezone of Lake Tahoe. They are differentiated from each other by characteristics such as parent material, landscape position, texture, structure, organic matter content, depth to bed rock, depth to groundwater, and hydrologic function. Frequently, soils from similar parent materials found in similar landscape positions will have many qualities in common. For this analysis, shorezone soils have been grouped by a dominant characteristic that affects the soils use and erosion hazard. Exhibit 7-3 shows the distribution of these soils throughout the Basin.

Volcanic Soils: Volcanic eruptions blanketed much of the Basin in layers of ash, mud, and rubble. Over time these materials developed into the deep nutrient rich soils which dominate the landscape of the northwestern portion of the Basin. Generally, volcanic soils in the Basin are well drained and do not erode easily. Jorge and Tahoma are typical volcanic soils found in northwest portion of the shorezone.

Granitic Soils: Granitic soils formed in the hardened remnants of volcanic material that cooled in place without erupting. Granitic soils tend to be nutrient poor, and generally more susceptible to erosion. Cagwin, Cassenai, and Gefo are typical granitic soils.

Glaciated Soils: The glaciers that followed Tahoe's volcanic period carved out the west shore canyons, leaving behind deep, rubbly, deposits of Glacial till. Soils in till or glacial outwash tend to have a great deal more gravels and cobbles than the alluvial soils often found adjacent to them. Typical glacial soils include Paige, Tallac, and Inville.

Alluvial Soils: After glaciers disappeared from the Tahoe Basin, the rivers and streams became the strongest soil altering force. The alluvial soils in the project area are the product of sediments that were carried by waterbodies and deposited in floodplains. These soils are very different from mountain slope and glacial soils because of the presence of a seasonal high water table that supports an abundance of moisture loving vegetation. Many sensitive ecosystems such as wetlands, meadows, and riparian areas are associated with alluvial soils. The Tahoe and Marla soil types are they dominant alluvial soils in the Basin.

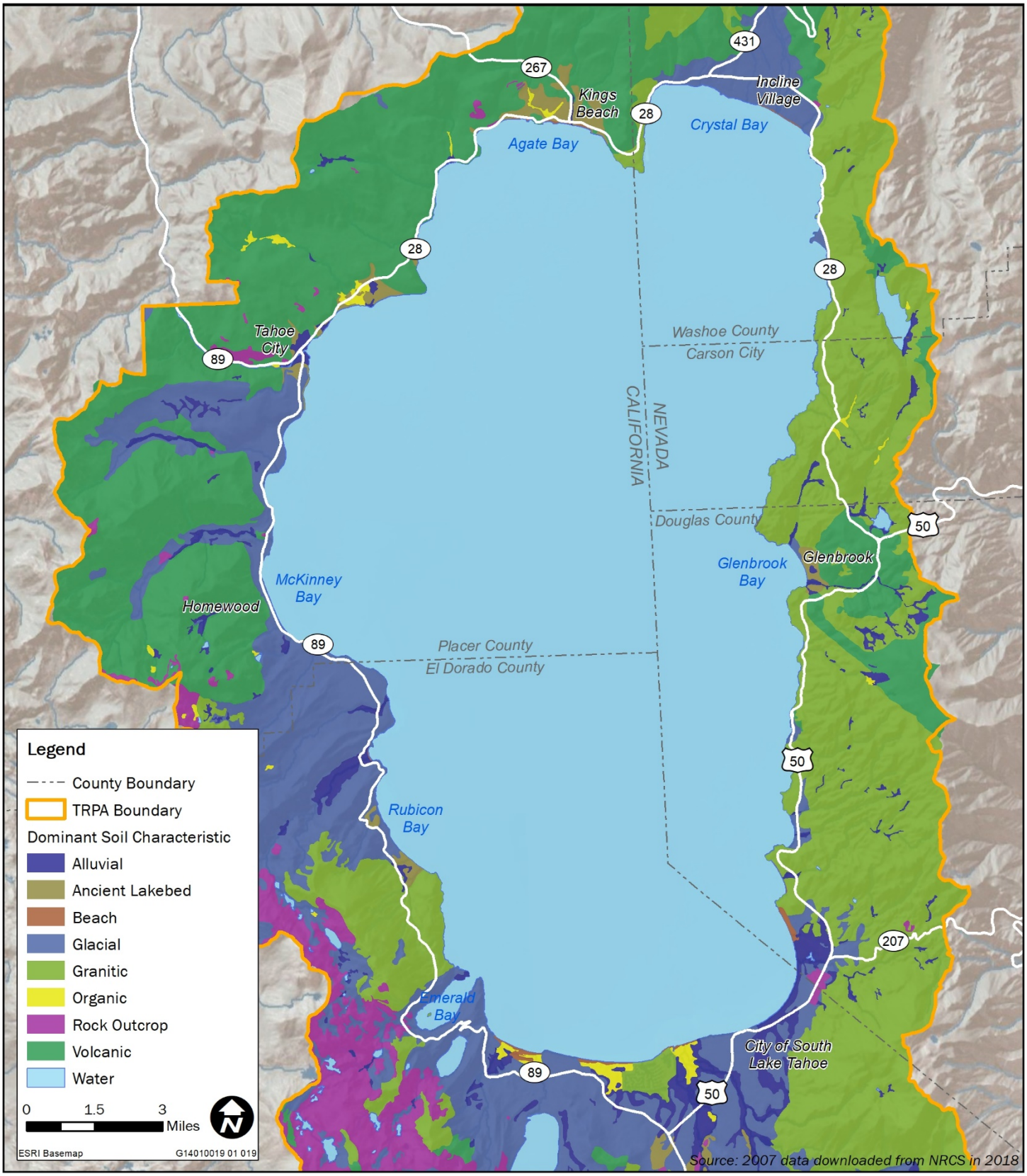
Organic Soils: Organic soils are commonly alluvial soils that developed in an area where a persistently high water table allows the accumulation of organic matter. These highly sensitive soils are found in the wettest areas of meadows and stream margins and are found in pot hole wetlands in the high country. In the shorezone, the dominant organic soil is the Watah peat.

Ancient Lakebed Soils: These soils are the result of fluctuations in the water level in Lake Tahoe and consist of an upper profile of coarse textured volcanic material, which abruptly changes to dense, clay textured lakebed sediments. Although water moves easily through the upper portion of the soil profile, infiltration into the lakebed sediments is very slow creating a "perched" or artificially high water table. As a result, these soils are usually dry for 45 to 75 consecutive days in late summer and are moist for the rest of the year (NRCS 2018). Ancient Lakebed soils are typically associated with alluvial soils and support similar vegetation. The Kingsbeach stony sandy loam is a typical example of an ancient lakebed soil.

Beach Soils. Beaches are characterized by well-drained, homogenous, gravelly coarse sand. Beach sediments take on a variety of characteristics depending on their physical origin and location, including stable beach sediments as well as active littoral deposits that respond to wave action. Beaches account for only a small portion of the shorezone and include younger and older barrier beaches, lakeshore dunes, and lakeshore strand beaches. These landforms are highly prone to erosion when disturbed by either natural or human activity (Orme 1972:52).

SHOREZONE EROSION AND SEDIMENT DELIVERY

Weathering and erosion are active geologic processes that generate sediment within the shorezone. Weathering breaks down material in place while erosion and deposition transport and redistribute the sediments. Erosion is more likely where unconsolidated or poorly consolidated materials such as alluvium, colluvium, sediments from glacial moraines, and outwash materials are exposed to wave action (Adams 2001:10). Eroding shorezone areas commonly occur in front of moderate to high land capability as classified by Bailey (1974). Weathering includes chemical and mechanical processes. Chemical processes are the result of the slightly acidic nature of water which breaks down rock formations over time. Mechanical weathering occurs in the shore zone through front heave, plant root intrusion, wave action, and abrasion which results in the breakdown of bedrock to fine sands, silts, and clays.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 7-3 Dominant Soil Characteristics

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

The total maximum daily load completed in 2010 estimated that the total mass of sediment eroded into Lake Tahoe from the shorezone since 1938 amounts to approximately 429,000 metric tons (MT). Adams et al. (2004:47) estimated that annual sediment contribution because of this erosion was composed of 7150 MT per year (6,000 metric tons of sand, 440 metric tons of silt, and 110 metric tons of clay (Adams 2004:42). The amount of phosphorus and nitrogen loading from shore zone erosion ranks last with respect to the other four nutrient sources (atmospheric deposition, stream loading, direct runoff, and groundwater) but is one of the highest contributors of sediment loading (Adams et al. 2004:47). Thus, shore zone erosion is an important component of the sediment and to a lesser extent, nutrient budget for Lake Tahoe. Wave induced currents and density currents also contributes to the movement of sediment out of the shorezone and into the lakezone (Orme 1971:7). Tributaries are not expected to deposit much coarse material to the shorezone except for the occasional delta formed during a large storm event (Osborne et al. 1985:9).

SHOREZONE LAND COVERAGE

As described in Section 7.2.2, allowable land coverage in the backshore is one percent. Although the entire backshore is treated as LCD 1b, some areas of the backshore may not exhibit a primary indicator of SEZ. Shorezone Tolerance District 1, areas influenced by streams, and areas found to exhibit one primary SEZ key indicator are all classified as SEZ, subject to field verification. Additional land coverage or other permanent land disturbance is not permitted in SEZs except for stream crossings, public outdoor recreation, public service facilities, water quality control facilities (TRPA Code Section 30.5). Additionally, permissible disturbance in Shorezone Tolerance District 1 is limited to planned foot paths which provide access to the shoreline while minimizing disturbance (TRPA Code Section 83.7.2(A)). Removal of indigenous vegetation is not permitted in SEZ. There are additional provisions in the TRPA Code that stipulate that if coverage is created for the uses listed above in an SEZ, restoration in the amount of 1.5 times the area of land covered or disturbed for the project must take place within the same LCD. TRPA Code Section 85.5 prohibits new land coverage or other permanent land disturbance in the backshore (with the exceptions discussed above listed in Code Sections 85.5.1, 85.5.2, 85.5.3, and 85.5.4).

The location of the backshore boundary varies widely and is field verified on an individual parcel basis when requested by property owners. Mapping of verified backshore is sporadic around the lake, so it is too speculative to estimate existing coverage in the backshore. TRPA has estimated the typical width of backshore areas by shorezone tolerance districts based on field verifications (Table 7-3). These typical widths are only approximate and vary greatly based on site-specific characteristics. TRPA will continue to review and assess typical widths of the backshore as field verifications are carried out, and as lake and climatic condition change in the future.

Table 7-3 Typical Widths of the Backshore Areas

Shorezone Tolerance District	Width (feet)	Shorezone Tolerance District	Width (feet)
1	200	5	35
2	40	6	35
3	35	7	100
4	47.5	8	35
1-8 AVERAGE	66		

Source: TRPA 2004

SEISMIC SETTING

Seismic activity is the release of energy in the earth's crust in the form of seismic waves or earthquakes. Earthquakes have the potential to cause ground rupture, landslides, avalanches, liquefaction, and seiche waves in the shorezone of Lake Tahoe. The three major faults in the Tahoe Basin are the West Tahoe Fault, the Stateline Fault, and Incline Faults. The Stateline–North Tahoe, Incline Village, and West Tahoe–Dollar Point

faults all show evidence for large (2+ m) rupture events within the past 11,000 years (Dingler et al. 2009:18). Studies by Brothers et al. (2009:499 and 514) suggest a magnitude-7 earthquake occurs every 2,000 to 3,000 years in the Basin, and that the largest fault in the Basin, West Tahoe, appears to have last ruptured between 4,100 and 4,500 years ago. The shorezone of Lake Tahoe could be affected by seismic activity.

GROUND FAILURE/LIQUEFACTION

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking (CGS 2008: pp. 35-37). Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls, and slope instability. Areas of the shorezone underlain by relatively loose sandy soils combined with a shallow groundwater table could be susceptible to liquefaction.

SUBSIDENCE

Land surface subsidence can be induced by both natural and human phenomena. Natural phenomena include: subsidence resulting from tectonic deformations and seismically induced settlements; soil subsidence from consolidation, hydrocompaction, or rapid sedimentation; subsidence from oxidation or dewatering of organic rich soils; and subsidence related to subsurface cavities. Subsidence related to human activity includes subsurface fluid or sediment withdrawal. Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where there is a high groundwater table, where there are relatively soft and recent alluvial deposits, and where creek banks are relatively high. In the shorezone, areas around stream mouths and alluvial deposits in areas of high groundwater that could be susceptible to subsidence and lateral spreading.

TSUNAMI/SEICHE

A tsunami is a wave or series of waves that may result from a major seismic event that involves the displacement of a large volume of water and can occur in any large body of water. A seiche is a periodic oscillation of an enclosed or restricted water body, typically a lake or reservoir, produced by seismic shaking. A seiche results in a potentially damaging wave, similar to a tsunami, which is caused from seismic activity near a large lake. A seiche wave may occur in periods that differ from a tsunami; however, should the period of wave propagation occur simultaneously with a tsunami, it could result in cumulative seismic-related wave effects.

7.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

7.4.1 Methods and Assumptions

Evaluation of soil conservation impacts were based on a review of documents pertaining to the Lake Tahoe Basin shorezone, including the NRCS soil survey of the Lake Tahoe Basin, California and Nevada, scientific studies, and TRPA regulations and planning documents. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section.

To calculate backshore coverage estimates, some assumptions were made based on details of the various Shoreline Plan alternatives. The following assumptions were applied:

- For Alternatives 1 and 3, the largest multiple-use pier design standards (see Tables 2-6 and 2-8 in Chapter 2) and were applied to calculate pier footprint. For Alternative 4, the pier design standards for the largest-allowed multiple use pier under Alternative 1 were applied.
- For Alternative 2, multiple-use pier design standards are not specified; therefore, single-use pier design standards were applied (Table 2-7), plus 15 percent to account for potential multiple-use and public pier design deviations.
- For all four alternatives, it was assumed that 35 percent of the overall pier length would be placed in the backshore, and therefore the portion extending into the foreshore and nearshore (over water) would be 65 percent[1].
- Boat ramps for all alternatives were estimated to be 20 feet wide (to accommodate two simultaneous launches), and 75 feet long.
- For all alternatives, it was assumed that 20 feet of boat ramp length would be placed in the backshore.
- Access paths for shorezone structures in the backshore were calculated as follows:
  - Five feet wide and 20 feet long for pier foot paths, and
  - 12 feet wide and 200 feet long (the longest backshore width; see Table 7-3) for boat ramp access roads.

7.4.2 Significance Criteria

Significance criteria relevant to soil conservation are summarized below. The applicable TRPA threshold standards, the soil conservation criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- compact or cover soil beyond the limits allowed in the land capability districts;
- cause a substantial change in the topographic features of a site in a manner inconsistent with the natural surrounding conditions;
- substantially change undisturbed soil or native geologic substructures;
- cause a substantial increase in wind or water erosion of soils; or
- expose people or property to geologic hazards such as earthquakes, landslides, backshore erosion, avalanches, mud slides, ground failure, or similar hazards.

[1] These coverage estimates do not account for any coverage exemptions that would apply pursuant to TRPA Code Section 30.4.6

7.4.3 Environmental Effects of the Project Alternatives

Impact 7-1: Increase land coverage beyond the limits allows by the Bailey land capability system

All Shoreline Plan alternatives would permit the construction or expansion of structures that would create coverage in the backshore. However, all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b (i.e., backshore) coverage created by the project. Because all projects permitted through Alternatives 1, 2, 3, and 4 would be required to comply with TRPA land coverage regulations and would result in a net decrease in the amount of coverage within LCD 1b, this impact would be **less than significant**.

This impact addresses whether the implementation of the Shoreline Plan alternatives would result in compaction or coverage of soil beyond the limits allowed by TRPA Code. No new impervious cover would be created by new buoys, slips, and pier extensions because these would occur entirely within the nearshore or would be additions to existing facilities that would rely on existing access paths across the backshore. New or modified piers, boat ramps, and marinas would result in new coverage in the shorezone and are discussed in the analysis below.

Alternative 1: Proposed Shoreline Plan

The proposed Shoreline Plan would allow for a total of up to 10 new public piers, 128 private piers, and two new public boat ramps which would each require new access paths in the backshore. These structures would create coverage in the backshore (LCD 1b). The area of new coverage associated with the implementation of Alternative 1 is estimated to be 0.3 acres.

The base allowable coverage associated with the backshore is one percent. TRPA Code Section 81.3.2 allows for boat launching facilities and marinas to be permitted in the backshore and Section 85.5.4 allows land coverage to provide access to an approved or legally existing structure or use in the nearshore or foreshore provided that the coverage is mitigated through application of best management practices (BMPs) and restoration of LCD 1b lands in the amount of 1.5 times the area of backshore disturbed. Further protections are provided for Shorezone Tolerance District 1, which is treated as SEZ for coverage purposes (TRPA Code Section 83.7.2(E)). In Shorezone Tolerance District 1, coverage would only be permitted for planned footpaths which provide access to the shoreline while minimizing environmental impacts. These existing TRPA Code requirements would remain under Alternative 1.

Alternative 1 would encourage the removal of coverage from stream mouths and SEZ areas by encouraging the transfer of existing piers out of stream mouth protection areas through incentives including offering multiple-use design standards consistent with a two-parcel pier for a single-use pier or providing upland scenic credits. When a pier is transferred or relocated, the old pier would be removed, and the area restored to a natural condition. In the case of pier transfers, the sending parcel would become deed-restricted to prevent future pier development.

Projects permitted through Alternative 1 would create land coverage in the backshore (LCD 1b). However, all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b coverage created by the project. Alternative 1 would create an estimated 0.3 acres of new coverage and result in the restoration of an estimated 0.45 acres of coverage for a net reduction of 0.15 acres of coverage within LCD 1b. Because all project permitted through Alternative 1 would be required to comply with TRPA land coverage regulations, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under Alternative 2, up to 476 new piers and six new boat ramps could be permitted. Existing TRPA Code stipulates design standards for single-use piers but provides for flexibility in design standards for multiple-use and public piers. This is the only alternative that would allow new marinas. Access routes and the

construction or expansion of the piers, boat ramps, and potentially new marinas would create coverage in the backshore. The estimated additional backshore coverage created through the implementation of Alternative 2 is approximately 2.4 acres.

The same TRPA land coverage regulations described for Alternative 1 would also apply to Alternative 2. Alternative 2 would create an estimated 2.4 acres of new coverage and result in the restoration of an estimated 3.6 acres of coverage for a net reduction of 1.2 acres of coverage within LCD 1b. Because all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b coverage created by the project, the implementation of Alternative 2 would have a **less-than-significant** impact relative to TRPA regulated land coverage**.**

Alternative 3: Limit New Development

This alternative would allow the development of five new public piers, one new public boat ramp, and 86 new, multiple-use private piers. These structures and the access routes that serve them would create coverage in the backshore (LCD 1b). The estimated additional backshore coverage created through the implementation of Alternative 3 is approximately 0.2 acres.

The same TRPA land coverage regulations described for Alternative 1 would also apply to Alternative 3. Alternative 3 would create an estimated 0.2 acres of new coverage and result in the restoration of an estimated 0.3 acres of coverage for a net reduction of 0.1 acres of coverage within LCD 1b. Because all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b coverage created by the project, the implementation of Alternative 3 would have a **less-than-significant** impact relative to TRPA regulated land coverage**.**

Alternative 4: Expand Public Access and Reduce Existing Development

This alternative would allow 15 new public piers and no other new shorezone structures. Alternative 4 would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations provided that the project resulted in a 2:1 reduction in the number of structures, which would not be expected to result in a net increase in coverage. The area of additional backshore coverage associated with the implementation of the Alternative 4 is estimated to be 0.06 acres.

The same TRPA land coverage regulations described for Alternative 1 would also apply to Alternative 4. Alternative 4 would create an estimated 0.06 acres of new coverage and result in the restoration of an estimated 0.09 acres of coverage for a net reduction of 0.03 acres of coverage within LCD 1b. Because all projects would be required to demonstrate their compliance with existing TRPA land coverage regulations including restoration of 1.5 times the amount of LCD 1b coverage created by the project, the implementation of Alternative 4 would have a **less-than-significant** impact relative to TRPA regulated land coverage

Mitigation Measures

No mitigation is required.

Impact 7-2: Increase erosion or degrade soil conditions during construction activities

Implementation of all Shoreline Plan alternatives would permit construction activities in the shorezone that would create ground disturbance and loss of vegetation and would increase the potential for erosion. However, the potential for increased erosion resulting from future projects implemented under the Shoreline Plan alternatives would be reduced through compliance with county, TRPA, and LRWQCB or NDEP code requirements, permit conditions, and regulations. For this reason, implementation of any of the Shoreline Plan alternatives would have a **less-than-significant** impact related to increased soil erosion and degradation during construction.

The addition of new buoys or slips would not affect soil and geologic resources because they do not require construction or modification of land-side infrastructure. However, soils would be affected by construction of new boat ramps and ramp extensions and new piers and pier extensions because they require ground

disturbance in the backshore. The effects of construction activities below the high-water mark are discussed in Chapter 6, "Hydrology and Water Quality," in Impact 6-1. The effects of landside construction activities are discussed in the impact analysis below.

Alternative 1: Proposed Shoreline Plan

The installation of 128 new private piers, 10 new public piers, and two new boat ramps would create construction-related disturbance in the backshore. Ground-disturbing activities such as excavation and grading conducted for development allowed by the proposed Shoreline Plan could produce soil erosion or the loss of topsoil. Removal of soil and vegetation exposes bare earth which becomes unstable resulting in soils that are easily dislodged by equipment and could more easily be carried by water and wind into Lake Tahoe.

The timing, location, and duration of construction activities could result in the temporary disturbance of soil and exposure of disturbed areas to storm events. Construction activities would likely include grading, excavation, cut and fill, and trenching, all of which could alter the existing topography or ground surface of individual sites within the backshore. All proposed projects would be assessed on an individual level and would be required to conform to existing regional and local regulations to minimize grading and soil instability. As discussed in Section 7.2, "Regulatory Setting," and in Impact 6-1 in Chapter 6, "Hydrology and Water Quality," construction projects in the shorezone must meet multiple requirements and regulations of TRPA, LRWQCB (California), NDEP (Nevada), federal, and local (city and county) agencies, which include coverage restrictions (TRPA Code Chapter 30), implementation of BMPs (TRPA Code Chapter 60), and grading and excavation permits (TRPA Code Chapter 33).

Backshore soils have varying degrees of resilience and resistance to erosion as characterized by the TRPA shorezone tolerance districts. Sensitive beach soils in Shorezone Tolerance District 1 are afforded strong protections that effectively limit disturbance to planned footpaths. In the more stable Shorezone Tolerance Districts 2 and 3, projects must demonstrate that they will not accelerate or initiate backshore erosion and may be required to install and maintain stabilizing backshore vegetation. Projects in Shorezone Tolerance Districts 4 and 5 cannot be permitted unless TRPA finds that cliff and beach stability will not be accelerated, and the project must be designed to cause the least possible environmental hard to the backshore. Shorezone Tolerance Districts 6, 7, and 8 include the same protections as 4 and 5 but require that TRPA determine the stability of nearshore geology before permitting boat launching facilities and marinas. Verification of the shorezone tolerance district would occur as part of projects permitting process.

In addition to development restrictions specific to the shorezone, projects implemented through the proposed Shoreline Plan would be required to comply with local jurisdiction codes and with Chapter 33 and Chapters 60 through 68 of the TRPA Code. These requirements include the installation of BMPs for all projects, as specified in Section 60.4 of the TRPA Code. Temporary BMPs which comply with the TRPA *Best Management Practices Handbook* (Handbook) must be implemented on construction sites and maintained throughout the construction period until winterization, and permanent BMPs must be installed once construction has been finalized. Chapter 8 of the TRPA Handbook addresses shorezone specific projects and includes additional guidance for dredging, marina maintenance, boat ramp construction, and backshore stabilization. Improvement plans are submitted for review and approval to ensure conformance with county and TRPA rules, regulations, and ordinances as part of standard conditions of approval. Projects would also need to comply with TRPA's Standard Conditions of Approval for Shorezone Projects which includes specific measures to be implemented to protect environmental resources, including soil resources, from the effects of filling, dredging, grading, clearing of trees, and other activities associated with construction. Examples of standard conditions include:

- Applicants must provide final construction drawings to TRPA for approval. Such plans must include specifications for revegetation, areas to be revegetated, and drainage improvements, and must conform with the TRPA Handbook. Once approved by TRPA, these plans are incorporated as a part of the permit issued to the applicant.

- Applicants must post a security bond with TRPA to ensure compliance with conditions in their permit. All revegetation requirements must be met before release of the bond.
- Prior to construction activities, the applicant must contact TRPA at least 48 hours prior to commencing construction to arrange a pre-grading inspection. The inspection verifies that all erosion, stormwater, and water quality control measures and protective fencing are in place and are properly installed.

Furthermore, all construction projects on the California side of Lake Tahoe with greater than 1 acre of disturbance are required, by LRWQCB, to prepare a stormwater pollution prevention plan (SWPPP) that includes a site-specific Construction Site Monitoring and Reporting Plan pursuant to the National Pollution Discharge Elimination System 2011 Tahoe Construction Stormwater permit. In Nevada, projects are required to comply with NDEP's Stormwater General Permit, which also includes a requirement for the preparation and implementation of a SWPPP. Project SWPPPs are required to describe the site, construction activities, proposed erosion and sediment controls, means of waste disposal, maintenance requirements for temporary BMPs, and management controls unrelated to stormwater. Temporary BMPs to protect water quality would be required during all site development activities. Water quality controls outlined in a SWPPP would be required to be consistent with TRPA requirements. Controls would be required to ensure that runoff quality meets or surpasses TRPA water quality objectives and federal and state antidegradation policies, remains within the TRPA and LRWQCB discharge limits to surface water and groundwater sources, and maintains beneficial uses of Lake Tahoe. Stormwater quality sampling and reporting requirements outlined as a Construction Site Monitoring and Reporting Plan are also part of the SWPPP under the California permit and may also be a requirement in Nevada on a project-specific basis.

Some shorezone structures could require excavation beyond 5 feet in depth, as in the case of placement of landward pier footings. Groundwater is often shallow in the areas adjacent to a surface water and it is likely that groundwater would be intercepted. Excavation beyond 5 feet in depth would be evaluated on a project level basis. TRPA Code Section 33.3.6 allows excavation deeper than 5 feet in limited circumstances, provided that a soils/hydrologic report has been completed that demonstrates that the excavation will not interfere with or intercept groundwater, no damage occurs to mature trees or SEZ vegetation, excavated material is disposed of properly (as defined in Code Section 33.3.4), and the project site's natural topography is maintained.

Although Alternative 1 would permit grading, excavation, and ground disturbing activities in the shorezone, all future development pursuant to the proposed Shoreline Plan would be required to adhere to existing regulations and permit requirements, which reduce the potential for substantial soil erosion or loss of topsoil. Therefore, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would allow for the construction of 476 new piers, six new boat ramps, and two additional marinas allowed with a master plan. Alternative 2 would likely result in more intensive construction activities and more construction-related ground disturbance within the shorezone than Alternative 1 because of the greater number of structures and potential for development of new marinas. As described for Alternative 1, all future projects implemented through the existing TRPA shorezone regulations would be required to comply with the stringent permit conditions required by TRPA, LRWQCB or NDEP, and local codes. With enforcement of these protections, the potential for Alternative 2 to result in increased erosion or unstable soils would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would allow for five new public piers, 86 new private piers, and one new boat ramp. This would result in a smaller amount of construction-related ground disturbance than Alternatives 1 and 2. As described for Alternative 1, all future projects implemented through the existing TRPA shorezone regulations would be required to comply with the stringent permit conditions required by TRPA, LRWQCB or NDEP, and local codes. With enforcement of these protections, the potential Alternative 3 to result in increased erosion or unstable soils would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 only allows for the construction of 15 new public piers. This alternative would result in the least impact to the shorezone from construction because Alternative 4 allows for the fewest structures of any alternative. As described for Alternative 1, all future projects implemented through the existing TRPA shorezone regulations would be required to comply with the stringent permit conditions required by TRPA, LRWQCB or NDEP, and local codes. With enforcement of these protections, the potential Alternative 4 to result in increased erosion or unstable soils would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 7-3: Long-term increases in shoreline erosion

All Shoreline Plan alternatives would allow development of new facilities in the shorezone; however, the potential for the operation of these facilities to increase shoreline erosion would be controlled through existing TRPA regulations and permit conditions. Implementation of Alternatives 1, 2, and 3 would result in increased watercraft use on Lake Tahoe and would expand access to portions of the shoreline that are undeveloped or difficult to access without watercraft. Alternative 4 would not result in an increase in boating activity. Depending on the location of the 15 public piers allowed by Alternative 4, there could be an increase in public access to areas that are currently difficult to access (e.g., if a public pier and associated upland facilities were constructed in undeveloped parkland). Notwithstanding this potential, there is no evidence to suggest that such increased use of remote areas would occur as a result of future shorezone projects, nor that use of such areas, if more accessible, would result in long-term increases in erosion of the shoreline. This impact would be **less than significant**.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would result in an estimated 16 percent increase in annual boat trips, which would result in increased pedestrian activity in adjacent areas of the shorezone. Additionally, the increased number of motorized and nonmotorized watercraft on Lake Tahoe could increase recreational use of portions of the shorezone that are difficult to access from landside developments (such as the East Shore beaches). This increase in foot traffic and in the launching and beaching of watercraft at remote beaches could increase erosion and contribute to unstable soil conditions. Shorezone vegetation could be lost due to trampling and disturbance which could further destabilize shorezone soils.

The potential for increased erosion near permitted facilities would be reduced through compliance with existing TRPA code provisions and regulations. As described in Impact 7-2, only planned footpaths would be allowed in Shorezone Tolerance District 1 and projects in Districts 2 through 8 would be required to demonstrate that they will not accelerate or initiate backshore erosion and may be required to install and maintain stabilizing backshore vegetation. Also, projects permitted through the Shoreline Plan would be consistent with the TRPA Handbook, including shorezone specific BMPs. Finally, major structural repairs of permitted facilities would require TRPA verification that the project is not causing shoreline erosion (TRPA Code Section 82.4.4 (C)).

While the potential for increased erosion and loss of shorezone vegetation due to increased use of remote and undeveloped beach areas cannot be controlled by permit conditions or regulatory oversight, there is no evidence to suggest that a 16 percent increase in boating activity over the buildout period of the proposed Shorezone Plan would result in a substantial increase in use of remote beaches and shoreline areas, or that such use would substantially increase erosion of the shoreline over the long term. This would be a **less-than-significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would result in an estimated 53 percent annual increase in the number of boat trips. As discussed for Alternative 1, the potential for the operation and maintenance of new facilities to result in increased erosion would be controlled by existing TRPA permit conditions and regulation. Like the proposed

Shoreline Plan, Alternative 2 would likely result in increased use of remote and undeveloped beaches, but to a greater degree given the much greater increase in boating activity over the buildout period. However, there is no evidence to suggest that the increase in boating activity would result in a substantial increase in use of remote beaches and shoreline areas, or that such use would substantially increase erosion of the shoreline over the long term. This would be a **less-than-significant** impact.

Alternative 3: Limit New Development

Alternative 3 would result in an estimated 4 percent annual increase in boat trips. As discussed for Alternative 1, the potential for the operation and maintenance of new facilities to result in increased erosion would be controlled by existing TRPA permit conditions and regulation. While the increase in boating activity of Alternative 2 over the buildout period is small, Alternative 2 could result in some increased use of remote and undeveloped beaches. This small increase over the buildout period is unlikely to result in any discernable change in levels of use at remote beaches and shoreline areas or degree of shoreline erosion. This would be a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for the construction of 15 new public piers. As discussed for Alternative 1, the potential for the operation and maintenance of new facilities to result in increased erosion would be controlled by existing TRPA permit conditions and regulation. Alternative 4 would not increase boating activity on Lake Tahoe, and therefore would not result in any increased access to, or use of remote and undeveloped beaches, and would not contribute to increased shoreline erosion. This would be a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

Impact 7-4: Potential for damage from liquefaction, settlement, tsunami, and seiche

The Shoreline Plan alternatives would permit structures in the shorezone that could be damaged during an earthquake from liquefaction in saturated sand deposits, settlement, tsunami, and seiche. The risk from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code and the International Building Code. Alternatives 1, 2, and 3 would increase the number of boats that could be exposed to inundation by tsunami or seiche; however, while such an event could be catastrophic, the probability of occurrence in any given year, or over the coming decades is very low. The impact would be **less than significant**.

Alternative 1: Proposed Shoreline Plan

The installation of 128 new private piers, 10 new public piers, and two new boat ramps under the proposed Shoreline Plan would result in increased structures in the backshore which could expose people to risk of liquefaction, settlement, tsunami, and seiche while utilizing these structures. These structures and their users could be susceptible to earthquake damage. Additionally, the areas of the shorezone underlain by beach sands could be susceptible to liquefaction during seismic events. The risk to people and structures from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code in California and the International Building Code in Nevada.

The addition of new private and public piers and boat ramps would increase the number of recreationalists to the shorezone area, which is at risk of inundation from a lake tsunami or seiche triggered by a large seismic event. A 2006 study by the U.S. Geological Survey found that between 7,000 and 15,000 years ago, a massive landslide in McKinney Bay on the west shore of Lake Tahoe dropped several cubic miles of the West Shore 1,500 feet to the bottom of the lake and likely generated enormous seiche waves (Moore et al. 2006). Scientists at the University of Nevada, Reno, seismological laboratory studied faults beneath Lake Tahoe and estimate the probability of a large event would be approximately 2–4 percent in the next 50 years (Ichinose et al. 2000). Therefore, while several major faults beneath the lake and in the Tahoe Region are considered active and capable of producing large magnitude earthquakes that could produce destructive

tsunamis and seiches, the probability of such an event in any given year, or in the foreseeable future, is extremely low. This impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 includes the construction of 476 new piers, six new boat ramps, and up to two new marinas allowed with a master plan. As described for Alternative 1, The risk to people and structures from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code in California and the International Building Code in Nevada. The increase in shorezone facilities would increase the number of people exposed to potential inundation by tsunami or seiche, but the probability of such an event in any given year, or in the foreseeable future, is extremely low. Therefore, this would be a **less-than-significant** impact.

Alternative 3: Limit New Development

Alternative 3 would allow for five new public piers, 86 new private piers, and one new boat ramp. As described for Alternative 1, The risk to people and structures from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code in California and the International Building Code in Nevada. The increase in shorezone facilities would increase the risk to people exposed to potential inundation by tsunami or seiche, but the probability of such an event in any given year, or in the foreseeable future, is extremely low. Therefore, this would be a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for the construction of 15 new public piers. As described for Alternative 1, The risk to people and structures from seismic shaking would be controlled through compliance with the current seismic design requirements of the California Building Standards Code. Additionally, because Alternative 4 would balance the addition of public piers with removal of private piers, there would be little increase in the exposure to tsunami or seiche which, in any case, is a very low probability event. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required.

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8 RECREATION

8.1 INTRODUCTION

This chapter includes a discussion of existing recreation resources, a summary of applicable recreation regulations, and an analysis of potential impacts to recreation that could result from implementation of the Shoreline Plan. The primary issues raised during scoping that pertain to recreation include:

- need for transportation to public beaches to support changes in recreation patterns;
- maintaining public access along the shoreline around shorezone structures and within the public trust easement;
- concern about the effects on nonmotorized and motorized watercraft recreation around buoys and piers;
- enforcement of, and recreation user education about, no-wake zone areas and water safety;
- capacity analysis of level of infrastructure and boat use on the lake;
- concern for increased amounts of motorized boats on the lake; and
- fair-share distribution of access to the lake.

The Shoreline Plan does not propose new development (e.g., residential development) that would generate new demand for recreation facilities; thus, demand for recreation is not discussed further in this chapter.

The Shoreline Plan would allow for additional recreation capacity for motorized watercraft and anglers. The effects of this additional recreation capacity are assessed throughout this EIS. This chapter focuses on the effects of increased recreation capacity on access to the shoreline, quality of recreation experiences, recreation user conflicts, and fair-share distribution of recreation facilities.

8.2 REGULATORY SETTING

8.2.1 Federal

U.S. FOREST SERVICE LAKE TAHOE BASIN MANAGEMENT UNIT

National Forest System lands overseen by the U.S. Forest Service (USFS) are managed on a multiple-use, sustained yield basis for production of forage, wildlife, wood, fish, water, and outdoor recreation. The mission statement for the USFS Lake Tahoe Basin Management Unit (LTBMU) states, “The Forest Service mission at Lake Tahoe is to manage, protect, and enhance the environment of this national treasure for the benefit of the people.” Wilderness management and protection of forest areas containing historic, scenic, geologic, ecologic, or other special qualities, are inherent in USFS management policies. A revised Land Management Plan (also known as the Forest Plan) for the LTBMU was completed in 2015. This plan replaces the Forest Plan that was adopted in 1988. The Land Management Plan guides decisions on recreational issues. Unique to this plan is the emphasis on watershed, wildlife and fisheries restoration, and outdoor recreation with a de-emphasis on grazing and timber production.

8.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has established two threshold standards for recreation, which represent minimum standards of environmental quality targets to be achieved in the region. The recreation thresholds are in the form of policy statements rather than numeric standards. The two recreation threshold standards are as follows:

- **Quality Experience and Additional Access.** It shall be the policy of the TRPA Governing Body in development of the Regional Plan to preserve and enhance the high-quality recreational experience including preservation of high-quality undeveloped shorezone and other natural areas. In developing the Regional Plan, the staff and Governing Body shall consider provisions for additional access, where lawful and feasible, to the shorezone and high-quality undeveloped areas for low density recreational uses.

- **Fair Share of Resource Capacity.** It shall be the policy of the TRPA Governing Body in development of the Regional Plan to establish and ensure a fair share of the total Tahoe Basin capacity for outdoor recreation is available to the general public.

The Quality Experience and Additional Access Threshold consists of two parts: (1) preservation and enhancement of a high-quality recreational experience and opportunities and (2) the provision of additional access to high-quality lands for recreation, including lake access. The status of this threshold standard is evaluated by considering the quality of the experience of recreation users and by considering the availability of public access to the lake and other natural features. The quality of recreation experiences was evaluated for the 2015 Threshold Evaluation through recreation user surveys conducted by City of South Lake Tahoe, El Dorado County, Tahoe City Public Utility District, Lake Tahoe Visitors Authority, and North Lake Tahoe Resort Association. Such surveys assessed the overall satisfaction of recreation users and compare the importance of identified recreation attributes, such as condition of recreation facilities, with the experience that the recreationists perceive. The evaluation criteria for the second part of the threshold standard relies on assessing the extent of public land acquired, and the availability of additional amenities that provide public access for low density recreational uses, such as trails and trailheads.

The Fair Share of Resource Capacity Threshold is intended to ensure a fair share of the Region's total capacity for outdoor recreation is available to the general public. The attainment of this threshold standard is based on three indicators: (1) cumulative accounts of persons at one time (PAOT) allocations; (2) facility development for recreation projects that do not require PAOT assignments; and (3) land acquisition of new public lands that support recreation purposes.

Based on the most recent Threshold Evaluation Report completed in 2016, both recreation thresholds are in attainment (TRPA 2016a:11-3 and 11-11).

GOALS AND POLICIES

The Regional Plan contains specific goals and policies to achieve and maintain thresholds. Policies related to recreation on Lake Tahoe and in the Shorezone are addressed in three broad categories: dispersed recreation, developed recreation, and urban recreation. Dispersed recreation includes such activities as hiking, jogging, primitive camping, mountain biking, nature study, fishing, cross country skiing, rafting/kayaking, and swimming. All these activities require a quality resource base and some degree of solitude. Developed recreation includes marina and boat launch facilities, ski areas, campgrounds, and beaches. Urban recreation includes facilities located near urban areas, such as sports facilities, day-use areas, and recreation centers. Goals and policies for all types of recreation generally pertain to providing opportunities and sufficient capacity for high-quality recreation opportunities in a manner consistent with resource protection and overall regional capacity. The Regional Plan Goals and Policies also address public access to the shorezone. Policies relevant to recreation and shorezone access include (TRPA 2012:5-1–5-9):

GOAL SZ-1: Provide for the appropriate shorezone uses of Lake Tahoe, Cascade Lake, and Fallen Leaf Lake while preserving their natural and aesthetic qualities.

- **Policy SZ-1.13:** Allow public access to the shorezone where lawful and feasible on public lands. There is considerable demand for public use of the Lake Tahoe shoreline. Increased opportunities to use the shoreline shall be provided when consistent with the tolerance levels of the shorezone. Improved access to the shorezone should be provided through public lands from expanded public ownership. Trails and support facilities in the backshore should be consistent with the goals and policies of the Recreation Element.

GOAL R-2: Provide high-quality recreational opportunities.

- **Policy R-2.3.** Nearshore/foreshore structures should be appropriately located to minimize impacts to recreational boating and top line fishing. Excellent recreational fishing is possible in the nearshore of Lake Tahoe. Fish concentrate in this zone due to favorable habitat conditions. To the extent feasible, buoys and other nearshore structures in areas of prime fish habitats should be located to provide for safe navigation through this zone.

GOAL R-3: Provide a fair share of the total basin capacity for outdoor recreation.

- **Policy R-3.3.** Provisions shall be made for additional developed outdoor recreation facilities capable of accommodating 6,114 PAOT in overnight facilities and 6,761 PAOT in summer day use facilities and 12,400 PAOT in winter day-use facilities.

GOAL R-4: Provide for the appropriate type, location, and rate of development of outdoor recreational uses.

- **Policy R-4.3.** Public boat launching facilities shall be expanded, where appropriate, and when consistent with environmental constraints. There is a need for additional boat launching capacity on Lake Tahoe. This policy would encourage expansion of existing facilities or conversion of private facilities to allow public use. Incentives for redevelopment or conversion of existing facilities to provide expansion of public use will be provided in areas where these opportunities exist.

- **Policy R-4.4.** Private marinas shall be encouraged to provide public boat launching facilities. This policy would increase boat access to Lake Tahoe by encouraging marina facilities to provide public launching facilities, where practical, and provide incentives to those facilities which improve or provide such services.

Persons at One Time

The Regional Plan uses the concept of PAOTs as a measure of recreation capacity. PAOT describes the number of people that a recreation use area can accommodate at a given time. Allocations of PAOTs are used to both promote and control recreation facility development. Although certain recreation facilities have a design capacity for a given number of people at a time (e.g., developed campgrounds), PAOTs are not a management tool and do not indicate the overall use of a site. PAOTs are intended to ensure that a “fair share” of the region’s remaining resource capacity (e.g., water and sewer services) is available for outdoor recreation areas and is allocated to projects that would result in an increase in the carrying capacity of recreation sites. If a recreation project would result in additional vehicle trips at a rate that would trigger a traffic analysis, PAOTs would be needed in an amount commensurate with the intensity of new development. TRPA has identified PAOT targets for outdoor recreation (see Table 8-1).

The categories of PAOTs utilized under this system include winter day-use PAOTs, summer day-use PAOTs, and summer overnight PAOTs. Winter day-use PAOTs are necessary for winter recreation facilities such as ski areas or snowmobile courses. Summer day-use PAOTs are necessary for summer day-use recreation facilities such as beaches or trailhead parking. Summer overnight PAOTs are necessary for a new campground or existing campground expansion. Dispersed recreation does not require the allocation of

PAOTs unless the dispersed activity is associated with a facility that requires them (e.g., a kayak rental concession at a developed beach).

Table 8-1 PAOT Allocations in the Tahoe Basin

PAOT Categories	Regional Plan Allocations	Assigned as of 2015	PAOTs Remaining	Percent of PAOTs Remaining
Summer Day Use[1]	6,761	1,722	5,039	74.5
Winter Day Use[2]	12,400	5,267	7,133	57.5
Summer Overnight[3]	6,114	394	5,720	93.6
Total	25,275	7,383	17,892	70.8

[1] Summer day use PAOTs apply to all marinas, boat launching facilities, rural sports, golf courses, visitor information centers, off-road vehicle courses, and tour boat operations. Per TRPA Code Subsection 50.9.3.C.2, 2,000 PAOTs are reserved for marina and boat launching facility expansion pursuant to a master plan. PAOTs apply when a federal agency or State department of parks and recreation (or their permittees) operate a recreation center, participant sports facility, sport assembly facility, or beach recreation or day use area.

[2] For downhill ski areas pursuant to a master plan pursuant to TRPA Code Subsection 50.9.3.c.3.

[3] These PAOTs apply to all developed campgrounds, group facilities, and RV parks.

Source: TRPA 2016a:11-14

CODE OF ORDINANCES

The TRPA Code consists of ordinances needed to implement the Goals and Policies. Chapter 50, "Allocation of Development," of the TRPA Code includes a section on the regulation of additional recreational facilities (Section 50.8). TRPA regulates the rate and distribution of expanding recreational uses in the Tahoe Region through the allocation of PAOTs.

Chapters 11 and 12 of the Code, plan area statements (PAS) and plan area maps and community plans, requires that each PAS and community plan specify the permissible amount of additional recreational capacity, subject to the PAOT system. Any additional capacity that is beyond that specified in the PAS or community plan can be drawn from the reserved pool of PAOTs.

8.2.3 California

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

The mission of the California Department of Parks and Recreation (State Parks) is "…to provide the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and providing opportunities for high-quality recreational experiences based on those resources." State Parks manages the California State Park System, including Burton Creek State Park in Tahoe City and Sugar Pine Point State Park south of the Placer County line on the West Shore. State Parks also manages the Tahoe State Recreation Area (SRA) in Tahoe City and the Kings Beach SRA in Kings Beach.

CALIFORNIA STATE LANDS COMMISSION

The California State Lands Commission (State Lands) is responsible for leasing sovereign lands on the California side of Lake Tahoe. On the California side of Lake Tahoe, a public trust easement allows for public access between the low- and high-water elevation of Lake Tahoe. The area in the public trust easement allows for commerce, navigation, fishing, recreation, and preservation. The high- and low-water marks for the California side of the Lake have been established as elevations 6,228.75 feet and 6,223 feet Lake Tahoe datum, respectively. Any activities involving the state's sovereign lands in Lake Tahoe below 6,223 feet require a lease from State Lands. State Lands is involved with the protection of California's rare and endangered wildlife and plant species as described in Chapters 5 and 14 of this document, as applicable, and for ensuring compliance with the California Environmental Quality Act (CEQA).

CALIFORNIA TAHOE CONSERVANCY

The California Tahoe Conservancy (Conservancy) was created in 1984 to restore and sustain a balance between the natural and human environments for public and private uses at Lake Tahoe. The Conservancy provides grants to local governments and nonprofit organizations for erosion control, public recreation and access, land acquisition, and other projects, and implements a mandate that, among other things, seeks to increase public access to the region's natural recreational opportunities. In the past 20 years, the Conservancy has acquired and developed many lake access parcels, including heavily used lakefront parks in Kings Beach and Carnelian Bay. Acquisitions in Tahoe Vista resulted in removal of dilapidated structures and site restoration for more passive lake access. The Conservancy also owns shoreline property operated for other recreational purposes by State Parks and the North Tahoe Public Utility District, and numerous other properties available for dispersed and developed recreational uses.

8.2.4 Nevada

NEVADA STATE PARKS

The Nevada State Parks manages the Lake Tahoe–Nevada State Park. The Lake Tahoe–Nevada State Park Master Development Plan with Resource Analysis (Lake Tahoe–Nevada State Park Plan) describes the basic principles for the use, preservation, and operation of Lake Tahoe–Nevada State Park. The goal of the plan is to provide a long-range management and development strategy based on current visitation, needs and conditions, as well as projections for future use and needs. The plan includes a description of user conflicts and visitor impacts for Sand Harbor Management Area, Cave Rock Management Area, and the State Route 28 Management Area.

NEVADA DIVISION OF STATE LANDS

The Nevada Division of State Lands (NDSL) requires applications for structures lakeward of high water, 6,229.1 feet elevation, although the state claims ownership of Lake Tahoe lakeward of 6,223 feet elevation, Lake Tahoe datum (NRS 321.595). NDSL requests comments from the Nevada Department of Wildlife regarding impacts to recreational access and fish habitat resulting from Shorezone leases. NDSL also maintains the public trust on the Nevada side for submerged land below an elevation of 6,223 feet Lake Tahoe datum.

NEVADA DEPARTMENT OF WILDLIFE

The Nevada Department of Wildlife (NDOW) is responsible for managing the fisheries, wildlife, and habitat resources on the Nevada side of Lake Tahoe. In addition, NDOW is also responsible for boating and safety on navigable waters in the state. NDOW protects boaters from navigational obstacles and protects the recreational angler's boating access along the shoreline of Lake Tahoe. NDOW is a reviewing and commenting agency but has no regulatory authority related to permits for construction in hazards to navigation within the waters of Lake Tahoe.

8.3 AFFECTED ENVIRONMENT

The recreation opportunities in the Lake Tahoe region are abundant due to the diverse terrain and topography. Activities are generally associated with the lake's open water (e.g., swimming, boating, personal watercraft use, and fishing), the shoreline (e.g., sunbathing, camping, bicycling, and sightseeing), and the mountains surrounding the lake (e.g., hiking, mountain biking, backpacking, snowboarding, and skiing). The Lake Tahoe Region is home to almost 55,000 full-time residents and is a recreational destination with four to six million visitors each year (TRPA 2017a), including many who live in nearby metropolitan centers within a few hours' travel time.

The recreational activities in the region are a major draw. Tourism is an important part of the local economy and a high-quality recreation experience coupled with outstanding recreation opportunities is important to maintaining tourism.

The peak period for recreational use of Lake Tahoe occurs during the summer months (i.e., June through August) with some lake-based recreational use in the shoulder seasons (i.e., spring and fall) and very little during the winter. The Shoreline Plan EIS focuses on recreation uses that occur within the shorezone and on the lake. Recreation uses that occur upland from the shorezone are not discussed further.

8.3.1 Land Ownership

Currently, approximately 55 percent of the shoreline is in public ownership and approximately 45 percent is in private ownership (see Table 8-2; TRPA 2018). Public and private ownership of land along the shore of Lake Tahoe is shown on Exhibit 4-6 in Chapter 4, "Land Use." A summary of the public lands by public agency owner type is provided below.

Table 8-2 Percent of Shoreline in Each Land Ownership Category

Land Ownership	Percentage of Shoreline
Federal	27
State	25
Local	3
Private	45
Total	**100**

Source: data provided by TRPA in 2018

FEDERAL

The U.S. Forest Service (USFS) owns nearly 27 percent of the shoreline of Lake Tahoe (see Table 8-2), with the majority located along the east shore between Sand Harbor and the community of Glenbrook. Pockets of shoreline owned by USFS are also located at William Kent Beach and Kaspian Day Use Area, both located south of Tahoe City. Meeks Bay Resort, beach, and campground are located on USFS land, but are operated by the Washoe Tribe of Nevada and California. USFS-owned shoreline in the south shore area include Baldwin Beach, Taylor Creek Beach, Kiva Picnic Area, and Tallac Historic Site. The Camp Richardson Resort and Marina operates under a special-use permit with USFS. Similarly, Zephyr Cove Resort in Nevada is also operated under a special-use permit with USFS.

CALIFORNIA

California State Parks (State Parks) owns approximately 14 percent of the shoreline on Lake Tahoe (TRPA 2015). These areas include Kings Beach SRA, Tahoe City SRA, Ed Z'berg Sugar Pine Point State Park, D.L. Bliss State Park, and Emerald Bay State Park. The Conservancy has contributed to the access of and enhanced beachfront amenities at over 1.75 miles of shoreline for public enjoyment and boat launching (Conservancy 2018). Carnelian Beach West, Moon Dunes Beach, Patton Landing, and Sandy Beach are among the Conservancy's shoreline properties.

NEVADA

The State of Nevada owns approximately six percent of Lake Tahoe shoreline, which includes Lake Tahoe Nevada State Park and Sand Harbor.

LOCAL

Local agencies that own land along the shoreline of Lake Tahoe include the City of South Lake Tahoe, Douglas County, El Dorado County, Incline Village General Improvement District, North Tahoe Public Utility District, Placer County, and Tahoe City Public Utility District. Local agencies own approximately three percent of the shoreline of Lake Tahoe. Some of the locally owned public access, beaches and other amenities around the lake include Lakeview Commons and Boat Ramp and Regan Beach in the City of South Lake Tahoe, Commons Beach and Skylandia Park in Tahoe City, and Secline Beach in Kings Beach.

8.3.2 Recreation Facilities

PUBLIC BEACHES AND ACCESS POINTS

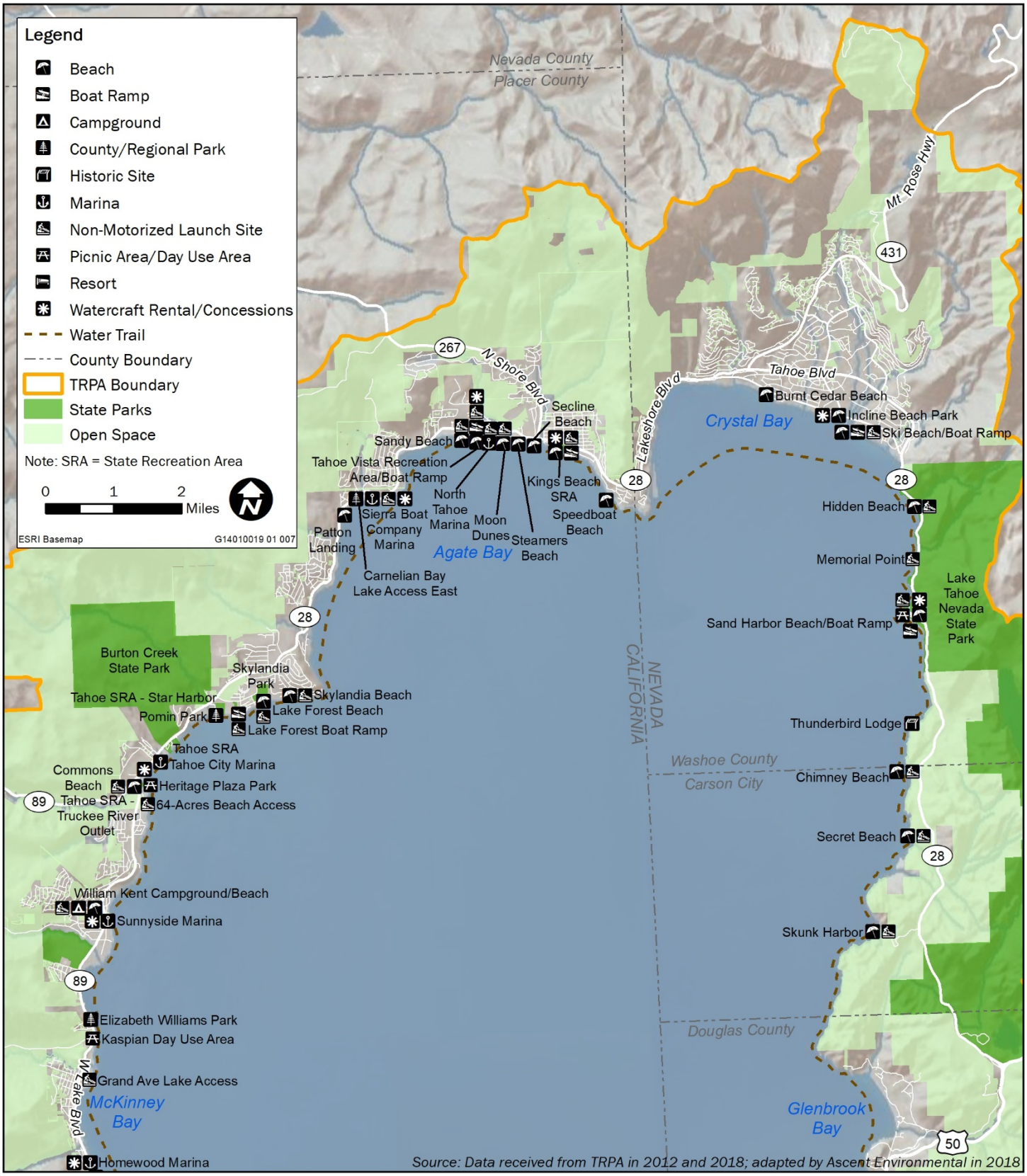
Over 40 public beaches and access points are located around Lake Tahoe (see Exhibits 8-1 and 8-2). The highest concentration of these public areas are in Tahoe City, Tahoe Vista, Kings Beach, and the south shore between Emerald Bay and the state line. Public beaches on the west shore and east shore are generally located in Lake Tahoe Nevada State Park, U.S. Forest Service lands, and California state parks. During peak summer months, Lake Tahoe's public beaches and access points are popular places for a variety of recreation activities: swimming, sunbathing, relaxing, barbecuing, paddle boarding, kayaking, jet skiing, and boating. Conflicts can arise among differing recreation user groups, especially when competing for the same resource. Because of the sound generated by motorized watercraft and their ability to produce waves when traveling at speeds greater than 5 miles per hour, the presence of motorized watercraft near shoreline areas with many people swimming, using nonmotorized watercraft, or playing in the water creates the potential for conflicts among these recreationists. The quality of recreation experiences at public beaches could be influenced by the noise generated by motorized watercraft, boat wake, or number of boats in the viewshed of the beach. Additionally, the effects on recreation experience of people seeking a solitary beach experience away from the more developed portions of the shoreline may be more greatly affected by increased numbers of motorized boaters.

In locations where public and private property exist in close proximity, access conflicts often arise. Public recreation can result in unauthorized trespass, litter, and safety concerns. Conflicts also arise when private owners restrict access lakeward of the high-water elevation with structures that do not allow for lateral passage, such as fences or piers.

PIERS

The shorezone of Lake Tahoe is dotted by a total of 762 piers, nearly all of which are individual private piers or private multiple-use piers (see Table 2-1 in Chapter 2, "Project Description"). Piers provide opportunities for fishing, viewing and to otherwise experience the lake in a way that does not require getting in the water or using watercraft. When the water is high enough, piers can also serve as a place for swimmers to jump or dive in the lake.

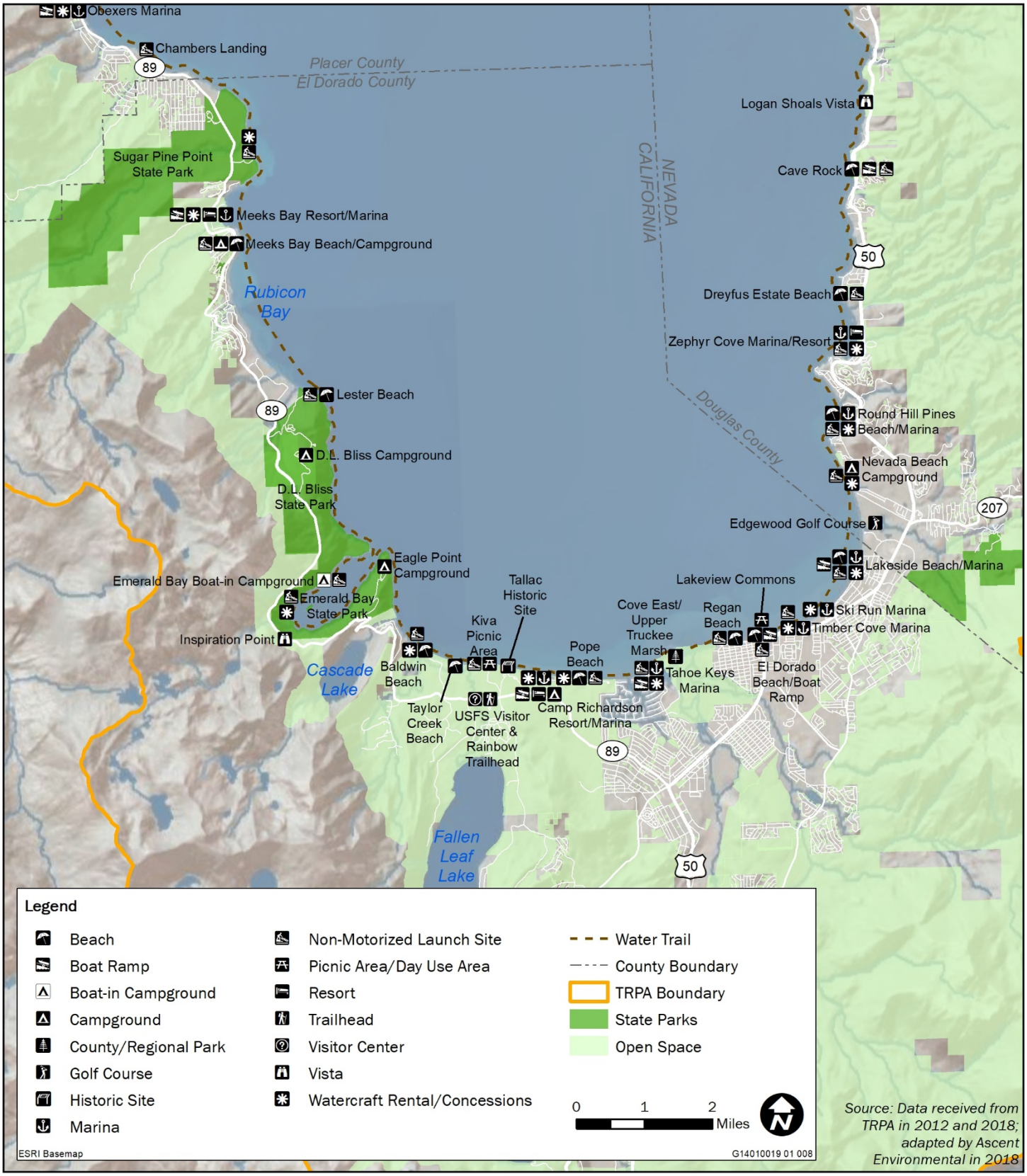
In some sections of Lake Tahoe's shoreline, the density and/or length of piers is such that very little, if any, obstruction to access exists (e.g., east shore, Crystal Point, Emerald Bay). However, in sections with pier densities in excess of one pier every 100 feet (e.g., Rubicon/Meeks Bay, Cedar Flat, portions of Carnelian Bay and Agate Bay) access is significantly restricted. The areas with high densities of piers are areas with a high concentration of private landowners along the shoreline. Where long piers or other shorezone structures, such as piers or buoy fields, are located, nonmotorized watercraft users may be required to travel outside of the 600-foot no-wake zone as they travel laterally around these structures. Outside the no-wake zone, motorized watercraft are allowed to travel at higher speeds. The presence of slower moving nonmotorized watercraft in these areas creates the potential for safety hazards because they might not be highly visible to motorized watercraft or they may be knocked over by large wake from boats.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-1 **Recreation Facilities and Public Access Points – North Lake Tahoe**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-2 **Recreation Facilities and Public Access Points – South Lake Tahoe**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

LAKE TAHOE WATER TRAIL

Lake Tahoe has more than 72 miles of shoreline with approximately 40 public nonmotorized watercraft launch/landing sites (see Exhibits 8-1 and 8-2; Lake Tahoe Water Trail 2018). The Lake Tahoe Water trail follows the 72-mile route along the shoreline of the lake with opportunities for recreation users to plan day trips between the different public launch and landing points or to plan a multi-day trip. Signs are installed at several launching sites that provide water safety, maps, and other educational information. These locations include Tahoe Vista Recreation Area, Waterman's Landing, Sand Harbor, and Lake Forest Boat Ramp.

MARINAS AND BOAT LAUNCHING FACILITIES

Lake Tahoe has 14 public marinas and 22 public or quasi-public motorized watercraft launching facilities located around the lake (see Exhibits 8-1 and 8-2 and Table 2-1 in Chapter 2, "Project Description"). The public can gain access to the shorezone and to the lake itself through boat launching and marina/mooring opportunities. Marinas also offer opportunities for the public to rent motorized and nonmotorized watercraft. These facilities are sensitive to changes in lake levels, significantly reducing their ability to meet public needs during low water conditions when many ramps and slips are left dry.

8.3.3 Recreation Usage

NONMOTORIZED WATERCRAFT

The types of nonmotorized watercraft typically used on the lake include kayaks, canoes, stand up paddleboards, and dinghies that do not contain motors. Nonmotorized watercraft can be launched by hand from many locations around the lake and can be stored on beaches or in upland areas when not in use. This decentralized use pattern makes it extremely difficult to estimate levels of nonmotorized boat use. However, nonmotorized boating is clearly very popular, with nonmotorized watercraft outnumbering motorized watercraft in many areas. Anecdotal observations indicate that the use of nonmotorized watercraft, and stand-up paddle boards, in particular, has increased over the last decade. Nonmotorized watercraft use appears to be highest near public beaches and near undeveloped shoreline with easy public access, such as along state parks. Nonmotorized watercraft typically, though not always, travel in closer proximity to the shore than motorized watercraft.

MOTORIZED WATERCRAFT

Motorized boat use on Lake Tahoe includes a wide variety of watercraft including pleasure craft with outboard, inboard, and stern drive motors; personal watercraft, such as jet skis; and sailboats with auxiliary engines. Based on a review of boat registration data and boat inspections conducted in 2015 (the most recent year for which data is available), an estimated 13,617 separate motorized watercraft operated on Lake Tahoe during the boating season (TRPA 2016b). Under baseline conditions, there are an estimated 5,899 peak day boat trips and approximately 234,102 annual boat trips (see Table 2-3 in Chapter 2, "Project Description").

Motorized boats on Lake Tahoe are operated as either day-use boats, boats moored on Lake Tahoe, or rental concessions:

- **Day-use boats** are boats that are launched and removed from the lake on the same day. Day-use boats are launched at a boat ramp or marina. Based on boater surveys conducted during AIS inspections in 2015, between 50 and 60 percent of all boats that operated on Lake Tahoe at any point during the year were day-use boats (TRPA 2016c).

- **Boats moored on Lake Tahoe** are those boats that are stored for multiple days on a mooring (i.e., a buoy, slip, or boat lift) on Lake Tahoe. Boats moored on Lake Tahoe are typically launched in the spring or early summer at a marina or boat ramp, then stored on a seasonal mooring during some or all of the boating

season. Based on 2015 boat user surveys, between 40 and 50 percent of the boats that operated on Lake Tahoe at any point during the year were moored on Lake Tahoe (TRPA 2016c).

- **Boat rentals** are boats that are rented for short-term use (e.g., hourly or daily rentals). Rental boats are owned by private parties and stored at marinas or other facilities around Lake Tahoe. They include boats that are rented and operated by private parties, as well as charter boats. Motorized boat rentals comprise approximately two percent of the motorized boats on Lake Tahoe. However, they account for a larger proportion of the boats in use at any time because rental boats tend to be in use more often than personal boats. An estimated 463 motorized boats were available for rent at Lake Tahoe (TRPA 2017b).

The number of shoreline structures (boat ramps and associated parking, buoys, boat lifts, and slips) limits the total capacity for day-use and moored boats on Lake Tahoe.

8.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

8.4.1 Methods and Assumptions

The following analysis assesses the environmental effects of each alternative with respect to the existing recreation uses and facilities in the shorezone and changes in public access to these recreation resources and Lake Tahoe. This analysis is based on review of existing documents, policies, ordinances, and other regulations pertinent to recreation.

8.4.2 Significance Criteria

Significance criteria relevant to recreation are summarized below. The applicable TRPA threshold standards, the recreation criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- have the potential to create conflicts between recreation uses, either existing or proposed;
- result in a decrease or loss of public access to any lake, waterway, or public lands;
- result in a decrease in the quality of recreation experience; or
- alter the balance of public and private development such that a fair share of recreation capacity is not reserved for the general public.

8.4.3 Environmental Effects of the Project Alternatives

Impact 8-1: Alter the quality of recreational experiences or create user conflicts

Alternatives 1, 3, and 4 would result in construction of new shorezone structures, with Alternative 4 structures limited to public piers. These alternatives include density and location standards for moorings and piers that would help preserve scenic areas around the lake and maintain the quality of recreation experience. Alternatives 1, 3, and 4 would not result in a substantial change to quality of recreation experience. Implementation of Alternatives 1, 3, and 4 could result in public piers extending beyond the 600-foot no-wake zone, which could create potential conflicts between nonmotorized recreation (i.e., nonmotorized watercraft and swimmers) and motorized watercraft. This would be a **potentially significant** impact related to recreation user conflicts for Alternatives 1, 3, and 4. With implementation of Mitigation Measure 8-1a, the impact of Alternatives 1, 3, and 4 would be reduced to a **less-than-significant** level.

Because of the substantial increase in boat launch capacity and overnight mooring provided by the number of new shorezone structures associated with Alternative 2, the increase in the number of motorized watercraft on the lake would be great enough that there would be a substantial adverse change in quality of recreation experience for people using motorized and nonmotorized, swimmers, and other beachgoers and increased potential for conflicts between motorized and nonmotorized recreationists outside the no-wake zone. Alternative 2 could also result in new multiple-use and public piers that extend beyond the no-wake zone, creating the potential for conflicts between nonmotorized recreationists and motorized watercraft. For these reasons, Alternative 2 would result in a **potentially significant** impact related to changes in the quality of recreational experiences and creation of new recreation user conflicts. After implementation of the required mitigation measures, this impact would be reduced to a **less-than-significant** level.

Alternative 1: Proposed Shoreline Plan

The goal of Alternative 1 is to enhance the recreational experience at Lake Tahoe while protecting the environment and responsibly planning for the future. At buildout, it would allow for a total of up to 10 new public piers and 128 new private piers (including private multi-use piers) for a total of 900 piers, two new public boat ramps for a total of 24 public boat ramps, and up to 2,116 new moorings (estimated at 265 new public buoys, 1,741 new private buoys, 65 public slips, and 45 private lifts) for a total of approximately 10,800 moorings, or a 24 percent increase over existing moorings. The estimated number of new private boat lifts is based on the assumption that, with implementation of Alternative 1, the same proportion of piers would have boat lifts in the future as under existing conditions (see Appendix A). Some of the new and existing buoys could be converted to slips, and vice versa, at facilities open to the public (e.g., marinas) and would count toward the mooring cap.

The Shoreline Plan would establish a permitting and allocation process intended to limit the pace of new pier and buoy approvals and provide for equitable distribution of new piers and buoys between marinas, public agencies, private littoral property owners, and homeowners associations (HOAs). Location and density standards for the placement of piers and buoys would also be established. Alternative 1 would maintain the existing 600-foot no-wake zone, which limits watercraft speed to 5 mph within 600 feet of shore and would expand the no-wake zone to include all of Emerald Bay.

The character of natural-dominated shoreline areas experienced for recreationists would not substantially change with implementation of Alternative 1. Natural-dominated shoreline areas are generally undeveloped public land and may have limited access and parking. These areas are important to the quality of recreational experiences because they offer natural scenic beauty, solitude, and a sense of adventure. New structures in these areas would be limited to new public shorezone facilities, such as public piers. With implementation of Alternative 1, most new shorezone facilities would be constructed throughout shoreline areas characterized as visually dominated or visually modified, based on the location of private land and development potential around the lake. Because these areas already contain a substantial number of buoys and piers (see Chapter 4, “Land Use”), the addition of new buoys and piers in these areas would not change the recreational experience because recreationists already see a developed shoreline and recreational watercraft already navigate around piers and buoys in these areas.

The quality of scenic views of the shoreline is also an important component of the quality of recreational experiences at Lake Tahoe. Alternative 1 includes provisions intended to protect scenic quality by limiting pier density, limiting the visible mass of shoreline structures, and requiring improvements. A more detailed discussion of the scenic effects of new shorezone facilities is included in Chapter 9, “Scenic Resources.”

As shown in Table 2-3, Alternative 1 at buildout would result in an approximately 13 percent increase in peak day boat trips and an approximately 16 percent increase in annual boat trips over baseline conditions. The increase in number of boat trips are influenced by increases in boat launch capacity, which would be provided by the two new public boat launches, and overnight mooring at buoys, slips, and boat lifts. Based on the number of existing and new shorezone structures, boat trips would be estimated to increase to 6,666 boat trips on a peak day and 272,359 boat trips annually.

The surface area of Lake Tahoe is approximately 122,880 acres. On a peak day at buildout (i.e., a summer holiday weekend in the year 2040), Alternative 1 would result in approximately one boat for every 18.4 acres on the lake, which is an increase in density of boats on the lake. This translates to an 11.5 percent decrease in space per boat compared to baseline conditions of approximately one boat for every 20.8 acres (see Table 8-3). While additional boats would not be evenly spaced at these densities, the estimate of acres per boat provides a relative comparison of crowding under each alternative. As described above, the TRPA threshold related to quality experience and additional access for recreation is in attainment. The attainment determination encompasses baseline conditions in which boat density is approximately 20.8 acres per boat on a peak day.

Table 8-3 Changes in Density of Boats on the Lake on a Peak Day

	Peak Day Boat Trips[1]	Existing Plus Project Peak Day[1]	Boat Density[2] (acres/boat)
Baseline Conditions	5,899	N/A	20.8
Alternative 1	+767	6,666	18.4
Alternative 2	+2,639	8,537	14.4
Alternative 3	+222	6,121	20.1
Alternative 4	+0	5,899	20.8

Note: N/A = not available

[1] Peak Day Boat Trips were obtained from Table 2-3 in Chapter 2, "Project Description."

[2] The surface area of Lake Tahoe is approximately 122,880 acres.

Source: Compiled by Ascent Environmental in 2018

With implementation of Alternative 1, recreation users of motorized watercraft would likely follow existing patterns of travel to popular destinations around the lake, including Baldwin Beach, east shore beaches, and many of the state parks such as Emerald Bay and Sand Harbor, and public beaches along the south shore. Because of the relatively small increase in boat density (11.5 percent on a peak day) and because motorized recreation users would congregate near existing popular destinations along the shoreline, the increase in motorized recreation with Alternative 1 would not be substantial enough to be noticeable by recreation users on the lake and in the shorezone such that the quality of recreation experience would be degraded. The increase in motorized watercraft would not change the character of the experience in areas that already experience overcrowding. Large areas in the center of the lake would be less crowded and those people seeking a quieter recreation experience could still find those away from popular destinations. Additionally, because of the relatively small increase in motorized watercraft on the lake with implementation of Alternative 1, there would not be a substantial increase in the potential for conflict between motorized watercraft and nonmotorized recreationists in areas of the lake outside of the no-wake zone. Impact 15-1 in Chapter 15, "Public Health and Safety," provides additional discussion related to the potential increase for accidents on the lake due to increased boating.

As described above, most new shorezone structures would be located within areas with existing shorezone development. With Alternative 1, new buoys would be required to comply with location standards that would allow buoys outside of buoy fields to be located up to 600 feet lakeward from elevation 6,220 feet (an increase from the current limit of 350 feet) and a minimum of 20 feet from property boundaries and 50 feet from other legally existing buoys. New buoys in buoy fields that serve homeowners associations (HOAs), commercial, or tourist uses would be subject to the same location standards as individual private buoys. Marina buoy fields would also comply with the same placement standards as for other buoy fields, but they could extend more than 600 feet from elevation 6,220 feet. Although the maximum distance for buoys from shore coincides with the no-wake zone boundary, there would be sufficient distance between buoys (50 feet from nearby buoys) and between the buoy and the shoreline such that nonmotorized watercraft users and swimmers could navigate through the buoys fields or landward of individual buoys. There may be new boats and buoys in existing buoy fields, where potential conflicts already exist, but Alternative 1 would not result in any new buoy fields. If necessary, navigational buoys could also be installed to demarcate no-wake zones in these areas. The increase in the no-wake zone area in Emerald Bay would help reduce potential for conflicts

between motorized watercraft and nonmotorized watercraft or swimmers. For these reasons, new buoys under Alternative 1 would not create conflicts between motorized watercraft and nonmotorized watercraft or swimmers or affect navigation for nonmotorized recreation activities.

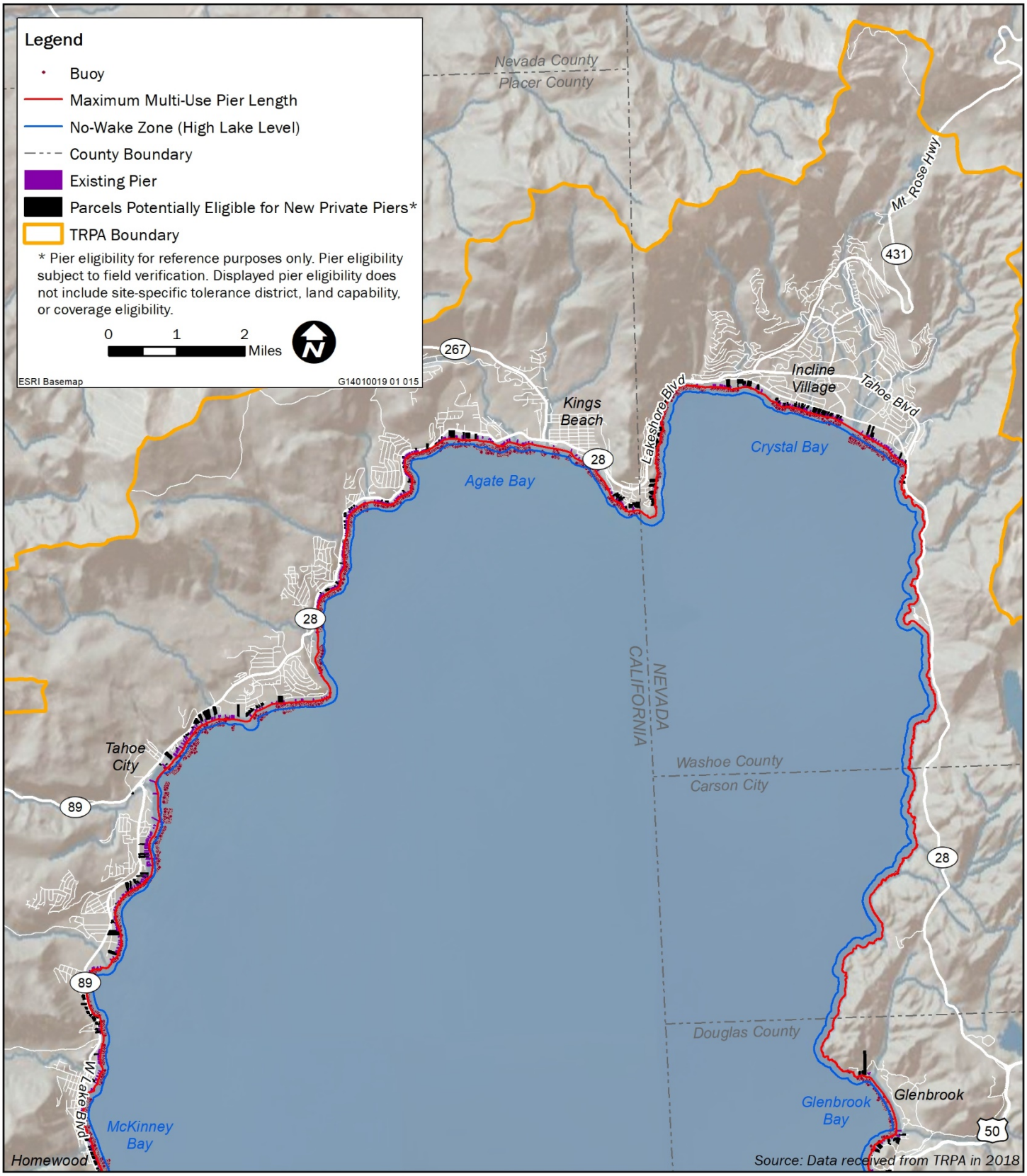
As described above, Alternative 1 would allow for new public, private, and multi-use private piers, which could result in new areas where nonmotorized watercraft and swimmers would need to paddle or swim around the end of the pier as they travel laterally along the shoreline. New private single-use and multi-use piers would be required to comply with design standards for length of the pier. Single-use piers would be limited to within the location of the contour line for elevation 6,219 feet or pierhead line, and multiple-use private piers would be limited to the more landward of either elevation 6,219 feet or 30 feet lakeward of the pierhead line. The existing shorezone structures, parcels potentially eligible for new private piers, the maximum length for multiple-use piers, and the 600-foot no-wake zone under high water conditions are shown on Exhibits 8-3 and 8-4. As seen on this exhibit, any new multiple-use piers would be within the no-wake zone, which would allow nonmotorized recreation users and swimmers to move around the end of a pier while remaining within the no-wake zone. Therefore, new private single-use and multiple-use private piers would not substantially affect navigation for nonmotorized activities or create a conflict between motorized watercraft and nonmotorized watercraft or swimmers.

Public piers could exceed design standards that apply to private multiple-use piers to the extent necessary to provide a public service. Thus, a public pier could be designed such that it extends beyond the 600-foot no-wake zone, which could require nonmotorized watercraft and swimmers traveling laterally along the shoreline to navigate further away from the shoreline and travel outside of the no-wake zone and into areas where motorized watercraft are travelling at higher speeds, particularly if the pier does not provide sufficient space for recreationists to pass underneath the pier. For these reasons, public piers that extend beyond the no-wake zone could affect navigation for nonmotorized activities and create conflicts between motorized watercraft and nonmotorized recreation. The conflict would be created because there would be a potential hazard for nonmotorized watercraft and swimmers recreating in an area where motorized watercraft speeds could exceed 5 miles per hour creating waves, noise, and reducing the quality of the experience for nonmotorized recreationists. Motorized watercraft traveling at higher speeds may also have more trouble seeing nonmotorized watercraft and swimmers, creating a greater potential for accidents. Public piers could result in a potentially significant impact by creating a new conflict for recreation users associated with navigating around the pier outside the no-wake zone.

With implementation of Alternative 1, most new shorezone facilities would be constructed throughout shoreline areas with existing development and a substantial number of buoys and piers, which would not substantially reduce the quality of recreation by changing the character of undeveloped shoreline. Additionally, Alternative 1 includes standards for buoys and piers that would help preserve scenic areas around the lake. The increase in motorized watercraft on the lake from implementation of Alternative 1 would not substantially change the quality of the recreation experience. This alternative could allow for new public piers that extend beyond the no-wake zone, which could affect navigation for nonmotorized activities creating conflicts between motorized watercraft and nonmotorized watercraft or swimmers. This would be a **potentially significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

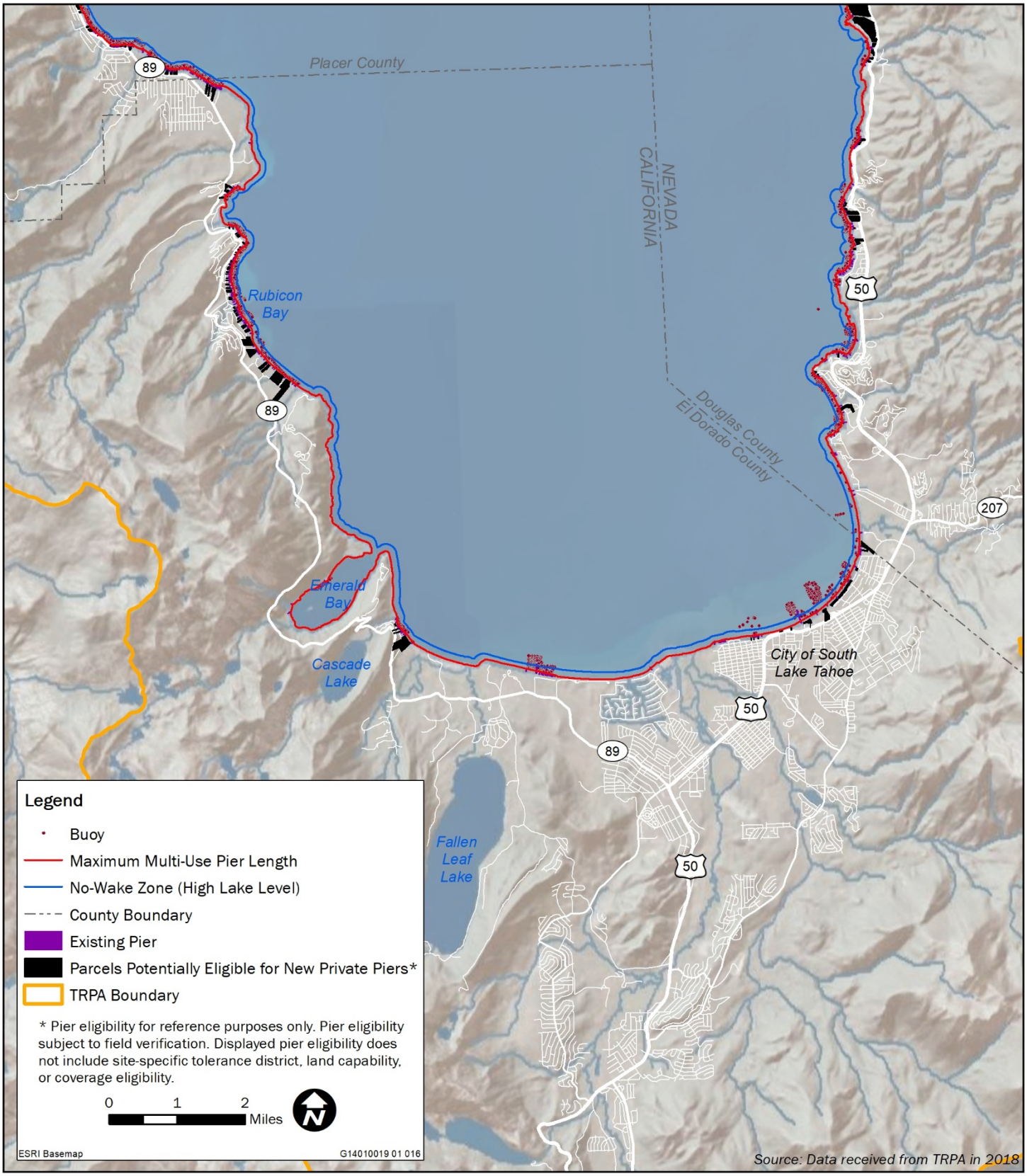
Alternative 2 would retain the existing TRPA Shorezone Code but would lift the temporary moratorium on new shorezone structures. This alternative would prohibit new structures within TRPA-designated prime fish habitat. There would be no numeric cap on new moorings. The number of buoys, slips, and boat lifts would be limited by the number of eligible parcels that could place moorings consistent with locations standards including the prohibition on structures within prime fish habitat. These standards would allow for up to 4,871 new buoys, 1,897 boat slips, and 168 boat lifts. Under this alternative, up to 476 new piers that could include any number of public, multiple-use, or private single-use piers up to that limit with a maximum of one pier per eligible parcel. This is the only alternative that would allow new marinas (up to two new marinas). New shorezone structures would be excluded from fish habitat, 200 feet of stream or river inlets, and water purveyors must be consulted for any proposed shorezone structure within 600 feet of a drinking water intake. Alternative 2 would maintain the existing 600-foot no-wake zone.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-3 **Alternative 1 Maximum Multiple-Use Pier Length in North Lake Tahoe**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-4 **Alternative 1 Maximum Multiple-Use Pier Length in South Lake Tahoe**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Alternative 2 would result in similar effects on the character of the shoreline experienced by recreationists as described above for Alternative 1. Because natural-dominated shoreline areas are owned by public agencies and few, if any, new public shorezone facilities would be located in these areas, Alternative 2 would not substantially change the character of the shoreline in these areas and would have little, if any, effect on user experience relative to shoreline character. By virtue of the locations of parcels eligible for new piers—primarily within visually dominated and visually modified shoreline character types—constructing or placing new shorezone structures in these areas that already contain substantial numbers of buoys and piers would not substantially affect the quality of the recreational experience by changing the character of undeveloped areas (see Exhibit 2-5 in Chapter 2, "Project Description").

The quality of scenic views of the shoreline is also an important component of the quality of recreational experiences at Lake Tahoe. Alternative 2 includes provisions intended to protect scenic quality by requiring scenic offsets for increases in visible mass. A more detailed discussion of the scenic effects of new shorezone facilities is included in Chapter 9, "Scenic Resources."

As shown in Table 2-4 and Exhibit 2-12 in Chapter 2, "Project Description," Alternative 2 would result in an approximately 45 percent increase in peak day boat trips and an approximately 53 percent increase in annual boat trips over baseline conditions at buildout (i.e., by the year 2040). This is a substantially greater increase than the increase in peak day and annual boat trips over baseline conditions for Alternative 1. Based on the number of existing and new shorezone structures, boat trips would be estimated to increase to approximately 8,500 boat trips on a peak day and 358,900 boat trips annually. On a peak day (i.e., a summer holiday weekend) at buildout, there would be approximately one boat for every 14.4 acres on the lake, which would be a 31 percent increase in density of boats on the lake compared to baseline conditions of approximately one boat for every 20.8 acres (see Table 8-3). The increase in the density of motorized watercraft on the lake would be noticeable such that it could alter the recreation experience for users (Reclamation 2011). This would result in a substantial adverse change in quality of recreation experiences for people using motorized and unmotorized watercraft, swimmers, and other beachgoers.

The increase in motorized boats on the lake could result in an increase in conflicts with nonmotorized recreationists in areas outside the no-wake zone. It is reasonable to assume there would be an increase in nonmotorized recreationists on the lake associated with background population growth and visitation growth. Conflicts would most likely occur when paddle boarders, kayakers, or swimmers are recreating in areas lakeward of the 600-foot no-wake zone, including near existing piers that extend beyond the no-wake zone. Motorized boats can pose hazards to nonmotorized recreationists when travelling at high speeds, creating large wake and conditions that make it more difficult for nonmotorized watercraft and swimmers to be seen. The substantial increase in boats on the lake would result in a corresponding increase in the potential for conflicts between motorized watercraft and nonmotorized recreationists. Because of the substantial increase in motorized watercraft that would occur with implementation of Alternative 2, there would be a potentially significant impact associated with conflicts between motorized watercraft and nonmotorized watercraft or swimmers. Impact 15-1 in Chapter 15, "Public Health and Safety," provides additional discussion related to the potential increase for accidents on the lake due to increased boating.

The existing shorezone regulations identify location standards for buoys to be placed a minimum of 20 feet from each property line and not any further lakeward than necessary to provide for safe mooring, but not to exceed 350 feet lakeward of the high-water line. Buoy fields would be allowed to deviate from these design standards and would be anticipated to develop following existing patterns for buoy fields. As described above for Alternative 1, nonmotorized watercraft and swimmers could navigate within the 600-foot no wake zone around buoy fields on the landward side or navigate through the buoy field if there is not sufficient space lakeward of the buoy field to allow for recreation users to stay within the no-wake zone. If necessary, navigational buoys could also be installed to demarcate no-wake zones in these areas. For these reasons, new buoys under Alternative 2 would not affect navigation for nonmotorized recreation activities or create conflicts between motorized watercraft and nonmotorized watercraft or swimmers.

Alternative 2 includes design standards for private single-use piers and multiple-use piers. Public piers would be considered multiple-use piers and would be subject to the same evaluation criteria as private multiple-use

piers. Design standards for single-use private piers would limit their length to 6,219 feet Lake Tahoe Datum (LTD) or pierhead line, whichever is more limiting, which allows for nonmotorized recreationists to navigate around the end of the pier within the no-wake zone. With Alternative 2, new multiple-use piers could affect navigation and create conflicts and safety hazards for nonmotorized watercraft and swimmers because this alternative does not include location standards that limit the length of multiple-use piers to within the no-wake zone. Multiple-use piers could be designed as floating piers, which would not allow recreationists to pass beneath at any time, or they could be designed as open-piling piers that may not provide enough space between the surface of the water and the bottom of the pier deck for recreationists to pass beneath at all lake levels. If multiple-use piers extend beyond the no-wake zone, then nonmotorized watercraft and swimmers may need to navigate into an area of the lake where motorized watercraft are traveling at speeds greater than 5 miles per hour. It is possible that nonmotorized watercraft and swimmers would be less visible to motorized watercraft users, resulting in safety hazards. Thus, new multiple-use piers associated with implementation of Alternative 2 could result in a potentially significant impact related to navigation for nonmotorized activities and conflicts between nonmotorized and motorized recreationists.

The increase in number of motorized watercraft on the lake would be noticeable such that Alternative 2 would result in a substantial adverse change in quality of recreation experience for users of motorized watercraft, nonmotorized watercraft, swimmers, and other beachgoers, and would increase the potential for conflicts outside the no-wake zone. Alternative 2 could also result in new multiple-use piers that extend beyond the no-wake zone, creating additional potential for conflicts between nonmotorized recreationists and motorized recreationists. For these reasons, Alternative 2 would result in a **potentially significant** impact.

Alternative 3: Limit New Development

The goal of this alternative is to reduce the risk of environmental impacts by limiting new shoreline development. Motorized watercraft access would be concentrated at marinas and public facilities. This alternative would authorize fewer structures than Alternatives 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would also authorize 86 new private piers, but they would be restricted to multiple-use piers. Alternative 3 would include the same no-wake zone as Alternative 1.

Construction of new shorezone structures, such as piers, buoys, and slips, with implementation of Alternative 3 would result in a similar effect on the character of shoreline experienced by recreationists as described above for Alternative 1. However, the effects of Alternative 3 would be less than those described for Alternative 1 because fewer private piers and fewer public piers could be constructed under this alternative. Alternative 3 also includes the same location standards as Alternative 1 and includes pier distribution that would reduce the potential scenic impacts. For these reasons, Alternative 3 would not substantially alter the character of the shoreline experienced by recreationists.

As shown in Table 2-3, at buildout Alternative 3 would result in an approximately four percent increase in peak day boat trips and an approximately four percent increase in annual boat trips over baseline conditions. Based on the number of existing and new shorezone structures for Alternative 3, boat trips would be estimated to increase to 6,121 boat trips on a peak day and 242,923 boat trips annually. On a peak day (i.e., summer holiday weekend) at buildout, there would be approximately one boat for every 20.1 acres on the lake, which would be a small increase in density of boats on the lake on a peak day over baseline conditions of approximately 20.8 acres per boat (see Table 8-3). This small, less than one percent, increase in boat density on the lake would not be noticeable to recreation users; thus, the increase in motorized watercraft of the lake as a result of Alternative 3 would not substantially affect the recreational experience. The increase in motorized watercraft would not change the character of the experience in areas that already experience overcrowding. Large areas in the center of the lake would be less crowded and those people seeking a quieter recreation experience could still find those away from popular destinations. Additionally, because of the relatively small increase in motorized watercraft on the lake with implementation of Alternative 3, there would not be a substantial increase in the potential for conflict between motorized watercraft and nonmotorized recreationists in areas of the lake outside of the no-wake zone. Impact 15-1 in Chapter 15, “Public Health and Safety,” provides additional discussion related to the potential increase for accidents on the lake due to increased boating.

Similar to Alternative 1, most new shorezone structures would be located in areas with existing shorezone development. With Alternative 3, new buoys and slips would be required to comply with the same location standards included in Alternative 1 but would also be limited to marinas or public facilities. If necessary, navigational buoys could also be installed to demarcate no-wake zones in these areas. New private multiple-use piers would be required to comply with design standards for length of the pier such that the maximum length of the pier is 300 feet, extends to the pierhead line, 6,219 feet, or the minimum necessary to reach navigable water, whichever is less. The maximum length for multiple-use piers under Alternative 3 and the 600-foot no-wake zone under high water conditions are shown on Exhibits 8-5 and 8-6. As seen on these exhibits, any new multiple-use piers would be within the no-wake zone, which would allow nonmotorized recreation users and swimmers to move around the end of a pier while remaining within the no-wake zone. For the reasons described above for Alternative 1 and herein, new buoys, slips, and multi-use piers for Alternative 3 would not affect navigation for nonmotorized activities or create conflicts between motorized watercraft and nonmotorized watercraft or swimmers.

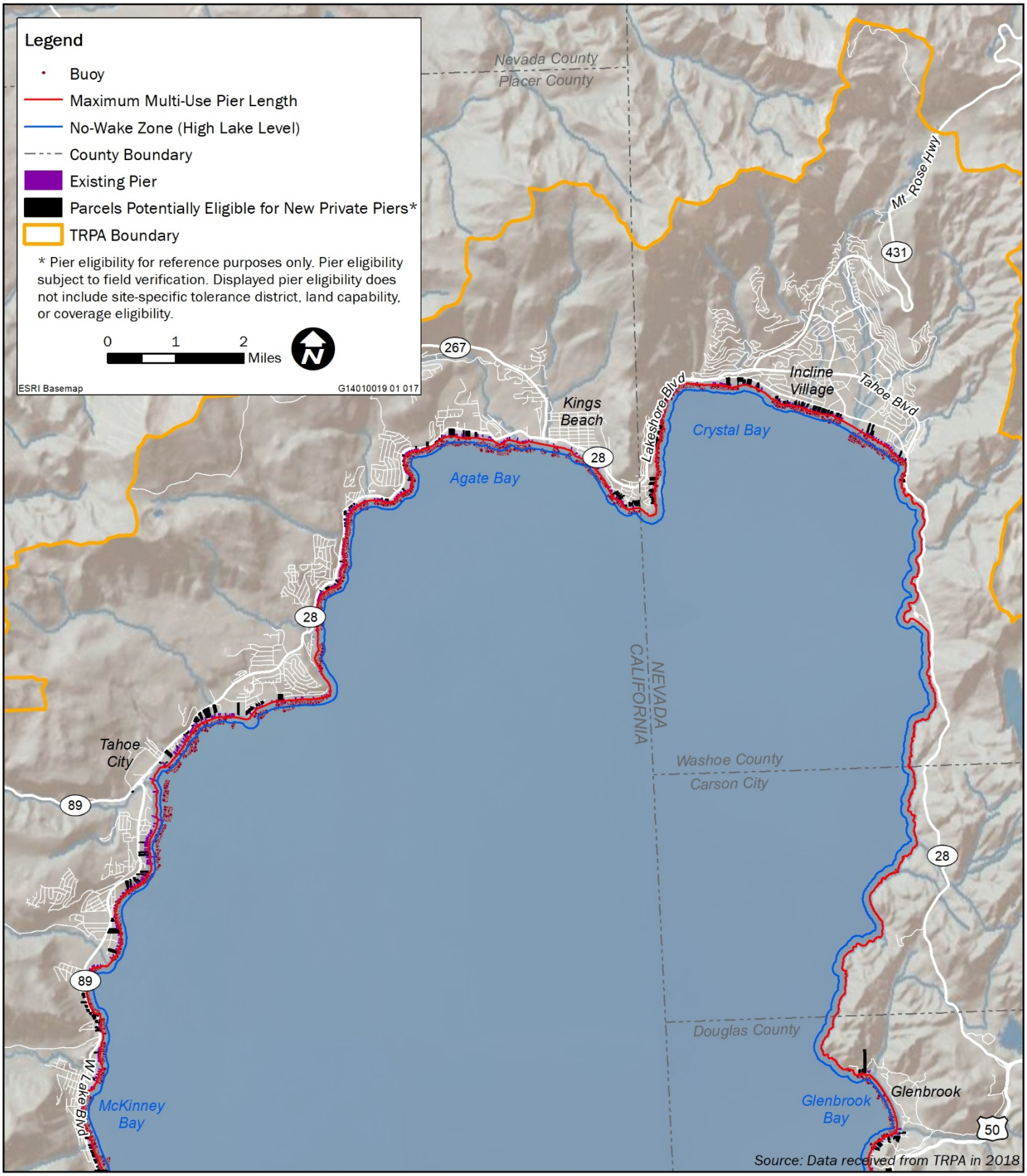
Public piers under Alternative 3 could deviate from design standards that apply to private multiple-use piers to the extent necessary to provide a public service. Thus, as also described above for Alternative 1, a public pier could be designed such that it extends beyond the 600-foot no-wake zone, which could result in requiring nonmotorized watercraft and swimmers traveling laterally along the shoreline to navigate outside of the no-wake zone as they pass the pier if the pier does not provide sufficient space for recreationists to pass underneath the pier. For these reasons, public piers that extend outside of the no-wake zone could affect navigation for nonmotorized activities and create conflicts between motorized watercraft and nonmotorized watercraft or swimmers.

With implementation of Alternative 3, most new shorezone facilities would be constructed throughout shoreline areas with existing development and a substantial number of buoys and piers, which would not change the character of the recreational experience. Additionally, Alternative 3 includes standards that would help preserve scenic areas around the lake. The increase in motorized watercraft on the lake from implementation of Alternative 3 would not substantially change the quality of the recreation experience. This alternative could allow for new public piers that extend outside of the no-wake zone, which could create conflicts between nonmotorized watercraft and swimmers and motorized watercraft resulting in a **potentially significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. The alternative would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations as long as the project resulted in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shorezone structures.

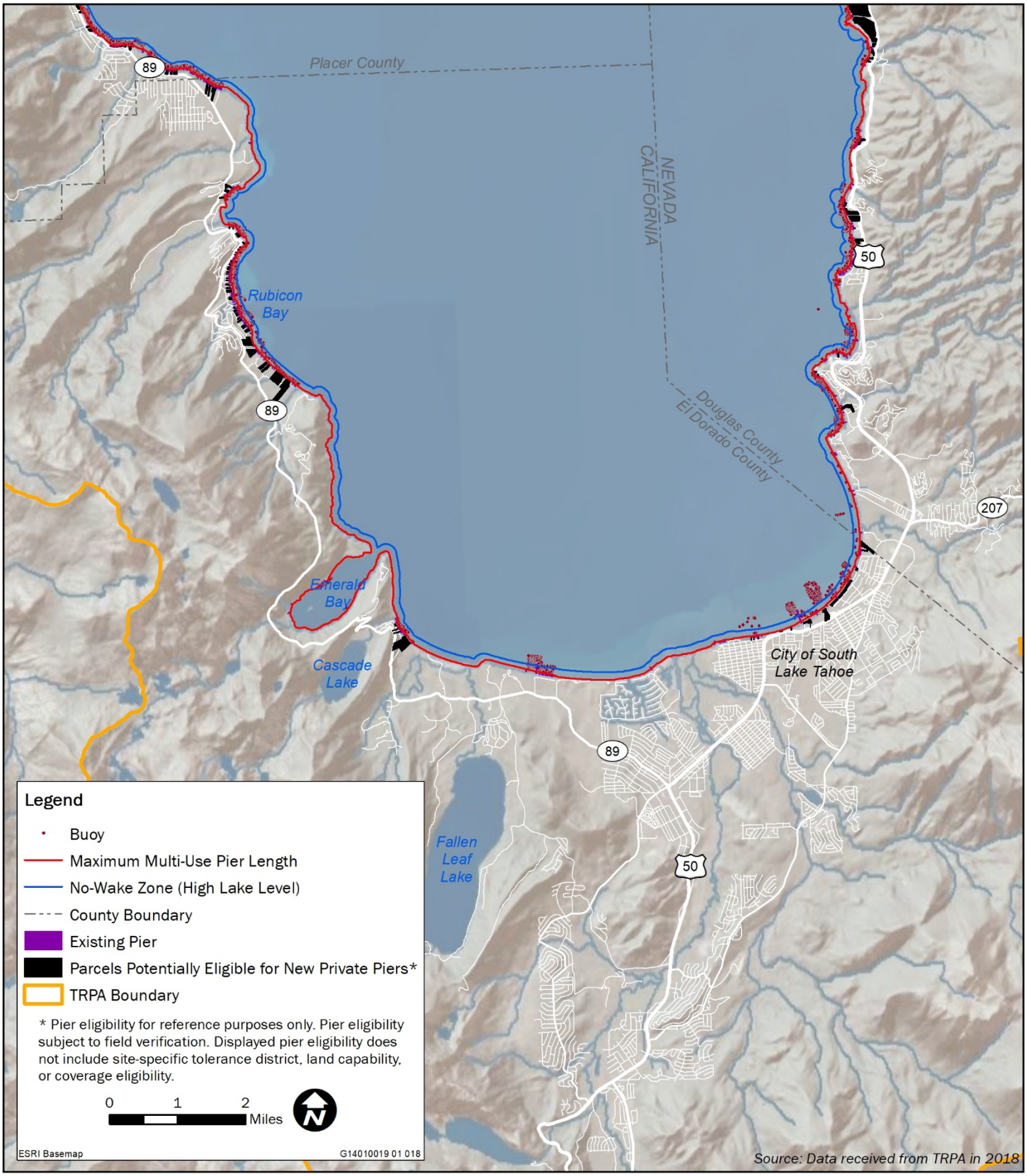
Implementation of Alternative 4 would include expanding the no-wake zone to include all of Emerald Bay and would increase the no-wake zone in front of priority areas to 1,200 feet lakeward from the waterline of the lake. These priority areas are shown on Exhibit 8-7 and include portions of the lake adjacent to Sand Harbor and the surrounding Lake Tahoe Nevada State Park, D.L. Bliss State Park, and Sugar Pine Point State Park. The expanded wake zone areas would be enforced through increased no-wake zone education and patrols by enforcement agencies. If necessary, navigational buoys could also be installed to demarcate no-wake zones in these areas. The increase in no-wake zone areas would help reduce potential for conflicts between motorized watercraft and nonmotorized watercraft or swimmers. This expanded no-wake zone would have a beneficial effect on nonmotorized recreation because it would increase the lake area where nonmotorized recreation could occur without potential conflicts with motorized watercraft travelling at speeds greater than 5 mph. The expanded no-wake zone would also benefit onshore recreation (e.g., hikers, beachgoers) at these state parks because it would reduce noise associated with motorized watercraft moving at high speeds.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-5 **Alternative 3 Maximum Multiple-Use Pier Length – North Lake Tahoe**

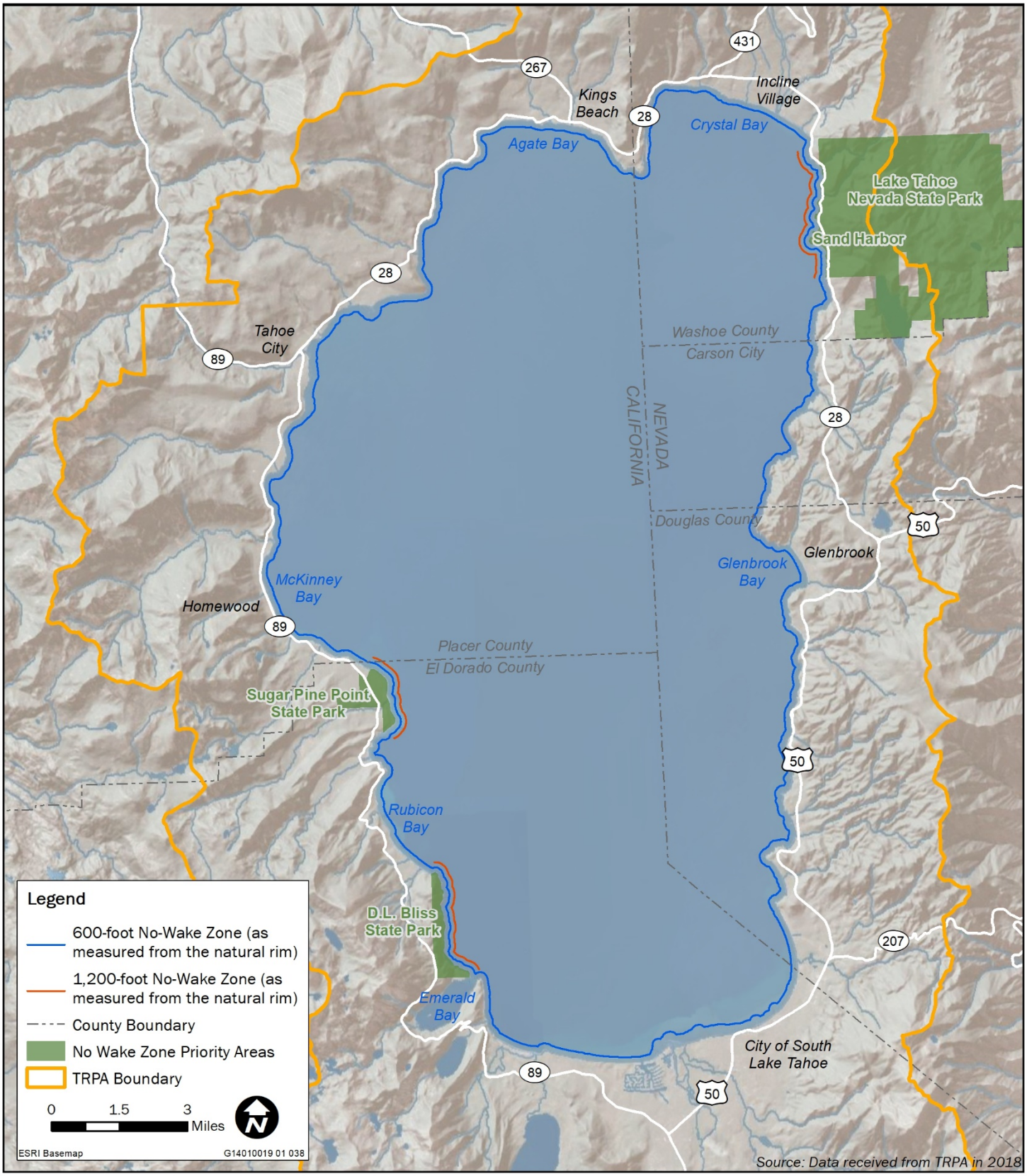
SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-6 **Alternative 3 Maximum Multiple-Use Pier Length – South Lake Tahoe**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



TAHOE REGIONAL PLANNING AGENCY

Exhibit 8-7 **Alternative 4 Proposed No-Wake Zone Areas**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

New shorezone structures allowed with implementation of Alternative 4 would be limited to new public piers, which would be subject to similar design, location, and scenic requirement standards as identified for Alternatives 1 and 3. For these reasons, Alternative 4 would not substantially alter the character of the shoreline experienced by recreationists. However, a public pier could be designed such that it extends beyond the 600-foot no-wake zone, which could result in requiring nonmotorized watercraft and swimmers traveling laterally along the shoreline to navigate outside of the no-wake zone as they pass the pier, if the pier does not provide sufficient space for recreationists to pass underneath the pier. For these reasons, public piers that extend outside of the no-wake zone could affect navigation for nonmotorized activities and create conflicts between motorized watercraft and nonmotorized watercraft or swimmers.

With implementation of Alternative 4, there would be no change in peak day or annual boat trips over baseline conditions and no change in density of boats on the lake (i.e., one boat for every 20.8 acres on the lake during a summer holiday weekend). Alternative 4 would not increase the number of motorized watercraft on the lake such that the experience of recreation users would be adversely affected.

Alternative 4 would result in an expanded no-wake zone near three state parks that would benefit nonmotorized and onshore recreation in these areas. Implementation of Alternative 4 would result in a limited number of new shorezone structures that would only include new public piers. Additional motorized boating capacity would not be provided by this alternative, resulting in no change over baseline conditions in the density of boats on the lake or numbers of shorezone structures. Thus, the quality of recreation experience would not change compared to baseline conditions. As described above, the length of public piers could be long enough to extend into the no-wake zone, affecting navigation for nonmotorized activities and creating potential recreation user conflicts. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 8-1a: Maintain nonmotorized navigation within the no-wake zone

This mitigation measure would be required for public piers in Alternatives 1, 3, and 4 and multiple-use and public piers in Alternative 2.

TRPA will revise the pier design standards for piers that extend 600 feet or more from the high-water elevation to provide lateral nonmotorized recreation access within the 600-foot no-wake zone. Lateral nonmotorized recreation access within the 600-foot no-wake zone could be provided by either of the following:

- The pier design standards would require public piers (for Alternatives 1, 3, and 4) and multiple-use piers (for Alternative 2) to accommodate lateral nonmotorized access by limiting the pier length to within the 600-foot no-wake zone and providing at least 10 feet between the end of the pier and the no-wake zone boundary to allow nonmotorized recreationists to stay within the no-wake zone. The applicant for a new multiple-use pier that extends to within 30 feet of the no-wake zone would also be required to install one or more navigational buoys to identify the location of the no-wake zone relative to the pier; or

- The pier design standards could allow exceptions for public piers (for Alternatives 1, 3, and 4) and multiple-use and public piers (for Alternative 2) that extend beyond the no-wake zone if the pier is designed to allow nonmotorized recreationists to have lateral access underneath the pier during high lake level conditions.

Mitigation Measure 8-1b: Implement Mitigation Measure 10-1 to limit the number of moorings and boat ramps

This mitigation measure would be required for Alternative 2.

TRPA will implement Mitigation Measure 10-1, as described in Chapter 10, “Air Quality,” which would revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat

ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps.

Mitigation Measure 8-1c: Establish buffer area around nonmotorized recreationists outside of the no-wake zone

This mitigation measure would be required for Alternative 2.

TRPA will amend the no-wake zone section of the Code of Ordinances to include a 200-foot buffer between motorized watercraft in motion and nonmotorized recreationists in areas outside of no-wake zones, which is already in practice by Nevada State Parks.

Significance after Mitigation

With implementation of Mitigation Measure 8-1a, new public piers for Alternatives 1, 3, and 4 and multiple-use piers for Alternative 2 would be required to demonstrate that safe lateral access for navigation of nonmotorized watercraft and swimmers would be provided within the no-wake zone either through reducing pier length or by constructing a pier that would allow for passage of these recreation users underneath the pier. Implementation of this mitigation measure would maintain space for lateral navigation by nonmotorized recreationists within the no-wake zone and reduce the potential for user conflicts created by piers extending into the no-wake zone. Impacts would be reduced to **less-than-significant** levels.

With implementation of Mitigation Measure 8-1b for Alternative 2, TRPA would restrict the number of new moorings and boat ramps to the same number authorized for Alternative 1. Together with implementation of Mitigation Measure 8-1a and 8-1c, this would reduce the impact related to quality of recreation experience associated with Alternative 2 to a **less-than-significant** level.

With implementation of Mitigation Measure 8-1c for Alternative 2, TRPA would revise the TRPA Code to require motorized watercraft in motion to keep at least 200 feet between them and any nearby nonmotorized recreationist. The additional buffer would increase safety for the nonmotorized recreationist by reducing the potential for conflict with a motorized watercraft. The impact related to user conflicts between motorized watercraft and nonmotorized recreationists would be reduced to a **less-than-significant** level.

Impact 8-2: Affect access or opportunities for motorized watercraft

Alternatives 1, 2, and 3 would increase capacity for boat launching and mooring by allowing for additional boat ramps and overnight mooring structures. The design and location standards for all three of these alternatives and expansion of the no-wake zone to include all of Emerald Bay with Alternatives 1 and 3 would not substantially change opportunities for recreation activities on the lake that rely on motorized watercraft, including activities such as fishing and water skiing. Alternatives 1 and 3 also provide standards for shorezone structures to allow for boating access under a range of lake levels. Because increased motorized boating capacity would be provided on the lake with additional moorings and public boat ramps, Alternatives 1, 2, and 3 would have a **beneficial** impact on access and opportunities for motorized boating.

Alternative 4 would allow for additional piers but would not provide additional launch capacity or moorings to increase access or opportunities for recreational users of the lake. Alternative 4 would have **a less-than-significant** impact on access or opportunities for motorized boating.

Alternative 1: Proposed Shoreline Plan

Implementation of Alternative 1 would allow for two new public boat ramps, 2,116 new moorings, and 138 additional piers. The use and placement of these facilities would affect a range of boater access and use considerations. Boaters use the water near the shore in different ways, depending on the type of watercraft and recreational activity. Improved shoreline and lake access points for some types of recreationists can pose navigational and speed obstacles for others. However, overall, more shorezone structures generally provides additional access to the lake for motorized users. Other elements of Alternative 1 include an expanded and more strictly enforced no-wake zone, and provisions for shorezone development to adapt to

lower lake levels. These elements of the proposed Shoreline Plan would influence access and opportunity for recreationists, as described below.

Under Alternative 1, new mooring and boat launching facilities would increase motorized boating capacity (Table 8-4), resulting in the ability for more motorized watercraft users to enjoy the lake during the boating season.

Table 8-4 Projected New Boating Activity for New Shorezone Structures

Shorezone Structures	Alternative 1			Alternative 2			Alternative 3			Alternative 4		
	Number of New Structures	Peak Day Boat Trips	Annual Boat Trips	Number of New Structures	Peak Day Boat Trips	Annual Boat Trips	Number of New Structures	Peak Day Boat Trips	Annual Boat Trips	Number of New Structures	Peak Day Boat Trips	Annual Boat Trips
Buoys	2,006	501	31,269	4,871	1,218	75,934	300	75	4,677	0	0	0
Slips	65	23	1,047	1,897	683	30,551	65	23	1,047	0	0	0
Boat Lift	45	16	734	168	60	2,730	30	11	493	0	0	0
Public Boat Ramp	2	226	5,206	6	678	15,619	1	113	2,603	0	0	0
Public Pier	10	0	0	78	0	0	5	0	0	15	0	0
Private Pier	128	0	0	398	0	0	86	0	0	0	0	0
Total Boat Trips		766	38,257		2,639	124,834		222	8,820		0	0

Detailed calculations of boating activity are provided in Appendix A.

Source: compiled by Ascent Environmental in 2018

The addition of 138 new piers under Alternative 1 would expand opportunities for motorized watercraft to access the shoreline. New piers would allow for short-term mooring, which would enable guests on a boat to access beaches and nearby amenities without the need to swim or wade to shore.

Modification of existing, and construction of new structures in the shorezone may impede access to the nearshore water or create use and safety conflicts, as described above under Impact 8-1. However, motorized watercraft can move to deeper water to avoid new or extended piers and buoys easily and without substantial safety concerns. Motorized watercraft users often seek a higher speed experience and may keep to deeper water anyway.

Provisions for low lake level adaptation, which chiefly include design and location standards for shorezone structures, would improve functional access for all types of watercraft to piers, boat ramps, and other shorezone structures over a wider range of lake level conditions.

Low speed limits in the no-wake zone generally prohibit activities such as water skiing, wakeboarding, and speed boating, insofar as they limit the ability to get speeds fast enough to safely do these activities. However, some areas in the nearshore are unsuitable for these activities anyway, due to existing shorezone structures and shallow water. Implementation of Alternative 1 would expand the existing 600-foot no-wake zone to include all waters inside Emerald Bay, and enforcement of the no-wake zone would be increased in some high-traffic areas, such as state parks. The existing speed limit in Emerald Bay is 15 miles per hour, which effectively excludes high speed recreation activities (e.g., water skiing, wakeboarding, tubing), so this area is not typically used for such activities. With implementation of Alternative 1, speeds would be limited to 5 mph (or 7 mph for tour boats) so recreation activities that rely on high speeds would continue to be excluded from Emerald Bay. The change in no-wake zone for Emerald Bay or increase in enforcement for some areas would not prohibit or decrease access to the shoreline for motorized watercraft and would not degrade recreational opportunities for motorized watercraft related to waterskiing, wakeboarding, and other

similar recreation activities. Additionally, because the lake is large, boaters would still have many areas of the lake in which those activities could be enjoyed, and therefore new shorezone structures and higher levels of enforcement in the no-wake zone would not be expected to impede these activities in any way.

Shorezone structures in prime fish habitat could create obstacles to trolling and limit access to fishing from motorized watercraft along the shoreline. Generally, piers that extend beyond the pierhead line force anglers away from the shore. Buoys placed close together, particularly if located in large buoy fields that extend far into the lake, create sufficient barriers to through travel to also force anglers out of prime fishing habitat, particularly during the boating season when boats occupy the buoys. Most fishing on Lake Tahoe occurs in deep water from a boat (USFS 2018). As described under Impact 8-1, new piers and buoys would tend to be located in areas near existing shorezone structures, including the west shore, Tahoe City, Incline Village, and South Lake Tahoe. The proposed Shoreline Plan standards would require buoys to be placed a minimum of 50 feet from nearby buoys and new private single-use piers would be required to limit their length to the more limiting of elevation 6,219 feet LTD or the pierhead line. The maximum extent of multiple-use piers would be the more limiting of 6,219 feet LTD or 30 feet lakeward of the pierhead line. Thus, the length of private piers would be within or close to the pierhead line. Although public piers could exceed the design standards that apply to multiple-use piers, only 10 new public piers could be constructed with Alternative 1, which is a small number relative to the size of the lake. Trolling is done using very long lines, which make areas containing buoys and piers unattractive for fishing. Because new piers and buoys would generally be located in areas that already contain these structures, these new structures would likely not interfere with existing angling patterns. For these reasons and because fishing on Lake Tahoe typically occurs far from shore, Alternative 1 would not substantially affect navigation for fishing.

Alternative 1 would increase capacity for boating, provide new access points for motorized watercraft to access both the shore and the lake, and provide standards for shorezone structures to allow boating access under a range of lake levels. Alternative 1 would also not impede existing activities by constructing new structures that would substantially change opportunities for recreation activities that rely on motorized watercraft or inhibit those activities with new provisions for the no-wake zone. Because increased motorized boating capacity would be provided on the lake with additional moorings and public boat ramps, Alternative 1 would have a **beneficial** impact on access or opportunities for motorized boating.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Implementation of Alternative 2 would allow for six new public boat ramps, 6,936 new moorings, two new marinas, and 476 piers. New shorezone structures associated with buildout of Alternative 2 would increase motorized boat launching and overnight mooring capacities resulting in a potential for an estimated 2,639 additional motorized boat trips on a peak day and additional 124,834 annual motorized boat trips (see Table 8-4). Alternative 2 would continue to prohibit new structures in prime fish habitat. Buoy floats and anchors within buoy fields would continue to be allowed to move farther lakeward during periods of low lake conditions, but there are no other provisions to allow modifications to facilities or structures to be useable during low lake conditions. The existing 600-foot no-wake zone around the lake would be retained.

As described under Impact 8-1, in general, new piers and buoys would be located in areas near existing shorezone structures, including the west shore, Tahoe City, Incline Village, and South Lake Tahoe. Alternative 2 standards limit buoys outside of buoy fields to within 350 feet lakeward of the high-water line and buoy fields could deviate from these location standards. Private single-use piers would be limited in length to 6,219 feet LTD or the pierhead line, whichever is more limiting.

Because Alternative 2 includes the same types of shorezone structures as Alternative 1, with similar design and location requirements for buoys and piers, this alternative would have the same types of impacts related to expanding opportunities for motorized watercraft to access the shoreline, creating use and safety conflicts with longer multiple-use and public piers (see Impact 8-1). Motorized watercraft could move to deeper water to avoid new or extended piers and buoys. Recreationists that participate in activities such as fishing, trolling, waterskiing, and other similar recreation activities would still have many areas of the lake in which they could participate in these activities.

Because new shorezone structures associated with Alternative 2 would be prohibited from prime fish habitat, no new obstacles to trolling or fishing would be created in these areas. As described above for Alternative 1, fishing more typically occurs in deep water on Lake Tahoe. For these reasons, Alternative 2 would not substantially affect navigation for fishing.

Alternative 2 would increase capacity for boat launching and mooring and would not construct new structures that would substantially change opportunities for recreation activities that rely on motorized watercraft. Because increased motorized boating capacity would be provided on the lake with additional moorings and public boat ramps, Alternative 2 would have a **beneficial** impact on access or opportunities for motorized boating.

Alternative 3: Limit New Development

Implementation of Alternative 3 would allow for one new public boat ramp, 395 new public moorings, and 91 piers. New shorezone structures associated with buildout of Alternative 3 would increase boat launching and overnight mooring capacities resulting in a potential for an estimated 222 additional boat trips on a peak day and additional 8,820 annual boat trips (see Table 8-4). Alternative 3 would include the same standards for the no-wake zone as Alternative 1, which includes a no-wake zone for all of Emerald Bay and expanded enforcement in areas that receive heavy nonmotorized watercraft use. Alternative 3 would also establish the same location standards as Alternative 1 for the placement of buoys in buoy fields. Design and location standards for new multiple-use piers would limit pier length to 300 feet, the pierhead line, or 6,219 feet LTD, whichever is less or the minimum necessary to get to navigable water. These pier standards are more restrictive than those for Alternative 1 piers. Public piers could exceed these standards.

As described under Impact 8-1, new piers and buoys would tend to be located in areas near existing shorezone structures. Alternative 3 standards for buoys limit buoys outside of buoy fields to within 350 feet lakeward of the high-water line and buoy fields could deviate from these location standards. Private single-use piers would be limited in length to 6,219 feet LTD or the pierhead line, whichever is more limiting.

Because Alternative 3 includes the same types of shorezone structures as Alternative 1, with similar design and location requirements for buoys and piers such that this alternative would have the same types of impacts related to expanding opportunities for motorized watercraft to access the shoreline, creating use and safety conflicts with longer public piers (see Impact 8-1). Motorized watercraft could move to deeper water to avoid new or extended piers and buoys. Recreationists that participate in activities such as fishing, trolling, waterskiing, and other similar recreation activities that rely on motorized watercraft would still have many areas of the lake in which they could participate in these activities.

Alternative 3 would increase capacity for motorized boat launching and mooring, provide standards for shorezone structures to allow for boating access under a range of lake levels, and would not construct new structures that would substantially change opportunities for recreation activities that rely on motorized watercraft. Because increased motorized boating capacity would be provided on the lake with additional moorings and public boat ramps, Alternative 2 would have a **beneficial** impact on access or opportunities for motorized boating.

Alternative 4: Expand Public Access and Reduce Existing Development

Implementation of Alternative 4 would allow for 15 new public piers. Because this alternative would not increase the number of motorized boat ramps or overnight moorings, Alternative 4 would not increase the capacity for motorized boats on the lake. Alternative 4 promotes expansion of public access to the lake through new piers but would also reduce existing shoreline development through transfer ratios. Some existing private shoreline facilities could be removed and rebuilt in a different location provided that the project resulted in a 2:1 reduction in the number of structures. However, there is little incentive for property owners to remove existing shorezone structures through these transfer ratios. Therefore, the analysis assumes that the existing boating capacity and levels of boating activity would not be changed by Alternative 4. As described for Alternative 1, new public piers constructed through implementation of Alternative 4 could provide access to the shoreline for passengers of motorized watercraft. Similarly, new piers would not adversely affect navigation for motorized watercraft or activities that rely on motorized watercraft. Alternative

4 would retain existing capacity on the lake for motorized watercraft access and would not adversely affect motorized watercraft recreation opportunities. This would be a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

Impact 8-3: Change access to or along the shoreline

Each of the proposed alternatives would result in the construction of piers that would extend into the public trust areas in the shorezone and impede, to some degree, lateral access along the shoreline in California. New public piers would be constructed for the benefit of public use; thus, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. Alternative 4 would only allow new public piers to be constructed. Alternatives 1, 2, and 3 would also allow private piers. None of the alternatives include any design standards for private or public piers that prohibit access for the public along the shore. TRPA and California State Lands Commission would develop a memorandum of understanding (MOU) that would provide a review process that protects public lateral access within the public trust easement in California. In Nevada, no existing public trust easement on private land is recognized; thus, this impact only assesses impacts to lateral access along the shoreline in the California portion of Lake Tahoe. Under the MOU and for all alternatives, TRPA would not be able to approve any shorezone structure that unreasonably interferes with lateral public access where it is otherwise lawfully allowed. Impacts on access to or along the shoreline from Alternatives 1, 2, 3, and 4 would be **less than significant**.

In Nevada, no existing public trust easement on private land is recognized; thus, lateral access along the shoreline cannot be guaranteed or enforced and there would be no change to lateral access on private land in Nevada with implementation of any of the alternatives. This impact analysis only evaluates effects on public access to or along the shoreline in the California portion of Lake Tahoe.

Alternative 1: Proposed Shoreline Plan

As described above, a California public trust easement covers the area between the high and low water marks (elevations 6,228.75 and 6,223 feet LTD) on the California side of Lake Tahoe. Public access is allowed within the public trust easement. Modifications of existing and construction of new structures that cross public easement or public trust areas in the shorezone could impede lateral passage of pedestrians along the shore in California. Implementation of Alternative 1 would allow up to 10 new public piers and up to 86 new private or multiple-use piers that could cross the public trust easement in California. Development of a portion of the total new shorezone structures that extend into the public trust easement in California could reduce lateral access, restrict the public right of travel along public easement areas, and limit shorezone access.

With implementation of Alternative 1, no new public or private breakwaters, jetties, rock crib piers, or sheet pile piers (or other structures of this type) would be permitted along the shoreline except as part of a habitat restoration project or as part of a marina environmental improvement project. Similar to baseline conditions, fences would not be allowed below the high-water line, which would maintain access to the public trust easement below the high-water line.

Because new public piers would be constructed for the benefit of public use, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. Alternative 1 does not include any design standards for private or public piers that prohibit access for the public along the shoreline.

With implementation of Alternative 1, TRPA and California State Lands Commission would adopt an MOU that details a process to coordinate review of applications for new and modified piers in California. The MOU would specify a coordinated review process that protects public trust values (e.g., public lateral access) within the public trust easement in California. The MOU would require design features to accommodate lateral access where it is otherwise legally allowed. During the review process TRPA or the California State Lands Commission could require project reasonable design elements to maintain legal public access. Project modifications could

include access paths around or under structures; or ladders, ramps, or other structural features that provide public access over structures. Any structural components required to maintain lateral public access (e.g., ladders to provide access over a pier), would be exempt from visible mass offset requirements.

New structures, design standards, or other regulatory provisions included in Alternative 1 would not change public access to the shoreline or lateral pedestrian access along the shoreline. The TRPA MOU with California State Lands Commission would protect lateral access for the public along the public trust easement below the high-water mark in California. Impacts on access to or along the shoreline from Alternative 1 would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Implementation of Alternative 2 would allow up to 78 new public piers and 398 new private piers to be constructed in the shorezone around Lake Tahoe. These new piers would cross the California public trust easement and potentially reduce lateral access, restrict the public right of travel along public easement areas, or limit shorezone access. Under existing conditions, California State Lands would review pier projects to ensure that legal public access is maintained.

Based on the design and construction standards in TRPA Code Section 84.12, access over these types of structures would be feasibly maintained because no jetty or breakwater may be constructed as a solid or nearly solid structure. Marinas may construct solid or nearly solid jetties or breakwater or they may be constructed near a public boat launching facility. Presumably, because marinas and public boat ramps are public facilities, lateral access along the shoreline would be provided elsewhere around these structures. Similar to baseline conditions, fences would not be allowed below the high-water line, which would maintain access to the public trust easement below the high-water line.

Because new public piers would be constructed for the benefit of public use, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. Alternative 2 does not include any design standards for private or public piers that prohibit access for the public along the shoreline.

Alternative 2 would include an MOU between TRPA and California State Lands Commission, as described for Alternative 1, that would include a review process that protects public lateral access within the public trust easement in California. TRPA would not be able to approve any shorezone structure in California that prohibits lateral access. The MOU would require design features to accommodate lateral access where it is otherwise legally allowed. During the review process TRPA or the California State Lands Commission could require project reasonable design elements to maintain legal public access. However, any structural components required to maintain lateral public access (e.g., ladders to provide access over a pier), would not be exempt from visible mass offset requirements. Private pier owners could also choose to provide public access landward of the pier instead of providing access over the pier.

New structures, design standards, or other regulatory provisions included in Alternative 2 would not change public access to the shoreline or lateral pedestrian access along the shoreline. The TRPA MOU with California State Lands Commission would protect lateral access for the public along the public trust easement below the high-water mark in California. Impacts on access to or along the shoreline from Alternative 2 would be **less than significant**.

Alternative 3: Limit New Development

Implementation of Alternative 3 would allow five new public piers and up to 86 new private multiple-use piers to be constructed in the shorezone around Lake Tahoe. These new piers would cross the California public trust easement or public trust areas would be new piers and potentially reduce lateral access, restrict the public right of travel along public easement areas, or limit shorezone access.

Alternative 3 would also not allow new public or private breakwaters, jetties, rock crib piers, or sheet pile piers (or other structures of this type) except as part of a habitat restoration project or as part of a marina environmental improvement project. Similar to baseline conditions, fences would not be allowed below the high-water line.

Because a new public pier would be constructed for the benefit of public use, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. Alternative 3 does not include any design standards for private or public piers that prohibit access for the public along the shoreline.

Alternative 3 would include an MOU between TRPA and California State Lands Commission, as described for Alternative 1, that would include a review process that protects public lateral access within the public trust easement in California. The MOU would require design features to accommodate lateral access where it is otherwise legally allowed. During the review process TRPA or the California State Lands Commission could require project reasonable design elements to maintain legal public access. Any structural components required to maintain lateral public access (e.g., ladders to provide access over a pier), would be exempt from visible mass offset requirements. Private pier owners could also choose to provide public access landward of the pier instead of providing access over the pier.

New structures, design standards, or other regulatory provisions included in Alternative 3 would not change public access to the shoreline or lateral pedestrian access along the shoreline. The TRPA MOU with California State Lands Commission would protect lateral access for the public along the public trust easement below the high-water mark in California. Impacts on access to or along the shoreline from Alternative 3 would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Implementation of Alternative 4 would allow 15 new public piers to be constructed in the shorezone around Lake Tahoe. These new piers would cross the California public trust easement or public trust areas would be new piers and potentially reduce lateral access, restrict the public right of travel along public easement areas, or limit shorezone access.

Alternative 4 would also not allow new public or private breakwaters, jetties, rock crib piers, or sheet pile piers (or other structures of this type) except as part of a habitat restoration project or as part of a marina environmental improvement project. Similar to baseline conditions, fences would not be allowed below the high-water line.

Because the new public piers would be constructed for the benefit of public use, pedestrians would have unrestricted access over or around the pier as they walk laterally along the shoreline. As described for Alternative 1, an MOU between TRPA and California State Lands Commission would require design features to accommodate lateral access where it is otherwise legally allowed. During the review process TRPA or the California State Lands Commission could require project reasonable design elements to maintain legal public access.

New structures, design standards, or other regulatory provisions included in Alternative 4 would not change public access to the shoreline or lateral pedestrian access along the shoreline. The TRPA MOU with California State Lands Commission would protect lateral access for the public along the public trust easement below the high-water mark in California. Impacts on access to or along the shoreline from Alternative 4 would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 8-4: Affect the fair-share distribution of recreation capacity

The 2015 Threshold Evaluation found the recreation threshold for fair-share distribution of recreation capacity to be in attainment (TRPA 2016a). The existing distribution of land ownership in the shorezone is approximately half public and half private ownership, with slightly less land in private. Each alternative would change the percent of shorezone structures that are accessible to the public to various degrees, but the distribution between public and private owners around the lake would not change substantially over baseline conditions. All of the new shorezone structures under each alternative in combination with existing shorezone structures would either maintain the same proportion of public and private structures as under baseline conditions or would result in a small increase in the proportion of public structures compared to baseline conditions. At buildout of the alternatives, publicly-accessible shorezone structures would generate between 50 and 52.5 percent, depending on alternative, of all boat trips on the lake, which is similar to baseline conditions. For these reasons, the impacts of Alternatives 1, 2, 3, and 4 on fair-share distribution of recreation capacity would be **less than significant**.

The TRPA threshold for fair-share distribution of recreation capacity requires that a fair-share of total recreation capacity be available for public use. The 2015 Threshold Evaluation determined that the threshold is currently in attainment (TRPA 2016a). The effects of the Shoreline Plan alternatives on the fair-share distribution of recreation capacity is evaluated by determining whether a Shoreline Plan alternative would substantially decrease the proportion of lake access capacity that is available to the general public. Public lake access capacity can be measured in three ways: the proportion of shoreline in public ownership, the proportion of access structures that are open to the public, and the proportion of total boating capacity that is available to the public.

The existing distribution of publicly owned property in the shorezone includes approximately 55 percent of the shoreline and privately-owned includes approximately 45 percent (Table 8-2). None of the Shoreline Plan alternatives would directly change the amount of shoreline in public ownership.

Table 8-5 shows the percent of shorezone structures that are private and the percent that are open to the public. Shoreline structures that are privately owned but available to the public (e.g., slips in a marina) are considered public in this analysis. Under baseline conditions, an average of approximately 17 percent of all shorezone structures are accessible to the public while approximately 83 percent are privately owned. Each alternative would change the percent of structures that are accessible to the public to various degrees (see Table 8-5).

The amount of lake access provided by different structures can vary substantially. For example, a boat ramp can provide access for over 100 people a day, while a buoy provides access for one person. Therefore, a comparison of the amount of boating capacity available to the general public can provide a meaningful comparison of an alternative's effect on the fair-share distribution of recreation capacity. Table 8-6 shows the percent of total boat trips that are generated from structures that are publicly-accessible (i.e., public boat ramps, quasi-public boat ramps, public slips and buoys, publicly-accessible slips and buoys at marinas) under baseline conditions and with each alternative.

To develop this estimate, peak-day boat trip generation rates for shorezone structures were developed based on boating use activity on Lake Tahoe and the maximum number of shoreline structures allowed under each alternative (see Appendix A). The level of boat usage on Lake Tahoe associated with individual shoreline structures was calculated based on observed and collected data on Lake Tahoe. Peak day boat trips originating from structures that are open to the public (i.e., public ramps, and public or marina slips and buoys). Additional detail on the data sources, assumptions, and calculations of boating activity and structure buildout are provided in Appendix A.

Table 8-5 Percent of Shorezone Structures Available to the Public and Restricted for Private Use

Structure	Baseline Conditions	Alternative 1 Baseline Plus Project	Alternative 2 Baseline Plus Project	Alternative 3 Baseline Plus Project	Alternative 4 Baseline Plus Project
Buoys					
Public Buoys	13%	13%	6%	19%	13%
Private Buoys	87%	87%	94%	81%	87%
Slips					
Public Slip	26%	27%	49%	27%	26%
Private Slip	74%	73%	51%	73%	74%
Lifts					
Public Boat Lift	2%	2%	1%	12%	2%
Private Boat Lift	98%	98%	99%	88%	98%
Boat Ramps					
Public Boat Ramp	58%	60%	64%	59%	58%
Private Boat Ramp	42%	40%	36%	41%	42%
Piers					
Public Piers	3%	4%	8%	3%	5%
Private Piers	97%	96%	92%	97%	95%

Notes: Boat house moorings are not included in this table because none of the alternatives would allow additional moorings of this type.

Marinas are not included in this table because only Alternative 2 would add marinas and the existing and new numbers of slips, buoys, and lifts that could be added to marinas are already included in the table.

Source: Compiled by Ascent Environmental in 2018

Table 8-6 Boat Trips Generated by Publicly-Accessible Shorezone Structures

	Baseline Conditions		Alternative 1 Baseline Plus Project		Alternative 2 Baseline Plus Project		Alternative 3 Baseline Plus Project		Alternative 4 Baseline Plus Project	
	Boat Trips	% of Total Boat Trips	Boat Trips	% of Total Boat Trips	Boat Trips	% of Total Boat Trips	Boat Trips	% of Total Boat Trips	Boat Trips	% of Total Boat Trips
Public Boat Ramp	2,487	42.17	2,714	40.71	3,166	37.08	2,600	42.48	2,487	42.17
Public Buoys	137	2.31	202	3.03	136	1.59	214	3.49	137	2.31
Public Slips	384	6.51	405	6.08	1,059	12.40	405	6.62	384	6.51
Total Boat Trips from Public Shorezone structures	3,008	51.0	3,321	49.8	4,361	51.1	3,219	52.6	3,008	51.0
Total Boat Trips from All Shorezone Structures	5,899	–	6,666	–	8,537	–	6,121	–	5,899	–

Additional detail on the data sources, assumptions, and calculations of boating activity and structure buildout are provided in Appendix A.

Source: Compiled by Ascent Environmental in 2018

Alternative 1: Proposed Shoreline Plan

Alternative 1 would not change the proportion of land along the shoreline that is publicly owned. Buildout of new shorezone structures allowed with Alternative 1 would maintain approximately the same existing distribution of facilities under public and private ownership (see Table 8-5). This alternative would result in a small increase in the proportion of public facilities compared to private facilities for slips, boat ramps, and piers. At buildout of Alternative 1, publicly-accessible shorezone structures would generate approximately 50 percent of all boat trips on the lake (see Table 8-6). This would be approximately one percent less than the proportion of all boat trips that are generated from publicly-accessible structures under baseline conditions.

With implementation of Alternative 1, the distribution of shoreline access capacity between public users and private property owners would not substantially change compared baseline conditions. The proportion of shoreline in public ownership would not change. The percent of shoreline structures accessible to the public would slightly increase and the proportion of boat capacity available to the general public would decrease slightly. For these reasons, the impact of Alternative 1 on fair-share distribution of recreation capacity would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would not change the proportion of land along the shoreline that is publicly owned. Buildout of new shorezone structures allowed with Alternative 2 would increase the proportion of structures that are publicly-accessible by approximately four percent compared to baseline conditions while decreasing the proportion of structures in private ownership (see Table 8-5). This increase in the proportion of publicly-accessible structures is largely due to allowance for two new marinas, which would include new public slips, and six new public boat ramps. At buildout of Alternative 2, publicly-accessible shorezone structures would generate approximately 51 percent of all boat trips on the lake (see Table 8-6). This would be the same proportion as under baseline conditions.

With implementation of Alternative 2, the distribution of shoreline access capacity between public users and private property owners would not substantially change compared baseline conditions. The proportion of shoreline in public ownership would not change. The percent of shoreline structures accessible to the public would slightly increase and the proportion of boat capacity available to the general public would remain unchanged. For these reasons, the impact of Alternative 1 on fair-share distribution of recreation capacity would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would not change the proportion of land along the shoreline that is publicly owned. Buildout of new shorezone structures allowed with Alternative 3 would increase the proportion of structures that are publicly-accessible by approximately four percent compared to baseline conditions while decreasing the proportion of structures in private ownership (see Table 8-5). This increase in the proportion of publicly-accessible structures is because all structures except piers under Alternative 3 would be publicly-accessible. At buildout of Alternative 2, publicly-accessible shorezone structures would generate approximately 52.5 percent of all boat trips on the lake (see Table 8-6). This would be approximately 1.5 percent more than under baseline conditions.

With implementation of Alternative 3, the distribution of shoreline access capacity between public users and private property owners would not substantially change compared baseline conditions. The proportion of shoreline in public ownership would not change. The percent of shoreline structures accessible to the public and the proportion of boat capacity available to the general public would slightly increase. Alternative 3 would make a greater share of shoreline access capacity available for public use than Alternatives 1 and 2. However, this increase would be minor. For these reasons, the impact of Alternative 3 on fair-share distribution of recreation capacity would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would only allow for the construction of new public piers. Piers do not provide additional boating capacity on the lake or generate new boat trips. Buildout of Alternative 4 in combination with existing shorezone structures would result in a small increase (one percent) in the proportion of public structures

compared to private structures, essentially maintaining the existing distribution of publicly-accessible facilities under, with approximately 13 percent of all shorezone structures available to the public (see Table 8-5). The amount of public boat trips generated by public shorezone structures for Alternative 4 would remain the same as under baseline conditions, with 51 percent of boat trips from all shorezone structures generated by publicly-accessible shorezone structures. For these reasons, the impact of Alternative 4 on fair-share distribution of recreation capacity would be **less than significant**.

Mitigation Measures

No mitigation is required.

9 SCENIC RESOURCES

9.1 INTRODUCTION

This chapter includes a discussion of existing visual conditions, a summary of applicable visual quality regulations, and an analysis of potential visual impacts that could result from implementation of the Shoreline Plan alternatives. The primary issues raised during scoping that pertain to scenic resources include:

- scenic degradation from new and existing unpermitted buoys;
- visual effects of new private piers and private shoreline development;
- concerns about the scenic effects of specific design standards, pier lengths, and scenic requirements;
- visual effects of non-motorized boat rentals on beaches; and
- Concerns are about whether moorings would include lights.

The methods of analyzing the Shoreline Plan alternatives effects in this chapter are consistent with the TRPA scenic threshold monitoring system and the scenic analysis approach endorsed by the Shoreline Plan Joint Fact-Finding Committee (TRPA 2017a). Scenic threshold monitoring data collected by TRPA in 2015 are used to determine existing conditions. The review includes an evaluation of the long-term effects of buildout of shoreline development consistent with the policies and standards proposed in each alternative. Scenic threshold monitoring data and, where available, information on parcels that could be eligible for new structures are used to identify portions of the shoreline that have the greatest potential for scenic degradation. The analysis includes simulations of views of those portions of the shoreline that have the greatest potential for scenic degradation, as viewed from the lake and shore. The analysis also quantifies estimated changes in visible mass based on the proposed design standards, required visual screening, and typical visible mass associated with shoreline structures.

As discussed in Chapter 3, “Approach to Environmental Analysis,” this analysis is provided to assess and document the environmental effects of the four Shoreline Plan alternatives. The broad geography and long timeframe to which the Shoreline Plan applies, and the policy-oriented nature of its guidance is such that the EIS is prepared at a programmatic level, i.e., a more general analysis of each resource area with a level of detail and degree of specificity commensurate with the overall planning level of the Shoreline Plan. The scenic effects of individual future shoreline projects would be evaluated when those projects are proposed. Project level review would include a scenic assessment consistent with the Scenic Resources/Community Design, and Light and Glare sections of TRPA’s Initial Environmental Checklist. The project-level review of future shoreline projects would require compliance with scenic regulations in the TRPA Code, including the visual magnitude system and mitigation requirements in Chapter 66.

Development under the Shoreline Plan alternatives would not produce new sources of light or glare. Piers and boat ramps would be prohibited from having lighting, except for limited cases where public safety lighting is required, and other shorezone structures such as buoys, slips, boat lifts, and swim platforms would not include lights. The components of marina expansions regulated by the Shoreline Plan under Alternatives 1, 2, and 3 (or new marinas under Alternative 2) would also not generally be associated with new sources of light or glare, because they would be related to additional moorings. Reflective materials would not be allowed in construction of any new shorezone structures. Therefore, impacts on light and glare are not addressed in detail in this chapter.

In addition, development under the Shoreline Plan alternatives would not affect the character of existing communities. While landside development could occur in association with shoreline development (e.g., parking and building reconfigurations associated with a new boat ramp), the shoreline plan would not alter the design guidelines and standards that apply to landside structures. Redevelopment or new development along the shore, but outside of the shorezone, would continue to comply with standards in the TRPA Code

and local plans that are intended to preserve and promote desired community character. Therefore, impacts on community character are not addressed in detail in this chapter.

9.2 REGULATORY SETTING

9.2.1 Federal

U.S. FOREST SERVICE VISUAL MANAGEMENT SYSTEM

The U.S. Forest Service (USFS), Lake Tahoe Basin Management Unit manages approximately 27 percent of Lake Tahoe's shoreline. The USFS employs the Visual Management System (VMS) to analyze effects of management activities on the scenery of a given area. The VMS had been used since the mid-1970s and in 1995, the USFS developed an updated version of the VMS, introducing the Scenery Management System (SMS). The VMS and SMS are both structured to primarily emphasize "natural appearing" scenery, but SMS recognizes the positive scenic values associated with some human modified (cultural) features and settings that are valued for their scenic influence. The SMS allows for analysis and conservation beyond national forest lands into adjacent communities and other jurisdictions. The SMS provides a systematic approach for determining the relative value and importance of scenery in National Forest lands (USFS 1995). In addition to the TRPA scenic management system, described below, the USFS may apply the VMS and SMS in the planning and review of future shoreline projects on National Forest lands.

9.2.2 Tahoe Regional Planning Agency

SCENIC THRESHOLDS

TRPA adopted environmental threshold carrying capacities in August 1982 for the purpose of maintaining and improving the various resources of the Tahoe Basin. Scenic quality is an exceptional attribute of the Tahoe Basin, and specific threshold carrying capacities were developed to protect and improve the scenic resources of the area. TRPA threshold standards require maintenance of numeric threshold rating values for roadway and shoreline travel routes, individually mapped scenic resources, and recreation area scenic resources. The scenic thresholds also include a policy statement that address the community design. Additional detail on the scenic thresholds is available in Chapter 9, "Scenic Resources," of the 2015 Threshold Evaluation Report (TRPA 2016).

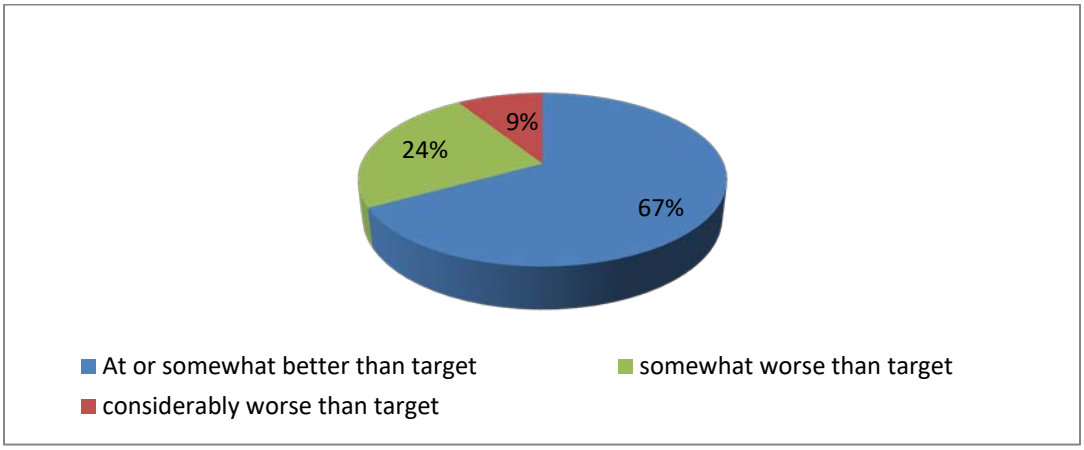
Shoreline Travel Route Ratings

The shoreline travel route ratings evaluate long-term cumulative scenic conditions looking toward the shore from the surface of Lake Tahoe. The lake's 72-mile shoreline is separated into 33 individual units, each representing a portion of the shoreline (of varying length) that exhibits similar visual character. Updated travel route ratings that reflect current conditions are generated every 4 to 5 years during shoreline scenic threshold monitoring. Travel route ratings consist of a numeric composite score that represents the relative scenic quality throughout the entire travel unit. The following components are considered and rated for each shoreline travel unit:

- man-made features along shoreline,
- general landscape views within the shoreline unit, and
- variety of scenery within the shoreline unit.

Each component is rated from one (low or absent) to five (high). A composite rating is obtained by summing the ratings of the three aspects. Therefore, the composite rating for an individual shoreline travel unit can range from three to 15. To be in attainment of the threshold standard, the current composite rating of any shoreline travel unit must be at least 7.5 and must also be at least equal to the rating originally assigned in

1982. Therefore, if the current rating for a shoreline travel unit is below the standard of 7.5, the unit is out of attainment. Additionally, if the current rating is below its original 1982 rating, even if the current rating is above 7.5, the unit is out of attainment. Eleven shoreline travel units (33 percent) are out of attainment, with three of those being assessed as "considerably worse than target" and eight of those assessed as "somewhat worse than target". The remaining 22 shoreline travel units are in attainment of the threshold standard (see Exhibit 9-1; TRPA 2016).



Source: TRPA 2016

Exhibit 9-1 Percent of Shoreline Travel Units by Threshold Attainment Status

Exhibit 9-2 shows the percentage of shoreline travel units that were in attainment of the threshold standard for each threshold evaluation since the standards were adopted in 1982. As shown in Exhibit 9-2, there was a steady decline in the number of shoreline travel units in attainment from 1982 through 2001. From 2006 through 2015, there has been an improving trend in the number of units in attainment. This improving trend is partly due to the adoption of shoreland ordinances in 2002, which added a visual magnitude system for the evaluation of projects along the shoreline as described below (TRPA 2016).

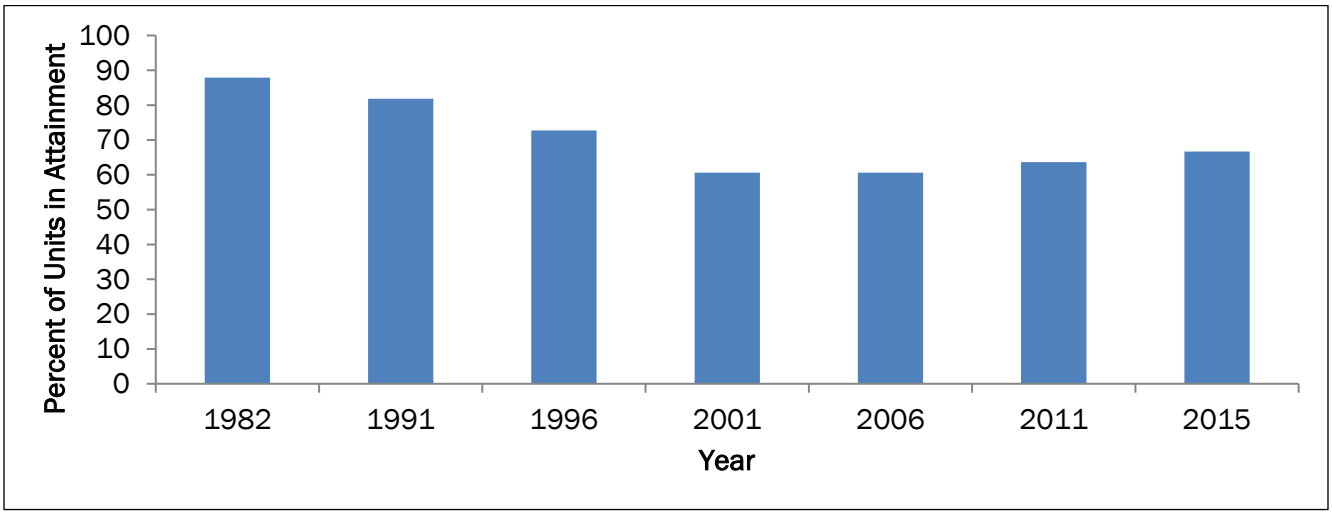


Exhibit 9-2 Trend in the Percent of Shoreline Travel Units in Attainment

Exhibit 9-3, below, shows the change in the average composite rating for all shoreline travel units since the standards were adopted in 1982. The improving trend since 2006 is more evident in the average composite ratings because it shows scenic improvements in travel units that are already in attainment. The average composite ratings also account for improvements in the scenic quality of travel units that are not in attainment, that did not bring the unit into attainment.

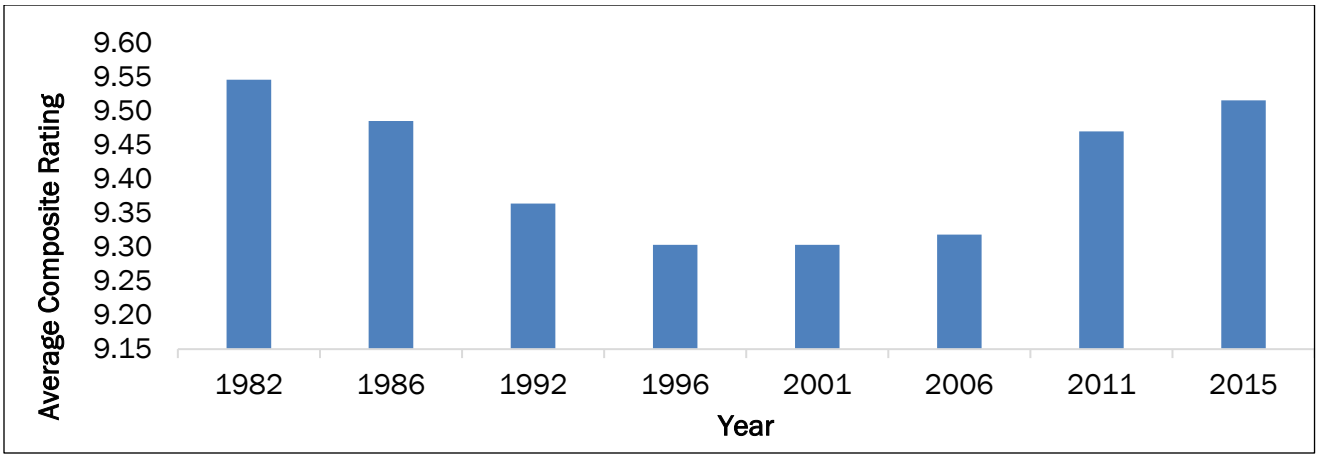


Exhibit 9-3 Trend in the Average Composite Rating of Shoreline Travel Units

Scenic Quality Ratings for Shoreline Scenic Resources

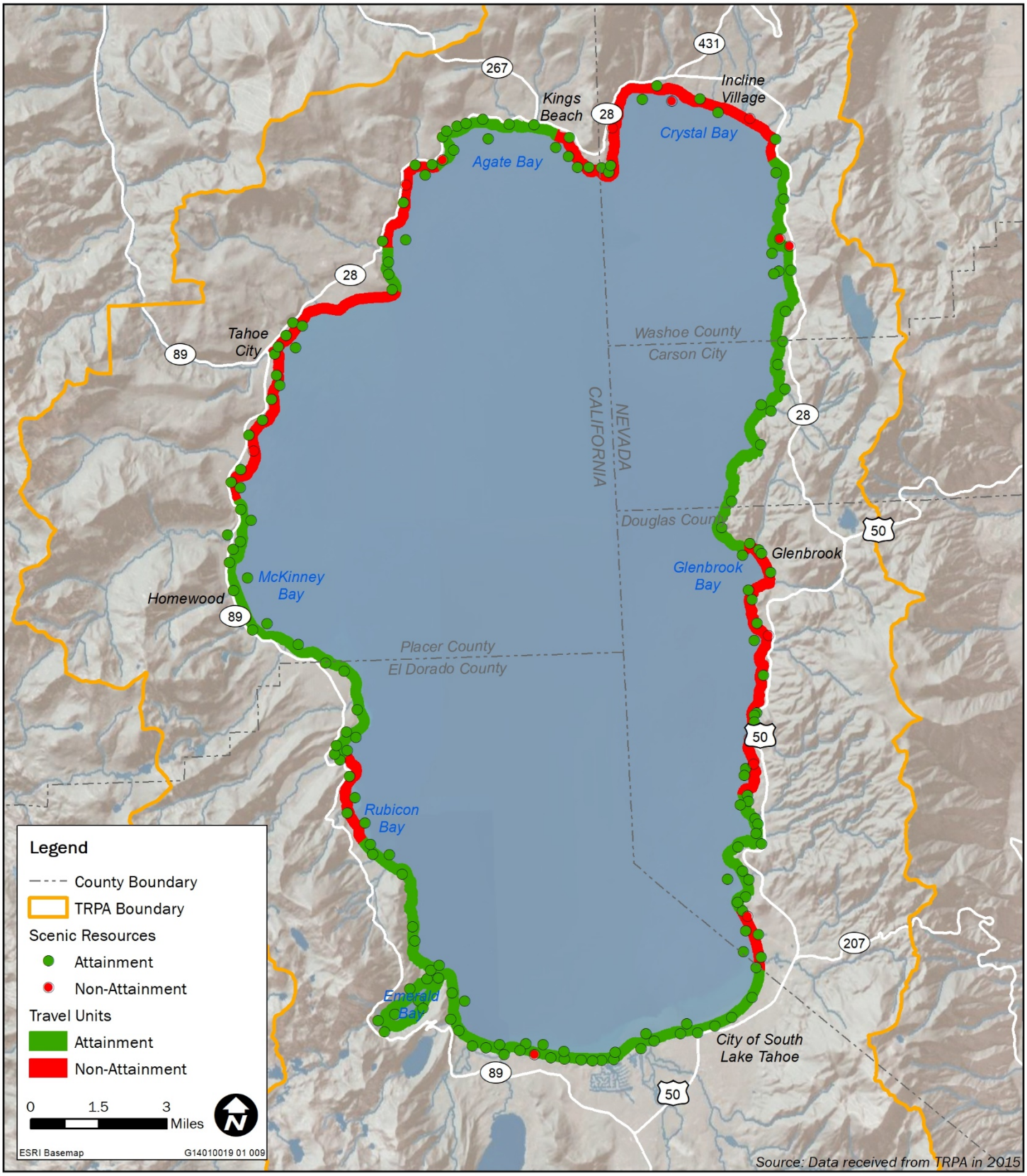
In contrast to travel route ratings that reflect the positive or negative effects of the landscape on scenic quality throughout an entire travel unit, the quality rating for scenic resources in shoreline travel units reflect the scenic quality of individual views or features of the shoreline that are visible from the lake. The scenic resources in the region include certain views of the natural landscape and distinctive natural features that were identified, mapped, described, and evaluated as part of a 1982 scenic resource inventory (TRPA 1982).

Scenic quality is measured by rating each of four subcomponents and summing the values to produce a composite score. The following visual characteristics comprise the subcomponents. These characteristics are well documented in academic and professional literature as useful and objective measures of relative scenic value (Iverson et. al. 1993; TRPA 2016):

- Unity - A unified landscape is one where the visual resources join together to form a single, coherent, harmonious visual unit.
- Vividness - Also described as distinctiveness, can be expressed by contrasting elements such as color, line, and shape, or marked differences in elements seen as related, or repetition of similarities.
- Variety - Variety or richness usually consists of numerous of different parts seen together that add visual interest.
- Intactness - Intactness describes the degree to which modifications emphasize or enhance the natural condition of the landscape.

Each characteristic is rated from zero (absent) to three (high). A composite rating is obtained by summing the ratings of the four characteristics; therefore, the composite rating for an individual shoreline scenic resource can range from zero to 12. There are 184 inventoried shoreline scenic resources and, 169 (92 percent) are in attainment of the threshold standard (TRPA 2016).

Exhibit 9-4 shows the locations and attainment status of the 33 shoreline travel units (shown as segments of the shoreline) and shoreline scenic resources (shown as points).



TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-4 **Location and Threshold Attainment Status of Shoreline Travel Units and Scenic Resources**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Roadway Travel Units

Similar to the shoreline travel units, roadway travel units are used to evaluate long-term cumulative scenic conditions of traveling the Region's major roads, including all state and federal highways and Pioneer Trail. These roadways are separated into 54 travel units, each of which represents a continuous, two-directional viewshed of similar visual character. As with shoreline travel units, updated travel route ratings that reflect current conditions are generated every four to five years during scenic threshold monitoring. Travel route ratings consist of a numeric composite score that represents the relative scenic quality throughout the entire travel unit. Scenic roadway travel units are divided into three visual environments: urban, transition, and natural based on the level of human alterations that are visible within the unit. Section 66.2.2 of the TRPA Code provides definitions for each of these visual environments. The following components are identified and rated according to their effect on scenic quality within each roadway travel unit (TRPA 2016):

- man-made features along the roadway;
- physical distractions to driving along the roadways;
- roadway characteristics;
- view of the lake from the roadways;
- general landscape views from the roadways; and
- variety of scenery from the roadways.

Roadway travel unit ratings reflect all six of these components. Each component is rated from one, a strong negative effect on scenic quality, to five, a strong positive effect on scenic quality. A composite rating is calculated by summing the ratings of the six components. Therefore, the composite rating for a roadway travel unit can range from six to 30. To be in attainment with the threshold standard, the composite rating of each roadway travel unit must be at least 15.5 and equal or exceed the rating originally assigned in 1982. Of the 54 roadway travel units, 33, or 63 percent are in attainment and 21, or 34 percent, are not in attainment.

Exhibit 9-5 shows the trend in the percent of roadway travel units in attainment since 1982. As shown in Exhibit 9-5, the scenic quality of roadway travel units decreased from 1982 to 1991 and have been improving ever since. The improvement in roadway travel unit ratings since 1991 is the result of redevelopment consistent with design standards, roadway upgrades, and scenic quality improvement projects (TRPA 2016).

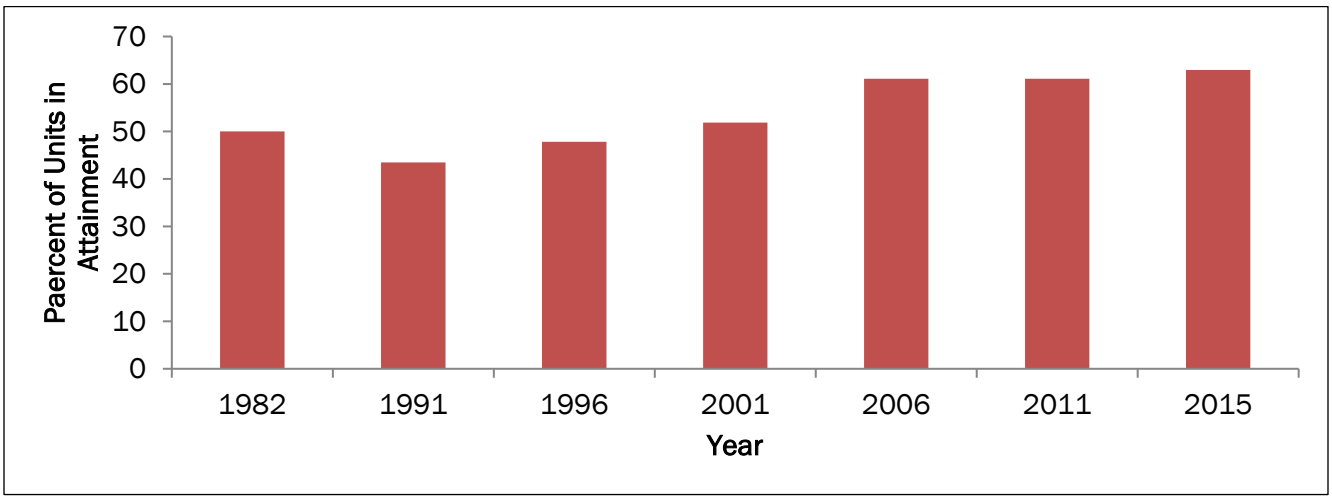


Exhibit 9-5 Trend in the Percent of Roadway Travel Units in Attainment

Scenic Quality Ratings for Roadway Scenic Resources

Similar to the scenic quality rating for shoreline travel units, the scenic quality ratings for roadway travel units reflect the scenic quality of individual views or scenic resources that are visible from the region's major

roadways that were identified, mapped, described, and evaluated as part of a 1982 scenic resource inventory (TRPA 1982). Scenic resources visible from roadways include:

- foreground, middleground, and background views of the natural landscape;
- views to the lake from roadways;
- views of the lake and natural landscape from roadway entry point into the basin; and
- unique regional landscape features such as streams, beaches, and rock formations that add interest and variety.

The quality of scenic resources in roadway travel units is measured by rating each of the four characteristics described above: unity, vividness, variety, and intactness. Each characteristic is rated from zero (absent) to three (high). A composite rating is obtained by summing the ratings of the four characteristics; therefore, the composite rating for an individual roadway scenic resource can range from zero to 12. There are 208 inventoried roadway scenic resources and, 202 (97 percent) are in attainment of the threshold standard (TRPA 2016).

Exhibit 9-6 shows the locations and attainment status of the 54 roadway travel units (shown in varying widths for urban, transition, and natural travel units) and roadway scenic resources (shown as points).

Public Recreation Areas and Bike Trails Scenic Quality Ratings

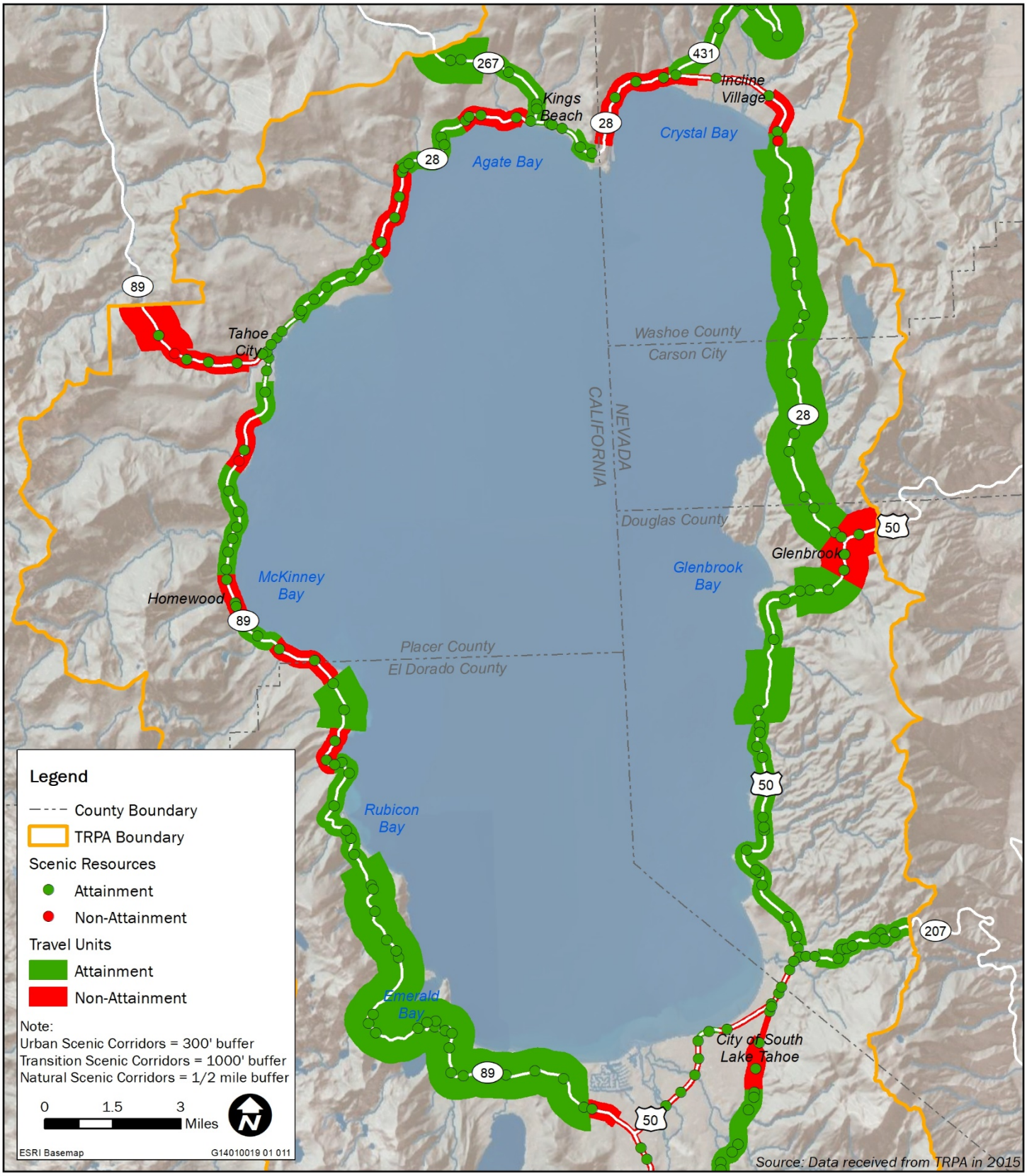
The TRPA public recreation area scenic quality threshold applies to specific public recreation areas, including beaches, campgrounds, ski areas, and segments of Class I and Class II bicycle trails. Public recreation areas with views of scenic resources are valuable because they are major public gathering places, hold high scenic values, and are places where people are static (compared to people on the travel routes) and, therefore, have more time to focus their attention on the views and scenic resources. Scenic resources seen from public recreation areas include: views of the lake and the surrounding natural landscape from within the recreation area; views of distinctive natural features that are within the recreation area; and views of human-made features in or adjacent to the recreation area that influence the viewing experience.

The scenic quality of views of natural features and the lake from public recreation areas and bike trails is measured by rating each of the four characteristics described above: unity, vividness, variety, and intactness. In addition, human-made features are rated for their coherence, condition, and compatibility. A composite score is generated for each inventoried public recreation area or bicycle trail by summing the scores of the applicable characteristics. There are 390 inventoried scenic resources associated with public recreation areas and bicycle trails and, 381 (98 percent) are in attainment of the threshold standard (TRPA 2016).

Community Design

The TRPA community design threshold is a policy statement that applies to the built environment and is intended to ensure that design elements of buildings are compatible with the natural, scenic, and recreational values of the region. The policy states:

> It shall be the policy of the TRPA Governing Body in development of the Regional Plan, in cooperation with local jurisdictions, to ensure the height, bulk, texture, form, materials, colors, lighting, signing and other design elements of new, remodeled and redeveloped buildings be compatible with the natural, scenic, and recreational values of the region.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-6 **Location and Threshold Attainment Status of Roadway Travel Units and Scenic Resources**

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

The community design threshold is implemented in two ways. First, the area plan and community plan process has been used to develop design standards and guidelines that are tailored to the needs and desires of individual communities. These standards and guidelines are considered "substitute" standards because they replace all or portions of TRPA Code that would otherwise regulate the same subject. Secondly, the site planning and design principles contained in the TRPA Code are implemented as part of individual development projects, and are reviewed and approved by TRPA and local governments. The 2015 Threshold Evaluation Report determined that the community design policy statement was being implemented (TRPA 2016).

GOALS AND POLICIES

The Goals and Policies of the Regional Plan establish an overall framework for development and environmental conservation in the Lake Tahoe region. The goals and policies present the overall approach to meeting TRPA's environmental threshold carrying capacities (discussed below) and establish guiding policy for each resource element. The Conservation Element (Chapter 4) of the Goals and Policies includes a Scenic Subelement. In addition, the Shorezone Subelement includes goals and policies that address the scenic quality of the shoreline. Applicable goals and policies are listed below:

GOAL SR-1 Maintain and restore the scenic qualities of the natural appearing landscape.

- **Policy SR-1.1** All proposed development shall examine impacts to the identified landscape views from roadways, bike paths, public recreation areas, and Lake Tahoe.
- **Policy SR-1.2** Any development proposed in areas targeted for scenic restoration or within a unit highly sensitive to change shall demonstrate the effect of the project on the 1982 travel route ratings of the scenic thresholds
- **Policy SR-1.3** The factors or conditions that contribute to scenic degradation, as specified in the scenic quality improvement program (SQIP), need to be recognized and appropriately considered in restoration programs, plan development, and during project review to improve scenic quality.

GOAL SR-2 Improve the accessibility of Lake Tahoe for public viewing.

- **Policy SR-2.1** Enhance the opportunities to view Lake Tahoe by designing view corridors from highways.
- **Policy SR-2.2** Scenic viewpoints from roadways should be identified and pull off facilities provided on public property, wherever desirable.
- **Policy SR-2.3** Signs should be placed along the roadways, as appropriate, to identify photo sites and scenic turnouts.
- **Policy SR-2.4** Time limits for parking at roadside turnouts should be established

GOAL SZ-1 Provide for the appropriate shorezone uses of Lake Tahoe, Cascade Lake, and Fallen Leaf Lake while preserving their natural and aesthetic qualities

- **Policy SZ-1.1** All vegetation at the interface between the backshore and foreshore zones shall remain undisturbed unless allowed by permit for uses otherwise consistent with the shorezone policies
- **Policy SZ-1.9** The agency shall regulate the placement of new piers, buoys, and other structures in the foreshore and nearshore to avoid degradation of fish habitats, creation of navigation hazards, interference with littoral drift, interference with the attainment of scenic thresholds, and other relevant concerns.

CODE OF ORDINANCES

If a project is visible from Lake Tahoe, a scenic roadway travel unit, or a designated scenic resource, the potential scenic impacts of the project from those areas must be analyzed and mitigated. Chapter 3 of the TRPA Code requires that TRPA review any proposed project to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of whether a project could affect a scenic threshold standard (see TRPA Initial Environmental Checklist Section 18). Prior to approving a shoreline structure or other project, TRPA would require feasible mitigation measures to reduce or avoid significant adverse environmental effects, including effects on scenic resources. Furthermore, Code Section 4.4.1.B requires that, prior to approving any project, TRPA must make a finding, based on evidence, that the project "will not cause the environmental threshold carrying capacities to be exceeded". This finding would prevent TRPA from approving individual projects that could degrade a shoreline or roadway travel unit rating, or a scenic quality rating for a scenic resource.

Design Standards

Chapter 36, "Design Standards," and Chapter 66, "Scenic Quality," of the TRPA Code contain standards pertaining to scenic quality. These chapters establish a process for analyzing projects for scenic quality and define those circumstances that require preparation of scenic assessments and/or other documents. Sections 66.1.3, 66.1.4, 66.1.5, and 66.2.4 describe scenic quality standards for roadway and shoreline travel units, and for public recreation areas and bicycle trails. Specific design standards and scenic requirements for shorezone structures would be established by the Shoreline Plan. The proposed standards included in each alternative are described in Chapter 2, "Description of the Proposed Project and Alternatives," of this EIS.

Visual Magnitude System

TRPA Code section 66.3 includes requirements for the scenic quality review of projects in the shoreland (i.e., projects along the shoreline but landward of the shorezone). For all projects in the shoreland, except for some exact in-kind replacements of existing structures, a scenic assessment is required, and the visual magnitude of existing and proposed structures is regulated. Visual magnitude is a measure of the size and visual contrast of human-made structures that could detract from scenic views. Appendix H of the TRPA Design Review Guidelines (TRPA 2004) provides a detailed methodology for calculating the visual magnitude of a proposed project. For each element of a structure visible from the lake, this methodology calculates a score for the color, reflectivity of glass, surface texture, and percentage of the structure's perimeter that is visible. These factors are combined to generate a numeric contrast rating ranging from 3 to 35. TRPA Code section 66.3 regulates the allowable visible mass of shoreland structures based on this contrast rating.

Visible Mass

To attain and maintain the scenic threshold standards, TRPA evaluates and regulates the visible mass of shoreline structures. Visible mass is defined by TRPA as the total visible area of a shoreline structure, including all elements of the structure. Visible mass is calculated by summing the area (in square feet) of visible elements of the structure when viewed in profile (i.e., parallel to the shore), and the area of visible elements of the structure when viewed from the end (i.e., perpendicular to the shore). The existing shorezone partial permitting program screening criteria require that a shorezone project offset any increase in visible mass at a 1:1 ratio in shoreline travel units that are in attainment of threshold standards, and at a 1.5:1 ratio in units that are not in attainment (TRPA 2011). The visible mass regulations and offset requirements proposed under each Shoreline Plan alternative are described in Chapter 2, "Description of the Proposed Project and Alternatives," and are evaluated below.

SCENIC QUALITY IMPROVEMENT PLAN AND ENVIRONMENTAL IMPROVEMENT PROGRAM

The Scenic Quality Improvement Plan (SQIP) was adopted by TRPA to provide a program for implementing physical improvements to the built environment. The SQIP is intended to contribute to the attainment of the scenic thresholds and serves as an implementation guide for the Regional Plan. The Environmental Improvement Program (EIP), adopted in 1998 and updated in 2010, incorporates elements of the SQIP. The

EIP includes a list of specific projects throughout the Basin that are needed to attain and maintain the thresholds (TRPA 2010a). The EIP includes program elements to improve the scenic quality of roadways and shorelines. Currently the Tahoe Vista Utility Undergrounding Project is the only public sector scenic improvement project on the 5-year EIP project list.

9.2.3 California

CALIFORNIA SCENIC HIGHWAY PROGRAM

California's Scenic Highway Program was created by the California Legislature in 1963 and is managed by the California Department of Transportation. The goal of this program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view (Caltrans 2011).

The program includes a list of highways designated as, or eligible to become, official scenic highways, and includes a process for the designation of official State and County Scenic Highways. State Route SR 89 and SR 28 within the Placer County portion of the region are classified as "eligible" routes under the Scenic Highway Program. Within the El Dorado County portion of the region, SR 89 is officially designated as a State Scenic Highway. The U.S. Highway 50 (U.S. 50) from the Nevada state line to the "Wye" intersection with SR 89 is designated as eligible, and U.S. 50 from the "Wye" intersection through Echo Summit is officially designated as a State Scenic Highway. All roadways that are eligible or officially designated under the program are also within TRPA-designate scenic roadway travel units.

9.2.4 Nevada

NEVADA SCENIC BYWAY PROGRAM

Nevada maintains a system of scenic byways. Nevada's Scenic Byway program was established by the Nevada Legislature in 1983. The Nevada Department of Transportation is the primary agency responsible for the program, and its director has the authority to add new byways into the system. The entirety of U.S. 50 and SR 28 within the Nevada portion of the region are designated as scenic byways. These scenic byways are also within TRPA-designate scenic roadway travel units.

9.3 AFFECTED ENVIRONMENT

Scenic quality is perhaps the most often identified natural resource of the Lake Tahoe Region. The Region affords views of a magnificent lake setting within a forested mountainous environment. The unique combination of visual elements provides for exceptionally high aesthetic values. The Bi-State Compact declares "Maintenance of the social and economic health of the region depends on maintaining the significant scenic …values provided by the Lake Tahoe Basin." (Public Law 96-551).

Human activity has had a notable influence on the visual landscape within the Tahoe region. Beginning with the Comstock era around 1859, demand for timber resulted in extensive logging within the area with large portions appearing virtually deforested by 1890 (USGS 2005). Urban development began in the early 1900s with small vacation resorts and a few communities. After World War II, demand for recreation, tourism, and permanent housing fueled large increases in development. Commercial development increased to become the second largest developed land use next to residential by 2002. Even so, concentrated shoreline development in the region is largely confined to private lands associated with residential, commercial, and tourist land uses (see Chapter 4, "Land Use").

LAKE TAHOE

Lake Tahoe is a lake with remarkable color, clarity, size, and depth. The lake's water clarity allows a viewer to see approximately 70 feet deep, though the clarity has declined from greater than 100 feet since readings began in the late 1960s (TRPA 2012). Lake Tahoe is the second deepest lake in the United States and the tenth deepest in the world, with a maximum depth measured at 1,645 feet. The color of Lake Tahoe's water is highly variable, influenced by depth. Water color ranges from clear, light green at the shallow lake edges (especially noteworthy in areas near Tahoe City), to dark blue in the deeper areas. The Lake is approximately 22 miles long and 12 miles wide, with 72 miles of shoreline and a surface area of 191 square miles (USGS 2008). The expansiveness of the Lake allows for long-distance views throughout the area.

Shoreline Character Types

Each portion of the shoreline is also classified as one of four shoreline character types, based on the level of human development that is visible. The visual character types along the shoreline are shown Exhibit 9-7 and include the following:

- **Visually Dominated Shoreline**. Approximately two percent of the shoreline is composed of visually dominated character types. This character type includes all marinas and other areas with large prominent buildings, high boat density and buoy fields, equipment, and commercial activity. There is usually considerable visual clutter associated with these uses (Exhibit 9-8).

- **Visually Modified Shoreline**. Approximately 48 percent of the shoreline is composed of visually modified character types. This character type includes areas with visually-prominent homes and other structures along the shoreline, but with considerable vegetation intact. This character type can include limited areas with high intensity clusters of shoreline structures. Most of the developed portions of the shoreline fall into this category (Exhibit 9-9).

- **Visually Sensitive Shoreline**. Approximately 16 percent of the shoreline is composed of visually sensitive character types. These are highly scenic or vulnerable landscapes exhibiting the influence of man-made modifications within an otherwise natural setting. Visually Sensitive areas include long expansive sandy beaches where shoreline structures are highly visible and difficult to screen from view (Exhibit. 9-10).

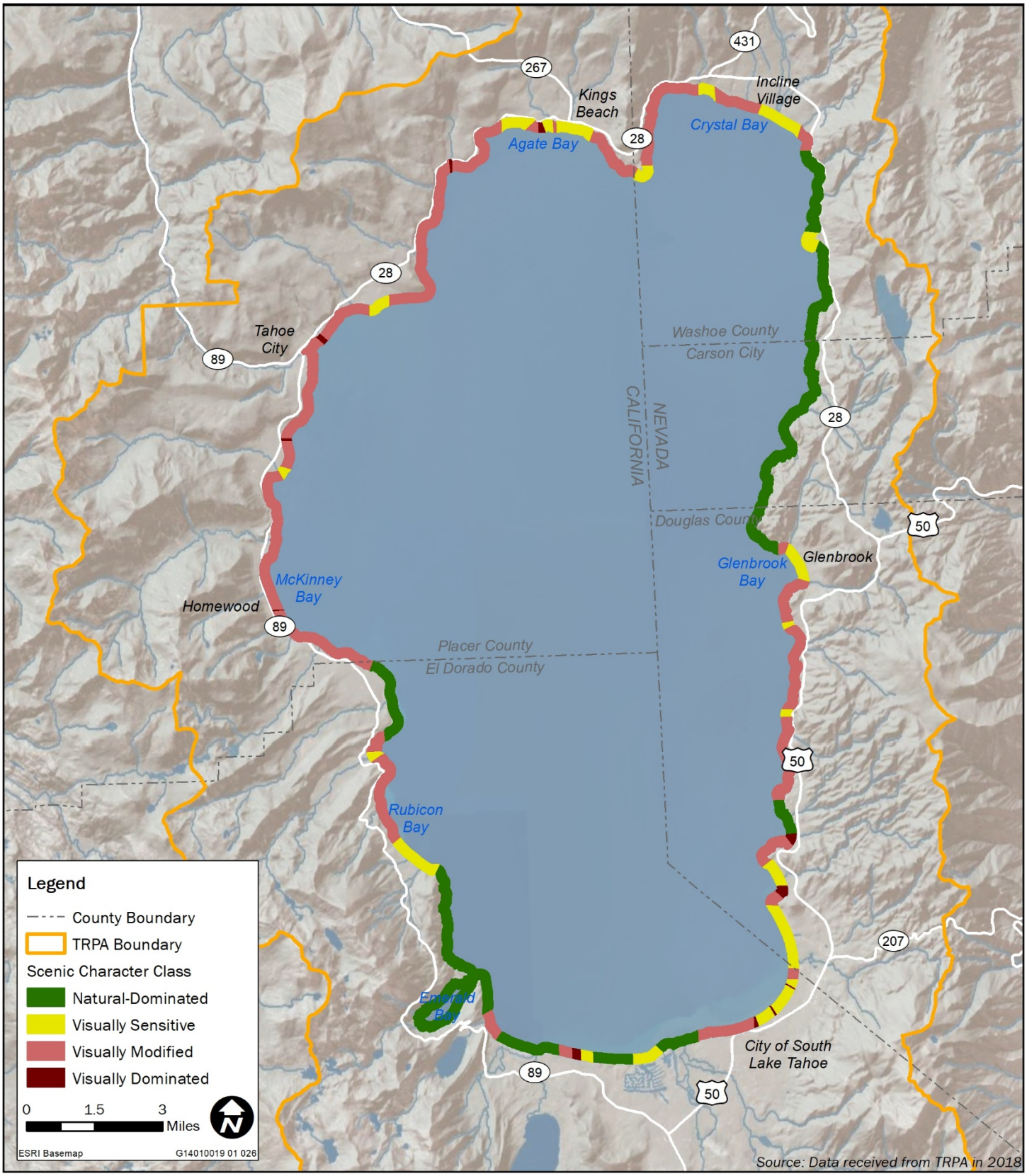
- **Natural Dominated Shoreline**. Approximately 34 percent of the shoreline is composed of natural dominated character types. These areas consist of either naturally appearing landscapes (e.g., east shore, Emerald Bay, Upper Truckee Marsh), or historical/traditional locations that include culturally modified landscapes in highly scenic locations (e.g., Thunderbird Lodge, Vikingsholm) (Exhibit 9-11).

Shorezone Development

The shorezone of Lake Tahoe is defined in Section 2.2. of Chapter 2, "Description of the Proposed Project and Alternatives." It generally includes the shore and the portion of the lake closest to the shore. Development in this area can negatively affect the intactness and unity of views toward or along the shoreline. The scenic effects of shorezone development depend on factors including the visible mass, color, density, and location of shorezone development. The type of structures that occur in the shorezone include piers, buoys, boat ramps, breakwaters, and the most lakeward portions of marinas.

Shoreland Development

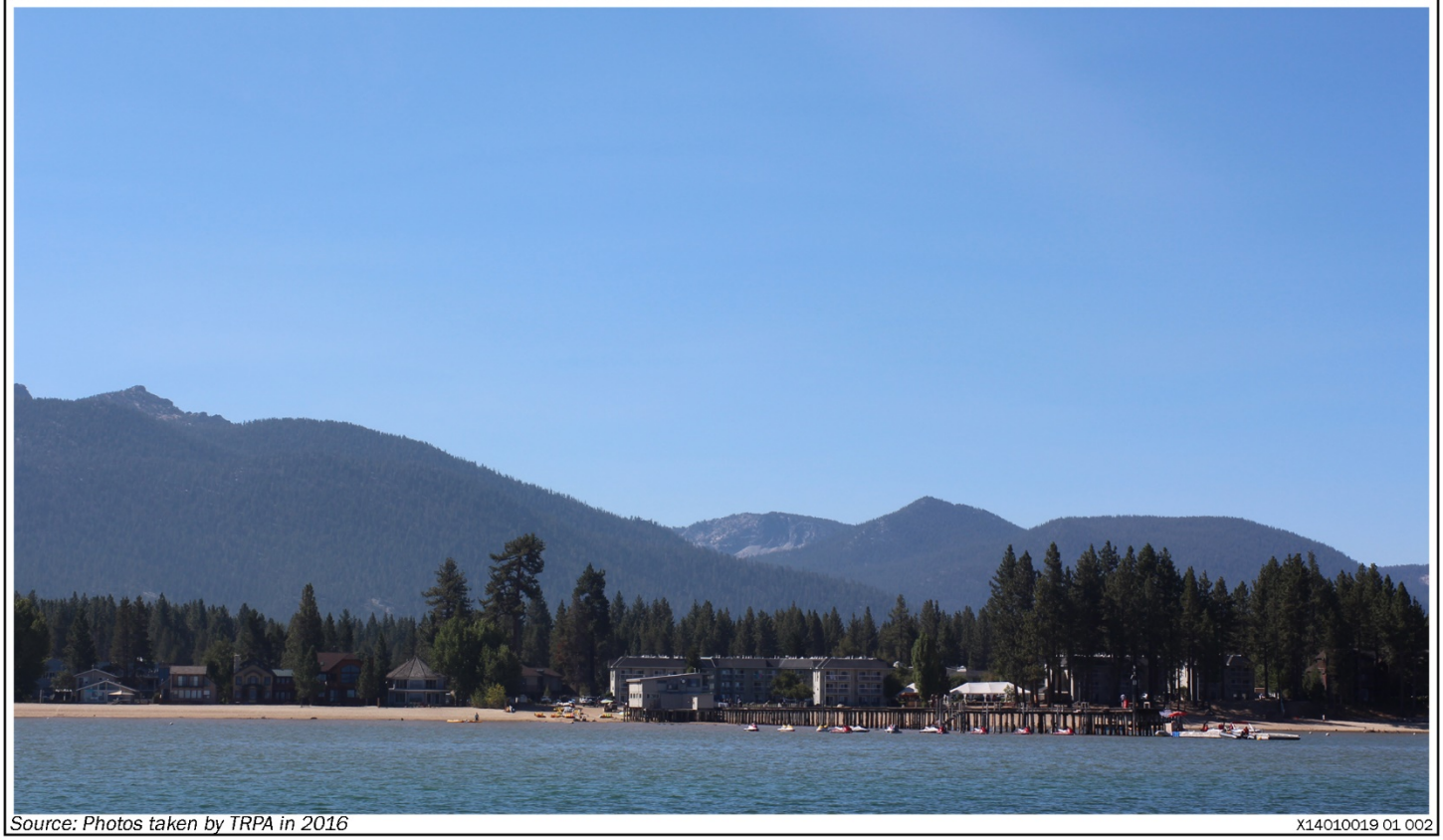
The Shoreland is defined in Section 90.2 of the TRPA Code. It generally includes upland areas along the shoreline that are landward of the shorezone. Development in the shoreland can also negatively affect the intactness and unity of views toward or along the shoreline. The scenic effects of shoreland development depends on the amount and visible magnitude (see description of visual magnitude system in the regulatory setting, above) of the development. The type of structures that occur in the shoreland include residences, commercial buildings, roadways, parking lots, and the most landward portions of marinas.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-7 Scenic Character Type

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline



Source: Photos taken by TRPA in 2016

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-8 Visually Dominated Shoreline

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Source: Photos taken by TRPA in 2016

X14010019 01 003

TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-9 Visually Modified Shoreline

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Source: Photos taken by TRPA in 2016

X14010019 01 004

TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-10 Visually Sensitive Shoreline

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Source: Photos taken by TRPA in 2016

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-11 Natural Dominated Shoreline

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

VIEWER SENSITIVITY

Viewer sensitivity is the overall measure of the degree to which potential viewers would be sensitive to adverse visual changes in an existing landscape. Viewer sensitivity is evaluated based on the viewer exposure to the visual resource, the existing visual quality, the frequency and duration of views, the number of viewers, and the type and expectations of individuals and viewer groups. In areas of more distinctive visual quality and where viewers expect to encounter high-quality scenic views, viewer sensitivity is more pronounced. Because the Lake Tahoe shoreline generally contains views with high scenic quality, and because viewers tend to be recreationists or residents that visit or reside at Lake Tahoe in part due to this high scenic quality, viewer sensitivity to changes in Lake Tahoe's shoreline is very high. Visible changes that would have little or no effect on viewers elsewhere could be perceived as substantial changes if they occur along the shoreline of Lake Tahoe.

9.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

9.4.1 Methods and Assumptions

Each of the Shoreline Plan alternatives is examined in light of the maximum potential for shoreline development or redevelopment, the nature and character of that development, and where it would be likely to occur. In addition, the analysis considers the effects of implementing design standards, shoreland scenic improvements, and visible mass offsets required under each alternative. As described in Chapter 2, "Description of the Proposed Project and Alternatives," each alternative offers different standards that would affect the number, location, and design of new and redeveloped shoreline structures. For all of the alternatives, the existing scenic review assessment and analysis requirements would remain, with the exception of revised standards specifically described Chapter 2 of this EIS. The scenic quality regulations outlined in Chapter 66 of the TRPA Code of Ordinances would remain under all alternatives.

No specific projects or shoreline structures are proposed or would be approved as a result of the Shoreline Plan. Therefore, the analysis evaluates the maximum amount of shoreline development that could occur under each alternative consistent with the standards that would apply under each alternative. It is important to note that any new or redeveloped shoreline structures would be subject to project-specific environmental review requirements, as well as a project review for consistency with the required standards.

The analysis considers scenic threshold monitoring data, shoreline character types, and the potential locations of new shoreline structures to identify the shoreline scenic travel units that have the greatest potential for scenic degradation under the alternatives. Seven key viewpoints (KVPs) were identified that provide views of those portions of the shoreline that have the greatest risk of scenic degradation.

Visual simulations were prepared for each KVP. Each simulation shows a worst-case scenario in that it depicts the maximum number and size of shoreline structures that could occur within each view. For each simulation, the number of parcels within the view and the number of existing shoreline structures was determined. Then, the maximum number of additional piers and moorings allowable under each alternative was calculated and those additional structures were depicted in the simulation. Pier simulations depict the maximum length of piers allowed at each location based on a review of the pierhead line and site-specific bathymetry. A variety of mooring types (e.g., buoys and boat lifts) and pier types (e.g., single- and multiple-use piers) were included in the simulations where allowed under an alternative, to depict the range of structures that could be developed under each alternative.

Methods that comprise the TRPA scenic threshold monitoring system are used to evaluate the scenario depicted in each simulation. The method is based on visual characteristics of the landscape (TRPA 2010b). The condition of these characteristics, when considered as a group and expressed as a numerical rating, represents the relative level of excellence in scenic quality that the visual landscape exhibits. Assessing the

condition of the characteristics under pre- and post-project scenarios provides an understanding of the status of scenic quality and the visual effect of a proposed action.

This analysis also quantifies the expected change in visible mass that could occur from the complete build-out of all new structures authorized under each alternative. This visible mass analysis accounts for visible mass limitations and offsets required under each alternative, and the analysis identifies cumulative net changes in visible mass on Lake Tahoe that could occur under each alternative.

9.4.2 Significance Criteria

Significance criteria relevant to scenic resources are summarized below. The applicable TRPA threshold standards, the scenic criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- Decrease the TRPA Travel Route or Scenic Quality rating for roadway or shoreline travel units, or bicycle trails and recreation areas.
- Be inconsistent with the TRPA SQIP, TRPA Design Review Guidelines, or applicable height and design standards.

9.4.3 Environmental Effects of the Project Alternatives

Impact 9-1: Alter views of the shore from Lake Tahoe

The effects Alternatives 1, 2, and 3 on views from Lake Tahoe would vary based on the location, intensity, and other characteristics of future projects. In some scenarios under Alternatives 1 and 3, the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with proposed design standards. In other scenarios under Alternatives 1, 2, and 3, scenic quality could be unchanged or degraded due to additional visible mass associated with new buoys, redeveloped piers that are a contrasting color, or in the case of Alternative 2, from additional visible structures in the shorezone that are not compensated for with reductions in the visual magnitude of development in the shoreland. This would be a **significant** impact for Alternatives 1, 2, and 3.

Due to the limited number of new shorezone structures that could be developed under Alternative 4, the project-level scenic assessment and mitigation requirements for public piers, and the prohibition of other new or expanded shoreline structures, Alternative 4 would have a **less-than-significant** impact.

The mitigation measures would require offsets for new visible mass associated with buoys, regulate the color of piers to prohibit undesirable contrast, and in the case of Alternative 2, require that minimum contrast ratings be achieved for parcels with new or expanded piers. These mitigation measures would reduce the impact to a **less-than-significant** level for Alternatives 1, 2, and 3.

Each of the alternatives would allow for some new shoreline structures. New shoreline structures could reduce the unity or intactness of views from Lake Tahoe toward the shoreline. New shoreline structures would not be distributed evenly around the shoreline. Instead, they would tend to be denser in areas with residential or mixed-use development along the shore because these developed areas have more private parcels with development potential. The visual effect of shoreline structures would also vary depending on their location. Dense clusters of shoreline structures would tend to have a greater visual impact than more dispersed or isolated structures.

The visual effects of shoreline structures would vary depending on the shoreline character type within which they occur. In visually dominated character types, new shoreline structures would have limited impacts on scenic quality because the shoreline is already visually dominated by intensive human-made development in these areas.

In visually modified character types, the effect of new shoreline structures on scenic quality would depend on the size, design, and density of the structures. Additional shoreline structures that are consistent with the size and visual character of existing structures would have more limited effects than large structures or dense clusters of structures. Most of the private land and development potential along the shoreline is within visually modified character types.

Visually sensitive character types contain long expanses of sandy beaches, which increase the visual prominence of shoreline structures and make them more difficult to screen. Shoreline structures have a greater potential to degrade the scenic quality of visually sensitive character types than other character types.

Natural dominated character types are associated with public lands and they tend to have the high scenic quality due to their undeveloped state, intact natural features, and, in some cases, visible historic features. New shoreline structures in natural dominated character types could adversely affect the scenic quality of these areas depending on the specific location, design, size, and visual compatibility of the individual structures. However, because natural dominated character types are associated with national forest, state parks, and other public lands, these areas would not be affected by new private shoreline structures and are therefore less likely to be degraded than other character types.

The effect of shoreline structures on scenic quality is also more pronounced in areas where existing shoreline development degrades the scenic quality such as travel units where scenic thresholds are not in attainment. In these non-attainment areas, additional shoreline structures could contribute to visual clutter and further decrease scenic threshold ratings, making it less likely that the TRPA scenic thresholds would be attained.

Table 9-1 shows the relative risk of scenic quality degradation in each shoreline travel unit based on the considerations described above. The travel unit name and threshold attainment status are listed, and the table indicates whether each unit contains visually sensitive character types. The estimated percentage of new private piers was calculated based on an assessment of private littoral parcels that could be eligible for private piers under each alternative. The likely location of new buoys, public piers, and other structures is not known. However, the locations of other private structures would be closely associated with private land ownership and would generally be similar to the distribution of new private piers. Therefore, the estimated distribution of new private piers serves as a proxy estimate for new private shoreline structures.

Travel units are considered to have a high risk of scenic degradation if they are currently not in attainment of threshold standards, include visually sensitive character types, and are estimated to receive 5 percent or more of the new private piers allowed under an alternative. If a travel unit meets two of those three criteria, it is considered to have a moderate risk of scenic degradation. Travel units are considered to have a low risk of scenic degradation if they meet less than two of those criteria.

As shown in Table 9-1, the Crystal Bay, Rubicon Bay, Lake Forest and Cave Rock shoreline travel units have the greatest potential for scenic degradation from the Shoreline Plan alternatives. The Crystal Bay travel unit has the highest risk for scenic degradation because the existing scenic quality rating is considerably worse than the threshold standard, it has worsening trend in scenic quality, it contains visually sensitive character types, and it includes more parcels potentially eligible for new private piers than any other travel unit.

Exhibit 9-12 shows the location of scenic shoreline travel units with a high, moderate, and low risk of scenic degradation. It also shows the location of four KVPs that were selected to show views of the locations that have the greatest risk of scenic degradation. KVPs 1 through 4 include views from Lake Tahoe looking toward the shore, and are evaluated for each alternative, below.

Table 9-1 Relative Risk of Scenic Degradation for Shoreline Travel Units

Shoreline travel unit	Threshold attainment status	Includes visually sensitive character type	Estimated percent of new private piers within unit (Alternatives 1 and 3)	Estimated percent of new private piers within unit (Alternative 2)	Risk of scenic degradation
1. Tahoe Keys	Attainment	Yes	0	7	Low
2. Pope Beach	Attainment	Yes	0	0	Low
3. Jameson Beach	Attainment	Yes	0	1	Low
4. Taylor Creek	Attainment	No	0	1	Low
5. Ebright	Attainment	No	2	2	Low
6. Emerald Bay	Attainment	No	0	1	Low
7. Bliss State	Attainment	No	0	1	Low
8. Rubicon Point	Attainment	Yes	0	2	Low
9. Rubicon Bay	Non-Attainment	Yes	11	10	High
10. Meeks Bay	Attainment	Yes	1	2	Low
11. Sugar Pine Point	Attainment	No	0	0	Low
12. McKinney Bay	Attainment	No	12	5	Moderate
13. Eagle Rock	Attainment	No	4	0	Low
14. Ward Creek	Non-Attainment	Yes	6	3	Moderate
15. Tahoe City	Non-Attainment (Considerably worse)	No	2	1	Low
16. Lake Forest	Non-Attainment (Considerably worse)	Yes	6	5	High
17. Dollar Point	Attainment	No	0	0	Low
18. Cedar Flat	Non-Attainment	No	6	1	Moderate
19. Carnelian Bay	Non-Attainment	No	2	0	Low
20. Flick Point	Attainment	No	3	2	Low
21. Agate Bay	Attainment	Yes	2	4	Moderate
22. Brockway	Non-Attainment	Yes	2	4	Moderate
23. Crystal Bay	Non-Attainment (Considerably worse, declining trend)	Yes	17	15	Highest
24. Sand Harbor	Attainment	Yes	0	1	Low
25. Skunk Harbor	Attainment	No	0	3	Low
26. Cave Rock	Non-Attainment	Yes	9	8	High
27. Lincoln Park	Non-Attainment	Yes	4	4	Moderate
28. Tahoe School	Attainment	No	0	1	Low
29. Zephyr Cove	Attainment	Yes	1	3	Low
30. Edgewood	Non-Attainment	Yes	0	0	Low
31. Bijou[1]	Attainment	Yes	9	9	Moderate
32. Al Tahoe	Attainment	NO	1	3	Low
33. Truckee Marsh	Attainment	No	0	1	Low

Notes: [1] Bijou travel unit is considered a moderate rather than high risk of scenic degradation because the number of structures placed in that unit would likely be much lower than the nine percent shown, because that unit is comprised almost entirely of Shorezone Tolerance District 1, which limits development potential.

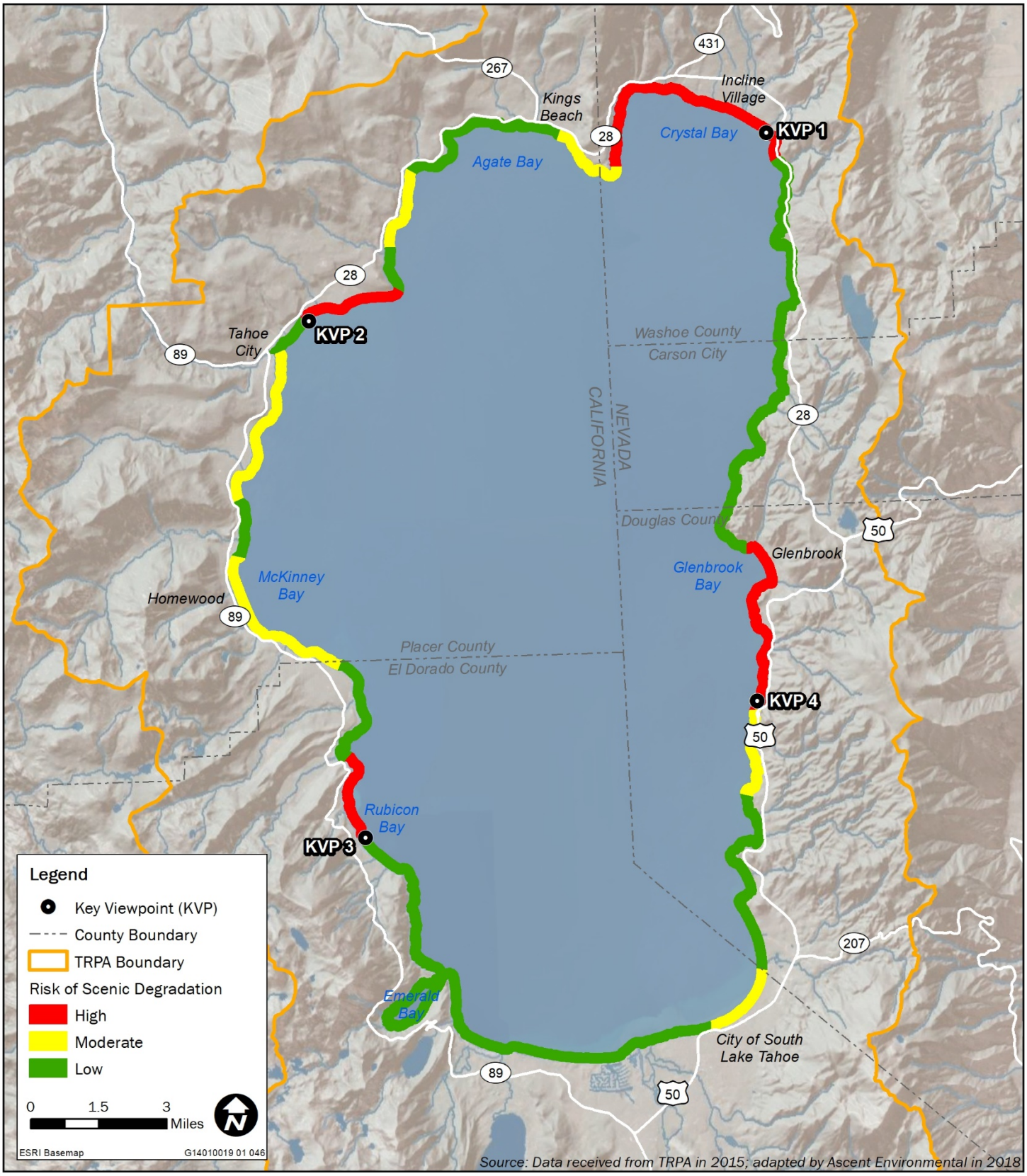

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Exhibit 9-12 Shoreline Travel Units Key View Points

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Alternative 1: Shoreline Plan

Alternative 1 would allow for up to 138 new piers (10 public and 128 private), two public boat ramps, and 2,116 new moorings, which would include a combination of buoys, boat lifts, and slips. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, "Description of the Proposed Project and Alternatives." In addition, Alternative 1 would allow littoral property owners to bank scenic improvements. This would incentivize property owners to implement scenic improvements sooner because they could apply the scenic improvements toward a future shoreline project.

Piers

The 128 new private piers allowed under Alternative 1 would be distributed to individual jurisdictions to prevent dense clusters of new piers along any portion of the shoreline. The pier distribution requirements would limit the total number of new piers in each jurisdiction as follows: Placer County – 58, El Dorado County – 28, Washoe County – 21, and Douglas County/Carson City Rural Area – 21. In addition, Alternative 1 would limit the number of new piers within visually sensitive character types to no more than 19, and would proportionately distribute those piers in visually sensitive character types to individual jurisdictions to prevent the dense clustering of piers within any one area containing a visually sensitive character type. New private piers would not be allowed within Shoreline Preservation Areas or Stream Mouth Protection Areas (see Exhibit 2-13 in Chapter 2, "Description of the Proposed Project and Alternatives").

Alternative 1 would promote multiple-use piers as a way to reduce overall pier development potential while increasing the number of littoral property owners with access to a pier. Up to 26 of the new private piers could be individual private piers, and the remainder (102) would be multiple-use piers. While multiple-use piers would require deed restrictions that can reduce the overall number of piers that could be constructed, each multiple-use pier can be larger than an individual private pier, and therefore, would have a greater visual effect.

Each new or redeveloped pier would be required to comply with design standards that address the pier length, width, setbacks, location, number of boat lifts, and total visible mass (see Table 2-6 in Chapter 2, "Description of the Proposed Project and Alternatives").

New or redeveloped individual private piers would be limited to 220 square feet of visible mass, and multiple-use piers would be allowed more visible mass depending on the number of parcels or residential units served by the pier. The largest multiple-use piers (serving 20 or more residential units or at least four littoral parcels) would be allowed a maximum of 520 square feet of visible mass.

Moorings

Alternative 1 would allow for up to 2,116 new moorings, which would include a combination of buoys, slips, and boat lifts. It is estimated that majority of these (2,006) would be buoys with approximately 65 slips and 45 boat lifts. Boat lifts would only be associated with piers and would be regulated as part of the pier, as described above. The scenic requirements that apply to piers would also apply to boat lifts. Slips within marinas would not be visible from the lake, or their visual impacts would be mitigated as part of a marina expansion project. However, the estimated 2,006 buoys would be visible from the lake and could affect scenic quality.

New buoys could be placed either within a buoy field or outside of a buoy field, lakeward of individual littoral parcels. Buoys outside buoy fields could be located up to 600 feet lakeward from elevation 6,220 feet LTD, measured perpendicularly to the shore. This is an increase from the current limit of 350 feet from shore. Buoys would be required to be located a minimum of 20 feet from adjacent property boundaries and a minimum of 50 feet from other legally existing buoys. Buoy fields would be designed in a grid using the same setback and spacing standards as for littoral parcels (a minimum 20 feet from adjacent property boundaries and a minimum 50 feet from other legally existing buoys). TRPA could approve deviations from these standards based on site-specific considerations, and buoy fields associated with marinas could extend farther lakeward than 600 feet, if consistent with existing authorizations.

Buoys consist of an anchor block on the lakebed attached to a float on the surface of the lake. When a boat is not moored at a buoy, the only visible portion of the buoy is the float, which is typically a white sphere between one and two feet in diameter. When a boat is moored on a buoy, the visual effect of the buoy is much more pronounced. TRPA has estimated that the typical visible mass of a boat on a buoy is approximately 83 square feet (TRPA 2017b, 2017c). During the boating season (May through September), the percentage of buoys with a boat moored to it ranges from approximately 22 percent on a weekday during the early or late boating season, to approximately 63 percent on a summer holiday weekend. Thus, the visual effect of buoys would vary throughout the year depending on the number of boats moored on buoys.

Alternative 1 would not require scenic offsets or improvements associated with new buoys. Thus, Alternative 1 would allow for an estimated 2,006 buoys consistent with location standards. The visual effect of these buoys would vary over time depending on whether they are in use, and these visual effects would not be offset by scenic improvements.

Public Facilities and Marinas

Alternative 1 would allow for new public facilities including 10 new public piers, two new public boat ramps, and expansions of existing marinas. The new public piers could deviate from the design standards described above to the extent necessary to serve their public purpose. Public piers that deviate from standards would be evaluated on a case-by-case basis, and mitigation would be required where necessary to avoid significant effects on scenic quality. Any new or expanded public piers would be required to comply with the visible mass offsets described below.

Up to two new public boat ramps could be constructed. New boat ramps would be required to comply with the same visible mass offsets as piers, such that any new boat ramp would result in a net decrease in the amount of mass of human-made structures visible from the lake. Alternative 1 would also allow marinas to expand to add additional slips or buoys.

The locations and characteristics of possible new public boat ramps or marinas cannot be known at this time. If, and when a new public boat ramp or marina expansion is proposed, it would be required to undergo an environmental review and scenic assessment including an evaluation of the visual magnitude of the project area as required by TRPA Code Section 66.3. As documented in the 2015 Threshold Evaluation Report, the visual magnitude requirements of the TRPA Code have resulted in improved scenic conditions along the shoreline (TRPA 2016). Compliance with these requirements would prevent scenic degradation from public boat ramps and marinas.

Visible Mass

Visible mass is defined by TRPA as the total visible area of a shoreline structure, including all elements of the structure. Visible mass is calculated by summing the area above elevation 6,226 LTD (in square feet) of visible elements of the structure when viewed in profile (i.e., parallel to the shore), and the area of visible elements of the structure when viewed from the end (i.e., perpendicular to the shore).

New shoreline structures would add visible mass to the shoreline or surface of Lake Tahoe. Scenic offsets, in the form of removing or screening existing visible mass that can be seen from Lake Tahoe, would be required for any new or redeveloped pier, boat lift, boat ramp, or marina that results in a net increase in visible mass. Scenic improvement would be required as close to the proposed structure as feasible. TRPA would prioritize the location of scenic offsets as follows: 1) on the same parcel in the shorezone, 2) on the same parcel in the upland area, 3) elsewhere in the shorezone within the same shoreline scenic travel unit, 4) within the same travel unit in the upland, and 5) in another nonattainment scenic travel unit. Scenic offset requirements would increase with the scenic sensitivity of the developing parcel's location, as follows:

- in visually dominated character types, the visible mass offset ratio would be 1:1.5;
- in visually modified character types, the visible mass offset ratio would be 1:2; and
- in visually sensitive character types, the visible mass offset ratio would be 1:3.

While the visual effect of any shoreline structure depends on numerous factors such as the location and color of the structure, visible mass provides a broad quantitative tool to assess the visual effects of structures. Table 9-2 provides the estimated change in visible mass that would result from buildout of Alternative 1. While the actual visible mass would vary depending on the size and design of proposed shoreline structures, Table 9-2 provides an approximate estimate based on conservative assumptions.

Table 9-2 Change in visible mass under Alternative 1

Structure	Typical Visible Mass per Structure (sq. ft.)	Number of Structures	Additional Visible Mass (sq. ft.)	Estimated Required Screening (sq. ft.)[6]	Net Change in Visible Mass (sq. ft.)
Private Multiple-Use Piers[1]	520	102	53,040	115,960	-62,920
Private Single-Use Piers[1]	220	26	5,720	11,440	-5,720
Public Piers[2]	1,400	10	14,000	35,000	-21,000
Boat Lifts[3]	83	45	3,735	8,051	-4,316
Boat Ramps[4]	323	2	646	1,615	-969
Buoys[5]	83	2,006	166,498	0	166,498
Total			243,639	172,066	**71,573**

Notes:

1 Visible mass of private piers reflects maximum allowable for single-use piers and multiple use piers serving four or more littoral parcel owners

2 Visible mass of public piers based on visible mass calculations for proposed Kings Beach pier rebuild EIR/EIS (TRPA and State Parks 2018)

3 Visible mass of boat lifts based on estimates of the typical visible mass of boat lifts prepared by TRPA for a scenic assessment training (TRPA 2017b)

4 Visible mass of new boat ramp based on visible mass drawings of Kings Beach SRA boat ramp and accessory structures (TRPA and State Parks 2018)

5 Visible mass of boats on buoys based on estimates of the average visible mass of boats prepared by TRPA to inform the Shoreline Steering Committee and to support scenic assessment trainings (TRPA 2017b, 2017c), and assumes all buoys would have boats

6 Required screening assumes 19 private multi-use piers, 5 public piers,7 boat lifts, and 1 boat ramp would be placed in visually sensitive shoreline areas (1:3 offset) and remainder in visually modified shoreline areas (1:2 offset), based on proposed limits on structures within visually sensitive areas

As shown in Table 9-2, new piers, boat lifts, and boat ramps would add visible mass. However, the visible mass offset requirements would require the removal or screening of other existing visible mass at a greater than 1:1 ratio. Thus, these structures would result in a net decrease in the amount of visible mass along the shoreline or on the surface of Lake Tahoe.

New buoys would also contribute visible mass and, as described above, this additional visible mass would not be required to be offset. Under a worst-case scenario (i.e., assuming every buoy had a boat moored to it), each buoy would contribute an average of 83 square feet of visible mass. The estimated 2,006 new buoys would contribute an estimated 166,498 square feet of additional visible mass. Even after the net decrease in visible mass required for other structures is considered, Alternative 1 would result in an estimated net increase of approximately 72,000 square feet of visible mass due to new buoys.

Visual Magnitude of the Shoreland

In addition to offsetting increases in visible mass, Alternative 1 would require that shoreland properties achieve minimum contrast ratings as part of the approval process for new piers (see description of the visual magnitude system in Section 9.2, “Regulatory Setting,” above). For new private piers, TRPA would require an initial contrast rating of 21 as part of the pier application. Following permit submittal, applicants would have 6 months to increase their contrast rating to 25 to offset the visual impact of new or redeveloped piers. TRPA would exempt property owners from the contrast rating of 25 if it is not feasible to achieve it. As described above, contrast ratings are calculated for parcels along the shoreline based on the color, texture, articulation, amount and reflectivity of glass, and amount of visible perimeter of structures visible from the lake. Thus, prior to authorizing a new pier, TRPA would require that the project area complete feasible scenic improvements to development along the shore to achieve a minimum contrast rating. Such improvements could include, but are not limited to:

- repainting or residing buildings with a darker earth tone color that blends into the background;
- planting trees or other vegetation to visually screen the perimeter of a structure and reduce its visible silhouette;

- removing fences, sheds, walls, or other features visible from the lake;
- replacing standard windows with anti-reflective glass; and/or
- resurfacing structures with textured materials (e.g., covering a smooth wall with a natural stone veneer).

Key View Point 1 – Visually Modified Character Type in Crystal Bay, Alternative 1

KVP 1 is located approximately 450 feet offshore of the eastern side of the Crystal Bay Shoreline Travel Unit facing northeast. The KVP shows a visually modified character type. Exhibit 9-13 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP 1.

Existing View

The existing view includes four piers and four buildings. On the left edge of the view, a residence is visible but does not stand out because it is a dark brown color and partially screened by conifers. To the right of that residence is a short, light-color pier with double pilings and a personal watercraft on a lift. Above the pier is a tan residence that is partially screened behind a small conifer. To the right of that residence is an L-shaped dark brown rock-crib style pier. While this pier is a similar length as the other piers in the view, it is much more visually prominent due to its design. The L shaped design presents a larger visible surface when viewed from the lake, and the rock crib design creates substantially more visible mass than an open piling design. Above the L-shaped pier is a parking area with vehicles partially visible through the trees. To the right and below the parking area is another pier that is a similar length as the other piers in the view, however it appears larger because it is not perpendicular to the shore. The orientation results in more of the pier being visible from the lake than similar piers that are oriented perpendicular to the shore. Above that pier is a large light-colored building, the roof and walls of which are partially visible through the trees. On the right side of the existing view is another light-colored pier with double pilings and a partial railing. Four buoys are visible in the existing view, none of which have boats.

Simulation

The simulation shows the same view if each parcel were to redevelop consistent with the standards and requirements of Alternative 1. The simulation includes five piers and two additional boat lifts and one additional buoy. On the left side of the view, the existing residence is unchanged because the dark color and existing screening would likely already meet the minimum contrast rating of 25 required by Alternative 1. The short, light-colored pier on the left side of the existing view is replaced with a longer, single piling pier in the simulation. The simulated pier is shown without superstructures (i.e., structures above the pier deck), which would be prohibited under Alternative 1. The pier is also depicted with a low visual profile, single-piling design because this type of design would be necessary to comply with the maximum 220 square feet of visible mass allowed for an individual private pier under Alternative 1. As with the existing pier, the simulated pier includes a personal watercraft on a boat lift. Above that pier, the existing tan residence is shown as a dark brown color with additional vegetative screening along the lower portion of the structure. These changes would be necessary to achieve the minimum required contrast rating of 25.

The existing L-shaped rock crib style pier is replaced with a new pier consistent with design standards. The new pier is approximately the same length as the existing pier, which already reached the pier headline (the maximum length that an individual private pier could achieve in this area), but a new boat lift with a personal watercraft has been added. No changes are shown at the parking area above that pier, because the contrast rating requirements would not address vehicles parked along the shoreline. To the right and below the parking area, the existing double-piling pier is replaced with a single-piling pier that is oriented perpendicular to the shore, as required by Alternative 1. Above that pier, the large light-colored building is shown in a dark brown color, as would be required to achieve the minimum contrast rating. Below that building, a new pier with a boat lift has been added, and the existing pier on the right side of the view is retained with no changes. A new buoy with a boat is visible on the right side of the view, and this buoy is placed farther from the shore than the existing buoys, as allowed by Alternative 1.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-13 Key View 1 – Visually Modified Character Type in Crystal Bay, Alternative 1

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Overall, buildings and other development in the shoreland are less visible in the simulation due to scenic improvements that would be required to attain minimum contrast ratings. The simulation shows one additional pier which, with compliance with Alternative 1 design standards and visible mass regulations, decreases the overall visual prominence of piers. The most visually prominent feature in the simulation is the new boat on a buoy, which is located farther lakeward than the existing buoys. Taken together, the changes shown in the simulation of KVP 1 would improve the intactness of the view and would not degrade scenic quality.

Key View Point 2 – Visually Modified Character Type Near Lake Forest, Alternative 1

KVP 2 is located approximately one quarter mile (1,300 feet) offshore of the western side of the Lake Forest Shoreline Travel Unit facing northeast. The KVP shows a visually modified character type. Exhibit 9-14 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP 2.

Existing View

The existing view includes a portion of a buoy field in the foreground, and four piers (approximately 250–280 feet in length) in the middleground within the left half of the view. On the right side of the view, four shorter piers (approximately 80–100 feet in length) are visible in the background. In the shoreland, four large residences are clearly visible on the right side on the view. Another five residences are visible on the right side of the view, but they are less prominent than the residences on the left of the view. Three additional residences are visible on the hillside behind the shoreland, including a prominent building on the hilltop.

Simulation

In the simulation, two additional buoys with boats have been added to the left side of the view and two new individual private piers have been added near the center of the view. In addition, two of the existing large piers on the left side of the view are shown as being expanded into multiple-use piers with two boat lifts each. These multiple-use piers would also serve property owners that are outside of the view, which would reduce the shoreline development potential for those properties. Two of the existing shorter piers on the right side of the view are shown as expanded piers of approximately 200 feet in length, which is the longest individual private pier that could be approved in this area. Two new boats on buoys are visible on the right side of the view.

In the simulation, the pier on the left edge of the view is unchanged and is associated with a residence that is to the left and outside of the view. The second pier from the left, which is associated with the residence on the left side of the view is also unchanged. The third pier from the left is shown as a slightly longer multiple-use pier. This pier is associated with the second residence from the left, but that residence is shown as unchanged because the existing structure is partially screened and a dark color that would likely already meet the minimum contrast rating.

The third residence from the left is a very large and visually prominent structure. In the simulation the existing pier in front of this residence is expanded as a multiple-use pier, but is shown as a low-profile single piling design, which would be necessary to comply with the visible mass limitations. Additional vegetative screening is shown along the lower portion of this residence as would be required to achieve the minimum required contrast rating.

Two new piers are shown in the simulation near the fourth and fifth residences from the left. Each residence is shown in a darker color to achieve the minimum required contrast rating. A small structure on the beach has been removed, and additional vegetative screening has been added in front of each residence, which would be required to meet the visible mass offsets required for the new piers.

On the right side of the view, two existing piers are replaced with expanded individual private piers that extend to the pierhead line, approximately 200 feet off shore. No scenic improvements are shown for the residences on the right side of the view because the dark color and vegetative screening of those residences in expected to already meet the minimum contrast rating and any visible mass offsets required for the expanded piers would not be visible from this viewpoint.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-14 Key View 2 – Visually Modified Character Type Near Lake Forest, Alternative 1

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In the simulation of Alternative 1 from KVP 2, development in the shoreland is less visible due to scenic improvements that would be required to attain minimum contrast ratings and visible mass offset requirements. The simulation shows two additional piers which, with compliance with Alternative 1 design standards and visible mass regulations, does not substantially increase the overall visual prominence of piers. Taken together, the changes shown in the simulation of KVP 2 would not degrade the scenic quality of the view.

Key View Point 3 – Visually Sensitive Character Type in Rubicon Bay, Alternative 1

KVP 3 is located approximately 650 feet offshore of the southern end of the Rubicon Bay Shoreline Travel Unit, facing west. The KVP shows a visually sensitive character type. Exhibit 9-15 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP 3.

Existing View

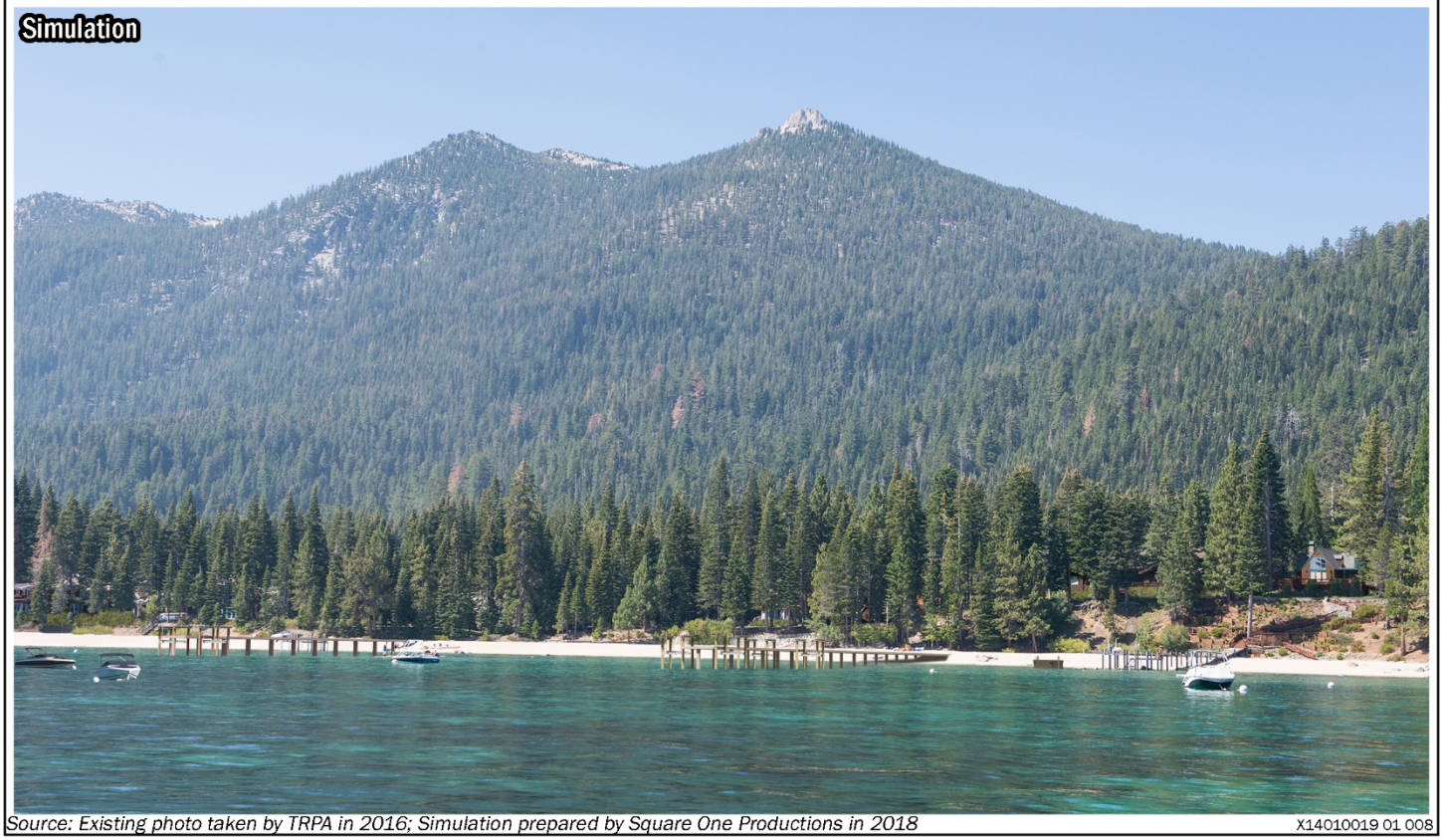
The existing view includes five individual private piers and six residences that are mostly screened by existing vegetation. On the left side of the existing view is an approximately 140-foot-long pier, followed by a short (approximately 50-foot-long) pier, then another approximately 140-foot-long pier with a boat lift. Near the center of the existing view is an approximately 120-foot-long pier with a double piling design and a covered boat lift. On the right side of the existing view is an approximately 160-foot-long pier with a double piling design and a boat lift. The most visible structures in the shoreland are a light-colored structure with a rooftop deck near the center-right of the view, and a residence on the right side of the view.

Simulation

Because this view shows a visually sensitive character type, any new piers authorized under Alternative 1 would be restricted to multiple-use piers, and any increase in visible mass would be offset at a 3:1 ratio. The simulation shows the placement of two multiple-use piers within the view. Because multiple-use piers require shared access by multiple littoral properties, the simulation shows the removal of the four existing piers on the left side of the view, which are replaced by the two larger multiple-use piers. The new multiple-use pier on the left side of the view includes two boat lifts and is approximately 190 feet, or approximately 30 feet longer than the longest existing pier in the view. This reflects a multiple-use pier serving three littoral parcels. The multiple-use pier on the right is also approximately 190 feet in length and includes four boat lifts, reflecting a multiple-use pier serving five littoral parcels. The existing pier on the right side of the view remains unchanged, and a swim platform has been added to the left of that existing pier. Two new boats on buoys are shown on the left side of the view. In the shoreland, the small structure on the beach is removed and the other residences are shore in darker colors with some additional vegetative screening, which would be required to meet minimum contrast ratings and to partially offset the visible mass of the new piers.

Because the existing structures are mostly screened from view by vegetation, there are limited opportunities to achieve the required visible mass offsets within this view. Therefore, additional removal or screening of visible mass would be required to occur outside of this view to meet the 3:1 visible mass offsets required for the two new piers.

The simulation shows the removal of four individual private piers, and the construction of two larger multiple-use piers serving a combined eight littoral parcels, some of which would be outside of the view. Overall, the visual prominence of development in the shoreland is slightly reduced in the simulation due to contrast rating and visible mass requirements of Alternative 1. The visual clutter in the shorezone is also slightly reduced due to the consolidation of several individual private piers into fewer multiple-use piers. However, the additional length and visible mass of the new multiple-use structures makes those piers more visually prominent than the existing piers. These larger piers, as well as the new buoys, slightly reduce the intactness of this view, which could contribute to a reduction in scenic quality. However, the required 3:1 offset of visible mass in a visually sensitive character type would mean additional visible mass removal or screening outside of this view, and within the same shoreline travel unit, if feasible. Therefore, the slight reduction in the scenic quality of this view would be offset by visible mass reductions and scenic improvements elsewhere in the scenic travel unit, and the threshold standard for the travel unit would not be reduced.



Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-15 Key View 3 – Visually Sensitive Character Type in Rubicon Bay, Alternative 1

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Key View Point 4 – Visually Modified Character Type Near Cave Rock, Alternative 1

KVP 4 is located approximately 575 feet offshore of the southern end of the Cave Rock Shoreline Travel Unit facing southeast. The KVP shows a visually modified character type. Exhibit 9-16 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP 4.

Existing View

The existing view includes seven residences in the shoreland with varying amounts of visual screening. Several small structures are visible along the shoreline below the residences. Three boulder breakwaters are visible: one on the left, one in the center, and one on the right of the view. On the left side of the view, an approximately 90-foot-long pier with a double piling design and a boat lift is visible. Near the center of the view, an approximately 90-foot L-shaped rock crib pier is visible. Another L-shaped rock crib pier of approximately 120 feet in length is visible on the right side of the view. Six boats on buoys are also visible.

Simulation

In the simulation, two new individual private piers are added, and the three existing piers are expanded to the maximum allowable length. Two new boat lifts and an additional boat on a buoy are also shown.

On the left side of the simulation the existing pier is replaced with an expanded pier of approximately 145 feet in length (the maximum length that could be allowed in this area). An expanded boat lift is also shown on this pier. A small shed near the base of the existing pier is removed to reflect the visible mass offsets that would be required for the pier expansion. To the right of that pier is a new pier of approximately 150 feet in length. The existing residence above the new pier is shown in a darker color, which would be required to meet the minimum contrast rating. Some additional vegetative screening is included around that residence, to depict the required visible mass offsets.

Near the center of the simulation is another new pier extending approximately 120 feet in length. The residence above that pier is shown in a slightly darker color to meet the contrast rating requirements, and some additional vegetative screening is added to depict the required visible mass offsets. To the right of that pier, the existing rock crib pier is removed and replaced with a new pier with a boat lift, and a buoy with a boat. The residence behind this pier is shown in a darker color with some additional vegetative screening. On the right side of the view, the other existing rock crib pier is replaced with a floating pier. No additional screening is shown in this area, because the replacement of the rock crib pier with a floating pier would not result in a net increase in visible mass.

In the simulation of Alternative 1 from KVP 4, development in the shoreland is less visible due to scenic improvements that would be required to attain minimum contrast ratings and visible mass offset requirements. The simulation shows two new piers and removal of the existing L-shaped rock crib piers. This change reduces overall visible mass, but the new and expanded piers add visual clutter. The piers are shown in a light to medium brown color that contrasts with the grey color of the water and rocky shoreline in this view. This contrast makes the new and expanded piers more visually prominent than the existing piers and reduces the intactness of the view. Taken together, the changes shown in the simulation of KVP 4 could degrade the scenic quality of the view, largely due to the contrasting color of the piers and the additional mass of the boat on a buoy, which is not offset.

Conclusion

As described above, Alternative 1 would authorize new shorezone structures that could affect views from Lake Tahoe toward the shore. New and redeveloped structures would be required to comply with applicable design standards addressing the location, length, width, orientation, and maximum visible mass. The visible mass of piers would be restricted, and all piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in the amount of visible mass that can be seen from Lake Tahoe. In addition, these structures would be evaluated under the visual magnitude system in TRPA Code Section 66.3. New or expanded structures would require scenic improvements in the shoreland to achieve minimum required contrast ratings.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-16 Key View 4 – Visually Modified Character Type Near Cave Rock, Alternative 1

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New buoys would be allowed to be placed farther from the shore than under existing conditions. The visible mass associated with buoys would not be offset, and projects adding buoys would not be required to implement scenic improvements through the visual magnitude system.

The effects of buildout of Alternative 1 would vary based on the location, intensity, and other characteristics of future projects. In some situations, the intactness of views would be improved, and the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with proposed design standards. In other situations, scenic quality could be unchanged, or the unity and/or intactness of views could be degraded, which would reduce the scenic threshold ratings. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys, and/or new or redeveloped piers that are a color that contrasts with the background view. Because new visible mass of buoys and contrasting piers could degrade scenic threshold ratings, this would be a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would maintain the existing shorezone ordinances and the number of new structures would be limited by site-specific eligibility criteria, including a prohibition on new structures in prime fish habitat. It is estimated that Alternative 2 could allow for up to 476 new piers, six new public boat ramps, and 6,936 new moorings, which would include a combination of buoys, boat lifts, and slips. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, “Description of the Proposed Project and Alternatives.”

Piers

Unlike Alternative 1, Alternative 2 would not distribute new piers to individual jurisdictions to prevent dense clusters of new piers along any portion of the shoreline or limit the number of new piers within visually sensitive character types. As with Alternative 1, new piers would not be allowed within Stream Mouth Protection Areas, but Alternative 2 would not designate Shoreline Preservation Areas.

Each new or redeveloped pier would be required to comply with design standards that address the pier length, width, setbacks, location, and number of boat lifts (see Table 2-7 in Chapter 2, “Description of the Proposed Project and Alternatives”). Alternative 2 would not establish a numeric limit on the visible mass of piers, however it would require that piers either be floating or have an open pile design that is at least 90 percent open space, which would result in less visible mass than other designs. Alternative 2 would promote multiple-use piers by allowing them to deviate from design standards as described in Chapter 2, “Description of the Proposed Project and Alternatives.”

Moorings

As described for Alternative 1, boat lifts would only be associated with piers and would be regulated as part of the pier; slips would be within marinas and would not be visible from the lake, or their visual impacts would be mitigated as part of a marina expansion. However, the estimated 4,871 new buoys would be visible from the lake and could affect scenic quality. New buoys could be placed either within or outside a buoy field, lakeward of individual littoral parcels consistent with the standards described in Chapter 2. Buoys outside buoy fields could be located up to 350 feet lakeward from elevation 6,220 feet LTD, measured perpendicularly to the shore, which is less than allowed under Alternative 1. Alternative 2 would not require scenic offsets or improvements associated with new buoys.

Public Facilities and Marinas

Alternative 2 would allow for new public facilities including new public piers, six new public boat ramps, and up to 2 new marinas. The new public piers could deviate from the design standards described above to the extent necessary to serve their public purpose. Public piers that deviate from standards would be evaluated on a case-by-case basis, and mitigation would be required where necessary to avoid significant effects on scenic quality. Any new or expanded public piers would be required to comply with the visible mass offsets described below.

Up to six new public boat ramps could be constructed. New boat ramps would be required to comply with the same visible mass offsets as piers, such that any new boat ramp would result in a net decrease in the amount of mass of human-made structures visible from the lake. The locations and characteristics of possible new public boat ramps or marinas cannot be known at this time. If and when a new public boat ramp or marina is proposed, it would be required to undergo an environment review and scenic assessment including an evaluation of the visual magnitude of the project area as required by TRPA Code Section 66.3. As documented in the 2015 Threshold Evaluation Report, the visual magnitude requirements of the TRPA Code have resulted in improved scenic conditions along the shoreline (TRPA 2016). Compliance with these requirements would prevent scenic degradation from public boat ramps and marinas.

Visible Mass

As with Alternative 1, Alternative 2 would require scenic offsets, in the form of removing or screening existing visible mass that can be seen from Lake Tahoe, for any new or redeveloped pier, boat lift, boat ramp, or marina that results in a net increase in visible mass. Scenic offset requirements would be greater in shoreline travel units that are not in attainment of threshold standards as follows:

- In shoreline travel units that are not in attainment, the visible mass offset ratio would be 1:1.5; and
- In shoreline travel units that are in attainment, the visible mass offset ratio would be 1:1.

Table 9-3 provides the estimated change in visible mass that would result from buildout of Alternative 2. While the actual visible mass would vary depending on the size and design of proposed shoreline structures, Table 9-3 provides an approximate estimate based on conservative assumptions.

Table 9-3 Change in Visible Mass under Alternative 2

Structure	Typical Visible Mass per Structure (sq. ft.)	Number of Structures	Additional Visible Mass (sq. ft.)	Estimated Required Screening (sq. ft.)[5]	Net Change in Visible Mass (sq. ft.)
Piers[1]	518	476	246,568	308,210	-61,642
Boat Lifts[2]	83	168	13,944	17,430	-3,486
Boat Ramps[3]	323	6	1,938	2,423	-484
Buoys[4]	83	4,871	404,293	0	404,293
Total			666,743	328,063	338,681

Notes:

1 Visible mass of piers based on new pier calculations from pier applications under existing Code (TRPA 2017b),

2 Visible mass of boat lifts based on (TRPA 2017b)

3 Visible mass of new boat ramp based on visible mass drawings of Kings Beach SRA boat ramp and accessory structures (TRPA and State Parks 2018)

4 Visible mass of boats on buoys based on estimates of the average visible mass of boats prepared by TRPA to inform the Shoreline Steering Committee and to support scenic assessment trainings (TRPA 2017b, 2017c), and assumes all buoys would have 5 Required screening assumes 50% of all structures would be placed in travel units that are not in attainment (1:1.5 offset), remainder in units that are in attainment (1:1 offset), based on the percentage of parcels eligible for piers in each unit (see Table 9-1, above)

As shown in Table 9-3, new piers, boat lifts, and boat ramps would add visible mass. However, the visible mass offset requirements would require the removal or screening of other existing visible mass at a 1:1 or greater ratio. Thus, these structures would result in a net decrease in the amount of visible mass along the shoreline or on the surface of Lake Tahoe. New buoys would also contribute visible mass and, as described above, this additional visible mass would not be required to be offset. Under a worst-case-scenario (i.e., assuming every buoy had a boat moored to it), the estimated 4,871 new buoys would contribute an estimated 404,293 square feet of additional visible mass. Even after the net decrease in visible mass required for other structures is considered, Alternative 2 would result in an estimated net increase of approximately 339,000 square feet of visible mass due to new buoys.

Visual Magnitude of the Shoreland

Unlike Alternative 1, Alternative 2 would not require that new shoreline structures achieve minimum contrast ratings. New and redeveloped piers would not be evaluated under the visual magnitude system. New or expanded marinas and boat ramps would continue to be evaluated under the visual magnitude system and would be required to implement scenic improvements required by TRPA Code Section 66.3.

Key View Point 1 - Visually-Modified Character Type in Crystal Bay, Alternative 2

Exhibit 9-17 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 1. The existing elements and their locations are described above under Alternative 1. The simulation shows one additional pier and four existing piers replaced with new individual private piers consistent with the design standards for Alternative 2, and one new boat on a buoy. This is the same level of development shown for Alternative 1, and the design standards for Alternative 2 would result in new individual private piers that appear similar to piers developed under Alternative 1.

Because KVP 1 is within a shoreline travel unit that is not in attainment, any increase in visible mass would be required to be offset at a 1.5:1 ratio. The simulation shows additional vegetative screening in front of the residences that are associated with new piers. The amount of screening is less than shown in the simulation of KVP 1 for Alternative 1, which would require screening at a 2:1 ratio. No new screening is shown in front of buildings associated with redeveloped piers because redevelopment of these piers consistent with the design standards in Alternative 2 would not substantially increase the visible mass of the piers (i.e., the piers could be longer, but compliance with the width and design standards in Alternative 2 would result in narrower and more streamlined designs, assumed to result in no increase in visible mass). Consequently, no visible mass offset would be required. These parcels would also not be required to achieve minimum contrast ratings for a pier redevelopment project, therefore no scenic improvements would be required in the shoreland for these parcels.

Overall, buildings and other development in the shoreland are very similar to the buildings in the existing view, but slightly less visible due to visible mass offsets for new piers that would be required by Alternative 2. The simulation shows one additional pier which, with compliance with design standards proposed in Alternative 2, decreases overall visual prominence. Taken together, the changes shown in the simulation of KVP 1 would maintain the intactness of the view and would not degrade scenic quality.

Key View Point 2 - Visually Modified Character Type Near Lake Forest, Alternative 2

Exhibit 9-18 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 2. The existing elements and their locations are described above under Alternative 1. The simulation shows a similar number of piers as in Alternative 1, because this reflects the maximum number of piers that could be associated with the parcels in the view. Two additional buoys with boats have been added to the left side of the view and two new individual private piers have been added near the center of the view. In addition, two of the existing large piers on the left side of the view are shown as being expanded into multiple-use piers with two boat lifts each, and two of the existing shorter piers on the right side of the view are shown as expanded individual private piers. The two multiple-use piers on the left side of the view are each approximately 30 feet longer than the multiple-use piers shown for Alternative 1 because Alternative 2 would allow multiple-use piers to deviate from pier length limitations. Two new boats on buoys are visible on the right side of the view, and these buoys are closer to the shore than the ones shown under Alterative 1.

Because KVP 2 is within a shoreline travel unit that is not in attainment, any increase in visible mass would be required to be offset at a 1.5:1 ratio. The simulation shows additional vegetative screening in front of the residences associated with new piers. Very little new screening is shown in front of buildings associated with redeveloped piers because redevelopment consistent with Alternative 2 design standards would only slightly increase visible mass, which would require limited offsets. Alternative 2 would not require minimum contrast ratings and no additional scenic improvements would be required in the shoreland for new or redeveloped piers.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-17 Key View 1 - Visually-Modified Character Type in Crystal Bay, Alternative 2

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-18 Key View 2 - Visually Modified Character Type Near Lake Forest, Alternative 2

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Overall, buildings and other development in the shoreland are very similar to the existing view, but slightly less visible due to visible mass offsets that would be required by Alternative 2. The simulation shows two additional piers. With the additional piers and buoys, the overall visual prominence of structures on the lake is greater than in the existing view. This increase is not offset by a reduced visual magnitude of development in the shoreland. The changes shown in the simulation would reduce the intactness of the view, which could contribute to a reduction in the scenic quality rating for travel unit.

Key View Point 3– Visually Sensitive Character Type in Rubicon Bay, Alternative 2

Exhibit 9-19 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 3. The existing elements and their locations are described above under Alternative 1. The simulation shows the replacement of four existing small individual private piers with two larger multiple-use piers containing boat lifts. The two new multiple-use piers are longer than the multiple-use piers in Alternative 1, and a new single-use pier has been added approximately 40 feet from the new multiple-use pier near the center of the view. This reflects the minimum distance between piers required by the Alternative 2 design standards. As with Alternative 1, two new boats on buoys have been added near the left side of the view. However, these buoys are shown closer to shore as would be required by Alternative 2. Alternative 2 would allow floating swim platforms that do not exceed 100 square feet, and a new floating swim platform of approximately 100 square feet is shown on the right side of the view.

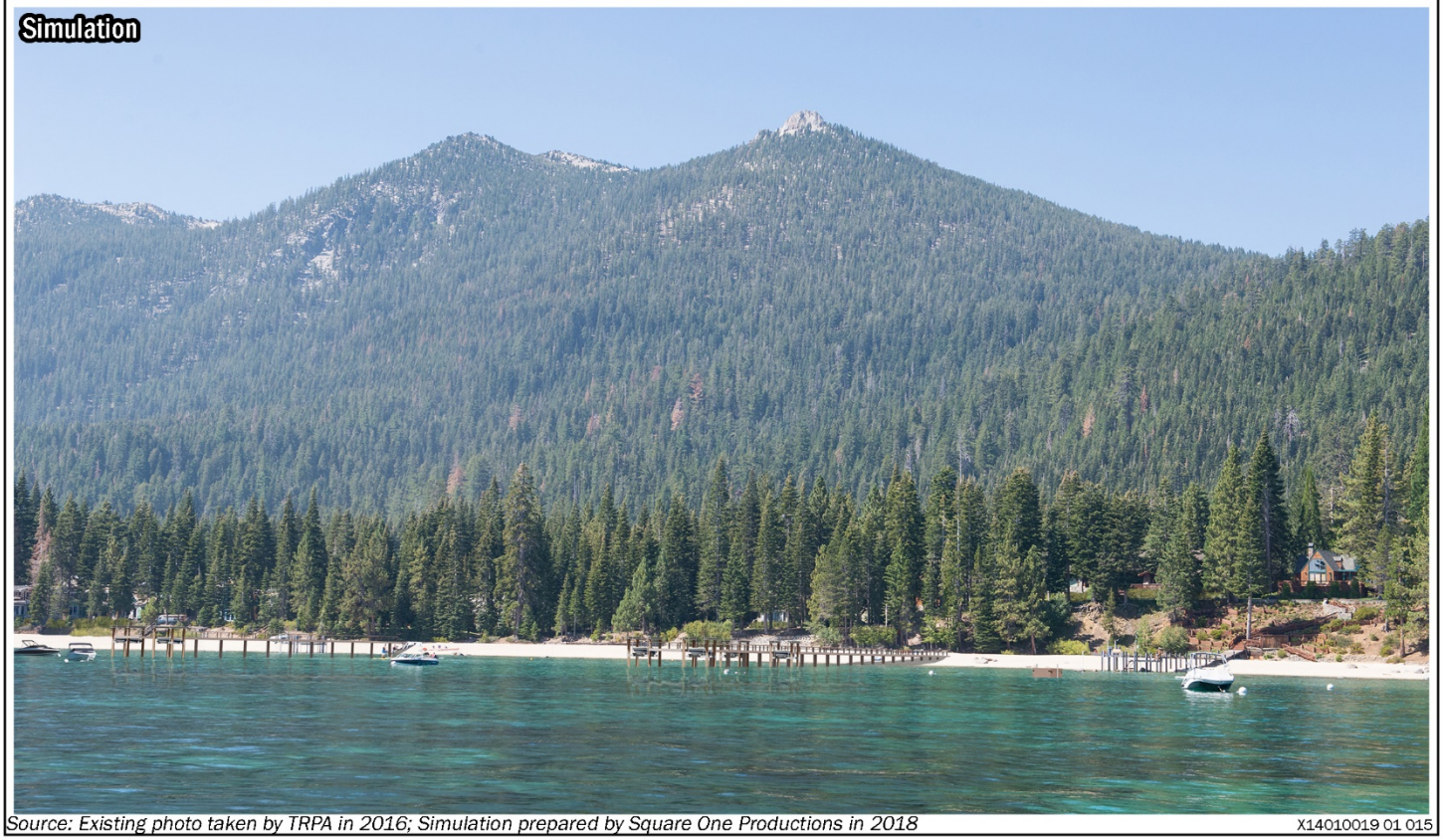
Because KVP 3 shows a travel unit that is not in attainment, the increases in visible mass from the new and redeveloped piers would be required to be offset at a 1.5:1 ratio. To depict this visible mass offset, the small building on the beach in the center right of the existing view is removed, and additional vegetative screening is shown in front of existing residences. The simulation includes less vegetative screening than the simulation of Alternative 1, which would require visible mass offsets at a 3:1 ratio. Alternative 2 would not require minimum contrast ratings and no additional scenic improvements would be required in the shoreland.

The simulation shows the removal of three individual private piers, the expansion of one pier, and the construction of two larger multiple-use piers serving a combined eight littoral parcels, some of which would be outside of the view. The additional length and visible mass of the new and expanded piers makes those piers more visually prominent than the existing piers. These larger piers, as well as the new buoys, reduce the intactness of this view. In the simulation, the buildings in the shoreland are very similar to the buildings in the existing view, but slightly less visible due to visible mass offsets that would be required by Alternative 2. These visible mass offsets do not compensate for the visual effects of the piers, boat lifts, and buoys in this view. Overall, the intactness of the view is reduced, which could contribute to a reduction in the scenic quality ratings for this travel unit.

Key View Point 4 – Visually Modified Character Type Near Cave Rock, Alternative 2

Exhibit 9-20 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 4. The existing elements and their locations are described above under Alternative 1. In the simulation, a new individual private pier and a new multiple-use pier are added and all three of the existing piers are shown being expanded to the maximum allowable length. Two new boat lifts and an additional boat on a buoy are also shown in the simulation.

Because KVP 4 shows a travel unit that is not in attainment, the increases in visible mass from the new and redeveloped piers would be required to be offset at a 1.5:1 ratio. Additional vegetative screening has been added and a small structure near the base of the pier on the left side of the view has been removed to reflect the visible mass offsets required by Alternative 2. The simulation includes less vegetative screening than the simulation of Alternative 1, which would require visible mass offsets at a 2:1 ratio. As described above, Alternative 2 would not require minimum contrast ratings and no additional scenic improvements would be required in the shoreland.



Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-19 Key View 3 – Visually Sensitive Character Type in Rubicon Bay, Alternative 2

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-20 Key View 4 – Visually Modified Character Type Near Cave Rock, Alternative 2

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The simulation shows the expansion of three piers, and the construction of two new piers including a multiple-use pier serving two littoral parcels (one of which is outside of the view). The contrasting color, additional length, and visible mass of the new and expanded piers makes those piers more visually prominent than of the existing piers, even with the removal of existing rock crib piers. In the simulation, the buildings in the shoreland are very similar to the buildings in the existing view, but slightly less visible due to visible mass offsets that would be required by Alternative 2. These visible mass offsets do not compensate for the visual effects of the piers, boat lifts, and buoys in this view. Overall, the intactness of the view is reduced, which could contribute to a reduction in the scenic quality ratings for this travel unit.

Conclusion

Alternative 2 would authorize new shorezone structures that could affect views from Lake Tahoe toward the shore. New and redeveloped structures would be required to comply with applicable design standards addressing location, length, and width. All piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in the amount of visible mass, although with less of a decrease in visible mass than under Alternative 1. In addition, new or expanded marinas or boat ramps would be evaluated under the visual magnitude system in TRPA Code Section 66.3.

New piers and buoys would not be required to implement scenic improvements through the visual magnitude system. The over 400,000 square feet of visible mass associated with buoys would not be subject to visible mass offset requirements. Even after considering the reduction in visible mass associated with other structures, this would result in an estimated net increase in visible mass of over 338,000 square feet.

The effects of buildout of Alternative 2 would vary based on the location, intensity, and other characteristics of future projects. In some situations, scenic quality could be unchanged and in other situations the unity and/or intactness of views could be degraded, which would reduce the scenic threshold ratings. Under Alternative 2, scenic threshold ratings could decline be due to additional visible mass associated with new buoys, and piers colors that contrast with the background when viewed from the lake. The additional visual prominence of piers in the shorezone would not be compensated for with reductions in the visual magnitude of shoreland development. This would be a **significant** impact.

Alternative 3: Limit New Development

Alternative 3 would focus new shorezone structures at public facilities to maximize the number of people served by each new structure. Alternative 3 would authorize up to 365 new public buoys or slips, five new public piers, 86 new private multiple-use piers, and one new boat ramp. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, “Description of the Proposed Project and Alternatives.”

Piers

Alternative 3 would limit new private piers to multiple-use piers serving two or more littoral parcels. It would not distribute new piers to individual jurisdictions to prevent dense clusters of new piers along any portion of the shoreline or limit the number of new piers within visually sensitive character types. However, Alternative 3 would limit the density of piers to an average of no more than one pier per 100 linear feet of shoreline in visually modified and visually dominated character types, and an average of no more than one pier per 300 feet in visually sensitive character types. This would have a similar effect as the pier distribution provisions in Alternative 1. As with Alternative 1, new piers would not be allowed within Stream Mouth Protection Areas or Shoreline Preservation Areas. Each new or redeveloped pier would be required to comply with design standards that address the pier length, width, setbacks, location, and visible mass (see Table 2-8 in Chapter 2, “Description of the Proposed Project and Alternatives”).

Moorings

Alternative 3 would prohibit new private moorings (buoys, boat lifts, and slips). Up to 365 new public slips or buoy could be added at marinas or other public facilities.

Public Facilities and Marinas

Alternative 3 would allow for five new public piers, one new public boat ramp, and would allow existing marinas to expand and add up to 365 new buoys or slips. The new public piers could deviate from the design standards described above to the extent necessary to serve their public purpose. Public piers that deviate from standards would be evaluated on a case-by-case basis, and mitigation would be required where necessary to avoid significant effects on scenic quality. Any new or expanded public piers would be required to comply with the same visible mass offsets as Alternative 1.

The new boat ramp would be required to comply with the same visible mass offsets as piers and result in a net decrease in the amount of mass of human-made structures visible from the lake. The location and characteristics of the possible new public boat ramp cannot be known at this time. If, and when a new public boat ramp is proposed, it would be required to undergo an environmental review and scenic assessment including an evaluation of the visual magnitude of the project area as required by TRPA Code Section 66.3. As documented in the 2015 Threshold Evaluation Report, the visual magnitude requirements of the TRPA Code have resulted in improved scenic conditions along the shoreline (TRPA 2016). Compliance with these requirements would prevent scenic degradation from public boat ramps and marinas.

Visible Mass

Alternative 3 would require the same visible mass offsets as Alternative 1. Table 9-4 provides the estimated change in visible mass that would result from buildout of Alternative 3. While the actual visible mass would vary depending on the size and design of proposed shoreline structures, Table 9-4 provides an approximate estimate based on conservative assumptions.

Table 9-4 Change in Visible Mass under Alternative 3

Structure	Typical Visible Mass per Structure (sq. ft.)	Number of Structures	Additional Visible Mass (sq. ft.)	Estimated Required Screening (sq. ft.)[6]	Net Change in Visible Mass (sq. ft.)
Private Multiple-Use Piers[1]	520	86	44,720	96,200	-51,480
Public Piers[2]	1,400	5	7,000	15,400	-8,400
Boat Lifts[3]	83	30	2,490	5,395	-2,905
Boat Ramps[4]	323	1	323	646	-323
Buoys[5]	83	300	24,900	0	24,900
Total			79,433	117,641	**-38,208**

Notes:

1 Visible mass of private piers reflects maximum allowable for single-use piers and multiple use piers serving four or more littoral parcel owners

2 Visible mass of public piers based on visible mass calculations for proposed Kings Beach pier rebuild EIR/EIS (TRPA and State Parks 2018)

3 Visible mass of boat lifts based on (TRPA 2017b)

4 Visible mass of new boat ramp based on visible mass drawings of Kings Beach SRA boat ramp and accessory structures (TRPA and State Parks 2018)

5 Visible mass of boats on buoys based on estimates of the average visible mass of boats prepared by TRPA to inform the Shoreline Steering Committee and to support scenic assessment trainings (TRPA 2017b, 2017c), and assumes all buoys would have boats6 Required screening assumes 13 private multi-use piers, 1 public pier, and 5 boat lifts would be placed in visually sensitive character types (1:3 offset), remainder in visually modified (1:2 offset), based on proposed limits on structures within visually sensitive areas

As shown in Table 9-4, new piers, boat lifts, and boat ramps would add visible mass. However, the visible mass offset requirements would require the removal or screening of other existing visible mass at ratios that result in a net decrease in visible mass. New buoys would also contribute visible mass and, as described above, this additional visible mass would not be required to be offset. Under a worst-case-scenario (i.e., assuming every buoy had a boat moored to it), the estimated 300 new buoys would contribute an estimated 24,900 square feet of additional visible mass. After the net decrease in visible mass required for other structures is considered, Alternative 3 would result in an estimated net decrease of approximately 38,000 square feet of visible mass.

Visual Magnitude of the Shoreland

As with Alternative 1, Alternative 3 would require that parcels with new or expanded piers achieve minimum contrast ratings. Alternative 3 would require a minimum contrast rating of 25, which is the same contrast rating required under Alternative 1. However, Alternative 3 would require that the minimum contrast rating be achieved prior to submission of an application for a new or expanded pier. This requirement could result in more rapid scenic improvements than Alternative 1, but it could also serve as a disincentive for scenic improvements because parcels that do not meet the contrast rating may not make improvements without certainty that their pier application would be approved.

Key View Point 1– Visually Modified Character Type in Crystal Bay, Alternative 3

Exhibit 9-21 shows the existing view and a simulation of buildout of Alternative 3 as seen from KVP 1. The existing elements and their locations are described above under Alternative 1. The simulation shows the expansion of three existing piers consistent with the design standards for Alternative 2, including an individual private pier replaced with a multiple-use pier. This is less development than shown for Alternative 1 in KVP 1 because Alternative 3 would authorize fewer piers and no new private buoys. The design standards for Alternative 3 would result in new individual private piers that appear similar to piers developed under Alternative 1, except that piers would be narrower overall but with a wider pierhead and railings would be present on multiple-use piers.

Because KVP 1 is within a visually modified character type, any increase in visible mass would be required to be offset at a 2:1 ratio. The simulation shows additional vegetative screening in front of the residences that are associated with new piers or expanded piers, similar to the simulation of Alternative 1. These parcels would also be required to achieve minimum contrast ratings for a pier redevelopment project, and the simulation shows the existing buildings in a darker color, which could be necessary to achieve the required minimum contrast ratings.

Overall, buildings and other development in the shoreland are less prominent than in the existing view, due to visible mass offsets and minimum contrast ratings required for new and expanded piers. The simulation shows the expansion of an existing individual private pier into a multiple-use pier serving two littoral parcels. With this change, the overall visual prominence of piers is decreased due to compliance with the design standards proposed in Alternative 3. Taken together, the changes shown in the simulation of KVP 1 would improve the intactness and unity of the view, which could contribute to an improvement in the scenic quality rating for this travel unit.

Key View Point 2– Visually Modified Character Type Near Lake Forest, Alternative 3

Exhibit 9-22 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 2. The existing elements and their locations are described above under Alternative 1.

One new multiple-use pier has been added near the center right of the view. In addition, two of the existing large piers on the left side of the view are shown as being expanded into multiple-use piers with two boat lifts each, and two of the existing shorter piers on the right side of the view are shown as expanded individual private piers. The multiple-use piers are slightly shorter than the multiple-use piers shown for Alternative 2, consistent with the length standards proposed in Alternative 3. No new buoys are shown because Alternative 3 would not authorize new private moorings.

Because KVP 2 is within a visually modified character type, any increase in visible mass would be required to be offset at a 2:1 ratio. The simulation shows additional vegetative screening in front of the residences that are associated with new or expanded piers. The amount of screening is similar to the amount shown in the simulation of KVP 2 for Alternative 1. To reflect the contrast ratings for shoreland development required for new pier or pier redevelopment projects, several structures are shown in a darker color.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-21 Key View 1 – Visually Modified Character Type in Crystal Bay, Alternative 3

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-22 Key View 2 – Visually Modified Character Type Near Lake Forest, Alternative 3

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Overall, buildings and other development in the shoreland are less visible than in the existing view, which improves the intactness of the view due to visible mass offsets and contrast ratings that would be required. The simulation shows one additional multiple-use pier, which would serve two littoral parcels. With the new and expanded piers, the overall visual prominence of structures on the lake is greater than in the existing view, which reduces the intactness of the view. When viewed together, the increase in intactness in the shoreland offsets the decrease in intactness from the additional visible mass of piers. The scenic quality of the view is not substantially changed and would not reduce the scenic quality rating for this travel unit.

Key View Point 3 – Visually Sensitive Character Type in Rubicon Bay, Alternative 3

Exhibit 9-23 shows the existing view and a simulation of buildout of Alternative 3 as seen from KVP 3. The existing elements and their locations are described above under Alternative 1. The simulation shows the replacement of five existing small individual private piers with two larger multiple-use piers. The two new multiple-use piers are similar to the multiple-use piers in Alternative 1, but they do not include new boat lifts and one includes railings as could be allowed under Alternative 3. The piers are placed approximately 300 feet apart, which is the minimum average distance between piers required within visually sensitive character types under Alternative 3. No new buoys have been added, but an approximately 100 square foot swim platform has been added to the right side of the view.

Because KVP shows a visually sensitive character type, the increases in visible mass from the redeveloped piers would be required to be offset at a 3:1 ratio. To depict this visible mass offset, the small building on the beach in the center right of the existing view is removed, and additional vegetative screening is shown in front of existing residences. To reflect the minimum contrast ratings required under Alternative 3, the light-colored existing buildings are shown in a darker color.

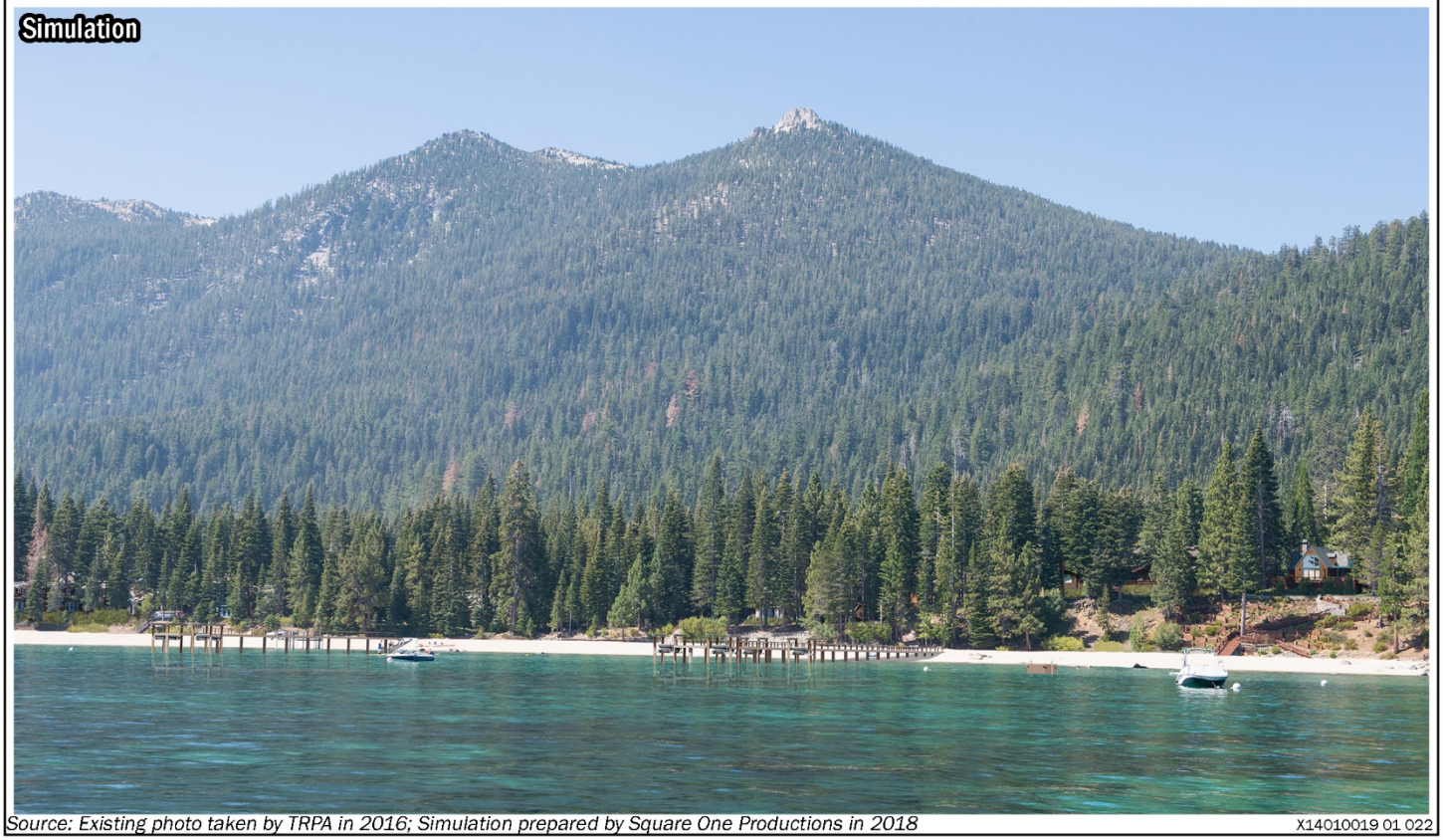
The simulation shows the removal of four individual private piers and the construction of two larger multiple-use piers serving a combined seven littoral parcels, some of which would be outside of the view. The additional length and visible mass of the new piers makes those piers more visually prominent than the existing piers. These larger piers slightly reduce the intactness of this view. This is partially offset by the decreased visual clutter that results from consolidating multiple smaller structures into fewer larger structures. In the simulation, the buildings in the shoreland are less visible than the buildings in the existing view, due to visible mass offsets and contrast ratings that would be required by Alternative 3. Overall, the intactness of the view is similar to the existing view, and the changes would not reduce the scenic quality ratings for this shoreline travel unit.

Key View Point 4 – Visually Modified Character Type Near Cave Rock, Alternative 3

Exhibit 9-24 shows the existing view and a simulation of buildout of Alternative 3 as seen from KVP 4. The existing elements and their locations are described above under Alternative 1. In the simulation, a new multiple-use pier is added and all three of the existing piers are expanded to the maximum allowable length. No new boat lifts or buoys are shown in the simulation.

Because KVP 4 shows a visually modified character type, the increases in visible mass from the new and redeveloped piers would be required to be offset at a 2:1 ratio. Additional vegetative screening has been added and a small structure near the base of the pier on the left side of the view has been removed to reflect the visible mass offsets required by Alternative 3. To reflect the minimum contrast ratings required under Alternative 3, the light-colored existing buildings are shown in a darker color.

The simulation shows the expansion of three piers and construction of a new multiple-use pier serving two littoral parcels (one of which is outside of the view). The contrasting color, additional length, and visible mass of the new and expanded piers makes those piers more visually prominent than of the existing piers, even with the removal of existing rock crib piers. In the simulation, the buildings in the shoreland are slightly less visible due to visible mass offsets that would be required by Alternative 2. These visible mass offsets do not compensate for the visual effects of the piers, boat lifts, and buoys in this view. Overall, the intactness of the view is reduced, which could contribute to a reduction in the scenic quality ratings for this travel unit.



Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-23 Key View 3 – Visually Sensitive Character Type in Rubicon Bay, Alternative 3

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-24 Key View 4 – Visually Modified Character Type Near Cave Rock, Alternative 3

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Conclusion

As described above, Alternative 3 would authorize new shorezone structures that could affect views from Lake Tahoe toward the shore. New and redeveloped structures would be required to comply with applicable design standards addressing the location, length, width, orientation, and maximum visible mass. The visible mass of piers would be restricted, and all piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in the amount of visible mass that can be seen from Lake Tahoe. In addition, these structures would be evaluated under the visual magnitude system in TRPA Code Section 66.3. New or expanded structures would require scenic improvements in the shoreland to achieve minimum required contrast ratings.

New buoys would be restricted to marinas or other public facilities. The visible mass associated with buoys would not be offset, and projects adding buoys would not be required to implement scenic improvements through the visual magnitude system.

The effects of buildout of Alternative 3 would vary based on the location, intensity, and other characteristics of future projects. In some situations, the intactness of views would be improved, and the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with proposed design standards. In other situations, scenic quality could be unchanged, or the unity and/or intactness of views could be degraded, which would reduce the scenic threshold ratings. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys, and/or new or redeveloped piers that are a color that contrasts with the background view. Because new visible mass of buoys and contrasting piers could degrade scenic threshold ratings, this would be a **significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would prohibit new private shoreline structures, except where they result in a net reduction in the number of structures. It would allow for up to 15 new public piers and no other new shorezone structures.

Piers

New public piers would be subject to the same requirements as under Alternative 1, which allows public piers to deviate from design standards to the extent necessary to provide a public service. No new private piers would be allowed. Modifications of existing piers would only be allowed if the modification reduced the visible mass of the pier. No expansions of existing piers would be allowed.

Public Facilities and Marinas

Alternative 5 would allow no additional public facilities beyond the 15 new public piers. Marinas would not be allowed to expand, and a new public boat ramp could only be constructed if two existing boat ramps were removed. Public piers that deviate from standards would be evaluated on a case-by-case basis, and mitigation would be required where necessary to avoid significant effects on scenic quality. Any new or expanded public piers would be required to comply with the same visible mass offsets as Alternative 1. If existing marinas or public boat ramps were reconfigured, they would undergo an environment review and scenic assessment including an evaluation of the visual magnitude of the project area as required by TRPA Code Section 66.3. As documented in the 2015 Threshold Evaluation Report, the visual magnitude requirements of the TRPA Code have resulted in improved scenic conditions along the shoreline (TRPA 2016). Compliance with these requirements would prevent scenic degradation from public boat ramps and marinas.

Visible Mass

Alternative 4 would require the same visible mass offsets as Alternative 1. Table 9-5 provides the estimated change in visible mass that would result from buildout of Alternative 5. While the actual visible mass would vary depending on the size and design of proposed shoreline structures, Table 9-5 provides an approximate estimate based on conservative assumptions.

Table 9-5 Change in Visible Mass under Alternative 4

Structure	Typical Visible Mass per Structure (sq. ft.)	Number of Structures	Additional Visible Mass (sq. ft.)	Estimated Required Screening (sq. ft.)[2]	Net Change in Visible Mass (sq. ft.)
Public Piers[1]	1,400	15	21,000	45,500	**-24,500**

Notes:

[1] Visible mass of public piers based on visible mass calculations for proposed Kings Beach pier rebuild EIR/EIS (TRPA and State Parks 2018)

[2] Required screening assumes 5 public piers would be placed in visually sensitive character types (3:1 offset), 5 would be placed in visually modified (2:1 offset), and 5 would be placed in visually dominated (1.5:1 offset).

Conclusion

Alternative 4 would authorize up to 15 new public piers and no other new shorezone structures. The public piers would comply with visible mass offsets that result in a net reduction in the visible mass that can be seen from Lake Tahoe. In addition, each proposed public pier would be evaluated through a project-level scenic assessment that would evaluate the project's effect on potentially affected scenic travel units and resources. No other new or expanded shoreline structures would be allowed, and pier reconfigurations would only be allowed if they reduce the visible mass of the existing pier. For these reasons, Alternative 4 would have very little effect on the scenic quality of views from Lake Tahoe toward the shore, and it is not necessary to evaluate Alternative 4 with visual simulations. Due to the project-level assessment and mitigation of scenic effects of public piers, and the prohibition on other new or expanded shoreline structures, Alternative 4 would have a **less-than-significant** effect on scenic quality of views from Lake Tahoe.

Mitigation 9-1a: Offset the visible mass of buoys

This mitigation measure applies to Alternatives 1, 2, and 3

TRPA will require that all new buoys offset the visible mass associated with the buoy and boat. The average visible mass of a buoy and boat is estimated at 83 square feet. Each new buoy will require removal or screening of a minimum of 83 square feet of existing mass visible from Lake Tahoe. The visible mass of a buoy can be offset through the direct reduction of visible mass or through the payment of an in-lieu fee used to reduce visible mass, as described below.

If a buoy applicant chooses to directly remove or screen visible mass as part of the buoy project, then the applicant would comply with the same visible mass offset requirements that apply to piers and other structures. The 83 square feet of visible mass associated with the buoy would be offset at the same ratios required for other shoreline structures. The offset would be required as close to the proposed buoy as possible, in the following order of priority: 1) on the same parcel in the shorezone, 2) on the same parcel in the upland area, 3) elsewhere in the shorezone within the same shoreline scenic travel unit, 4) within the same travel unit in the upland, and 5) in another nonattainment scenic travel unit.

TRPA will also provide the option to pay an in-lieu fee to offset the additional visible mass of the buoy. TRPA will set a fee amount that is adequate to remove or visually screen 83 square feet of existing visible mass. TRPA will use the fee to acquire and remove or screen existing visible mass visible from shoreline scenic travel units that are not in attainment of threshold standards. The funds will be dedicated to projects that TRPA determines will have the greatest benefit to scenic threshold standards and will be prioritized for use in the following order: 1) in the shorezone, 2) in the shoreland, and 3) to improve background views visible from Lake Tahoe. Funds could be used to implement projects directly or through grants, contracts, or other agreements with partner organizations. TRPA could also authorize mitigation funds for projects that permanently reduce the visual magnitude of shoreland development when the project contributes to the attainment of scenic thresholds and is not otherwise required. Visible mass mitigation projects that could be funded by the in-lieu fee include, but are not limited to:

- scenic improvement projects identified in the 2018 update to the SQIP;
- lakefront recreation projects with scenic improvements such as replacing dilapidated structures or relocating structures (public gathering areas and waterfront public access scenic improvements);

- scenic improvement of existing rip rap and retaining walls along visible roadway cuts (e.g., recoloring of light-colored rip rap);
- permanent removal of existing shorezone and shoreland structures;
- permanent screening of roadside parking areas, roadways, and infrastructure through the planting of native vegetation and creation of vegetated berms;
- undergrounding of utility lines that are visible from the lake; and
- improving existing shoreland structures and deed restricting those parcels such that visual magnitude of existing development is permanently reduced.

Mitigation 9-1b: Establish color standards for piers

This mitigation measure applies to Alternatives 1, 2, and 3

TRPA will modify the proposed design standards to regulate the color of piers. These standards will be enforced for all new or expanded piers. The standards will require that piers be a matte medium to dark gray. The standards will also allow TRPA to require alternate colors that TRPA determines would better blend into the background view of the project site.

Mitigation 9-1c: Require visual magnitude reductions in the shoreland

This mitigation measure applies to Alternative 2

TRPA will revise the TRPA Code under Alternative 2 to incorporate the same visual magnitude requirements for new or expanded shoreline structures as included in Alternative 1. These Code revisions will require that shoreland properties achieve minimum contrast ratings as part of the approval process for new piers. For new private piers, TRPA would require an initial contrast rating of 21 as part of the pier application. Following permit application submittal, applicants would have 6 months to increase their contrast rating to 25 to offset the visual impact of new or redeveloped piers. TRPA would exempt property owners from the contrast rating of 25, if it is not feasible.

Significance after Mitigation

Mitigation Measure 9-1a would require the removal or visual screening of existing visible mass to offset the additional visible mass that could result from new buoys. These offsets would occur near the project site or in scenic travel units that are not in attainment. With implementation of this mitigation measure, all alternatives would result in a net reduction the mass of human-made structures visible from Lake Tahoe. Mitigation Measure 9-1b would require that piers be a color that does not contrast with the background view of the project site. This requirement, in combination with the other design standards, visible mass offsets, scenic improvements required to attain required contrast ratings, and project-level scenic analysis requirements would substantially reduce the potential for new piers to degrade scenic threshold ratings. Mitigation measure 9-1c would require that Alternative 2 include the same minimum contrast ratings for new or expanded piers as required under Alternative 1. As shown above, implementation of these minimum contrast ratings requirements would reduce the visual magnitude of development in the shoreland and compensate for new visible structures in the shorezone. After implementation of the required mitigation measures, all alternatives would reduce visible mass and prevent new structures from degrading scenic travel unit ratings. Therefore, the impact would be **less than significant** after mitigation.

Impact 9-2: Alter views of Lake Tahoe from the shore

The scenic effects on views from the shore would vary based on the location, intensity, and other characteristics of future projects. In some scenarios under Alternatives 1 and 3, the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with design standards. In other scenarios under Alternatives 1, 2, and 3, scenic quality would not substantially change, or the scenic threshold ratings could be reduced. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys, and in the case of Alternative 2, because no reductions in the visual magnitude of the shoreland would be required to compensate for additional development in the shorezone. This would be a **significant** impact for Alternatives 1, 2, and 3.

Due to the limited number of new shorezone structures that could be developed under Alternative 4, the project-level scenic assessment and mitigation requirements for public piers, and the prohibition of other new or expanded shoreline structures, Alternative 4 would have a **less-than-significant** impact on views from the shore.

The mitigation measures would require offsets for new visible mass associated with buoys, would regulate the color of piers to prohibit contrasting piers, and in the case of Alternative 2, would require that minimum contrast ratings be achieved for parcels with new or expanded piers. These mitigation measures would reduce the impact to a **less-than-significant** level for Alternatives 1, 2, and 3.

Views of Lake Tahoe are an important element that affects the scenic quality of roadways, recreation areas, and other public gathering spots. Views of Lake Tahoe are one of the six criteria considered in determining scenic quality ratings for road travel units. Similarly, views of Lake Tahoe are considered in determining the scenic quality ratings for roadway scenic resources, public recreation areas, and bicycle trails. Shoreline structures that are visible from the shore can detract from the unity or intactness of views and degrade scenic quality ratings.

As described under Impact 9-1, above, the visual effects of the alternatives would not occur uniformly or consistently around the shoreline. The alternatives would have the greatest potential to degrade scenic views of Lake Tahoe in areas where scenic vistas of Lake Tahoe are visible from roads or other public areas, and where those vistas could include a substantial number of new shoreline structures. Three KVPs were selected that include TRPA-designated scenic resources within roadway travel units with existing vistas of Lake Tahoe in areas where new shoreline structures could be added. Exhibit 9-25 shows the location of these three KVPs, along with the threshold attainment status of roadway travel units.

Alternative 1: Shoreline Plan

Alternative 1 would allow for up to 138 new piers (10 public and 128 private), two public boat ramps, and 2,116 new moorings, which would include a combination of buoys, boat lifts, and slips. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, “Description of the Proposed Project and Alternatives.”

The visual effects of buildout of Alternative 1 is shown in simulations of KVPs 5–7. Each of these simulations shows a buildout scenario for Alternative 1 as viewed from a Scenic Resource on the shore. New structures are shown consistent with the design standards proposed in Alternative 1, and visible changes to achieve required contrast ratings and visible mass offsets are simulated where those changes would be visible.

Key Viewpoint 5 - Near SR 28 Facing East Across Agate Bay, Alternative 1

Exhibit 9-26 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP5. KVP 5 shows the view from TRPA-designated Scenic Resource 20-9, located within the Tahoe Vista Roadway Travel Unit, which is not in attainment of scenic threshold standards. The viewpoint is located along SR 28 near the intersection with Stag Drive. The view is facing east with expansive views across Agate Bay. The KVP shows a

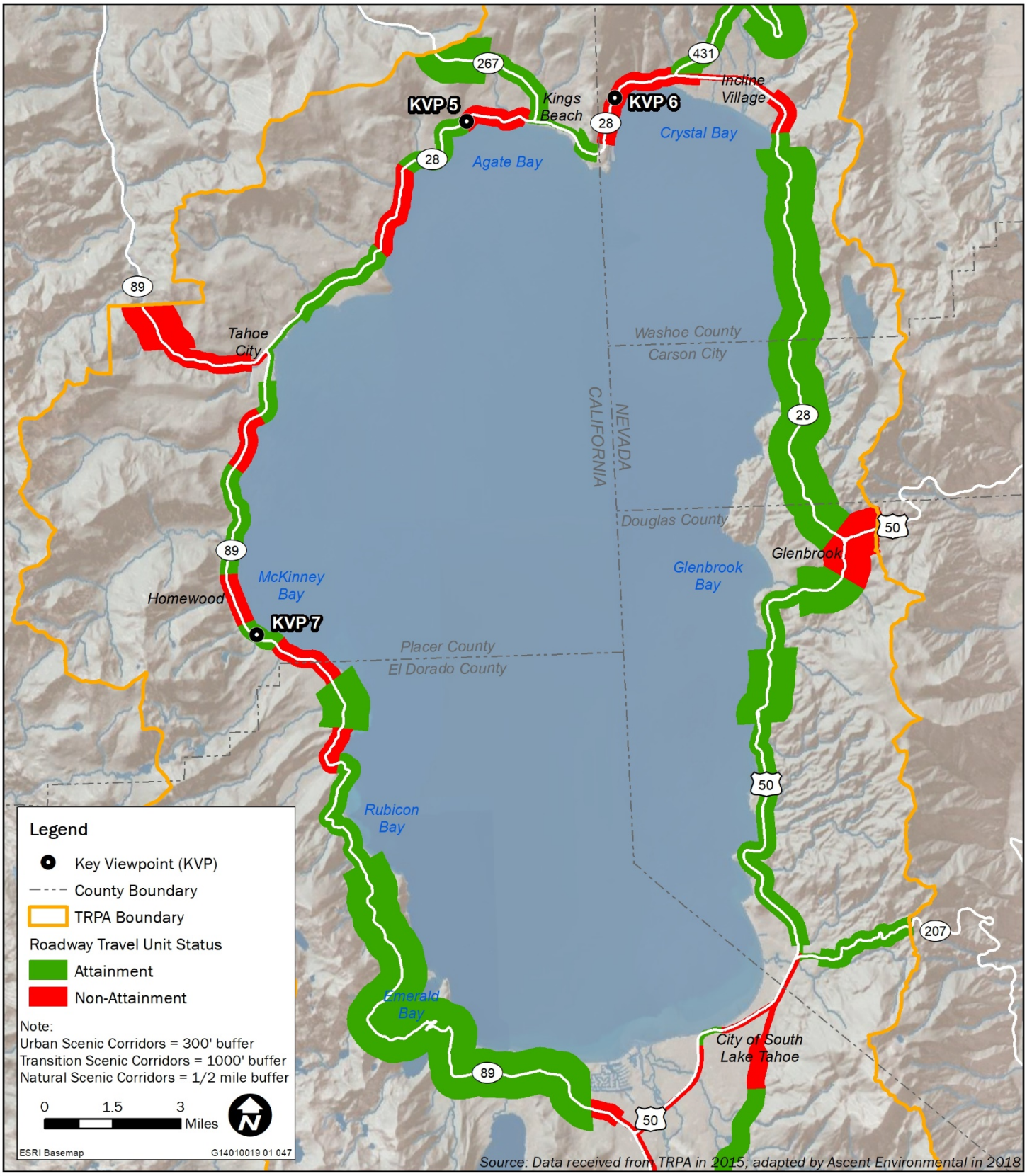

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Exhibit 9-25 Roadway Travel Units Key View Points

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-26 Key View 5 – Near SR 28 Facing East Across Agate Bay, Alternative 1

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visually sensitive shoreline character type on the left side of the view associated with the sandy beaches in front of Tahoe Vista. The shoreline transitions into a visually modified character type in the distance. A point that includes North Tahoe Marina is visible in the background near the center of the view, and Stateline Point is visible in the far background of the view.

Existing View

In the existing view, over 20 boats on buoys are visible in the foreground and middleground. These include a mix of buoys associated with private littoral parcels and buoys within small buoy fields. On the left side of the existing view, four piers are visible ranging from 180 to 290 feet in length. Several large buildings are visible in the shoreland above the sandy beach. In the background of the right side of the view a breakwater and large buoy field associated with the North Tahoe Marina are barely visible.

Simulation

In the simulation, three additional piers and 10 boats on buoys have been added to the foreground and middleground of the view. Because the view contains a visually sensitive character type, only multiple-use piers would be allowed, and any increase in visible mass from a new or expanded pier would be offset at a 3:1 ratio. In addition, any project area adding or expanding a pier would be required to achieve a minimum contrast rating of 25. The three additional multiple-use piers and ten additional buoys represents a realistic build-out scenario for this view based on the number of parcels potentially eligible for piers and the requirement that multiple-use piers serve more than one littoral parcel.

One new pier of approximately 180 feet in length is visible in front of the existing piers. The other two piers are farther away along the sandy beach but are barely visible due to the distance and intervening existing piers. The existing buildings in the shoreland are shown in a darker color with additional vegetative screening as would be necessary to meet the contrast rating and visible mass offset requirements for the new piers. Seven new boats on buoys are visible in the foreground center left of the view. These boats are arranged in a grid pattern consistent with the design standards for a buoy field. Three additional new boats are visible in the center of the view and are not in a grid pattern to represent new buoys associated with individual littoral parcels.

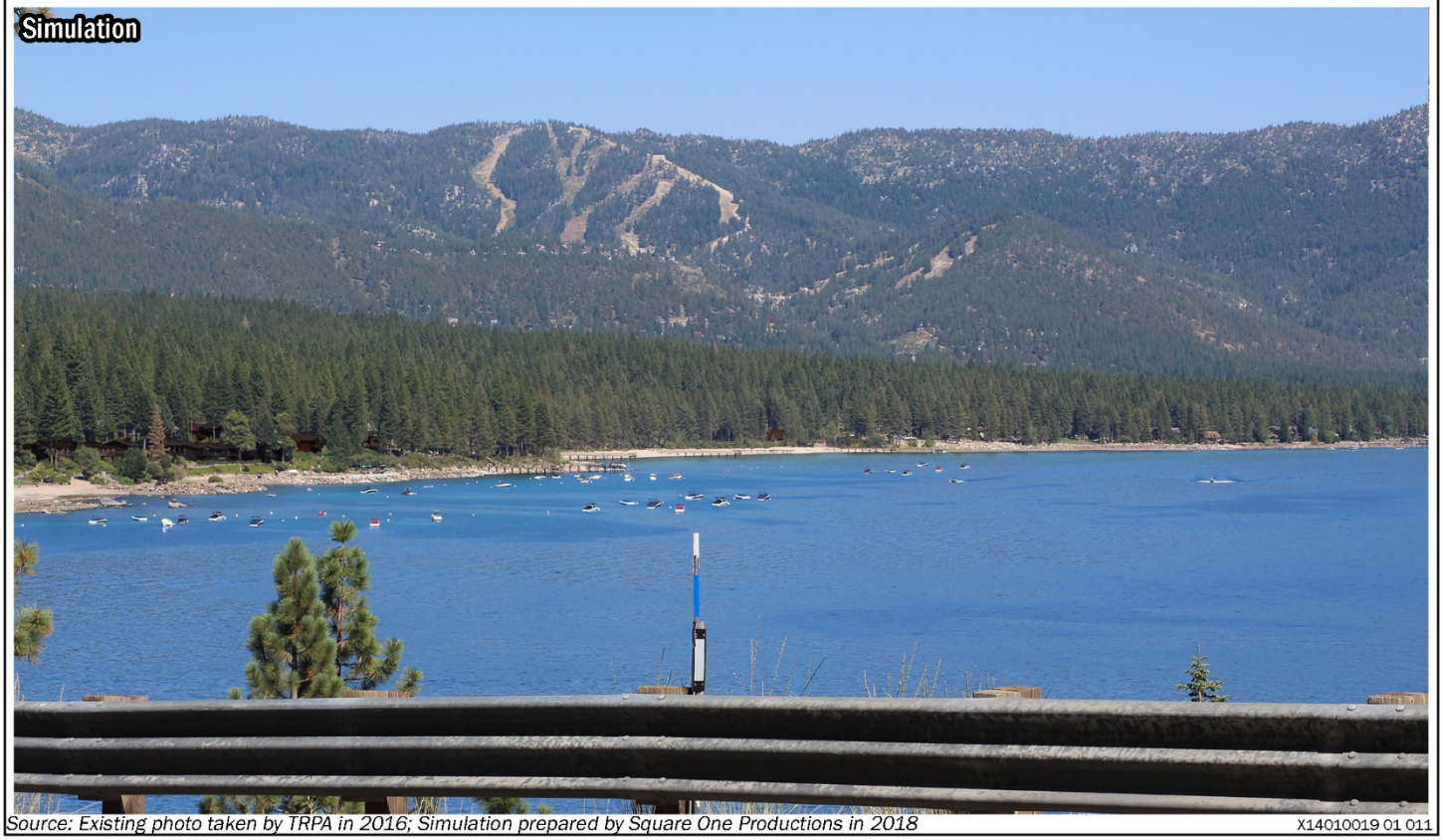
The scenic quality of the sandy beach is slightly improved. One of the new piers is clearly visible but does not substantially reduce the intactness of the view of the beach because it is consistent with the existing partially-developed character of the shoreline in this area and is more than offset by the required scenic improvements in the shoreland. The additional boats on buoys are visually similar to the existing boats in the view. However, the additional visible mass associated with these boats detracts from views of the surface of the lake and reduces the intactness of this view. This could reduce the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Key Viewpoint 6 - Along SR 28 Facing East Across Carnelian Bay, Alternative 1

Exhibit 9-27 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP6. KVP 6 shows the view from TRPA-designated Scenic Resource 21-1, located within the North Stateline Roadway Travel Unit, which is not in attainment of scenic threshold standards. The viewpoint is located along SR 28 north of the intersection with Gonowabie Road. The view is facing east with expansive views across Carnelian Bay. The KVP shows a visually sensitive shoreline character type.

Existing View

In the existing view, two separate buoy fields and several buoys outside of buoy fields are visible in the left half of the view. On the far-left side of the existing view, boulder breakwaters associated with two private harbors are visible. One existing pier is visible near a small point in the center left of the view, and another pier is barely visible along the sandy beach in the center right of the view. Several large buildings are visible on the left side of the view and several smaller residences are visible in the shoreland in the center and right side of the view. Some of the buildings are very prominent due to their contrasting colors.



Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-27 Key View 6 – Along SR 28 Facing East Across Carnelian Bay, Alternative 1

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Simulation

In the simulation, four additional multiple-use piers and 15 boats on buoys have been added to the view. One new pier of approximately 145 feet in length is visible in front of the existing pier on the left side of the view. The other three new piers are visible along the sandy beach near the center of the view. The existing buildings in the shoreland are shown in a darker color with additional vegetative screening as would be necessary to meet the contrast rating and visible mass offset requirements for the new piers. The 15 new buoys are visible near the center of the view. These buoys are shown approximately 600 feet from shore as would be allowed under Alternative 1.

The new piers are visible but are more than offset by the required scenic improvements in the shoreland. The additional visible mass associated with the new buoys detracts from views of the surface of the lake and reduces the intactness of this view. However, the reduced visible mass and visual magnitude of the buildings in the shoreland substantially improves the unity and intactness of the view. Overall, the unity and intactness of the view is improved, which could increase the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Key Viewpoint 7 - Along SR 89 Facing South Across McKinney Bay, Alternative 1

Exhibit 9-28 shows the existing view and a simulation of buildout of Alternative 1 as seen from KVP7. KVP 7 shows the view from TRPA-designated Scenic Resource 10,11-2, located within the Homewood Roadway Travel Unit, which is in attainment of scenic threshold standards. The viewpoint is located along SR 89 near the intersection with Meadow Road. The view is facing southeast with views across the southern portion of McKinney Bay. The KVP shows a visually modified shoreline character type.

Existing View

In the existing view, numerous boats are visible on the left side of the view, including boats within and outside of buoy fields. Five piers ranging from approximately 100 to 150 feet in length are visible along the shoreline, including two piers with enclosed boat houses.

Simulation

In the simulation, four additional individual private piers and seven boats on buoys have been added to the view. The new piers are visible between the existing piers and the new boats are visible in the middleground of the left side of the view. No existing buildings in the shoreland are visible in the view, and the required visible mass offsets and visual magnitude reductions that would be required for the new piers are not shown.

The new piers are visible but do not substantially reduce the intactness of the view because they are consistent with the developed character of the view and they comply with design standards that limit their visible mass and restrict the pier length to the existing pierhead line. The additional boats on buoys are visually similar to the existing boats in the view. However, the additional visible mass associated with these boats detracts from views of the surface of the lake and reduces the intactness of this view. This could reduce the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Conclusion

As described above, Alternative 1 would authorize new shorezone structures that could affect views from the shore toward Lake Tahoe. New and redeveloped structures would be required to comply with applicable design standards addressing the location, length, width, orientation, and maximum visible mass. The visible mass of piers would be restricted, and all piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in visible mass. In addition, these structures would be evaluated under the visual magnitude system in TRPA Code Section 66.3. New or expanded structures would require scenic improvements in the shoreland to achieve minimum required contrast ratings.

New buoys would be allowed to be placed farther from the shore than under existing conditions. The visible mass associated with buoys would not be offset, and projects adding buoys would not be required to implement scenic improvements through the visual magnitude system.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-28 Key View 7 – Along SR 89 Facing South Across McKinney Bay, Alternative 1

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The effects of buildout of Alternative 1 would vary based on the location, intensity, and other characteristics of future projects. In some situations, the intactness and/or unity of views from the shore would be improved, and the scenic threshold ratings would increase due to required scenic improvements in the shoreland, visible mass reductions, and redevelopment of existing shorezone structures consistent with proposed design standards. In other situations, scenic quality could be unchanged, or the intactness of views could be degraded, which would reduce the scenic threshold ratings. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys. Because new visible mass from buoys could degrade scenic threshold ratings, this would be a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would maintain the existing shorezone ordinances and the number of new structures would be limited by site-specific eligibility criteria, including a prohibition on new structures in prime fish habitat. It is estimated that Alternative 2 could allow for up to 476 new piers, six new public boat ramps, and 6,936 new moorings, which would include a combination of buoys, boat lifts, and slips. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, "Description of the Proposed Project and Alternatives". The visual effects of buildout of Alternative 2 is shown in simulations of KVPs 5–7. Each of these simulations shows a buildout scenario for Alternative 2 as viewed from a TRPA-designated scenic resource on the shore.

Key Viewpoint 5 - Near SR 28 Facing East Across Agate Bay, Alternative 2

Exhibit 9-29 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 5. The existing elements and their locations are described above under Alternative 1.

In the simulation, six additional piers and 15 boats on buoys have been added to the view. This reflects five more buoys and three more piers than Alternative 1, which would restrict new piers to multiple-use piers in the visually sensitive character type shown in KVP 5. Two new piers of approximately 180 feet in length are visible in front of the existing piers. The other four new piers are farther away along the sandy beach but are barely visible due to the distance and intervening existing piers. Because Alternative 2 would not require minimum contrast ratings for new or expanded piers, the buildings in the shoreland are in the same color as in the existing view. Some additional vegetative screening is shown near these buildings, as would be necessary to meet the 1.5:1 visible mass offset requirement in this area. Twelve new boats on buoys are visible in the foreground center left of the view. These boats are arranged in a grid pattern consistent with the design standards for a buoy field. Three additional new boats are visible in the center of the view and are not in a grid pattern to represent new buoys associated with individual littoral parcels.

Overall, the scenic quality of the sandy beach is slightly degraded. Two of the new piers are clearly visible and are consistent with the existing partially-developed character of the shoreline in this area. The additional boats on buoys are visually similar to the existing boats in the view. However, the additional visible mass associated with these boats detracts from views of the surface of the lake and reduces the intactness of this view. The additional piers and buoys are not offset by reductions in the visual magnitude of the shoreland. This could reduce the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Key Viewpoint 6 - Along SR 28 Facing East Across Carnelian Bay, Alternative 2

Exhibit 9-30 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 6. The existing elements and their locations are described above under Alternative 1.

In the simulation, two additional multiple-use piers, four additional individual private piers, and 15 boats on buoys have been added to the view. Two new piers are visible in front of the existing pier on the left side of the view. The other four new piers are visible along the sandy beach near the center of the view. The existing buildings in the shoreland are shown with additional vegetative screening as would be necessary to meet the visible mass offset requirements for the new piers. Because Alternative 2 would not require minimum contrast ratings for new or expanded piers, the buildings in the shoreland are in the same color as in the existing view. The 15 new buoys are arranged into two new buoy fields near the center of the view. These buoy fields are shown approximately 350 feet from shore.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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Exhibit 9-29 Key View 5 - Near SR 28 Facing East Across Agate Bay, Alternative 2

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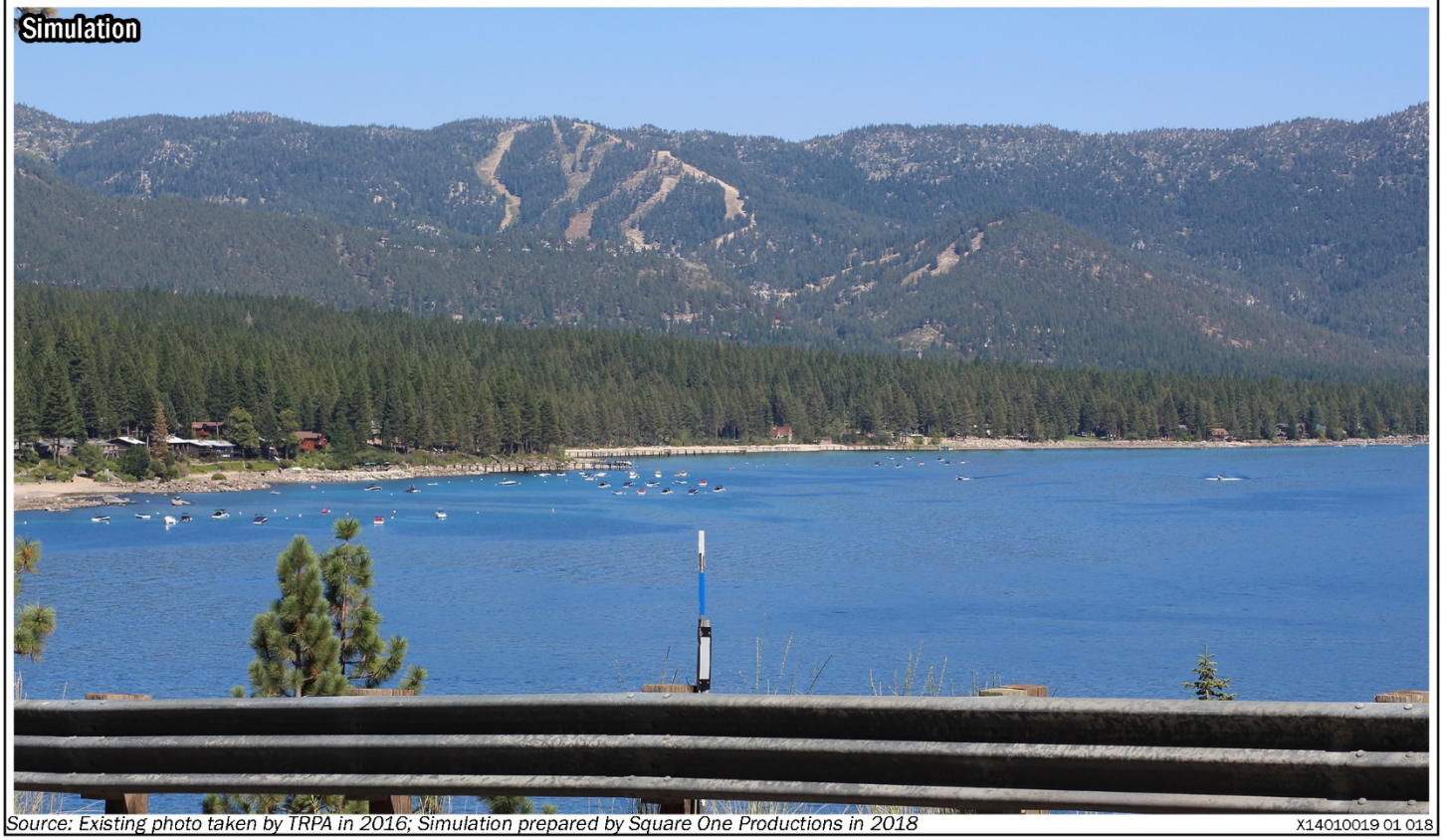

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-30 Key View 6 - Along SR 28 Facing East Across Carnelian Bay, Alternative 2

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The new piers are visible across the sandy beach and slightly reduce the intactness of the view. The additional visible mass associated with the new buoy fields detracts from views of the surface of the lake and also reduces the intactness of this view. The reduced visible mass of the buildings in the shoreland slightly improves the intactness of the shoreland, but not to an extent that compensates for the visual effect of the new piers and buoys. When viewed together, the intactness of the view is reduced, which could decrease the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Key Viewpoint 7– Along SR 89 Facing South Across McKinney Bay, Alternative 2

Exhibit 9-31 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 7. The existing elements and their locations are described above under Alternative 1. The simulation shows the addition of four individual private piers and ten boats on buoys. The new piers are visible between the existing piers and the new boats are visible in the middleground of the left side of the view. No existing buildings in the shoreland are visible in the view, and the required visible mass offsets that would be required for the new piers are not shown.

The new piers are visible but do not substantially reduce the intactness of the view because they are consistent with the developed character of the view and they comply with design standards that require an open piling design and restrict the pier length to the existing pierhead line. The additional boats on buoys are visually similar to the existing boats in the view. However, the additional visible mass associated with these boats detracts from views of the surface of the lake and reduces the intactness of this view. This could reduce the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Conclusion

As described above, Alternative 2 would authorize new shorezone structures that could affect views from the shore toward Lake Tahoe. New and redeveloped structures would be required to comply with applicable design standards addressing their location, length, width, and design. Piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in visible mass. As with Alternative 1, these structures would be evaluated under the visual magnitude system in TRPA Code Section 66.3. Unlike Alternative 1, new or expanded structures would not be required to implement scenic improvements in the shoreland to achieve minimum required contrast ratings. The visible mass associated with new buoys would not be offset.

The effects of buildout of Alternative 1 would vary based on the location, intensity, and other characteristics of future projects. The intactness of views could be degraded in some scenarios, which would reduce the scenic threshold ratings. This potential reduction in scenic threshold ratings would be due to additional visible mass associated with new buoys and because reductions in the visible magnitude of shoreland structures would not be required in association with new or expanded shorezone structures. This would be a **significant** impact.

Alternative 3: Limit New Development

Alternative 3 would focus new shorezone structures at public facilities to maximize the number of people served by each new structure. It would authorize up to 365 new public buoys or slips, five new public piers, 86 new private multiple-use piers, and one new boat ramp. These new structures, and the redevelopment of existing structures would be subject to design and location standards, and scenic requirements described in Chapter 2, “Description of the Proposed Project and Alternatives.” The visual effects of buildout of Alternative 3 are shown in simulations of KVPs 5–7. Each of these simulations shows a buildout scenario for as viewed from a TRPA-designated scenic resource on the shore.

Key Viewpoint 5 - Near SR 28 Facing East Across Agate Bay, Alternative 3

Exhibit 9-32 shows the existing view and a simulation of buildout of Alternative 2 as seen from KVP 5. The existing elements and their locations are described above under Alternative 1.

Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-31 Key View 7– Along SR 89 Facing South Across McKinney Bay, Alternative 2

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-32 Key View 5 - Near SR 28 Facing East Across Agate Bay, Alternative 3

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The simulation shows the addition of three multiple-use piers and no additional buoys. One new pier of approximately 180 feet in length is visible in front of the existing piers. The other two new piers are farther away along the sandy beach but are barely visible due to the distance and intervening existing piers. The buildings in the shoreland are shown in a darker color than the existing view to reflect the changes that would be necessary to achieve minimum contrast ratings in Alternative 3. Additional vegetative screening is shown near these buildings, as would be necessary to meet the 3:1 visible mass offset requirement in this area.

The scenic quality of the sandy beach is slightly improved. One of the new piers is clearly visible but does not substantially reduce the intactness of the view of the beach because it is consistent with the existing partially-developed character of the shoreline in this area and is more than offset by the required scenic improvements in the shoreland. The reduced visual magnitude in the shoreland could increase the scenic quality rating for this scenic resource and/or for the roadway travel unit.

Key Viewpoint 6- Along SR 28 Facing East Across Carnelian Bay, Alternative 3

Exhibit 9-33 shows the existing view and a simulation of buildout of Alternative 3 as seen from KVP 6. The existing elements and their locations are described above under Alternative 1.

The simulation shows three additional multiple-use piers. Two new piers are visible in front of the existing pier on the left side of the view. The new piers are visible along the sandy beach near the center of the view. The existing buildings in the shoreland that are associated with new piers are shown a darker color with additional vegetative screening as would be necessary to meet the visible mass offset and minimum contrast rating requirements for the new piers.

The new piers are visible across the sandy beach and slightly reduce the intactness of the view. The reduced visible mass and visual magnitude of the buildings in the shoreland improves the intactness of the shoreland and compensates for the visual effect of the new piers. When viewed together, the intactness of the view is not substantially changed, and the scenic quality rating for this scenic resource and/or for the roadway travel unit would not change.

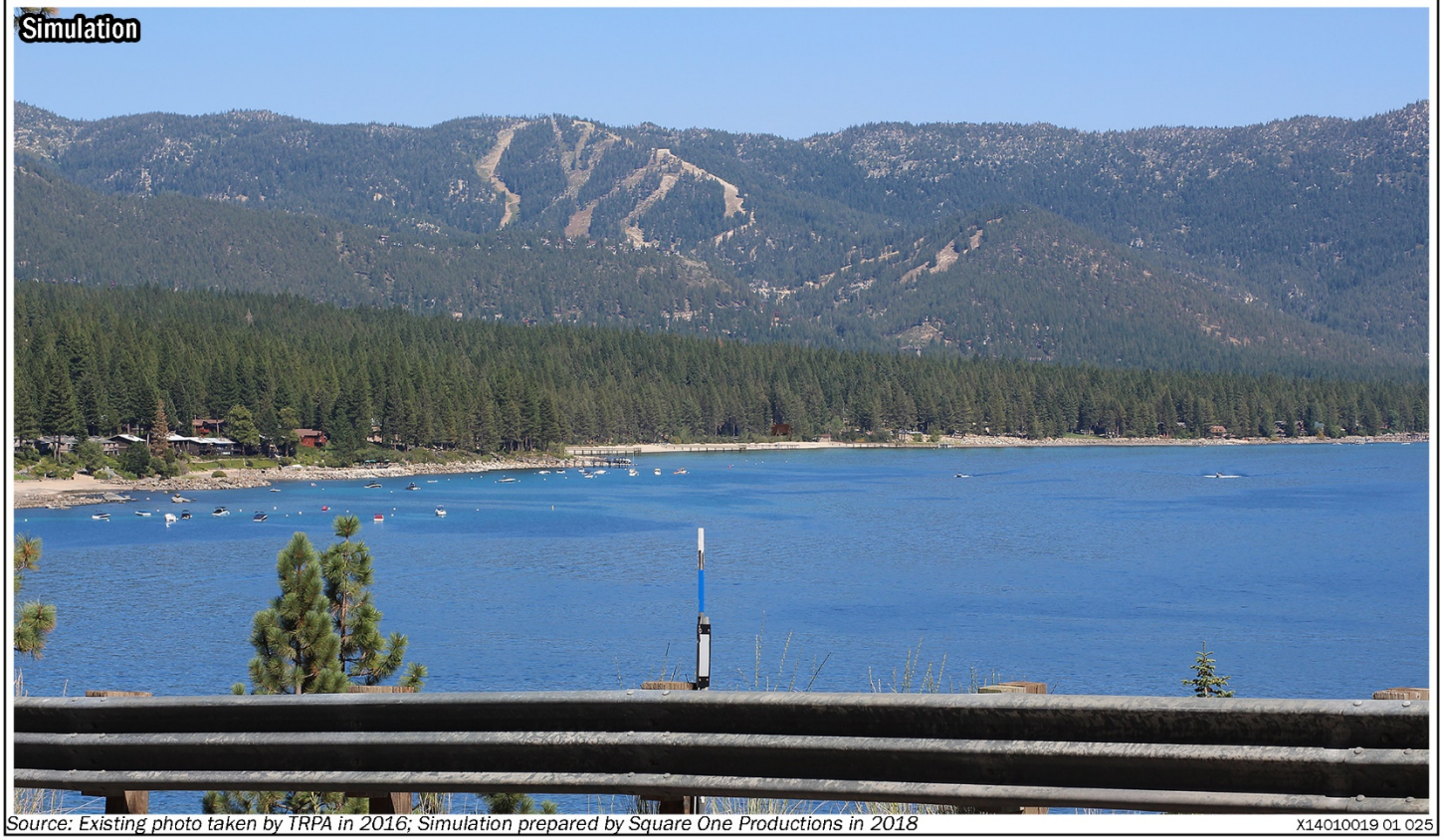
Key Viewpoint 7– Along SR 89 Facing South Across McKinney Bay, Alternative 3

Exhibit 9-34 shows the existing view and a simulation of buildout of Alternative 3 as seen from KVP 7. The existing elements and their locations are described above under Alternative 1. The simulation shows the addition of two multiple-use piers and no buoys. The new piers are visible between the existing piers. No existing buildings in the shoreland are visible in the view, and the required visible mass offsets and visual magnitude reductions that would be required for the new piers are not shown.

The new piers are visible but do not substantially reduce the intactness of the view because they are consistent with the developed character of the view and they comply with design standards that limit pier length and visible mass. The changes shown in the simulation modify the view, but not to the extent that would reduce the scenic quality ratings for the scenic resource and/or for the roadway travel unit.

Conclusion

As described above, Alternative 3 would authorize new shorezone structures that could affect views from the shore toward Lake Tahoe. New and redeveloped structures would be required to comply with applicable design standards addressing their location, length, width, and visible mass. Piers, boat lifts, boat ramps, marinas, or other similar structures would be required to offset increases in visible mass at ratios that would result in a net reduction in visible mass. As with Alternative 1, these structures would be evaluated under the visual magnitude system in TRPA Code Section 66.3. New or expanded piers would also be required to implement scenic improvements in the shoreland to achieve minimum required contrast ratings. The visible mass associated with new buoys would not be offset, however the estimated 300 new buoys would only be placed at marinas or other public facilities.



Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-33 Key View 6 - Along SR 28 Facing East Across Carnelian Bay, Alternative 3

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Source: Existing photo taken by TRPA in 2016; Simulation prepared by Square One Productions in 2018

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TAHOE REGIONAL PLANNING AGENCY

Exhibit 9-34 Key View 7 – Along SR 89 Facing South Across McKinney Bay, Alternative 3

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The effects of buildout of Alternative 3 would vary based on the location, intensity, and other characteristics of future projects. The intactness of views could be improved in some scenarios, which would increase the scenic threshold ratings. In other scenarios, the scenic quality ratings would be unchanged due to buildout of Alternative 3. This would be a **less-than-significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would prohibit new private shoreline structures, except where they result in a net reduction in the number of structures. It would allow for up to 15 new public piers and no other new shorezone structures. Any new or expanded public piers would be required to comply with the same visible mass offsets as Alternative 1, which would result in a net reduction in visible mass from the construction of any new public piers.

In addition, each proposed public pier would be evaluated through a project-level scenic assessment that would evaluate the project's effect on potentially affected scenic travel units and resources. No other new or expanded shoreline structures would be allowed, and pier reconfigurations would only be allowed if they reduce the visible mass of the existing pier. For these reasons, Alternative 4 would have very little effect on the scenic quality of views from the shore toward Lake, and it is not necessary to evaluate Alternative 4 with visual simulations. Due to the project-level assessment and mitigation of scenic effects of public piers, and the prohibition on other new or expanded shoreline structures, Alternative 4 would have a **less-than-significant** effect on scenic quality of views from the shore.

Mitigation 9-2a: Implement Mitigation Measure 9-1a to offset the visible mass of buoys

This mitigation measure applies to Alternatives 1, 2, and 3.

TRPA will implement Mitigation Measure 9-1a, "Offset the visible mass of buoys," as described above.

Mitigation 9-2b: Implement Mitigation Measure 9-1a to require visual magnitude reductions in the shoreland

This mitigation measure applies to Alternative 2.

TRPA will implement Mitigation 9-1c: "Require visual magnitude reductions in the shoreland," as described above.

Significance after Mitigation

Mitigation Measure 9-2 would require the removal or visual screening of existing visible mass to offset the additional visible mass that could result from new buoys. These offsets would occur near the project site or in scenic travel units that are not in attainment. With implementation of this mitigation measure, Alternatives 1, 2, and 3 would result in a net reduction the amount of visible mass associated with human-made structures on or along Lake Tahoe. Mitigation Measure 9-2b would require that Alternative 2 include the same minimum contrast rating requirements as Alternative 1. As described above for Alternative 1, adherence to this requirement would reduce the visual magnitude of development in the shoreland, which would compensate for the effect of additional shorezone structures. After implementation of the mitigation measures, Alternatives 1, 2, and 3 would result in a net reduction in visible mass and would reduce the visual magnitude of shoreland development. The impact of Alternatives 1, 2, and 3 would be **less than significant** after mitigation.

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10 AIR QUALITY

10.1 INTRODUCTION

This chapter includes a discussion of existing air quality conditions in the Tahoe Basin, a summary of applicable air quality regulations, and an analysis of potential short-term and long-term air quality impacts that could result from implementation of the Shoreline Plan. The primary issues raised during scoping that pertain to air quality are:

- emissions generated by heavy-duty equipment used for dredging and construction of new facilities,
- the potential long-term increase in emissions associated with increased motorized boating activity,
- accounting for the seasonality of emissions-generating activity, and
- cumulative air quality conditions considering in-basin and out-of-basin projects.

The methods of analysis for short-term construction, long-term regional (operational), local mobile-source, and toxic air emissions used in this chapter are consistent with the recommendations of the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA).

The threshold related to vehicle miles traveled (VMT) and traffic volumes are addressed further in Chapter 13, "Roadway Transportation and Circulation." The threshold related to nitrate deposition is addressed in Chapter 6, "Hydrology and Water Quality."

10.2 REGULATORY SETTING

10.2.1 Federal

EPA has been charged with implementing national air quality programs. EPA air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments to the CAA were made by Congress in 1990.

CRITERIA AIR POLLUTANTS

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 10-1, EPA has established NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead. The primary standards protect the public health, and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a state implementation plan (SIP). The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementation would achieve air quality goals.

Table 10-1 Ambient Air Quality Standards

Pollutant	Averaging Time	TRPA Thresholds	California [a]	National [b]	
				Primary [c,d]	Secondary [c,e]
Ozone	1-hour	0.08 ppm	0.09 ppm (180 µg/m³)	– [f]	Same as primary standard
	8-hour	–	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)	
Carbon monoxide (CO)	1-hour	–	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	Same as primary standard
	8-hour	6 ppm	6 ppm [f] (7 mg/m³)	9 ppm (10 mg/m³)	
Nitrogen dioxide (NO_2) [f]	Annual arithmetic mean	–	0.030 ppm (57 µg/m³)	53 ppb (100 µg/m³)	Same as primary standard
	1-hour	–	0.18 ppm (339 µg/m³)	100 ppb (188 µg/m³)	–
Sulfur dioxide (SO_2)	Annual arithmetic mean	–	–	–	–
	24-hour	–	0.04 ppm (105 µg/m³)		
	3-hour	–	–	–	0.5 ppm (1300 µg/m³)
	1-hour	–	0.25 ppm (655 µg/m³)	75 ppb (196 µg/m³)	–
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 µg/m³ in CA, 50 µg/m³ in NV	20 µg/m³	–	Same as primary standard
	24-hour	50 µg/m³ in CA, 150 µg/m³ in NV	50 µg/m³	150 µg/m³	
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	–	12 µg/m³	12.0 µg/m³	15 µg/m³
	24-hour	35 µg/m³	–	35 µg/m³	Same as primary standard
Lead [g]	Calendar quarter	–	–	1.5 µg/m³	Same as primary standard
	30-day average	–	1.5 µg/m³	–	–
	Rolling 3-month average	–	–	0.15 µg/m³	Same as primary standard

Table 10-1 Ambient Air Quality Standards

Pollutant	Averaging Time	TRPA Thresholds	California [a]	National [b]	
				Primary [c,d]	Secondary [c,e]
Hydrogen sulfide	1-hour	–	0.03 ppm (42 µg/m^3)	No national standards	
Sulfates	24-hour	–	25 µg/m^3		
Vinyl chloride [g]	24-hour	–	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	*Regional:* Extinction coefficient of 25 Mm^{-1} (157 km, 97 miles) 50 percent of the year, 34 Mm^{-1} (115 km, 71 miles) 90 percent of the year. *Subregional:* 50 Mm^{-1} (48 miles) 50 percent of the year, 125 Mm^{-1} (19 miles) 90 percent of the year.			

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million; TRPA = Tahoe Regional Planning Agency; Mm^{-1} = inverse mega meters; CA = California; NV = Nevada.

[a] California standards for ozone, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was issued. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] Applicable in the Lake Tahoe Air Basin.

[g] The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: CARB 2016a, TRPA 2016:3-2 to 3-4

EMISSION STANDARDS FOR RECREATIONAL WATERCRAFT

EPA has separate emission requirements for watercraft with spark-ignition engines and compression-ignition engines. Most, if not all, recreational watercraft used on Lake Tahoe have spark-ignition engines powered by gasoline rather than compression-ignition engines powered by diesel fuel. Table 10-2 summarizes the exhaust emission standards promulgated by EPA for marine spark-ignition engines.

Table 10-2 EPA Exhaust Emission Standards for Marine Spark-Ignition Engines

Engine Type [a]	Model Year	HC + NO_X (g/kW-hr)		CO (g/kW-hr)	
		P ≤ 4.3 kW [b]	P > 4.3 kW [b]	P ≤ 4.3 kW [b]	P > 4.3 kW [b]
Personal watercraft and outboard marine engines	1998	278	(0.917 x (151 + 557/($P^{0.9}$)) + 2.44	–	–
	1999	253	(0.833 x (151 + 557/($P^{0.9}$)) + 2.89	–	–
	2000	228	(0.750 x (151 + 557/($P^{0.9}$)) + 3.33	–	–
	2001	204	(0.667 x (151 + 557/($P^{0.9}$)) + 3.78	–	–
	2002	179	(0.583 x (151 + 557/($P^{0.9}$)) + 4.22	–	–
	2003	155	(0.500 x (151 + 557/($P^{0.9}$)) + 4.67	–	–
	2004	130	(0.417 x (151 + 557/($P^{0.9}$)) + 5.11	–	–
	2005	105	(0.333 x (151 + 557/($P^{0.9}$)) + 5.56	–	–
	2006–2009	81	(0.250 x (151 + 557/($P^{0.9}$)) + 6.00	–	–
	2010 and newer	30.0	2.1 + 0.09 x (151 + 557/$P^{0.9}$)	500 - 5.0 x P	300
Conventional sterndrive/inboard engines	2010 and newer	5.0		75.0	

Notes: HC + NO_X = hydrocarbons plus oxides of nitrogen; CO = carbon monoxide; kW = kilowatts; g/kW-hr = grams per kilowatt-hour.

[a] Separate federal emission standards are established for marine vessels with high-performance engines.

[b] P stands for the maximum engine power in kilowatts.

Sources: 40 CFR 91.104, Outboard and personal watercraft exhaust emission standards (1998–2009); and 40 CFR 1045.103, Outboard and personal watercraft exhaust emission standards (2010+)

To better understand the degree to which these emission standards became more stringent for later model year engines, Table 10-3 shows how the EPA standards apply to engines with power ratings of 50 horsepower (hp), 100 hp, and 200 hp (equivalent to 37 kilowatts [kW], 75 kW, and 149 kW, respectively) and operating at 40 percent load. Table 10-3 also shows the outcome of watercraft subject to CARB's emission standards, which are discussed in more detail below.

Table 10-3 Emission Rates Pursuant to EPA and CARB Exhaust Emission Standards for Spark-Ignition Personal Watercraft and Outdoor Marine Engines of 50, 100, and 200 Horsepower

Model Year	HC + NO_X (lb/hr)					
	50-hp Engine		100-hp Engine		200-hp Engine	
1998	5.2	—[1]	10.0	—[1]	19.3	—[1]
1999	4.8	—[1]	9.1	—[1]	17.6	—[1]
2000	4.3	—[1]	8.3	—[1]	15.9	—[1]
2001	3.9	1.6	7.4	3.1	14.3	6.0
2002	3.4	1.6	6.5	3.1	12.6	6.0
2003	3.0	1.6	5.7	3.1	10.9	6.0
2004	2.5	1.3	4.8	2.5	9.3	4.8
2005	2.1	1.3	3.9	2.5	7.6	4.8

Table 10-3 Emission Rates Pursuant to EPA and CARB Exhaust Emission Standards for Spark-Ignition Personal Watercraft and Outdoor Marine Engines of 50, 100, and 200 Horsepower

Model Year	HC + NO_X (lb/hr)					
	50-hp Engine		100-hp Engine		200-hp Engine	
2006	1.6	1.3	3.1	2.5	6.0	4.8
2007	1.6	1.3	3.1	2.5	6.0	4.8
2008	1.6	0.6	3.1	1.1	6.0	2.1
2009	1.6	0.6	3.1	1.1	6.0	2.1
2010 and newer	0.6	0.6	1.1	1.1	2.1	2.1
Factor of increased level of stringency from 1998 model year to 2010 model year	9.1	9.1	9.1	9.1	9.0	9.0

Notes: HC = total hydrocarbons; NO_X = oxides of nitrogen; lb/hr = pounds per hour.

[1] Model years 1998-2000 registered in California were subject only to EPA emission standards because CARB did not establish more stringent emission standards for those model years.

Source: Calculated by Ascent Environmental using the equations for federal emission standards listed in Tables 10-2 and 10-3 and a load factor of 40 percent. See Appendix C for detailed calculations.

As shown in Table 10-3, emission standards for engines model year 2010 and newer are approximately nine times more stringent (or 89 percent less polluting) than 1998 model year engines. This means that the fleet of recreational watercraft will become cleaner as older engines are replaced by newer engines.

EPA also established standards for evaporative loss emissions from marine spark-ignition watercraft. These include an evaporative loss emissions standard for fuel lines of 15 grams per square meter per day ($g/m^2/day$) starting with model year 2009, an evaporative loss emission standard for fuel tank permeation of 1.5 $g/m^2/day$ staring with model year 2011, and a diurnal evaporative loss emission standard for fuel tanks of 0.40 gram per gallon per day (40 CFR 1045.112). Thus, it is anticipated that the level of evaporative loss emission from recreational watercraft will decrease as engines newer than model year 2009 replace older engines.

HAZARDOUS AIR POLLUTANTS AND TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs), are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects, such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute affects, such as eye watering, respiratory irritation (a cough), runny nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and noncarcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 10-1). Cancer risk from TACs is expressed as excess cancer cases per 1 million exposed individuals, typically over a lifetime of exposure.

EPA regulates HAPs through its National Emission Standards for Hazardous Air Pollutants. The standards for a source category require the maximum degree of emission reduction that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology standards. These standards are authorized by Section 112 of the CAA, and the regulations are published in 40 CFR Parts 61 and 63.

10.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has adopted environmental threshold carrying capacities (environmental thresholds) related to air quality and other resources for the Tahoe Region. Every 4 years, TRPA evaluates the environmental thresholds to determine whether each threshold standard is being achieved and/or maintained, makes specific recommendations to address problem areas, and directs general planning efforts for the next 4-year period.

TRPA threshold standards address CO, ozone, regional and subregional visibility, respirable (PM_{10}) and fine ($PM_{2.5}$) particulate matter, and nitrate deposition. Numerical standards have been established for each of these parameters, and management standards have been developed that are intended to assist in attaining the threshold standards. Environmental thresholds for air quality are listed below.

<u>Carbon Monoxide</u>

- **Numerical Standard:** Maintain CO concentrations at or below 9 parts per million (ppm) averaged over 8 hours.

- **Management Standard:** Reduce average daily traffic volume between 4:00 p.m. and midnight in the U.S. 50 corridor by 7 percent from the 1981 base year during the months of November through February.

<u>Ozone</u>

- **Numerical Standards:**
  - Maintain ozone concentration below 0.08 ppm averaged over 1 hour.
  - Maintain NO_X emissions at or below the 1981 level.

<u>Regional Visibility and Subregional Visibility</u>

- **Numerical Standards:**
  - Achieve an extinction coefficient of 25 inverse mega meters (Mm^{-1}) at least 50 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 97 miles). Calculations will be made during 3-year running periods using the existing monitoring data as the performance standards to be met or exceeded 156 kilometers (97 miles) at least 50 percent of the year as measured by aerosol concentrations measured at the Bliss State Park monitoring site.

  - Achieve an extinction coefficient of 34 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 71 miles).

  - Achieve an extinction coefficient of 34 Mm^{-1} at least 50 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 48 miles).

  - Achieve an extinction coefficient of 125 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 19 miles).

Subregional Visibility

- Numerical Standards:
  - Achieve 78 kilometers (48 miles) at least 50 percent of the year as measured by particulate concentrations measured at the South Lake Tahoe monitoring site.
  - Achieve 31 kilometers (19 miles) at least 90 percent of the year as measured by particulate concentrations measured at the South Lake Tahoe monitoring site.
- Management Standards:
  - Reduce suspended soil particles by 30 percent of the 1981 base values through technology, management practices, and educational programs.
  - Reduce wood smoke emissions by 15 percent of the 1981 base values through technology, management practices, and educational programs.
  - Reduce vehicle miles of travel by 10 percent of the 1981 base values.

Respirable and Fine Particulate Matter

- Numerical Standards:
  - Maintain PM_{10} at or below 50 micrograms per cubic meter (µg/m^3) measured over a 24-hour period in the portion of the Tahoe Region within California, and maintain PM_{10} at or below 150 µg/m^3 measured over a 24-hour period in the portion of the region within Nevada.
  - Maintain PM_{10} at or below annual arithmetic average of 20 µg/m^3 in the portion of the Tahoe Region within California, and maintain PM_{10} at or below annual arithmetic average of 50 µg/m^3 in the portion of the region within Nevada.
  - Maintain $PM_{2.5}$ at or below 35 µg/m^3 measured over a 24-hour period using gravimetric or beta attenuation methods or any equivalent procedure that can be shown to provide equivalent results at or near the level of air quality standard.
  - Maintain $PM_{2.5}$ at or below annual arithmetic average of 12 µg/m^3 in the portion of the Tahoe Region within California, and maintain $PM_{2.5}$ at or below annual arithmetic average of 15 µg/m^3 in the portion of the region within Nevada.

Nitrate Deposition

- **Vehicle Miles Traveled:** Reduce VMT in the [Tahoe region] by 10% of the 1981 base year values.
- **Management Standards:** Reduce the transport of nitrates into the [Tahoe region], and reduce NO_X produced in the [Tahoe region] consistent with the water quality thresholds.

Attainment status and trends of each air quality indicator are summarized in Chapter 3 of the 2015 Threshold Evaluation Report (TRPA 2016).

In addition, the TRPA compact between California and Nevada states that the Regional Plan shall provide for attaining and maintaining federal, state, or local air quality standards, whichever are strictest, in the respective portions of the Tahoe Region for which the standards are applicable.

LAKE TAHOE REGIONAL PLAN

Goals and Policies

The goals and policies are designed to achieve and maintain adopted environmental thresholds and are implemented through the TRPA Code of Ordinances (TRPA Code), the Environmental Improvement Program, and the Transportation Improvement Plan (with the Tahoe Metropolitan Planning Organization). The Land

Use Element of the goals and policies document consists of seven subelements, including the air quality subelement. The air quality subelement includes the following two goals:

GOAL AQ-1: Attain and maintain air quality in the region at levels that are healthy for humans and the ecosystem, achieve and maintain environmental thresholds and do not interfere with residents' and visitors' visual experience.

GOAL AQ-2: Maintain an effective air quality mitigation program for the region.

Code of Ordinances

Applicable provisions of Chapter 33, "Grading and Construction," and Chapter 65, "Air Quality and Transportation," of the TRPA Code are described below.

Chapter 33.3.1—Grading and Construction

Chapter 33 includes requirements about grading and construction activity, which include limiting grading and earth disturbance activity to the portion of the calendar year between May 1 and October 15 unless approval is granted by TRPA and TRPA-approved dust control measures are implemented.

Chapter 65.1—Air Quality Control

The provisions of Chapter 65.1 apply to direct sources of air pollution in the Tahoe Region, including certain on-road motor vehicles registered in the region, combustion heaters installed in the region, open burning and stationary sources of air pollution, and idling combustion engines. The following provisions are potentially applicable to the proposed project and alternatives:

- Section 65.1.3, "Vehicle Inspection and Maintenance Program," states that to avoid duplication of effort in implementation of an inspection/maintenance program for certain vehicles registered in the CO nonattainment area, TRPA shall work with the affected state agencies to plan for applying state inspection/maintenance programs to the Tahoe Region.

- Section 65.1.8, "Idling Restrictions," states that no person shall cause a combustion engine in a parked auto, truck, bus, or boat to idle for more than 30 consecutive minutes in the designated plan areas (with limited exemptions). It also states that no person shall cause a diesel engine in a vehicle exceeding 10,000 pounds gross vehicle weight or a diesel engine in off-road self-propelled equipment exceeding 25 horsepower to idle more than 15 minutes within the portions of the region in Nevada, or to idle longer than 5 minutes within the portions of the region in California.

Chapter 60.1—Water Quality Control

Chapter 60 includes the following requirements related to the attainment and maintenance of water quality standards:

- Section 60.1.3.E, "Prohibition of Certain Watercraft, "prohibits the launching, mooring, or operation of all two-stroke engine–powered watercraft within the Tahoe Region is prohibited, except as follows:

    1. Any two-stroke engine–powered watercraft whose fuel is directly injected into the cylinder shall be exempt from the prohibition.

    2. Any two-stroke engine–powered watercraft whose fuel is directly injected into the crankcase prior to entering the cylinder and the fuel injection engine and that was purchased before January 27, 1999, shall be prohibited commencing October 1, 2001.

    3. Any watercraft powered by a two-stroke engine whose engine is certified as meeting the EPA 2006 standard or the CARB 2001 standard shall be exempt from the prohibition.

    4. Sailboats utilizing two-stroke engines as auxiliary power shall be prohibited commencing October 1, 2001.

5. Any watercraft powered by a two-stroke engine rated at 10 horsepower or less shall be prohibited commencing October 1, 1999.

6. Any watercraft powered by an engine that has been certified as meeting EPA's 2001–2005 emission standard shall be prohibited commencing October 1, 2001.

TRPA Standard Conditions of Approval for Shorezone Projects

TRPA is committed to continue to monitor and adaptively manage construction emissions through existing permit compliance programs. Pregrade inspections occur for every permitted project prior to any ground-disturbing activities. These inspections verify that all required permit conditions, such as the location of staging areas and the use of approved power sources, are in place prior to intensive construction activities. In addition, compliance inspections occur throughout the period of construction activity to verify compliance with all permit requirements. These compliance inspections are a core function of TRPA and local jurisdiction building departments. If an inspection determines that a project is not in compliance with permit conditions, then enforcement actions are taken, which can include stopping activity at the construction site and monetary fines.

In addition to existing permit limits, TRPA's Standard Conditions of Approval for Shorezone Projects (TRPA Permit Attachment S) include the following air quality–related measures:

- All existing disturbed areas and areas disturbed as a result of construction activity authorized by the permit, or otherwise occurring on the subject project during the time period when the permit is valid, shall be revegetated using only those species contained on TRPA's list of acceptable species. All required vegetation shall be completed by completion of the project.

- All material obtained from excavation work shall be contained within the foundations, retaining walls, or by a similar means approved by TRPA, or the excavated material shall be disposed of at a site approved by TRPA.

- Soil and construction materials shall not be tracked off-site. Grading operations shall cease in the event a danger of violating this condition exists. The site shall be cleaned and the road right-of-way shall be swept clean when necessary.

- The length of open trenches (excluding foundations) shall not exceed 50 feet at the end of each working day, unless approved by TRPA.

- Loose soil mounds or surfaces shall be protected from wind and water erosions by being appropriately covered or contained when active construction is not occurring.

- Replanting of all exposed surfaces, as shown on the revegetation and slope stabilization plans, shall be completed within 1 year following the commencement of construction, unless the approved construction schedule establishes otherwise.

- At all times during construction, environmental protection and erosion control devices shall be maintained in a functioning state. Such devices include, but are not limited to, sediment barriers, dust control devices, and vegetative protection.

Air Quality Monitoring

The overall effectiveness of efforts to attain and maintain air quality standards will continue to be monitored through a comprehensive multiagency air quality program. The existing air quality monitoring program is being expanded to ensure adequate data continues to be available to assess the status and trends of a variety of constituents. If ongoing monitoring determines that efforts to achieve adopted air quality standards have not been successful, then TRPA will develop and implement additional compliance measures as required by Chapter 16 of the TRPA Code. Additional compliance measures could include additional required construction best practices, an expanded rebate program to replace nonconforming

woodstoves or other emission-producing appliances, or restrictions on other emission sources such as off-highway vehicles or boats.

10.2.3 California

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). California law authorizes CARB to set ambient (outdoor) air pollution standards (California Health and Safety Code Section 39606) in consideration of public health, safety, and welfare (i.e., the California Ambient Air Quality Standards [CAAQS] shown in Table 10-1).

CRITERIA AIR POLLUTANTS

CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest date practical. The CCAA specifies that local air districts should focus attention on reducing the emissions from transportation and areawide emission sources and provides air districts with the authority to regulate indirect sources. (Placer County Air Pollution Control District has jurisdiction in Placer County, California, and El Dorado County Air Quality Management District has jurisdiction in El Dorado County, California.)

Among CARB's other responsibilities are overseeing local air district compliance with federal and state laws; approving local air quality plans; submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

TOXIC AIR CONTAMINANTS

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs, including diesel particulate matter (diesel PM), and adopted EPA's list of HAPs as TACs.

EMISSION STANDARDS FOR RECREATIONAL WATERCRAFT

The exhaust emission standards established by CARB for marine spark-ignition engines are summarized in Table 10-4.

Table 10-3 shows how CARB's standards apply to engines with power ratings of 50 hp, 100 hp, and 200 hp (equivalent to 37 kW, 75 kW, and 149 kW, respectively) and operating at 40 percent load. Table 10-3 also shows the outcome of watercraft subject to EPA's emission standards, which are discussed in more detail above.

CARB's emission standards become more stringent sooner than EPA's emission standards. For instance, the emission standards CARB requires for 2001 model year engines (shown in Table 10-4) is the same as the federal requirement for 2006 model year engines (shown in Table 10-4).

Table 10-4 CARB Exhaust Emission Standards Marine Spark-Ignition Engines

Engine Type [a]	Model Year	HC + NO_X [a] (g/KW-hr)		CO (g/KW-hr)	
		P ≤ 4.3 kW [b]	P > 4.3 kW [b]	P ≤ 40 kW [b]	P > 40 kW [b]
Personal watercraft and outboard marine engines	2001–2003	81.00	(0.25 x (151 + 557/($P^{0.9}$)) + 6.0	–	–
	2004–2007	64.80	(0.20 x (151 + 557/($P^{0.9}$)) + 4.8	–	–
	2008 and newer	30.00	(0.09 x (151 + 557/($P^{0.9}$)) + 2.1	–	–
	2009 and newer	–	–	500 - 5.0 x P	300
Conventional sterndrive/inboard engines	Model Year	P ≤ 373 kW		P ≤ 373 kW	
	2003–2006	16.0		–	
	2007	14.0		–	
	2008	5.0		–	
	2009 and newer	5.0		75.0	

Notes: HC + NO_X = hydrocarbons plus oxides of nitrogen; CO = carbon monoxide; kW = kilowatts; g/kW-hr = grams per kilowatt-hour.

[a] Separate emission standards are established for marine vessels with high-performance engines.

[b] P stands for the maximum engine power in kilowatts.

Source: 13 CCR 2442, Emission Standards

CARB also established emission standards for conventional sterndrive/inboard engines starting with model year 2003, whereas EPA standards start with model year 2010. In 2015, CARB also established more stringent standards for evaporative emissions from spark-ignition watercraft of model years 2018–2020 and later (CFR, Title 13, Section 2442).

ADVANCED CLEAN CARS PROGRAM

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of greenhouse gas (GHG) emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of regulatory standards for vehicle model years 2017–2025. The new regulations strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions than the statewide fleet in 2016 (CARB 2016b).

10.2.4 Nevada

Nevada has not established emission standards for recreational watercraft or on-road vehicles that are more stringent than the emission standards established by EPA.

10.3 AFFECTED ENVIRONMENT

Ambient concentrations of air pollutants are determined by the amount of pollutants emitted in an area, and the atmosphere's ability to transport and dilute those emissions. Natural factors influence transportation and dilution including terrain, wind, atmospheric stability, and sunlight. The Lake Tahoe Air Basin (LTAB) is a geographic unit demarcated by similar regional meteorological and geographic conditions. The LTAB comprises portions of El Dorado and Placer Counties on the California side and Washoe County, Douglas County, and the Carson City Rural District on the Nevada side, which together also compose the study area for air quality impacts from the Shoreline Plan. The air quality standards listed above generally apply to the basin as a unit.

10.3.1 Climate, Meteorology, and Topography

Lake Tahoe and the surrounding region lie in a depression between the crests of the Sierra Nevada and Carson Range at a surface elevation of 6,260 feet above sea level. The mountains surrounding Lake Tahoe are approximately 8,000–9,000 feet high, with some reaching beyond 10,000 feet. This geographic boundary delineates the LTAB. According to documents from the Tahoe Integrated Information Management System, the "bowl" shape of the LTAB has significant air quality implications. There are two meteorological regimes that affect air quality in the LTAB.

First, thermal inversions occur when a warm layer of air traps a cold layer of air at the surface of the land and lake. Locally generated air pollutants are often trapped in the "bowl" by frequent inversions that limit the amount of air mixing, which allows pollutants to accumulate. Inversions most frequently occur during the winter in the LTAB but are common throughout the year. Often, wintertime inversions result in a layer of wood smoke, mostly from residential heating, which can be seen over Lake Tahoe.

The second meteorological regime affecting air quality in the LTAB is the atmospheric transportation of pollutants from the Sacramento Valley and San Francisco Bay Area. Lake Tahoe's location directly to the east of the crest of the Sierra Nevada allows prevailing easterly winds, combined with local mountain upslope winds, to bring air from populated regions west of the Sierra to the LTAB. The strength of this pattern depends on the amount of heat, usually highest in summer beginning in April and ending in late October.

10.3.2 Existing Air Quality

CRITERIA AIR POLLUTANTS

Concentrations of criteria air pollutants are used to indicate ambient air quality. CARB, the Placer County Air Pollution Control District (PCAPCD), and the El Dorado County Air Quality Management District (EDCAQMD) operate a regional monitoring network that measures the ambient concentrations of the six criteria air pollutants within the LTAB. These monitoring stations measure maximum daily concentrations and the number of days during which CAAQS or NAAQS for a given pollutant were exceeded. The measurements are available on CARB's website.

Both EPA and CARB use ambient air quality monitoring data to designate the attainment status of an area relative to the NAAQS and CAAQS for each criteria air pollutant. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement.

EPA has designated the LTAB in attainment of the NAAQS for all the criteria air pollutants (EPA 2018a, 2018b). However, EPA designated the California portion of the LTAB as a maintenance area with respect to the NAAQS for CO. The applicable federal air quality maintenance plan for the LTAB is California's SIP for

Carbon Monoxide (CO Maintenance Plan), originally adopted in 1996 and revised in 2004 (CARB 2004). Part of the maintenance strategy involves allocation of transportation emissions budgets to the maintenance areas, which are tracked by the Tahoe Metropolitan Planning Organization.

The Tahoe Basin is designated as nonattainment with respect to TRPA's 8-hour average ozone threshold standard and TRPA's 24-hour average PM_{10} threshold standard (TRPA 2016:3-8 and 3-9).

CARB has designated the LTAB as nonattainment with respect to the CAAQS for ozone and PM_{10} and as attainment or "unclassified" with respect to the CAAQS for all other criteria air pollutants (CARB 2017a). "Unclassified" is used in an area that cannot be classified based on available information as meeting or not meeting the standards.

Existing Emissions from Recreational Boating Activity

Table 10-5 shows the mass of emissions of criteria air pollutants and precursors generated by recreational boating activity in the LTAB in 2017 and 2035. These values are part of the statewide emissions inventory and projections developed for California by CARB and include only emissions generated by recreational boats registered in California and active in the LTAB.

Table 10-5 Emissions Inventory and Projections for Recreational Boats in the Lake Tahoe Air Basin

Calendar Year	Peak Summer Day (lb./day)[1]				
	NO_X	ROG	CO	PM_{10}	$PM_{2.5}$
2017	322	1,376	5,536	90	68
2035	240	542	4,872	38	28

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] These values are part of the statewide emissions inventory and projections developed for California by CARB and include only emissions generated by boats registered in California and active in the Lake Tahoe Air Basin.

Source: CARB 2017b

Staff at CARB have indicated that the level of boat ownership on the California side of the LTAB is expected to increase from 2017 to 2035 and that the increase is based on projected population growth in California and trends in recreational boat sales; nonetheless, the level of boat-generated emissions is expected to decrease as newer, cleaner boats replace older boats over time (Chou, pers. comm., 2018).

The State of Nevada has not developed an emissions inventory for recreational watercraft registered in Nevada and operated in the LTAB. However, it is anticipated that emissions from Nevada-registered watercraft in the LTAB will also decrease from existing conditions to 2035 because recreational watercraft sold in Nevada are subject to increasingly stringent federal emission standards (summarized in Table 10-2). Also, the rate at which activity by Nevada-registered watercraft in the LTAB would increase is assumed to be similar to that of California-registered watercraft. Moreover, there is an approximate 5-year lag in the timing of when federal emission standards become more stringent compared to CARB's emission standards. This means even more emissions reduction will be realized as the fleet of Nevada-registered watercraft turns over between existing conditions and the planning horizon year of the Shoreline Plan. Therefore, the downward trend for boat emissions shown in Table 10-5 is representative of a downward projection in emissions for all boats operating in the LTAB.

TOXIC AIR CONTAMINANTS

Existing sources of TACs in the LTAB include diesel-fueled vehicles traveling on major roadways such as U.S. 50 and SR 89. Other sources of TACs include seasonal operation of diesel-powered snow management equipment, such as plows and snow makers, during the winter season.

Most, if not all, recreational watercraft used on Lake Tahoe are powered by gasoline. Notable TACs contained in the exhaust of gasoline-powered engines include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, hexane, methanol, methyl ethyl ketone, naphthalene, propylene, styrene, toluene, and xylene (BAAQMD 2012:87). TAC emissions from recreational watercraft on Lake Tahoe are not a major concern because, due to the nature of boating activity, they are mostly a function of fuel consumption and boating activity occurs throughout the lake rather than in a few concentrated locations.

Naturally occurring asbestos is also recognized by CARB as a TAC. Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. According to two reports by the California Department of Conservation Division of Mines and Geology—*Relative Likelihood for the Presence of Naturally Occurring Asbestos in Placer County, California* and *A General Location Guide to Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Van Gosen and Clinkenbeard 2011; Higgins and Clinkenbeard 2006:54; Churchill and Hill 2000), the Tahoe Basin is not likely to contain naturally occurring asbestos.

10.3.3 Sensitive Receptors

Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants. Sensitive land uses are land uses that accommodate sensitive receptors, and exposure to pollutants could result in health-related risks to individuals. Existing sensitive land uses that accommodate sensitive receptors throughout the Tahoe Region include residences, schools, hospitals, daycare centers, parks, and playgrounds.

10.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

10.4.1 Methods and Assumptions

Operational emissions of criteria air pollutants and precursors (reactive organic gases [ROG], NO_X, PM_{10}, and $PM_{2.5}$) associated with implementation of the Shoreline Plan alternatives were calculated using CARB's existing and projected emissions inventory, the projected increase in boating activity on Lake Tahoe (as presented in Chapter 2, "Description of Proposed Project and Alternatives"), and the associated increase in on-road motor vehicle travel (as presented in Chapter 13, "Roadway Transportation and Circulation"). See Appendix C for all emission calculations, including output from the EMFAC2014 model used to estimate on-road mobile-source emissions. The analysis of operational emissions focuses on whether implementation of any of the Shoreline Plan alternatives would result in a substantial increase in emissions of criteria air pollutants and precursors in the LTAB. It is assumed that all the increases in boating activity associated with implementation of any of the Shoreline Plan alternatives would be in addition to the growth in boat ownership and boating activity incorporated into CARB's emissions projections for 2035, as shown in Table 10-4.

Although CARB's emissions inventory for recreational boating activity in the LTAB accounts for emissions only from boats registered in California, this analysis considers the projected decline in boat emissions, as shown in Table 10-5, to also be representative of the trend for emissions generated by Nevada-registered boats in the LTAB. This assumption is based on the fact that boats sold in California have been subject to CARB's increasingly stringent emission standards (see Table 10-4) and boats sold in Nevada have been

subject to federal emission standards that have also become increasingly stringent by model year. In other words, CARB's projected trend for boat emissions generated by California-registered boats in the LTAB serves as a proxy for Nevada-registered boats in the LTAB.

It is not meaningful to speculate on the specific type, number, location, timing, or construction details of future projects that would be implemented over the planning horizon of the Shoreline Plan, so short-term construction-generated emissions of criteria air pollutants and ozone precursors (NO_X and ROG) (which would be assessed at the project level during environmental review of specific development proposals) are assessed qualitatively.

Construction- and operation-related emissions of TACs were evaluated qualitatively based on the magnitude and duration of TAC-emitting activity and the proximity to nearby sensitive receptors. Odor impacts were also assessed qualitatively.

10.4.2 Significance Criteria

Significance criteria relevant to air quality are summarized below. The applicable TRPA threshold standards, the air quality criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- cause a substantial increase in pollutant emissions or a deterioration of ambient air quality;
- violate any air quality standard, including the NAAQS, CAAQS, and TRPA's numeric thresholds (as listed in Table 10-1) or contribute substantially to an existing or projected exceedance of these standards;
- result in a cumulatively considerable net increase of any criteria pollutant for which the LTAB is nonattainment with respect to the applicable NAAQS, CAAQS, or TRPA numeric threshold standard;
- conflict with applicable local, state, or regional air quality plans;
- expose sensitive receptors to substantial pollutant concentrations (including TACs/HAPs); or
- create substantial, objectionable odors.

10.4.3 Environmental Effects of the Project Alternatives

Impact 10-1: Long-term operational emissions of regional criteria air pollutants and precursors

Based on estimates of increased boating activity and emissions modeling and analysis, implementation of the Shoreline Plan under Alternatives 1, 3, and 4 would not result in the long-term increase in emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ in the LTAB and therefore would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standards. Long-term operational emissions also would not contribute to the nonattainment designation with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10} or inhibit implementation of the CO Maintenance Plan. This impact would be **less than significant** for Alternatives 1, 3, and 4.

Based on estimates of increased boating activity and emissions modeling and analysis, Shoreline Plan Alternative 2 would result in a long-term increase in emissions of NO_X and CO. The long-term increase in NO_X, which is an ozone precursor, would contribute to the nonattainment status of the LTAB with respect to the CAAQS for ozone and/or an exceedance of TRPA's 1-hour ozone threshold standard of 0.08 ppm. The long-term increase in CO would conflict with implementation of the CO maintenance plan and/or contribute to

exceedances of TRPA's 8-hour threshold standard of 6 ppm. This would be a **significant** impact for Alternative 2. Mitigation Measure 10-2 would require TRPA to limit the number of new moorings and boat ramps to the same numbers authorized under Alternative 1. This would reduce boat emissions such that they would not cause or contribute to an exceedance of the TRPA's numeric threshold standard for ozone or the CAAQS for ozone or CO and thereby would reduce this impact to a **less-than-significant** level.

The increase in long-term operational emissions associated with each Shoreline Plan alternative would primarily be a function of the increase in recreational boating activity that would occur, and, to a lesser degree, any new roadway vehicle trips associated with boating activity. None of the Shoreline Plan alternatives would result in new area sources or stationary sources of emissions such as those typically associated with the development of new residential or commercial buildings (e.g., natural gas-fired boilers, operation of landscape maintenance equipment).

Table 10-6 shows the projected increase in peak-day boating activity and roadway vehicle travel under each Shoreline Plan alternative.

Table 10-6 Boating Activity Levels and Roadway Travel by Alternative

	Peak-Day Boating Activity[1]		Increase in Peak-Day Roadway Vehicle Travel[2]
	Boat-hr/day	% Change	(VMT/day)
Baseline conditions	12,512	–	–
Baseline + Alternative 1	14,096	13%	11,368
Baseline + Alternative 2	17,939	43%	49,007
Baseline + Alternative 3	12,982	4%	7,613
Baseline + Alternative 4	12,521	No change	No change

Notes: boat-hr/day = boating-hours per day; VMT/day = vehicle miles travelled per day.

[1] Boating Activity levels are provided in Table 2-3 with percent change calculations added.

[2] The increases in VMT by roadway vehicles are provided in Table 13-5, in Chapter 13, "Roadway Transportation and Circulation."

Source: Values from Chapter 2, "Description of Proposed Project and Alternatives," Table 2-3; % change based on calculations

It is conservatively assumed that none of the increases in boating activity projected for the Shoreline Plan alternatives is accounted for in CARB's projected 2035 emissions inventory (as presented in Table 10-5). That is, all additional boating activity resulting from the Shoreline Plan alternatives is assumed to be in addition to the boating growth anticipated in CARB's emission inventory.

The net change in emissions associated with the change in boating activity levels and any associated increase in roadway vehicle trips were estimated for buildout (2040) and compared with existing conditions (2017) for each alternative below.

Alternative 1: Proposed Shoreline Plan

As shown in Table 10-6, the level of peak-day boating activity would increase from approximately 12,500 boat-hours per day (boat-hr/day) under existing conditions to approximately 14,100 boat-hr/day in 2040 under Alternative 1, or an increase of approximately 13 percent. In addition, there would be an associated increase of approximately 11,400 vehicle miles travelled per day (VMT/day) by roadway motor vehicles.

These changes are reflected in the operational emissions estimates for Alternative 1 and shown in Table 10-7.

Table 10-7 Net Change in Operational Emissions in the Lake Tahoe Air Basin under Alternative 1

Emissions Source	Peak-Day Emissions (lb/day)				
	NO_X	ROG	CO	PM_{10}	$PM_{2.5}$
Existing boating activity (2017) [1]	322	1,376	5,536	90	68
Boating activity in 2040 [2]	270	610	5,485	43	32
Increased roadway vehicle travel [3]	1.0	0.7	10.2	1.2	0.5
Net change[4]	-51	-765	-41	-46	-36

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emissions inventory (CARB 2017b). These values are based on emission factors for boats registered in California.

[2] The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2035, which is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6).

[3] Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles travelled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2015).

[4] The net change in emissions levels accounts only for the change in emissions per boat for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

Source: Data and calculations compiled by Ascent Environmental in 2018. See Appendix C for detailed modeling results and calculations.

Based on the emissions estimates presented in Table 10-7, emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ in the LTAB would decrease from existing conditions to 2040 under Alternative 1. This is because the emission rates for recreational watercraft on Lake Tahoe would decrease substantially over the planning horizon of the Shoreline Plan (as described in Section 10.2, "Regulatory Setting"). Any increase in boating activity and associated roadway vehicle travel resulting from Alternative 1 would be more than offset by fleet turnover and the increasingly stringent California and federal emissions standards for recreational watercraft. Because of the long-term reduction in emissions of ozone precursors, CO, PM_{10} and $PM_{2.5}$ that would result from stricter standards and cleaner engines over time, implementation of Alternative 1 would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standard. It would also not contribute to nonattainment designation with respect to the CAAQS and numeric TRPA threshold standards for ozone and PM_{10} or inhibit implementation of the CO Maintenance Plan. This impact would be **less than significant**.

<u>Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)</u>

As shown in Table 10-6, the level of peak-day boating activity would increase from approximately 12,500 boat-hr/day under existing conditions to approximately 18,000 boat-hr/day in 2040 under Alternative 3, or an increase of approximately 43 percent. There would also be an associated increase of approximately 49,000 VMT/day by roadway motor vehicles.

These changes are reflected in the operational emissions estimates for Alternative 2 and are shown in Table 10-8.

Based on the emissions estimates presented in Table 10-8, emissions of NO_X and CO in the LTAB would increase from existing conditions to 2040 under Alternative 2, while emissions of ROG, PM_{10}, and $PM_{2.5}$ would decrease. The long-term increase in NO_X, which is an ozone precursor, could contribute to the nonattainment status of the LTAB with respect to the CAAQS for ozone and/or an exceedance of TRPA's 1-hour ozone threshold standard of 0.08 ppm. In addition, the long-term increase in CO would conflict with implementation of the CO maintenance plan and/or contribute to exceedances of TRPA's 8-hour threshold standard of 6 ppm. This would be a **significant** impact.

Table 10-8 Net Change in Operational Emissions in the Lake Tahoe Air Basin under Alternative 2

Emissions Source	Peak-Day Emissions (lb/day)				
	NO_X	ROG	CO	PM_{10}	$PM_{2.5}$
Existing boating activity (2017) [1]	322	1,376	5,536	90	68
Boating activity in 2040 [2]	344	777	6,980	54	40
Increased roadway vehicle travel [3]	4.3	2.9	44.0	5.0	2.0
Net change[4]	26	-597	1,488	-31	-26

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emissions inventory (CARB 2017b). These values account only for boating activity by boats registered in California.

[2] The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2035, which is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6).

[3] Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles travelled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2015).

[4] The net change in emissions levels accounts only for the change in emissions per boat for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

Source: Data and calculations compiled by Ascent Environmental in 2018. See Appendix C for detailed modeling results and calculations.

<u>Alternative 3: Limit New Development</u>

As shown in Table 10-6, the level of peak-day boating activity would increase from approximately 12,500 boat-hr/day under existing conditions to approximately 13,000 boat-hr/day in 2040 under Alternative 3. This represents an increase of approximately 4 percent. In addition, there would be an increase of approximately 7,600 VMT/day by roadway motor vehicles.

These changes are reflected in the operational emissions estimates for Alternative 3 and shown in Table 10-9.

Table 10-9 Net Change in Operational Emissions in the Lake Tahoe Air Basin under Alternative 3

Emissions Source	Peak-Day Emissions (lb/day)				
	NO_X	ROG	CO	PM_{10}	$PM_{2.5}$
Existing boating activity (2017) [1]	322	1,376	5,536	90	68
Boating activity in 2040 [2]	249	562	5,051	39	29
Increased roadway vehicle travel [3]	0.7	0.5	6.8	0.8	0.3
Net change[4]	-72	-814	-478	-50	-39

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emissions inventory (CARB 2017b). These values account only for boating activity by boats registered in California.

[2] The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2035, which is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6).

[3] Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles travelled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2015).

[4] The net change in emissions levels accounts only for the change in emissions per boat for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

Source: Data and calculations compiled by Ascent Environmental in 2018. See Appendix C for detailed modeling results and calculations.

Based on the emissions estimates presented in Table 10-9, emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ in the LTAB would decrease from existing conditions to 2040 under Alternative 3. This is because the emission rates of recreational watercraft on Lake Tahoe would decrease substantially over the planning

horizon of the Shoreline Plan (as described in Section 10.2, "Regulatory Setting"). Any additional increase in boating activity and associated roadway vehicle travel would be more than offset by fleet turnover and the increasingly more stringent California and federal emissions standards for recreational watercraft. Because of the long-term reduction in emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ that would result from stricter standards and cleaner engines over time, implementation of Alternative 1 would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standard. It would also not contribute to nonattainment designation with respect to the CAAQS and numeric TRPA threshold standards for ozone and PM_{10} or inhibit implementation of the CO Maintenance Plan. This impact would be **less than significant**.

<u>Alternative 4: Expand Public Access and Reduce Existing Development</u>

As shown in Table 10-6, there would be no substantial increase in the level of peak-day boating activity or roadway motor vehicle activity between existing conditions and 2040 buildout conditions under Alternative 4.

Operational emissions estimates for Alternative 4 are shown in Table 10-10.

Table 10-10 Net Change in Operational Emissions in the Lake Tahoe Air Basin under Alternative 4

Emissions Source	Peak-Day Emissions (lb/day)				
	NO_X	ROG	CO	PM_{10}	$PM_{2.5}$
Existing boating activity (2017) [1]	322	1,376	5,536	90	68
Boating activity in 2040 [2]	240	542	4,872	38	28
Increased roadway vehicle travel [3]	0	0	0	0	0
Net change[4]	-82	-834	-664	-52	-40

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emissions inventory (CARB 2017b). These values account only for boating activity by boats registered in California.

[2] The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2035, which is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6).

[3] Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles travelled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2015).

[4] The net change in emissions levels accounts only for the change in emissions per boat for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

Source: Data and calculations compiled by Ascent Environmental in 2018. See Appendix C for detailed modeling results and calculations.

Based on the emissions estimates presented in Table 10-10, emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ in the LTAB would decrease from existing conditions to 2040 under Alternative 4. This is because there would be no increase in boating activity and, as described in Section 10.2, "Regulatory Setting," the emission rates of recreational watercraft on Lake Tahoe would decrease substantially over the planning horizon of the Shoreline Plan because of increasingly stringent California and federal emission standards. Because of the long-term reduction in emissions of ozone precursors, CO, PM_{10}, and $PM_{2.5}$ that would result from stricter standards and cleaner engines over time, and static level of boat and roadway vehicle activity, Alternative 4 would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standard. It would also not contribute to a nonattainment designation with respect to the CAAQS and numeric TRPA threshold standards for ozone and PM_{10} or inhibit implementation of the CO Maintenance Plan. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measure 10-1: Limit the number of moorings and boat ramps

This mitigation measure would be required for Alternative 2.

TRPA will revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps.

Significance after Mitigation

Implementation of Mitigation Measure 10-1 would restrict the number of new moorings and boat ramps to the same number authorized for Alternative 1. Because motorized watercraft activity and emissions are directly correlated to the number of moorings and boat ramps, this mitigation measure would reduce motorized watercraft activity under Alternative 2 to the same level as Alternative 1. As described above, the amount of motorized watercraft activity that would result from Alternative 1 would result in levels of boat emissions that would not cause or contribute to an exceedance of the TRPA's numeric threshold standard for ozone or the CAAQS for ozone or CO. This impact would be reduced to a **less-than-significant** level for Alternative 2.

Impact 10-2: Short-term construction emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$

Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would result in the construction of new piers, boat ramps, marinas, and/or boat houses. Given the number of new facilities that could be developed and the limited construction season in the Tahoe Region (i.e., May 1 to October 15), it is possible that a substantial amount of construction activity could occur at one time. Thus, equipment exhaust and fugitive dust emissions could violate or contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}. Therefore, this impact would be **potentially significant** for Alternatives 1, 2, 3, and 4.

It is anticipated that the best practices incorporated into the TRPA Standard Conditions of Approval for Shorezone Projects, as required by Mitigation Measure 10-2, would be effective in substantially reducing construction-generated emissions to **less-than-significant** levels for Alternatives 1, 2, 3, and 4.

Construction emissions are described as "short term" or temporary in duration and have the potential to represent a significant air quality impact if they violate or contribute to the violation of an applicable air quality standard. ROG and NO_X emissions are primarily associated with gas and diesel equipment exhaust. ROG is also emitted during the application of architectural coatings and during paving. Fugitive dust emissions (PM_{10} and $PM_{2.5}$) are primarily associated with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT and travel speed by construction vehicles on- and off-site.

Construction activities performed under all alternatives would be required to comply with TRPA's Standard Conditions of Approval for Shorezone Projects (TRPA Permit Appendix S), which are summarized in Section 10.2, "Regulatory Setting." These conditions include some dust control measures, including covering mounds of loose soil, revegetating disturbed areas, and avoiding track out.

Although project-specific details are not known for individual construction projects that would occur under the Shoreline Plan, the types of construction activities that would be associated with the development of a new boat ramp or pier, or dredging activity generate equipment exhaust and fugitive dust emissions that could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of the LTAB with respect to the CAAQS and numeric TRPA threshold standards for ozone and PM_{10}.

Because several local jurisdictions have their own regulations pertaining to construction emissions, project construction activities in those locations would be required to comply with those rules under all proposed alternatives. For projects in Placer, El Dorado, and Washoe Counties, construction equipment exhaust emissions may not exceed PCAPCD Rule 202, EDCAQMD Rule 202, or Washoe County Health District Regulation 040.005 limitations regarding visible emissions, respectively. Operators of vehicles and equipment that exceed opacity limits must be immediately notified, and the equipment must be repaired within 72 hours. Construction of projects located in California are also required to comply with all other applicable PCAPCD or EDCAQMD rules, as appropriate, including PCAPCD Rule 228 and EDCAQMD Rule 223, regarding fugitive dust; PCAPCD Rule 218 and EDCAQMD Rule 215, regarding the application of architectural coatings; and PCAPCD Rule 217 and EDCAQMD Rule 224, regarding cutback and emulsified asphalt paving materials. Projects located in Washoe County would be required to comply with Regulations 040.030, Dust Control; 040.090, Cutback Asphalts; and 040.200, Diesel Engine Idling.

The level of construction-generated emissions that could occur under each alternative is discussed separately below.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would allow new dredging under certain conditions and would result in the construction of up to an additional 10 new public piers, 128 private multiple-use or single-use piers, and two new boat ramps.

Given the limited construction season in the Tahoe Region (i.e., May 1 to October 15) and the number of new facilities that could be developed under Alternative 1, it is possible that a substantial amount of construction activity could occur at one time. Thus, equipment exhaust and fugitive dust emissions could violate or contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}. Therefore, this impact would be **potentially significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would authorize additional public and private piers, buoys, public and private marina slips, public boat ramps, new and expanded marinas, and private boat lifts. As described in Section 2.8.2, the number of new moorings would be limited by the number of eligible parcels that could place moorings consistent with location standards including the prohibition on structures within prime fish habitat. A maximum of two buoys and one boat lift would be allowed for each littoral parcel. Based on an assessment of the most recent prime fish habitat map and pier eligibility criteria, it is estimated that up to 4,871 new buoys, 1,897 new slips, and 168 new boat lifts could be developed under the No Project Alternative, for a total of 6,396 new moorings.

For the same reasons described for Alternative 1, construction activity under Alternative 2 could contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}. Therefore, this impact would be **potentially significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize five new public piers, 86 private multiple-use piers, and one new boat ramp.

For the same reasons described for Alternative 1, construction activity under Alternative 3 could contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}. Therefore, this impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would authorize an additional 15 public piers and the potential removal and relocation of existing piers and boat ramps with a 2:1 reduction in the total number of structures.

For the same reasons described for Alternative 1, construction activity under Alternative 4 could contribute substantially to an existing or projected air quality violation, especially considering the nonattainment status of the LTAB with respect to the CAAQS and TRPA numeric threshold standards for ozone and PM_{10}. Therefore, this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 10-2: Add best construction practices for emissions to the standard conditions of approval for shoreline projects

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

TRPA will revise the Standard Conditions of Approval for Shorezone Projects (TRPA Permit Attachment S) to require that minimum construction emission reduction best practices be implemented for all projects within the shorezone. The Standard Conditions of Approval for Shorezone Projects will be amended to add the following best construction practices:

- Fugitive dust shall not exceed 40 percent opacity and not go beyond the property boundary at any time during project construction.
- No open burning of removed vegetation shall occur during infrastructure improvements.
- Idling time for all diesel-powered equipment shall not exceed 5 minutes.
- Water shall be applied as needed to prevent dust impacts from extending off-site. Operational water truck(s) shall be on-site, as required, to control fugitive dust. Construction vehicles leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked off-site.
- Existing power sources or clean-fuel generators rather than temporary diesel power generators shall be used wherever feasible.

Significance after Mitigation

Mitigation Measure 10-2 includes basic best practices for dust control during construction. Implementation of Mitigation Measure 10-2 would reduce fugitive PM_{10} and $PM_{2.5}$ dust emissions for each project and minimize dispersion beyond a given property boundary. Implementation of Mitigation Measure 10-2, as prescribed, would also reduce diesel equipment exhaust emissions of NO_X and PM_{10} by restricting idling times for diesel equipment. It is anticipated that these best practices would be effective in substantially reducing construction-generated emissions. Importantly, projects located in the jurisdictions of PCAPCD or EDCAQMD must demonstrate, as a condition of approval, that emissions would be mitigated to levels below the respective district-applicable threshold standards for construction emissions. This would ensure that impacts from project-specific construction activities would be mitigated to a **less-than-significant** level.

Impact 10-3: Exposure of sensitive receptors to toxic air contaminants

Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would not result in the siting of new stationary sources of TACs, new sensitive receptors, or an increase in TAC emissions generated by recreational watercraft. Construction of new facilities would involve the use of off-road heavy-duty diesel-powered equipment that emits diesel PM. However, because of the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs. This impact would be **less than significant** for Alternatives 1, 2, 3, and 4.

None of the Shoreline Plan alternatives would result in the siting of new sensitive receptors, such as residences or schools, or new stationary sources of TACs.

As described in Section 10.3.2, "Existing Air Quality," notable TACs emitted by recreational watercraft on Lake Tahoe may include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, hexane, methanol, methyl ethyl ketone, naphthalene, propylene, styrene, toluene, and xylene—and the quantity in which these TACs are emitted is a function of the level of total organic gases (TOG) (BAAQMD 2012:87). TOG is a portion of total hydrocarbon emissions. Tables 10-7, 10-8, 10-9, and 10-10 show that emissions of hydrocarbons are expected to decrease from existing conditions to 2040 under Alternatives 1, 2, 3, and 4, respectively, because of the turnover in the boat fleet. Therefore, it is expected that emissions of TACs generated by recreational watercraft would also decrease. For this reason, and because emission-generating recreational boating activity would occur lakewide and not be concentrated in a few locations or near sensitive receptors for any extended period, there would be no adverse effect from boat-generated TAC emissions.

For construction activities, diesel PM is the primary TAC of concern. Construction of new facilities, such as piers, boat ramps, or a new or expanded marina, could involve the generation of diesel PM emissions in the exhaust of off-road heavy-duty diesel equipment used in dredging, site preparation (e.g., clearing and grading), and paving. On-road diesel-powered haul trucks or barges traveling to and from a construction site to deliver materials and equipment are less of a concern because they would not stay on the site for long durations. Consequently, it is important to consider that the use of off-road heavy-duty diesel equipment would be limited to the periods of construction, for which most diesel-powered off-road equipment use would occur during the limited construction season (approximately May 1 to October 15) and only during the season or seasons when the proposed facility is being constructed.

The primary factor used to determine health risk associated with exposure to TAC emissions is the dose to which receptors are exposed. Dose is a function of the concentration of one or more substances in the environment and the duration of exposure to that substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for any exposed receptor. Thus, the risks estimated for an exposed individual are higher if a fixed exposure occurs over a longer period. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the acceptable level of exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period for residential receptors; however, such assessments should be limited to the period/duration of activities associated with the proposed project (OEHHA 2015:8-1 and 8-6).

Another important factor is the proximity of nearby sensitive receptors and their occupancy characteristics. Studies show that diesel PM is highly dispersive (as an example, diesel PM concentrations decrease by 70 percent at 500 feet from the source) (Zhu et al. 2002). Thus, receptors must be close to sources to result in the possibility of exposure to concentrations of concern.

Also, research of diesel PM generated by freeway traffic (i.e., on-road vehicles) indicates that vegetation, particularly fine-needle tree species, can remove particulate from the air (Fuller et al. 2009; Breathe California 2008), further reducing potential exposure to diesel PM. This suggests that some protection may be provided by fine needle conifer trees located between diesel PM-emitting construction activity and sensitive receptors.

In addition, emissions of diesel PM generated by construction activity would be limited by TRPA conditions of approval, for any facilities that would be constructed in an upland area (e.g., parking lot for a boat ramp or marina), and Mitigation Measure 10-2, which would require best construction practices that include limit emissions from construction equipment.

The potential for sensitive receptors to be exposed to elevated levels of health risk from construction-generated emissions of diesel PM is discussed for each alternative separately below.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would authorize new dredging in certain instances, and construction of new slips and an additional 10 public piers, 128 private multiple-use piers, and two new boat ramps over the buildout period.

It is not anticipated that construction any of these facility types would take more than one or two construction seasons (i.e., May 1 to October 15). Moreover, because the shorezone of Lake Tahoe is geographically spread out, multiple construction sites would not be near each other generating emissions that affect the same individual receptors. Therefore, due to the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs. Additionally, construction projects must comply with provisions of the TRPA Code limiting idling, which reduces the amount of TAC emissions. This impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)
Alternative 2 would authorize additional public and private piers, buoys, public and private marina slips, public boat ramps, new and expanded marinas, and private boat lifts. As described in Section 2.8.2, the number of new moorings would be limited by the number of eligible parcels that could place moorings consistent with location standards including the prohibition on structures within prime fish habitat. It is anticipated that the construction of a new or expanded marina could take place over two construction seasons (i.e., May 1 to October 15). Like Alternative 1, due to the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs. Additionally, construction projects must comply with provisions of the TRPA Code limiting idling, which reduces the amount of TAC emissions. This impact would be **less than significant**.

Alternative 3: Limit New Development
Alternative 3 would authorize new dredging in certain instances, and construction of an additional 5 public piers, 86 private multiple-use piers, and one new boat ramp. Like Alternative 1, due to the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs. Additionally, construction projects must comply with provisions of the TRPA Code limiting idling, which reduces the amount of TAC emissions. This impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development
Alternative 4 would authorize an additional 15 public piers and the potential removal, relocation, and rebuild of some existing piers and boat ramps. Like Alternative 1, due to the short duration of construction activity at any single location and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to substantial concentrations of TACs. Additionally, construction projects must comply with provisions of the TRPA Code limiting idling, which reduces the amount of TAC emissions. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 10-4: Exposure to excessive odorous emissions

Implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would not result in the siting of new major sources of odors or new sensitive receptors. Neither construction nor operation of facilities that may be developed because of the Shoreline Plan would create objectionable odors affecting a substantial number of people. This impact would be **less than significant**.

The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. Although offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would not result in any new major sources commonly known to produce odors (e.g., landfills, wastewater treatment facilities) and it would not result in the development of new sensitive receptors. Correspondingly, PCAPCD, EDCAQMD, and TRPA have no records of odor complaints regarding emissions generated by recreational watercraft (Springsteen, pers. comm., 2018, Lenkin 2018). Diesel exhaust from the use of heavy-duty off-road equipment during the construction of new facilities would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance. Thus, implementation of Alternative 1 would create objectionable odors affecting a substantial number of people. As a result, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

For the same reasons described above for Alternative 1, odor impacts associated with Alternative 2 would be **less than significant.**

Alternative 3: Limit New Development

For the same reasons described above for Alternative 1, odor impacts associated with Alternative 3 would be **less than significant.**

Alternative 4: Expand Public Access and Reduce Existing Development

For the same reasons described above for Alternative 1, odor impacts associated with Alternative 4 would be **less than significant.**

Mitigation Measures

No mitigation is required.

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11 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

11.1 INTRODUCTION

This chapter includes a discussion of existing greenhouse gas (GHG) emissions and climate change conditions, a summary of applicable regulations and policies, and an analysis of the potential for the Shoreline Plan to result in construction- and operation-related GHG emissions that contribute to climate change. This was the primary issue raised during scoping that pertains to GHG emissions and climate change.

The methods of analysis for addressing construction- and operation-related GHGs used in this chapter are consistent with the recommendations of the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA).

11.2 REGULATORY SETTING

GHG emission standards and fuel efficiency standards have not been established for recreational watercraft by any federal or state agencies, or by TRPA. However, GHG emissions from other sources and responses to global climate change are regulated by a variety of federal, state, and local laws and policies. Key regulatory and conservation planning issues applicable to the Shoreline Plan are discussed below.

11.2.1 Federal

GREENHOUSE GAS EMISSIONS STANDARDS

In October 2012, EPA and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). NHTSA CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO_2) per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

In January 2017, EPA Administrator Gina McCarthy signed her determination to maintain the current GHG emissions standards for model year 2022-2025 vehicles. However, on March 15, 2017, the new EPA Administrator, Scott Pruitt, and Department of Transportation Secretary, Elaine Chao, announced that EPA intends to reconsider the final determination. EPA intends to make a new Final Determination regarding the appropriateness of the standards no later than April 1, 2018 (EPA 2017).

CLEAN POWER PLAN

The Clean Power Plan was unveiled by President Obama on August 3, 2015. The plan aims to reduce carbon dioxide emissions from electrical power generation by 32 percent within twenty-five years relative to 2005 levels. President Donald Trump signed an executive order on March 28, 2017 mandating the EPA to review the plan. EPA is proposing to repeal the Clean Power Plan based on a change to the legal interpretation of Section 111(d) of the CAA, upon which the Clean Power Plan was based. EPA is accepting public comments on the proposal until April 26, 2018 (EPA 2018).

11.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA does not have any environmental thresholds concerning GHGs (TRPA 2016).

GOALS AND POLICIES

TRPA's Regional Plan does not include any goals or policies addressing GHGs throughout the Tahoe Basin (TRPA 2012). However, TRPA's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which serves as the transportation element of the Regional Plan (TRPA 2012:3-1), includes a strategy to reduce GHGs generated by on-road vehicle travel in the California portion of the Tahoe Basin. The RTP/SCS is discussed in greater detail below.

REGIONAL TRANSPORTATION PLAN AND SUSTAINABLE COMMUNITIES STRATEGY

As the Lake Tahoe region's federally designated metropolitan planning organization, TRPA completed the latest update to its RTP in 2017 (TRPA 2017). The plan seeks to improve mobility and safety for the commuting public while at the same time delivering environmental improvements throughout the transportation network in the Tahoe Basin. Important directions of the plan are to reduce the overall environmental impact of transportation in the region, create walkable, vibrant communities, and provide real alternatives to driving. The plan met the challenge of California's Senate Bill (SB) 375 (2008, summarized below) and qualifies as an SCS by presenting an integrated land use and transportation strategy that will reduce vehicle miles traveled and make it possible for the California side of Lake Tahoe Region to reduce its GHG emission generated by passenger cars and light duty trucks from 2005 levels 8.8 percent by 2020 and 5 percent by 2035. A smaller GHG reduction is forecast for 2035 based on the projections of increased population growth in metropolitan areas surrounding Lake Tahoe and the related increases in visitation from those areas (TRPA 2017:ES-5).

CODE OF ORDINANCES

Subsection 13.5.3.E, Greenhouse Gas Reduction Strategy

Subsection 13.5.3.E requires that area plans to include a strategy to reduce GHGs from the construction and operation of buildings. The strategy must include elements in addition to those included to satisfy other TRPA or state requirements. Additional elements included in the strategy may include but are not limited to the following:

- a local green building incentive program to reduce the energy consumption of new or remodeled buildings;
- a low interest loan or rebate program for alternative energy projects or energy efficiency retrofits;
- modifications to the applicable building code or design standards to reduce energy consumption; or
- capital improvements to reduce energy consumption or incorporate alternative energy production into public facilities.

Lake Tahoe Sustainability Action Plan

The Sustainability Action Plan (SAP), released in 2013, provides tools to assist local governments, agencies, businesses, residents, visitors, and community groups with prioritizing and adopting consistent sustainability actions throughout the Tahoe Region. The SAP represents an integrated approach to reducing GHG emissions and striving toward zero-impact in all aspects of sustainability. The SAP includes a GHG emissions inventory and reduction targets, and climate change and adaptation strategies vetted through the Lake Tahoe Sustainability Collaborative and the Tahoe Basin Partnership for Sustainable Communities. Within the

SAP, TRPA established a GHG reduction goal for the Tahoe Region of 5 percent and 49 percent below the 2005–2010 average baseline by 2020 and 2035, respectively. The SAP identifies actions that have the potential to reduce GHG emissions during construction and operation of land uses and protect against the effects of climate change. Identified actions include expanding the bicycle and pedestrian network, improving transit, supporting alternative fueled vehicles, increasing solid waste diversion, and urban forestry. None of the GHG reduction measures identified in the SAP pertain to boating activity. The recommended actions have not been officially adopted and thus are not currently required by TRPA or Tahoe Metropolitan Planning Organization (TMPO) (Lake Tahoe Sustainable Communities Program 2013).

11.2.3 California

EXECUTIVE ORDER S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established total GHG emission targets for the state. Specifically, statewide emissions are to be reduced to 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

This executive order was the subject of a California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (SANDAG) (November 24, 2014) 231 Cal.App.4th 1056, which was reviewed by the California Supreme Court in January 2017. The case addressed the adequacy of the GHG analysis in the Environmental Impact Report (EIR) SANDAG prepared for its 2011 Regional Transportation Plan. Although the court ruling concerned an EIR prepared pursuant to the California Environmental Quality Act, it may be relevant to the preparation of this EIS.

The Court decided a singular question in its decision, which was released on July 13, 2017. The Court ruled that SANDAG did not abuse its discretion by declining "to adopt the 2050 goal as a measure of significance because the Executive Order does not specify any plan or implementation measures to achieve its goal." In addition to concluding that an EIR need not use this executive order's goal for determining significance, the Court described several principles relevant to CEQA review of GHG impacts, including: (1) EIRs should "reasonably evaluate" the "long-range GHG emission impacts for the year 2050;" (2) the 2050 target is "grounded in sound science" in that it is "based on the scientifically supported level of emissions reduction needed to avoid significant disruption of the climate." The Court also ruled that "an EIR's designation of a particular adverse environmental effect as 'significant' does not excuse the EIR's failure to reasonably describe the nature and magnitude of the adverse effect." The Court also recognized that the 40 percent reduction in 1990 GHG levels by 2030 is "widely acknowledged" as a "necessary interim target to ensure that California meets its longer-range goal of reducing greenhouse gas emission 80 percent below 1990 levels by the year 2050." SB 32 has since defined the 2030 goal in statute (discussed below).

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that (a) the statewide greenhouse gas emissions limit shall remain in effect unless otherwise amended or repealed. (b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continues in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020. (c) The [California Air Resources Board] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020." [California Health and Safety Code, Division 25.5, Part 3, Section 38551]

EXECUTIVE ORDER B-30-15

On April 20, 2015 Governor Brown signed EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's EO aligns California's GHG reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (AB 32 of 2008, discussed above). California's new emission reduction target of 40 percent below 1990 levels by 2030 sets the next interim step in the State's continuing efforts to pursue the long-term target expressed under Executive Order S-3-05 to reach the goal of reducing emissions 80 percent below 1990 levels by 2050. This is in line with the scientifically established levels needed in the U.S. to limit global warming below 2 degrees Celsius, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

SENATE BILL 32 AND ASSEMBLY BILL 197 OF 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

CLIMATE CHANGE SCOPING PLAN

In December 2008, CARB adopted its first version of its *Climate Change Scoping Plan*, which contained the main strategies California will implement to achieve the mandate of AB 32 (2006) to reduce statewide GHG emissions to 1990 levels by 2020. In May 2014, CARB released and subsequently adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching the goals of AB 32 (2006) and evaluate the progress made between 2000 and 2012. After releasing multiple versions of proposed updates in 2017 CARB adopted the next version titled *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan) in December of that same year (CARB 2017a). The 2017 Scoping Plan indicates that California is on track to achieve the 2020 statewide GHG target mandated by AB 32 of 2006. It also lays out the framework for achieving the mandate of SB 32 of 2016 to reduce statewide GHG emissions to at least 40 percent below 1990 levels by the end of 2030 (CARB 2017a:9). The 2017 Scoping Plan identifies the GHG reductions needed by each emissions sector. The Scoping Plan does not include any information or guidance specific to motorized recreational watercraft or off-road recreational equipment.

The 2017 Scoping Plan also identifies how GHGs associated with proposed projects could be evaluated under CEQA (CARB 2017a:101-102). Specifically, it states that achieving "no net increase" in GHG emissions is an appropriate overall objective of projects evaluated under CEQA if conformity with an applicable local GHG reduction plan cannot be demonstrated. CARB recognizes that it may not be appropriate or feasible for every development project to mitigate its GHG emissions to zero and that an increase in GHG emissions due to a project may not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change.

SENATE BILL 375 OF 2008

SB 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt an SCS or Alternative Planning Strategy, showing prescribed land use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, provides each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035. As discussed above, TRPA serves as the MPO for the Tahoe Basin.

ADVANCED CLEAN CARS PROGRAM

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of regulatory standards for vehicle model years 2017 through 2025. The new regulations strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions than the statewide fleet in 2016 (CARB 2016).

LOW CARBON FUEL STANDARD

In January 2007, Executive Order S-01-07 established a Low Carbon Fuel Standard (LCFS). The Order calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and that a LCFS for transportation fuels be established for California. The LCFS applies to all refiners, blenders, producers, or importers ("Providers") of transportation fuels in California, including fuels used by off-road construction equipment, including boats (Wade, pers. comm. 2018). The LCFS is measured on a full fuels cycle basis and may be met through market-based methods by which providers exceeding the performance required by an LCFS receive credits that may be applied to future obligations or traded to Providers not meeting LCFS.

In June 2007, CARB adopted the LCFS as a Discrete Early Action item under AB 32 pursuant to Health and Safety Code Section 38560.5, and, in April 2009, CARB approved the new rules and carbon intensity reference values with new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels they provide and demonstrate they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher intensity fuels.

After some disputes in the courts, CARB re-adopted the LCFS regulation in September 2015, and the LCFS went into effect on January 1, 2016.

SENATE BILL X1-2, THE CALIFORNIA RENEWABLE ENERGY RESOURCES ACT OF 2011

SB X1-2 of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020, referred to as California's Renewable Portfolio Standard (RPS). SB X1-2 sets a three-stage compliance period requiring all California utilities, including independently owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020. SB X1-2 also requires the renewable electricity standard to be met increasingly with renewable energy that is supplied to the California grid from sources within, or directly proximate to, California. SB X1-2 mandates that renewables from these sources make up at least 50 percent of the total renewable energy for the 2011-2013 compliance period, at least 65 percent for the 2014-2016 compliance period, and at least 75 percent for 2016 and beyond.

SENATE BILL 350

Approved by the Governor on October 7, 2015, SB 350 targets a 50 percent renewable mix in California electricity by December 31, 2030 and a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses of retail customers by January 1, 2030 with annual targets established by the California Energy Commission. This bill is meant as an extension of the State's current 2020 RPS goal. SB 350's energy efficiency goals are applicable to both existing building stock and new construction but would have the most impact on existing building stock.

11.2.4 Nevada

The Nevada Climate Change Advisory Committee (NCCAC) was created through an Executive Order signed in April 2007. The Executive Order directed the committee to propose recommendations for reducing GHG emissions in Nevada. The committee's final report included 28 recommendations related to reducing GHG emissions from the energy, transportation, waste, agriculture, and other sectors. One of the committee's priority recommendations is to develop a State Climate Action Plan (NCCAC 2008:7-9). At this time, the Nevada Division of Environmental Protection (NDEP) has not adopted GHG reduction goals or climate change-related policies or regulations that would pertain to the Shoreline Plan.

11.3 AFFECTED ENVIRONMENT

GHG emissions have the potential to adversely affect the environment because they contribute, on a cumulative basis, to global climate change. This section provides background on global climate change sources of GHG emissions.

11.3.1 Scientific Basis of Greenhouse Gas Emissions and Climate Change

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs more than natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcing (IPCC 2014).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the

atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates. GHG impacts relative to global climate change are inherently cumulative.

11.3.2 Greenhouse Gas Emission Sources

GHG emissions are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural emissions sectors (CARB 2014a). In both California and Nevada, the transportation sector and electricity generation sectors are the largest emitters of GHGs (CARB 2017c; NDEP 2017:9). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. NO_2 is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water), respectively, two of the most common processes for removing CO_2 from the atmosphere.

11.3.3 Effects of Climate Change on the Environment

The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programmed to provide the world with a scientific view on climate change and its potential effects. According to the IPCC global average temperature is expected to increase relative to the 1986–2005 period by 0.3 to 4.8 degrees Celsius (°C) (0.5 to 8.6 degrees Fahrenheit [°F]) by the end of the 21st century (2081–2100), depending on future GHG emission scenarios (IPCC 2014:SPM-8).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and resulting rise in global average temperature. In the recent years, California has been marked by extreme weather and its effects. According to CNRA's draft report, *Safeguarding California Plan: 2017 Update* (CNRA 2017), California experienced the driest four-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2017). In contrast, the northern Sierra Nevada range experienced its wettest year on record in 2016 (CNRA 2017). The changes in precipitation exacerbate wildfires throughout California with increasing frequency, size, and devastation. As temperatures increase, the increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada and Cascade mountains until spring would flow into the Central Valley concurrently with winter rainstorm events. This scenario would place more pressure on California's levee/flood control system (CNRA 2017). Furthermore, in the extreme scenario involving the rapid loss of the Antarctic ice sheet, sea level along California's coastline could rise to 10 feet by 2100, which is approximately 30 to 40 times faster than sea level rise experienced over the last century (CNRA 2017).

Changes in temperature, precipitation patterns, extreme weather events, and sea-level rise have the potential to effect and decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines, disrupt electrical demand, and threaten energy infrastructure with the increased risk of flooding (CNRA 2017).

Sea level rise, storm surge, and coastal erosion are imminent threats to highways, roads, bridge supports, airports, transit systems and rail lines near sea level and seaports. Shifting precipitation patterns, increased temperatures, wildfires, and increased frequency in extreme weather events also threaten transportation systems across California and Nevada. Temperature extremes and increased precipitation can increase the risk of road and railroad track failure, decreased transportation safety, and increased maintenance costs (CNRA 2017).

Water availability and changing temperatures, which affects prevalence of pests, disease, and species, directly impact crop development and livestock production. Other environmental concerns include decline in water quality, groundwater security, and soil health (CNRA 2017). Vulnerabilities of water resources also include risks to degradation of watersheds, alteration of ecosystems and loss of habitat, impacts to coastal areas, and ocean acidification (CNRA 2017). The ocean absorbs approximately a third of the CO_2 released into the atmosphere every year from industrial and agricultural activities, changing the chemistry of the ocean by decreasing the pH of seawater. This ocean acidification is harmful to marine organisms especially calcifying species such as oysters, clams, sea urchins, and corals (CNRA 2017).

Cal-Adapt is a planning tool developed by the California Energy Commission (CEC) to evaluate climate change impacts consistent with emissions scenarios identified in the IPCC Fifth Assessment Report (IPCC 2014). The IPCC Fifth Assessment Report uses future emissions projections known as Representative Concentration Pathways (RCP) to estimate scenarios in which varying (higher or lower) levels of GHGs would be emitted in the future. Emissions scenarios used in the Cal-Adapt tool are based on the RCP 4.5 and RCP 8.5 scenarios. The RCP 4.5 scenario assumes global GHG emissions peak around 2040 and then decline between 2040 and 2100. The RCP 8.5 scenario assumes global GHG emissions continue to rise through 2050 with global annual emissions peaking around 2100. According to Cal-Adapt, annual mean temperatures in the City of South Lake Tahoe would increase 4.9°F by 2050 and 6.7°F by 2099 under the RCP 4.5 scenario and an increase 6.1°F by 2050 and 9.8°F by 2099 under the RCP 8.5 scenario. (Cal-Adapt 2017a).

Based on Cal-Adept's Annual Averages Precipitation tool, historical annual mean precipitation in the project region, identified as the Tahoe-Sierra Integrated Regional Water Management Region, is 41.7" per year. Under the RCP 4.5 scenario, annual mean precipitation is projected to increase by 3.6" to 45.3" by 2050 and decrease slightly to 45.5" by the end of the century. Under the RCP 8.5 scenario, annual mean precipitation is projected increase by 4.9" to 46.6" by 2050 and increase to 51.3" by the end of the century (Cal-Adapt 2017b).

11.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

11.4.1 Methods and Assumptions

GHG emissions associated with increased on-road vehicle travel were estimated using vehicle miles traveled (VMT) determined by the traffic analysis in Chapter 13, "Roadway Transportation and Circulation", and the EMFAC2014 web database (CARB 2015). The estimate of GHG emissions from VMT are based on estimates of annual VMT, which differs from the peak-day VMT estimates in Chapter 13. The estimate of GHGs associated with the construction of new shorezone facilities are also addressed qualitatively.

The potential change in long-term operational emissions generated by boating activity in the Tahoe Region under the Shoreline Plan alternatives is addressed qualitatively. CARB has not developed an estimate of GHG emissions from motorized watercraft in the Tahoe Region as it has for criteria pollutants and precursors. In addition, he statewide GHG inventories prepared for California and Nevada by CARB and the Nevada Division of Environmental Protection do not include any values specific to motorized boats or watercraft (CARB 2017c, NDEP 2017).

Furthermore, no GHG emission standards or fuel efficiency standards have been established for recreational watercraft by EPA, CARB, Nevada, or any other agency. Therefore, this analysis assesses the potential for a long-term net increase in GHG emissions at buildout (2040) of the Shoreline Plan alternatives based on the projected increase in boating activity and, the extent to which it can be known whether the future boat fleet will more GHG efficient than the existing boat fleet, and the potential for a longer boating season.

11.4.2 Significance Criteria

While TRPA considers GHG emissions and climate change within its EISs, TRPA has not adopted specific significance criteria for analyzing GHG emissions generated by a proposed project or endorsed a methodology for analyzing impacts related to GHG emissions or global climate change. An impact would be considered significant if it would:

- Result in a net increase in GHG emissions.

11.4.3 Environmental Effects of the Project Alternatives

Impact 11-1: Greenhouse gas emissions

Implementation of the Shoreline Plan would result in GHG emissions associated with the construction and demolition of boating facilities and on-road motor vehicle trips to and from new boating facilities. Under Alternatives 1, 2, and 3, implementation of the Shoreline Plan would also result in an increase in GHG-emitting boating activity. It is not feasible to know whether the fleet of motorized boats on Lake Tahoe will become more GHG efficient and, if it does, whether the improvement in GHG efficiency would be enough to offset the GHGs associated with construction activity, the increase in on-road motor vehicle travel, and the projected increase in boating activity. Therefore, this impact would be **potentially significant**.

The development and implementation of a GHG Reduction Policy, as required by Mitigation Measure 11-1, would reduce GHG emissions, but the extent of this reduction depends on participation rates, available funding, and available technology. Given the uncertainty about the magnitude of the increase in GHG emissions under the Shoreline Plan and the uncertain effect of these mitigation measures, the Shoreline Plan alternatives could have a considerable contribution to the cumulative impact of GHG emissions and climate change and this impact would be **significant and unavoidable** for all alternatives.

The increase in long-term operational GHG emissions associated with each Shoreline Plan alternative would primarily be a function of the increase in recreational boating activity that would occur, and, to a lesser degree, any new on-road vehicle trips associated with boating activity. None of the Shoreline Plan alternatives would result in new area sources or stationary sources of GHGs such as those typically associated with the development of new residential or commercial buildings (e.g., natural gas-fired boilers, operation of landscape maintenance equipment).

Table 11-1 shows the projected increase in annual boating activity under each Shoreline Plan Alternative.

Table 11-1 Estimated Boating Activity Under Each Alternative

	Annual Boating Activity[1]	
	boat-hr/year	% change
Baseline Conditions	489,155	–
Baseline + Alternative 1	566,814	+16%
Baseline + Alternative 2	742,260	+52%
Baseline + Alternative 3	507,368	+4%
Baseline + Alternative 4	489,155	0%

Notes: boat-hr/day = boating-hours per day; VMT/day = vehicle miles travelled per day

[1] Boating activity levels are provided in Table 2-3. Percent change calculations are added.

[2] The increases in VMT by on-road vehicles is provided in the traffic used to support the impact analysis in Section 12, "Roadway Transportation and Circulation."

Source: Values from Project Description, Table 2-3; % change based on calculations. For detailed calculations see Appendix C.

Table 11-2 shows the increase in VMT and GHG emissions generated by on-road vehicle activity associated with each of the alternatives.

Table 11-2 Annual Increase in VMT and GHG Emissions from On-Road Motor Vehicle Travel by Alternative

Alternative	VMT/year	MT CO_2/year
Alternative 1	–	4.4
Alternative 2	+373,841	19.7
Alternative 3	+1,662,124	3.6
Alternative 4	+299,771	0.0

Notes: MT CO_2/year = metric tons of carbon dioxide per year

Source: Modeling by Ascent Environmental using the EMFAC 2014 web database (CARB 2014b). For detailed calculations see Appendix C.

The potential for the change in boating activity and associated on-road vehicle travel to result in a net increase in GHG emissions is discussed for each alternative below.

<u>Alternative 1: Proposed Shoreline Plan</u>

Alternative 1 would authorize new dredging in specific circumstances, an additional 10 public piers, 128 private multiple-use piers, and two new boat ramps. Construction of these facilities would involve the use of GHG-emitting off-road construction equipment, GHG-emitting trucks delivering materials and equipment to construction sites, and GHG-emitting commute trips by construction workers. Construction of each facility would result in a one-time increase in GHG emissions.

As shown in Table 11-2, the on-road motor vehicle activity associated with the increase in boating would generate approximately 4.4 MT CO_2e/year at buildout under Alternative 1. Thus, there would be an increase in GHGs generated by on-road motor vehicle activity.

As shown in Table 11-1, boating activity at buildout (2040) under Alternative 1 is projected to increase approximately 16 percent from existing conditions. It is not feasible to know whether the fleet of boats operating at buildout would be more GHG-efficient than the existing boat fleet because there are no established GHG emission standards for motorized recreational watercraft. Even if some improvement to the GHG efficiency of the future boat fleet is achieved it is not feasible to know whether the magnitude of this improvement would be sufficient to offset the increase in boating activity, the associated on-road mobile-source GHG emissions, and construction-related emissions. Therefore, implementation of Alternative 1 has the potential to result in a substantial contribution to GHG emissions. This impact would be **potentially significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would authorize additional public and private piers, buoys, public and private marina slips, public boat ramps, new and expanded marinas, and private boat lifts. As described in Chapter 2, "Project Description," the number of new moorings would be limited by the number of eligible parcels that could place moorings consistent with location standards including the prohibition on structures within prime fish habitat. A maximum of two buoys and one boat lift would be allowed for each littoral parcel. Based on an assessment of the most recent prime fish habitat mapping and pier eligibility criteria, it is estimated that up to 4,871 new buoys, 1,897 new slips, and 168 new boat lifts could be developed under the No Project Alternative, for a total of 6,396 new moorings.

As shown in Table 11-2, the on-road motor vehicle activity associated with the increase in boating would generate approximately 19.7 MT CO_2e/year at buildout under Alternative 2. Thus, there would be an increase in GHGs generated by on-road motor vehicle activity.

As shown in Table 11-1, boating activity at buildout (2040) under Alternative 2 is projected to increase approximately 52 percent from existing conditions. As with Alternative 1, it is not feasible to know whether the fleet of boats operating at buildout would be more GHG efficient than the existing boat fleet because there are no established GHG emission standards for motorized recreational watercraft. Even if some improvement to the GHG efficiency of the future boat fleet is achieved it is not feasible to know whether the magnitude of this improvement would be sufficient to offset the increase in boating activity, the associated on-road mobile-source GHG emissions, and construction-related emissions. Therefore, implementation of Alternative 2 has the potential to result in a substantial contribution to GHG emissions. This impact would be **potentially significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize new dredging in specific circumstances, an additional 5 public piers, 86 private multiple-use piers, and one new boat ramp and, like Alternative 1, construction of these facilities would result in a one-time increase in GHG emissions.

As shown in Table 11-2, the on-road motor vehicle activity associated with the increase in boating would generate approximately 3.6 MT CO_2e/year at buildout under Alternative 1. Thus, there would be an increase in GHGs generated by on-road motor vehicle activity.

As shown in Table 11-1, boating activity at buildout (2040) under Alternative 3 is projected to increase approximately 4 percent from existing conditions. As with Alternative 1, it is not feasible to know whether the fleet of boats operating at buildout would be more GHG efficient than the existing boat fleet because there are no established GHG emission standards for motorized recreational watercraft. Even if some improvement to the GHG efficiency of the future boat fleet is achieved it is not feasible to know whether the magnitude of this improvement would be sufficient to offset the increase in boating activity, the associated on-road mobile-source GHG emissions, and construction-related emissions. Therefore, implementation of Alternative 3 has the potential to result in a substantial contribution to GHG emissions. This impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would authorize an additional 15 public piers and would allow for the relocation and reconstruction of some private piers and boat ramps, if the relocation resulted in a 2:1 reduction in the number of structures. Construction of new piers and removal of existing piers would result in a one-time increase in GHG emissions. As shown in Tables 11-1 and 11-2, there would be no increase in GHG-emitting boating activity and on-road vehicle travel. As with Alternative 1, it is not feasible to know whether the fleet of boats operating at buildout would be more GHG efficient than the existing boat fleet because there are no established GHG emission standards for motorized recreational watercraft. Even if some improvement to the GHG efficiency of the future boat fleet is achieved it is not possible to know whether the magnitude of this improvement would be sufficient to offset construction-related emissions. Therefore, implementation of Alternative 4 has the potential to result in a substantial contribution to GHG emissions. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 11-1: Develop and implement a GHG reduction policy

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

Within 12 months of adoption of the Shoreline Plan, TRPA will coordinate the implementation of a GHG Emission Reduction Policy through TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments addressing Best Construction Practices and ongoing operational efficiencies. Until that time, TRPA will continue its existing practice to require measures developed on a project-by-project basis. The policy will require implementation of measures for the reduction of GHG emissions generated by demolition and construction activity in the shorezone and in associated upland areas, by on-road motor vehicles trips directly associated with the operation of boating facilities, and by ongoing operation of recreational watercraft. Where local ordinances already require GHG emission reductions consistent with the policy, no further action is necessary. Where local government ordinances do not adequately address GHG reduction practices, those practices will be implemented through local government and/or TRPA permitting activities or implementation program. Such measures may include, but are not limited to, the following:

Minimize Construction-Related GHG Emissions

- All diesel-powered construction equipment shall have engines that comply with Tier 4 emission standards or better.
- Require all construction contractors to use renewable diesel (RD) fuel for all diesel-powered construction equipment (off-road land- and water-based). Any RD product that is considered for use by the construction contractors shall comply with California's Low Carbon Fuel Standards and be certified by the California Air Resources Board Executive Officer. RD fuel must also meet the following criteria:
    - Be hydrogenation-derived (reaction with hydrogen at high temperatures) from 100 percent biomass material (i.e., nonpetroleum sources), such as animal fats and vegetables;
    - Contain no fatty acids or functionalized fatty acid esters; and
    - Have a chemical structure that is identical to petroleum-based diesel which ensures RD will be compatible with all existing diesel engines; it must comply with American Society for Testing and Materials (ASTM) D975 requirements for diesel fuels.
- Use electric powered equipment instead of fossil fuel-based generators.
- Purchase mitigation credits from the Climate Action Reserve's GHG Mitigation Credit Program to offset construction-generated GHG emissions.

Minimize GHG Emissions Associated with On-Road Vehicle to Watercraft Facilities

- Provide charging stations for electric vehicles and bike lockers at parking lots that serve public piers and marinas.

Minimize GHG Emissions Generated by Recreational Watercraft

- Require or incentivize businesses that rent motorized watercraft to convert their rental fleet to watercraft with electric engines.
- Require or incentivize charging stations at marinas and public piers for electric-motor watercraft.
- Require or incentivize the installation of charging stations for electric-motor watercraft at private piers, boat houses, and boat lifts.
- Require solar panels on all marina buildings.

This measure will apply to new construction occurring under the Shoreline Plan. TRPA will also initiate a funding program to apply these measures to existing facilities within the Tahoe Basin.

Significance after Mitigation

Under all alternatives, the Shoreline Plan may increase overall GHG emissions. Implementation of Mitigation Measure 11-1 would reduce some of the anticipated future GHG emissions at buildout. Some of these measures would also be consistent with those identified in the Sustainability Action Plan (Lake Tahoe Sustainable Communities Program 2013). However, the effectiveness of these measures would depend on participation rates, available funding, and available technology. Given the uncertainty about the magnitude of the increase in GHG emissions from projects accommodated by the Shoreline Plan and the uncertain effect of these mitigation measures, it is possible that the Shoreline Plan could have a considerable contribution to the cumulative impact of GHG emissions and climate change and this impact would be **significant and unavoidable** for all alternatives.

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12 NOISE

12.1 INTRODUCTION

This chapter includes a description of acoustic fundamentals, a summary of applicable regulations, characterization of the existing noise environment, and analyses of potential short- and long-term noise impacts of the project alternatives.

The primary issues raised during scoping that pertain to noise included:

- concern regarding loud motor boats and boat speed limits,
- suggestions to enforce noise limits consistent with California boating noise laws,
- concern over the level of enforcement and education for boaters regarding noise and no-wake zones, and
- noise threshold attainment and maintenance.

The methods of analysis and noise propagation calculations for construction noise and vibration, operational noise, and traffic noise used in this chapter are consistent with the recommendations of the Tahoe Regional Planning Agency (TRPA), Federal Transit Authority (FTA), Federal Highway Administration (FHWA), and California Department of Transportation (Caltrans).

Where appropriate, specific issues that are not applicable to the project have been scoped out of this analysis; therefore, the following issues are not addressed in this chapter. Exposure to noise from airports would not occur because the Shoreline Plan does not include development of structures where people would reside or work near existing airports. In addition, no residential or tourist accommodation uses are proposed; therefore, noise-sensitive uses would not be placed in areas where existing noise levels exceed applicable limits.

12.1.1 Acoustic Fundamentals

Background information on sound, noise, vibration, and common noise descriptors is included to provide context and a better understanding of the technical terms and regulations referenced throughout this section.

The noise descriptors referenced or used in this section (Caltrans 2009) are defined as follows:

- Decibel (dB): a sound level expressed in decibels that is the logarithmic ratio of two like-pressure quantities, with one pressure quantity being a reference sound pressure of 20 micropascals.

- A-weighted decibel (dBA): the frequency-response adjustment of a sound level meter that conditions the output signal to approximate human hearing response. All noise levels in this analysis are A-weighted unless otherwise noted.

- Equivalent continuous sound level (L_{eq}): the equivalent steady-state sound level in a stated period that would contain the same acoustic energy as the time-varying sound level during the same period (i.e., average noise level).

- Maximum sound level (L_{max}): the highest instantaneous noise level during a specified period.

- Community noise equivalent level (L_{dn}/CNEL): similar to L_{dn}, L_{dn}/CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to sound levels occurring between 10 p.m. and 7 a.m. and a 5-dB penalty applied to sound levels occurring during evening hours between 7 p.m. and 10 p.m.

SOUND, NOISE, AND ACOUSTICS

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium to the human ear. In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines how loud the sources is. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of dB.

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. That is, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than if only one of the sound sources was producing sound under the same conditions. For example, if one automobile generates 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels or dBA. Table 12-1 describes typical A-weighted noise levels for various noise sources.

Table 12-1 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock band
Jet fly-over at 1,000 feet	– 100 –	
Gas lawn mower at 3 feet	– 90 –	
Diesel truck at 50 feet at 50 miles per hour	– 80 –	Food blender at 3 feet, garbage disposal at 3 feet
Noisy urban area, daytime, Gas lawn mower at 100 feet	– 70 –	Vacuum cleaner at 10 feet, normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	– 60 –	
Quiet urban daytime	– 50 –	Large business office, dishwasher next room
Quiet urban nighttime	– 40 –	Theater, large conference room (background)
Quiet suburban nighttime	– 30 –	Library, bedroom at night
Quiet rural nighttime	– 20 –	Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	– 0 –	Lowest threshold of human hearing

Source: Caltrans 2009

Human Response to Changes in Noise Levels

As discussed above, the doubling of sound energy results in a 3 dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured. Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dBA changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. With respect to how humans perceive and react to changes in noise levels, a 1-dBA increase is imperceptible, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly noticeable, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 2007).

In typical noisy environments, changes in noise of 1–2 dBA are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dBA in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dBA increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dBA increase in sound would generally be perceived as barely detectable.

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous (e.g., operating factory machinery) or transient in nature. Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006; Caltrans 2013). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2006). This is based on a reference value of 1 micro inch per second (µin/sec).

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Ground vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006).

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Table 12-2 describes the general human response to different ground vibration-velocity levels.

Table 12-2 Human Response to Different Levels of Ground Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Note: VdB = vibration decibels referenced to 1 µin/sec and based on the RMS velocity amplitude.

Source: FTA 2006

12.2 REGULATORY SETTING

Key federal, state, and local regulatory requirements applicable to the project for noise-related impacts are discussed below.

12.2.1 Federal

FEDERAL NOISE CONTROL ACT OF 1972

The Federal Noise Control Act of 1972 established a requirement that all federal agencies must comply with applicable federal, state, and local noise control regulations. Federal agencies are directed to administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare.

U.S. DEPARTMENT OF TRANSPORTATION

To address the human response to ground vibration, the FTA established guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines are used to determine potential impacts from plan-related construction and operational-related ground vibration, and include the following:

- 65 VdB, referenced to 1 µin/sec and based on the RMS velocity amplitude, for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities);

- 80 VdB for residential uses and buildings where people normally sleep; and
- 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2006).

12.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has established environmental thresholds, known as Environmental Threshold Carrying Capacities (thresholds), for nine resources, including noise. There are two noise threshold indicators: single noise events and cumulative noise events, discussed separately below. Table 12-3 shows all adopted thresholds and Table 12-4 summarizes the status of attainment.

Single Noise Events

Single noise event threshold standards adopted by TRPA are based on the numerical value associated with the maximum measured level in acoustical energy during an event. This threshold establishes maximum noise levels (Table 12-3) for aircraft, watercraft, motor vehicles, motorcycles, off-road vehicles, and snowmobiles.

Cumulative Noise Events

TRPA adopted cumulative noise standards, expressed using the 24-hour community noise equivalent metric (CNEL) for different zones within the region to account for expected levels of serenity. Table 12-3 summarizes thresholds for single events (L_{max}) and thresholds for community noise events.

The noise limitations established in Chapter 68 of the TRPA Code of Ordinance (TRPA Code), including the noise standards of individual area plans, plan area statements (PAS), and community plans, do not apply to noise from TRPA-approved construction or maintenance projects, or the demolition of structures, provided that such activities are limited to the hours between 8:00 a.m. and 6:30 p.m. Further, the noise limitations of Chapter 68 do not apply to emergency work to protect life or property.

Table 12-3 TRPA Maximum Allowable Noise Levels

Single Noise Event Thresholds	
Types of Operations	dBA L_{max}
Aircraft	80 dBA/77.1 dBA[1] at 6,500 m- start of takeoff roll, 2,000 m-runway threshold approach
Boats (not to exceed any of 3 tests)	Pass-By Test: 82 dBA measured at 50 feet with engine at 3,000 rpm
	Shoreline Test: 75 dBA, microphone 5 ft above water, 2 ft above curve of shore, dock, or platform; watercraft in lake, no minimum distance (standard adopted 7/03)
	Stationary Test: 88 dBA if watercraft manufactured on or after 1/1/93 and 90 dB if watercraft manufactured before 1/1/93, microphone 3.3 ft from exhaust outlet-5 ft above water. (standard adopted 7/03)
Motor vehicles (less than 6,000 pounds GVW)	76 dBA running at <35/mph (82 dBA running at >35/mph) measured at 50 feet
Motor vehicles (greater than 6,000 pounds GVW)	82 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Motorcycles	77 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Off-road vehicles	72 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Snowmobiles	82 dBA running at <35/mph measured at 50 feet

Table 12-3 TRPA Maximum Allowable Noise Levels

Cumulative Noise Level Thresholds	
Use Type	dBA CNEL
Land-Use Based Thresholds	
High density residential	55
Low density residential	50
Hotel/motel facilities	60
Commercial area	60
Industrial	65
Urban outdoor recreation	55
Rural outdoor recreation	50
Wilderness and roadless areas	45
Critical wildlife areas	45
Transportation Corridor Thresholds[2]	
U.S. 50	65
State Routes 89, 207, 28, 267, and 431	55[1]
South Lake Tahoe Airport	60

Notes: CNEL = community noise equivalent level; dB = decibels; dBA = A-weighted decibels; mph = miles per hour; rpm = revolutions per minute; m = meter; ft = feet; GVW = gross vehicle weight.

[1] Between the hours of 8 p.m. and 8 a.m.

[2] The transportation corridor noise threshold overrides the land use–based CNEL thresholds and is limited to an area within 300 feet from the edge of the road.

Source: TRPA Code of Ordinances, Chapter 68

Table 12-4 Status of TRPA Noise Thresholds

Threshold Status	Noise Events
At or somewhat better than target	Low-density residential, hotel and motel, commercial areas, industrial areas, urban outdoor recreation areas, rural outdoor recreation areas, roadless areas, and U.S. 50 and State Route 431 corridors.
Somewhat worse than target	Aircraft departures and arrivals, watercraft (shoreline test), high-density residential, the South Lake Tahoe airport transportation corridor, and the State Route 28, 89, and 267 corridors.
Considerably worse than target	Critical wildlife habitat
Insufficient data to determine status or no target established	Watercraft (pass-by test), watercraft (stationary test), motor vehicles (less and greater than 6,000 GVW) motorcycles, off-road vehicles, and snowmobiles.

Note: GVW= gross vehicle weight.

Source: TRPA 2016

GOALS AND POLICIES

The Noise Subelement of the Goals and Policies document includes a goal to attain and maintain single-event noise standards that are relevant to the project (Goal N-1) and a goal to attain and maintain community noise equivalent levels (Goal N-2). The underlying policy intended to help achieve Goal N-1 includes preparing a model ordinance and encouraging local governments and the U.S. Coast Guard to adopt and enforce the model ordinance. As part of the policy, TRPA also encourages marinas and other boat

launching facilities to participate in implementation of the single-event threshold standard. The relevant policies intended to help achieve Goal N-2 include establishing specific site design criteria for projects to reduce noise from transportation corridors, which may include using earthen berms and barriers.

CODE OF ORDINANCES

Chapter 68, "Noise Limitations," of the TRPA Code is intended to implement the Noise Subelement of the Goals and Policies document and to attain and maintain the TRPA thresholds (discussed above). TRPA Code Section 68.4, "Community Noise Levels," states that TRPA shall use CNELs to measure community noise levels and that area plans, PASs, and community plans shall set forth CNELs that shall not be exceeded by any one activity or combination of activities. The CNELs set forth in the area plan, PASs, and community plans are based on the land use classification, the presence of transportation corridors, and the applicable threshold standard.

COMMUNITY PLANS, PLAN AREA STATEMENTS, AND AREA PLANS

As a means for providing orderly growth and development consistent with the TRPA Regional Plan, various community plans have been developed for specific urbanized areas, as determined by the Goals and Policies document. Each community plan establishes goals, objectives, special policies, programs, and strategies for funding and implementation of the unique community area. Each community plan contains unique maximum CNEL noise standards for the entire community plan area and for any special areas that it may contain. Following adoption of a community plan, all projects within the plan area must be consistent with the community plan.

TRPA has established PASs to direct development and preserve the natural character of the land surrounding Lake Tahoe. Boundaries for each of the plan areas have been established based upon similar land uses and the unique character of each geographic area. Each PAS contains noise standards based on the intensity of development in the PAS that are generally consistent with the environmental threshold standards for the land uses shown in Table 12-3. Maximum CNEL standards range from as low as 45 dBA CNEL in PASs where residential density is low and undisturbed land is ample (i.e., Mount Rose) to 65 dBA CNEL in PASs that contain entire communities (e.g., Ponderosa Ranch).

Area plans—a relatively new type of planning instrument borne out of the 2012 Regional Plan—supersede previously adopted community plans and PASs intended to implement the 1987 Regional Plan. Placer County, Douglas County, and the City of South Lake Tahoe have adopted area plans. As with community plans and PASs, area plans identify noise standards based on intensity of development.

Where a highway corridor overlaps an area plan, PAS, or community plan with a lower maximum CNEL standard, the highway corridor CNEL standard supersedes the CNEL standard established in those planning documents.

TRPA Best Construction Practices Policy

TRPA requires the following standard conditions for all project construction activity that involves grading; these conditions also apply to development within the shorezone of Lake Tahoe:

- Any normal construction activities creating noise in excess of the TRPA noise standards shall be considered exempt from said standards provided all such work is conducted between the hours of 8:00 a.m. and 6:30 p.m.
- Engine doors shall remain closed during periods of operation except during necessary engine maintenance.

- Stationary equipment (e.g., generators or pumps) shall be located as far as feasible from noise-sensitive receptors and residential areas. Stationary equipment near sensitive noise receptors or residential areas shall be equipped with temporary sound barriers.

12.2.3 California

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

CALIFORNIA STATE BUILDING CODE TITLE 24

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, California Building Code. Title 24 is applied to new construction in California and states that interior noise levels attributable to exterior sources shall not exceed 45 dBA in any habitable room. An acoustical analysis documenting compliance with the interior sound level standards shall be prepared for structures containing habitable rooms within the CNEL noise contours of 60 dBA or greater.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Caltrans Standard Specification 14-8.02, Noise Control, states that noise levels from construction activity between the hours of 9:00 p.m. and 6:00 a.m. shall not exceed 86 dBA L_{max} at 50 feet from the construction site (Caltrans 2015).

TRANSPORTATION- AND CONSTRUCTION-INDUCED VIBRATION

In 2013, Caltrans published the Transportation-and Construction Vibration Guidance Manual, which provides general guidance on vibration issues associated with construction and operation of projects in relation to human perception and structural damage. Table 12-5 below presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 12-5 Caltrans Recommendations Regarding Vibration Levels

PPV (in/sec)	Effect on Buildings
0.4-0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006-0.019	Vibration unlikely to cause damage of any type

Note: PPV = peak particle velocity.

Source: Caltrans 2013

12.2.4 Nevada

The State of Nevada does not have any specific laws pertaining to noise control. In Nevada, local cities and counties have the authority to regulate noise through local code.

12.3 AFFECTED ENVIRONMENT

12.3.1 Sensitive Land Uses

Noise-sensitive land uses generally include those uses where noise exposure could result in health risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, schools, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transient lodging, and other places where low interior noise levels are essential, are also considered noise sensitive. Those noted above are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Older buildings are also more prone to vibration-induced damage.

Existing sensitive land uses exist throughout the project vicinity around the lake. Because of the regional scale of this project and analysis, identification of individual receptors that might be affected by future, as yet unknown projects would not be possible. Noise levels and potential impacts are addressed generally because specific locations of future development are unknown.

12.3.2 Existing Noise Levels

The sound levels in most communities fluctuate, depending on the activity of nearby and distant noise sources, time of the day, or season of the year. Noise sources around Lake Tahoe include roadway traffic, aircraft, watercraft, and recreational activity (e.g., people talking, music playing, dogs barking). Other secondary noise influences include noise attributed to construction and natural events, such as thunderstorms.

As a part of continuing efforts to monitor and achieve established noise thresholds, TRPA conducts threshold evaluations every 4 years, and part of those evaluations includes taking noise measurements at various locations around the lake. Noise monitoring includes measuring noise associated with different land uses and single-noise events (e.g., boats, airplanes). For purposes of characterizing the existing ambient noise environment, cumulative/CNEL noise levels are presented here, as documented in the TRPA 2015 Threshold Evaluation Report (TRPA 2016). The status of all TRPA noise thresholds (i.e., land-use based, single event, transportation corridor) are discussed above and shown in Table 12-4.

Areas that are included in the threshold noise monitoring program where boat activity may be part of the ambient noise levels are listed below, along with their most recent documented maximum 24-hour CNEL measured during the threshold monitoring period. While most of these are upland areas that are not within the shorezone, many are areas that draw and concentrate boater traffic.

- Tahoe Keys Marina (High-Density Residential): 56.2 dBA CNEL,
- Rubicon Estates (Low-Density Residential): 47.6 dBA CNEL,
- Carnelian Bay Tourist Area (Hotel/Motel Areas): 52.2 dBA CNEL,
- Kingsbury Commercial Area (Commercial Areas): 57.1 dBA CNEL,
- Old Fish Hatchery (Urban Outdoor Recreation Areas): 50.1 dBA CNEL,
- Eagle Falls Parking Lot (Rural Outdoor Recreation): 45.8 dBA CNEL, and
- Rubicon Point (Critical Wildlife Habitat): 65.3 dBA CNEL.

12.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

12.4.1 Methods and Assumptions

To assess potential short-term, construction-related noise and vibration impacts, project-generated construction noise and vibration levels were determined based on methodologies, reference emission levels, and usage factors from the FTA *Guide on Transit Noise and Vibration Impact Assessment* methodology (FTA 2006) and the Federal Highway Administration *Roadway Construction Noise Model User's Guide* (FHWA 2006). Reference levels are noise and vibration emissions for specific equipment or activity types that are well documented in the field of acoustics.

The assessment of long-term increases in noise (e.g., watercraft and traffic) was based on available documentation pertaining to watercraft threshold attainment (i.e., TRPA 2015 Threshold Evaluation Report) and projected boat activity developed for the Shoreline Plan alternatives, as well as traffic generation rates developed for the project. Commonly used and accepted principles of acoustics were used for the assessment.

The Shoreline Plan establishes ordinances to guide and regulate resource management and development within the shorezone and lakezone of Lake Tahoe. Although it is anticipated that new boating structures (e.g., slips, buoys, lifts, boat ramps) would be located in areas near existing development or areas where boating structures are currently concentrated, the Shoreline Plan does not identify specific locations, timing of new structures to be built, or type of structures that would be constructed in any one location on the lake. Thus, due to the large geographic scale of the Shoreline Plan and the local nature of noise impacts (proximity of a noise source to an existing sensitive land use), individual sensitive receptors were not identified. Rather, a programmatic approach to the noise analysis was conducted. Adopted TRPA noise thresholds were evaluated generally based on available boating and traffic data. Specific noise standards pertaining to area plans, PASs, community plans, and for various land use types were not evaluated. Rather, long-term increases in noise are discussed generally in comparison to existing conditions and how they would affect the entire Tahoe Basin or overall threshold attainment.

12.4.2 Significance Criteria

Significance criteria related to noise and vibration are summarized below. The applicable TRPA threshold standards, the noise criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it:

- causes a substantial temporary (or periodic) increase in ambient noise levels in the project vicinity above levels existing without the project;
- exposes existing structures to levels of ground vibration that could result in structural damage (i.e., exceedance of Caltrans's recommended level of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or FTA's maximum acceptable level of 80 VdB with respect to negative human response for noise-sensitive uses);
- increases existing CNELs beyond those permitted in applicable area plans, PASs, or community plans; or if traffic noise levels would exceed the contour-based transportation corridor noise thresholds;
- causes a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (i.e., a long-term noise level increase of 3 dB or greater at a noise-sensitive receptor such as a residence, hotel, or tourist accommodation unit); or
- results in a substantial increase in the number of watercraft exceeding the 75-dBA single-event noise standard.

12.4.3 Environmental Effects of the Project Alternatives

Impact 12-1: Construction noise impacts

Construction activities would occur under all alternatives, including the No Project Alternative. Activities associated with construction of shorezone structures, including new piers, pier modifications, marinas, or new boat ramps would generate varying levels of noise. However, all activities would be carried out in a manner consistent with TRPA's standard permit conditions such that exposure of nearby receptors to construction-related noise is minimized and construction is limited to daytime hours. In addition, the types of activities associated with constructing new boating structures would be relatively minor, localized, temporary, and intermittent, and would not result in a substantial increase in temporary noise levels. Given the relatively low intensity of construction activities associated with shorezone structures and compliance with standard permit conditions, construction noise impacts associated with all four Shoreline Plan alternatives would be **less than significant**.

Alternative 1: Proposed Shoreline Plan

With Alternative 1, some construction activity would be associated with new piers and boat ramps. In addition, some of the existing buoys would be converted to slips, requiring minor construction work. Construction activities associated with new piers would require pile driving, material hauling, and heavy-duty equipment such as cranes. Construction of new boat ramps would require dredging, concrete pouring, and earth movement. Slip construction would be relatively minor but could involve material hauling and localized construction activity.

Construction equipment use would vary by project and phase but would generally involve operation of heavy-duty diesel equipment. Typical noise levels generated by various types of construction equipment likely to be used are identified in Table 12-6.

Table 12-6 Typical Noise Levels from Construction Equipment

Type of Equipment	Noise Level (dBA L_{max}) at 50 feet
Pile driver (for pier construction)	95
Crane/dozer/excavator/paver	85
Loader	80
Pickup trucks	55

Source: FHWA 2006

Construction noise can vary depending on equipment type, number of pieces of equipment operating simultaneously, and duration of activities. Different equipment and construction methods would be used for pier, boat ramp, and slip construction. Slip construction would be relatively minor and would not require use of heavy-duty construction equipment. Thus, this analysis focuses on pier and boat ramp construction, discussed separately below.

Pier Construction/Modification

Under the Shoreline Plan, 138 additional piers would be constructed, and existing piers could be modified; both types of activities would require construction. Although specific locations of new piers and pier modifications are unknown, pier construction would involve the use of cranes mounted on watercraft, pile driving to place pier poles, and other support equipment such as heavy-duty trucks to haul materials and light-duty trucks and vehicles for worker transportation. Boats or barges may be used during construction, but boat use would be minor and typically stationary during construction activities. The equipment used during pier construction is similar to those described above (e.g., excavator, loader, crane). Based on reference noise levels (Table 12-6), pile driving would result in the greatest noise levels.

Based on reference maximum noise levels for pile driving, and considering typical equipment usage factors, noise generated during pier construction or modification could result in noise levels of 95 dBA L_{max} and 88 dBA L_{eq} at 50 feet from construction. There are numerous locations around the shoreline where existing residential, tourist accommodation units, and other noise-sensitive land uses (e.g., recreational areas) currently exist. Because piles are typically needed for pier construction, and existing receptors are located within 50 feet of the shoreline in some parts of the lake, it is possible that pile driving for new pier construction could take place within 50 feet of an existing receptor, resulting in noise levels of up to 95 dBA L_{max}, depending on the actual location of piles and existing sensitive land uses.

Boat Ramps

Under the proposed Shoreline Plan, up to two new public boat ramps would be allowed. Construction activities would include dredging, material movement and site preparation, and paving. Although dredging may require the use of a barge or other watercraft, the equipment used during dredging is similar to those described above (e.g., excavator, loader, crane), and thus, reference noise levels shown in Table 12-6 were used to model noise levels associated with dredging. Based on reference maximum noise levels and considering typical equipment usage factors as well as multiple construction equipment operating simultaneously, boat ramp construction (dredging and paving) could result in noise levels of approximately 83 dBA L_{eq} and 89 dBA L_{max} at 50 feet (see Appendix D for modeling assumptions and outputs). Actual locations of the two new public boat ramps are unknown. Because specific locations of new or relocated boat ramps are unknown, and existing sensitive land uses exist within 50 feet of the shoreline, it is possible that construction from boat ramps results in noise levels of up to 89 dBA L_{max} at existing sensitive land uses.

All Construction

As discussed above, construction activities associated with new piers, pier modifications, and new boat ramps could generate varying levels of noise. However, construction activities would be consistent with TRPA's standard permit conditions that require measures to minimize the exposure of nearby receptors to construction-related noise. One of the key required measures is to limit noise-generating construction activity to the hours between 8:00 a.m. and 6:30 p.m. (TRPA No Date). In addition, the construction activities associated with all project components would be relatively minor, temporary, localized, and intermittent, not resulting in a substantial temporary increase in noise. Given the nature of such construction, and that construction would only occur during the less-sensitive daytime hours, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under the No Project Alternative, there would be no numeric cap on moorings. Construction of up to 4,871 buoys, 1,897 new slips, and 168 boat lifts could occur. Additionally, up to 476 new piers and modifications to existing piers could be constructed in accordance with current TRPA Code and guidelines, and up to six new boat ramps and two new marinas could be authorized.

Construction noise associated with new piers, pier modifications, boat slips, and boat ramps would be the same as described above for Alternative 1, but with the number of structures allowed, it is possible or even likely that construction of multiple shoreline structures would occur simultaneously and in close proximity. Noise associated with marina construction would be similar to that described for piers and pier modification, as similar equipment would be used, but it would be larger scale, over a larger area, and for a longer duration. Although construction activities are assumed to be generally greater under Alternative 2 in terms of the number of active sites at one time, potential proximity, and intensity, all construction activities within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, reducing noise exposure during the more sensitive times of the day. This impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize fewer structures than Alternative 1 or 2, with up to 365 new public buoys or slips, five new public piers, 86 new private piers, and one new public boat ramp. Construction noise associated with new piers, pier modification, boat slips, and boat ramps would be the same as described above for Alternative 1. All construction activities occurring within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, minimizing noise exposure during the more sensitive times of the day. This impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers and reduce existing shoreline development through transfer ratios that would reduce the number of shoreline structures on the lake. This alternative would allow 15 new public piers and no other new shoreline structures. Construction noise associated with new piers would be the same as described above for Alternative 1. All construction activities occurring within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, minimizing noise exposure during the more sensitive times of the day. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required.

Impact 12-2: Construction vibration impacts

Construction activates would occur under all alternatives. Construction activities associated with new shorezone structures, including new piers, pier modifications, marinas, and new boat ramps would generate varying levels of vibration. Pile driving would be required for pier construction/modification and marina construction, resulting in vibration levels that could potentially damage existing structures if located within 55 feet. In accordance with TRPA standard construction practices, all construction activity would take place during the day, minimizing the potential for disturbance during noise-sensitive evening and nighttime hours. However, because specific locations of pile driving activity is unknown, there is a potential that existing structures could be exposed to excessive vibration levels that could result in structural damage. This impact would be **significant**. Mitigation would require site-specific acoustical analysis for projects that require pile driving activities close to existing structures and would ensure proper precautions to protect nearby structures from damage. With mitigation, this impact would be reduced to a **less-than-significant** level.

Alternative 1: Proposed Shoreline Plan

As discussed under Impact 12-1, new piers and pier modification construction work would require pile driving. Construction of other structures (e.g., boat slips, lifts) would involve minor construction activities but would not require the use of major vibration-inducing construction equipment (e.g., pile driving, blasting). Thus, the focus of this analysis is pile driving associated with 183 new piers or modification to existing piers.

According to FTA, vibration levels associated with typical pile drivers are 0.644 in/sec PPV and 104 VdB at 25 feet (FTA 2006). Based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, vibration levels from pile driving could exceed Caltrans recommended level of 0.2 in/sec PPV with respect to the structural damage within 55 feet of pile driving activities and could exceed FTA's maximum acceptable level of 80 VdB with respect to human response within 160 feet of pile driving activities. Refer to Appendix D for attenuation calculations.

There are numerous existing private and public piers located around the lake at varying distances to existing structures, in some cases within 55 feet of existing buildings. It is unknown where additional future piers would be constructed but based on the location of some existing piers around the lake, it is possible that new piers would also be located within 55 feet of existing structures, potentially exposing the structures to ground vibration levels exceeding 0.2 in/sec PPV. Regarding disturbance to sensitive receptors from pile driving activity, all construction activity would be limited to the less sensitive times of the day, in accordance with TRPA's standard permitting requirements and best management practices. Nonetheless, the potential exists for pier construction to generate vibration that could exceed applicable thresholds of significance. This impact would be **significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Under the No Project Alternative, there would be no numeric cap on moorings. Alternative 2 could allow for construction of up to 1,897 new slips, 168 boat lifts, 476 new piers and modifications to existing piers, up to six new boat ramps, and two new marinas.

Pile driving would be required for pier construction and potentially for marina construction. Vibration levels would be the same as discussed for Alternative 1, but with the number of structures allowed, it is possible or that construction of multiple shoreline structures would occur simultaneously and in close proximity. As discussed above for Alternative 1, all construction activities occurring within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, minimizing vibration exposure during the more sensitive times of the day. However, because specific locations of future pier construction and pile driving is unknown and given that existing piers are located close to existing structures, it is possible that pile driving activity associated with Alternative 2 could exceed vibration thresholds at existing structures. This impact would be **significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize fewer structures than Alternative 1 or 2, with up to 365 new public buoys or slips, five new public piers, 86 new private piers, and one new public boat ramp. Similar to Alternative 1, vibration associated with pile driving would be the primary source of ground vibration. As discussed above for Alternative 1, all construction activities occurring within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, minimizing vibration exposure during the more sensitive times of the day. However, because specific locations of future pier construction and pile driving is unknown and given that existing piers are located close to existing structures, it is possible that pile driving activity associated with Alternative 3 could exceed vibration thresholds at existing structures. This impact would be **significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers and reduce existing shoreline development through transfer ratios that would reduce the overall number of shoreline structures on the lake. This alternative would allow 15 new public piers and no other new shoreline structures. Vibration levels associated with pile driving for new pier construction would be the same as described above for Alternative 1. All construction activities occurring within the Shoreline Plan area would be required to comply with TRPA's construction best management practices, minimizing vibration exposure during the more sensitive times of the day. However, because specific locations of future pier construction and pile driving is unknown and given that existing piers are located close to existing structures, it is possible that pile driving activity associated with Alternative 4 could exceed vibration thresholds at existing structures. This impact would be **significant**.

Mitigation Measures

Mitigation Measure 12-2: Vibration reduction measures

This mitigation measure applies to Alternatives 1, 2, 3, and 4.

To address potential vibration impacts associated with shorezone projects that involve pile driving activity, TRPA shall revise TRPA Permit Attachment S, "Standard Conditions of Approval for Shorezone Projects," to incorporate the following vibration reduction measures:

- All construction equipment, including vibration-inducing impact equipment, on construction sites shall be operated as far away from vibration-sensitive uses as reasonably possible.
- Earthmoving and ground-disturbing operations shall be phased so as not to occur simultaneously in areas close to sensitive uses, to the extent feasible. The total vibration level produced could be significantly less if each vibration source is operated at separate times.
- To prevent structural damage, minimum setback requirements for different types of ground vibration-producing activities (e.g., pile driving) for the purpose of preventing damage to nearby structures shall be established based on the proposed pile driving activities and locations, once determined. Factors to be considered include the specific nature of the vibration producing activity (e.g., type and duration of pile driving), local soil conditions, and the fragility/resiliency of the nearby structures. Established setback

requirements (i.e., 55 feet) can be breached if a project-specific, site specific analysis is conducted by a qualified geotechnical engineer or ground vibration specialist that indicates that no structural damage would occur at nearby buildings or structures or provides further recommendations (e.g., alternative pile driving methods, site monitoring requirements) to avoid damaging nearby structures.

Significance after Mitigation

Implementation of Mitigation Measure 12-2 would reduce vibration exposure at nearby receptors by locating equipment as far from receptors as possible, and by phasing operations for shorezone projects that are close enough to each other to combine to produce greater vibration levels. Further, if pile driving would be required near existing structures or sensitive receptors, a site-specific analysis would be required to determine appropriate measures that would prevent structural damage, and would consider site-specific and project-specific details, proximity of structures to pile driving activity, and specific vibration levels based on proposed pile driving parameters. These measures would result in compliance with recommended levels to prevent structural damage. With implementation of Mitigation Measure 12-2, this impact would be reduced to a **less-than-significant** level.

Impact 12-3: Increases in operation-related watercraft noise

Alternatives 1, 2, and 3 would result in additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would contribute to an overall increase in boating activity over time. Because boating is generally a daytime activity and increases in boating activity would be distributed across the lake, it would have a negligible effect on CNEL, which considers noise levels in a given location over a 24-hour period. Single-event noise levels are affected by individual boater behaviors (e.g., exceeding speed limits in the no-wake zone) and boat/engine type. Under Alternatives 1, 2, and 3, TRPA would increase enforcement of the no-wake zone through additional boat crews, signage, and increased boater education, which would reduce such boater behaviors that contribute to exceedances of single-event noise standards. Further, none of the alternatives would result in a substantial increase (i.e., 3 dBA) in CNEL from increases in boating activity. This impact would be **less than significant**. With Alternative 4, no increases in boating activity would occur and there would be **no impact**.

As described above in the "Regulatory Setting" section, TRPA has established single-event noise standards for watercraft and cumulative noise standards for various land use types around the lake. In addition, noise standards are also established within area plans, PASs, and community plans. Implementation of the Shoreline Plan alternatives, except Alternative 4, would result in varying levels of boating activity increases around the lake; Alternative 4 is projected to retain boating levels at existing levels. Long-term operational increases in boating-related noise are addressed below for each alternative. The single-event noise standard for watercraft and the cumulative noise standards are considered separately.

Alternative 1: Proposed Shoreline Plan

Single-Event Noise

Single-noise-event threshold standards adopted by TRPA are based on the numerical value associated with the maximum measured level in acoustical energy during an event. These thresholds are intended to minimize noise associated with relatively short but loud noise events, such as boat engines that, at high levels, could disturb sleep or speech. As shown in Table 12-3, noise from watercraft shall not exceed 75 dBA as monitored at a distance of 5 feet above water.

TRPA has conducted noise monitoring since 2009 to determine compliance with the established 75 dBA threshold, and publishes results periodically, the latest in the 2015 Threshold Evaluation Report. Single-event noise standard exceedances are measured in number of average daily exceedances, based on monitoring conducted at nine different locations around the lake, during the peak boating season of July 4 through Labor Day. Based on the most recent 2015 Threshold Evaluation Report there has been little to no change in the total number of exceedances per day and the status of the threshold is somewhat worse than the target of zero exceedances (TRPA 2016). Also, as discussed in the 2015 Threshold Evaluation Report,

confidence in the trend for all single-event noise exceedances due to watercraft was low, with little statistical significance.

Additional monitoring was conducted in 2016 and 2017, with 2017 data representing the highest number of daily exceedances and 2013 the lowest (average of all sites) since monitoring began in 2009 (TRPA 2017). Annual boating data was also available for years 2013, 2015, 2016, and 2017, obtained from the total number of boat stickers issued in those years. The total number of boats on the lake in 2013 was 14,472, with a steady annual increase up to 16,625 boats in 2017 (Driscoll, pers comm., 2018). However, it is important to note that many factors contribute to the recorded exceedances of the single-event noise standard. For example, daily boating activity, boat types, boater behavior, and compliance (or lack thereof) with the no-wake zone can vary greatly and there could be more or fewer boats on any given day in proximity to where the noise monitoring is being conducted. Further, in some years monitoring occurred for as few as 10 days and in other years monitoring occurred for as many as 47 days, resulting in various sample sizes over the years of monitoring. Complete data regarding daily boating activity and boat type that resulted in the measured exceedances is not available.

Considering the variation in number of exceedances of the single-event noise standard recorded over the past 9 years and the many factors contributing to exceedances (e.g., individual boater behavior, boat engine type, enforcement level, boating activity in proximity to noise meter), the number of daily exceedances have not been shown to be positively correlated with increases in the number of boat trips. Likewise, there is not enough information to conclude that increases in boating activity would not lead to increases in single-event noise standard exceedances. In fact, it would be reasonable to assume that more boats on the lake in a given period could result in more people not complying with the no-wake zone, resulting in exceedance of the single-event noise standards. Currently, the daily and annual level of boating activity in combination with the level of TRPA enforcement of the no-wake zone results in exceedances of the single-event noise thresholds. Consistent with previous findings, the threshold is still not being achieved as any level of noncompliance results in non-attainment.

Noise sources from motorized watercraft include the engine revving, exhaust noise, and the boat slapping the water. Shoreline topography and wind can also influence noise levels. Currently, TRPA enforces a 600-foot no-wake zone, which requires boaters to limit their speed to 5 miles per hour (mph) within 600 feet of the shore and in all areas of Emerald Bay, with an exception of up to 7 mph for tour boats. Limiting boat speed reduces engine noise, exhaust noise, and wake-slapping noise, thus substantially reducing boat noise levels at the shore. Nonetheless, individual boater behavior (i.e., exceeding the speed limit in the 600-foot zone) and boat/engine type continue to cause exceedances of the single-event noise standard. In addition, boats that have malfunctioning or illegal exhaust systems also contribute to excessive noise levels that can exceed the standards.

Alternative 1 would authorize additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would lead to a 13 percent increase in boating activity over existing conditions (Table 12-7). Considering that existing levels of enforcement and boating behavior results in incidences of exceedance of the standard, it is likely that the single-event noise standard would continue to be exceeded in the future regardless of the total number of boats on the lake at any given time. However, as discussed in further detail in the Chapter 2, “Description of Proposed Project and Alternatives,” enforcement of the no-wake zone would be increased under the Shoreline Plan. A new funding source would be created, and an additional TRPA boat crew would be established to increase enforcement of the no-wake zone. New signage would be installed in key areas along the shoreline such as marinas and state parks to remind boaters of the no-wake rules, and TRPA would increase education and training for staff at boat inspection sites and motorized rental concessions to increase public awareness of the no-wake rules around the lake.

Exceedance of the watercraft single-event noise level standard is directly related to individual boater behavior, boat type, and enforcement of the existing 600-foot no-wake zone requirement. Considering that annual average boating activity has continued to increase on the lake and will continue to increase with the Shoreline Plan, it is plausible that the likelihood for the single-event noise exceedances would increase if nothing were to be done in comparison to existing conditions. However, because enforcement and education

of the no-wake zone rules will be increased around the lake, future increases in the exceedance of the single-event noise standard would be likely be reduced or avoided. Because TRPA will expand enforcement of current regulations designed to reduce single-event boat noise, and there is no evidence to suggest that a 13 percent increase in boat use would substantially increase the number of exceedances of the 75-dBA single-event noise standard, Alternative 1 would result in a **less-than-significant** impact with regard to single-event noise.

Ambient Noise Levels

In addition to single-event noise standards, TRPA maintains cumulative noise standards, measured using a weighted average of all measured noise over a 24-hour period using the CNEL indicator. Adopted CNEL standards range from 40 dBA where residential density is low and undisturbed land is ample, to 65 dBA in highway corridors. CNEL standards are also established for area plans, PASs, and community plans. See Table 12-3 for complete list of TRPA CNEL noise standards.

Boat trips originate from buoys, slips, boat houses, boat lifts, boat ramps, and marinas. As such, boat activity can be estimated based on the number of each type of structure on the lake. Implementation of this alternative would regulate the number of allowable structures on the lake, thereby reducing overall boat activity in comparison to Alternative 2, under which caps on boating structures would not be put in place. Alternative 1 would authorize additional buoys, slips, boat lifts, and boat ramps, resulting in increases in boating activity or boat trips originating and ending at shoreline structures (Table 12-7).

Table 12-7 Effects of Alternative 1 on Boating Activity

Boat-Trip Generating Structure	Existing Trips (peak day)	Existing + Alternative 1 Trips (peak day)	Percent Increase
Buoy	1,050	1,551	48
Slip	1,478	1,501	2
Boat house	27	27	0
Boat lift	93	109	17
Boat ramps	2,492	2,719	9
Marina	49	49	0
Rental concessions	710	710	0
Total	5,899	6,666	13

Source: Boat use estimates prepared by the Joint Fact-Finding Committee (Appendix A)

As shown in Table 12-7, total boat trips are anticipated to increase by 13 percent with implementation of this alternative. The greatest increase in trips would be associated with additional buoys. In assessing increases in noise, a doubling of the noise source results in a 3-dBA increase. This principle applies to all noise sources, including boats. Thus, when considering overall average noise increases on the lake, a 13 percent increase in boat trips (i.e., noise source) would not result in a substantial increase in average noise over existing conditions. Further, additional buoys would contribute the most to projected increases in boating activity and increased boat trips would be dispersed throughout the lake, depending on location of new buoys. Therefore, although overall boating activity would increase by 13 percent lake wide, the increase in activity at any one location would be far less than 13 percent and depending on distribution, would likely be indiscernible.

TRPA has adopted land-use-based CNEL standards, which consider noise over a 24-hour period. Because boating typically takes place during daytime hours, it has less of an effect on CNEL noise levels. Further, due to the 600-foot no-wake zone enforced by TRPA, noise from boats is not typically the primary noise source within the land uses surrounding the lake; roadway noise, recreation activity, special events, and other environmental noise sources are often more pronounced. Exceptions to this would include areas where these noise sources are not present such as undeveloped portions of the shoreline without adjacent

roadways. However, as discussed above, increased enforcement of the no-wake zone would include identifying primary areas of concern which include state parks and places where preserving the quiet natural setting is important. Ensuring that boat noise is minimal near the shoreline would reduce the overall effect of boat noise on the CNEL standards at receiving land uses, as noise dissipates rapidly with increased distance from the source. Thus, given the increase in TRPA enforcement around the lake and the fact that primary noise sources in many parts of the lake are not a result of boating activity, increases in boating activity would have little to no effect on land use-based CNEL standards.

Up to two new boat ramps could be constructed under this alternative, resulting in localized noise increases at the boat ramp locations. However, for the same reasons discussed above, boat activity at new boat ramps would not contribute substantially to the CNEL noise levels associated with land use types (e.g., residential, commercial, recreational) or established in area plans, PASs, or community plans. Alternative 1 would not result in substantial increases in noise over existing conditions. In fact, adoption of the Shoreline Plan would limit overall boating activity over the long-term, resulting in relatively small increases in watercraft use and activity compared to what might occur with no limits on boating activity. This impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would authorize additional boating structures (e.g., slips, buoys, lifts, boat ramps, marinas) that would lead to a 51 percent increase in boating activity over current conditions (Table 12-8). For the same reasons discussed above for Alternative 1, increases in boating activity under this alternative would not be expected to result in a substantial increase in the number of exceedances of the watercraft single-event noise threshold. Additional boat trips would be dispersed throughout the lake, resulting in lower increases at any one location on the lake than reported for total boating activity associated with all structure types (Table 12-8). For example, this alternative would result in an increase of approximately 1,200 trips associated with all new buoys. However, the buoys would be distributed throughout the lake and trips originating from each buoy would be variable with regard to path, distance, destination, and timing, thereby dispersing the noise source. Because total boating activity would not double in any given location at a given time, and boat trips would be dispersed throughout the lake, increases in boating activity would not result in a substantial (i.e., 3 dBA) increase in noise over existing conditions. This impact would be **less than significant**.

Table 12-8 Effects of Alternative 2 on Boating Activity

Boat-Trip Generating Structure	Existing Trips (peak day)	Existing + Alternative 2 Trips (peak day)	Percent Increase
Buoy	1,050	2,268	117
Slip	1,478	2,161	46
Boat house	27	27	0
Boat lift	93	152	40
Boat ramps	2,492	3,171	27
Marina	49	49	0
Rental concessions	710	710	0
Total	5,899	8,537	45

Source: Data provided by TRPA in 2018

Alternative 3: Limit New Development

Alternative 3 would authorize additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would lead to a 4 percent increase in boating activity over current conditions (Table 12-9). For the same reasons discussed above for Alternative 1, increases in boating activity under this alternative would not result in a substantial increase in the number of exceedances of the watercraft single-event noise standard. Further, for the same reasons described above, overall boating activity would not result in a doubling of the noise source and, therefore, would not result in a substantial (i.e., 3 dBA) increase in noise over existing

conditions. Additional boating structures and associated boating activity with this alternative would be less than Alternatives 1 and 2 but would still result in some level of increase over existing conditions. However, given that total increases in boating activity would be modest and new structures would be distributed across the lake, additional boating activity under this alternative would not result in an audible increase (i.e., 3 dBA) in noise. This impact would be **less than significant**.

Table 12-9 Effects of Alternative 3 on Boating Activity

Boat-Trip Generating Structure	Existing Trips (peak day)	Existing + Alternative 3 Trips (peak day)	Percent Increase
Buoy	1,050	1,125	7
Slip	1,478	1,501	2
Boat house	27	27	0
Boat lift	93	103	11
Boat ramps	2,492	2605	5
Marina	49	49	0
Rental concessions	710	710	0
Total	5,899	6,121	4

Source: Data provided by TRPA in 2018

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers and reduce existing shoreline development through transfer ratios that would reduce the overall number of shoreline structures on the lake. This alternative would allow 15 new public piers and no other new shoreline structures. Because no additional mooring or boat ramps would be allowed with this alternative, boat trips on the lake would be essentially the same as existing conditions. Existing pier locations and other structures may be relocated, simply shifting or relocating some of the existing boat activity. However, because no increases in boat activity would occur, existing noise levels would not change and there would be **no impact**.

Mitigation Measures

No mitigation is required.

Impact 12-4: Increases in operational-related traffic noise

Alternatives 1, 2, and 3 would result in additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would lead to an overall increase in boating activity, and commensurate increases in roadway traffic as compared to existing conditions. However, Alternatives 1, 2, and 3 would not result in a substantial increase (i.e., 3 dBA) in average noise levels from increases in traffic. This impact would be **less than significant**. With Alternative 4, no increases in boating activity or additional vehicle trips would occur and there would be **no impact**.

Alternative 1: Proposed Shoreline Plan

As described above, Alternative 1 would allow additional boating structures (e.g., slips, buoys, lifts, boat ramps) that could generate increased boating activity. As a result, increases in roadway traffic could occur on the various roads that would serve these new recreational amenities.

Major roadways, typically used by people entering and leaving the region, have been identified in the TRPA Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) and are summarized in Chapter 13, “Automotive Transportation and Circulation.” Because locations of future boating structures are unknown at this time, traffic noise increases on specific roadway segments cannot be evaluated. This analysis considers the potential increases in traffic associated with this alternative in comparison to existing

volumes for the 24 roadway segments identified in the RTP/SCS, which are primary roadways used to access the lake and associated amenities.

Based on the traffic modeling conducted and summarized in Chapter 13, "Automotive Transportation and Circulation," this alternative could result in an increase of up to 632 daily vehicle trips during the peak boating season. As discussed above in the "Affected Environment" section and under Impact 12-3, a doubling of a noise source results in a 3-dBA increase in noise. Of the 24 study segments, the lowest existing traffic volume of 3,400 daily trips occurs on State Route 89 from U.S. 50 to Pomo Street. Even in the highly unlikely situation that all new trips occurred on this segment, existing volumes would not double and traffic noise increases would be less than 3 dBA. Further, existing volumes on the other identified road segments range from 3,400 to 39,500 daily trips. Thus, an additional 632 trips during the peak boating season would represent substantially smaller incremental increases on other roadways in the basin.

In accordance with the requirements of Mitigation Measure 3.6-1 in the 2012 Regional Plan Update (RPU) EIS (TRPA 2012:3.6-15 through 3.6-16) and Mitigation Measure 3.6-4 of the 2012 RTP/SCS EIR/EIS, TRPA developed its Region-wide traffic noise mitigation program. This program aims to reduce traffic noise levels along highways where they currently exceed applicable TRPA standards and to maintain traffic noise levels along highways where they currently do not exceed TRPA thresholds. With this mitigation, the 2012 RTP/SCS EIR/EIS determined that transportation corridor noise levels would be in attainment of TRPA thresholds. Moreover, individual future actions that require permits from TRPA (e.g., buoys, marinas, boat ramps, slips, lifts) would be subject to project-level environmental review and TRPA would only approve individual projects that can demonstrate compliance with TRPA's adopted thresholds.

In summary, additional trips associated with this alternative would not result in substantial noise increases on any study roadway segment and future development would be required to comply with adopted TRPA thresholds. This impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Without additional regulation on boat structures with this alternative, boat activity and associated traffic would increase by 2,723 trips during the peak boating season. Although traffic and associated noise would be higher with this alternative compared to Alternative 1, for the same reasons described above for Alternative 1, traffic noise increases would still be below 3 dBA on all roadway segments. Also, future development that require permits from TRPA (e.g., buoys, marinas, boat ramps, slips, lifts) would be subject to project-level environmental review and TRPA would only approve individual projects that can demonstrate compliance with TRPA's thresholds. In summary, additional trips associated with this alternative would not result in substantial noise increases on any study roadway segment and future development would be required to comply with adopted TRPA standards. This impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize additional boating structures (e.g., slips, buoys, lifts, boat ramps) that would lead to an overall increase in boating activity. As a result, increases in traffic could occur on the various roads that would serve these new recreational amenities. Based on the traffic modeling conducted, this alternative could result in an increase of up to 423 daily trips during the peak boating season. Similar to the discussion for Alternative 1, increases of 423 daily vehicle trips would not result in a substantial increase in noise on any affected roadway. Any future development that requires a permit from TRPA (e.g., buoys, marinas, boat ramps, slips, lifts) would be subject to project-level environmental review and TRPA would only approve individual projects that can demonstrate compliance with TRPA's thresholds. In summary, additional trips associated with this alternative would not result in substantial noise increases on any study roadway segment and future development would be required to comply with adopted TRPA standards. This impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access by providing new public piers and reduce existing shoreline development through transfer ratios that would reduce the overall number of shoreline structures on the lake. This alternative would allow 15 new public piers and no other new shoreline structures. Because

no additional mooring or boat ramps would be allowed with this alternative, boat trips and associated traffic increases are not anticipated to increase over existing conditions. Existing pier locations and other structures may be relocated, simply shifting or relocating some of the existing boat activity. However, because no increases in boat activity and associated traffic would occur, existing noise levels would not change and there would be **no impact**.

Mitigation Measures

No mitigation is required.

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13 ROADWAY TRANSPORTATION AND CIRCULATION

13.1 INTRODUCTION

This chapter describes existing transportation conditions in the Region, identifies the applicable regulations and policies governing transportation, identifies significance criteria for land use impacts, and assesses the environmental effects of each alternative with respect to automotive transportation and circulation.

The primary issues raised during scoping that pertain to transportation included:

- changes in recreation patterns and their effect on transportation,
- traffic by new public piers,
- parking capacity and demand,
- roadway erosion from increased usage, and
- transit access to marinas and shorezone facilities.

This analysis is based on consultation with TRPA, review of the Regional Transportation Plan and other agency documents, boat use monitoring and survey data, and buoy inventory data (see Appendix A). Watercraft on Lake Tahoe are used primarily for recreational purposes rather than for transportation, however some water taxi services are in operation, and may become more prevalent as projects identified in the 2017 Regional Transportation Plan and Sustainable Communities Strategy are implemented. Therefore, the effects of the Shoreline Plan and associated alternatives on recreational navigation are addressed in Chapter 8, "Recreation," and the transportation section focuses on effects to onshore transportation systems, including motor vehicles and transit.

The widespread geography to which the Shoreline Plan applies, the long horizon over which it will be implemented, and the policy-oriented nature of its guidance are such that the automotive transportation and circulation analysis is prepared at a program level. As such, the analysis focuses on the potential effects of policies and ordinances, which—because they are to be implemented through yet unknown projects—do not provide a high level of detail or degree of specificity. Assumptions about projects at a general level, such as their broad location, timing, and magnitude are projected in this analysis, but individual shorezone facility projects are not identified or assumed. The Shoreline Plan alternatives do not propose site-specific changes to ingress or egress routes, travel route alignments, parking configurations, transit service and operations, or bicycle and pedestrian facilities. It is not possible to speculate on the precise site-specific characteristics of future projects that would be proposed over the planning horizon of the Shoreline Plan alternatives. Consequently, this analysis is not intended to replace project-specific environmental review and transportation analysis required to implement site-specific projects that may be proposed in the future consistent with the adopted alternative.

Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project, including those projects that could be proposed pursuant to the Shoreline Plan alternatives, to determine if it would result in a significant environmental effect. The site-specific effects of individual projects proposed pursuant to the Shoreline Plan alternatives would appropriately be reviewed when individual projects are proposed, and when the site-specific characteristics of those projects are known. Prior to approving any project authorized under a Shoreline Plan alternative, TRPA would require feasible mitigation measures to reduce or avoid significant adverse environmental effects, including effects on site-specific circulation patterns, safety hazards, parking impacts, transit service and operations, and bicycle and pedestrian facilities. Because the effects of individual future projects that could be proposed pursuant to the Shoreline Plan alternatives (including effects on site-specific circulation patterns, vehicular safety hazards, parking, and bicycle and pedestrian facilities) cannot be known now and would be evaluated at a project-level at the time they are proposed, they are not evaluated in this environmental impact statement (EIS).

The structures that could be developed under the Shoreline Plan alternatives are predominately boating facilities, which generally require the use of private vehicles. For example, the use of a boat ramp would require a personal vehicle to transport the boat to and from the shorezone, and thus, it is unlikely that any transit demand would be generated from a new boat ramp. It is likely that some transportation to new public shorezone facilities accommodated under the plan (e.g., public piers) could involve use of transit, bicycles, or pedestrian infrastructure. However, it is unlikely that such facilities would create such a demand for transit or active transportation such that it would result in the need for increased transit service or bike and pedestrian facilities. Therefore, effects on transit demand and operations, and bicycle and pedestrian infrastructure are not evaluated in detail in this chapter.

The Shoreline Plan alternatives would not propose new airports or rail lines, nor would they interfere with or alter existing air or rail travel patterns. Because the alternatives would not affect air or rail travel patterns, the effects on the respective transportation systems are not evaluated within this EIS.

13.2 REGULATORY SETTING

13.2.1 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has adopted threshold standards pertaining to air quality that are expressed in terms of regionwide vehicle miles traveled (VMT). These thresholds are also applicable to transportation analyses. VMT is a computed value, which correlates to the volume of traffic, the length of vehicle trips, and the extent of an area's reliance on the private automobile for travel. The TRPA TransCAD Travel Demand Model provides a forecast of the number of trips made on the highway network and the distance between trip origins and destinations for each trip purpose. Total VMT is the sum of all these trip lengths.

The adopted air quality management TRPA threshold standard that relates to traffic and transportation facilities in the Region calls for reducing VMT in the basin by 10 percent of the 1981 base year values.

The VMT threshold is periodically updated whenever TRPA updates its transportation model. The most recent VMT threshold was calculated at 2,030,938 for a peak summer day. Additional background on VMT, an overview of TRPA's transportation model and threshold updates, details on the VMT threshold, and a discussion of the use of the VMT threshold as a significance criterion in an EIS is provided on pages 3.1-2 through 3.1-7 of the Placer County Tahoe Basin Area Plan and Tahoe City Lodge Project Final EIR/EIS (Placer County and TRPA 2017) and is incorporated by reference into this EIS.

Over the last decade VMT has declined significantly, by roughly nine percent, within the Region, (2017a). Based on the most recent modeling completed in support of the Regional Transportation Plan, existing VMT in the Tahoe Region over the course of a peak summer weekday is approximately 1,937,070, indicating that the Region is currently in attainment (TRPA 2016).

LAKE TAHOE REGIONAL PLAN

Chapter 3, the Transportation Element includes transportation goals, policies, and implementation measures that address multiple aspects of transportation planning and interact to create a successful multi-modal transportation system. TRPA's Goals and Policies sets standards for vehicle level of service (LOS). The TRPA Goals and Policies related to LOS are listed below.

- **Policy T-4.6.** LOS Criteria for the region's highway system and signalized intersections during peak periods shall be:
  - LOS C on rural recreational/scenic roads;
  - LOS D on rural developed area roads;

- LOS D on urban developed area roads;
- LOS D for signalized intersections; and
- LOS E may be acceptable during peak periods in urban areas, not to exceed 4 hours per day.

These vehicle LOS standards may be exceeded when provisions for multi-modal amenities and/or services (such as transit, bicycling, and walking facilities) are adequate to provide mobility for users at a level that is proportional to the project-generated traffic in relation to overall traffic conditions on affected roadways. While the Tahoe Regional Planning Compact looks to "reduce the dependency on the private automobile" there are currently no adopted requirements or standards regarding the quality of service of other travel modes (i.e., transit, biking, or walking) that could potentially reduce the demand on the roadway system. TRPA has no standards specific to unsignalized intersections.

REGIONAL TRANSPORTATION PLAN

The Tahoe Metropolitan Planning Organization (TMPO) and TRPA jointly developed the *Lake Tahoe Regional Transportation Plan and Sustainable Communities Strategy: Mobility 2035* (TRPA 2012) (2012 RTP/SCS) as Lake Tahoe's blueprint for a regional transportation system that enhances the quality of life in the Tahoe Region, promotes sustainability, and offers improved mobility options for people and goods. Important objectives of the 2012 RTP/SCS are to reduce the overall environmental impact of transportation in the Region, create walkable and vibrant communities, and provide real alternatives to driving. The 2012 RTP/SCS included an SCS, in accordance with California Senate Bill 375, statutes of 2008 (Sustainable Communities and Climate Protection Act). The 2012 RTP/SCS presents 14 goals consistent with regional and federal requirements that focus on reducing dependency on the automobile and giving preference to projects that increase the capacity of the Region's transportation system through public transportation projects and programs.

The 2012 RTP/SCS focuses on long-range transportation planning and has established LOS criteria (see Policy 4.6, below) consistent with those in the Regional Plan. These vehicle LOS standards may be exceeded when provisions for transit, bicycling, and walking facilities would provide a mobility level proportional to the mobility level that would be provided in the existing plus project condition on affected roadways.

- **Policy 4.6.** Level of service (LOS) criteria for the Region's highway system and signalized intersections during peak periods shall be:

  - Level of service "C" on rural recreational/ scenic roads.
  - Level of service "D" on rural developed area roads.
  - Level of service "D" on urban developed area roads.
  - Level of service "D" for signalized intersections.
  - Level of service "E" may be acceptable during peak periods in urban areas, not to exceed four hours per day.

  These vehicle LOS standards may be exceeded when provisions for multimodal amenities and/ or services (such as transit, bicycling, and walking facilities) are adequate to provide mobility for users at a level that is proportional to the project-generated traffic in relation to overall traffic conditions on affected roadways.

The 2012 RTP/SCS was updated in 2017, tiering from the 2012 RTP/SCS EIS through an expanded checklist. The 2017 RTP/SCS, *Linking Tahoe: Regional Transportation Plan and Sustainable Communities Strategy* (TRPA 2017a) builds on the 2012 RTP/SCS, focusing on providing frequent and prioritized multi-modal connections between town centers and neighborhoods and easy and convenient access to high demand recreation sites. The 2017 RTP/SCS contains new goals and policies that draw from stakeholder feedback, detailed goals in the 2015 Intelligent Transportation Systems Strategic Plan, and the 2016 Active

Transportation Plan. The 2017 RTP/SCS envisions a first-class transportation system that prioritizes bicycling, walking, and transit, and serves residents and visitors while contributing to the environmental and socioeconomic health of the Region (TRPA 2017a). The plan offers strategies to jump start innovation through electric vehicle infrastructure, address the routine travel demands of residents and commuters, and the recreational travel demands of visitors that during peak periods stress and cause congestion on Lake Tahoe's transportation system (TRPA 2017a). Strategies detailed within the 2017 RTP/SCS focus on projects and programs that dynamically meet the needs of all roadway users by:

- offering better travel mode options;
- creating incentives that spread out the times, places, and ways people travel to improve traffic flow;
- providing environmentally innovative infrastructure;
- improving safe and equitable access to the places people want to go; and
- prioritizing funding for projects that fulfill TRPA objectives in transit, active transportation, transportation demand management, and other programs and directly support identified TRPA transportation performance outcomes.

CODE OF ORDINANCES

Chapter 4, "Required Findings," of the TRPA Code of Ordinances includes mandatory findings and sets forth procedures describing how TRPA shall make the required findings. Section 4.4, "Threshold-Related Findings," of the Code of Ordinances requires the following findings applicable to this project:

A. The project is consistent with and will not adversely affect implementation of the Regional Plan, including all applicable Goals and Policies, plan area statements and maps, the Code, and other TRPA plans and programs;

B. The project will not cause the environmental threshold carrying capacities to be exceeded.

Chapter 50, "Allocation of Development," of the TRPA Code of Ordinances sets forth the requirements for regulating the rate and timing of growth within the region. Section 50.4, "Allocation of Commodities and Development Rights Accounting," of the Code of Ordinances includes LOS and VMT monitoring requirements that shall be implemented by TRPA as follows:

> 50.4.3. LOS and VMT Monitoring - Two years after each release, TRPA shall monitor existing and near-term LOS to evaluate compliance with applicable LOS policies. Should LOS projections indicate that applicable LOS policies will not be met, TRPA shall take action to maintain compliance with LOS standards. TRPA shall also monitor VMT and only release commodity allocations upon demonstrating, through modeling and the use of actual traffic counts, that the VMT Threshold Standard shall be maintained over the subsequent four-year period.

Chapter 65, "Air Quality/Transportation," of the TRPA Code of Ordinances addresses how to protect air quality; and thus, attain and maintain applicable standards and thresholds, including limits on direct sources of air pollution, and new and modified stationary source review; and establishment of programs to maintain and improve air quality, including a traffic and air quality mitigation program, a rental car mitigation program, and an employer-based trip reduction program. Additionally, Section 65.2, "Traffic and Air Quality Mitigation Program," of the Code of Ordinances includes standards for new or transferred development in which requirements related to transportation are detailed.

13.2.2 California

CALTRANS TRANSPORTATION CORRIDOR CONCEPT REPORT

The California Department of Transportation (Caltrans) prepares Transportation Corridor Concept Reports for each highway in the state system which include a "20 Year Concept LOS" for each segment. Reflecting forecast conditions and the limited opportunities to expand capacity in the Tahoe Region, the most recent Transportation Corridor Concept Reports (2012) for the three state highways identify the following:

Roadway	Segment	20-Year Concept LOS
SR 28	All	E
SR 89	El Dorado County Line to SR 28	E
SR 89	SR 28 to Nevada County Line	E
SR 267	All	D

Although this report provides LOS standards for intersection and roadway operations, the standards set forth by the TRPA typically govern over the state standards for projects located within the Tahoe Region, but any projects affecting a state highway are also subject to Caltrans review.

13.3 AFFECTED ENVIRONMENT

13.3.1 Roadway Network

The Tahoe shorezone includes portions of El Dorado and Placer Counties in California, and Carson City, Washoe, and Douglas counties in Nevada. Roadways within the Tahoe Region, which can be used to access the shorezone, consist of state highways, arterials, collectors, and local/neighborhood streets. General descriptions of these roadways and their intended function are provided below. Exhibit 13-1 shows the roadway network in the Tahoe Region.

STATE HIGHWAYS

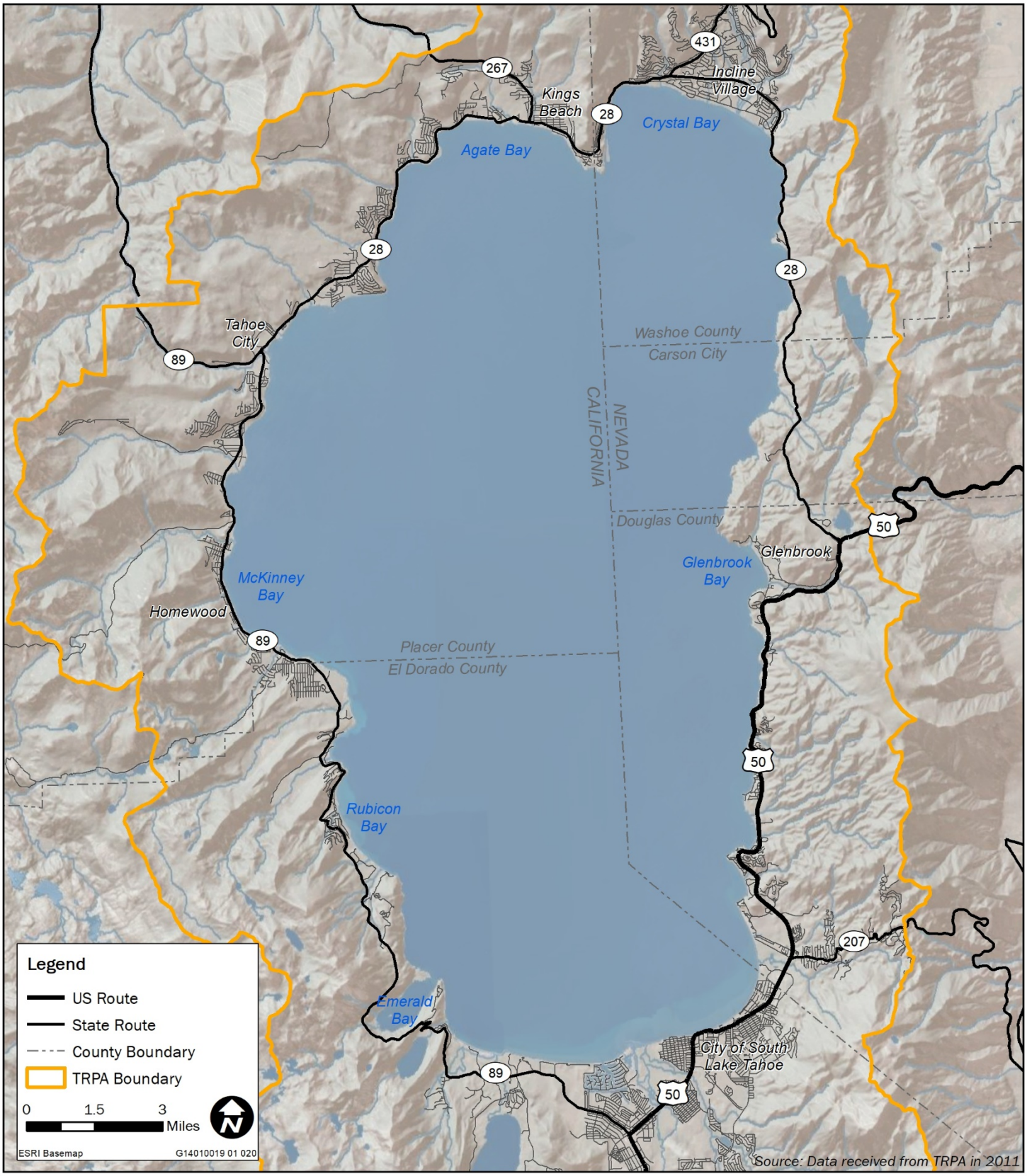
Most vehicular travel in the Tahoe Region occurs on state highways including U.S. Route (US) 50, State Route (SR) 28, SR 89, SR 207, SR 267, and SR 431. Most highways are two-lane facilities; however, portions of US 50, SR 28, and SR 89 have wider cross-sections such as four-lane roadways with center two-way left-turn lanes.

ARTERIALS

Arterial roadways carry moderate to high traffic volumes to and from local and collector roads to other arterials and highways. Although access to adjacent parcels is more limited from arterials than from collector and local streets, arterial roadways also provide direct access to properties, particularly in commercial areas.

COLLECTORS

Collector roadways serve as transition facilities, distributing traffic from arterials and highways to their ultimate destination, and collecting traffic from local roadways to roads higher in the street classification hierarchy, such as arterials and state highways. Collector roads serve a dual function by providing access to properties on the roadway and moving moderate traffic volumes for medium-length trips.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 13-1 Roadway Network

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

LOCAL/NEIGHBORHOOD STREETS

Local roadways are intended to serve as access roads to adjacent properties only. They provide connections to higher order roadways, carry little if any through traffic, and generally have low traffic volumes.

13.3.2 Existing Traffic Volumes and Levels of Service

ROADWAY SEGMENT LEVEL OF SERVICE

The 2017 RTP/SCS Initial Study/Initial Environmental Checklist (IS/IEC) included updated LOS modeling for major roadway segments within the Tahoe Region. These roadways provide connections throughout the Tahoe Region and access to the shorezone and Lake Tahoe. The existing average daily traffic (ADT) volumes and LOS for these major roadway segments are shown in Table 13-1.

Table 13-1 Existing Roadway Segment Operations

Roadway	Roadway Segment	ADT	LOS	PM Peak Hour Volume	PM Peak Hour LOS
US 50	SR 89 (Luther Pass Rd.) to Navahoe Dr.	17,600	C or better	1,760	E
US 50	Pioneer Trail to Arapahoe St.	17,200	C or better	1,710	E
US 50	SR 89 to Dunlap Dr.	39,500	D	3,230	E
US 50	Tahoe Keys Blvd. to Winnemucca Ave.	37,500	D	3,070	E
US 50	Edgewood Cir. to Al Tahoe Blvd.	39,000	D	3,190	E
US 50	Pioneer Trail to Park Ave. / Heavenly Village Way	36,500	D	3,220	E
US 50	Lake Parkway to SR 207 (Kingsbury Grade Rd.)	33,738	C or better	2,980	D
US 50	SR 207 (Kingsbury Grade Rd.) to Kahle Dr.	25,980	C or better	2,370	D
SR 28	West of US 50	6,805	C or better	610	C or better
SR 28	Red Cedar Dr. to W. Lakeshore Blvd.	16,494	E	1,510	E
SR 28	SR 28 Cal Neva Dr. to Stateline Rd.	17,900	E	1,650	E
SR 28	SR 28 Brassie Ave. to SR 267 (N Shore Blvd.)	21,500	C or better	1,970	D
SR 28	N Lake Blvd. to Lake Forest Rd.	13,700	D	1,350	D
SR 89	South of Lester Beach Rd.	6,000	C or better	730	D
SR 89	Fallen Leaf Rd. / Heritage Way to Valhalla Rd.	6,400	C or better	860	D
SR 89	Tucker Ave. to US 50 (Lake Tahoe Blvd.)	18,200	C or better	1,720	D
SR 267	North Ave. to Tiger Ave.	13,100	D	1,280	D
SR 89	US 50 to Pomo St.	3,400	C or better	390	C or better
US 50	North of Lincoln Hwy	15,100	E	1,620	E
SR 207	US 50 to Kahle Dr.	13,153	D	1,350	D
US 50	SR 28 to Kings Canyon Rd.	14,349	C or better	1,290	C or better
SR 431	SR 28 to 2nd Creek Dr.	6,700	C or better	620	C or better
SR 267	Tahoe Rim Trail to Gas Line Rd.	10,600	D	1,040	D
SR 89	West of Fairway Dr.	16,600	E	1,660	E

Source: TRPA 2017b: Table 18, p 3-61.

As indicated in Table 13-1, all study roadway segments currently operate at acceptable LOS. A number of these roadway segments operate at LOS E; however, these segments are considered to operate at acceptable LOS because they do not operate at this level for 5 hours or more.

INTERSECTION LEVELS OF SERVICE

The 2017 RTP/SCS IS/IEC included updated LOS modeling for existing conditions of major intersections within the Tahoe Region as shown in Table 13-2.

Table 13-2 Existing Intersection Operations

Intersection	Jurisdiction	City/Community	LOS/Average Delay (seconds)
SR 28 / SR 267	Caltrans	Kings Beach	D / 43
SR 28 / Village Boulevard	NDOT	Incline Village	C / 31
US 50 / SR 89 (south Y)	Caltrans	South Lake Tahoe	C / 25
US 50 / Ski Run Boulevard	Caltrans	South Lake Tahoe	C / 24
US 50 / Park Avenue	Caltrans	South Lake Tahoe	D / 39
SR 28 / SR 89	Caltrans	Tahoe City	C / 23
US 50 / SR 207	NDOT	Kingsbury	C / 23

Notes: Existing conditions representative of a Friday afternoon/evening peak hour in August.

Source: TRPA 2017b: Table 16

As shown in Table 13-2, all intersections listed currently operate at LOS D or better; and thus, meet applicable LOS standards.

13.3.3 Transit Network

Transit service within the vicinity is provided by a mix of public and private transit services. Tahoe Transportation District (TTD) and Tahoe Truckee Area Regional Transit (TART) are the regional transit providers. These two transit providers operate year-round and seasonal services on the North, East, South and West Shores. They also provide commute services to nearby areas such as Truckee to the North, and Carson valley to the East. Washoe Regional Transportation Commission, the Town of Truckee, State Departments of Transportation, and private entities such as ski-resorts also partner with transit providers to offer transit service through cost sharing agreements, formula funding allotments, and private shuttles and taxi services (TRPA 2017a).

LOCAL AND REGIONAL TRANSIT SERVICE

TART connects the North and West shores of Tahoe to the Town of Truckee year-round and runs a free night shuttle service during summer. TTD provides year-round service throughout the South Shore and connects to the neighboring communities of Gardnerville and Minden. The TTD also connects parts of the West and East shores during the summer with the Emerald Bay Trolley and the East Shore Express. Some local buses also provide connections to trailheads, such as at Spooner Summit. Though many parts of the Lake are served with transit, year-around connections from North to South do not exist.

SHUTTLES AND ON-DEMAND SERVICE

TART and TTD supply on-demand services to qualified individuals with special needs who are unable to independently use the fixed-route transit system. Location-specific shuttle service is provided by private companies and public/private partnerships. Many major ski resorts also provide shuttle services. Additionally, some private shuttle companies focus on the needs of the recreational hiker and biker by providing point-to-point pick-up and drop-off. Private providers include Flume Trail Bikes and Over the Edge Tahoe (TRPA 2017a).

INTER-REGIONAL TRANSIT SERVICES

Amtrak and Greyhound provide connections to Lake Tahoe from surrounding areas of California and Nevada, including Sacramento, San Francisco, Sparks, and Reno. These services run three times daily from the Bay Area/Sacramento to and from the Town of Truckee and one time daily to and from Lake Tahoe's South Shore. Trips may require transfers to regional rail or bus service to reach the destination. Charter services are available by commercial companies. Shuttles to the Reno/Tahoe airport from both the North and South shores are available. The North Lake Tahoe Express is managed by the Truckee-North Tahoe Transportation Management Association and the South Tahoe Express is a public/private partnership between the South Tahoe Alliance of Resorts and Amador Stage Lines (TRPA 2017a).

13.3.4 Pedestrian and Bicycle Network

The current network includes roughly 50 miles of shared-use path, 44 miles of bicycle lanes, 23 miles of sidewalks, and four enhanced crosswalks that include a pedestrian active beacon or rapid flashing beacon (TRPA 2017a). The United States Forrest Service also operates and maintains 350 miles of National Forest System Trails and 250 miles of National Forest System Roads (TRPA 2017a).

The Region has over 70 miles in separated class-I shared-use paths and sidewalks. These routes are well-connected in some areas and have gaps in others. Caltrans and local jurisdictions have constructed sidewalks along the state highway system through town centers and more are planned. Local jurisdictions are connecting Class-I shared-use paths around the lake, providing links across communities and to neighboring areas (TRPA 2017a).

13.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

13.4.1 Methods and Assumptions

The geographic area addressed by the Shoreline Plan alternatives is the 72-mile-long shoreline of Lake Tahoe, including portions of Placer and El Dorado Counties in California, and Washoe and Douglas Counties and Carson City in Nevada. The primary types of shorezone structures addressed by the alternatives include piers, moorings for motorized watercraft (i.e., buoys, slips, and boat lifts), boat ramps, and marinas. Many of these structures would be associated with private residences.

Access to moorings associated with private residences would be restricted at the discretion of the property owner. Additionally, the inherent nature of locating moorings at private residences is to increase accessibility to boating on Lake Tahoe by removing the necessity to transport boats to a remote facility (i.e., boat ramp, marina, public mooring) to access the Lake. Thus, private moorings eliminate the generation of automobile trips from these private residences to a boat ramp, or to public moorings or marinas to access the Lake for boating activities. Thus, the addition of buoys, slips, or boat lifts at private residences would not generate additional vehicle trips beyond those already associated with private residences.

Piers are categorized as private multiple-use, individual private, or public. The private multiple-use piers are privately-owned piers that serve either a homeowners association (HOA) or two or more private parcel owners. Individual private piers are privately-owned piers that serve a single private parcel. Thus, due to the restrictive access to these types of piers, and the limited number of permissible users to private piers, this category of structure would not generate new vehicular trips that are in addition to those already generated by the residence(s). Public piers are defined as piers owned and operated by a public agency that provide public access or another public service, or piers that are owned or operated by a private organization and provide access to the public free of charge. In general, public piers are accessory structures within a multiple-use facility (e.g., marina) or park and not the primary land use that would generate vehicular trips (e.g., public beach, public park). Thus, public piers would function as accessory structures that would not generate additional vehicle trips beyond those trips already generated by the marina, public beach, or other primary land use.

The specific shorezone structures that would result in the generation of new vehicular trips are public buoys and slips, including any buoys or slips associated with a new or expanded marina, and public boat ramps.

PROJECT TRIP GENERATION

The first step in the analysis of traffic impacts is to identify the trip generation rates and resulting traffic volumes that could occur as a result of the project. Peak-day trip generation rates for the shorezone structures that generate additional vehicular trips (i.e., public buoys, slips, and boat ramps) were developed based on boating use activity on Lake Tahoe and the maximum number of shorezone structures allowed under each alternative. The level of boat usage on Lake Tahoe associated with individual shorezone structures was calculated based on observed and collected data on Lake Tahoe. A description of boat activity is provided in Chapter 2, “Project Description.” The maximum number of shorezone structures that could be developed under each alternative are also summarized in Chapter 2, “Project Description.” Additional detail on the data sources, assumptions, and calculations of boating activity and structure buildout are provided in Appendix A. The calculated trip generation rates for the vehicle trip-generating shorezone structures are shown in Table 13-3. These trip generation rates are based on the assumption that each new boat trip generated by a public structure would result in two automobile trips (i.e., one trip to the structure prior to the boat trip, and one trip from the structure after the boat trip).

Table 13-3 Trip Generation Rates

	Boat Trips Per Structure/Unit (Peak-day)	Vehicle Trips Per Structure/Unit (Peak-day)
Moorings		
Buoy	0.25	0.50
Slip	0.36	0.72
Launch Points		
Public Boat Ramp	113	226

Source: Joint Fact-Finding Committee 2017 (see Appendix A)

ROADWAY AND INTERSECTION OPERATIONS

The location, site-specific design, and timing of development under the proposed alternatives over the planning horizon of the Shoreline Plan are not known at this time. Therefore, the specific location of vehicle trips and travel patterns resulting from implementation of the Shoreline Plan alternatives cannot be known. Thus, project-related trips cannot be accurately distributed within the project area or assigned to specific roadway segments or intersections. The existing operation of roadway segments and intersections, as shown in Table 13-1 and 13-2, respectively, are used to qualitatively analyze potential impacts of individual Shoreline Plan alternatives on vehicular transportation operations.

VEHICLE MILES TRAVELED

VMT is defined as one vehicle traveling on a roadway for one mile and has long been a primary indicator of travel. A reasonable estimate of total VMT is required to evaluate compliance with the TRPA VMT Threshold Standard, with number of trips and trip length being the two main components needed for calculating VMT.

For the purpose of this analysis, average trip length is based on recreation trip lengths for visitors and seasonal residents, which is approximately 18 miles per trip within the Tahoe Region (Haefer, pers. comm., 2018). This data was derived from the TRPA travel demand model and the trip length is based on the 2014 base year model run conducted as part of the 2017 RTP and 2015 Threshold Evaluation. The trip length used for this analysis does not account for trips by permanent residents (approximately a 5-mile average trip length) because of the lack of refinement for this trip length category (i.e., includes variety of trip types such as work, school, and shopping in addition to recreation trips). However, the permanent resident average trip length is lower than that of the visitors and seasonal residents (i.e., 5 miles compared to 18 miles); and thus, by applying the recreation visitor and seasonal resident trip length to all Shoreline Plan alternative generated trips, the analysis provides a conservative estimate of VMT.

Project-related VMT for each alternative was calculated using the number of project trips generated by each of the Shoreline Plan alternatives, and the estimated average trip length of 18 miles, detailed above.

13.4.2 Significance Criteria

Significance criteria relevant to automotive transportation and circulation are summarized below. The applicable TRPA threshold standards, the transportation and circulation criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- substantially impact existing highway systems or alter present patterns of circulations, defined here as:
  - cause a study roadway within a rural area to worsen from LOS D or better to LOS E or worse;
  - cause a study roadway within an urban area to degrade as follows:
    - worsen from LOS E or better to LOS F;
    - worsen from LOS D or better to LOS E for 5 hours or more;
    - worsen from LOS E (for 4 hours per day or less) to LOS E for 5 hours or more; or
    - worsen an LOS F condition.
  - cause a study intersection controlled by signal or roundabout to worsen from LOS A through D or less than 5 hours per day of LOS E to LOS F or to LOS E for 5 or more hours per day;
  - cause a study intersection not controlled by signal or roundabout to worsen from LOS A through E to LOS F, or to increase delay where LOS F currently exists; or
- cause total VMT within the Tahoe Region to exceed the TRPA Air Quality Threshold value of 2,030,938.

13.4.3 Environmental Effects of the Project Alternatives

Impact 13-1: Roadway and intersection operations

Under Shoreline Plan Alternatives 1, 2, and 3 future development of shorezone structures would result in additional vehicular trips being added to the transportation network in the Region. It is not known at this time where any of these structures would be developed; and therefore, the addition of vehicle trips associated with the development of these alternatives (Alternatives 1, 2, and 3) could result in an increase in delay and degradation of LOS at intersections and along roadway segments in the project area if concentrated in such a way that a large portion of the trips affect a single roadway segment or intersection. However, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project, including projects that could result in new trips such as a marina expansion or public boat ramp, to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS. Therefore, any potential impacts would be evaluated and mitigated on the project-level; and thus, this would be a **less-than-significant** impact for Shoreline Plan Alternatives 1, 2, and 3. Alternative 4 would not generate any new vehicle trips; and thus, would result in **no impact**.

Structures that could be developed under the Shoreline Plan (i.e., public buoys, slips, and boat ramps) could result in additional vehicle trips that would be added to the circulation network within the Tahoe Region. The timing, location, and intensity of development under the Shoreline Plan alternatives would dictate the roadway segments and intersections that project-generated trips would affect. However, the location of potential future public buoys, slips, and boat ramps is not known at this time; and thus, the analysis of potential roadway and intersection operation impacts is qualitative in nature.

The trip generation analysis for the Shoreline Plan alternatives is shown in Table 13-4.

Table 13-4 Trip Generation

Structure/ Unit Type	Vehicle Trips Per Structure (Peak-day)	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Number of Structures	Peak Summer Day Vehicle Trips	Number of Structures	Peak Summer Day Vehicle Trips	Number of Structures	Peak Summer Day Vehicle Trips	Number of Structures	Peak Summer Day Vehicle Trips
Moorings									
Public Buoy	0.50	265	133	–	–	300	150	–	0
Public Slip	0.72	65	47	1,897	1,366	65	47	–	0
Launch Points									
Public Boat Ramp	226	2	452	6	1,357	1	226	–	0
Total Peak Summer Day Vehicle Trips[1]		**632**		**2,723**		**423**		**0**	

Source: Joint Fact-Finding Committee 2017 (see Appendix A)

[1] Values rounded to the nearest whole number. Exact values for total peak summer day vehicle trips are shown in Appendix A.

<u>Alternative 1: Proposed Shoreline Plan</u>

As shown in Table 13-4 above, Alternative 1 could generate approximately 632 additional vehicle trips on a peak summer day. The major roadway segments and intersections within the Tahoe Region shown in Tables 13-1 and 13-2 are all currently operating at acceptable LOS; however, several facilities are operating at LOS just above (e.g., LOS D for intersections, LOS E for roadway segments) that which is considered acceptable under TRPA LOS standards. Thus, if a large percentage of the trips generated by Alternative 1 were concentrated in an area where roadways and/or intersections are operating narrowly above an acceptable

LOS, the addition of project generated trips could result in an increase in delay and degradation of LOS such that a significant impact would result.

However, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project, including a marina expansion or public boat ramp, to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS (see TRPA Initial Environmental Checklist Section 13, and Code of Ordinances Section 65.2). Prior to approving a marina expansion, public boat ramp, or other project TRPA would require feasible mitigation measures to reduce or avoid significant adverse environmental effects, including effects on LOS. Furthermore, Code Section 4.4.1.A requires that, prior to approving any project, TRPA must make a finding, based on evidence, that the project "…will not adversely affect implementation of the Regional Plan, including all applicable Goals and Policies…" This finding would prevent TRPA from approving a marina expansion, public boat ramp, or other project that would exceed the LOS standards identified in Regional Plan Policy T-4.6. Therefore, effects on LOS would be analyzed and mitigated, if necessary, at the project level. Thus, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

As shown in Table 13-4 above, Alternative 2 could generate approximately 2,700 additional vehicle trips on a peak summer day. The major roadway segments and intersections within the Tahoe Region shown in Tables 13-1 and 13-2 are all currently operating at acceptable LOS; however, several facilities are operating at LOS just above (e.g., LOS D for intersections, LOS E for roadway segment) that which is considered acceptable under TRPA LOS standards. Thus, if many of the trips generated by Alternative 2 were concentrated in an area where roadways and/or intersections are operating just above an acceptable LOS, the addition of project generated trips could result in an increase in delay and degradation of LOS such that a significant impact would result.

However, as described for Alternative 1 above, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS; and TRPA would be required to make a finding that would prevent TRPA from approving a marina expansion, public boat ramp, or other project that would exceed the LOS. For the same reasons described for Alternative 1, this impact would be **less than significant**.

Alternative 3: Limit New Development

As shown in Table 13-4 above, Alternative 3 could generate approximately 400 additional vehicle trips on a peak summer day. The major roadway segments and intersections within the Tahoe Region shown in Tables 13-1 and 13-2 are all currently operating at acceptable LOS; however, several facilities are operating at LOS just above (e.g., LOS D for intersections, LOS E for roadway segment) that which is considered acceptable under TRPA LOS standards. Thus, if a large percentage of the trips generated by Alternative 3 were concentrated in an area where roadways and/or intersections are operating just above an acceptable LOS, the addition of project generated trips could result in an increase in delay and degradation of LOS such that a significant impact would result.

However, as described for Alternative 1 above, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS; and TRPA would be required to make a finding that would prevent TRPA from approving a marina expansion, public boat ramp, or other project that would exceed the LOS. For the same reasons described for Alternative 1, this impact would be less than significant.

Alternative 4: Expand Public Access and Reduce Existing Development

As shown in Table 13-4 above, Alternative 4 would not generate any new vehicle trips. Therefore, Alternative 4 would not increase delay along any roadway segment or at any intersection within the Tahoe Region. Thus, this would result in **no impact**.

Mitigation Measures

No mitigation is required.

Impact 13-2: Vehicle miles traveled

Each Shoreline Plan alternative would include ordinances that would affect the location and intensity of future shorezone structure development, which would affect travel patterns, the number of new vehicle trips generated, and VMT. Alternatives 1, 2, and 3 would result in an increase in VMT but would maintain VMT levels below the adopted TRPA threshold standard. This would be a **less than significant** impact for Alternatives 1, 2, and 3. Alternative 4 would not increase VMT and would maintain summer daily VMT levels below the adopted TRPA VMT threshold. Alternative 4 would result in **no impact**.

The target value for the TRPA VMT threshold is a 10 percent reduction from 1981 levels, or no more than 2,030,938 daily VMT (TRPA 2016). 2017 RTP/SCS projects that VMT in the Region is anticipated increase to 2,168,384 VMT/day by 2040 (TRPA 2017b).

The VMT generated in the Tahoe Region on a peak summer day under each Shoreline Plan alternative is calculated based on the trip generation estimates by facility as shown in Table 13-3, and the average trip length within the Region for visitors/seasonal residents recreation trips (approximately 18 miles). The total peak summer day vehicle trips shown in Table 13-4 are rounded to the nearest whole number; however, calculation of the VMT for each alternative uses the exact calculated mathematical value of the total peak summer day vehicle trips. Additional details are provided in Appendix A.

The VMT estimates reflect those generated from buildout of Shoreline Plan in addition to the 2040 VMT forecast for the 2017 RTP/SCS. The methodology for calculating project-related VMT is described in more detail in Section 13.4, "*Methods and Assumptions*." Table 13-5 below shows the baseline regional VMT as well as the regional VMT for each alternative.

Table 13-5 Region-Wide Daily Summer VMT Under Buildout by Alternative

	Alternative 1 (2040)	Alternative 2 (2040)	Alternative 3(2040)	Alternative 4(2040)
Project Generated Region-wide VMT	11,368	49,007	7,613	0
Baseline Region-wide VMT (2040)	2,168,384	2,168,384	2,168,384	2,168,384
Baseline Plus Project Region-wide VMT	2,179,752	2,217,391	2,175,997	2,168,384
TRPA Threshold Standard	2,030,938	2,030,938	2,030,938	2,030,938
Standard Met	No	No	No	No

Notes: Additional details provided in Appendix A

Source: TRPA 2016; TRPA 2017b; data provided by Ascent Environmental in 2018.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would result in a total of 2,179,752 region-wide peak-daily summer VMT under buildout conditions. When compared to the projected 2040 summer daily VMT in the Tahoe Region of 2,168,384 (TRPA 2017b), Alternative 1 is estimated to increase region-wide VMT from baseline 2040 conditions by 11,368, or approximately 0.5 percent. Thus, the total VMT under Alternative 1 would exceed the TRPA threshold standard of 2,030,938 by 148,814 VMT.

However, as described in Chapter 50 of the TRPA Code of Ordinances, two years after each release of land use commodities (which are released in 4-year cycles), TRPA is required to monitor VMT and only release commodity allocations upon demonstrating through modeling and the use of traffic counts that the TRPA VMT threshold standard shall be maintained over the subsequent four-year period (see Code of Ordinances Section 50.4). Therefore, the monitoring of VMT, and release of commodity allocations contingent on

achievement of the TRPA VMT threshold standard would prevent region-wide VMT from exceeding the threshold standard of 2,030,938. This is consistent with the findings of the 2017 RTP/SCS IS/IEC which determined that the mitigation presented in the 2012 RPU EIS (and subsequently incorporated into the TRPA Code of Ordinances as Section 50.4) would be applicable to the current RTP and would adequately resolve the impact. Thus, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would result in a greater increase in VMT than Alternative 1. Alternative 2 would result in a total of approximately 2,217,391 region-wide peak-daily summer VMT under buildout conditions. When compared to the projected 2040 summer daily VMT in the Tahoe Region of 2,168,384 (TRPA 2017b), Alternative 2 is estimated to increase region-wide VMT from baseline 2040 conditions by 49,007, or approximately 2.3 percent. Thus, the total VMT under Alternative 2 would exceed the TRPA threshold standard of 2,030,938 by 186,453 VMT.

However, as described for Alternative 1 above, Chapter 50 of the TRPA Code of Ordinances requires TRPA to monitor VMT and only release commodity allocations upon demonstrating through modeling and the use of actual traffic counts that the TRPA VMT threshold standard shall be maintained over the subsequent four-year period. This would prevent region-wide VMT from exceeding the threshold standard of 2,030,938. For the same reasons described for Alternative 1, this impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would result in a total of approximately 2,175,997 region-wide peak-daily summer VMT under buildout conditions. When compared to the projected 2040 summer daily VMT of 2,168,384 (TRPA 2017b), Alternative 3 is estimated to increase region-wide VMT from baseline 2040 conditions by 7,613, or approximately 0.4 percent. Thus, the total VMT under Alternative 2 would exceed the TRPA threshold standard of 2,030,938 by 145,059 VMT.

However, as described for Alternatives 1 and 2 above, Chapter 50 of the TRPA Code of Ordinances requires TRPA to monitor VMT and only release commodity allocations upon demonstrating through modeling and the use of actual traffic counts that the TRPA VMT threshold standard shall be maintained over the subsequent four-year period. This would prevent region-wide VMT from exceeding the threshold standard of 2,030,938. For the same reasons described for Alternative 1, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would not include the development of vehicular trip generating structures and would result in no increase in region-wide VMT. The 2017 RTP/SCS IS/IEC projected that the 2040 summer daily VMT in the Tahoe Region (2,168,384) would exceed the threshold standard of 2,030,938 (TRPA 2017b). However, the 2017 RTP/SCS IS/IEC determined that the mitigation presented in the 2012 RPU EIS (and subsequently incorporated into the TRPA Code of Ordinances as Section 50.4) would be applicable to the current RTP/SCS and would adequately resolve the impact. The projected 2040 summer daily VMT would remain below the TRPA threshold standard of 2,030,938 with the implementation of TRPA Code requirements. Therefore, with implementation of Alternative 4, there would be no increase in region-wide VMT and VMT would remain below the TRPA threshold standard of 2,030,938. Alternative 4 would result in **no impact**.

Mitigation Measures

No mitigation is required.

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14 TERRESTRIAL BIOLOGICAL RESOURCES (WILDLIFE AND VEGETATION)

14.1 INTRODUCTION

This chapter describes the common and sensitive terrestrial wildlife and vegetation resources known or with potential to occur in the shorezone and nearby upland areas. Terrestrial biological resources include common vegetation and habitat types, sensitive plant communities, and special-status plant and animal species. Federal, TRPA, state, and local regulations related to biological resources are summarized. Potential impacts of the proposed alternatives are analyzed, and mitigation measures are provided for those impacts determined to be significant. Cumulative biological resources impacts are addressed in Chapter 17, "Cumulative Impacts."

The primary issues raised during scoping that pertain to terrestrial biological resources included:

- consideration for effects of piers on osprey and other avian species, and
- potential effects of increases in lateral access along the shoreline on vegetation.

For this analysis, information about common and sensitive terrestrial biological resources known or with potential to occur in the plan area is based primarily on the following available data sources: Section 3.10, "Biological Resources," of the Regional Plan Update Environmental Impact Statement (RPU EIS) and Lake Tahoe Regional Transportation Plan (RTP, also known as *Mobility 2035*) and Sustainable Communities Strategy Environmental Impact Report and Environmental Impact Statement (RTP/SCS EIR/EIS); TRPA survey and GIS data; a records search of the California Natural Diversity Database (CNDDB 2018); California Native Plant Society Online Inventory of Rare and Endangered Plants (CNPS 2015); a database search of the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) and a list of federally proposed, candidate, threatened, and endangered species that may occur in the project region (USFWS 2018); U.S. Forest Service Region 5 EVeg land cover data (2014); and high resolution aerial imagery.

Section 14.3, "Affected Environment," discusses the terrestrial special-status plant and animal species evaluated in this analysis, with a focus on TRPA special interest wildlife and TRPA sensitive plant species that may be affected by alternatives. Generally, those terrestrial plant and animal species not expected to regularly occur, or with a low probability to occur (because of a lack of suitable habitat, existing disturbance levels, or lack of occurrence records) are not addressed further in the effects analysis. Implementation of the proposed alternatives would have no considerable effect on those species, including any species listed, proposed for listing, or designated as a candidate for listing under the federal Endangered Species Act (ESA). Additionally, although Lake Tahoe's shorezone provides important wildlife habitat functions, none of the alternatives would impose barriers to or otherwise impede the necessary movements of terrestrial wildlife. Therefore, potential effects on important wildlife movement corridors are not addressed further.

None of the Shoreline Plan alternatives would generate construction or uses that would affect old growth forest ecosystems; and, any future tree removal required for the construction of new facilities (e.g., marinas, boat ramps) in the shorezone would be relatively minor and likely similar in magnitude to potential effects that could occur under current ordinances. Additionally, modification of the shorezone chapters of the TRPA Code under any of the alternatives would not change existing policies, code provisions, project-level environmental review procedures and permitting requirements, sensitive design practices, and standard conditions of approval that address tree removal, disturbance of riparian and other sensitive habitats, use of fertilizers, or the potential introduction and spread of terrestrial invasive species as a result of specific projects. Therefore, shorezone ordinance modifications under any of the alternatives are not expected to substantially change conditions related to these resources and issues, and they are not addressed further in the effects analysis.

14.2 REGULATORY SETTING

14.2.1 Federal

FEDERAL ENDANGERED SPECIES ACT

Pursuant to the federal ESA (16 U.S.C. Section 1531 et seq.), USFWS and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) regulate the taking of species listed in the ESA as threatened or endangered. In general, persons subject to ESA (including private parties) are prohibited from "taking" endangered or threatened fish and wildlife species on private property, and from "taking" endangered or threatened plants in areas under federal jurisdiction or in violation of state law. Under Section 9 of the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take.

Two sections of the ESA address take. Section 10 regulates take if a non-federal agency is the lead agency for an action that results in take and no other federal agencies are involved in permitting the action. However, if a project would result in take of a federally-listed species and federal discretionary action (even if a non-federal agency is the overall lead agency) is involved (i.e., a federal agency must issue a permit), the involved federal agency consults with USFWS under Section 7 of the ESA. Because this project involves federal permits, interagency cooperation under Section 7 of the ESA is required. Section 7 of the ESA outlines procedures for federal interagency cooperation to protect and conserve federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with USFWS and NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

EXECUTIVE ORDER 11990—PROTECTION OF WETLANDS

Executive Order 11990 established the protection of wetlands and riparian systems as the official policy of the federal government. The order requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

CLEAN WATER ACT

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) before performing any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, tidally influenced waters, and all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate regional water quality control board (RWQCB) indicating that the action would uphold state water quality standards.

BALD AND GOLDEN EAGLE PROTECTION ACT

Under the Bald and Golden Eagle Protection Act, it is illegal to take bald eagles, including their parts, nests, or eggs unless authorized. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means to agitate or bother a bald or golden eagle to a degree that

causes, or is likely to cause (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment (USFWS 2007: 31156). In addition to immediate impacts, this definition also addresses impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or egg of any such bird. Under the MBTA, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations (CFR), Section 10.13 (50 CFR 10.13). The list includes nearly all birds native to the United States.

EXECUTIVE ORDER 13112—NATIONAL INVASIVE SPECIES MANAGEMENT PLAN

Executive Order 13112 directs all federal agencies to prevent the introduction and control the spread of invasive species in a cost-effective and environmentally sound manner to minimize economic, ecological, and human health impacts. It established a national Invasive Species Council made up of federal agencies and departments and a supporting Invasive Species Advisory Committee composed of state, local, and private entities. The Invasive Species Council and advisory committee oversee and facilitate implementation of the executive order.

14.2.2 Tahoe Regional Planning Agency

THRESHOLDS

The TRPA thresholds includes standards that have been developed to focus management efforts and provide a measure of progress for vegetation, wildlife, and fisheries. The adopted TRPA threshold standards for vegetation, wildlife, and fisheries, and the attainment status for each standard, are summarized in Table 14-1 (TRPA 2016).

Table 14-1 TRPA Vegetation, Wildlife, and Fisheries Resource Threshold Indicators and their Attainment Status

TRPA Threshold Indicator	2015 Attainment Status
Vegetation	
Common Vegetation:	
Vegetation Community Richness	At or Somewhat Better than Target
Relative Abundance of Red Fir Forest in Seral Stages Other Than Mature	Considerably Worse than Target
Relative Abundance of Yellow Pine Forest in Seral Stages Other Than Mature	Considerably Worse than Target
Relative Abundance of Meadow and Wetland Vegetation	Somewhat Worse than Target
Relative Abundance of Shrub Vegetation	Considerably Better than Target
Relative Abundance of Deciduous Riparian Vegetation	Considerably Worse than Target
Size of Forest Openings and Juxtaposition of Vegetation Communities – Management Standard	Implemented

Table 14-1 TRPA Vegetation, Wildlife, and Fisheries Resource Threshold Indicators and their Attainment Status

TRPA Threshold Indicator	2015 Attainment Status
Consistency with Baily Land Capability System	Implemented
Nondegradation of Stream Environment Zones	Implemented
Appropriate Management Practices	Implemented
Uncommon Plant Communities:	
Upper Truckee Marsh	Somewhat Worse than Target
Taylor Creek Marsh	Insufficient Data to Determine Status
Pope Marsh	Insufficient Data to Determine Status
Osgood Swamp	Insufficient Data to Determine Status
Hell Hole	Insufficient Data to Determine Status
Grass Lake	Insufficient Data to Determine Status
Freel Peak Cushion Plant Community	Somewhat Worse than Target
Deep-Water Plants	Considerably Worse than Target
Sensitive Plants:	
Tahoe Yellow Cress	Considerably Better than Target
Tahoe Draba	Considerably Better than Target
Long-petaled Lewisia	Considerably Better than Target
Cup Lake Draba	Considerably Better than Target
Galena Creek Rockcress	Considerably Worse than Target
Late Seral/Old-Growth Ecosystems Overall and in Montane, Upper Montane, and Subalpine Elevation Zones	Considerably Worse than Target (in all elevation zones)
Wildlife	
Special Interest Species:	
Northern Goshawk Population Sites	Insufficient Data to Determine Status
Osprey	Considerably Better than Target
Nesting Bald Eagle Population	At or Somewhat Better than Target
Wintering Bald Eagle Population Sites	Considerably Better than Target
Golden Eagle Population Sites	Insufficient Data to Determine Status
Peregrine Falcon Population Sites	Considerably Better than Target
Waterfowl Population Sites	Somewhat Worse than Target
Deer	Insufficient Data to Determine Status
Disturbance Free Zones Management Standards	Implemented
Habitats of Special Significance:	
Riparian Habitat	Implemented
Fisheries	
Stream Habitat:	
Miles of Stream Habitat in Excellent Condition	Considerably Better than Target
Miles of Stream Habitat in Good Condition	Considerably Worse than Target
Miles of Stream Habitat in Marginal Condition	Considerably Worse than Target

Table 14-1 TRPA Vegetation, Wildlife, and Fisheries Resource Threshold Indicators and their Attainment Status

TRPA Threshold Indicator	2015 Attainment Status
Instream Flow:	
Nondegradation Standard for Instream Flow	Implemented
Divert Stream Intakes to Lake Sources	Implemented
Lahontan Cutthroat Trout	Implemented
Lake Habitat:	
Acres of "Prime" Fish Habitat	At or Somewhat Better than Target

Source: TRPA 2016

GOALS AND POLICIES

The Conservation Element of the TRPA Goals and Policies document establishes goals for the preservation, development, utilization, and management of natural resources within the Tahoe Region. These goals and policies are designed to achieve and maintain adopted threshold standards and are implemented through the Code.

The Conservation Element includes 10 subelements that address the range of Lake Tahoe's natural and historical resources. The Vegetation, Wildlife, and SEZ Subelements are discussed in this section, and the goals related to the Shoreline Plan from each of these subelements are identified below.

Chapter 4 of the Goals and Policies identifies the following six goals for vegetation in the Tahoe Region:

GOAL Veg-1: provide for a wide mix and increased diversity of plant communities;

GOAL Veg-2: provide for the protection, maintenance, and restoration of such unique ecosystems as wetlands, meadows, and other riparian vegetation;

GOAL Veg-3: conserve threatened, endangered, and sensitive plant species and uncommon plant communities of the Lake Tahoe Region;

GOAL Veg-4: provide for and increase the amount of late seral/old-growth stands within the Lake Tahoe Region;

GOAL Veg-5: the appropriate stocking level and distribution of snags and coarse woody debris shall be retained in the Region's forests to provide habitat for organisms that depend on such features and to perpetuate natural ecological processes; and

GOAL Veg-6: TRPA shall work with fire protection agencies in the Region to reduce the risk of catastrophic wildfire.

The two goals identified for wildlife are as follows:

GOAL WL-1: maintain suitable habitats for all indigenous species of wildlife without preference to game or nongame species through maintenance and improvement of habitat diversity, and

GOAL WL-2: preserve, enhance, and where feasible, expand habitats essential for threatened, endangered, rare, or sensitive species found in the Region.

The goal identified for SEZs is:

GOAL SEZ-1: provide for the long-term preservation and restoration of stream environment zones.

CODE OF ORDINANCES

The applicable provisions of the TRPA Code regarding terrestrial vegetation and wildlife are summarized below.

Protection and Management of Vegetation

The Code requires the protection and maintenance of all native vegetation types. Chapter 61, "Vegetation and Forest Health," Section 61.3, "Vegetation Protection and Management," provides for the protection of SEZ vegetation, other common vegetation, uncommon vegetation, and sensitive plants in SEZs (TRPA 2012). TRPA defines an SEZ as an area that owes its biological and physical characteristics to the presence of surface water or groundwater. SEZ includes perennial, intermittent, or ephemeral streams; meadows and marshes; and other areas with near–surface water influence within the Tahoe Basin. No project or activity may be implemented within the boundaries of an SEZ except as otherwise permitted for habitat improvement, dispersed recreation, vegetation management, or as provided in Code Chapter 30, "Land Coverage." TRPA can require the preparation and implementation of a remedial vegetation management plan, where the need has been identified, for the purposes of threshold standard maintenance or attainment. In addition, Chapter 61, Section 61.4, "Revegetation," specifies minimum criteria for revegetation programs.

Protection of Sensitive and Uncommon Plants

Code Chapter 61, Section 61.3.6, "Sensitive and Uncommon Plant Protection and Fire Hazard Reduction," establishes standards for preserving and managing sensitive plants and uncommon plant communities, as referenced above in Thresholds. Projects and activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat must fully mitigate their significant adverse effects. Measures to protect sensitive plants and their habitat include:

- fencing to enclose individual populations or habitat,
- restricting access or intensity of use,
- modifying project design as necessary to avoid adverse impacts,
- dedicating open space to include entire areas of suitable habitat, and
- restoring disturbed habitat.

Tree Removal

TRPA regulates the management of forest resources in the Tahoe Basin to achieve and maintain the threshold standards for species and structural diversity, to promote the long-term health of the resources, and to create and maintain suitable habitats for diverse wildlife species. Tree removal is subject to review and approval by TRPA (TRPA 2012). Provisions for tree removal are provided in the following chapters and sections of the TRPA Code: Chapter 61, "Vegetation and Forest Health," Section 61.1, "Tree Removal," Section 61.3.6, "Sensitive and Uncommon Plant Protection and Fire Hazard Reduction," and Section 61.4, "Revegetation;" Chapter 36, "Design Standards;" and Chapter 33, "Grading and Construction," Section 33.6, "Vegetation Protection During Construction."

Applicants must obtain a tree removal permit from TRPA for cutting of live trees 14 inches diameter at breast height (dbh) or greater. However, trees of any size marked as a fire hazard by a fire protection district or fire department that operates under a memorandum of understanding with TRPA can be removed without a separate tree permit.

With limited exceptions, Code Section 61.1.4, "Old Growth Enhancement and Protection," prohibits the removal of trees greater than 24 and 30 inches dbh in eastside and westside forest types, respectively. Code Section 61.1.4 allows private landowners to remove trees larger than these size classes provided the

landowner follows one of the planning processes identified in that section of the Code. However, trees larger than 30 inches dbh in westside forest types and larger than 24 inches dbh in eastside forest types may be removed for Environmental Improvement Program projects or large public utilities projects if TRPA finds there is no other reasonable alternative.

In addition, trees and vegetation not scheduled to be removed must be protected during construction in accordance with Chapter 33, "Grading and Construction," Section 33.6, "Vegetation Protection during Construction." If a project would result in substantial tree removal, a tree removal or harvest plan must be prepared by a qualified forester. The required elements of this plan, and TRPA's review process for tree removal plans, are described in Chapter 61, Section 61.1.5 of the Code. Substantial tree removal is defined under Code Section 61.1.8 as activities on project areas of three acres or more and proposing the removal of more than 100 live trees 14 inches dbh or larger. Code Chapter 62 also provides quantitative requirements for retention and protection of snags and coarse woody debris by forest type, in terms of size, density, and decay class.

Wildlife

TRPA sets standards for preserving and managing wildlife habitats, with special emphasis on protecting or increasing habitats of special significance, such as deciduous trees, wetlands, meadows, and riparian areas (Code Chapter 62). Specific habitats that are protected include riparian areas, wetlands, and SEZs; wildlife movement and migration corridors; important habitat for any species of concern; critical habitat necessary for the survival of any species; nesting habitat for raptors and waterfowl; fawning habitat for deer; and snags and coarse woody debris. In addition, TRPA-designated special-interest species (also referred to as "threshold species"), which are locally important because of rarity or other public interest, and species listed under the ESA or CESA are protected from habitat disturbance by conflicting land uses.

TRPA-designated special-interest wildlife species are northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus anatum*), mule deer (*Odocoileus hemionus*), and waterfowl species.

The Code includes the following requirements for protection of wildlife movement and migration corridors.

- SEZs adjoining creeks and major drainages that link islands of habitat will be managed, in part, for use by wildlife as movement corridors. Structures, such as bridges, proposed within these movement corridors will be designed to avoid impairment of wildlife movement.
- Projects and activities in the vicinity of deer migration areas will be required to mitigate or avoid significant adverse impacts.

The Code also contains several provisions regarding critical habitat. TRPA defines critical habitat as any element of the overall habitat for any species of concern that, if diminished, could reduce the existing population or impair the stability or viability of the population. This applies also to habitat for special-interest species native to the Tahoe Basin whose breeding populations have been extirpated, but could return or be reintroduced. The Code includes the following critical-habitat provisions.

- No project or activity will cause, or threaten to cause, the loss of any habitat component considered critical to the survival of a particular wildlife species.
- No project or activity will threaten, damage, or destroy nesting habitat of raptors and waterfowl or fawning habitat of deer.
- Wetlands shall be preserved and managed for their ecological significance, including their value as nursery habitat to fishes, nesting and resting sites for waterfowl, and as a source of stream recharge, except as permitted pursuant to Chapter 30 of the TRPA Code.

14.2.3 California

CALIFORNIA ENDANGERED SPECIES ACT

Pursuant to the California Endangered Species Act (CESA), a permit from California Department of Fish and Wildlife (CDFW) is required for projects that could result in the "take" of a plant or animal species that is listed by the state as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harm" or "harass," like the ESA definition does. As a result, the threshold for take is higher under CESA than under ESA. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2081 incidental take permit.

CALIFORNIA NATIVE PLANT PROTECTION ACT

In addition to CESA, the California Native Plant Protection Act provides protection to endangered and rare plant species, subspecies, and varieties of wild native plants in California. The California Native Plant Protection Act definitions of "endangered" and "rare" closely parallel the CESA definitions of endangered and threatened plant species.

CALIFORNIA FISH AND GAME CODE SECTIONS 3503 AND 3503.5—PROTECTION OF BIRD NESTS AND RAPTORS

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 of the California Fish and Game Code states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes*), including their nests or eggs. Typical violations include destruction of active nests as a result of tree removal or disturbance caused by project construction or other activities that cause the adults to abandon the nest, resulting in loss of eggs and/or young

CALIFORNIA FISH AND GAME CODE FULLY PROTECTED SPECIES

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

CALIFORNIA FISH AND GAME CODE SECTION 1602—STREAMBED ALTERATION

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

- substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's

jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for any action that would result in an impact on a river, stream, or lake.

14.2.4 Nevada

NEVADA NATURAL HERITAGE PROGRAM

The Nevada Natural Heritage Program (NNHP) systematically collects information on Nevada's at-risk, rare, endangered, and threatened biological features and acts as a single source of information on Nevada's imperiled biodiversity. Taxa considered at risk and actively inventoried by NNHP typically include those with federal or other Nevada agency status, indicating some level of imperilment. The following statutes and codes specify guidelines and provisions for those species afforded some level of protection by the state of Nevada, and which are included in the NNHP at-risk species list.

NEVADA ADMINISTRATIVE CODE 527.010 AND NEVADA REVISED STATUTES 527.260, NRS 527.270, AND NRS 527.300

Under Nevada Revised Statutes (NRS) 527.270, state law provides that a species or subspecies of native flora shall be regarded as threatened with extinction when the state forester fire warden, after consultation with competent authorities, determines that its existence is endangered and its survival requires assistance because of overexploitation, disease, or other factors or because its habitat is threatened with destruction, drastic modification, or severe curtailment. These species are also on a state list of fully protected species of native flora (Nevada Administrative Code 527.010), also known as the Critically Endangered Species List. The law also authorizes a program for the conservation, protection, restoration, and propagation of selected species of flora and for the perpetuation of the habitats of such species (NRS 527.260 and NRS 527.300).

NEVADA REVISED STATUTES, TITLE 45

The Nevada Department of Wildlife manages fish and wildlife resources on the Nevada side of the Tahoe Basin under Title 45, Wildlife, of the NRS. Title 45 consists of provisions that address wildlife management, including protective measures that establish a program for the conservation, protection, restoration, propagation, and perpetuation of native fish and other vertebrate wildlife species.

NEVADA REVISED STATUTES 503.610 AND NEVADA REVISED STATUTES 503.620

Bald eagles, golden eagles, and migratory birds are specifically protected under NRS 503.610 and NRS 503.620. Under these statutes, it is unlawful for any person or organization to "kill, destroy, wound, trap, injure, possess dead or alive, or in any other manner to catch or capture, or to pursue with such intent," bald eagles and golden eagles or other birds protect under the MBTA (16 USC Section 703 *et seq.*).

14.3 AFFECTED ENVIRONMENT

OVERVIEW OF TERRESTRIAL LAND COVER AND HABITAT TYPES

Natural terrestrial habitats within the shorezone consist primarily of beach (with variable composition of sand, gravel, and cobble, depending on location) and a mix of conifer forest (Jeffrey pine, lodgepole pine, Sierran mixed conifer), scattered conifer trees and snags, and patches of montane riparian and wet meadow vegetation. Additionally, urban/developed and ruderal (disturbed) areas are distributed throughout the shorezone where existing facilities (e.g., boat ramps, marinas, buildings, trails) and lake access are present.

SENSITIVE BIOLOGICAL RESOURCES

In this analysis, sensitive biological resources include those species and biological communities that receive special consideration through the TRPA Goals and Polices and TRPA Code, ESA, CESA, CWA, or local plans, policies, and regulations; or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Sensitive biological resources evaluated as part of this analysis include sensitive natural communities and special-status plant and animal species. These resources are addressed in the following sections.

Sensitive Natural Communities and Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through the TRPA Goals and Policies and TRPA Code, Section 404 of the CWA, and other applicable regulations. Sensitive natural habitats may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. For the California side of the Tahoe Basin, many of these communities are tracked in the CNDDB. Sensitive terrestrial natural communities and habitats in the project site are montane riparian and montane meadow.

Most of the wetland/riparian habitats in the shorezone area would likely be considered jurisdictional by USACE and, in California, the Lahontan Regional Water Quality Control Board (Lahontan Water Board) under Section 404 of the federal CWA and the state's Porter-Cologne Act. In addition, on the California side of the Tahoe Basin, CDFW has jurisdiction over activities affecting the bed and bank of drainages. Additionally, habitats consisting of deciduous trees, wetlands, and meadows (i.e., riparian, wetland, and meadow habitats) are designated by TRPA as habitats of special significance. The TRPA threshold standard for habitats of special significance is nondegradation while providing for opportunities to increase the acreage of these habitats.

Most of the areas within wetland/riparian habitats in the Tahoe Basin are also designated as stream environment zone (SEZ), which is one of two TRPA-adopted threshold standards for soil conservation. SEZ is a term used specifically in the Tahoe Basin to describe perennial, intermittent and ephemeral streams; wet meadows, marshes, and other wetlands; riparian areas; and other areas expressing the presence of surface and ground water through its biological and physical characteristics.

For reasons discussed in Section 14.1, "Introduction," sensitive terrestrial habitats are not addressed further in the effects analysis for terrestrial biological resources. Potential effects of the Shoreline Plan alternatives on lands designated specifically as SEZ are addressed in Chapter 7, "Soil Conservation."

Special-Status Species

Special-status species include plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource agencies and conservation organizations. Special-status species are defined as plants and animals in the following categories.

- Designated as a sensitive, special interest, or threshold species by TRPA.
- Listed or proposed for listing as threatened or endangered under ESA.
- Designated as a candidate for listing as threatened or endangered under ESA.
- Listed or proposed for listing as threatened or endangered under CESA.
- Listed or a candidate for listing by the state of California as threatened or endangered under CESA.
- Listed as fully protected under the California Fish and Game Code.

- Animals identified by CDFW as species of special concern.
- Plants considered by CDFW to be "rare, threatened or endangered in California" (California Rare Plant Ranks [CRPR] of 1A, presumed extinct in California; 1B, considered rare or endangered in California and elsewhere; and 2, considered rare or endangered in California but more common elsewhere). The California Rare Plant Ranks correspond with and replace former CNPS listings. While these rankings do not afford the same type of legal protection as ESA or CESA, the uniqueness of these species requires special consideration under CEQA.
- Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA Guidelines Section 15125 [c]) or is so designated in local or regional plans, policies, or ordinances (State CEQA Guidelines, Appendix G).
- Otherwise meets the definition of rare or endangered under CEQA Guidelines Section 15380(b) and (d).
- Plant species on Nevada's state list of fully-protected species of native flora (Nevada Administrative Code, Section 527.010), also known as the Critically Endangered Species List.
- Designated as an At-Risk Species by the Nevada Natural Heritage Program (NNHP).

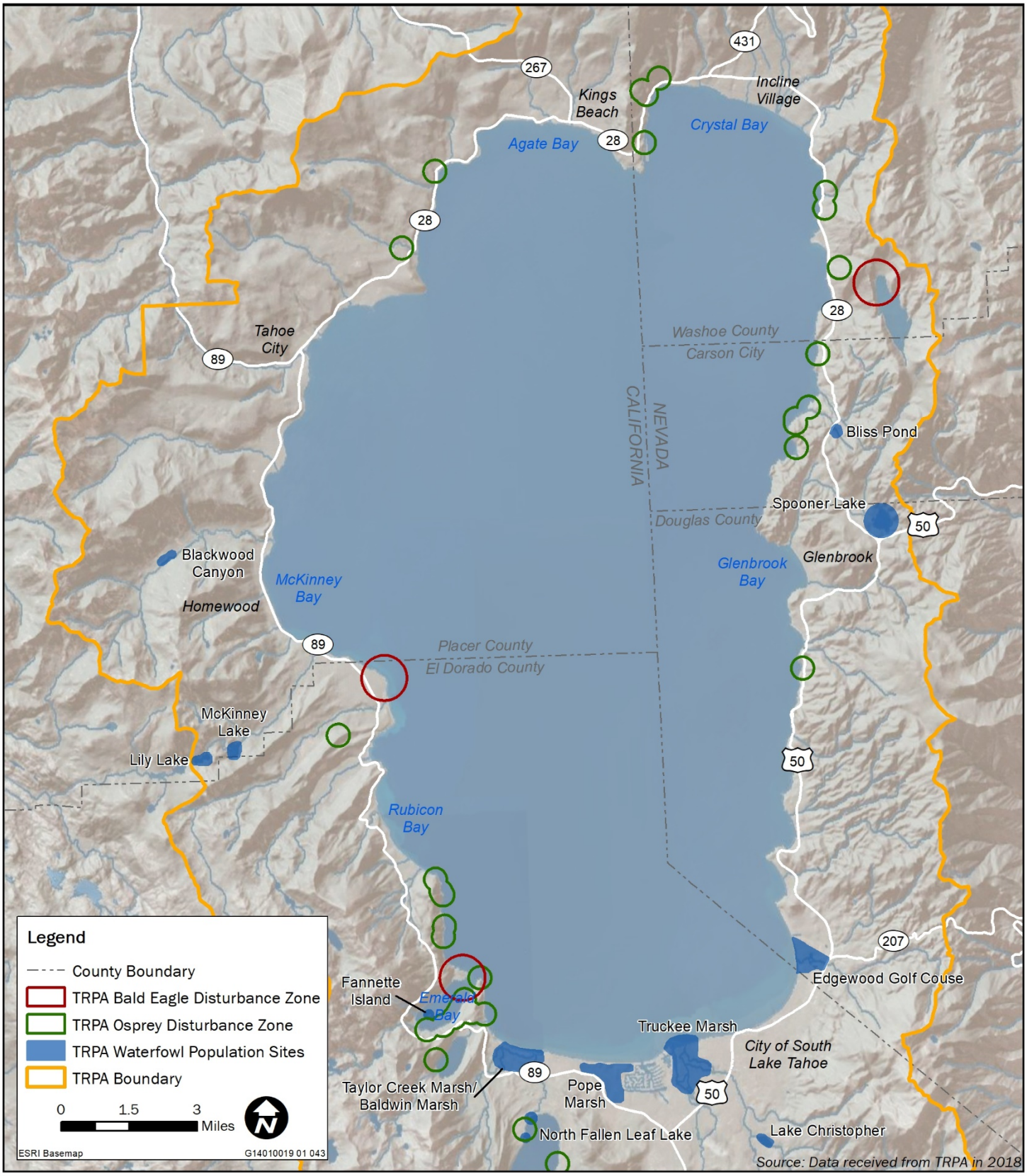
A preliminary list of special-status plant and animal species known or with potential to occur in the project site was developed based on a review of the sources listed at the beginning of this chapter. The data review identified 49 and 39 special-status terrestrial plant and wildlife species, respectively, known or with potential to occur in the shorezone or vicinity. Three special-status wildlife species (osprey, bald eagle, waterfowl) and one special-status plant species (Tahoe yellow cress [*Rorippa subumbellata*]) are known to occur in the shorezone and could be affected by shorezone ordinance modifications under the alternatives. These species are the focus of the impact analysis for special-status species presented in Section 14.4, "Environmental Consequences and Mitigation Measures," and are described below. Other special-status terrestrial species could use or occur in portions of the shorezone area but are not expected to be affected considerably by the proposed modifications to the shorezone ordinances.

Osprey

Osprey is designated by TRPA as a special interest species. Osprey is associated with large fish-bearing waters. In the Tahoe Basin, osprey nests are distributed primarily along the northern portion of the east shore and the southern portion of the west shore of Lake Tahoe. Other osprey nests in the Tahoe Basin are located along the shorelines of smaller lakes (such as Fallen Leaf Lake) and in forest uplands up to 1.5 miles from water. Ospreys forage in Lake Tahoe as well as several other fish-bearing lakes, streams, and rivers within the Tahoe Basin.

The osprey population in the Tahoe Basin has increased over the last several years. For example, between 1997 and 2015, the number of active nests increased steadily from 12 to 31 (TRPA 2016). The status of the Tahoe Basin's osprey population has been in attainment with respect to TRPA's environmental threshold standard for this species during the last six threshold evaluation periods (1991, 1996, 2001, 2006, 2011, 2016). The TRPA threshold standard for osprey includes maintaining a minimum of four population sites (i.e., four nests).

TRPA maintains a nondegradation standard for habitat within a 0.25-mile buffer zone ("disturbance zone") around each osprey nest site. The number of nesting pairs, active nests, and associated disturbance zones in the shorezone vary annually, and the locations of nest sites have shifted over the last several years. For example, some trees along Lake Tahoe that were historically used by osprey for nesting have fallen down in recent years. Exhibit 14-1 shows the most recent (2017) distribution of osprey disturbance zones, based on years of annual nest monitoring coordinated by TRPA.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 14-1 TRPA Osprey and Bald Eagle Disturbance Zones and Waterfowl Population Sites

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

Bald Eagle

Bald Eagle is designated by TRPA as a special interest species. Bald eagle is also federally protected by USFWS under the Bald and Golden Eagle Protection Act. Bald eagles require large bodies of water or free-flowing streams with abundant fish and adjacent snags or other perches for hunting. They generally nest in undisturbed coniferous forests, usually within one mile of a lake or reservoir. Bald eagle habitat typically consists of several components, most significantly, proximity to large bodies of water and wetlands associated with lakes, mature coniferous stands with presence of dominant trees, and adequate protection from human disturbance. Over the past several years, bald eagles have nested consistently in two areas of the Tahoe Basin–Marlette Lake and Emerald Bay. More recently, a third bald eagle nest site was documented at Sugar Pine Point along the west shore; this nest was active in 2013, 2014, and 2015 (TRPA data). The three bald eagle nest sites known in the Tahoe Basin from 2011 to 2017 are displayed in Exhibit 14-1. The Tahoe Basin is also a wintering area for bald eagles, and the wintering population is considerably greater than during the breeding season.

Waterfowl

"Waterfowl" is designated by TRPA as a special-interest group of species because its nesting habitat in the Tahoe Basin is limited. Several waterfowl species occur in the Tahoe Basin during spring and summer months, including Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), green-winged teal (*A. crecca*), common merganser (*Mergus merganser*), ruddy duck (*Oxyura jamaicensis*), northern pintail (*A. acuta*), northern shoveler (*A. clypeata*), cinnamon teal (*A. cyanoptera*), American widgeon (*A. americana*), gadwall (*A. strepera*), ring-necked duck (*Aythya collaris*), and others. Most of these species nest along shallow-water margins of streams or lakes, in areas of emergent vegetation or other vegetation that provides concealment. Typically, nests are in marshes or adjacent meadows. Most of these ducks are dabblers and feed on vegetation in water approximately 6–10 inches deep. Ring-necked duck and common mergansers feed by diving under water, in aquatic areas that are anywhere from 3 feet to 10 feet deep. In the Tahoe Basin wetlands provide nesting, resting, and foraging habitat for waterfowl. Important areas for waterfowl include Pope Marsh, Truckee Marsh, Taylor Creek Marsh, Grass Lake, and Spooner Lake (TRPA 2016).

Generally, recreational activities and human access to wetlands may disrupt normal waterfowl behavior (Knight and Cole 1995). TRPA has established threshold standards and regulates activities within 18 designated waterfowl population sites. The distribution of TRPA waterfowl population sites is displayed in Exhibit 14-1. Because of increased recreational encroachment into wetland areas over the last several decades, habitat quality at TRPA-designated waterfowl population sites has been degraded and the 2016 TRPA threshold attainment status is considered below target (TRPA 2016).

Existing TRPA regulations prevent new projects from directly degrading wetland and riparian habitats, including mapped waterfowl population sites (Code of Ordinances Section 62.3.3). However, several waterfowl population sites coincide with recreation destinations, such as Fannette Island, Fallen Leaf Lake, Lake Baron, and Edgewood Golf Course, which are used extensively for recreational activities and could reduce their suitability to waterfowl for breeding, feeding, and resting (Korschgen and Dahlgren 1992).

Tahoe Yellow Cress

Tahoe yellow cress (TYC) occurs only on the sandy beaches of Lake Tahoe. This species is designated as a sensitive plant and threshold indicator species by TRPA and is state-listed as critically endangered and endangered by the states of Nevada and California, respectively. The distribution and abundance of TYC are closely linked to lake level, with greater abundance and more occurrences present during low lake levels when more beach habitat is available for colonization (Pavlik et al. 2002, Stanton et al. 2015). The species exhibits a metapopulation dynamic, where populations or clusters of plants at some locations may periodically disappear or decline in number in some years (e.g., in high water years), and TYC may recover or colonize exposed suitable habitats during other periods (Pavlik et al. 2002). The timing and probability of these dynamic extirpation and colonization events depend primarily on lake level and disturbances from recreation or development, but also on the biophysical characteristics of the sites themselves. The primary anthropogenic disturbances to this species are recreational use of beaches occupied by TYC and potentially development of marinas, boat ramps, and piers, which result in trampling and degradation or loss of habitat.

In response to low numbers of TYC occurrences in the late-1990s, a multiagency technical advisory group (TAG) was formed to develop and implement a conservation strategy for the species. The Tahoe Yellow Cress Conservation Strategy was completed in 2002 (Pavlik et al. 2002) and updated in 2015 (Stanton et al. 2015), and a memorandum of understanding and conservation agreement were signed by 13 state and local agencies and stakeholders to implement the strategy. In 2002, the TAG initiated a research program that has included seed collection, greenhouse propagation, experimental outplantings of container-grown TYC plants, translocation of naturally occurring TYC among sites, and some limited genetic analysis. In 2005, members of the TAG transitioned to being members of an adaptive management working group (AMWG). A central goal of the Conservation Strategy is to ensure a sufficient level of protection and conservation for the species that will preclude the need for USFWS to list TYC under the ESA.

The AMWG conducts regular population surveys at known and potential TYC population sites in the shorezone. The cumulative distribution of TYC occurrences (based on numerous years of data) is displayed in Exhibit 14-2.

14.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

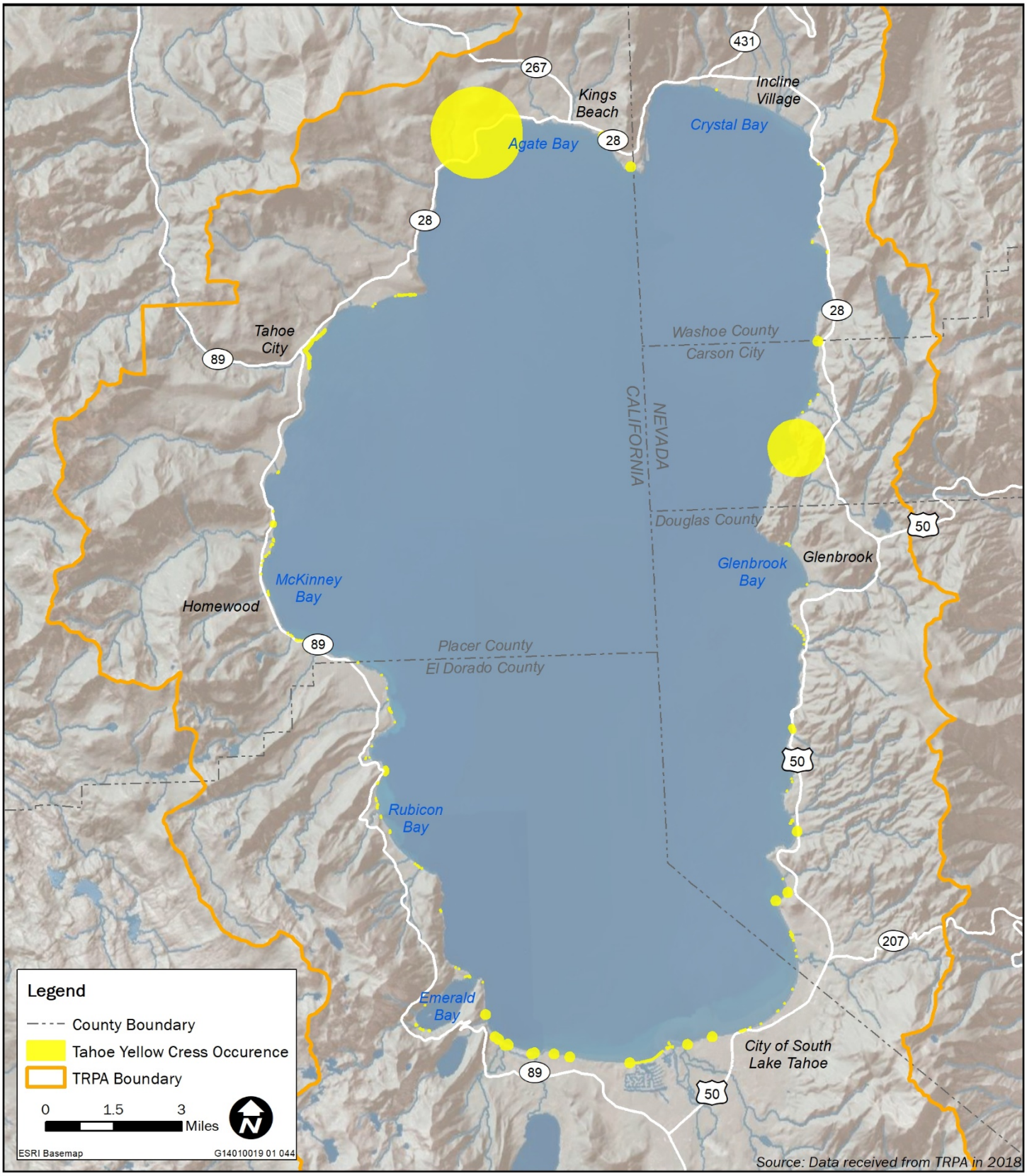
14.4.1 Methods and Assumptions

The analysis of potential impacts to terrestrial biological resources from the Shoreline Plan alternatives is based on the data review, resource mapping, environmental review documents, and technical studies referenced in Section 14.1, “Introduction.” The information obtained from these sources was reviewed and summarized to understand existing conditions and to identify potential environmental effects, based on the significance criteria identified below. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant federal, state, and regional laws, regulations, and ordinances.

Potential impacts of the project on biological resources can be classified as either temporary or permanent. Temporary impacts generally include ground or lake-bottom disturbances associated with temporary construction activities for new pier and boat ramp projects, including: removal of existing structures; construction staging; minor cut and fill that would be restored to existing conditions after project completion; potential construction disturbances assumed to occur adjacent to permanent project features; and noise, ground vibration, airborne particulate (dust) generated, and turbidity caused by construction activities.

Permanent impacts generally include physical effects associated with conversion of land use and cover (e.g., permanent vegetation removal) or permanent disturbance of upland areas or the lake bed as a result of: earthwork/excavation, new paving for the shared-use path and parking facilities, landscaping, and installation of new structures. In addition, permanent impacts include long-term changes to recreational uses (e.g., boating, beach use) that can result in disturbances to wildlife and vegetation. Changes in patterns and intensity of human activity as a result of the Shoreline Plan alternatives could cause changes to noise levels, visual disturbances, and physical disturbances that may affect wildlife and vegetation, particularly for species that are sensitive to these factors.

As discussed in Chapter 3, “Approach to the Environmental Analysis,” because of the broad geography and long timeframe to which the proposed Shoreline Plan alternatives apply and the policy-oriented nature of the their guidance, the potential effects of each alternative on terrestrial biological resources are analyzed at a program level. This analysis focuses on the potential effects of policies and ordinances, which—because they are to be implemented through later site-specific projects over the duration of the Plan—are inherently less precise than analyses that evaluate implementation programs or specific projects.



TAHOE REGIONAL PLANNING AGENCY

Exhibit 14-2 Tahoe Yellow Cress Occurrences

SHORELINEPLAN
Enhancing Recreation & Protecting Lake Tahoe's 72 Miles of Shoreline

This analysis is not intended to replace more detailed project-specific environmental documentation that will be needed to evaluate individual projects proposed following approval of a Shoreline Plan. For future projects that are not otherwise exempt or qualified exempt, TRPA will review those site-specific projects to determine the appropriate level of environmental review. For projects that could result in significant effects on biological resources, TRPA would—in coordination with other federal, state, or local agency with jurisdiction by law, or specialized expertise—conduct project-level, site-specific analysis to identify adverse effects and develop feasible mitigation measures that must be implemented to minimize any such effects.

14.4.2 Significance Criteria

Significance criteria related to vegetation and wildlife are summarized below. The applicable TRPA threshold standards, the vegetation and wildlife criteria from the TRPA Initial Environmental Checklist, and other relevant information were considered in the development of the significance criteria. An impact would be considered significant if it would:

- create substantial adverse effects on any unique, rare, or endangered terrestrial plant or animal species, or
- result in substantial change in the distribution or abundance of common terrestrial plant and animal species, or reduced quantity and quality of native habitats.

14.4.3 Environmental Effects of the Project Alternatives

Impact 14-1: Disturbances to osprey, bald eagle, and waterfowl from construction and recreational uses

Osprey, bald eagle, and waterfowl are designated by TRPA as special interest species and use the shorezone and adjacent locations for breeding and foraging. Potential effects of the Shoreline Plan alternatives on osprey and bald eagle could include construction-related disturbances to nesting activities from new piers and boat ramps, long-term increased disturbance to osprey and bald eagle and suitable habitat from boating and other recreational uses, and habitat degradation within TRPA-designated osprey and bald eagle disturbance zones. Although suitable nesting habitat for waterfowl is limited in the shorezone where new projects would be permitted (e.g., outside of TRPA-designated waterfowl population sites), construction-related activities that may occur within suitable habitat could disturb nesting attempts of waterfowl. The types of potential impacts to osprey, bald eagle, and waterfowl would be similar for Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the locations, amounts, and quality of habitats potentially affected. The potential disturbance to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternatives 1, 2, 3, and 4 would be a **significant** impact. However, with implementation of Mitigation Measures 14-1a and 14.1b, potential impacts to osprey, bald eagle, and waterfowl would be **less than significant** for all alternatives.

This impact discussion addresses the significance criterion “substantial adverse effects on any unique, rare, or endangered terrestrial plant or animal species” as it relates to osprey, bald eagle, and waterfowl. Although osprey and waterfowl are not uncommon in the shorezone, they are special-status species and have special protections in the Tahoe Basin; therefore, they are analyzed here and separate from “common wildlife” addressed in Impact 14-3.

Alternative 1: Proposed Shoreline Plan

Osprey

Osprey is designated by TRPA as a special interest species. The most recent (2017) distribution of osprey population sites in the Tahoe Basin, based on years of annual nest monitoring coordinated by TRPA, is shown in Exhibit 14-1.

Potential effects of the proposed Shoreline Plan on osprey could include construction-related disturbances to nesting activities from new piers and boat ramps, long-term increased disturbance to ospreys and suitable habitat from boating and other recreational uses, and habitat degradation within TRPA-designated osprey disturbance zones. These impacts are discussed in the following sections.

New piers and boat ramps allowable under the proposed Shoreline Plan would be sited to avoid all TRPA-designated disturbance zones for osprey and other special interest species, to the extent feasible. Additionally, for areas outside of TRPA urban plan areas, TRPA maintains a nondegradation standard for habitat within a 0.25-mile buffer zone around osprey nest sites ("disturbance zones"). However, because specific locations and project-specific constraints of future piers and boat ramps have not been identified and would be evaluated during project-level planning and environmental review, this analysis conservatively assumes that a new pier or boat ramp could potentially be permitted within a disturbance zone under certain circumstances. Such projects would require appropriate compensation or other mitigation to meet the habitat nondegradation standard.

Construction-Related Disturbances

With Alternative 1, construction activity would be associated with new piers and boat ramps. At buildout, Alternative 1 would allow for a total of up to 10 new public piers and 128 new private piers (including private multi-use piers) for a total of 900 piers, and two new public boat ramps for a total of 24 public boat ramps. Project construction activities could temporarily disturb ospreys and/or their suitable habitat located within the shorezone. Depending on the specific locations of these facilities in relation to osprey nest sites and high-quality foraging areas, construction-related activities (including site preparation and equipment access) could disturb foraging or nesting activities.

Temporary disturbances resulting from construction noise, visual disturbance, and increased human activity within osprey habitat could cause individuals or breeding pairs to temporarily leave an area or abandon nests to avoid the disturbance. Although osprey sensitivity to disturbance is highly variable (discussed further in "Long-term Recreational Disturbances," below) and the species can habituate to human activity nearby, construction activities in close proximity to nests, particularly during the incubation and nesting stages, could disturb nesting birds, reduce nest success, or cause abandonment by introducing new disturbance sources at the nest during this sensitive period.

Project construction could also temporarily disturb osprey foraging activities. However, because of the presence of existing recreation uses and other activities throughout osprey foraging habitat on Lake Tahoe, particularly in the shorezone, the existing disturbance level is considerable; additional construction-related disturbance are not expected to substantially affect the foraging patterns of osprey. Also, abundant and suitable foraging habitat would be available nearby in other areas of Lake Tahoe.

Long-Term Recreational Disturbances

At buildout, in addition to the new piers and boat ramps discussed previously, Alternative 1 would allow for up to 2,116 new moorings (265 new public buoys, 1,741 new private buoys, 65 public slips, and 45 private lifts) for a total of approximately 10,800 moorings. Alternative 1 would maintain the existing 600-foot no-wake zone, which limits watercraft speed to 5 mph within 600 feet of shore and would expand the no-wake zone to include all of Emerald Bay.

Alternative 1 would result in an approximately 13 percent increase in peak day boat trips and an approximately 16 percent increase in annual boat trips over baseline conditions. The increase in number of boat trips are influenced by increases in boat launch capacity, which would be provided by the two new

public boat launches, and overnight mooring at buoys, slips, and boat lifts. Based on the number of existing and new shorezone structures, boat trips would be estimated to increase to 6,666 boat trips on a peak day and 272,359 boat trips annually.

Over the long term, the additional recreation capacity for motorized watercraft, nonmotorized watercraft, anglers, swimmers, and beachgoers could increase the frequency of recreationists within osprey disturbance zones and in close proximity to nests, which could increase the level of noise, visual, and physical disturbance to nesting pairs. The sensitivity of ospreys to human disturbance varies considerably by geographic region, the type and context of disturbance, and the specific individual or pair of birds. Some birds or pairs tolerate human disturbances more than others (Poole et al. 2002); this is apparent at Lake Tahoe, where some pairs nest very close to frequent disturbances (e.g., Emerald Bay, Memorial Point), while others nest in remote locations (TRPA 2002). The highest density and abundance of osprey nests in the Tahoe Basin are located at Emerald Bay, which receives some of the highest levels of recreation use (including motorized boating) in the area during the osprey breeding season.

In general, ospreys can habituate to human activity nearby. Throughout the species' range, its nesting distribution generally confirms a level of tolerance to relatively high levels of disturbance associated with boat traffic, highways and other roads, neighborhoods, and buildings. The type, duration, timing, and predictability of disturbances appear important to birds at specific locations. Pairs that select and initially nest near human activities typically develop a high tolerance to disturbance; however, birds that select areas away from human infrastructure may be sensitive to human activities (Poole et al. 2002). In the Tahoe Basin, where ospreys have established nests near roads, constant vehicle traffic does not appear to disturb individuals. However, humans approaching nests on foot often disturb and elicit agitation calls from ospreys. Also, breeding ospreys are likely most sensitive during the incubation to early nestling stages (approximately April to August). Human disturbances during this period can cause adults to abandon nests for long periods of time, resulting in mortality of embryos and nestlings (Van Daele and Van Daele 1982, Levenson and Koplin 1984).

With implementation of Alternative 1, most new shorezone structures would be located within areas with existing shorezone development; and, motorized watercraft users would likely follow existing patterns of travel to popular destinations around the lake, including Baldwin Beach, east shore beaches, and many of the state parks such as Emerald Bay and Sand Harbor, and public beaches along the south shore. Additionally, the increase in boat density (11.5 percent on a peak day) would be relatively small and motorized recreation users would congregate near existing popular destinations. For osprey nest sites in these areas (popular destinations, existing developed areas, and along popular watercraft routes), or pairs in other areas that have demonstrated acclimation to existing boat traffic and other recreation uses in the shorezone, the increase in motorized and nonmotorized recreation with Alternative 1 would likely not be substantial enough to degrade osprey habitat measurably above existing levels and may not cause additional disturbance to use of the nests. Therefore, potential impacts to most osprey nest sites as a result of increased recreation uses with Alternative 1 may not be substantial.

For other nest sites, whether this increase in disturbance would cause abandonment or nest failure at those locations is unknown. However, it is reasonable to assume that some new recreational disturbances in close proximity to the nests, particularly during the incubation and nesting stages, could disturb nesting birds, reduce nest success, or cause abandonment by introducing new disturbance sources at the nest during this sensitive period (Van Daele and Van Daele 1982, Levenson and Koplin 1984). Therefore, increased recreational disturbances have a potential to cause adverse effects on the success of osprey nests in some areas.

Additional motorized and nonmotorized watercraft use could also disturb osprey foraging activities. However, because of the presence of existing recreation uses and other activities throughout osprey foraging habitat on Lake Tahoe, particularly in the shorezone, the existing disturbance level is considerable; the projected increase in recreation uses under Alternative 1 is not expected to substantially affect the foraging patterns of osprey. Suitable foraging habitat in Lake Tahoe is abundant and ospreys can forage over large areas.

With Alternative 1, although increased recreation uses could disturb osprey nests and foraging activities, effects on the overall Tahoe Basin osprey population is not expected to be substantial. Despite steady levels of recreation activity and other uses in the shorezone over the last several decades, the osprey population has been increasing and the number of active nests (approximately 31) has been consistently well above TRPA's threshold standard for the species (four nests). Therefore, long-term recreational disturbances with Alternative 1 would not conflict with TRPA threshold attainment for osprey.

Habitat Degradation within TRPA Osprey Disturbance Zones

Regardless of the biological significance of population-level effects on osprey, or TRPA threshold attainment for the species, TRPA maintains a nondegradation standard for habitat within osprey disturbance zones. For areas outside of TRPA urban plan areas, Section 62.4.1, "Disturbance Zones," of the TRPA Code states that the habitat in TRPA-designated disturbance zones around osprey nests "shall not be manipulated in any manner unless such manipulation is necessary to enhance the quality of the habitat." Section 62.4.3, "Environmental Documents," states that "applicants for projects within disturbance zones shall submit with their applications appropriate environmental documentation prepared by a biologist that includes specific recommendations for avoiding significant adverse impacts to the … species."

To meet TRPA Code requirements, TRPA has determined for other projects proposed within osprey disturbance zones that habitat enhancement for osprey must be a project objective and would be required to compensate for significant effects of projects and improve osprey habitat conditions overall in the Tahoe Basin. Accordingly, with Alternative 1, the construction and operation of any new shorezone structures within osprey disturbance zones that would degrade habitat quality, without appropriate habitat enhancement objectives or mitigation, would conflict with the nondegradation standard for osprey disturbance zones.

Summary of Effects on Osprey

The loss of an active osprey nest or reduced nest success as a result of project construction, and potential habitat degradation within TRPA-designated osprey habitat disturbance zones, would be a **significant** impact.

Bald Eagle

Bald Eagle is designated by TRPA as a special interest species. Bald eagle is also federally protected by USFWS under the Bald and Golden Eagle Protection Act. Bald eagles have nested consistently in two areas of the Tahoe Basin–Marlette Lake and Emerald Bay. More recently, a third bald eagle nest site was documented at Sugar Pine Point along the west shore; this nest was active in 2013, 2014, and 2015 (TRPA data). The three bald eagle nest sites known in the Tahoe Basin from 2011 to 2017 are displayed in Exhibit 14-1. The shorezone encompasses the Emerald Bay and Sugar Pine Point nest sites. The Tahoe Basin is also a wintering area for bald eagles, and the wintering population is considerably greater than during the breeding season.

With Alternative 1, the impact types and mechanisms described in detail previously for osprey are generally the same as those for bald eagle. Potential effects of the Proposed Shoreline Plan on bald eagle could include construction-related disturbances to nesting activities from new piers and boat ramps, long-term increased disturbance to bald eagles and suitable habitat from boating and other recreational uses, and habitat degradation within TRPA-designated bald eagle disturbance zones. However, nesting bald eagles are considered to be consistently more sensitive to visual and noise disturbances; and their distribution in the shorezone is limited to 3 nest sites, with no more than two being active during a year. Additionally, the TRPA disturbance zone for bald eagle is a 0.5-mile radius around nest sites.

For the same reasons described for osprey, the potential disturbance of bald eagle nests at Emerald Bay and Sugar Pine Point, and potential degradation of habitat within bald eagle disturbance zones at these locations, would be a **significant** impact.

Waterfowl

Waterfowl species are common and abundant throughout the shorezone, and four TRPA-designated waterfowl population sites are concentrated along the south shore of the lake (Fannette Island, Taylor Creek/Baldwin Marsh, Pope Marsh, Truckee Marsh, Edgewood Golf Course; Exhibit 14-1). Generally,

recreational activities and human access to wetlands may disrupt normal waterfowl behavior (Knight and Cole 1995). TRPA has established threshold standards and regulates activities within waterfowl population sites. Because of increased recreational encroachment into wetland areas over the last several decades, habitat quality at TRPA-designated waterfowl population sites has been degraded and the 2016 TRPA threshold attainment status is considered below target (TRPA 2016). Because existing TRPA regulations prevent new projects from directly degrading wetland and riparian habitats, including mapped waterfowl population sites (Code of Ordinances Section 62.3.3), the construction of future shorezone facilities within TRPA waterfowl population sites that could degrade waterfowl habitat conditions would not be permitted under Alternative 1.

Nesting habitat for waterfowl species within other parts of the shoreline is very limited due to lack of extensive riparian vegetation or other natural areas that may provide adequate cover and limited buffer distance between beach recreation and wetland/open water habitats. However, small areas of nesting habitat may exist in areas near undisturbed emergent wetlands, ponds, and other aquatic features where vegetation cover is relatively dense. Surveys for nesting waterfowl have not been conducted within most of the shorezone and whether those areas are used for nesting is currently unknown.

Alternative 1 would result in construction and operation of new shorezone structures, as discussed in detail previously. Depending on the specific locations and size of individual projects in relation to suitable habitat for nesting waterfowl, construction-related activities that may occur within or adjacent to these areas could disturb nesting attempts and reduce reproductive success. In addition, other disturbances such as noise generated in association with construction could affect foraging and resting waterfowl. Although not highly likely, if waterfowl use any future shorezone areas for nesting, these disturbances could result in the loss of active nests, and injury or mortality to individuals. This would be a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

The goal of Alternative 2 is to balance access and environmental protection by applying the approach that was developed under the 1987 Regional Plan. This alternative would not include a numeric cap on shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. This alternative would allow more shorezone structures than any other alternative and is the only alternative that would allow new marinas. At buildout, it would potentially allow for up to 6,768 new buoys and slips, 476 new piers, six new boat ramps, and two new marinas. Alternative 2 would maintain the existing 600-foot no-wake zone.

Alternative 2 would result in an approximately 45 percent increase in peak day boat trips and an approximately 53 percent increase in annual boat trips over baseline conditions at buildout conditions (i.e., by the year 2040). This is a substantially greater increase than the increase in peak day and annual boat trips for Alternative 1. As discussed in detail in Chapter 8, “Recreation,” of this EIS, the increase in the density of motorized watercraft on the lake would be considerable.

With Alternative 2, the types of potential impacts to osprey, bald eagle, and waterfowl would be similar to those described for Alternative 1, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 2 includes the greatest number of new shorezone structures and the greatest projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to osprey, bald eagle, and waterfowl is highest under this alternative.

For the same reasons described for Alternative 1, the potential disturbance to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternative 2 would be a **significant** impact.

Alternative 3: Limit New Development

With Alternative 3, motorized watercraft access would be more concentrated at marinas and public facilities, and fewer structures would be authorized under this alternative than under Alternative 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. Eighty-six new private piers would be authorized under this alternative, but they would be restricted to

multiple-use piers. Alternative 3 would result in an approximately four percent increase in peak day boat trips and an approximately four percent increase in annual boat trips over baseline conditions. Alternative 3 would maintain the same no-wake zone as Alternative 1.

With Alternative 3, the types of potential impacts to osprey, bald eagle, and waterfowl would be similar to those described for Alternative 1, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 3 includes fewer new shorezone structures and a substantially lower projected increase in watercraft use compared to Alternatives 1 and 2, the potential magnitude of construction and recreational disturbances to osprey, bald eagle, and waterfowl would be lower under this alternative. For the same reasons described for Alternative 1, the potential disturbance to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternative 3 would be a **significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access, reduce existing shorezone development, and increase restoration to minimize the risk of environmental harm. This alternative would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations if the project would result in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shorezone structures. There would be no change in peak day or annual boat trips over baseline conditions and no change in density of boats on the lake, and the number of motorized watercraft on the lake would not increase substantially.

Implementation of Alternative 4 would include expanding the no-wake zone to include all of Emerald Bay and would increase the no-wake zone in front of priority areas to 1,200 feet lakeward from the waterline of the lake. These priority areas include portions of the lake adjacent to Sand Harbor and the surrounding Lake Tahoe Nevada State Park, D.L. Bliss State Park, and Sugar Pine Point State Park.

With Alternative 4, the types of potential impacts to osprey, bald eagle, and waterfowl would be similar to those described for Alternative 1, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 4 includes substantially fewer new shorezone structures compared to the other Plan alternatives and no projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to osprey, bald eagle, and waterfowl would be lower under this alternative. For the same reasons described for Alternative 1, the potential disturbance to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternative 4 would be a **significant** impact.

Mitigation Measures

Mitigation Measure 14-1a: Avoid construction disturbances to nesting osprey and bald eagle, install interpretive signage, and prepare and implement habitat enhancement plans or other compensatory measures for unavoidable activities within TRPA-designated disturbance zones

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

- Surveys for nesting osprey and bald eagle will be conducted prior to construction of new shorezone facilities, to identify active nests that could be disturbed during construction. No construction activities will occur within 0.25 mile of active osprey nests and 0.5 mile of bald eagle nests during the breeding season (approximately April to August), unless surveys confirm that the birds are not nesting. A qualified biologist can amend the start and end dates of this limited operating period (LOP) with concurrence from appropriate agencies if it can be determined that breeding has not started or that fledglings have left the nest. Additionally, with concurrence from appropriate agencies, the LOP could be waived in locations where construction disturbance is not expected to increase ambient levels or disturbance to an active nest through presence of visual screening or other factors.

- During project-specific planning, design, and environmental review of new shorezone facilities, avoid siting projects within TRPA-designated disturbance zones for osprey and bald eagle, to the extent feasible.
- For projects and uses that may result in unavoidable increased human intrusion into the terrestrial/upland portions of TRPA osprey or bald eagle disturbance zones, signage that describes the sensitivity of the area and discourages users to leave established trails or access routes or otherwise disturb nesting osprey or bald eagle will be designed and installed.
- For projects that could cause unavoidable long-term degradation of habitat within TRPA osprey or bald eagle disturbance zones, coordination with TRPA will occur to identify and implement appropriate compensatory measures that are effective and feasible for achieving TRPA's nondegradation standard for disturbance zones.

  Potential approaches to mitigating adverse effects and enhancing habitat within disturbance zones include preparation and implementation of a habitat enhancement and management plan that includes objectives, measures, techniques, performance standards, and adaptive management to enhance osprey habitat. Habitat enhancement would be implemented within the affected TRPA osprey or bald eagle disturbance zones and/or other osprey or bald eagle disturbance zones in the Tahoe Basin where enhancement opportunities and benefits to the regional osprey or eagle population could be maximized. Coordination with TRPA would occur to determine whether more focused measures to achieve habitat enhancement as part of the project could be implemented, or whether the current project design may benefit osprey or bald eagle habitat, in lieu of a formal habitat enhancement and management plan.

Mitigation Measure 14-1b: Conduct preconstruction surveys for waterfowl and implement a limited operating period, if necessary

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

For construction activities that would occur in suitable habitat during the nesting season (generally April 1–August 31, depending on snowpack and other seasonal conditions), a qualified wildlife biologist shall conduct focused surveys for waterfowl nests no more than 14 days before construction activities are initiated each construction season. If an active nest is located during the preconstruction surveys, the biologist shall notify TRPA. If necessary, modifications to the project design to avoid removal of occupied habitat while still achieving project objectives shall be evaluated and implemented to the extent feasible. If avoidance is not feasible or conflicts with project objectives, a limited operating period shall apply to avoid disturbances during the sensitive nesting season. Construction shall be prohibited within a minimum of 500 feet (or at a distance directed by the appropriate regulatory agency) of the nest to avoid disturbance until the nest is no longer active. These recommended buffer areas may be reduced through consultation with TRPA.

Significance after Mitigation

Mitigation Measure 14-1a requires conducting preconstruction surveys for nesting ospreys and bald eagles, and implementing an appropriate exclusionary buffer and limited operating period to avoid or minimize effects of construction-related disturbance on nesting activity and breeding success.

Mitigation Measure 14-1a also requires avoiding the placement of new shorezone structures within TRPA-designated disturbance zones for osprey and bald eagle, to the extent feasible. For projects and uses that may result in unavoidable increased human intrusion into the terrestrial/upland portions of TRPA osprey or bald eagle disturbance zones, signage that describes the sensitivity of the area and discourages users to leave established trails or access routes or otherwise disturb nesting osprey or bald eagle will be designed and installed. For projects that may cause unavoidable long-term degradation of habitat within TRPA osprey or bald eagle disturbance zones, Mitigation Measure 14-1a also requires coordination with TRPA will occur to identify and implement appropriate compensatory measures that are effective and feasible for achieving TRPA's nondegradation standard for disturbance zones.

Implementation of Mitigation Measure 14-1b would avoid the loss of individuals and nests of waterfowl species.

In sum, with implementation of Mitigation Measures 14-1a and 14-1b, potential disturbances to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternatives 1, 2, 3, and 4 would be **less than significant**.

Impact 14-2: Disturbance or loss of Tahoe yellow cress

Tahoe yellow cress (TYC) is a sensitive plant species found only on the sandy beaches of Lake Tahoe. This species is designated as a sensitive plant and threshold indicator species by TRPA, and is state-listed as critically endangered and endangered by the states of Nevada and California, respectively. Alternatives 1, 2, 3, and 4 would result in construction and operation of new shorezone structures within beach habitats. Depending on the specific locations and size of individual projects in relation to TYC occurrences and suitable habitat, construction-related activities that may occur within or adjacent to beach habitat occupied by TYC could result in the direct removal of TYC plants, or other disturbances through inadvertent trampling, soil disturbance, and dust deposition. Over the long term, the additional recreation capacity for motorized watercraft, nonmotorized watercraft, anglers, swimmers, and beachgoers could increase the frequency of recreationists within occupied TYC habitat, which could result in additional trampling, degradation, or loss of existing TYC, and adversely affect current or future TYC habitat suitability. The types of potential impacts to TYC would be similar among Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the amounts and locations of beach habitats potentially affected.

Subsection 61.3.6 of the TRPA Code states that "all projects or activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat, shall fully mitigate their significant adverse effects. Those projects or activities that cannot fully mitigate their significant adverse effects are prohibited." Additionally, in California, because TYC is listed as endangered under CESA, any take of TYC would require authorization by CDFW through a California Fish and Game Code Section 2081 incidental take permit. For Alternatives 1, 2, 3, and 4, any potential loss of TYC plants as a result of Shoreline Plan implementation would be a **significant** impact. With implementation of Mitigation Measure 14-2, potential impacts to TYC would be **less than significant** for all alternatives.

This impact discussion addresses the significance criterion "substantial adverse effects on any unique, rare, or endangered terrestrial plant or animal species" as it relates to Tahoe yellow cress.

Alternative 1: Proposed Shoreline Plan

Tahoe yellow cress (TYC) is a sensitive plant species found only on the sandy beaches of Lake Tahoe. This species is designated as a sensitive plant and threshold indicator species by TRPA, and is state-listed as critically endangered and endangered by the states of Nevada and California, respectively. The cumulative distribution of TYC occurrences (based on numerous years of data) is displayed in Exhibit 14-2.

With Alternative 1, some construction activity would be associated with new piers, expanded marinas, and boat ramps. At buildout, this alternative would allow for a total of up to 10 new public piers and 128 new private piers (including private multi-use piers) for a total of 900 piers, and two new public boat ramps for a total of 24 public boat ramps. Depending on the specific locations and size of projects in relation to TYC occurrences and suitable habitat, construction-related activities (including site preparation and equipment access) that may occur within or adjacent to beach habitat occupied by TYC could result in the direct removal of TYC plants, or other disturbances through inadvertent trampling, soil disturbance, and dust deposition. Over the long term, the additional recreation capacity for motorized watercraft, nonmotorized watercraft, anglers, swimmers, and beachgoers could increase the frequency of recreationists within occupied TYC habitat, which could result in additional trampling, degradation, or loss of existing TYC, and adversely affect current or future TYC habitat suitability.

Subsection 61.3.6 of the TRPA Code states that "all projects or activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat, shall fully mitigate their significant adverse effects. Those projects or activities that cannot fully mitigate their significant adverse effects are prohibited." Additionally, in California, TYC is listed as endangered under CESA; and, any take of TYC would require authorization by CDFW through a California Fish and Game Code Section 2081 incidental take permit. Any potential loss of TYC plants as a result of project implementation would be a **significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would not include a numeric cap on shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. This alternative would allow more shorezone structures than any other alternative and is the only alternative that would allow new marinas. At buildout, it would potentially allow for up to 6,768 new buoys and slips, 476 new piers, 168 boat lifts, six new boat ramps, and two new marinas.

With Alternative 2, the types of potential impacts to TYC occurrences and suitable habitat would be similar to those described for Alternative 1, with differences in the amounts and locations of beach habitats potentially affected between the alternatives. Because Alternative 2 includes the greatest number of new shorezone structures and the greatest projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to beaches occupied by TYC is highest under this alternative. For the same reasons described for Alternative 1, any potential loss of TYC plants as a result of project implementation under Alternative 2 would be a **significant** impact.

Alternative 3: Limit New Development

With Alternative 3, motorized watercraft access would be more concentrated at marinas and public facilities, and fewer structures would be authorized under this alternative than under Alternative 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. Eighty-six new private piers would be authorized under this alternative, but they would be restricted to multiple-use piers. Alternative 3 would result in an approximately four percent increase in peak day boat trips and an approximately four percent increase in annual boat trips over baseline conditions.

With Alternative 3, the types of potential impacts to TYC occurrences and suitable habitat would be similar to those described for Alternatives 1 and 2, with differences in the amounts and locations of beach habitats affected between the alternatives. Because Alternative 3 includes fewer new shorezone structures and a substantially lower projected increase in watercraft use compared to Alternatives 1 and 2, the potential magnitude of construction and recreational disturbances to beaches occupied by TYC would generally be lower under this alternative. For the same reasons described for Alternative 1, any potential loss of TYC plants as a result of project implementation under Alternative 3 would be a **significant** impact.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 is designed to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. This alternative would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations if the project would result in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shorezone structures. There would be no change in peak day or annual boat trips over baseline conditions and no change in density of boats on the lake (i.e., one boat for approximately every 21 acres on the lake during a summer holiday weekend), and the number of motorized watercraft on the lake would not increase substantially.

With Alternative 4, the types of potential impacts to TYC occurrences and suitable habitat would be similar to those described for Alternative 1, with differences in the amounts and locations of beach habitats affected between the alternatives. Because Alternative 4 includes substantially fewer new shorezone structures compared to the other Plan alternatives and no projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to beaches occupied by TYC would be lowest under this alternative compared to Alternatives 1, 2, and 3. For the same reasons described for Alternative 1, any

potential loss of TYC plants as a result of project implementation under Alternative 3 would be a **significant** impact.

Mitigation Measures

Mitigation Measure 14-2: Conduct preconstruction surveys, avoid potential construction impacts, and avoid potential recreation impacts to Tahoe yellow cress plants

This mitigation measure would be required for Alternatives 1, 2, 3, and 4.

To avoid potential adverse effects on TYC plants resulting from construction activities and potential increased use of beaches that support TYC, the following actions shall be implemented:

(A) During project-specific planning, design, and environmental review of new shorezone facilities, avoid siting projects within areas known to support TYC occurrences, to the extent feasible.

(B) For any projects that could affect TYC, a qualified biologist familiar with the vegetation of the Tahoe Basin and identification of TYC shall conduct a focused preconstruction survey for TYC in all beach habitat where construction-related disturbance could occur in the vicinity of TYC populations during that year. Surveys shall be conducted between June 15 and September 30, when TYC is clearly identifiable, and shall follow *Survey Protocols for Tahoe Yellow Cress Annual Surveys* (Stanton and Pavlik 2009). Surveys shall be completed for each year that construction activities could occur in beach habitat. If no TYC stems are found during the survey, the results of the survey shall be documented in a letter report to TRPA and the TYC AMWG that shall become part of the project environmental record, and no further actions shall be required.

(C) If TYC stems are documented during the survey in areas potentially disturbed by construction activities, the stems shall be clearly identified in the field and protected from impacts associated with construction activities. Protective measures shall include installing high-visibility fencing around known stem locations during construction. No construction-related activities shall be allowed in areas fenced for avoidance, and construction personnel shall be briefed about the presence of the stems and the need to avoid effects on the stems.

(D) To protect TYC plants from potential long-term increased beach use and disturbance as an indirect result of increased recreation activity in the shorezone, protective fencing and educational signage about the need to avoid these areas shall be installed around all TYC clusters. In addition to beaches occupied by TYC where new shorezone facilities would be constructed and operated, other beach areas that support TYC that are likely to receive increased recreation uses as a result of the projects shall be identified and subject to these measures.

(E) Long-term fencing and signage will be periodically monitored and maintained, as necessary, to ensure that they remain effective and in good working condition. Also, because locations and concentrations of TYC could shift over time, the locations and configurations of fencing relative to TYC distribution shall be evaluated periodically. If necessary, fencing shall be moved or added in response to changes in TYC distribution to ensure that TYC plants are protected over time. The locations of TYC plants and shifts in their locations relative to fencing can be determined by surveys as part of the ongoing AMWG TYC monitoring program. The installation and maintenance of long-term protective fencing and signage will be designed to not interfere with necessary operations and maintenance activities at facilities.

Significance after Mitigation

With implementation of Mitigation Measure 14-2, TYC plants that are present in areas of potential disturbance would be identified before construction and disturbances to those plants would be avoided. To protect TYC plants from potential long-term increased beach use and disturbance as an indirect result of increased recreation activity in the shorezone, protective fencing and educational signage about the need to avoid these areas would be installed around all TYC clusters on beaches that may be affected. Therefore, potential impacts as a result of Alternatives 1, 2, 3, and 4 would be reduced to a **less-than-significant** level.

Impact 14-3: Disturbance or loss of common terrestrial vegetation communities and wildlife habitats

Common natural terrestrial habitats within the shorezone and adjacent areas consist primarily of beach and a mix of conifer forest, scattered conifer trees, and snags. Additionally, urban/developed and ruderal (disturbed) areas are distributed throughout the shorezone where existing facilities (e.g., boat ramps, marinas, buildings, trails) and lake access are present. These habitats support several common native wildlife species that use them for nesting, foraging, resting, or wintering. Alternatives 1, 2, 3, and 4 would result in construction and operation of new shorezone structures, and associated increases in recreation use, that could disturb common vegetation and wildlife. The types of potential impacts to common vegetation and wildlife communities would be similar among Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the locations, amounts, and quality of habitats potentially affected.

The potential disturbance or removal of terrestrial vegetation from future projects permitted under any of the Shoreline Plan alternatives would be relatively minor and not substantially reduce the quantity or quality of terrestrial vegetation communities and habitats in the region or cause a change in species distributions or diversity. Additionally, none of the alternatives are expected to increase construction-related or recreational disturbance levels in the shorezone above levels that would substantially affect most common species. Accordingly, the alternatives are not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity. Therefore, effects of Alternatives 1, 2, 3, and 4 on common vegetation and wildlife communities would be **less than significant**.

This impact discussion addresses the significance criterion "substantial change in the distribution or abundance of common terrestrial plant and animal species, or reduced quantity and quality of native habitats."

Alternative 1: Proposed Shoreline Plan

Common Vegetation

Common natural terrestrial habitats within the shorezone consist primarily of beach (with variable composition of sand, gravel, and cobble, depending on location) and a mix of conifer forest (Jeffrey pine, lodgepole pine, Sierran mixed conifer), scattered conifer trees and snags. Additionally, urban/developed and ruderal (disturbed) areas are distributed throughout the shorezone where existing facilities (e.g., boat ramps, marinas, buildings, trails) and lake access are present.

With Alternative 1, some construction activity would be associated with new piers and boat ramps. At buildout, this alternative would allow for a total of up to 10 new public piers and 128 new private piers (including private multi-use piers) for a total of 900 piers, and two new public boat ramps for a total of 24 public boat ramps. Depending on the specific locations and size of projects, construction-related activities (including site preparation and equipment access) could result in the disturbance or removal of terrestrial vegetation, including some conifer and other trees, shrubs (e.g., willow), and herbaceous vegetation. Because the footprints of new piers and boat ramps would likely cover mostly unvegetated areas (beach/sand), disturbance or permanent loss of vegetation would be minor and incidental; and, any temporarily disturbed areas would be restored following construction. TRPA's Handbook of Best Management Practices and standard conditions of approval require minimizing the disturbance footprint and amount of native vegetation removed by a project, temporarily fencing retained vegetation, and revegetating any temporarily disturbed areas.

While common vegetation could be permanently and/or temporarily removed or disturbed during construction of new piers and boat ramps with Alternative 1, the potential loss would be relatively minor for reasons discussed previously. Additionally, the terrestrial vegetation communities and habitats that may be affected are common and widely distributed in the Tahoe Basin and elsewhere in the Sierra Nevada, and the amount of habitat disturbance and loss would be very small relative to the total amount available in the area. Additionally, any tree removal that may be required would not substantially affect overall canopy cover or reduce the abundance of this vegetation type on the landscape.

In sum, potential disturbance or removal of terrestrial vegetation from future projects permitted under Alternative 1 would not substantially reduce the quantity or quality of vegetation communities and habitats in the region and would not result in a change in diversity or distribution of species in the region. Additionally, Plan implementation would not result in a substantial change in local population numbers of any common plant or tree species or any unique, rare, or endangered species of plants or animals. Any permanent and temporary loss and disturbance that would occur under Alternative 1 would be relatively minor and not substantially reduce the size, continuity, or integrity of any common vegetation community or habitat type or disrupt the natural processes that support common vegetation communities in the shorezone. This impact would be **less than significant**.

Common Wildlife

Several common resident and migratory wildlife species use habitats in the shorezone for foraging, shelter, and breeding. Common wildlife species in the Plan area primarily include waterfowl species (discussed in Section 14.3, "Affected Environment"), and several other bird, mammal, reptile, and amphibian species. Common small mammals that use certain habitat elements in or adjacent to the shorezone (including patches of conifer trees) include golden-mantled ground squirrel (*Spermophilus lateralis*), California ground squirrel (*S. beecheyi*), western gray squirrel (*Sciurus griseus*), Douglas' squirrel (*Tamiasciurus douglasii*), and yellow-pine chipmunk (*Tamias amoenus*). Larger mammals also use the shorezone for foraging and access to water; these species include raccoon (*Procyon lotor*), coyote (*Canis latrans*), and black bear (*Ursus americanus*). In addition to waterfowl, common bird species in the shorezone include mountain chickadee (*Poecile gambeli*), red-breasted nuthatch (*Sitta canadensis*), pygmy nuthatch (*Sitta pygmaea*), American robin (*Turdus migratorius*), yellow-rumped warbler (*Dendroica coronata*), Steller's jay (*Cyanocitta stelleri*), dark-eyed junco (*Junco hyemalis*), Brewer's blackbird (*Euphagus cyanocephalus*), and brown-headed cowbird (*Molothrus ater*). Amphibians and reptiles known or likely to use portions of the shorezone include Sierran tree frog (*Pseudacris regilla*) and sagebrush lizard (*Sceloporus graciosus*).

Although waterfowl and osprey are not rare or uncommon in the shorezone, they are special-status species and have special protections in the Tahoe Basin; therefore, they are not addressed here as "common wildlife" and are analyzed separately in Impact 14-1.

Effects of Alternative 1 on vegetation communities and associated terrestrial wildlife habitats are discussed in "Common Vegetation," above. Some regionally and locally common wildlife species would be subject to direct effects including construction disturbance associated with new pier and boat ramp construction, and possibly a minor loss or disturbance of habitat, and indirect effects such as increased recreation disturbance. In addition to the shorezone structures described in "Common Vegetation," Alternative 1 would allow for up to 2,116 new moorings (265 new public buoys, 1,741 new private buoys, 65 public slips, and 45 private lifts) for a total of approximately 10,800 moorings. Alternative 1 would maintain the existing 600-foot no-wake zone, which limits watercraft speed to 5 mph within 600 feet of shore and would expand the no-wake zone to include all of Emerald Bay. Alternative 1 at buildout would result in an approximately 13 percent increase in peak day boat trips and an approximately 16 percent increase in annual boat trips over baseline conditions.

Regionally and locally common wildlife species could be disturbed over the long term by operation and use of new recreation facilities, through increased access to portions of the shorezone. Increased recreational use of these areas could reduce the habitat value for wildlife. Changes in patterns and intensity of human activity, including watercraft use, as a result of the proposed Shoreline Plan could cause changes to noise levels, visual disturbances, and physical disturbances that may disturb the breeding, foraging, or resting activities of common wildlife.

With implementation of Alternative 1, most new shorezone structures would be located within areas with existing shorezone development; and, motorized watercraft users would likely follow existing patterns of travel to popular destinations around the lake. Additionally, the increase in boat density (11.5 percent on a peak day) would be relatively small and motorized recreation users would congregate near existing popular destinations. Therefore, Alternative 1 is not expected to substantially increase construction-related or recreational disturbance levels in the shorezone above existing levels for most common species. These common species are relatively abundant locally and regionally, and generally are not limited by the

availability of habitat in the region. Habitat in the shorezone is not considered critical or limiting to the presence or viability of common wildlife populations in the region. Accordingly, Alternative 1 is not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity. Therefore, effects of Alternative 1 on common wildlife species and communities would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would not include a numeric cap on shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. This alternative would allow more shorezone structures than any other alternative and is the only alternative that would allow new marinas. At buildout, it would potentially allow for up to 6,768 new buoys and slips, 476 new piers, 168 boat lifts, six new boat ramps, and two new marinas. Additionally, Alternative 2 would result in an approximately 45 percent increase in peak day boat trips and an approximately 53 percent increase in annual boat trips over baseline conditions at buildout conditions.

With Alternative 2, the types of potential impacts to common vegetation and wildlife would be similar to those described for Alternative 1, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 2 includes the greatest number of new shorezone structures and the greatest projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to common vegetation communities/habitats and common wildlife species is highest under this alternative.

For the same reasons described for Alternative 1, potential disturbance or removal of terrestrial vegetation from future projects permitted under Alternative 2 would not substantially reduce the quantity or quality of vegetation communities and habitats in the region and would not result in a change in diversity or distribution of species in the region. Any permanent and temporary loss and disturbance that would occur under Alternative 2 would be relatively minor and not substantially reduce the size, continuity, or integrity of any common vegetation community or habitat type or disrupt the natural processes that support common vegetation communities in the shorezone.

Alternative 2 is not expected to substantially increase construction-related or recreational disturbance levels in the shorezone above existing levels for most common species. These common wildlife species are relatively abundant locally and regionally, and generally are not limited by the availability of habitat in the region. Habitat in the shorezone is not considered critical or limiting to the presence or viability of common wildlife populations in the region. Accordingly, alternative 2 is not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity. Therefore, effects of Alternative 2 on common vegetation and wildlife communities would be **less than significant**.

Alternative 3: Limit New Development

With Alternative 3, motorized watercraft access would be more concentrated at marinas and public facilities, and fewer structures would be authorized under this alternative than under Alternative 1 or 2. At buildout, it would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. Eighty-six new private piers would be authorized under this alternative, but they would be restricted to multiple-use piers. Alternative 3 would result in an approximately four percent increase in peak day boat trips and an approximately four percent increase in annual boat trips over baseline conditions.

With Alternative 3, the types of potential impacts to common vegetation and wildlife communities would be similar to those described for Alternatives 1 and 2, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 3 includes fewer new shorezone structures and a substantially lower projected increase in watercraft use compared to Alternatives 1 and 2, the potential magnitude of construction and recreational disturbances to common vegetation communities/habitats and common wildlife species would be lower under this alternative.

For the same reasons described for Alternative 1, potential disturbance or removal of terrestrial vegetation from future projects permitted under Alternative 3 would not substantially reduce the quantity or quality of

vegetation communities and habitats in the region and would not result in a change in diversity or distribution of species in the region. Any permanent and temporary loss and disturbance that would occur under Alternative 3 would be relatively minor and not substantially reduce the size, continuity, or integrity of any common vegetation community or habitat type or disrupt the natural processes that support common vegetation communities in the shorezone.

Alternative 3 is not expected to substantially increase construction-related or recreational disturbance levels in the shorezone above existing levels for most common species. These common wildlife species are relatively abundant locally and regionally, and generally are not limited by the availability of habitat in the region. Habitat in the shorezone is not considered critical or limiting to the presence or viability of common wildlife populations in the region. Accordingly, alternative 3 is not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity. Therefore, effects of Alternative 2 on common vegetation and wildlife communities would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of this alternative is to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. This alternative would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations if the project would result in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shorezone structures. There would be no change in peak day or annual boat trips over baseline conditions and no change in density of boats on the lake (i.e., one boat for every 20.8 acres on the lake during a summer holiday weekend), and the number of motorized watercraft on the lake would not increase substantially.

With Alternative 4, the types of potential impacts to common vegetation and wildlife communities would be similar to those described for Alternative 1, with differences in the amounts and locations of habitats affected between the alternatives. Because Alternative 4 includes substantially fewer new shorezone structures compared to the other Plan alternatives and no projected increase in watercraft use, the potential magnitude of construction and recreational disturbances to common vegetation communities/habitats and common wildlife species would be lowest under this alternative compared to Alternatives 1, 2, and 3.

For the same reasons described for Alternative 1, potential disturbance or removal of terrestrial vegetation from future projects permitted under Alternative 4 would not substantially reduce the quantity or quality of vegetation communities and habitats in the region and would not result in a change in diversity or distribution of species in the region. Any permanent and temporary loss and disturbance that would occur under Alternative 4 would be minor and not substantially reduce the size, continuity, or integrity of any common vegetation community or habitat type or disrupt the natural processes that support common vegetation communities in the shorezone.

Alternative 4 is not expected to substantially increase construction-related or recreational disturbance levels in the shorezone above existing levels for most common species. These common wildlife species are relatively abundant locally and regionally, and generally are not limited by the availability of habitat in the region. Habitat in the shorezone is not considered critical or limiting to the presence or viability of common wildlife populations in the region. Accordingly, alternative 4 is not expected to substantially affect the distribution, breeding productivity, viability, or the regional population of any common wildlife species, or result in a change in species diversity. Therefore, effects of Alternative 2 on common vegetation and wildlife communities would be **less than significant**.

Mitigation Measures

No mitigation is required.

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15 PUBLIC HEALTH AND SAFETY

15.1 INTRODUCTION

This chapter describes the existing conditions within the shorezone and lakezone with respect to public health and safety. Topics addressed include boating safety, hazardous materials, seismic hazards, and emergency access to Lake Tahoe. Public health and safety are not environmental factors, but it is important for public decision makers to consider how features of the project alternatives may affect health and safety issues. This chapter also describes the capacity of existing public services and evaluates how implementation of the Shoreline Plan could affect demand for public services, which may result in environmental impacts if new or altered facilities are required. Public services include law enforcement, fire protection, and emergency response within the project area. The primary issues raised during scoping that pertain to public health and safety included:

- impacts to nonmotorized recreation;
- conflicts between motorized and nonmotorized recreation (e.g., enforcement of a no-wake zone, speed, watercraft traffic, need for larger no-wake zones in high traffic areas);
- increase in navigational hazards such as buoys and longer piers;
- health hazards due to potential contamination of the lake from nearshore development and from human-water contact; and
- public lake access issues and the potential for increased trespassing and vandalism on private property.

Analysis provided in this chapter is based on a review of agency documents, publicly available hazardous waste site databases, and consultation with local public service providers.

A dam constructed at Tahoe City in the early 1900s regulates water flow to the Truckee River from the natural rim of Lake Tahoe (6,223 feet above sea level) to the maximum legal lake level of 6,229.1 feet. Because the Shoreline Plan project area is confined to the shorezone and lake levels are regulated by the dam, flooding hazards are not a concern within the shorezone and are not addressed further in this chapter. The Shoreline Plan project area does not include lands designated as high fire hazard severity zones. Thus, wildland fire risk is not discussed further in this chapter. The Shoreline Plan would not create mosquito habitat or increase exposure of people to existing mosquito habitat. Thus, vector-borne disease is not discussed further. The relationship of individual projects to schools, airstrips, and hazardous waste sites would be evaluated on an individual basis at the project level. The Shoreline Plan does not involve alterations to or increased need for schools or for utilities such as power, natural gas, communication systems, water, or wastewater disposal. These issues are also not discussed further.

15.2 REGULATORY SETTING

Numerous federal, state, and local laws, regulations, and programs have been enacted to protect public health and safety. Key laws and regulations applicable to the Shoreline Plan are discussed below.

15.2.1 Federal

BOATING SAFETY

Section 10 of the Rivers and Harbors Act of 1899 requires that regulated activities conducted below the ordinary high-water elevation of navigable waters of the United States be approved/permitted by the U.S. Army Corps of Engineers (USACE). Regulated activities include the placement/removal of structures, work involving dredging, disposal of dredged material, filling, excavation, or any other disturbance of soils/sediments or modification of a navigable waterway. Lake Tahoe is considered a navigable waterway.

The Federal Boat Safety Act was enacted by Congress in August 1971 and provides authority for the U.S Coast Guard to establish comprehensive boating safety programs, authorizes the establishment of national construction and performance standards for boats and associated equipment and creates a more flexible regulatory authority concerning the use of boats and associated equipment.

The U.S. Code of Federal Regulations (CFR) contains regulations governing the safe operation of boats in Title 33: Navigation and Navigable Waters. This includes regulations about the carriage and use of personal floatation devices (33 CFR 175.11 et seq.), visual distress signals (33 CFR 175.101 et seq.), and proper ventilation systems (33 CFR 175.201).

WATER QUALITY

The U.S. Environmental Protection Agency (EPA) is the lead federal agency responsible for water quality management. The Federal Water Pollution Control Act of 1977 (33 U.S. Code [USC] 1251 et seq.), commonly referred to as the Clean Water Act (CWA), is the primary federal law that governs and authorizes water quality control activities by EPA, as well as the states. The CWA employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff:

- Title 40 of the CFR contains water quality regulations. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States.

- In accordance with Section 404 of the CWA, USACE regulates discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Part 328.3(a) of the CFR to include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. “Fill” is defined as any material that replaces any portion of a water of the United States with dry land or that changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredged or fill material within waters of the United States requires a permit from USACE. In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate regional water quality control board (RWQCB) indicating that the project will uphold state water quality standards.

- Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) regulatory program. Point sources must obtain a discharge permit from the proper authority (usually a state, sometimes EPA, a tribe, or a territory). NPDES permits cover various industrial and municipal discharges, including industrial activity, and runoff from construction sites disturbing more than 1 acre.

- Specific requirements for Spill Prevention, Control, and Countermeasure (SPCC) plans were developed as one of the regulations under the CWA. SPCC plans are described in CFR Title 40, Part 112 (Oil Spill Prevention) and are intended to reduce the threat of oil spills to navigable waters of the United States. The site-specific plan must identify the design, control, training, and response requirements of a facility.

A SPCC plan is required for facilities that have an aggregate aboveground storage capacity (counting only total volumes of containers 55 gallons or larger) of oil of more than 1,320 gallons.

MANAGEMENT OF HAZARDOUS MATERIALS

The U.S. Department of Transportation (USDOT), Office of Hazardous Material Safety, defines "hazard" as a condition, activity, or inherent characteristic of a material that has the potential to cause harm to people, property, or the environment. Exposure to hazardous materials can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Federal laws require planning to ensure that hazardous materials are properly handled, used, transported, stored, and disposed of, and if such materials are accidentally released, to prevent or mitigate injury to health or the environment. EPA is the agency primarily responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials. Applicable federal regulations pertaining to hazardous materials are primarily contained in CFR Titles 29, 40, and 49. Management of hazardous materials is governed by the following laws:

- The Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.) is the law under which EPA regulates hazardous waste from the time the waste is generated until its final disposal ("cradle to grave").
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also called the Superfund Act or CERCLA) (42 USC 9601 et seq.) gives EPA authority to seek out parties responsible for releases of hazardous substances and ensure their cooperation in site remediation.
- The Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499; 42 USC 116), also known as SARA Title III or the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), imposes hazardous materials planning requirements to help protect local communities in the event of accidental release.
- The CFR contains regulations regarding the discharge of fuel, oil, oily wastes, and hazardous substances into navigable waters of the United States (40 CFR 110.3).
- USDOT regulates transport of hazardous materials between states and is responsible for protecting the public from dangers associated with such transport. The federal hazardous materials transportation law (49 USC Section 5101 et seq.; formerly the Hazardous Materials Transportation Act, 49 USC Section 1801 et seq.) is the basic statute regulating transport of hazardous materials in the United States. Hazardous materials regulations are enforced by the Federal Highway Administration, the U.S. Coast Guard, the Federal Railroad Administration, and the Federal Aviation Administration.

WORKER SAFETY

The Occupational Safety and Health Administration (OSHA) is the federal agency responsible for assuring worker health and safety standards. OSHA has adopted numerous regulations pertaining to worker safety, contained in CFR Title 29. These regulations set standards for safe workplaces and work practices, including standards relating to the handling and use of chemicals identified in the Occupational Safety and Health Act of 1970 (Public Law 91-596, 9 USC 651 et seq.) and for personal protective and life-saving equipment required when working over or near water (29 CFR 1926.106).

15.2.2 Tahoe Regional Planning Agency

THRESHOLDS

TRPA has not established any environmental threshold carrying capacities related to public safety, hazardous materials, seismic hazards, or public services.

GOALS AND POLICIES

The TRPA Regional Plan contains goals and polices intended to help the region achieve and maintain adopted environmental threshold carrying capacities while providing for orderly growth and development consistent with such capacities. There are a variety of goals and policies related to public health and safety within the TRPA Regional Plan. Chapter 2, "Land Use Element," of the Goals and Policies document sets forth fundamental land use philosophies which include the maintenance of the environmental, economic, social, and physical well-being of the Region. The Natural Hazards Subelement aims to minimize risks from natural hazards such as earthquakes, and seiches. The Water Quality Subelement aims to maintain thresholds for water quality by addressing point and non-point sources of pollution. Relevant polices include the following:

- **Policy NH-1.4.** TRPA will encourage public safety agencies to prepare disaster plans.
- **Policy WQ-2.3.** Underground storage tanks for sewage, fuel, or other potentially harmful substances shall meet standards set forth in TRPA ordinances, and shall be installed, maintained, and monitored in accordance with the Best Management Practices Handbook.
- **Policy WQ-2.5.** TRPA shall cooperate with other agencies with jurisdiction in the Lake Tahoe region in the preparation, evaluation, and implementation of toxic and hazardous spill control plans.
- **Policy WQ-2.6.** Liquid or solid wastes from recreational vehicles and boats shall be discharged at approved pump-out facilities. Pump-out facilities will be provided by public utility districts, marinas, campgrounds, and other relevant facilities in accordance with standards set forth in the Best Management Practices Handbook.

Chapter 4, "Conservation Element," plans for the preservation, development, utilization, and management of the scenic and other natural resources within the region. The Shorezone Subelement contains goals and policies that govern development in the shorezone area of Lake Tahoe. Relevant policies include the following:

- **Policy SZ-1.9.** The Agency shall regulate the placement of new piers, buoys, and other structures in the foreshore and nearshore to avoid degradation of fish habitats, creation of navigation hazards, interference with littoral drift, interference with the attainment of scenic thresholds, and other relevant concerns.
- **Policy SZ-1.11.** The Agency shall regulate the maintenance, repair, and modification of piers and other structures in the nearshore and foreshore.

Chapter 6, "Public Services and Facilities Element," includes goals and policies related to the provision of adequate public services to meet the needs of existing and new development. Relevant policies include the following:

- **Policy PS-1.1.** Public services and facilities should be allowed to upgrade and expand consistent with the land use element of the Regional Plan and federal, state, and local standards.
- **Policy PS-4.1.** The impact on educational and public safety services shall be considered when reviewing projects and plan amendments proposed within the region. To the extent feasible, adverse impacts should be mitigated as part of the review process.
- **Policy PS-4.2.** Educational and emergency service organizations should anticipate and plan for projected demands and needs consistent with the regional plan and are encouraged to advise the agency when development potentials exceed current or anticipated service capabilities or capacities.

CODE OF ORDINANCES

The TRPA Code of Ordinances compiles all the laws and ordinances needed to implement the TRPA Regional Plan goals and policies. The Shoreline Plan, once an alternative is approved and implemented, would amend parts of the TRPA Code, including portions of Chapters 80 through 86. As described in Chapter 2, "Description of Proposed Project and Alternatives," some provisions of the TRPA Regional Plan and other shoreline-related policy issues would remain unchanged under all alternatives. TRPA Code Section 84.10.2 establishes a framework to provide essential emergency access to and egress from Lake Tahoe to protect public health and safety. TRPA allows for the designation of up to one essential public safety facility within each county jurisdiction plus the U.S. Coast Guard Lake Tahoe Station, which is a second existing essential public health and safety facility in Placer County. In drought years, TRPA allows first responder organizations to designate locations for temporary moorings for regional public safety purposes, such as a marina, pier, or buoy, or a site where a new pier could be constructed pursuant to TRPA Code. The shoreline alternatives would not modify the existing essential public health and safety provisions.

Chapter 33, "Grading and Construction," applies to grading, excavation, filling, clearing of vegetation, and disturbance of the soil, and protection of vegetation during construction. In accordance with TRPA Code Section 33.3.4, the methods of disposal of solid or liquid materials, including soil, silt, clay, sand, or other organic or earthen materials, shall be reviewed and approved by TRPA. These methods of disposal shall include, but are not limited to:

- temporary stockpiling of all or some of the topsoil on the site for use on areas to be revegetated,
- disposal of the material at a location approved by TRPA, and
- export of the materials outside the Region.

Chapter 60, "Water Quality," implements the Water Quality Subelement of the TRPA Regional Plan goals and policies to attain and maintain federal, state, and local water quality standards. It prohibits the discharge of toxic or hazardous wastes to Lake Tahoe and states that all persons handling, transporting, using, or storing toxic or hazardous substances shall comply with the applicable requirements of state and federal law regarding spill prevention, reporting, recovery, and clean-up.

15.2.3 California

BOATING SAFETY

Senate Bill (SB) 941, which was signed into law September 18, 2014, mandates boater safety education for anyone who intends to operate a motor-powered vessel on California waterways. On January 1, 2018, the legislation took effect for boaters under 20 years old. The new law requirements will gradually expand to apply to all boaters by 2025. The California Code, Harbors and Navigation Code regulates navigable waters, navigation, and boating safety.

WATER QUALITY

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and each of the nine RWQCBs power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the CWA. The applicable RWQCB for the project area is the Lahontan RWQCB (Lahontan Water Board). SWRCB and the Lahontan Water Board have the authority and responsibility to adopt plans and policies, regulate discharges to surface water and groundwater, regulate waste disposal sites, and require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substances, sewage, or oil or petroleum products.

Through the Porter-Cologne Water Quality Act and the NPDES program, Lahontan Water Board has authority to require proper management of hazardous materials during project construction.

The proposed Shoreline Plan falls within the jurisdiction of the state Construction General Permit (Order No. 2009-009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ). The Construction General Permit covers areas that drain to the Truckee River and establishes a risk-based approach with monitoring. The NPDES Permit and Construction General Permit require that construction projects with greater than 1 acre of disturbance file permit registration documents, including a Notice of Intent and a storm water pollution prevention plan (SWPPP) that includes proposed best management practices and a site-specific Construction Site Monitoring and Reporting Plan developed by a Qualified SWPPP Developer. Although a major focus of the SWPPP is management of stormwater on the construction site, it must also address proper use and storage of hazardous materials, spill prevention and containment, and cleanup and reporting of any hazardous materials releases, if they occur.

MANAGEMENT OF HAZARDOUS MATERIALS

The term “hazardous material” is defined by California Health and Safety Code as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment (6.95 Health and Safety Code [HSC] 25501). In this section, the term “hazardous materials” is used to denote hazardous products and hazardous commodities that are transported or used in commerce. The term “hazardous waste” is used for waste materials that are destined for treatment or disposal and have been defined in state or federal regulations as being hazardous waste.

The California Department of Toxic Substances Control (DTSC), a department of the California Environmental Protection Agency (CalEPA), has primary regulatory responsibility over hazardous materials in California. DTSC works in conjunction with EPA to enforce and implement hazardous materials laws and regulations. As required by Section 65962.5 of the California Government Code, DTSC maintains a hazardous waste and substances site list for the state, known as the Cortese List. Management of hazardous materials is governed by the following laws:

- Chapter 6.7 of the Health and Safety Code outlines the requirements for underground storage tanks (USTs). The code identifies requirements for corrective actions, cleanup funds, liability, and the responsibilities of owners and operators of USTs.

- The California Aboveground Petroleum Storage Act (APSA) applies to facilities that are subject to the oil pollution prevention regulations specified in CFR 40, Part 112 or that have a storage capacity of at least 1,320 gallons of petroleum in the state of California. The California APSA only regulates tank facilities that store petroleum, whereas the federal SPCC requirement includes other oils. The California APSA requires preparation of an SPCC plan in accordance with CFR 40, Part 112.

- California has adopted USDOT regulations for the movement of hazardous materials originating within the state and passing through the state; state regulations are contained in Title 26 of the CCR. State agencies with primary responsibility for enforcing state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation (Caltrans). Together, these agencies determine container types used and license hazardous waste haulers to transport hazardous waste on public roads.

- California has developed an emergency response plan, managed by the Governor’s Office of Emergency Services, to coordinate emergency services provided by federal, state, and local governments and private agencies. Response to hazardous materials incidents is one part of the plan.

- Section 25150.7 of the California Health and Safety Code outlines procedures and regulations for the management and disposal of treated wood waste (TWW). Wood treated with preservatives and other

chemicals to protect the wood may have been used in constructing piers and pilings on Lake Tahoe. These preservatives and other chemicals could leach into water supplies if the wood waste is disposed of improperly. The Eastern Regional Landfill, Carson City Landfill, and Western Regional Landfill accept TWW.

WORKER SAFETY

The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are typically more stringent than federal OSHA regulations and are presented in Title 8 of the CCR. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

BUILDING CODES

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. The earthquake design requirements consider the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a Seismic Design Category for a project.

EMERGENCY RESPONSE

Under the Emergency Services Act (California Government Code, Sections 8550 through 8551), the State of California developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous material or hazardous waste is an important segment of the plan administered by the California Emergency Management Agency (CalEMA). The CalEMA coordinates the response of agencies, including CalEPA, Caltrans, California Highway Patrol, RWQCBs, Air Quality Management Districts, and county disaster response offices.

15.2.4 Nevada

BOATING SAFETY

The Nevada Boat Act of 1999 promotes safety for persons and property in and connected with the use, operation, and equipment of vessels (488 Nevada Revised Statutes 015 et seq.). The Act specifies required safety equipment such as adequate lights, personal flotation devices, and fire extinguishers. The Act also regulates the safe operation of vessels.

MANAGEMENT OF HAZARDOUS MATERIALS

The Nevada Division of Environmental Protection, Bureau of Waste Management manages a Hazardous Waste Program that is responsible for enforcing state hazardous waste statues and regulations in lieu of the EPA. With some modifications, Nevada adopts the federal hazardous waste regulations. The Hazardous Waste Program is responsible for permitting and inspecting hazardous waste generators and disposal, transfer, storage, and recycling facilities.

The Nevada Department of Public Safety Hazmat Permitting Office is responsible for the permitting and regulating of hazardous materials within the state of Nevada. Section 312 of the SARA requires covered facilities to submit hazardous chemical inventory forms annually. Information required for the substances at

the facility include the quantity and location of hazardous chemicals stored or used onsite above the threshold planning quantity. Also required are the categories of each chemical's physical and health hazards.

Transportation of hazardous materials on roadways is regulated by the Nevada Department of Motor Vehicles and the Nevada Highway Patrol (Nevada Revised Statutes 459.250).

WORKER SAFETY

The Nevada Occupational Safety and Health Act promotes safe and healthful working conditions to provide job safety and health protection for workers in the State of Nevada. This act provides the Nevada Occupational Safety and Health Administration the power to issue citations for conditions inspected and found to be unsafe.

EMERGENCY RESPONSE

In compliance with EPCRA, the Nevada State Emergency Response Commission (SERC) was established in 1987. SERC coordinates and supervises the activities of the Local Emergency Planning Committees to ensure that each committee has an approved Hazardous Materials Emergency Response Plan. SERC also collects chemical inventory reports, provides funds through grants, and processes information requests from the public.

15.2.5 Local

LAKE TAHOE GEOGRAPHIC RESPONSE PLAN

The Lake Tahoe Geographic Response Plan (LTGRP) (Lake Tahoe Response Plan Area Committee 2014) is the principal guide for agencies within the Lake Tahoe watershed, its incorporated cities, and other local government entities in mitigating hazardous materials emergencies. The LTGRP establishes the policies, responsibilities, and procedures required to protect life, environment, and property from the effects of hazardous materials incidents. The LTGRP establishes the emergency response organization for hazardous materials incidents occurring within the Lake Tahoe watershed. The LTGRP is generally intended to be used for oil spills or chemical releases that impact or could potentially impact drainages entering Lake Tahoe and the Truckee River.

LOCAL HAZARD MITIGATION PLANS

The El Dorado County Multi-Jurisdiction Hazard Mitigation Plan (El Dorado County 2004) protects life, safety, and property by identifying risks and recommending localized solutions to reduce vulnerabilities. It includes an assessment of how existing regulations and policies reduce impacts related to seiches.

The Placer County Local Hazard Mitigation Plan Update (Placer County 2016) reduces or eliminates long-term risk to people and property from hazards, provides protection for critical infrastructure, improves public awareness and preparedness, and improves communities' capabilities to respond and recover from disaster. While the plan identifies seiches as unlikely occurrences, vulnerability of existing infrastructure to a seiche is high, should one occur. A seiche wave warning system, signs, and public education is recommended.

The Douglas County Local Hazard Mitigation Plan Comprehensive Update (Douglas County 2015) reduces impacts and damages from hazard events, increases public awareness, strengthens communication and coordination, and integrates hazard mitigation activities with local land development planning.

The Washoe County Regional Hazard Mitigation Plan (Washoe County 2015) identifies hazard mitigation actions intended to eliminate or reduce the effects of future disasters throughout the county. The plan cites

computer models of seiche activity at Lake Tahoe prepared by the University of Nevada research team, which estimate that waves as high as 30 feet could strike the shore. These projections suggest the largest waves might hit Sugar Pine Point, Rubicon Point, and the casinos in South Lake Tahoe. Given the low likelihood of seiche occurrence, the plan recommends eventual evaluation of seiche warning systems.

The Carson City Hazard Mitigation Plan (Carson City 2016) identifies on-going and new hazard mitigation actions intended to eliminate or reduce the effects of future disasters in Carson City. While seiches are profiled in the plan, given the low risk of seiches, the plan does not identify specific actions to address seiches beyond greater public awareness.

15.3 AFFECTED ENVIRONMENT

The affected environment extends beyond Lake Tahoe's shorezone to include the lakezone, where water-dependent recreation may be present, and to include areas near the lake where hazardous materials may be transported, used, and disposed.

15.3.1 Boating

EXISTING USES

Water sports are a primary activity in the Lake Tahoe region in the summer. Nonmotorized uses include swimming, kayaking, paddle boarding, kiteboarding, and wind surfing. Motorized uses include power boats, towing sports, sail boats, and personal watercraft (PWC).

BOATING SAFETY AND ACCIDENT STATISTICS

Boating safety is a function of vessel preparedness, operator skill, weather, and navigational hazards. In 2016, there were approximately 11,862,000 registered boats in the United States and 701 reported fatalities, which equates to approximately 5.9 deaths per 100,000 registered boats. Compared to 2015, the number of accidents increased just over 7 percent, the number of deaths increased 12 percent, and the number of injuries increased 11 percent. The most common types of accidents are "collision with recreational vehicle" and "collision with fixed object." Operator inattention, operator inexperience, improper lookout, excessive speed, and machinery failure rank as the top five primary contributing factors in accidents (U.S. Coast Guard 2016).

The California State Parks Division of Boating and Waterways (DBW) tracks annual boating accident statistics in California waterways. In 2016, there were nine accidents, eight injuries, and four fatalities on the California side of Lake Tahoe. The largest percentages of accidents involved PWC (44 percent), operator inexperience (44 percent), towing sport accidents (33 percent), and collision with another vessel (11 percent) (DBW 2016a).

The Nevada Department of Wildlife (NDOW) tracks annual boating accident statistics in Nevada waterways. In 2016, there were two accidents, three injuries, and no fatalities on the Nevada side of Lake Tahoe. Contributing factors were operator inexperience and collision with another vessel (NDOW 2016).

Boating safety courses are offered by the U.S. Coast Guard as well as many state boating agencies. California and Nevada have online Boating Safety Courses, which are required to obtain boating cards in compliance with SB 941 in California and with the Nevada boating education requirements. The U.S. Coast Guard Auxiliary offers a variety of public educational classes including Boating Skills and Seamanship for powerboats and Sailing and Seamanship for sailors. Both classes generally last 13 weeks and cover legal requirements, rules of the road, aids to navigation marlinspike seamanship, charts and compasses and boat handling. Some auxiliary flotillas also offer classes in basic coastal navigation, boating safely, advanced

coastal piloting, advanced coastal navigation, personal watercraft, sailing fundamentals, boat and kids, and water and kids.

Operator Factors

The majority of accidents, injuries, and fatalities occur due to operator factors. Approximately 40 percent of fatalities in 2016 were due to operator factors such as alcohol use, operator inexperience, operator inattention, and excessive speed (DBW 2016b). Boating accidents occur most often when the number of boats on the water has peaked, and the greatest danger to boaters is other boaters. In response, the U. S. Coast Guard's Boating Safety Manual primarily addresses the type and use of safety devices that are located on vessels, not on shore. The manual requires boaters to operate their vessels at safe speeds, which is based on factors such as visibility; traffic density; the maneuverability of the vessel; the presence of background light at night from shore lights or back scatter of the vessel's own lights; the state of wind, sea, and current; the proximity of navigational hazards; and the draft in relation to the available depth of water.

Weather Factors

High winds and cold-water temperatures may pose the greatest natural threat to the safety of boaters on Lake Tahoe. Persons operating small craft on the west shore, after losing control of their vessel or becoming separated from their vessel, have been blown across the lake by west winds, and have landed on the east shore. Persons separated from their vessel in deeper, colder waters are subject to hypothermia in a matter of minutes and may lose consciousness if not rescued promptly.

Structures and Navigational Hazards

In addition to natural environmental hazards such as rocks and shoals, there are several types of structures within and around Lake Tahoe that may be navigational hazards. These structures include piers, buoys, and fences. Navigational hazards increase boating accidents in two ways; watercraft can collide with the hazard itself or the hazard can decrease maneuvering room and cause two watercrafts to collide. In daylight hours, these hazards pose the greatest concern during adverse weather conditions when wind or waves can reduce a boater's control, resulting in no-fault accidents. Improper watercraft operation also increases the chance of collision with navigational hazards. During the evening and nighttime hours, hazards associated with physical obstructions increase as few of them are lit. Nighttime watercraft operation risks collision with navigational hazards in adverse weather conditions and when they are not operated safely (e.g., excessive speed or inadequate lighting). Furthermore, rising lake levels have resulted in some buoy floats becoming submerged, because they were installed at a length appropriate for low lake levels and not adjusted as the lake level rises. Similarly, fences installed around the lake during times of drought may be inundated as the water levels have risen and may not be visible to watercraft at all times.

Spatial Conflicts

Accidents are caused not only by increased boating use but may also be a result of conflicting recreational uses on the lake. Spatial conflicts occur where different types and sizes of vessels encounter one another. This is of particular concern related to use of PWC and conflicts between motorized and nonmotorized uses.

Special Events

There are many events that take place at Lake Tahoe year-round. In addition to events that draw visitors to the region, there are several holidays and annual events where increased boating is likely such as the Fourth of July Fireworks show on the lake, Labor Day, the Concours d'Elegance Wooden Boat Show, and the American Century Championship Celebrity Golf Tournament, where spectators often watch the tournament from their boats.

EMERGENCY LAKE ACCESS

Emergency lake access is provided primarily from marinas and boat ramps. The access points are spatially well distributed, with the noted exceptions of the East Shore between Sand Harbor and Deadman's Point, just north of Glenbrook Bay, and the area around Emerald Bay. Because most of the emergency responders'

watercraft are located on the water, lake access is generally not an issue for first responders. Due to the proximity of local hospitals and factors of emergency transportation, Medivac helicopter transports are the preferred ambulatory method for patients in serious condition. Helicopter operations require a large, unobstructed area for the safety of the crew and the public. This factor along, with boating access, is a key consideration for using marinas and boat ramps as the preferred emergency access sites.

Lake geography determines, to some extent, where lake access points may be located. Backshore slope must be gentle enough to allow vehicular access. Ideal access points are protected from prevailing winds and oriented to avoid negative impacts created by littoral drift. Lake bottom slope should drop off sufficiently to allow marina channels or boat ramps to function during low water conditions.

Low Water Conditions

The climate of the Lake Tahoe region is characterized by cycles of flood and drought, with precipitation and runoff varying widely from year to year, leading to years where some existing lake access points are unavailable during low water conditions. Lake access is hindered in areas where piers, buoys, and boat ramps do not provide adequate access or moorage depths during low water conditions. Shallow water conditions have also constrained boat use and navigation at existing marinas. Low lake levels have limited emergency response access because boating facilities are unavailable due to low water levels. The *Truckee Basin Study: Basin Study Report* (Reclamation 2015) identifies and describes future risks to Tahoe basin water resources under multiple projected climate scenarios. Due to warming temperatures and less precipitation in the coming years, low lake levels may persist.

15.3.2 Hazardous Materials

Hazards in the region are both human made and naturally occurring. Human-made hazards are generally associated with the potential risk of accidents from the transport of hazardous materials and waste to support various commercial and industrial land uses. Many chemicals used for household cleaning, construction, dry cleaning, film processing, landscaping, and automotive maintenance and repair are considered to generate hazardous materials and waste.

Boat repair and maintenance activities at marinas create wastes that are considered hazardous and require proper handling. Typical wastes which are classified as hazardous include: oil, grease, diesel fuel, and oily bilge water; contaminated soil; gasoline and water; solvents, such as acetone, kerosene, mineral spirits; strong acids and alkalines; and paint chips or leftover paint.

Two recognized environmental conditions (RECs) whose cleanup status is open have been identified within or immediately adjacent to the shoreline the Tahoe Boat Company UST cleanup site, located at 700 North Lake Boulevard in Tahoe City; and the Sierra Boat Company UST cleanup site, located at 5146 North Lake Boulevard in Carnelian Bay. There are no open cases on the Nevada side of the lake (SWRCB 2015, NDEP 2018).

In addition to human-made hazardous materials, there are numerous naturally-occurring hazards in the region. These include: radon gas, which is a naturally radioactive gas commonly found in all soil types and often concentrated in granite rock and granite soils; and limited access for fire prevention personnel due to the topography of the region.

LEAD-BASED PAINT

Lead is a potentially hazardous material that can result in cardiovascular effects, increased blood pressure and incidence of hypertension; decreased kidney function; reproductive problems; and nervous system damage. Lead can be found in old water pipes, solder, paint, and in soils around structures painted with lead-based paints. Lead-based paints are likely present on buildings constructed before the late 1970s, when the quantity of lead in paints became regulated. Potentially hazardous exposure to lead can occur when lead-based paint is improperly removed from surfaces by dry scraping, sanding, or open-flame burning.

Lead-based paints and coatings used on the exterior of buildings may have also flaked or oxidized and deposited into the surrounding soils.

POLYCHLORINATED BIPHENYLS

Polychlorinated biphenyls (PCBs) belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. PCBs are highly persistent in the environment, and exposure can cause serious liver, dermal, and reproductive system damage. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications. Products that may contain PCBs include: transformers, capacitors, and other electrical equipment; oil used in motors and hydraulic systems; and thermal insulation material.

TREATED WOOD WASTE

Wood treated with a chemical preservative for protection against pests and environmental conditions is called treated wood. Examples include fence posts, sill plates, landscape timbers, pilings, guardrails and decking. The intended use of a particular treated wood product is a key factor in determining the type of chemical preservatives to be used for wood treatment. The preservative can include one or more of the following constituents: arsenic, chromium, copper, pentachlorophenol, or creosote. If TWW is not properly disposed of, the chemicals it contains can contaminate surface water and groundwater. This poses a risk to human health and the environment (DTSC 2011).

15.3.3 Seismicity

The potential for seismic activity is related to the proximity of faults, which are fractures or zones of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep (Bryant and Hart 2007:3).

The Tahoe basin is in a seismically-active region of the United States. The California-Nevada boundary is second only to the California coast in earthquake activity. The basin lies within a tectonically active, asymmetric half-graben, a depressed block of land bordered by a major fault. Evidence shows that Tahoe basin faults have had pre-historic earthquakes of a magnitude of 7.0 within the past 10,000 years. However, scientists believe that large quakes are “rare events” in the basin, meaning quakes of magnitude 6.5 or greater occur on individual faults about every 3,000 to 4,000 years (Segale and Cobourn 2005:1).

East of the basin, the Carson Range fault system is one of the largest fault systems and runs for 60 miles along the east face of the Carson Range from Reno to Markleeville. The probability of at least one magnitude ≥ 6.0 event occurring in the Reno-Carson City urban corridor over a 50-year period is estimated to be between 34 and 98 percent, the probability of a magnitude ≥ 6.6 event between 9 and 64 percent, and the probability of a magnitude ≥ 7.0 event between 4 and 50 percent. These probabilities are relatively high and are commensurate with many parts of California (dePolo et al. 1997:3).

According to the Earthquake Potential Map for Portions of Eastern California and Western Nevada (CGS 2005), the Tahoe basin is considered to have relatively low to moderate potential for shaking caused by seismic-related activity. However, earthquakes occurring nearby, such as the Reno-Carson urban corridor, have the potential to trigger secondary hazards in the basin.

FAULTS AND FAULT RUPTURE

Earthquake Fault Zones are delineated around active faults and are used for planning and construction purposes. Under the Alquist-Priolo Act Earthquake Fault Zoning Act of California, an active fault is one that has ruptured in the last 11,000 years (within Holocene time). An early Quaternary fault has had surface displacement during the last 1.6 million years (Quaternary time) and a pre-Quaternary fault has had surface displacement before the Quaternary period. None of the Tahoe basin counties include Earthquake Fault Zones under Alquist-Priolo; the closest mapped fault zone is located within 2 miles of the basin in Alpine County (Bryant and Hart 2007:19).

Table 15-1 lists faults that are found within the basin that have been sources of magnitude > 6 earthquakes during the Quaternary period (past 1.6 million years) (USGS and CGS 2006).

Table 15-1 Lake Tahoe Basin Faults

Name	Age (years)
Agate Bay Fault	<1,600,000
East Tahoe Fault	<1,600,000
Incline Village Fault	<15,000
Little Valley Fault	<1,600,000
North Tahoe Fault	<15,000
Tahoe-Sierra Frontal Fault Zone	<1,600,000
Tahoe Valley Fault zone	<1,600,000
Unnamed	<1,600,000
Wes Tahoe-Dollar Point Fault Zone	<15,000 <130,000 <1,600,000

Source: USGS and CGS 2006

SEICHE

A tsunami is a wave or series of waves that may result from a major seismic event that involves the displacement of a large volume of water and can occur in any large body of water. A seiche is a periodic oscillation of an enclosed or restricted water body, typically a lake or reservoir, produced by seismic shaking. A seiche results in a potentially damaging wave, similar to a tsunami, which may result from seismic activity near a large lake. A seiche may occur in periods that differ from a tsunami; however, should the period of wave propagation occur simultaneously with a tsunami, it could result in cumulative seismic-related wave effects. Modeling of potential earthquakes occurring beneath Lake Tahoe indicate that a fault rupturing seismic event of magnitude 7.0 could trigger a tsunami, followed by seiche with waves of up to 30 feet high along the shoreline of Lake Tahoe (Ichinose et al. 2000).

15.3.4 Public Services

FIRE PROTECTION

Six local fire protection districts provide emergency services to the project area. These fire protection districts operate under a mutual aid agreement. Although the California Department of Forestry and Fire Protection, and other local fire protection districts such as Meeks Bay Fire Protection District, respond to emergencies near Lake Tahoe, they are not the primary response, nor are they equipped to respond to emergencies on Lake Tahoe (Placke, pers. comm., 2018).

- City of South Lake Tahoe Fire Department: The City of South Lake Tahoe Fire Department has one boat that primarily patrols the lake during holidays such as the Fourth of July and Labor Day (Drennan and Meston, pers. comm., 2018).

- Lake Valley Fire Protection District: While the Lake Valley Fire Protection District does not currently have a marine unit, they provide medical aid on the shoreline via ambulances. They are involved in less than a dozen lake-related accidents per year, which are a small percentage of the total number of accidents they respond to on a yearly basis. They do not have water response capability, nor are there plans to develop one (Hekhuis, pers. comm., 2018).

- Fallen Leaf Lake Fire District: The Fallen Leaf Lake Fire District does not have boats on Lake Tahoe. It would take them roughly 1.5 hours to transport their boat from Fallen Leaf Lake to Lake Tahoe, which would only occur during major emergencies (Gerren, pers. comm., 2018).

- North Tahoe Fire Protection District: While the North Tahoe Fire Protection District does not currently have a watercraft program, it participates in nearshore rescue on the lake. They are in the process of setting up a marine unit and locating a slip or pier to rent (Simons, pers. comm., 2018).

- North Lake Tahoe Fire Protection District: The North Lake Tahoe Fire Protection District participates in roughly 80 water-related calls per year, which range from vessels in distress to drownings. Rescue equipment consists of a boat, which is housed at a boat lift during summer months, and jet skis with rescue boards (Green, pers. comm., 2018).

- Tahoe-Douglas Fire Protection District: The Tahoe-Douglas Fire Protection District has a fire boat on Lake Tahoe and operates out of the Zephyr Cove public pier. They operate 24 hours per day, seven days a week (Baker, pers. comm., 2018).

LAW ENFORCEMENT

Law enforcement within the project area is provided at the federal, state, county, and city levels. At the community level, law enforcement and protection services are provided by the Placer, El Dorado, Washoe, and Douglas County Sheriff's Offices in each respective county, and South Lake Tahoe Police Department. In addition to local law enforcement agencies, Lake Tahoe is also served by a variety of federal agencies such as the California Department of Fish and Wildlife (CDFW), NDOW, and the U.S. Coast Guard.

Waterborne Safety and Law Enforcement

Eight government agencies share law enforcement and emergency response duties on Lake Tahoe. In addition to the U.S. Coast Guard, which has jurisdiction over Lake Tahoe, local agencies that patrol the lake include:

- South Lake Tahoe Police Department: The South Lake Tahoe Police Department provides law enforcement services in the City of South Lake Tahoe, from Stateline on the east to Emerald Bay on the west. They have one boat for use during lake-related emergencies (Dougherty, pers. comm., 2018).

- Douglas County Sheriff: The Douglas County Sheriff provides law enforcement services in Douglas County, from Stateline on the south to Glenbrook on the north. They operate one boat out of a slip in the Tahoe Keys during the months of May through October. In the offseason, the boat is stored in a warehouse off of the water (Skibinski, pers. comm., 2018).

- El Dorado County Sheriff: The El Dorado County Sheriff provides law enforcement services within the El Dorado County portion of the region, from the California-Nevada state line to Tahoma. Rescue equipment consists of jet skis and boats, which are housed at the Tahoe Keys Marina. They are one of the only operations on the south shore that operate 24 hours per day (Almos, pers. comm., 2018).

- Placer County Sheriff: The Placer County Sheriff provides law enforcement services on the northwest corner of the lake, from Stateline Point south to Tahoma. They have a patrol boat on the lake that is staffed full time from mid-May through mid-September (Th-Sun). The boat operates out of the Sierra Boat Company (Baxter, pers. comm., 2018).

- Washoe County Sheriff: The Washoe County Sheriff provides law enforcement services in Washoe County, from Stateline Point south to Glenbrook. They have one boat for use during lake-related emergencies, which is manned on weekends from Memorial Day through October 1. The boat operates out of the Thunderbird Lodge (Bello, pers. comm., 2018).

- CDFW: CDFW is responsible for investigating polluting and oil spills on the California side of Lake Tahoe.

- NDOW: NDOW is responsible for investigating poaching or polluting on the Nevada side of Lake Tahoe. NDOW regulates boating safety pursuant to the Nevada Boat Act. Patterned after U.S. Coast Guard regulations, the Nevada Boat Act provides for the investigation of boating accidents on and the regulation of watercraft equipment and operation, and anchoring and mooring of watercraft to buoys.

- Nevada State Parks: Rangers from Nevada State Parks generally patrol Cave Rock and Sand Harbor. In emergency situations they can respond to assist local agencies. Rescue equipment and personnel consists of a boat, jet skis, and lifeguards (Wooldridge, pers. comm., 2018).

These law enforcement agencies implement either DBW regulations, known as the California Boating Law, or the Nevada Boat Act for their respective jurisdictions. The Sheriff's Offices also have other resources to respond to emergencies such as County Search and Rescue Teams and Air Search and Rescue.

EMERGENCY RESPONSE

U.S. Coast Guard

The U.S. Coast Guard is the overall search and rescue lead on Lake Tahoe. The marine units described below report to the U.S. Coast Guard Station Lake Tahoe, located at 2500 Lake Forest Road, when on patrol. The U.S. Coast Guard also has resources from Sacramento and the Bay Area to respond to any and all emergencies and large environmental spills. The U.S. Coast Guard is operational year-round and has two 29-foot patrol boats that regularly conduct patrols and respond to emergencies. They operate 24 hours per day, seven days a week. The mission of the Tahoe station is search and rescue only. All environmental spill responses would be coordinated through the U.S. Coast Guard's National Response Center (Bieber, pers. comm., 2018).

U.S. Navy

The U.S. Navy, located at Naval Air Station Fallon in Fallon, NV, provides additional air search and rescue capabilities. The U.S. Navy has three SH-60-S rescue helicopters, whose primary function is military search and rescue. Their secondary function is civilian search and rescue. While the U.S. Navy does perform search and rescue in the Lake Tahoe region, the majority of incidents are mountain rescue operations. They are rarely involved with incidents in Lake Tahoe (Upham, pers. comm., 2018).

15.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

15.4.1 Methods and Assumptions

The area of assessment extends beyond the shorezone to include the lakezone, where water-dependent recreation occurs, and generally includes upland areas where, in relation to potential future projects, hazardous materials may be transported, used, and disposed.

Methods for the impact analysis included a review of applicable laws and regulations pertaining to public safety, hazards, and hazardous materials generally, and as applicable to the project alternatives and the project area. Within this framework, potential for boating accidents, emergency response capacity, known locations of hazardous materials, and the potential for other safety or hazardous conditions were reviewed based on TRPA planning documents, goals, and policies, and through consultation with representatives of public service providers. The impact analysis considered potential for changes in the nature, extent, or presence of hazardous conditions to occur as a result of construction and operation of potential future projects, including increased potential for exposure to hazardous materials and conditions and increased boating accidents due to increased boating activity and navigation hazards. Compliance with applicable federal, state, and local health and safety laws and regulations would generally protect the health and safety of the public.

Potential effects associated with the project would be temporary or permanent. Temporary impacts generally include effects associated with construction activities, including the transport, storage, and use of potentially hazardous chemicals and the potential to encounter hazardous wastes during construction. Permanent impacts generally include effects associated with increased navigational hazards in the lake and increased boating use, which could lead to increased boating accidents and a corresponding need for emergency services and access to the lake.

15.4.2 Significance Criteria

Significance criteria relevant to public health and safety are summarized below. The “Human Health,” “Risk of Upset,” “Land,” “Water Quality,” and “Public Services” criteria from the TRPA Initial Environmental Checklist were reviewed to develop criteria pertaining to the hazards, public safety, and public services impacts of the alternatives. There are no TRPA environmental thresholds that relate to public health and safety. An impact would be significant if it:

- results in a substantial increase in the risk for watercraft accidents;
- involves a risk of the accidental release of hazardous substances;
- impairs or result in a decrease in emergency access to the Shoreline;
- exposes people or property to risk of injury or loss of life due to seismic hazards, including seiche; and/or
- creates a substantial need within the region for new or altered public services related to fire protection, law enforcement and protection, or other emergency response services.

15.4.3 Environmental Effects of the Project Alternatives

Impact 15-1: Increase in watercraft accidents due to increased boating and navigational hazards

Alternatives 1, 2, and 3 would increase the number of annual and peak day boat trips on the lake, whereas Alternative 4 would retain boating levels consistent with existing conditions. Increased levels of boating activity would add to the factors that contribute to boating accidents, such as more watercraft, higher boating density at popular shoreline areas and lake access points, and greater potential for conflicts between motorized and nonmotorized recreation. While the additional boating activity resulting from Alternatives 1, 2, and 3 would aggravate the factors that contribute to boating accidents, the 600-foot no-wake zone, improved public boating safety education programs, and compliance with California and Nevada boating safety laws would reduce the risks and associated impacts. Alternative 4 would not contribute to such factors.

Implementation of any of the four alternatives could lead to public piers extending beyond the 600-foot no-wake zone, which could create navigational hazards and conflicts between motorized and nonmotorized watercraft and swimmers. Additionally, Alternative 2 does not include location standards limiting the length of private multiple-use piers to within the no-wake zone. Given the increase in boating activity associated with Alternatives 1, 2, and 3 and the increase in navigational hazards associated with all four alternatives, there would be a **potentially significant** impact related to boating accidents with all four alternatives.

Implementation of Mitigation Measure 15-1a would reduce the impacts associated with Alternatives 1, 2, and 3 to **less-than-significant** levels. Implementation of both Mitigation Measure 15-1a and Mitigation Measure 15-1b would reduce the impact of Alternative 2 to a **less-than-significant** level.

Alternative 1: Proposed Shoreline Plan

The goal of Alternative 1 is to enhance the recreational experience at Lake Tahoe while protecting the environment and responsibly planning for the future. At buildout, it would allow for up to 10 new public piers and 128 new private piers (including private multi-use piers) for a total of 900 piers, two new public boat ramps for a total of 24 public boat ramps, and up to 2,116 new moorings for a total of 10,847 moorings. New and existing buoys could be converted to slips and vice versa at facilities open to the public (e.g., marinas). Littoral parcels would be eligible for up to two or three moorings, based on lot width.

Increased Boating

New moorings and boat ramps would increase the capacity for boating on the lake compared to baseline conditions. Increased boating would be expected during peak summer days at popular recreation areas including Baldwin Beach, east shore beaches, and many of the state parks such as Emerald Bay State Park, Lake Tahoe Nevada State Park at Sand Harbor, and Kings Beach State Recreation Area (see Chapter 8, "Recreation," for a detailed description of the pattern of recreation in the region). Buildout conditions would create an approximately 13 percent increase in peak day boat trips and an approximately 16 percent increase in annual boat trips over baseline conditions (Table 2-4). Boating activity would increase from approximately 5,900 to 6,700 boat trips on a peak day and from approximately 234,100 to 272,400 boat trips annually (Table 2-4). On a peak day, Alternative 1 would result in one boat for every 18 acres on the lake, compared to baseline conditions of approximately one boat for every 21 acres.

Increased boating use would result in a greater number of watercraft, increased boating density at popular shoreline locations and lake access points, and a higher potential for conflicts between motorized and nonmotorized recreators. Assuming the increase in boating use is commensurate with an increase in boating accidents, a 16 percent increase in annual boat trips over baseline conditions would result in 1.8 more accidents per year, based on the 11 accidents that occurred in 2016 (see Section 15.3.1, "Boating," above). However, other factors beyond the number of boats on the lake contribute to boating accidents, and there may be a nonlinear relationship between increased boating activity and number of accidents.

Alternative 1 would maintain the existing 600-foot no-wake zone and 5 mph speed limit. Within Emerald Bay, the no-wake zone would be expanded to include all areas within the bay. Speed would be limited to 5 mph generally, and up to 7 mph for tour boats. In addition, priority areas for enforcement of the no-wake zone would be created in areas that receive heavy nonmotorized watercraft use. TRPA would provide increased lake-wide no-wake zone education and increased patrols and enforcement in front of state park lands along the shoreline, including at DL Bliss State Park, Sugar Pine Point State Park, and Lake Tahoe Nevada State Park. Navigational buoys demarcating the no-wake zone near state parks, marinas, and other areas may be established to improve compliance. The establishment of the 600-foot no-wake zone is believed to have resulted in an overall decrease in the number of spatial conflicts with different types of marine craft (e.g., kayaks and canoes versus power boats) (TRPA 2004). Compliance with this standard relies on public education and the TRPA Watercraft Team, who are tasked with enforcing the no-wake zone. With implementation of the new launch fee, TRPA would have additional funds to increase patrols, resulting in better compliance with the no-wake zone regulations. As discussed above in Section 15.3.1, "Boating," California, Nevada, and the U. S. Coast Guard are engaged in public boating safety education programs and anticipate that these efforts are effective in reducing overall accident rates. In addition, SB 941 mandates

boater safety education for anyone who intends to operate a motor-powered vessel on California waterways and Nevada boating laws require safe boating operation and specific safety equipment. Given the 600-foot no-wake zone and expanded no-wake zone in Emerald Bay, improved public boating safety education programs, increased safety/enforcement patrols, and compliance with California and Nevada boating safety laws, impacts associated with increased boating would be **less than significant**.

Increased Navigational Hazards

Alternative 1 would result in an increase in potential navigational hazards within the lake such as new buoys, new piers (particularly in areas currently without piers), and extensions of existing piers. Due to their relatively smaller size and lower visibility compared to other structures, buoys installed in open waters, with few or no existing structures in the immediate area, create hazards for watercraft operators, particularly at night. If buoys are not maintained during fluctuating lake levels, they may become submerged. Submerged buoys in any location may be struck by a vessel underway, causing injury to boaters. Mooring buoys would comply with the construction specifications set forth in the California Waterway Marking System or as otherwise recommended by USACE or the U. S. Coast Guard. The U. S. Coast Guard requires that all mooring buoy fields be lit at the lakeward corners. This requirement would be enforced as buoy fields expand through permitting, thus reducing the navigational hazard.

New buoys could also present a navigational hazard to nonmotorized watercraft and swimmers forced to travel outside the no-wake zone to navigate around buoys. However, as described in Chapter 8, "Recreation," Impact 8-1, new buoys would be required to comply with location standards included in the Shoreline Plan, which would provide for adequate spacing between buoys and between a buoy or buoy field and the shoreline.

As shown in Section 4, "Land Use," Exhibits 4-1 through 4-5, 4-7, and 4-8, the majority of parcels eligible for new private piers are clustered in areas where there are already existing private piers and structures that drive navigational patterns (TRPA 2004). New private piers would also be required to comply with design standards for length of the pier and would terminate within the no-wake zone. This would allow nonmotorized recreation users and swimmers to move around the end of a pier while remaining within the no-wake zone. Therefore, new private piers constructed within the required setbacks and within the pierhead line rarely constitute a navigational hazard.

However, new or modified facilities that extend beyond the pierhead line represent new navigational hazards. Public piers could deviate from design standards that apply to private piers to the extent necessary to provide a public service. Thus, a public pier could be designed such that it extends beyond the 600-foot no-wake zone, which could cause nonmotorized watercraft and swimmers traveling laterally along the shoreline to move outside of the no-wake zone as they pass the pier if the pier does not provide sufficient space for recreationists to pass underneath. This could result in nonmotorized watercraft and swimmers recreating in an area where motorized watercraft speeds regularly exceed 5 miles per hour, creating large wakes. Motorized watercraft traveling at higher speeds may also have more trouble seeing nonmotorized watercraft and swimmers, creating a greater potential for accidents. Thus, public piers allowed to extend beyond the 600-foot no-wake zone could result in a **potentially significant** impact related to navigational hazards and public safety.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would retain the existing TRPA Shorezone Code prohibiting new structures within TRPA-designated prime fish habitat and there would be no cap on new moorings. The number of buoys, slips, and boat lifts would be limited by the number of eligible parcels that could place moorings consistent with locations standards. These standards would allow for an estimated 4,871 new buoys, 1,897 boat slips, and 168 boat lifts, for a total of 6,936 new moorings. Under Alternative 2, up to 476 new piers could be constructed, that could include any number of public, multiple-use, or private single-use piers. This is the only alternative that would allow new marinas (up to two). New shorezone structures would be excluded from fish habitat and from within 200 feet of stream or river inlets.

Alternative 2 would result in similar impacts as described above for Alternative 1, but greater in degree due to the larger number of structures projected at buildout and lack of the expanded no-wake zone. As described in Chapter 8, "Recreation," Impact 8-1, increased boating would be expected during peak summer days at popular recreation areas. Alternative 2 at buildout would result in an approximately 45 percent increase in peak day boat trips and an approximately 53 percent increase in annual boat trips over baseline conditions (Table 2-4). Boating activity would increase from approximately 5,900 to 8,500 boat trips on a peak day and from approximately 234,100 to 358,900 boat trips annually. On a peak day at buildout, there would be one boat for every 14 acres on the lake, compared to baseline conditions of approximately one boat for every 21 acres (Table 8-3). Assuming the increase in boating use is commensurate with an increase in boating accidents, a 53 percent increase in annual boat trips over baseline conditions would result in 5.8 more accidents per year. There are other factors that contribute to boating accidents besides the numbers of boats on the lake, and thus, there may be a nonlinear relationship with increased boating activity and accidents. Given the substantial increase in boating under Alternative 2, this impact would be **potentially significant**.

As described in Alternative 1, new or modified facilities that extend beyond the pierhead line represent a new navigational hazard. In addition to public piers which could extend beyond the 600-foot no-wake zone, Alternative 2 does not limit the length of private multiple-use piers to within the no-wake zone. Thus, new private multiple-use piers associated with Alternative 2 could result in a **potentially significant** impact related to conflicts between nonmotorized recreationists and motorized recreationists.

Alternative 3: Limit New Development

The goal of Alternative 3 is to reduce the risk of environmental impacts by limiting new shoreline development, while still providing enhanced public access. Motorized watercraft access would be concentrated at marinas and public facilities. This alternative would allow for a total of 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would also authorize 86 new private multiple-use piers.

Alternative 3 would result in similar impacts as described above for Alternative 1, but to a lesser degree due to fewer structures at buildout. Increased boating would be expected during peak summer days at popular recreation areas. Alternative 3 at buildout would result in an approximately four percent increase in peak day boat trips and an approximately four percent increase in annual boat trips over baseline conditions (Table 2-4). Based on the number of new shorezone structures for Alternative 3, boating activity would increase from approximately 5,900 to 6,100 boat trips on a peak day and from approximately 234,100 to 242,900 boat trips annually (Table 2-4). On a peak day at buildout, there would be one boat for every 20 acres on the lake, which represents an incremental increase in the density of boats on the lake on a peak day over baseline conditions of approximately 21 acres per boat (Table 8-3). It is not likely that this increase in boating density would be noticeable to recreation users. Assuming the increase in boating use is commensurate with an increase in boating accidents, a four percent increase in annual boat trips over baseline conditions would result in 0.4 more accidents per year. For the same reasons discussed under Alternative 1, public safety impacts due to increased boating would be **less than significant**.

Public piers with Alternative 3 could deviate from design standards that apply to private piers to the extent necessary to provide a public service. For the same reasons discussed under Alternative 1, public piers that extend outside of the no-wake zone could create new conflicts between nonmotorized watercraft and swimmers and motorized watercraft. Thus, Alternative 3 would result in a **potentially significant** impact related to public safety.

Alternative 4: Expand Public Access and Reduce Existing Development

The goal of Alternative 4 is to expand public access, reduce existing shoreline development, and increase restoration to minimize the risk of environmental harm. Alternative 4 would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations if the project resulted in a 2:1 reduction in the number of structures. At buildout, this alternative would allow 15 new public piers and no other new shorezone structures.

With implementation of Alternative 4, there would be no change in peak day or annual boat trips from baseline conditions, and no change in the density of boats on the lake (i.e., there would still be one boat for every 21 acres of lake). Therefore, **no impact** to public safety would occur due to increased boating.

However, public piers allowed under Alternative 4 would be subject to the same design and location standards as identified for Alternatives 1 and 3, in that they could extend outside of the no-wake zone, creating conflicts between nonmotorized watercraft and swimmers and motorized watercraft. As a result, Alternative 4 would result in a **potentially significant** impact on public safety.

Mitigation Measures

Mitigation Measure 15-1a: Maintain nonmotorized navigation within the no-wake zone

This mitigation measure would be required for public piers in Alternatives 1, 3, and 4 and multiple-use and public piers in Alternative 2.

TRPA will implement Mitigation Measures 8-1a and 8-1c as described in Chapter 8, "Recreation." These mitigation measures require that TRPA revise the pier design standards for piers that extend 600 feet or more from the highwater elevation to provide lateral nonmotorized recreation access within the 600-foot no-wake zone and provide for a 200-foot buffer between motorized watercraft in motion and nonmotorized recreationists in areas outside of no-wake zones.

Mitigation Measure 15-1b: Implement Mitigation Measure 10-1 to limit the number of moorings and boat ramps

This mitigation measure would be required for Alternative 2.

TRPA will implement Mitigation Measure 10-1, as described in Chapter 10, "Air Quality," which would revise the Code of Ordinances to limit the total number of new moorings (i.e., buoys, slips, and lifts) and boat ramps to the number authorized under Alternative 1. This would allow a total of 2,116 new moorings and two new boat ramps.

Significance after Mitigation

With implementation of Mitigation Measure 15-1a, new public piers for Alternatives 1, 3, and 4 and multiple-use piers for Alternative 2 would be required to demonstrate that safe lateral access for nonmotorized watercraft and swimmers would be provided within the no-wake zone either through reducing pier length or by constructing a pier that would allow for passage of these recreation users underneath the pier. A 200-foot buffer area between motorized watercraft in motion and nonmotorized recreationists outside of no-wake zones would also reduce conflict between motorized and nonmotorized uses. After implementation of this mitigation measure, public safety issues created by piers extending into the no-wake zone would be reduced to a **less-than-significant** level.

With implementation of Mitigation Measure 15-1b, TRPA would revise the standards for approval of new shorezone structures that would increase motorized boats on the lake so that the rate in which new moorings or boat ramps are approved is metered. This would allow for TRPA to monitor the number of boating accidents as the number of boats on the lake increases over time. If the monitoring results indicate a substantial increase in boating accidents, then no additional moorings or boat ramps would be approved. Because the number of boat ramps and moorings would be allocated over a longer period of time and could be capped in the event that there is a substantial increase in boating accidents, public safety impacts would be reduced to a **less-than-significant** level.

Impact 15-2: Accidental release of hazardous substances

Each of the Shoreline Plan alternatives would temporarily increase the regional transportation, use, storage and disposal of hazardous materials and petroleum products commonly used at construction sites (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals), which could result in accidents or upset conditions that could create hazards to people and the environment. The replacement of older piers may require the disposal of wood treated with preservatives, which could contaminate surface water and groundwater if not properly handled and disposed. Temporary impacts could occur if construction were to affect sites of known contamination or inadvertently disturb hazardous materials or wastes in a manner that could release these materials into the environment, exposing construction workers or nearby sensitive receptors to hazardous conditions. Compliance with all local, state, and federal regulations is sufficient to ensure that any hazardous materials used during construction of future projects would not result in adverse effects. Specific projects implemented in accordance to the adopted Shoreline Plan would be subject to permit processes and conditions pursuant to TRPA regulations and, depending upon location and whether or not there is federal discretion, CEQA and NEPA statutes and implementing regulations. Such review could include site-specific impact analysis and adoption of feasible mitigation measures that must be implemented to assure that standards of the region are met.

With the addition of access points to the lake and the increase in navigational hazards in the form of longer piers and additional structures in the water, the Shoreline Plan alternatives could result in a long-term increase in the risk of accidental discharge of fuel and other hazardous materials into the lake. Alternative 1 would require that TRPA consult with water purveyors when evaluating applications and development of permit conditions for any proposed shoreline structure within one quarter mile of a drinking water intake, while Alternatives 2, 3 and 4 would require consultation within 600 feet. Furthermore, as described in Chapter 6, “Hydrology and Water Quality,” Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using best management practices (BMPs), impacts associated with direct discharge of contaminants from boating activities and facilities were found to be less than significant. Therefore, impacts related to accidental release of hazardous substances would be **less than significant** for each alternative.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would allow for new piers, boat ramps, and moorings, which could pose a risk for accidental release of hazardous materials during construction and operation of these structures.

Construction

Construction of moorings, piers, and public boat ramps would temporarily increase the regional transportation, use, storage, and disposal of hazardous materials and petroleum products commonly used at construction sites (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals), which could result in accidents or upset conditions that could create hazards to people and the environment. Accidental spills and leakage from construction equipment may involve fuel, lubricants, hydraulic fluids and coolants. These types of routine uses are carefully regulated, and subsequent projects would be required to handle hazardous materials in accordance with applicable federal, state, and local laws. Projects would be required to conform to permit conditions and spill prevention plans prepared under SWRCB Construction General Permit to avoid spills and releases of hazardous materials and wastes. Pursuant to 40 CFR 112, a SPCC plan that identifies BMPs for spill and release prevention and provides procedures and responsibilities for rapidly, effectively, and safely cleaning up and disposing of any spills or releases would be established. BMPs include, for example, the designation of special storage areas and labeling, containment berms, coverage from rain, and concrete washout areas. As required pursuant to state and federal law, plans for notification and evacuation of site workers and local residents in the event of a hazardous materials release would be in place throughout construction.

The replacement of older piers may require the disposal of wood treated with preservatives, such as arsenic, chromium, copper, pentachlorophenol, or creosote. If TWW is not properly disposed of, the chemicals it

contains can contaminate surface water and groundwater. Existing piles would be pulled from the lakebed using a crane or jack mechanism mounted to a barge. If piles need to be cut prior to transport, plastic sheeting would be placed under the saw equipment area to gather all shavings, where feasible. Shavings would also be placed in bins for transport to an appropriate disposal facility. In accordance with Section 25150.7 of the California Health and Safety Code, TWW would be managed and transported to an appropriate disposal facility. This would minimize any impact related to the disposal of TWW.

Temporary impacts could occur if construction were to affect sites of known contamination or inadvertently disturb other hazardous materials or wastes in a manner that could release hazardous materials into the environment, exposing construction workers or nearby sensitive receptors to hazardous conditions. Two RECs have been identified within or immediately adjacent to the project area: the Tahoe Boat Company UST cleanup site and the Sierra Boat Company UST cleanup site. Other hazardous materials potentially encountered during demolition of existing structures and project construction could include asbestos, lead-based paint and other coatings, aerially deposited lead, heavy metals, polychlorinated biphenyls, and vapor encroachment conditions. Surveys for and removal of these substances are regulated. The project area could also be affected by undocumented contamination that has not been characterized or remediated and could, therefore, create a hazard to people or the environment.

Future projects would be required to comply with all local, state, and federal regulations pertaining to construction and operation, including TRPA's Standard Conditions of Approval for Shorezone Projects, that control the transport, use, and storage of hazardous materials and minimize the potential for an accidental release of hazardous materials. Development and implementation of a Spill Prevention and Response Plan also would be required prior to commencing construction activities. Additionally, all amphibious barges used for in-lake construction would be fueled on dry land. Floating barges would be fueled from appropriate containers that minimize the likelihood of spilling. All construction personnel, vehicles, or other heavy equipment would have spill containment kits readily accessible, and construction personnel would be trained to contain and clean up spills of routine chemicals (e.g., fuel, lubricants). With implementation of these measures, the probability for a chemical spill to enter the lake in volumes that would result in concentrations of contaminants that would pose a risk to public safety is low. Furthermore, specific projects implemented subsequent to the Shoreline Plan would be subject to TRPA permit processes, conditions, and regulations and, depending upon location and whether or not there is federal discretion, CEQA and NEPA statutes and implementing regulations. Such review would include site-specific impact analysis and adoption of feasible mitigation measures that must be implemented to assure that standards of the region are met. Therefore, this impact would be **less than significant**.

Operations and Maintenance

With the addition of access points to the lake and the increase in navigational hazards in the form of longer piers and additional structures in the water, Alternative 1 could result in a long-term increase in the risk of accidental discharge of fuel and other hazardous materials into the lake. The Shoreline Plan would require that TRPA consult with water purveyors when evaluating applications and development of permit conditions for any proposed shoreline structure within one quarter mile of a drinking water intake. Furthermore, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, impacts associated with direct discharge of contaminants from boating activities and facilities, such as fueling spills or accidental leaks, were found to be less than significant. Given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using BMPs, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would allow for new piers, boat ramps, and moorings, which could pose a risk for accidental release of hazardous materials during construction and operation of these structures. This is the only alternative that would allow new marinas (up to two).

Alternative 2 would consist of the same types of construction activities as Alternative 1 but, given the greater number of new structures allowed under Alternative 2, would result in a larger increase in the temporary transportation, use, storage, and disposal of hazardous materials and petroleum products commonly used

at construction sites. For the same reasons discussed under Alternative 1, construction impacts would be **less than significant**.

Alternative 2 would allow for up to two new marinas which would involve the regular transport of fuel to storage tanks. If USTs are improperly installed or maintained, fuel may leak into waterways, degrading water quality and public health. Future projects under Alternative 2 would be required to be constructed and implemented in compliance with all local, state, and federal regulations. Under the CWA, marinas with an aggregate aboveground oil storage capacity greater than 1,320 U.S. gallons or a completely buried storage capacity greater than 42,000 U.S. gallons are required to prepare a SPCC plan to reduce the threat of oil spills to navigable waters of the United States. The site-specific plan must identify the design, control, training, and response requirements of a facility. This would reduce impacts associated with new marinas.

Alternative 2 would not identify new shoreline protection areas. Existing requirements that address water intakes would remain. TRPA Code Section 60.3.3 would continue to require that water purveyors be consulted in the evaluation of applications and development of permit conditions for any proposed shoreline structure within 600 feet of a drinking water intake, which is a shorter distance than under Alternative 1. However, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using BMPs, impacts associated with direct discharge of contaminants from boating activities and facilities were found to be less than significant. Therefore, this impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would allow for new piers, boat ramps, and moorings, which could pose a risk for accidental release of hazardous materials during construction and operation of these structures.

Alternative 3 consists of the same types of construction activities as Alternative 1 but, given the fewer number of new structures allowed under Alternative 3, would result in a smaller increase in the temporary transportation, use, storage, and disposal of hazardous materials and petroleum products commonly used at construction sites. For the same reasons discussed under Alternative 1, construction impacts would be **less than significant**.

Alternative 3 would not identify new shoreline protection areas. Existing requirements that address water intakes would remain. TRPA Code Section 60.3.3 would continue to require that water purveyors be consulted with in the evaluation of applications and development of permit conditions for any proposed shoreline structure within 600 feet of a drinking water intake, which is a shorter distance than under Alternative 1. However, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using BMPs, impacts associated with direct discharge of contaminants from boating activities and facilities were found to be less than significant. Therefore, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for new public piers and would include transfer ratios that would allow some private shorezone structures to be removed and rebuilt in different locations. Construction and operation of these structures could pose a risk for accidental release of hazardous materials.

Alternative 4 consists of the same types of construction activities as Alternative 1 but, given the limited number of new structures allowed under Alternative 4, would result in a smaller increase in the temporary transportation, use, storage, and disposal of hazardous materials and petroleum products commonly used at construction sites. For the same reasons discussed under Alternative 1, construction impacts would be **less than significant**.

Alternative 4 would not identify new shoreline protection areas. Existing requirements that address water intakes would remain. TRPA Code Section 60.3.3 would continue to require that water purveyors be

consulted with in the evaluation of applications and development of permit conditions for any proposed shoreline structure within 600 feet of a drinking water intake, which is a shorter distance than under Alternative 1. However, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using BMPs, impacts associated with direct discharge of contaminants from boating activities and facilities were found to be less than significant. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 15-3: Shoreline emergency access

Implementation of the Shoreline Plan Alternatives 1, 2, or 3 would increase boating activity. Increased boat use would aggravate many of the factors that contribute to boating accidents, leading to an increased need for emergency response services. Emergency responders' ability to access boaters and swimmers in the water could be hindered by the increase in activity in the nearshore, foreshore, and backshore. Furthermore, low water conditions during drought years and under future projected climate scenarios would present a challenge for emergency responders, as some existing lake access points are unavailable during low water conditions. Because most of the emergency responders' watercraft are located on the water, lake access is not an issue for a majority of first responders.

Alternative 1 would incorporate low lake level adaptation strategies along with the provisions of TRPA Code Section 84.10.2, which establishes a framework to provide essential emergency access and egress to Lake Tahoe. Alternative 2 would allow for substantially greater levels of boating activity than Alternative 1. Alternative 2 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet Lake Tahoe Datum (LTD). Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels. Furthermore, TRPA Code Section 84.15.4 allows for temporary structures that extend beyond lake bottom elevation 6,219 feet or the pier headline during low water conditions. Given incorporation of these respective measures, the increase in lake access points, and compliance with applicable federal, state, and local permits, impacts related to shoreline emergency access would be **less than significant** for Alternatives 1 and 2.

Alternatives 3 and 4 would result in different levels of boating activity—a small increase with Alternative 3, and no projected increase from existing levels with Alternative 4. Alternatives 3 and 4 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels, but the alternatives contain no other provisions to allow modifications to facilities or structures to be useable during such conditions. Thus, shoreline emergency access could be hindered during low water conditions. This impact would be **potentially significant** for Alternatives 3 and 4. With implementation of Mitigation Measure 15-3, this impact would be reduced to a **less-than-significant** level.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would allow for new piers, boat ramps, and moorings. As described in Impact 15-1, these structures would result in greater shoreline accessibility, increasing boating compared to baseline conditions. This would aggravate many of the factors that contribute to boating accidents, leading to an increased need for emergency response services. Emergency responders' ability to access boaters and swimmers in the water could be hindered by the increase in activity in the nearshore, foreshore, and backshore. Furthermore, some emergency response providers such as the North Tahoe Fire Protection District are currently establishing a marine unit and have cited difficulties in securing a slip for housing their watercraft on the lake (Simons, pers. comm., 2018).

Existing emergency access to the lake is provided primarily by marinas and boat ramps. Because most of the emergency responders' watercraft are located on the water, lake access is not an issue for a majority of first

responders. Alternative 1 would increase the number of lake access points, which could enhance emergency access to the lake. Furthermore, TRPA Code Section 84.10.2 establishes a framework to provide essential emergency access and egress to Lake Tahoe to protect public health and safety. TRPA allows for the designation of up to one essential public safety facility within each county or jurisdiction plus the U.S. Coast Guard Lake Tahoe Station, which is a second existing essential public health and safety facility in Placer County. These measures and the increase in lake access points would ensure sufficient shoreline emergency access for emergency responders.

Low water conditions during drought years and under future projected climate scenarios would present a challenge for emergency responders, as some existing lake access points are unavailable during low water conditions. For example, an assessment of marina and public boat ramp access in 2015 (a drought year) found that several marinas and four of the six boat ramps evaluated closed early due to water levels (TRPA 2016). A study by the U.S. Bureau of Reclamation concluded that Lake Tahoe would likely experience more frequent low lake level conditions (Reclamation 2015). Generally, emergency response agencies are aware of which emergency access points are available in a given year. In drought years, TRPA allows first responder organizations to designate locations for temporary moorings for regional public safety purposes, such as a marina, pier, or buoy, or a site where a new pier could be constructed pursuant to TRPA Code. Additionally, TRPA would allow for "new" dredging (where dredging has not historically occurred) at marinas, five essential public health and safety facilities, and public boat ramps where previously approved uses exist. New dredging would only be approved upon environmental review and mitigation of significant impacts and compliance with applicable federal, state, and local permits. Alternative 1 would, to the extent feasible and based on site-specific considerations, allow for the reconfiguration of some structures such that they would be operational during low lake levels. Boats would be directed to marinas and public ramps that are operational at such elevations, clustering access near areas with infrastructure and transportation options. Specific low lake level adaptation strategies are detailed in Chapter 2, "Description of Proposed Project and Alternatives," and include relocating buoy floats to additional rows of lakeward anchors, temporary floating pier extensions at marinas, and relocation of existing boat ramps to new sites that are better suited to low lake levels or extension of boat ramps. These measures and the low lake level adaptation strategies would ensure sufficient shoreline emergency access during low water conditions.

Lastly, Alternative 1 would not interfere with implementation of existing regulations or plans pertaining to emergency response or evacuation. Given the provisions for public health and safety within the existing TRPA Code, the increase in lake access points, and the incorporation of low lake level adaptation strategies, impacts to shoreline emergency access from implementation of Alternative 1 would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would allow for new marinas, piers, boat ramps, and moorings. Alternative 2 would result in similar impacts to shoreline emergency access as Alternative 1, but to a greater extent, due to the additional structures and greater levels of boating activity. Alternative 2 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels. Furthermore, TRPA Code Section 84.15.4 allows for temporary structures that extend beyond lake bottom elevation 6,219 feet or the pier headline during periods when low lake levels prevent or significantly reduce access. Given the provisions for public health and safety within the existing TRPA Code and the overall increase in lake access points, impacts to shoreline emergency access from implementation of Alternative 2 would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would allow for new piers, boat ramps, and moorings. Alternative 3 would result in similar impacts to shoreline emergency access as Alternative 1, but to a lesser extent, due to the fewer structures it would allow than Alternative 1. Alternative 3 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Under Alternative 3, up to one new public boat ramp would be allowed. Applications for a new public boat ramp would be considered by TRPA based on the merits of the proposed site selected. This review would consider the existing geographic

distribution of boat ramp access, the relationship of the proposed ramp to clusters of upland development and transportation hubs, and the suitability of the site in terms of depth and bathymetry to accommodate access during periods of low lake levels of 6,220 feet. TRPA would allow relocation of existing boat ramps to new sites that are better suited to low lake levels. Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels, but there are no other provisions to allow modifications to facilities or structures to be useable during such conditions. This impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for new public piers but would reduce existing development such that boating activity would not increase as compared to existing conditions. Alternative 4 would maintain existing development standards, focusing development around the natural lake rim elevation of 6,223 feet LTD. Buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake conditions, but there are no other provisions to allow modifications to facilities or structures to be useable during low lake conditions. Thus, shoreline emergency access could be hindered during low water conditions. This impact would be **potentially significant**.

Mitigation Measures

Mitigation 15-3: Implement low lake level adaptation strategies

This mitigation measure would be required for Alternatives 3 and 4.

TRPA will incorporate the following low lake level adaptation strategies to provide shoreline emergency access during low water conditions:

- Marina buoy fields would be able to include additional rows of lakeward anchors to accommodate low lake levels. Buoy floats could be relocated to the lakeward anchors during low lake levels without increasing the total number of buoys.
- Marinas would be allowed to use temporary floating pier extensions to provide access for boats when lake levels fall below 6,225 feet LTD.
- Public boat ramps could be expanded to extend farther into the lake, subject to permit conditions.
- New dredging could be allowed at marinas and public boat ramps, subject to permit conditions.

Significance after Mitigation

Implementation of Mitigation Measure 15-3 would reduce potentially significant impacts to shoreline emergency access because the low lake level implementation strategies would provide sufficient lake access points that could be available to emergency response providers during low water conditions. Impacts of Alternatives 3 and 4 would be reduced to **less-than-significant** levels.

Impact 15-4: Increase demand for on-lake emergency response facilities

Implementation of each alternative would result in new shorezone structures, creating potential for an increase in boating accidents and the accidental release of hazardous materials. This would increase the demand for emergency response services. As discussed in Impact 15-1, the 600-foot no-wake zone, improved public boating safety education programs, expanded safety/enforcement patrols, and compliance with California and Nevada boating safety laws would reduce the risk of boating accidents due to increased boating. Impacts associated with increased navigational hazards would be reduced with implementation of Mitigation Measure 15-1a. As described in Impact 15-2, compliance with all local, state, and federal regulations is sufficient to ensure that any hazardous materials used throughout the project area during construction would not result in adverse effects. Thus, the increased demand for emergency services would likely be minor.

Emergency response providers that act on lake-related emergencies indicate that they have adequate capacity to handle additional project-generated demand for emergency services. Furthermore, TRPA Code Section 84.10.2, which allows for the designation of up to one Essential Public Safety Facility within each county-jurisdiction plus the U.S. Coast Guard Lake Tahoe Station, would remain unchanged. In drought years, TRPA allows first responder organizations to designate locations for temporary moorings for regional public safety purposes. This would ensure that emergency providers have adequate access points to the lake and reduce the need for construction of new lake-access facilities, the construction of which could result in adverse effects to the environment. Thus, this impact would be **less than significant** for all alternatives.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would allow for new piers, boat ramps, and moorings. As discussed in Chapter 2, "Description of Proposed Project and Alternatives," the Regional Plan and TRPA Code provisions that govern upland development, including the development of structures along the shoreline but outside of the shorezone, would not be altered by Alternative 1. Thus, Alternative 1 is not considered to be growth-inducing. However, while the project would not increase population growth, it would lead to increased boating activity and could lead to an increase in boating accidents and the accidental release of hazardous materials, as described in Impacts 15-1 and 15-2. This would increase the demand for emergency response services which, in turn, could require new or improved facilities, the construction of which could result in adverse effects to the environment.

As discussed in Impact 15-1, the 600-foot no-wake zone, improved public boating safety education programs, and compliance with California and Nevada boating safety laws would reduce risk of boating accidents due to increased boating. Impacts associated with increased navigational hazards would be reduced with implementation of Mitigation Measure 15-1a, which establishes a 200-foot buffer between motorized watercraft in motion and nonmotorized recreationists outside of no-wake zones and requires new public piers to demonstrate that safe lateral access for nonmotorized watercraft and swimmers would be provided within the no-wake zone. As described in Impact 15-2, compliance with all local, state, and federal regulations is sufficient to ensure that any hazardous materials used throughout the project area during construction would not result in adverse effects. Thus, the increased demand for emergency services would likely be minor.

While any individual fire protection district or law enforcement department has limited capacity, emergency response providers with jurisdiction over the lake operate under mutual aid agreements and coordinate closely so that sufficient patrol boats are on the water each day (Almos, pers. comm., 2018; Dougherty, pers. comm., 2018). Through consultation with the various emergency response providers, it was determined that while increased staffing may be required, there would be adequate capacity to handle additional project-generated demand for emergency services and there would be no need for additional facilities (Baxter, pers. comm., 2018; Bello, pers. comm., 2018; Bieber, pers. comm., 2018; Dougherty, pers. comm., 2018; Drennan and Meston, pers. comm., 2018; Green, pers. comm., 2018; Hekhuis, pers. comm., 2018; Simons, pers. comm., 2018; Skibinski, pers. comm., 2018; Upham, pers. comm., 2018; Wooldridge, pers. comm., 2018). Changes in staffing and fundraising for future improvements is already underway at the Tahoe-Douglas Fire Protection District and the North Tahoe Fire Protection District is establishing a Marine Unit to accommodate future need (Baker, pers. comm., 2018; Simons, pers. comm., 2018). Furthermore, TRPA Code Section 84.10.2, which allows for the designation of up to one Essential Public Safety Facility within each county-jurisdiction plus the U.S. Coast Guard Lake Tahoe Station, would remain unchanged. In drought years, TRPA allows first responder organizations to designate locations for temporary moorings for regional public safety purposes. This would ensure that emergency providers have adequate access points to the lake and reduce the need for construction of new lake-access facilities. Therefore, Alternative 1 would not increase demand for emergency services such that new or improved facilities are required, the construction of which could result in adverse effects to the environment. Therefore, this impact would be **less than significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would allow for new marinas, piers, boat ramps, and moorings. While Alternative 2 would not be growth-inducing, it would result in an increase in boating activity and could lead to an increase in boating

accidents and accidental release of hazardous materials, as described in Impacts 15-1 and 15-2. This would increase the demand for emergency response services. However, for the same reasons discussed under Alternative 1, this impact would be **less than significant**.

Alternative 3: Limit New Development

Alternative 3 would allow for new piers, boat ramps, and moorings. While Alternative 3 would not be growth-inducing, it could lead to an increase in boating accidents and accidental release of hazardous materials, as described in Impacts 15-1 and 15-2. This would increase the demand for emergency response services. However, for the same reasons discussed under Alternative 1, this impact would be **less than significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow for new public piers. While Alternative 4 would not be growth-inducing and would not generate additional boating activity relative to baseline conditions, it could lead to an increase in boating accidents related to public piers extending beyond the 600-foot no-wake zone and associated accidental release of hazardous materials, as described in Impacts 15-1 and 15-.2. Though unlikely because of the limited number of new structures accommodated by this alternative, this could increase the demand for emergency response services. However, for the same reasons discussed under Alternative 1, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

16 CULTURAL RESOURCES

16.1 INTRODUCTION

This chapter analyzes and evaluates the potential impacts of the project on known and unknown cultural resources (also known as heritage resources). Cultural resources include districts, sites, buildings, structures, or objects generally older than 50 years and considered to be important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources generally include a broad array of artifacts that contribute to a collective history of peoples or places, including historic resources, archaeological sites, transportation and trail corridors, heritage areas, cultural landscapes, and public works. They are categorized as historic resources, archaeological resources, and tribal resources. Archaeological resources are artifacts and locations where human activity has left deposits of prehistoric or historic-era physical remains (e.g., stone tools, shell fragments, bottles, pottery shards). Historical (or architectural) resources include standing buildings (e.g., houses, barns, outbuildings, cabins), intact structures (e.g., dams, bridges), and remnants of these structures. Tribal resources include site features, places, cultural landscapes, sacred places or objects, which are of cultural or ethnic value to a tribe. Communication with the Washoe Tribe of Nevada and California has been undertaken as part of the environmental analysis (see below).

No comment letters were received during scoping that pertain to cultural resources.

16.2 REGULATORY SETTING

16.2.1 Federal

Section 106 of National Historic Preservation Act

Federal protection of cultural resources is governed by the National Historic Preservation Act (NHPA) of 1966 and the Archaeological Resources Protection Act of 1979, as administered by the Advisory Council on Historic Preservation. These laws and organizations maintain processes for determination of the effects on historical properties eligible for listing in the National Register of Historic Places (NRHP). Federal and federally-sponsored programs and projects are reviewed pursuant to Section 106 of the NHPA. Section 106 requires federal agencies to consider the effects of proposed federal undertakings on historic properties. While NEPA calls for the federal government to invite the participation of any affected Native American tribes in the environmental review process, NHPA enhanced tribal roles in historic preservation and created the Tribal Historic Preservation Officer program. Federal agencies are obligated to consult with federally-listed Native American tribal governments under Section 106 of NHPA. NHPA requires federal agencies to initiate consultation with the State Historic Preservation Officer (SHPO) as part of the Section 106 review process.

Section 106 of the NHPA and accompanying regulations (36 Code of Federal Regulations [CFR] Part 800) constitutes the main federal regulatory framework guiding cultural resources investigations and requires consideration of effects on properties that are listed in, or may be eligible for, listing in the NRHP. Listing in the NRHP provides formal recognition of a property's historical, architectural, or archeological significance based on national standards used by every state. It is administered by the National Park Service and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, and cultural resources that are considered significant at the national, state, or local level.

National Register Criteria

The formal criteria (36 CFR 60.4) for determining NRHP eligibility are as follows:

1. The property is at least 50 years old (although properties under 50 years of age that are of exceptional importance or are contributors to a district can also be listed);
2. It retains integrity of location, design, setting, materials, workmanship, feeling, and associations; and
3. It possesses at least one of the following characteristics:
   A. Association with events that have made a significant contribution to the broad patterns of history (events);
   B. Association with the lives of persons significant in the past (persons);
   C. Distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant, distinguishable entity whose components may lack individual distinction (architecture); or
   D. Has yielded, or may be likely to yield, information important to prehistory or history (information potential).

16.2.2 Tahoe Regional Planning Agency

Article V(c)(3) of the Tahoe Regional Planning Compact (Public Law 96-551) required the development of a conservation plan for the preservation, development, utilization and management of scenic and other natural resources within the Tahoe Basin, including historic resources. The Tahoe Regional Planning Agency (TRPA) accomplishes historic resource protection through implementation of its goals and policies and code provisions as described below.

THRESHOLDS

TRPA has not established any environmental threshold carrying capacities related to cultural resources.

LAKE TAHOE REGIONAL PLAN

TRPA regulates growth and development in the Lake Tahoe Region through the Regional Plan, which includes the Goals and Policies document, Code of Ordinances, and other guidance documents.

Goals and Policies

The Goals and Policies document establishes guiding policies for each resource element. The Conservation Element (Chapter 4) of the Goals and Policies document (TRPA 2012) includes a Cultural Sub-element, with applicable goals as follows:

GOAL C-1: Identify and preserve sites of historical, cultural, and architectural significance within the region.

- Policy C-1.1: Historical or culturally-significant landmarks in the region shall be identified and protected from indiscriminate damage or alteration.
- Policy C-2.1: Sites and structures designated as historically, culturally, or archaeologically significant shall be given special incentives and exemptions to promote the preservation and restoration of such structures and sites.

Code of Ordinances

The TRPA Code is a compilation of the rules, regulations, and standards to implement the Regional Plan Goals and Policies. Chapter 67, "Historic Resource Protection," provides for the identification, recognition, protection, and preservation of the region's significant cultural resources. Resources are evaluated for significance prior to a project or activity that could cause an adverse impact to that resource. To be designated as a historic resource or determined eligible, the resource must meet at least one of the criteria summarized below (TRPA 2011). Chapter 67 also provides for consultation with the California and Nevada SHPOs as well as the Washoe Tribe.

- **Resources Associated with Historically-Significant Events and Sites.** Such resources shall meet one or more of the following: (a) association with an important community function in the past, (b) association with a memorable happening in the past, or (c) contain outstanding qualities reminiscent of an early stage of development in the region.
- **Resources Associated with Significant Persons.** Such resources include: (a) buildings or structures associated with a locally, regionally, or nationally known person; (b) notable example or best surviving works or a pioneer architect, designer, or master builder; or (c) structures associated with the life or work of significant persons.
- **Resources Embodying Distinctive Characteristics.** Resources that embody the distinctive characteristics of a type, period, or method of construction that possess high artistic values or that represent a significant and distinguishable entity but whose components may lack individual distinction. Works of a master builder, designer, or architect also are eligible. Resources may be classified as significant if they are a prototype of, or a representative example of, a period style, architectural movement, or method of construction unique in the region, the states, or the nation.
- **State and Federal Guidelines.** Archeological or paleontological resources protected or eligible for protection under state or federal guidelines.
- **Prehistoric Sites.** Sites where prehistoric archaeological or paleontological resources that may contribute to the basic understanding of early cultural or biological development in the region.

Additionally, Sections 32.3.1 "[Paved Road] Waiver", 33.3, "Grading Standards," 33.4.1 "Subsurface Investigations and Reports", 61.1.6 "Minimum Standards for Tree Removal", 66.3.1 "Applicability" for Scenic Quality Review in the Shoreland addresses the discovery and/or treatment of cultural resources.

16.2.3 California

California Register of Historical Resources

The California Register of Historical Resources (CRHR) is a listing of resources that are significant within the context of California's history. The CRHR is a statewide program of similar scope and with similar criteria for inclusion as those used for the NRHP. All properties listed in or formally-determined eligible for listing in the NRHP are eligible for the CRHR. In addition, properties designated under municipal or county ordinances are also eligible for listing in the CRHR.

A historic resource must be significant at the local, state, or national level under one or more of the criteria defined in the California Code of Regulations (CCR) Title 15, Chapter 11.5, Section 4850. The CRHR criteria are similar to the NRHP criteria and are tied to CEQA because any resource that meets the criteria below is considered a historical resource under CEQA. As noted above, all resources listed in or formally-determined eligible for the NRHP are automatically listed in the CRHR.

The CRHR uses four evaluation criteria to determine eligibility. A resource may be eligible for listing in the CRHR if it:

1. Is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. Is associated with the lives of persons important to local, California, or national history.

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values.

4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

Similar to NRHP, a resource must meet one of the above criteria and retain integrity. The CRHR uses the same seven aspects of integrity as the NRHP.

The California SHPO plays an advisory role to TRPA during project review of structures 50 years old or older. TRPA staff may request comment in such circumstances and often coordinate with the California SHPO on required studies and mitigation measures. Additionally, TRPA consults with the California SHPO during the scoping process for all EISs and submits these documents for comment during the public comment period.

16.2.4 Nevada

Nevada State Register of Historic Places

Created in 1979 by the Nevada Legislature, the Nevada State Register of Historic Places (NVSRHP) is an official list kept by the Nevada SHPO of places and resources worthy of preservation. These resources reflect history, architecture, archaeology, and culture that are important to Nevadans. The NVSRHP recognizes those places in the state that have significance to the past in a local, state, or national context, and possess good physical integrity to the period during which they were important. To be eligible, a resource can be a building, structure, site, or object. They can also be a larger landscape, or a collection of resources known as an historic district.

For a property to be eligible for listing in the NVSRHP, the property must demonstrate historical or cultural significance under one or more of the following five criteria:

A. Associated with events contributing to the broad patterns of the state's history and culture.

B. Associated with historically important people.

C. Embodies distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master.

D. Has the potential for yielding important information in Nevada's history or prehistory.

E. Property reflects cultural traditions important to historic or pre-historic peoples of Nevada.

The Nevada SHPO keeps the NVSRHP inventory to assist federal, state, and local agencies in planning projects so as to avoid impacts to important cultural resources. The Nevada Cultural Resource Information System (NVCRIS) is a collection of online Geographic Information System (GIS) database services that contain recorded archaeological and architectural resources and inventories for the state.

As a service to state and local agencies, Nevada SHPO reviews projects for potential impacts on historic properties. The Nevada SHPO plays an advisory role to TRPA during project review of structures 50 years old or older. TRPA staff may request comment in such circumstances and often coordinate with the Nevada SHPO on required studies and mitigation measures. Additionally, TRPA consults with the Nevada SHPO during the scoping process for all EISs and submits these documents for comment during the public comment period.

16.3 AFFECTED ENVIRONMENT

ENVIRONMENT

The primary sources of information used in describing existing prehistoric, ethnographic, and historic resources within the plan area include the following documents from the Tahoe Regional Planning Agency: the Tahoe Regional Planning Agency Regional Plan (2012), and the Placer County Tahoe Basin Area Plan and Tahoe City Lodge Project EIR/EIS (2016).

The plan area encompasses the shorezone, consisting of the nearshore, foreshore, and backshore, of Lake Tahoe in the Sierra Nevada. Geologically, the plan area is situated on Holocene (10,000 years before present [B.P.] to present) alluvial and lacustrine sediments near perennial streams and ponds following the recession of glaciers approximately 10,000 years ago.

PREHISTORY

Archaeological research in the Sierra Nevada over the last 50 years has resulted in the accumulation of a substantial body of knowledge. Investigations that began in the 1950s revolved around examining sites throughout the Lake Tahoe vicinity, including the Lake shoreline, and the high Sierra crest east of the Lake. These investigations led to the identification of the Martis and Kings Beach complexes. More recent investigations have led to important modifications of earlier archaeological sequences. For the purposes of this project, the following cultural sequence is used; a summary of each of these periods is provided below:

Late Kings Beach—Washoe	700 B.P. to historic times
Early Kings Beach	1,300 - 700 B.P.
Martis	7,000 - 1,300 B.P.
Early Holocene	10,500 - 7,000 B.P.
Paleo-Indian	> 10,500 B.P.

Paleo-Indian Period (>10,500 B.P.)

The Paleo-Indian period marks the earliest occupation of the north-central Sierra Nevada and is represented by Clovis-like projectile points and basally-thinned concave base variants. Clovis-like fluted and basally-thinned concave base points have been found in a variety of contexts in northeastern California and the western Great Basin, but not specifically in the Lake Tahoe Basin. Their occurrence, however, in surrounding areas, including upland zones of the north-central Sierra Nevada, suggest it is only a matter of time before such evidence of Paleo-Indian occupation is documented in the Lake Tahoe Region.

Early Holocene Period (10,500–7,000 B.P.)

Assemblages for the Early Holocene period are characterized by various large lanceolate and Great Basin stemmed projectile points, which typically occur in conjunction with a variety of heavy core tools, bifaces, patterned and unpatterned flake tools, and chipped-stone crescents around the former shores of pluvial lakes and other ancient landforms. Recent research indicates that Early Holocene period occupation of the Tahoe area may have been more intensive than was previously thought. It also now appears that Early Holocene assemblages are not an early manifestation of the “Martis” phenomenon, but represent a separate cultural group.

Martis Phase (7,000–1,300 B.P.)

The time between 7,000 to 1,300 B.P. is the Martis phase, a term that refers to the Early and Middle Archaic periods in the Tahoe Region. While this relatively long span of time has been previously broken into a variety of phases and sub-periods (e.g., Spooner; Early, Middle, and Late Martis), primarily on the basis of putative temporal differences between projectile point types, such distinctions have not been adequately established for the Tahoe Basin. Based on current evidence, the array of projectile points that represent this phase—corner-notched, side-notched, and contracting-stem darts, as well as certain concave base variants—all appear to have been manufactured throughout this period.

"Martis" times were probably not static. Middle Holocene climatic warming, commencing sometime after 8,000 B.P. and continuing to about 5,000 B.P., no doubt had a tremendous effect on Tahoe Basin hydrology, resource productivity, and human subsistence and settlement. During the latter part of the Martis period (5,000–1,300 B.P.), climates became more humid and population densities increased. It is at this time that we see the emergence of settlement hierarchies that include larger base camps and smaller logistical hunting, gathering, and fishing camps. During this time, basalt from Alder Hill, Watson Creek, and other upland quarries was being moved down the drainages that dissect the western slope of the Sierra Nevada into the foothills and Central Valley. It is possible that the movement of this basalt corresponded to the seasonal movements of people, and that there were connections and relationships between Martis and similarly dated foothill and Central Valley culture complexes.

Kings Beach Phase (1,300 B.P. to historic period)

The final period of prehistoric occupation in the Tahoe/Truckee region is referred to as the Kings Beach phase and has generally been equated to the Washoe Tribe who inhabited this area at the time of historical contact. Assemblage characteristics associated with Kings Beach include a preference for siliceous toolstones (e.g., chert) and obsidian over basalt; small, light-weight corner- and side-notched arrow points; bedrock mortars; hullers (two-handed flat stones used for cracking nuts); and an emphasis on fishing and seed use. The earlier part of the phase is marked by Rose Spring-series points, the latter half by Desert Side-notched forms. The almost-exclusive use of cherts and obsidian beginning with Kings Beach tool kits coincides with the end of quarry production at Alder Hill and other Sierran basalt source locations. Kings Beach settlement systems appear to have been more circumscribed, confined to the Lake Tahoe Region and surrounding uplands and the lower-lying, eastern flanks of the Sierra Nevada in Carson Valley, Washoe Valley, Truckee Meadows, and Long Valley.

ETHNOGRAPHY

Prior to historic contact in the early to mid-1800s, the shores of Lake Tahoe were part of the vast territory held by the Washoe people. Washoe territory extended north to Honey Lake and south to the headwaters of the Tuolumne River. To the east, the valleys at the base of the Sierra were also Washoe territory. The boundary to the west was more fluid, involving shared use of the upper and lower western slopes with the Nisenan and Miwok.

The primary sociopolitical group among the Washoe was the small extended family over which presided a family headman. Permanent villages were inhabited year-round, but most able-bodied adults and older children shifted their residence throughout the warmer seasons. A winter settlement would be home to several of these families, who shared a group identity but acted independently in most matters. While areas of settlement were rich in resources, they were relatively small oases within less-usable lands. This "patchiness" of the Washoe environment was best utilized by changing residence often to exploit resources in different zones as they became available, and by keeping populations sufficiently low to assure ample food for all members of the group.

The Washoe regularly convened throughout the year to participate in rabbit drives and large-scale fowling and fishing activities, as well as to maintain family contacts. The American River and Lake Tahoe were major year-round fisheries with good locations for villages and camps, and the Martis Valley was an important gathering place to obtain edible and medicinal roots, seeds, and marsh plants.

Washoe lifeways were not directly affected by the earliest historic-period activities in California and Nevada. However, by the 1850s and 1860s Washoe culture was affected by thousands of outsiders who had moved through their territory. Ranchers and other settlers restricted Washoe use of lands and resources. Although traditional settlement and subsistence practices were profoundly disrupted, many traditional customs persist among the Washoe people today.

HISTORY

Early History – Lake Tahoe

In 1844, John C. Frémont and his companion Charles Preuss recorded the first sighting of Lake Tahoe by Euro-Americans. Later that same year, members of the westward-bound Stevens-Murphy-Townsend party were likely the first Euro-Americans to venture onto the shore of the Lake. The California Gold Rush, centered mainly in the Sierra Nevada foothills, and the subsequent Comstock Lode silver rush that occurred a decade later in Nevada, drew thousands of miners and entrepreneurs through the Tahoe Sierra on their way to the mining locales. During this period, the Lake was known by various names, including Mountain Lake and Lake Bigler. It was officially designated Lake Tahoe by the California State Legislature in 1945.

The proximity of the Tahoe Basin to the Mother Lode in California and the Comstock Lode in Nevada promoted related development in lumbering, grazing, transportation, market hunting and fishing, tourism, and urban development in the region to provide materials to meet the demand of those areas.

Transportation

In 1854, a popular movement to open up California resulted in legislation creating a trans-Sierra highway, named the Placerville-Lake Tahoe Road. This road was graded to a width of 12 feet and was cleared of all brush and rocks. The public pledged $50,000 to construct it and the road opened in 1858. One year later, the Comstock mining boom exploded in western Nevada and a rush of people and supplies to the mines near Virginia City resulted in a surge of wagon traffic from California into the Tahoe Basin. While the Carson Road over Carson Pass to the south was the most popular route, many traveled on the Placerville-Lake Tahoe Road. Determined unconstitutional by the California Supreme Court, the route was a series of private turnpikes, each maintained by its own toll operator who charged travelers for every person, wagon, and animal who passed over it. In 1863, 30,000 tons of freight and 56,500 people traveled the road. Given the challenging geography and heavy use, the road was expensive to maintain. In the higher elevations, toll companies spent up to $5,000 per mile for improvements and up to $3,000 for maintenance. Offsetting the high expense was the very lucrative revenue totaling over $3 million in 1862. Once in the Tahoe Basin, many freighters, stagecoach drivers, and Pony Express riders preferred a side road south of the Lake closely following modern-day Pioneer Trail. This alternate route was easier on mules, horses, and oxen, as the road was less sandy than the Placerville-Lake Tahoe Road near Bijou along the lakeshore.

Maps from the 1860s through the 1940s depict Lake Tahoe Boulevard/US 50 and Pioneer Trail as major transportation routes. The Placerville-Lake Tahoe Road roughly paralleled modern-day U.S. 50. By 1950, the importance of US 50 as a major transportation route was established. With the end of the Comstock rush and subsequent economic depression in the 1870s, traffic on toll roads declined steadily to a point that most toll operators were gone by 1885. Due to general deterioration of the road and the economic necessity of a trans-Sierra route, El Dorado County assumed control of the road and designated the Placerville-Lake Tahoe Road a 65-mile section beginning at Smith's Flat three miles east of Placerville to the Nevada state line. Six years later, overwhelmed by the high costs of keeping the road passable, El Dorado County deeded the road to the state in perpetuity. The state balked at the high costs of maintenance and in 1907 appropriated just $5,000 to complete the road and place milestones. These funds proved woefully inadequate.

With the advent of the automobile in the 20th century, the need for good roads became imperative. The passage of state road improvement bonds in 1910, 1916, and 1919 along with the Federal-Aid Road Act in 1916, provided the monetary means to finance a series of road improvement projects statewide, including

routes into the Tahoe Basin. Previously, due to the inadequacy of the roads in the Tahoe Basin, most travelers to lakeshore resorts and cabins arrived at their destinations via steamer or sailboat departing from the Lake Tahoe Railway and Transportation Company's depot at Tahoe Tavern. Finally, a road ringing Lake Tahoe, the Brockway Highway (State Route 28), was completed in 1931, enabling travelers to reach Nevada's north shore of the lake and providing momentum to the development of that region. During the mid-1930s, a branch route, the Pioneer Route or Sierra Nevada Southern Route of the Lincoln Highway (modern US 50 through the Plan area), became the major automobile access to the basin. As year-round recreational demands increased, all the roads connecting Lake Tahoe to Nevada and California had been paved by 1930, and by 1931, a passable auto route had been completed around the Lake.

Industry

Early development at the Lake was precipitated by the discovery of silver in 1859 at the Comstock Lode near Virginia City, Nevada. The rich forest reserves of the Lake Tahoe Basin were stripped to provide timber for the ever-deepening mine shafts around Virginia City and for the construction of homes and commercial enterprises in the surrounding communities. The rich placer diggings in the California gold country had been played out, and the area was experiencing a depression. Disillusioned gold miners seeking easy riches rushed to the Comstock strike, again passing by Lake Tahoe on their return route.

While the major timber companies were located on the Nevada side of the Lake (the Carson and Tahoe Lumber and Fluming Company [CTLFC] at Glenbrook and the Sierra Nevada Wood and Lumber Company at Crystal Bay), other small operations were developed along the lake during the boom period between 1860 and the 1890s. Each developed an impressive network of mills, railroads, trams, flumes, and ponds designed to convey milled lumber over the Carson Range and down into the nearly treeless areas surrounding the Washoe mines.

Along the South Shore, timber harvesting was marginal until 1880. Between Al Tahoe and Lapham's Lake House (Stateline) only a few shacks owned by commercial fishermen were built. Logging activity in this area picked up dramatically as the timber stands on the northern and eastern shores were thinning out. The CTLFC built a railroad terminus near modern day Bijou and soon stripped lower Lake Valley of its marketable timber. By 1900, the forests had been logged out, the mills were closed, and the rail lines were removed.

Settlement, Recreation, and Tourism

During the Comstock days, rest houses and small hotels sprang up along the Placerville-Lake Tahoe Road. These hostelries and roadside inns such as Lake House (the present-day Al Tahoe community) and Lapham's Hotel supported small farms and ranches in Lake Valley by supplying travelers with products such as fresh milk, eggs, beef, fish, and vegetables. Ranches supplied the hay, oats, and other fodder for horse and mule teams.

After the logging operations diminished, the recreationists began to arrive. Beginning in the early 1860s, resorts had been established at Lake Tahoe as fashionable summer retreats for the well-to-do. Some of the earliest resorts on the California side of the Lake include the Lake House at Al Tahoe, Rubicon Point Lodge, Grand Hotel at Tahoe City, and the Bellevue Hotel at Sugar Pine Point. The first permanent settlements were at the mouth of McKinney Creek, Ward Creek, Glenbrook, and Tahoe City, where the Tahoe House was erected in 1864. When the Central Pacific Railroad reached Truckee, a wagon road was constructed to the Lake and the tourism boom began.

In 1899, Duane L. Bliss built the Lake Tahoe Railway and Transportation Company, a 15-mile narrow gauge railroad connecting the Central Pacific's Truckee depot with the Bliss family's Tahoe Tavern and lake side resort. This access also benefited south shore resorts and developers as steamers from the Tahoe Tavern crossed the Lake. As a result, tourism further grew and additional resorts were constructed. Several of the other South Shore area resorts, like Bijou Park, Lapham's, Row and Lake House, and Al Tahoe, boasted excellent swimming, clean beaches, horseback riding, hiking, and dancing to potential investors. Development continued at a moderate pace through the 1920s and slowed during the Great Depression.

World War II brought residential development to a near standstill as materials, men, and resources were redirected to the war effort.

After the war, the Region was readily accessible to a public clamoring to camp, build vacation cabins, and enjoy various recreation opportunities along the lakeshore. Two studies by the California Department of Public Health noted a 160 percent increase in summer visitors and a 90 percent increase in permanent residents between 1949 and 1959. Accompanying this increase in visitation, speculators, developers, and builders flocked to the Tahoe Basin at an unprecedented rate to meet the feverish demand for residential and associated commercial construction. A rapid growth in motel/hotel development also occurred during this time, reflecting trends elsewhere of these motels/hotels becoming part of the retreat and resort–like atmosphere. These architectural expressions of the automobile age steadily eroded the patronage of many of the earlier, pre-war lodges. Due to geographical constraints, there was a limited amount of space for a traditional stand-alone residential development. Faced with significant population growth as a result of Harvey's and Harrah's expansion and the growing number of service sector employees to staff them, area builders were compelled to construct more multi-unit apartment housing.

The Tahoe Basin has seen increasing use during the winter months, especially since the development for the 1960 Winter Olympic Games and the subsequent boom in ski resort construction. The history of skiing in the basin began mildly in the 1920s when the Tahoe National Forest (TNF) partnered with developers to build small snow-parks and small ski resorts. Later in the 1930s, TNF and the Sierra Club created trails for cross-country skiers. Following World War II, studies were completed to develop recreational amenities for snow sports. Soon more than 50 snow sports facilities, some on lands leased from the Forest Service, were open and serving skiers and other snow recreational activities at new resorts at Donner Summit, Squaw Valley, Alpine Meadows, Sugar Bowl, Mount Rose, and, later, Heavenly Valley. Ski resort development was later curtailed by concerns over water pollution from increased muddy runoff emptying into the lake from logging to clear ski runs, resort-driven urbanization, construction of multi-unit housing for resort workers, and year-round automobile traffic in the basin. Advancements in road clearing technology kept roads open longer and minimized severe weather delays, resulting in more traffic. Small, family-oriented, rustic cabins gave way to year-round subdivisions and timeshares, wholesale remodeling, and demolition, as present-day residents increased the size and changed the use of their properties.

Casinos

Gambling in the Tahoe Basin dates to the early Comstock period as miners wagered their earnings in games of chance. Officially outlawed in California and mildly restricted in Nevada, gambling was nevertheless common on both sides of the border. Hotels and saloons offered games of chance to tourists, miners, and residents with little regard for punishment. This would change in 1958 with the election of San Francisco District Attorney Edmund G. "Pat" Brown to the California Governorship. Governor Brown took a hard line against gambling and began aggressively enforcing anti-gambling statutes. The anti-gambling position was adopted by subsequent governors and only began to soften in 1984 with the passage of the California State Lottery Act, which intended to raise money for schools without raising taxes.

The rise of major casino developments such as Harvey's and Harrah's created a casino core which by 1990 employed one-third of the workers who lived in the City of South Lake Tahoe. Due to high land values and an aversion to high-density development, multi-unit apartments to house low-wage resort workers are limited in the City of South Lake Tahoe and Douglas County. As a result, many workers commute in from Carson City, Minden, and other outlying areas.

KNOWN CULTURAL RESOURCES

Federal, state, and regional regulatory agencies maintain inventories of historic and archaeological resources in the basin. As described above, the NRHP and the CRHR are comprehensive inventories of cultural resources. Additionally, the Lake Tahoe Basin Management Unit, TRPA, California SHPO, and the Nevada SHPO keep inventories of cultural resources. The Nevada SHPO administers the NVCRIS, which contains recorded archaeological and architectural resources and inventories for the state. The California

Historical Resources Information System includes the State Historic Resources Inventory as defined in California Public Resources Code § 5020.1(p), and a large number of resource records and research reports managed by the nine Information Centers located throughout the State.

Regionally, TRPA maintains a Historic Resources Map that identifies TRPA-designated historic sites and GIS layers of known historic resources determined eligible. Designated historic and cultural resources appearing on the Historic Resources Map were first recognized by TRPA and the USDA Forest Service for significance in 1971 and approved by the TRPA Governing Board for designation in 1984. Since that time, resources are evaluated and identified as part of a project or activity that could potentially cause an adverse impact to a cultural resource greater than 50 years of age. Resources determined eligible as historic or culturally significant are included in TRPA historic resource GIS layers. Currently, TRPA recognizes 112 sites of historical significance. These sites are categorized by two physical types: linear features and nonlinear features. Linear features account for 33 of the recognized sites and nonlinear features account for 79 of the sites.

- **Linear features include:** roads, grades, passes, railroads, trestles, flumes, trails, etc.
- **Nonlinear features include:** houses, lodges, chapels, ranger stations, ranches, toll houses, sawmills, bridges, dairies, historic districts, logging/lumber camps, railroad tunnels, cabins, taverns, mansions/estates, piers, hotels, resorts, beaches, points, creek/river mouths, marshes, Native American sites, springs, bays, harbors, etc.

These sites are also categorized as either historical or archaeological sites. All of the linear features are categorized as historic features. The nonlinear features are comprised of 55 historic features, 20 archaeological features, and four features that are listed as both an historic and archaeological feature. A few examples of these types of sites include:

- **Cave Rock Tunnels:** A large rock located on the East Shore of Lake Tahoe in Douglas County. Cave Rock is a place of historic legend, and cultural and spiritual significance to the Washoe people
- **Vikingsholm:** A Scandinavian architectural style mansion built in 1929 and located on an island in Emerald Bay
- **Camp Richardson Historic Resort:** A recreational resort built in the 1920s that is still in operation today. Located on the South Shore of Lake Tahoe
- **Mouth of Truckee River:** The Truckee River is the sole outlet of Lake Tahoe and drains into Pyramid Lake
- **Emigrant Road:** Constructed in 1852, this road traversed the Truckee River Canyon (SR 89) and Tahoe's north shore (SR 28)

In addition to linear and nonlinear features documented by TRPA, there are many small sites around the Lake where a variety of artifacts have been discovered. As described above, under the prehistoric archaeological context and ethnographic context in Section 16.3, "Affected Environment," evidence of human settlements appears throughout the area. Artifacts discovered at various sites include flaked basalt implements and milling stones, slabs for the grinding of seed foods, chert and obsidian toolstone, bedrock mortars, and smaller projectile points. Because historic and archaeological resources are site-specific, these resources are inventoried on a case-by-case basis for individual projects within the Region.

16.4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

16.4.1 Methods and Assumptions

This analysis identifies the potential impacts of implementation of the Shoreline Plan and associated alternatives on archaeological and historical resources and unique ethnic cultural values within the plan area. The impact analysis considers the known archaeological and historical resource environmental setting in the plan area, as well as the potential for previously undocumented resources and physical effects (i.e., disturbance, dredging, demolition) to known and previously undocumented cultural resources that could result from implementation of the Shoreline Plan. The analysis is also informed by the provisions and requirements of TRPA regulations that apply to cultural resources.

As described in Chapter 3, "Approach to the Environmental Analysis," this EIS evaluates the Shoreline Plan at a programmatic level. Because of the programmatic nature of the Shoreline Plan analysis, neither an archaeological nor built-environment survey were conducted for the entire Shoreline Plan area. Future projects implemented under the Plan would be subject to subsequent project-level environmental review and surveys.

16.4.2 Significance Criteria

Significance criteria related to cultural resources are summarized below. The cultural resources criteria from the TRPA Initial Environmental Checklist and other relevant information were considered in the development of the significance criteria. An impact on cultural resources would be considered significant if it:

- causes alteration of or adversely affect archaeological or historical sites, structures, objects or buildings determined eligible or recognized as designated historic or cultural resources;
- causes physical change that would affect unique ethnic cultural values; or
- restricts historic or prehistoric religious or sacred uses within the region.

16.4.3 Environmental Effects of the Project Alternatives

Impact 16-1: Cause the alteration of, or adversely affect a historical site, structure, object, or building

Implementation of the four Shoreline Plan alternatives would result in development on properties that could contain known or unknown historic resources, are associated with historically-significant events or individuals, or result in adverse physical or aesthetic effects to a significant historical site, structure, object, or building. Because each alternative would result in some new construction, each has the potential to disturb, disrupt, or destroy historic resources through implementation. Therefore, implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would result in a **potentially significant** impact.

<u>Alternative 1: Proposed Shoreline Plan</u>
Alternative 1 would implement the proposed Shoreline Plan as described in Chapter 2, "Description of the Proposed Project and Alternatives". The Shoreline Plan would meter out new private and public development over time. At buildout, it would allow for a total of up to 6,316 total moorings (new and existing), 138 new piers (public and private), and two new public boat ramps.

Historical resources include standing buildings (e.g., houses, barns, outbuildings, cabins), intact structures (e.g., dams, bridges), and remnants of these features. Because this is a programmatic document and the

locations of development under the proposed Shoreline Plan are not known, site-specific surveys were not conducted for this analysis; however, the Lake Tahoe area contains various historic resources, including federal, state, and locally-recognized resources. The majority of known resources are located along the shore of the lake in areas that overlap with or are near the shorezone. The demolition, alteration, or disturbance of existing sites, buildings, and structures that are designated historic resources, eligible for listing as historic resources, or that have not yet been evaluated, could result in the change in its historical significance. Therefore, the impact to historical resources would be **potentially significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)
Alternative 2 would retain the existing Shorezone Subelement of the Regional Plan Goals and Policies and the existing TRPA Code provisions related to the shorezone. This alternative would not cap the number of new shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. Alternative 2 would allow for up to 476 new piers in addition to 6,936 new moorings, six additional boat ramps, and marinas as allowed under a master plan.

This alternative would result in the development of the same type of shorezone structures as Alternative 1 but would also include implementation of up to two marinas. Marinas would involve a higher intensity of development than other types of shorezone structures, but overall the potential impacts on cultural resources would be the same as described under Alternative 1. Therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 3: Limit New Development
Alternative 3 would authorize fewer structures than Alternatives 1 and 2 but would still allow up to 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would also authorize 86 new private, multiple-use piers.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development
Alternative 4 would allow 15 new public piers and no other new shorezone structures. This alternative would include transfer ratios that would allow for some private shorezone structures to be removed and rebuilt in different locations if the project resulted in a 2:1 reduction in the number of structures.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Mitigation Measures

Mitigation 16-1: Avoid potential effects on historic resources

Consistent with TRPA Policy C-1.1, the following mitigation measure shall be required for Alternatives 1, 2, 3, and 4.

Once the exact location of the new piers, boat ramps, and any other land-based development has been determined and before commencement of earth-disturbing activities for construction, applicants shall identify and evaluate all historic-age (over 45-years in age) buildings and structures that are proposed to be removed and/or modified as part of a historic determination application with TRPA or applicable local jurisdiction. This may include preparation of an historic resource assessment and evaluation of resources to determine their eligibility for recognition under state, federal, or local criteria. If required, the assessment shall be prepared by an architectural historian, or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Professional Qualification Standards. If resources are eligible for inclusion in the NRHP, CRHR, or a local register are identified, an assessment of impacts on these resources shall be included in the report, as well as detailed mitigation measures to avoid impacts.

Significance after Mitigation

Implementation of Mitigation Measure 16-1 would reduce potentially significant impacts to historic resources because mitigation would avoid, move, record, or otherwise treat a discovered resource appropriately, in accordance with pertinent laws and regulations. By providing an opportunity to avoid disturbance, disruption, or destruction of historic resources, this impact would be reduced to a **less-than-significant** level.

Impact 16-2: Cause the alteration of, or adversely affect an archaeological resource

Implementation of the Shoreline Plan alternatives would result in development that could take place on properties that contain, be associated with, or result in adverse effects to known or unknown archaeological resources. Because each alternative would result in some new construction over the planning period, each has the potential to disturb, disrupt, or destroy archaeological resources through implementation of specific projects. Therefore, implementation of the Shoreline Plan under Alternatives 1, 2, 3, and 4 would be **potentially significant**.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would implement the proposed Shoreline Plan as described in Chapter 2, "Description of the Proposed Project and Alternatives". The Shoreline Plan would meter out new private and public development over time. At buildout, it would allow for a total of up to 6,316 total buoys (new and existing), 138 new piers, and two new public boat ramps.

Because this is a programmatic document and the locations of new development is not known, site-specific surveys were not conducted; however, the Lake Tahoe area contains various archaeological resources, including federal, state, and locally-recognized resources. Most known resources are located along the lake shore or near creek beds. The demolition, alteration, or disturbance of existing sites, either known or as yet undiscovered, could result in changes to the cultural significance or destruction of archaeological resources.

Project construction could encounter previously undiscovered or unrecorded archaeological sites and materials during project-related preconstruction or construction-related ground-disturbing activities. These activities could damage or destroy these archaeological resources. This would result in a **potentially significant** impact.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would retain the existing Shorezone Subelement of the Regional Plan Goals and Policies and the existing TRPA Shorezone Code. This alternative would not cap the number of new shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. Alternative 2 would allow for up to 476 new piers in addition to 6,936 new moorings, six new boat ramps, and marinas as allowed under a master plan.

This alternative would result in the development of the same type of shorezone structures as Alternative 1 but would also include implementation of up to two marinas. Marinas would involve a higher intensity of development than other types of shorezone structures, but overall the potential impacts on historical resources would be the same as described under Alternative 1. Therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize fewer structures than Alternatives 1 and 2, but would still allow up to 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would authorize 86 new private, multiple-use piers.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow 15 new public piers and no other new shorezone structures. This alternative would include transfer ratios that would allow for some private shorezone structures to be removed and rebuilt in different locations if the project would create a 2:1 reduction in the number of structures.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Mitigation Measures

Mitigation 16-2: Avoid potential effects on archaeological resources

Consistent with TRPA Policy C-1.1, TRPA Code Sections 33.3.7, "Discovery of Historic Resources,", 33.4.1., "Subsurface Investigations and Reports," and 61.1.6-J "Historic Resource Protection" the following mitigation measure would be required for Alternatives 1, 2, 3, and 4.

- Once the exact location of the new piers, boat ramps, dredging, or any other ground-disturbing development (excluding buoys) has been determined and before commencement of earth-disturbing activities for construction, applicants shall retain a qualified archaeologist to conduct archaeological surveys of the site as part of a historic determination application with TRPA or applicable local jurisdiction. To ensure that new or expanded facilities and uses do not adversely affect potentially buried archaeological deposits, an underwater archaeological survey shall also be conducted to identify, evaluate, and protect significant submerged cultural resources prior to activities that would disturb the lakebed.

- The applicant shall follow recommendations identified in the survey, which may include activities such as subsurface testing, designing, and implementing a Worker Environmental Awareness Program, construction monitoring by a qualified archaeologist, avoidance of sites, or preservation in place.

- All projects shall include the following requirements as a condition of approval: If evidence of any prehistoric or historic-era subsurface archaeological features or deposits are discovered during construction-related earth-moving activities (e.g., ceramic shard, trash scatters, lithic scatters), all ground-disturbing activity in the area of the discovery shall be halted and the appropriate jurisdiction and TRPA shall be notified immediately. A qualified archaeologist shall be retained to assess the significance of the find. If the find is a prehistoric archeological site, the appropriate Native American group shall be notified. If the archaeologist determines that the find does not meet NRHP, NVSRHP, or CRHR standards of significance, as applicable, for cultural resources, construction may proceed. If the archaeologist determines that further information is needed to evaluate significance, a data recovery plan shall be prepared. If the find is determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall work with the project applicant to avoid disturbance to the resources, and if complete avoidance is not feasible in light of project design, economics, logistics, and other factors, follow accepted professional standards in recording any find including submittal of the recordation forms required by the applicable SHPO and location information to the appropriate information center.

Significance after Mitigation

Implementation of Mitigation Measure 16-2 would reduce potentially significant impacts to archaeological resources because mitigation would avoid, move, record, or otherwise treat a discovered resource appropriately, in accordance with pertinent laws and regulations. By providing an opportunity to avoid disturbance, disruption, or destruction of archaeological resources, this impact would be reduced to a **less-than-significant** level.

Impact 16-3: Degrade ethnic and cultural values

Because the project could result in physical changes to historic and prehistoric sites, unique ethnic cultural values could be affected, and historic or prehistoric religious or sacred uses within the Plan area could be restricted. Consultation with the Washoe Tribe is required by TRPA regulations; however, project activities could still uncover or destroy historic or archaeological resources as identified in Impact 16-1 (historic) and Impact 16-2 (archaeological). For these reasons, this impact is considered **potentially significant**.

Alternative 1: Proposed Shoreline Plan

Alternative 1 would implement the proposed Shoreline Plan as described in Chapter 2, "Project Description." The Shoreline Plan would meter out new private and public development over time. At buildout, it would allow for a total of up to 6,316 total buoys (new and existing), 138 new piers (private and public), and two new public boat ramps.

Alternative 1 could result in physical changes to sites, structures, and areas that have religious or sacred significance. These could be permanent changes that alter or remove features or temporary changes that involve restriction of access to sites during construction activities for projects. These changes could infringe on sacred sites or uses that are adjacent to or within the boundaries of projects. For example, the development of new piers or boat ramps could bifurcate existing sacred sites, reducing intactness.

Tribal outreach occurred during the scoping period and the Washoe Tribe was notified of the Shoreline Plan environmental review on July 10, 2017, and during the scoping period. No comments were received. Because this is a programmatic level document, additional outreach would occur upon site-specific projects. Assembly Bill (AB) 52, signed by Governor Edmund G. Brown, Jr., in September of 2014, establishes a new class of resources (ethnic and cultural values) under CEQA: "tribal cultural resources" (TCRs). TCRs include site features, places, cultural landscapes, and sacred places or objects, which are of cultural value to a tribe. AB 52 requires that lead agencies undertaking CEQA review must, upon written request of a California Native American tribe, begin consultation once the lead agency determines that the application for the project is complete, prior to the issuance of a notice of preparation of an EIR or notice of intent to adopt a negative declaration or mitigated negative declaration. Subsequent discretionary projects located in the California side of the Shoreline Plan may be required to prepare site-specific project-level analysis to fulfill CEQA requirements, which may include additional AB 52 consultation that could lead to the identification of TCRs.

Because construction-related activities, both ground-disturbing and staging access, could encounter previously undiscovered or unrecorded resources or restrict access to known resources, this alternative could result in physical changes to sites, structures, and areas that have religious or sacred significance or other cultural significance to the Washoe people. Therefore, this impact would be **potentially significant**.

Alternative 2: Maintain Existing TRPA Shorezone Regulations (No Project)

Alternative 2 would retain the existing Shorezone Subelement of the Regional Plan Goals and Policies and the existing TRPA Shorezone Code. This alternative would not cap the number of new shorezone structures but would prohibit new structures within TRPA-designated prime fish habitat. Alternative 2 would allow for up to 476 new piers in addition to new moorings, boat ramps, and marinas.

This alternative would result in the development of the same type of shorezone structures as Alternative 1 but would also include implementation of up to two marinas. Marinas would involve a higher intensity of development than other types of shorezone structures, but overall the potential impacts on sites, structures, and areas that have religious or sacred significance or other cultural significance to the Washoe people would be the same as described under Alternative 1. Therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 3: Limit New Development

Alternative 3 would authorize fewer structures than Alternatives 1 and 2, but would still allow up to 365 new public buoys or slips, five new public piers, and one new public boat ramp. This alternative would authorize 86 new private, multiple-use piers.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Alternative 4: Expand Public Access and Reduce Existing Development

Alternative 4 would allow 15 new public piers and no other new shorezone structures. This alternative would include transfer ratios that would allow for some private shorezone structures to be removed and rebuilt in different locations if the project resulted in a 2:1 reduction in the number of structures.

This alternative would result in the development of the same type of shorezone structures as Alternative 1; therefore, for the same reasons discussed under Alternative 1, this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 16-3: Avoid degradation of ethnic and cultural values

The following mitigation measure would be required for Alternatives 1, 2, 3, and 4.

Implement Mitigation Measures 16-1 and 16-2.

Significance after Mitigation

Implementation of Mitigation Measures 16-1 and 16-2 would reduce potentially significant impacts to historic resources because mitigation would avoid, move, record, or otherwise treat a discovered resource appropriately, in accordance with pertinent laws and regulations. By providing an opportunity to avoid disturbance, disruption, or destruction of sites, structures, and areas that have religious or sacred significance or other cultural significance to the Washoe people, this impact would be reduced to a **less-than-significant** level.

17 CUMULATIVE IMPACTS

17.1 INTRODUCTION

The Shoreline Plan is a long-range plan developed to manage the amount and intensity of recreational use and development along Lake Tahoe's shore in a manner that attains and maintains the environmental thresholds. Together, the Shoreline Plan works with the other elements of the Regional Plan and the Regional Transportation Plan (RTP) to regulate the total amount and type of development within the Lake Tahoe Region. Consequently, this planning framework inherently represents the cumulative condition within the Region. Because the Shoreline Plan considers the cumulative buildout of the shoreline, the analyses contained in Chapters 4 through 16 of this EIS are cumulative in nature. Similarly, the Regional Plan regulates the buildout of portions of the Region that are outside of the shoreline, and the EIS prepared for adoption of the Regional Plan evaluated the cumulative conditions of those portions of the Region. The analyses that have been carried out for the Regional Plan and the RTP, and their relationship to the Shoreline Plan, are discussed in brief, below.

17.1.1 Relationship to Other Programmatic Documents

The Regional Plan is a long-range plan that serves as the regulatory framework and blueprint for redevelopment and limited growth within the Tahoe Region. The Regional Plan consists of goals, policies, ordinances, and implementation measures to support achievement and maintenance of specific environmental standards – environmental threshold carrying capacities (thresholds). The Regional Plan limits the total amount of growth that can occur within the Tahoe Region, and establishes regulatory provisions, incentives, and project-review requirements necessary to attain and maintain the thresholds. See Chapter 4, "Land Use," for additional detail on how the Regional Plan regulates growth and development.

The 2017 RTP is a four-year plan to develop a transportation system in the Tahoe Region that offers strategies to support a healthy and prosperous community, economy, and environment and mitigates existing adverse mobility and environmental conditions. Strategies focus on travel modes, providing environmentally innovative infrastructure, creating incentives for distributing travel volumes, and prioritizing funding for specific projects to meet the RTP goals. The Sustainable Communities Strategy (SCS) is a combined land use and transportation plan to meet adopted goals for the reduction in greenhouse gas (GHG) emissions, in compliance with California's Senate Bill (SB) 375, Statutes of 2008. The contemporary concepts necessary to achieve the region's transportation vision were incorporated into the RTP, in conjunction with the SCS. These concepts include integration of land use planning and transportation; bringing work, shopping, recreation, housing, and lodging closer together; linking development better to a multi-modal transportation system; closing gaps in the existing bicycle and pedestrian network; enhancing transit service; and revitalizing communities through corridor enhancement projects that improve mobility for all travel modes.

In December 2012, prior to adoption of the Regional Plan Update (RPU) and RTP/SCS, a policy-level EIS was certified for the RPU, and in February 2017, a policy-level Initial Study/Mitigated Negative Declaration/Initial Environmental Checklist/Finding of No Significant Effect (IS/MND/IEC/FONSE) was certified for the 2017 RTP/SCS. Because of the policy-level nature of the RPU and its long timeframe, the EIS evaluated the environmental impacts of the RPU at a policy level and recognized the need for future project-level environmental review. In accordance with Section 15168 of the State CEQA Guidelines, a program EIR may be prepared on a series of actions that can be characterized as one large project and are related to, among other things, the issuance of general criteria to govern the conduct of a continuing program or individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways.

A program EIS provides regional consideration of cumulative effects and includes broad policy alternatives and program mitigation measures that are equally broad in scope.

The RPU EIS and 2017 RTP/SCS IS/MND/IEC/FONSE provide regional-scale analysis of the cumulative buildout and development of private and public lands within the Region, and they established a series of mitigation measures that reduce cumulative effects to a less than significant level. As described in Chapter 1, "Introduction," the TRPA environmental thresholds are the foundation for much of the decision making that occurs in the Tahoe Region. The environmental thresholds are used, in part, to guide preparation of findings, which are required prior to approval of certain actions. The cumulative analyses of the RPU EIS and RTP/SCS IS/MND/IEC/FONSE included assessment of: 1) programs that focus on environmental improvement, some of which are specifically designed to address environmental thresholds; 2) local plans, which set forth more specific planning guidelines and standards for much of the land area of the Tahoe Basin; 3) Tahoe Transportation District/Tahoe Metropolitan Planning Organization Projects and Programs; and 4) specific development projects that were known and reasonably foreseeable at the time the RPU EIS and RTP/SCS IS/MND/IEC/FONSE were under preparation.

17.1.2 Cumulative Growth, Programs, and Projects

CUMULATIVE GROWTH

Regional growth is guided and capped by the Regional Plan, which is implemented in part through local area plans. These plans represent the cumulative buildout conditions of the Region. As discussed in Chapter 4, "Land Use," the Shoreline Plan is one such plan, intended to guide and cap growth of structures within the shorezone. The analysis in Chapters 4 through 16 evaluate the cumulative effects of all shorezone structures that could be developed under each alternative, including cumulative increases in boating that would result from the structures. Some degree of growth in boat use would likely still occur due to surrounding population growth and increases in visitation, even without a Shoreline Plan. This cumulative analysis considers the combination of this background growth in boat use in the Region in combination with increases in boat use that would result from the Shoreline Plan alternatives.

While the Shoreline Plan would regulate the total number of boating facilities, cumulative growth in motorized boating could occur from: (1) additional launches at existing boat ramps, (2) additional use of personal watercraft (e.g., jet skis) that do not require shorezone structures, (3) an increase in the number of rental boats, and (4) an extended boating season due to climate change, all of which would increase motorized boat use on the lake. Background growth in boat use associated with launches at boat ramps, personal watercraft, and boat rentals is estimated to increase by 1.2 percent per year, which is equivalent to estimates of population-driven growth in boating prepared by the California Air Resources Board (CARB 2014). It is assumed that there would be no growth in the number of launches from a boat ramp during peak summer holiday weekends, because boat ramps generally operate at maximum capacity on peak days. However, the number of launches from boat ramps could increase on non-peak days, when ramps could absorb additional users. Increased boat use associated with rental boats could occur if moorings are converted from individual private use to accommodate additional rentals (e.g., if a marina rented fewer slips to private boat owners and instead used those slips for additional rental boats). The increase in personal watercraft and rental boat use could occur during both peak and non-peak periods. Overall, peak day boat trips are expected to grow by 3 percent (Exhibit 17-1) and annual boat trips are expected to grow by 11 percent (Exhibit 17-2) by 2040, even without implementation of a Shoreline Plan, due to background growth.

The cumulative increase in boat use is the amount of background growth in boat use plus the increase in boat use from the Shoreline Plan alternatives (Table 17-1). Cumulative increases range from a low-growth scenario under Alternative 4 (background growth only), to a high-growth scenario under Alternative 2 (48 percent increase in boat trips on a peak day, and 66 percent increase annually), see Exhibits 17-1 and 17-2.

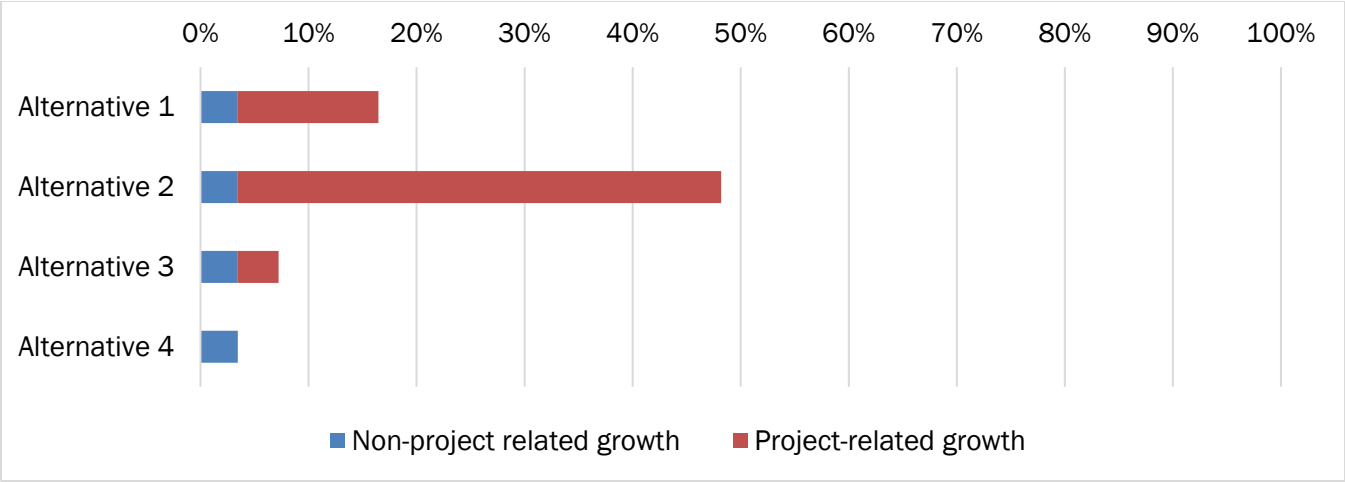

Exhibit 17-1 **Estimated Cumulative Percent Increase in Peak Day Boat Trips, 2040**

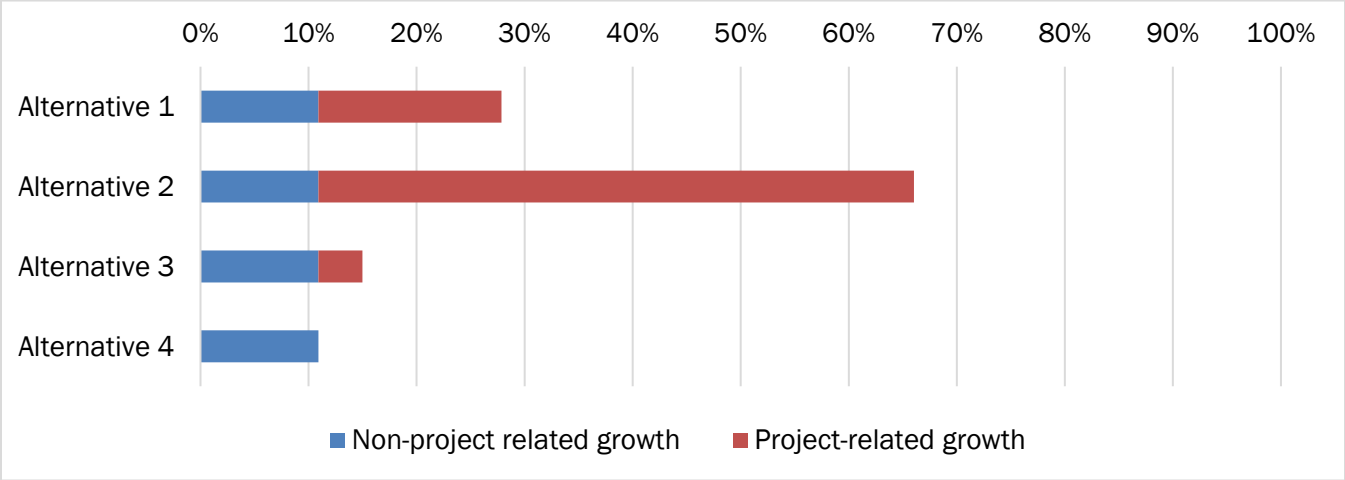

Exhibit 17-2 **Estimated Cumulative Percent Increase in Annual Boat Trips, 2040**

Table 17-1 Cumulative Peak Day and Annual Boat Use (engine hours, trips)

	Peak Day	Annual
Engine Hours		
Baseline Conditions	12,512	489,155
Baseline plus Background Growth	12,965	545,885
Alternative 1 Cumulative	14,549	626,653
Alternative 2 Cumulative	18,392	808,317
Alternative 3 Cumulative	13,435	565,653
Alternative 4 Cumulative	12,965	545,885
Boat Trips		
Baseline Conditions	5,899	234,102
Baseline plus Background Growth	6,103	259,656
Alternative 1 Cumulative	6,870	299,314
Alternative 2 Cumulative	8,741	388,692
Alternative 3 Cumulative	6,325	269,177
Alternative 4 Cumulative	6,103	259,656

CUMULATIVE PROGRAMS

Several existing programs will continue under any shoreline alternative. These programs, which are focused on environmental improvement, could combine with the effects of the Shoreline Plan on specific resources. Additional detail on cumulative programs is provided in Chapters 4 through 16, where applicable. Cumulative programs that could combine with the effects of the Shoreline Plan include the following:

Environmental Improvement Program

The Lake Tahoe Environmental Improvement Program (EIP) is a partnership of federal, state, and local agencies, private interests, and the Washoe Tribe, created to protect and improve the extraordinary natural and recreational resources of the Tahoe Region and attain and maintain thresholds. EIP partners implement projects that fall within on or more of the six EIP areas: (1) watersheds, habitat, and water quality; (2) forest management; (3) air quality and transportation; (4) recreation and scenic resources; (5) applied science; and (6) program support. TRPA would continue to identify environmental improvement projects with a nexus with recreational impacts and present them as opportunities to advance expanded recreational access in concert with environmental restoration.

Lake Tahoe Total Maximum Daily Load

The Lake Tahoe Total Maximum Daily Load (TMDL) was developed in a partnership between the Lahontan Water Board and Nevada Division of Environmental Protection (NDEP) to address the declining transparency and clarity of Lake Tahoe. Because fine sediment particles, phosphorus, and nitrogen are responsible for the decline in lake transparency and clarity, Lake Tahoe is listed under Section 303(d) of the federal Clean Water Act as impaired by the input of these three pollutants of concern. Based on California law, the Lahontan Water Board has the obligation to implement and enforce the California Lake Tahoe TMDL through National Pollutant Discharge Elimination System (NPDES) discharge permits. NDEP's stated plan for implementing the Lake Tahoe TMDL for Washoe County and Douglas County is through memoranda of agreement (MOAs) with each jurisdiction. MOAs are a collaborative, legally nonbinding approach to implementing a TMDL. NDEP regulates the Nevada Department of Transportation and the Stateline Stormwater Association through NPDES discharge permits. California and Nevada will continue to require implementation of stormwater projects and other measures to reduce pollutant loading.

Sustainable Communities Strategy

The Tahoe Metropolitan Planning Organization (TMPO) and TRPA jointly developed the Lake Tahoe Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) as Lake Tahoe's blueprint for a regional transportation system that enhances the quality of life in the Tahoe Region, promotes sustainability, and offers improved mobility options for people and goods. Important objectives of the RTP/SCS are to reduce the overall environmental impact of transportation in the Region, create walkable and vibrant communities, and provide real alternatives to driving. The RTP/SCS included an SCS, in accordance with California Senate Bill 375, statutes of 2008 (Sustainable Communities and Climate Protection Act). The RTP/SCS presents goals consistent with regional and federal requirements that focus on reducing dependency on the automobile and giving preference to projects that increase the capacity of the Region's transportation system through public transportation projects and programs.

Nearshore Agency Working Group

The Nearshore Agency Working Group (including representatives of TRPA, the U.S. Environmental Protection Agency, the Lahontan Quality Board, and the Nevada Division of Environmental Protection) is preparing a nearshore work plan, called the Nearshore Resource Allocation Plan, to guide nearshore monitoring and coordination needed to understand and manage nearshore conditions that affect water quality, including stormwater runoff, coverage, and fertilizer use.

Aquatic Invasive Species Management

The Tahoe Region's program to prevent and control aquatic invasive species (AIS) is expected to continue and expand. The program is governed and guided by the Lake Tahoe Region Aquatic Invasive Species

Management Plan, California–Nevada. This AIS management program includes mandatory boat inspections, decontamination of watercraft, and public education to prevent new introductions of AIS, and implementation of AIS control projects to manage or eradicate existing infestations.

CUMULATIVE SHORELINE PROJECTS

In addition to the cumulative analysis of buildout of the Shoreline Plan contained in Chapters 4 through 16, the cumulative programs, and the background growth in boating use described above, there are several reasonably foreseeable future projects that could combine with the effects of the Shoreline Plan on specific resources. These projects are described below and addressed in the cumulative analysis of each resource that follows.

Waterborne Passenger Ferry

The RTP includes a goal that calls for a passenger ferry service to transport residents, visitors, and commuters between North Lake Tahoe and South Lake Tahoe. This project would involve the redevelopment of two to three public piers and associated facilities on the north and south shores and operation of a passenger ferry between these points. This proposed project is in the early planning stages. Additional detail on the project is included in the 2017 RTP (TRPA 2017).

Public Safety Facilities

New public safety shorezone structures are allowed to provide lake access for public safety and emergency response (TRPA Code Section 84.10.1). One essential public safety facility is allowed in the shorezone for each of El Dorado, Placer, Washoe, and Douglas counties, and one for the U.S. Coast Guard. These facilities could be new facilities or modifications to existing facilities and could deviate from shorezone design standards to accommodate functionality. If they are no longer used as public safety facilities, they must be removed, or brought into conformance with design standards.

Tahoe Keys

Tahoe Keys is a homeowners association community of over 1,500 homes adjacent to a series of human-made canals and lagoons that provide water access to Lake Tahoe. An estimated 2,443 moorings are associated with private residences in Tahoe Keys. Its lagoons and boating facilities are not within the shoreline, so the future planning framework for the Tahoe Keys is not a subject of the Shoreline Plan. The Tahoe Keys are virtually built-out, so although there are specific development and redevelopment projects proposed in the community, the potential for substantial changes in boating levels is very low. However, the effects of future redevelopment of boating-related structures in the Tahoe Keys is considered in this cumulative analysis.

Kings Beach State Recreation Area General Plan and Pier Rebuild Project

California State Parks (CSP) is proposing to adopt a revised General Plan for the Kings Beach State Recreation Area (KBSRA). As a near-term project under the General Plan, CSP is proposing to rebuild the public pier within KBSRA. The rebuilt pier would be a combined fixed and floating pier located at the eastern edge of the park and reaching of approximately 488 feet in length. The pier would be open to the public but would not allow boat launches. As part of the pier rebuild project, CSP would remove the existing boat ramp within the park. CSP and TRPA released a Draft EIR/EIS for the project for public review from May 1 through June 29, 2018.

17.1.3 Cumulative Analysis

This section addresses the potential cumulative impacts for each resource topic, identified and summarized below. The geographic scope of the cumulative impact analysis for each resource is identified in Table 17-2. The analysis identifies: whether an existing significant adverse cumulative condition exists with respect to each resource, whether implementation of the Shoreline Plan alternatives in the context of past, present,

and reasonably foreseeable plans, programs and projects, would result in a significant cumulative impact, and whether the Shoreline Plan would represent a considerable contribution to the cumulative impact. In cases in which no existing significant cumulative condition is identified, the analysis addresses whether the incremental contribution of the Shoreline Plan alternatives, combined with those of related region-wide plans, programs, and projects, would create a significant cumulative impact.

Table 17-2 Geographic Scope of the Cumulative Impact Analysis by Topic

Topic	Geographic Scope
Land Use	Lake Tahoe Region
Fisheries and Aquatic Biological Resources	Shorezone and lakezone
Transportation	Lake Tahoe Region
Air Quality	Lake Tahoe Air Basin
Greenhouse Gas Emissions/Climate Change	Global
Noise	Localized (based on audibility and sensitive receptors) but may aggregate throughout the Shorezone
Geology, Soils, Land Capability, and Coverage	Geologic hazards – localized Coverage – Lake Tahoe Region Soil erosion – shorezone and adjacent upland areas
Hydrology and Water Quality	Lake Tahoe Hydrologic Basin
Scenic Resources	Localized (based on view shed and visibility) but may aggregate throughout the Lake Tahoe Region
Biological Resources	Lake Tahoe Region
Recreation	Recreation facilities – shorezone Demand for recreation – Lake Tahoe Region
Public Safety	Shorezone and lakezone
Cultural Resources	Shorezone and adjacent upland areas

LAND USE

Prior to adoption of the first Regional Plan and thresholds, development in the Tahoe Region included many damaging land development practices, including failure to recognize hydrologic and topographic limitations, unnecessary and widespread destruction of vegetation, realignment and pollution of streams, encroachment on flood plains, and disruption of natural drainages. These actions led to indirect impacts to various resources including water quality, air quality, biological resources, and recreation. The first Regional Plan, adopted in 1987, recognized the adverse cumulative condition resulting from such development and, in response, adopted land use policies and regulations to improve environmental conditions.

The Regional Plan and Code of Ordinances guide TRPA's land use planning efforts. In accordance with the Tahoe Regional Planning Compact, the Regional Plan was created as the practical guide for achieving the balance, or equilibrium, between the natural environment and the built environment articulated in the TRPA thresholds. The first iteration of the Regional Plan, developed in 1987, focused on growth control and on regulating development practices that degrade the natural and built environments. The Regional Plan was updated in 2012. It maintained the growth control system and environmental programs from the 1987 plan and added provisions to promote "environmental redevelopment" to replace older, environmentally degrading developments with more sustainable development and restored landscapes. The growth management system, limiting the number of development rights and allocations, concentrating development on high capability lands, and implementing the land use map, community plans, and plan area statements have facilitated environmental improvements since the original adoption of the Regional Plan. As such, there is no existing adverse cumulative land use condition in the Tahoe Region.

The four Shoreline Plan alternatives are intended to complement the Regional Plan in that they provide for implementation and design requirements for shorezone structures designed to assist in achieving the Regional Plan goals and attaining and maintaining TRPA thresholds. The policies addressed by the alternatives augment the Regional Plan and provide standards for development of structures within its framework. Development under the any of the Shoreline Plan alternatives, including development of the cumulative shoreline projects described above, would be required to conform with all other provisions of the TRPA Code and all existing land use designations, as specified by the Regional Plan and local plans. Plans, policies, and regulations associated with non-TRPA entities at the federal and state levels that govern the placement of shorezone structures would be adhered to, including any standards that are more stringent than the provisions of the Shoreline Plan. Consequently, there would be **no adverse cumulative condition** in the Tahoe Region with respect to land use that would result from implementation of the Shoreline Plan alternatives.

FISHERIES AND AQUATIC BIOLOGICAL RESOURCES

For more than a century, Lake Tahoe's aquatic biological resources have been affected by land use activities, lake development, fishing pressure, introduction of non-native aquatic species, and other factors. This has resulted in an assemblage of fish and aquatic biological resources that is different from natural historical conditions. Although actions and initiatives implemented to manage the lake's aquatic resources has improved lake ecology, changes will continue to occur. The combined effects on fish and aquatic biological resources from past, present, and reasonably foreseeable projects and actions considered under the future cumulative condition vary considerably. Key factors that may adversely affect the future conditions of aquatic biological resources in Lake Tahoe include the following:

- population growth immediately adjacent to the lake and within the lake's watershed, which will affect lake habitat, water quality, and lake clarity;
- development of new structures within the shorezone;
- increased recreational fishing
- increased recreational boating;
- introduction or spread of AIS;
- fish stocking programs; and
- changes in lake levels and water temperatures due to climate change.

In addition, TRPA and other parties have implemented, and will continue to implement policies, programs, and regulations intended to positively affect the future conditions of aquatic biological resources. These include:

- Lake Tahoe Restoration Act;
- Lake Tahoe Total Maximum Daily Load;
- regulations designed to protect aquatic species (e.g., no-wake zone and fishing regulations);
- aquatic habitat management and restoration activities,
- AIS detection, control, and eradication efforts; and
- Environmental Improvement Program projects.

The future cumulative condition of aquatic habitat in Lake Tahoe is anticipated to remain similar to the current condition or be somewhat further degraded due to expansion of AIS and climate change. These effects would be significantly adverse for some aquatic species and not adverse for others, relative to current conditions.

Climate change, increased nutrient loading to the lake, increased boat use, and increased angling activity could all promote AIS introduction and spread. The Shoreline Plan alternatives could contribute to the risk of AIS introduction and spread primarily through increased boating and angling. However, this risk would be more than offset by program provisions that would maintain AIS inspection programs and increase AIS control efforts. Because Alternative 4 would not increase boat use, the risk of AIS introduction or spread is substantially lower for Alternative 4 than for Alternatives 1, 2, and 3. Continued implementation of regulations, restrictions, policies, and fish habitat improvement actions by TRPA and other parties would help combat the factors that contribute introduction and spread of AIS and assist in eradicating existing infestations. Even with these programs, it is expected that the future cumulative conditions with respect to AIS will continue to be significantly adverse. However, as described in Chapter 5, "Fisheries and Aquatic Biology," the effects of each alternative on the introduction or spread of AIS would be less than significant. Alternative 1 would include a new funding mechanism that would increase the rate of AIS control, and Alternatives 2, 3, and 4 would include a mitigation measure that would increase the rate of AIS control. This program element and mitigation measure would reduce the risk of AIS spread, which would have a positive effect on the cumulative condition related to AIS. Therefore, the Shoreline Plan alternatives **would not make a considerable contribution** to a significant adverse cumulative effect related to AIS.

None of the Shoreline Plan alternatives would result in a loss of prime fish habitat. Alternatives 1, 3 and 4 would result in no net loss of prime fish habitat relative to baseline conditions because of the requirement to replace prime fish habitat at a ratio of 1.5:1. Alternative 2 does not allow placement of structures in prime fish habitat. Therefore, the alternatives would have **no impact** on prime fish habitat and therefore, **would not make a considerable contribution** to a significant cumulative condition pertaining to prime fish habitat.

Construction-related effects of the Shoreline Plan alternatives and the cumulative shoreline projects on Lake Tahoe aquatic habitat quality (including water quality), fish populations, invertebrate communities, and plankton communities would be minor, localized for any given structure, and temporary in nature. Consequently, these effects would not be of sufficient magnitude nor occur over a sufficiently long time-frame such that they could combine with the effects of other projects or actions to produce significant cumulative effects. Hence, the construction-related effects of implementing the Shoreline Plan alternatives would not, themselves, cause a new cumulatively significant impact to fish and aquatic resources, and they **would not make a considerable contribution** to an adverse future cumulative condition for fish and aquatic resources.

Although all of the alternatives would cause small amounts of habitat modification within the lake, none would result in a degree of permanent habitat modification or loss to cause a new significant, adverse future cumulative impact to lake habitat. Vast expanses of aquatic habitat would remain after buildout of any of the alternatives such that fish and aquatic organisms would be virtually unaffected with regard to habitat loss. The alternatives **would not make a considerable contribution** to any significant, adverse future cumulative habitat condition that may occur in the lake due to other future actions and factors.

Boat use is estimated to increase under the future cumulative condition due to buildout of the Shoreline Plan and population growth in surrounding areas, by about 66 percent under Alternative 2, 28 percent under Alternative 1, 15 percent under Alternative 3, and 11 percent under Alternative 4 (Exhibit 17-2). Because Alternative 4 would not itself cause increased boat use, it would neither cause a new future cumulative impact, nor contribute to any significant, adverse future cumulative condition for fish and aquatic resources caused by recreational activity. As described in Chapter 5, recreational activities (including increases due to the Shoreline Plan alternatives and population growth) in Lake Tahoe are heavily regulated and monitored for their potential direct adverse effects on fish and aquatic resources and their habitats. Due to the life history of species in Lake Tahoe, and the temporary and distributed nature of recreation activities, the cumulative condition related to recreation effects on fisheries would not be significantly adverse, for the same reasons described in Impact 5-5 in Chapter 5, "Fish and Aquatic Biological Resources." Therefore, future levels of boating and recreation in the lake would not cause significant, adverse future cumulative impacts to the lakes aquatic resources or habitats, and the alternatives **would not make a considerable contribution** to a significant adverse cumulative impact.

HYDROLOGY AND WATER QUALITY

Cumulative impacts to hydrology and water quality are considered in the context of the Lake Tahoe Basin. Historic activities such as logging, milling, mining, and grazing within the Tahoe Basin accelerated erosion and contributed to a decline in the clarity of Lake Tahoe. Urbanization and development altered the natural hydrologic regimes of many of the catchments in the Tahoe Region. Much of the urban development has occurred along the edge of Lake Tahoe, meaning that in many cases, there is little or no buffer between the source of pollution and the Lake. The nearshore of Lake Tahoe is an increasingly important focus for managers in the Region. It is the portion of the lake with which visitors and residents most often interact, and the presence of invasive species (e.g. Eurasian watermilfoil and curlyleaf pondweed) and anecdotal reports of change in nearshore conditions have heightened concern about the water quality of the nearshore. The effects of historic activities combined with runoff from urban and recreational developments have degraded the water quality of Lake Tahoe, resulting in an existing cumulative adverse condition.

The plans, projects, and programs that could combine with the Shoreline Plan to affect cumulative water quality conditions include those projects described above, as well as programs intended to improve water quality. The Lake Tahoe total maximum daily load (TMDL) was developed to address pollutant loading. Studies completed as part of the Lake Tahoe TMDL show that urban areas are the primary source of fine sediment (the pollutant known to impact lake clarity) (Lahontan & NDEP 2010). To achieve the goals set forth in the TMDL, local jurisdictions are implementing water quality improvement projects as described in each jurisdictions Pollutant Load Reduction Plan or Stormwater Load Reduction Plan. Actions to meet water quality goals, as outlined in the TMDL, include practices and treatment options for urban uplands, forest land, atmospheric deposition, and stream channel erosion. In additional to the TMDL, TRPA requires water quality BMPs as the first line of defense to reduce stormwater runoff from developed properties. They include vegetating bare soils, building infiltration trenches, paving dirt roads and driveways, and other improvements that capture and reduce runoff to adjacent roads or properties. Additionally, the Environmental Improvement Program (EIP) includes numerous publicly- and privately-funded projects to restore disturbed areas of the watershed and reduce the adverse cumulative condition. EIP partners are retrofitting roads with stormwater quality improvements, restoring sensitive lands in the Upper Truckee River, Blackwood Creek, Ward Creek, Meeks Creek, Cold Creek, Second Creek, Rosewood Creek, and Incline Creek watersheds, among others. The EIP also includes land acquisition programs and more than 3,000 acres of land have been acquired by state and federal agencies. To address water quality condition within the nearshore, a nearshore agency working group has developed a Nearshore Protection Plan and a resource allocation plan to expand the understanding of the drivers of nearshore water quality and to allocate water quality improvements resources in the most effective manner possible.

The Shoreline Plan alternatives would authorize new shoreline structures. These alternatives and the cumulative projects described above could affect water quality through construction activities (e.g., dredging, pier construction, redevelopment of existing shorezone structures), and through operations (e.g., aerial deposition of pollutants or resuspension of lakebed sediment through increased boating activity).

As described in Chapter 6, “Hydrology and Water Quality,” activities that could lead to erosion and/or release of pollutants to water bodies from shorezone construction and dredging activities are regulated by TRPA, Lahontan Water Board, Nevada Department of Environmental Protection, and federal and local agencies. Because all shorezone facility construction and maintenance, including dredging, that would occur would be required to conform with all applicable state, federal, local, and TRPA regulations pertaining to protection of water quality from construction-related discharges, and erosion and transport of sediment and other pollutants from a project site would be minimized to the extent feasible, individual projects and maintenance activities would not contribute to soil erosion or construction-related discharge impacts. Therefore, the Shoreline Plan alternatives and cumulative shorezone facility construction activities allowed under each alternative **would not make a considerable contribution** to a cumulative adverse condition related to hydrology or water quality.

Cumulative operational impacts could result from increases in pollutant loading from the direct entrainment or atmospheric deposition of pollutants from boat exhaust. The Waterborne Passenger Ferry, future changes

at the Tahoe Keys, and the public health and safety cumulative projects could each lead to additional boat activity. However, as described in Chapter 6, "Hydrology and Water Quality," a net reduction in boating emissions, including emissions of oxides of nitrogen (NO_X) and particular matter (PM), would result as the increased boating hours are offset by fleet turnover, with older boat engines replaced with cleaner and more fuel-efficient boat engines. Thus, the Shoreline Plan would result in less direct entrainment and atmospheric deposition than under existing conditions and it **would not make a considerable contribution** to a cumulative adverse condition.

Cumulative operational impacts could also result from the combined hydrodynamic effects of motorized boating, which can disturb and resuspend lakebed sediment through propeller wash and boat wake, potentially leading to increased turbidity and reductions in nearshore clarity. Water quality effects from propeller wash and boat wake are generally limited to shallower areas, with no effects for water depths greater than 10 feet (Beachler and Hill 2003). TRPA Code Section 84.17.1 requires a no-wake zone within 600 feet of the shore with 5-mile-per-hour (mph) speed limit. Most of Lake Tahoe's shallower depths are within the existing no-wake zone, with notable exceptions being the nearshore areas adjacent to South Lake Tahoe and Tahoe City.

Alternatives 1, 2, and 3 are projected to generate a peak-day increase in boating activity. On peak days, increased boat use could combine with existing boat use and background growth in boating activity to increase wave action and turbulence generated by boat wake. The shallower portions of the nearshore outside existing no-wake zone regulations are likely more susceptible to short-term and temporary declines in clarity because of increased wave action, relative to other nearshore areas. However, the alternatives include an expansion of the Nearshore Water Quality Network or a similar effort to include monitoring stations located within areas of shallow lakebed but outside the no-wake zone. If research generated by the monitoring concludes that boating activities contribute to an exceedance of TRPA's nearshore thresholds, TRPA would implement management actions to avoid or offset this impairment. Thus while, the shoreline Plan alternatives have the potential to affect nearshore water quality, they would expand nearshore water quality monitoring and implement actions to improve nearshore water quality. This effort, when considered in combination with the TMDL, EIP, and other projects, plans and programs would result in a cumulative improvement in nearshore water quality conditions. Thus, the Shoreline Plan **would not make a considerable contribution** to a cumulative adverse condition related to hydrology or water quality.

SOIL CONSERVATION

The Bailey (1974) land classification system (described in Chapter 7) provides the basic concept of land development in the Lake Tahoe Region, emphasizing prevention of water resource and ecosystem damage while planning and executing development in the Region. Development prior to TRPA's adoption of the land capability system included many damaging land development procedures, including failure to recognize hydrologic and topographic limitations, unnecessary and widespread destruction of vegetation, realignment and pollution of streams, encroachment on flood plains, and disruption of natural drainages. These actions led to the degradation of soil conditions and indirect impacts to various resources including water quality, air quality, biological resources, and recreation. The Regional Plan recognized the adverse cumulative condition resulting from such development and adopted policies and regulations related to land capability and coverage, as well as environmental threshold carrying capacities, aimed to improve the environmental conditions in the Region. Improvement of the cumulative adverse condition in the Region has been the focus of TRPA since.

Cumulative impacts related to land coverage, erosion, and changes to natural topography are considered in the context of the Lake Tahoe watershed. The cumulative projects described above, as well as the Shoreline Plan would adhere to regulations that would prevent increases in land coverage that exceed land capability limits, create soil disturbance that could lead to increased erosion, or make adverse changes to existing topography. Projects would be permitted on an individual basis and would be required to comply with the regulatory protections enforced by TRPA, Nevada Division of Environmental Protection, and the Lahontan Water Board. These protections control the amount of land coverage that can be created by any project, require temporary and permanent erosion control BMPs, and protect natural topographic features.

Therefore, because regulations are in place to protect geologic and soil resources for all cumulative projects within the Lake Tahoe watershed, including shorezone structures, the Shoreline Plan **would not make a considerable contribution** to cumulative adverse effects to these resources.

Seismic effects are localized by nature and are not cumulative. As discussed in Impact 15-4, because the potential for risk to people and structures would be minimized through the seismic design requirements of the California Building Code (CBC) and International Building Code (IBC), and because local hazard mitigation plans would continue to address seiche hazards through public education and development of early warning systems, this impact would be less than significant for all alternatives. Therefore, the alternatives **would not make a considerable contribution** to cumulative seismic impacts.

RECREATION

The Tahoe Region is a tourist destination with numerous recreational opportunities. Recreation services and facilities are located throughout the Region, within urban centers, forested land, along the shoreline, and on waterways. The Quality of Recreation Experience and Access to Recreational Opportunities recreation thresholds are in attainment. Recreational user surveys show the majority of recreational users are very satisfied with their recreational experience (TRPA 2016). The Region has seen a consistent increase in the amount of public land available for low-density recreational use and the number of amenities that provide access to that land. In addition, evaluation of the Fair Share of Recreation Capacity standard indicates an increase in recreational development that is consistent with the policy statement's direction that a "fair share" of resource capacity be available for public recreation, and the Region has experienced an increase in the amount of public land available to support recreational purposes (TRPA 2016). Because the threshold indicators demonstrate a reasonable level of recreational opportunities, experiences, and capacity, there is no existing adverse cumulative condition related to demand for recreation facilities and availability of outdoor recreation capacity.

While the Kings Beach State Recreation Area General Plan and Pier Rebuild Project would provide public access to the lake, there are no cumulative projects that would change public motorized boat use. Therefore, there would be no cumulative impact on access for motorized watercraft or other shoreline users, nor would the Shoreline Plan affect the fair share distribution of recreational capacity around the lake.

Population growth in outlying areas could increase overnight visitors to Lake Tahoe resulting in additional motorized boaters accessing the lake. Cumulative boat density with implementation of Alternative 1 would increase approximately 14 percent as compared to baseline conditions (see Table 17-3). Because of the size of Lake Tahoe (over 190 square miles) and the very low density of existing boating (over 20 acres per boat), this increase would not be noticeable by recreationists on the lake and in the shorezone such that the quality of recreation experience would be degraded. Cumulative boat density with implementation of Alternative 2 would represent an approximately 33 percent increase in boat density on the lake compared to baseline conditions (see Table 17-3). While this level of boat density is still relatively low at over 14 acres per boat, the change is substantial enough that it could contribute to a potentially significant impact related to quality of recreation experiences for motorized watercraft, nonmotorized watercraft, swimmers, and other beachgoers. However, with implementation of Mitigation Measure 8-1c, TRPA would revise the standards to decrease the rate at which new shorezone structures are approved, thus controlling the increase in motorized boats on the lake. TRPA would monitor recreation user satisfaction and if monitoring data indicate the need, the number of boat ramps and moorings could be capped if quality of recreation experience declines, which would also reduce the overall number of boats on the lake under cumulative conditions. Cumulative boat density with implementation of Alternative 3 would represent an approximately seven percent increase in boat density compared to baseline conditions (see Table 17-3). Cumulative boat density with implementation of Alternative 4 would represent an approximately four percent increase in boat density compared to baseline conditions. Under cumulative conditions, the increase in boat trips would not be substantially greater than the boat trips that would occur under buildout of each of Alternatives 3 or 4, as described in Impact 8-1, and would be similar to baseline conditions. For these reasons, there would be **no adverse cumulative condition** related to recreation.

Table 17-3 Peak Day Cumulative Boat Density

	Boat Density[1]					
	Boat Trips	Cumulative Growth in Boat Trips	Existing Plus Project Peak Day (boats/square mile)	Cumulative Peak Day (boats/square mile)	Existing Plus Project Peak Day (acres/boat)	Cumulative Peak Day (acres/boat)
Baseline Conditions	5,899	+204	31	32	20.8	20.1
Alternative 1	+767	+971	35	36	18.4	17.9
Alternative 2	+2,639	+2,843	44	46	14.4	14.0
Alternative 3	+222	+426	32	33	20.1	19.4
Alternative 4	No change	+426	No change	32	20.8	20.1

Notes: NA = not available

Additional detail on the data sources, assumptions, and calculations of boating activity and structure buildout are provided in Appendix A.

[1] The surface area of Lake Tahoe is approximately 122,880 acres, or 192 square miles.

Source: Compiled by Ascent Environmental in 2018

SCENIC RESOURCES

The visual landscape of the Tahoe Region possesses a striking combination of rugged mountain peaks, a vast lake surface, and densely forested slopes. These landscape elements work in concert to produce a visual impression that makes the Lake Tahoe Region one of the truly unique places in the world. Despite development and alteration of the landscape for over a century, the Tahoe Region continues to attract visitors due to its powerful and stunning inherent landscape character.

To maintain scenic values in the Region, as mandated by the Compact, the environmental thresholds include targets for roadways, the shoreline, and public recreation areas and bike trails. As described in Chapter 9, "Scenic Resources," scenic thresholds have improved since 2001, indicating improvement in the cumulative scenic environment. The threshold standard for Scenic Quality is a non-degradation standard, meaning that a scenic resource is considered in attainment of the threshold standard so long as its scenic quality rating remains equal to or higher than the rating it was originally assigned. Thus, there is not an existing adverse cumulative effect associated with scenic quality in the Tahoe Region (2016).

Cumulative increases in boat use would not affect scenic resources, because the boats themselves are temporarily visible on the lake and consistent with Lake Tahoe's character as a recreational destination. Other reasonably foreseeable cumulative projects could combine with the effects of the Shoreline Plan alternatives when they occur within the same viewshed.

After implementation of required mitigation measures, none of the Shoreline Plan alternatives would result in significant impacts related to scenic quality. In addition, future projects including those authorized under the Shoreline Plan and other reasonably foreseeable projects, would be evaluated when those projects are proposed. Project level review would include a scenic assessment consistent with the Scenic Resources/ Community Design, and Light and Glare sections of TRPA's Initial Environmental Checklist. The project-level review of future shoreline projects would require compliance with scenic regulations in the TRPA Code, including the visual magnitude system and mitigation requirements in Chapter 66. Prior to approving a shoreline structure or other project, TRPA would require feasible mitigation measures to reduce or avoid significant adverse environmental effects, including effects on scenic resources. Furthermore, Code Section 4.4.1.B requires that, prior to approving any project, TRPA must make a finding, based on evidence, that the project "will not cause the environmental threshold carrying capacities to be exceeded." This finding would prevent TRPA from approving individual projects that could degrade a shoreline or roadway travel unit rating, or a scenic quality rating for a scenic resource. Therefore, the Shoreline Plan alternatives **would not make a considerable contribution** to a cumulative impact related to scenic resources.

AIR QUALITY

The Lake Tahoe Air Basin (LTAB) is designated as nonattainment with respect to TRPA's 8-hour average ozone threshold standard and TRPA's 24-hour average PM_{10} threshold standard (TRPA 2016:3-8 and 3-9). CARB has designated the LTAB as nonattainment with respect to the California Ambient Air Quality Standards (CAAQS) for ozone and respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}). These nonattainment designations are the result of emissions of ozone precursors, reactive organic gases (ROG), and NO_X, generated by cumulative development projects in the LTAB, as well as from transport of these same pollutants from outside the LTAB. This is also the case regarding the nonattainment status of the LTAB with respect to the CAAQS for PM_{10}. When all sources of ROG and NO_X in the LTAB are combined they result in a severe ozone problem. Similarly, when all sources of PM_{10} in the LTAB are combined they result in a severe PM_{10} problem. The nonattainment designations of the LTAB with respect to the CAAQS for ozone and PM_{10} are the result of the emissions generated by cumulative development in the LTAB, as well as from transport of these same pollutants from outside the LTAB. When all sources of ROG, NO_X, and PM_{10} throughout the Tahoe Region are combined they can result in a severe ozone and PM_{10} problem, as expressed by a nonattainment status with respect to the CAAQS for these pollutants. The analysis of long-term emissions of ROG, NO_X, PM_{10}, and fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$) presented under Impact 10-1 in Chapter 10, "Air Quality," is an inherently cumulative analysis of the combined level of ozone precursor and particulate emissions from existing on-road vehicle travel, boating activity, and area sources in combination with new or increased boating activity and on-road vehicle travel that would result from implementation of the Shoreline Plan alternatives. While cumulative projects such as the Waterborne Passenger Ferry could increase air pollutant emissions during construction, and potentially decrease such emissions during operation (displacing vehicle trips), implementation of Shoreline Plan Alternatives 1, 3, and 4 would result in a net reduction in daily emissions of ozone precursors and particulate matter at buildout in 2040, as explained in Impact 10-1 and as shown in Tables 10-7, 10-9, and 10-10, respectively. Thus, long-term operational emissions under Shoreline Plan Alternatives 1, 3, and 4 **would not make a considerable contribution** to a cumulative impact.

Shoreline Plan Alternative 2 would result in a long-term increase in emissions of NO_X and CO. The long-term increase in NO_X, which is an ozone precursor, could contribute to the nonattainment status of the LTAB with respect to the CAAQS for ozone and/or an exceedance of TRPA's 1-hour ozone threshold standard of 0.08 parts per million (ppm). The long-term increase in CO could conflict with implementation of the CO maintenance plan and/or contribute to exceedances of TRPA's 8-hour threshold standard of 6 ppm. These adverse effects would be cumulatively considerable under Alternative 2. Mitigation Measure 10-2, however, would require TRPA to implement measures to ensure that boat emissions would not cause or contribute to an exceedance of the TRPA's numeric threshold standard for ozone, or the CAAQS for ozone or CO and thereby reducing this impact to a less-than-significant. Thus, long-term operational emissions under Shoreline Plan Alternative 2 **would not make a considerable contribution** to a cumulative impact.

As discussed in Impact 10-2, emissions of pollutants generated during construction are temporary in nature. Emissions are primarily associated with heavy-duty construction equipment and fugitive emissions from ground disturbance and earth-moving activities. Unmitigated emissions associated with construction projects in the LTAB that would occur under the Shoreline Plan alternatives would contribute on a cumulative basis to nonattainment conditions for ozone and PM_{10}. In addition, when taken together, construction-generated emissions would have the potential to result in violations of, or considerable contributions to violations of, ambient air quality standards.

All Shoreline Plan alternatives would implement Mitigation Measure 10-2, whereby TRPA would develop and implement a Construction Best Practices policy to reduce construction-generated emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. Implementation of Mitigation Measure 10-2 would reduce fugitive PM_{10} and $PM_{2.5}$ dust emissions percent for each project and reduce diesel equipment exhaust emissions of NO_X and PM_{10} by a minimum of 20 percent and 45 percent, respectively. This mitigation would minimize construction-generated emissions and an individual project's contribution to cumulative impacts for ozone and PM_{10}. Therefore,

cumulative construction-related emissions of ROG, NO_X, and PM_{10} would be less than significant, and the project contribution **would not be cumulatively considerable**.

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Greenhouse gas emissions are inherently cumulative in nature and are discussed in Chapter 11, "Greenhouse Gas Emissions and Climate Change." Implementation of any of the Shoreline Plan alternatives would result in GHG emissions associated with the construction and demolition of boating facilities and on-road motor vehicle trips to and from new boating facilities. Under Alternatives 1, 2, and 3, implementation of the Shoreline Plan would also result in an increase in GHG-emitting boating activity. It is not feasible to know whether the fleet of motorized boats on Lake Tahoe will become more GHG efficient and, if it does, whether the improvement in GHG efficiency would be enough to offset the GHGs associated with construction activity, the increase in on-road motor vehicle travel, and the projected increase in boating activity. Therefore, this impact would be potentially significant. The development and implementation of a GHG Reduction Policy, as required by Mitigation Measure 11-1, would reduce GHG emissions, but the extent of this reduction depends on participation rates, available funding, and available technology. Given the uncertainty about the magnitude of the increase in GHG emissions under the Shoreline Plan and the uncertain effect of these mitigation measures, the Shoreline Plan alternatives **could have a considerable contribution to the cumulative impact** of GHG emissions and climate change. Mitigation Measure 11-1 requires the implementation of all feasible measures to GHG emissions from boating, shoreline construction, and vehicle trips associated with the Shoreline Plan. Because there is uncertainty in the magnitude of GHG reductions associated with the mitigation and there is no other feasible mitigation this impact would be significant and unavoidable for all alternatives.

NOISE

Many parts of the Tahoe Region are currently nonattainment with respect to TRPA-established noise standards. According to the 2015 Threshold Evaluation, single noise events from aircraft and motorized watercraft; and cumulative noise levels for several land uses and transportation corridors are not in attainment of threshold standards (TRPA 2016). Therefore, ambient noise in the Tahoe Region is an existing adverse cumulative condition.

Noise and vibration levels associated with construction of boating structures would be temporary, intermittent, and relatively minor. Further, construction-related noise and vibration is typically considered a localized affect, affecting the land uses closest to construction activities. Regulations are in place that would limit construction noise and vibration to the less sensitive times of the day and construction activities would implement construction noise-reducing measures required by TRPA, further reducing human disturbance. Given that construction activities associated with individual shorezone structures developed in accordance with the Shoreline Plan would be relatively minor, dispersed over time, and throughout a large area (i.e., entire lake shorezone), noise and vibration levels would be localized only affecting areas surrounding individual construction sites, and would occur during the less-sensitive times of the day, construction activities associated with Alternatives 1, 2, 3, and 4 would not substantially combine with noise from other construction activities or from construction of other cumulative shorezone structures such that it would cause a substantial increase in cumulative noise levels. This impact would **not be cumulatively considerable**.

Under the cumulative conditions, boating activity is anticipated to increase due to population growth and related increases in demand. Because the number of moorings is capped by the Shoreline Plan and growth in boat use associated with moorings is evaluated as part of the project and thus inherently cumulative, this background growth is considered applicable to the types of boating activity that could increase and are not limited by the Shoreline Plan. Because adoption of Alternatives 1, 3, and 4 would limit boating activity to some level, increases in the number of exceedances of single-event noise levels and cumulative noise levels influenced by boating activity would be similar for all the action alternatives, for which little correlation was found between boating activity and number of exceedances. Nonetheless, because of the existing 600-foot no-wake zone enforced by TRPA and the fact that most boat use occurs during the day, boat-related noise is

not a primary noise source affecting CNEL around the lake. Adoption of any of the alternatives would not contribute to the nonattainment status of TRPA thresholds and this impact would **not be cumulatively considerable.**

Long-term increases in traffic-noise on area roadways would be associated with cumulative background growth (future development and population growth within and outside the region) and increases in boating activity related to additional boat structures (e.g., boat ramps, slips, buoys). The number of structures of all types would be greatest with Alternative 2 at buildout, but would be limited with Alternatives 1, 3, and 4. As discussed under Impact 12-4, even if all additional project-generated traffic were to occur on roadways with the lowest existing traffic volumes, a substantial (i.e., 3 A-weighted decibels) increase in noise would not result. Further, increases in traffic would be dispersed around numerous roadways around the lake, thus resulting in much fewer additional trips on any one roadway segment. Because Alternatives 1, 3, and 4 would all limit boating activity by regulating boating structures, additional vehicle trips on affected roadways would also be limited and would not result in a measurable difference in roadway noise under the cumulative condition. In addition, cumulative programs (e.g., RTP/SCS) and cumulative projects (e.g., Waterborne Passenger Ferry) would seek to reduce vehicle trips and noise.

In addition, TRPA, pursuant to the requirements of Mitigation Measure 3.6-1 in the 2012 RPU EIS (TRPA 2012:3.6-15 through 3.6-16) and Mitigation Measure 3.6-4 of the 2012 RTP/SCS EIR/EIS, developed its Region-wide traffic noise mitigation program, which aims to reduce traffic noise levels along highways where they currently exceed applicable TRPA standards and maintain traffic noise levels along highways where they currently do not exceed TRPA thresholds. When this mitigation is completely implemented, traffic-noise levels on transportation corridors would be in attainment of TRPA thresholds. This impact would **not be cumulatively considerable**.

ROADWAY TRANSPORTATION AND CIRCULATION

Cumulative projects, including known, and as-yet unknown residential, commercial, tourist, transit/ transportation, and recreational development in the Tahoe Region, would generate traffic trips that contribute to the cumulative intersection and roadway operations of the region. As described in Chapter 4, “Land Use,” cumulative growth in the Region is limited by the growth control system of the Regional Plan. The analysis in this section reflects the cumulative growth within the Tahoe Region and includes vehicle use associated with complete buildout of all development allowed by the Regional Plan, construction and operation of reasonably foreseeable transportation projects and programs proposed as part of the Regional Transportation Plan, and growth expected to occur outside the Tahoe Region, which could increase vehicle use within the Region.

The 2017 RTP/SCS included updated LOS modeling for major roadway segments within the Tahoe Region for the 2040 (cumulative) conditions. The existing average daily traffic volumes and LOS for these major roadway segments are shown in Table 17-4.

Table 17-4 2040 Cumulative Roadway Segment Operations

Roadway	Roadway Segment	ADT	LOS	PM Peak Hour Volume	PM Peak Hour LOS
US 50	SR 89 (Luther Pass Rd.) to Navahoe Dr.	22,570	**F**	2,060	**F**
US 50	Pioneer Trail to Arapahoe St.	20,260	D	1,940	**F**
US 50	SR 89 to Dunlap Dr.	42,380	E	3,420	**F**
US 50	Tahoe Keys Blvd. to Winnemucca Ave.	39,870	D	3,210	E
US 50	Edgewood Cir. to Al Tahoe Blvd.	41,280	**E***	3,300	**E***
US 50	Pioneer Trail to Park Ave. / Heavenly Village Way	38,450	D	3,320	**E***
US 50	Lake Parkway to SR 207 (Kingsbury Grade Rd.)	36,090	D	3,020	E

Table 17-4 2040 Cumulative Roadway Segment Operations

Roadway	Roadway Segment	ADT	LOS	PM Peak Hour Volume	PM Peak Hour LOS
US 50	SR 207 (Kingsbury Grade Rd.) to Kahle Dr.	27,780	C or better	2,450	D
SR 28	West of US 50	7,610	C or better	660	C or better
SR 28	Red Cedar Dr. to W. Lakeshore Blvd.	18,660	E	1,630	E
SR 28	SR 28 Cal Neva Dr. to Stateline Rd.	20,110	**E****	1,790	**E****
SR 28	SR 28 Brassie Ave. to SR 267 (N Shore Blvd.)	24,930	**F**	2,190	**F**
SR 28	N Lake Blvd. to Lake Forest Rd.	16,280	E	1,510	E
SR 89	South of Lester Beach Rd.	7,010	C or better	810	D
SR 89	Fallen Leaf Rd. / Heritage Way to Valhalla Rd.	7,370	C or better	940	D
SR 89	Tucker Ave. to US 50 (Lake Tahoe Blvd.)	19,950	C or better	1,900	D
SR 267	North Ave. to Tiger Ave.	15,100	E	1,460	E
SR 89	US 50 to Pomo St.	5,370	C or better	540	C or better
US 50	North of Lincoln Hwy	18,020	**E****	1,790	**E****
SR 207	US 50 to Kahle Dr.	14,250	D	1,370	D
US 50	SR 28 to Kings Canyon Rd.	16,150	C or better	1,360	C or better
SR 431	SR 28 to 2nd Creek Dr.	7,340	C or better	670	C or better
SR 267	Tahoe Rim Trail to Gas Line Rd.	12,960	D	1,240	D
SR 89	West of Fairway Dr.	20,740	**E****	1,870	**E****

Notes: ADT = Average Daily Traffic. Level of Service (LOS) in bold font indicates an exceedance of the LOS standard.

* Operations degrade from four or less hours at LOS E (acceptable) to five or more hours of LOS E (unacceptable)

** Currently unacceptable LOS E operations are degraded to a significant degree (v/c ratio increases by more than 0.05)

Source: TRPA 2017

As indicated in Table 17-4, multiple roadway segments (shown in bold) would operate at unacceptable LOS under cumulative conditions. The 2017 RTP/SCS also included updated LOS modeling for cumulative (2040) conditions of major intersections within the Tahoe Region shown in Table 17-5.

Table 17-5 2040 Intersection Operations

Intersection	Jurisdiction	City/Community	LOS/Average Delay (seconds)
SR 28 / SR 267	Caltrans	Kings Beach	E / 69
SR 28 / Village Boulevard	NDOT	Incline Village	D / 37
US 50 / SR 89 (south Y)	Caltrans	South Lake Tahoe	C / 27
US 50 / Ski Run Boulevard	Caltrans	South Lake Tahoe	C / 25
US 50 / Park Avenue	Caltrans	South Lake Tahoe	D / 39
SR 28 / SR 89	Caltrans	Tahoe City	C / 24
US 50 / SR 207	NDOT	Kingsbury	C / 27

Notes: Existing conditions representative of a Friday afternoon/evening peak hour in August.

Source: TRPA 2017

As shown in Table 17-5, all intersections listed would meet applicable LOS standards. As discussed in described in Impact 13-1 of Chapter 13, structures that would potentially be developed under the Shoreline Plan (i.e., public buoys, slips, boat ramps) could result in additional vehicle trips that would be added to the circulation network within the Tahoe Region. However, the timing, location, and intensity of development under the Shoreline Plan alternatives are not known at this time.

As shown in Table 13-4 in Chapter 13, "Automotive Transportation and Circulation," at buildout and during future cumulative peak summer traffic periods the Shoreline Plan alternatives would generate the following number of new vehicle trips:

- Alternative 1: 632 vehicle trips,
- Alternative 2: 2,723 vehicle trips,
- Alternative 3: 423 vehicle trips, and
- Alternative 4: no new vehicle trips.

As shown in Table 17-4 and 17-5, multiple roadway segments would operate at unacceptable LOS under 2040 conditions. Additionally, several intersections would operate at LOS just above an acceptable LOS; and thus, the addition of new project generated trips could result in an increase in delay and degradation of LOS to unacceptable levels at these intersections. Thus, Alternatives 1, 2, and 3 could add traffic volumes in a direction or at a location that would exacerbate an LOS deficiency or degrade an acceptable LOS in the cumulative scenario. Thus, the addition of project generated trips under Alternatives 1, 2, and 3 could contribute to a significant cumulative impact.

However, Chapter 3 of the TRPA Code of Ordinances requires that TRPA review any proposed project to determine if it would result in a significant environmental effect. This project-level environmental review would include an evaluation of the project-generated trips and effects on LOS (see TRPA Initial Environmental Checklist Section 13, and Code of Ordinances Section 65.2). Prior to approving a marina expansion, public boat ramp, or other project TRPA would require feasible mitigation measures to reduce or avoid significant adverse environmental effects, including effects on LOS. Furthermore, Code Section 4.4.1.A requires that, prior to approving any project, TRPA must make a finding, based on evidence, that the project "…will not adversely affect implementation of the Regional Plan, including all applicable Goals and Policies…." This finding would prevent TRPA from approving a marina expansion, public boat ramp, or other project that would exceed the LOS standards identified in Regional Plan Policy T-10.7, or add vehicle trips to a roadway or intersection operating at a deficient LOS. Therefore, effects on LOS would be analyzed and mitigated, if necessary, at the project level.

Alternative 4 would not generate and vehicular traffic; and thus, would not exacerbate an existing LOS deficiency or degrade an existing acceptable LOS. Thus, the Shoreline Plan alternatives **would not make a considerable contribution** to a significant cumulative impact.

The analysis of region-wide VMT resulting from buildout of the alternatives is presented in Chapter 13. That analysis also accounted for cumulative growth that could occur throughout the rest of the Lake Tahoe Region consistent with the TRPA Regional Plan, to allow for comparison of regional VMT under the alternatives to TRPA's regional VMT threshold standard. Table 17-6 shows summer daily VMT in the Tahoe Basin under baseline 2015 conditions and in cumulative 2040 conditions for each alternative, assuming full buildout of the Tahoe Basin. The VMT threshold is periodically updated whenever the TRPA updates its transportation model. The most recent VMT threshold was calculated at 2,030,938 for a peak summer day, based on the 2014 model update. Existing summer daily regional VMT is estimated to be 1,937,070, or 93,868 below the TRPA threshold standard based on the most recent modeling completed to support the Tahoe Regional Transportation Plan (TRPA 2016) but is projected to increase to 2,168,384 by 2040 with normal growth, not accounting for adoption of a Shoreline Plan. Therefore, even without adoption of a Shoreline Plan, Basin-wide VMT are expected to surpass the VMT threshold by 2040. In future cumulative conditions for all alternatives, daily summer VMT in the Tahoe region would increase by various amounts. Some cumulative programs (e.g., RTP/SCS) and cumulative projects (e.g., Waterborne Passenger Ferry) would seek to reduce VMT. However, under cumulative conditions for all alternatives, VMT would exceed the TRPA regional VMT threshold standard of 2,030,938.

However, as described in Chapter 50 of the TRPA Code of Ordinances, two years after each release of land use commodities (which are released in 4-year cycles), TRPA is required to monitor VMT and only release commodity allocations upon demonstrating through modeling and the use of traffic counts that the TRPA VMT threshold standard shall be maintained over the subsequent 4-year period (see Code of Ordinances Section 50.4). Therefore, the monitoring of VMT, and release of commodity allocations contingent on achievement of the TRPA VMT threshold standard would prevent region-wide VMT from exceeding the threshold standard of 2,030,938. This is consistent with the findings of the 2017 RTP/SCS IS/IEC which determined that the mitigation presented in the 2012 RPU EIS (and subsequently incorporated into the TRPA Code of Ordinances as Section 50.4) would be applicable to the current RTP and would adequately resolve the impact. Thus, the Shoreline Plan alternatives **would not make a considerable contribution** to a significant cumulative impact for VMT.

Table 17-6 Region-Wide Daily Summer VMT under Future Cumulative Conditions with Buildout of Each Alternative

	Baseline 2015	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cumulative Region-wide VMT (2040)	n/a	2,168,384	2,168,384	2,168,384	2,168,384
Cumulative Plus Project Region-wide VMT	1,937,070	2,179,752	2,217,391	2,175,997	2,168,384
TRPA Threshold Standard	2,030,938	2,030,938	2,030,938	2,030,938	2,030,938
Standard Met	No	No	No	No	No

Notes: n/a = not applicable. Additional details provided in Appendix A

Source: TRPA 2016; Data provided by Ascent Environmental in 2018

TERRESTRIAL BIOLOGICAL RESOURCES (WILDLIFE AND VEGETATION)

Osprey, bald eagle, and waterfowl are designated by TRPA as special interest species and use the shorezone and adjacent locations for breeding and foraging. As described in Chapter 14, “Terrestrial Biological Resources,” the osprey population in the Tahoe Basin has increased over the last several years; and, bald eagles have nested consistently in two areas of the Tahoe Basin (Marlette Lake and Emerald Bay), with a third bald eagle nest site recently documented at Sugar Pine Point along the west shore. The Tahoe Basin is also a wintering area for bald eagles, and the wintering population is considerably greater than during the breeding season. Because of increased recreational encroachment into wetland areas over the last several decades, habitat quality at TRPA-designated waterfowl population sites has been degraded; however, populations of waterfowl that occur in the Tahoe Basin are not considered rare or threatened.

As described in detail in Chapter 14, potential effects of the Shoreline Plan alternatives on osprey and bald eagle could include construction-related disturbances to nesting activities from new piers and boat ramps, long-term increased disturbance to osprey and bald eagle and suitable habitat from boating and other recreational uses, and habitat degradation within TRPA-designated osprey and bald eagle disturbance zones. Although suitable nesting habitat for waterfowl is limited in the shorezone where new projects would be permitted (e.g., outside of TRPA-designated waterfowl population sites), construction-related activities that may occur within suitable habitat could disturb nesting attempts of waterfowl. The types of potential impacts to osprey, bald eagle, and waterfowl would be similar for Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the locations, amounts, and quality of habitats potentially affected. However, with implementation of Mitigation Measures 14-1a and 14.1b, potential disturbances to osprey and bald eagle nest sites and disturbance zones, and disturbance or loss of waterfowl nests, under Alternatives 1, 2, 3, and 4 would be avoided, minimized, or compensated for. Through implementation of these project-level mitigation measures, the breeding productivity and population sizes of these species, and availability of suitable habitat in the region, would be fully mitigated. Therefore, the Shoreline Plan’s potential contribution to the existing significant cumulative impact on waterfowl habitat would not be considerable; and, the incremental contribution of the Shoreline Plan alternatives, combined with those of related region-wide plans, programs, and projects, **would not make a considerable contribution** to a significant cumulative impact on osprey or bald eagle.

Tahoe yellow cress (TYC) is a sensitive plant species found only on the sandy beaches of Lake Tahoe. This species is designated as a sensitive plant and threshold indicator species by TRPA and is state-listed as critically endangered and endangered by the states of Nevada and California, respectively. Therefore, a baseline significant cumulative impact exists for this species. The current attainment status of the TRPA threshold indicator for TYC is "considerably better than target." However, the attainment status may change from year to year depending on the number of TYC plants found during annual surveys.

Alternatives 1, 2, 3, and 4 of the Shoreline Plan would result in construction and operation of new shorezone structures within beach habitats. Depending on the specific locations and size of individual projects in relation to TYC occurrences and suitable habitat, construction-related activities that may occur within or adjacent to beach habitat occupied by TYC could result in the direct removal of TYC plants, or other disturbances through inadvertent trampling, soil disturbance, and dust deposition. Over the long term, the additional recreation capacity for motorized watercraft, nonmotorized watercraft, anglers, swimmers, and beachgoers could increase the frequency of recreationists within occupied TYC habitat, which could result in additional trampling, degradation, or loss of existing TYC, and adversely affect current or future TYC habitat suitability. The types of potential impacts to TYC would be similar among Alternatives 1, 2, 3, and 4, with some differences in magnitude based on the amounts and locations of beach habitats potentially affected.

Subsection 61.3.6 of the TRPA Code states that "all projects or activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat, shall fully mitigate their significant adverse effects. Those projects or activities that cannot fully mitigate their significant adverse effects are prohibited." Additionally, in California, because TYC is listed as endangered under CESA, any take of TYC would require authorization by CDFW through a California Fish and Game Code Section 2081 incidental take permit. For Alternatives 1, 2, 3, and 4, any potential loss of TYC plants as a result of Shoreline Plan implementation would be a project-level significant impact. However, with implementation of Mitigation Measure 14-2, potential impacts to TYC would be less than significant for all alternatives. With implementation of Mitigation Measure 14-2, TYC plants that are present in areas of potential disturbance would be identified before construction and disturbances to those plants would be avoided. To protect TYC plants from potential long-term increased beach use and disturbance as an indirect result of increased recreation activity in the shorezone, protective fencing and educational signage about the need to avoid these areas would be installed around all TYC clusters on beaches that may be affected. Therefore, with the project mitigation measures implemented, the project **would not make a considerable contribution** to a significant cumulative impact to Tahoe yellow cress.

PUBLIC HEALTH AND SAFETY

Chapter 15, "Public Health and Safety," identifies potentially significant impacts related to an increase in boating accidents due to increased boating and navigational hazards. Specifically, public piers that extend beyond the no wake zone and the 53 percent increase in annual boat trips over baseline conditions that could result with implementation of Alternative 2 could lead to a substantial increase in boating accidents.

Under the cumulative conditions, boating activity is anticipated to increase due to population growth and corresponding increases in demand consistent with increases statewide. Because the number of shorezone structures is capped by the Shoreline Plan and growth in boat use associated with shorezone structures is evaluated as part of the project, this cumulative growth is only applicable to the sources of boating activity that are unaffected by the shoreline plan. In other words, most of the potential boating safety impact would be borne out of and attributable to the proposed Shoreline Plan rather than from background growth or cumulative projects. The project's impacts combined with the incremental increase in boating activity due to population growth would result in cumulatively considerable impacts to public safety.

With implementation of Mitigation Measure 15-1a, new public piers for Alternatives 1, 3, and 4 and multiple-use piers for Alternative 2 would be required to demonstrate that safe lateral access for nonmotorized watercraft and swimmers would be provided within the no wake zone. A 200-foot buffer area between motorized watercraft in motion and nonmotorized recreationists outside of no wake zones would also reduce

conflict between motorized and nonmotorized uses. With implementation of Mitigation Measure 15-1b, TRPA would revise the standards for approval of new shorezone structures that would increase motorized boats on the lake so that the rate of new moorings or boat ramps are approved is metered, based on close monitoring of Lake Tahoe boating accident statistics. Therefore, upon implementation of Mitigation Measure 15-1a and 15-1b, the project's contribution to cumulative impacts to public safety would **not be cumulatively considerable**.

The Shoreline Plan could result in increased activity in the nearshore, foreshore, and backshore, which could hinder emergency responders' ability to access boaters and swimmers in the water. Furthermore, low water conditions during drought years and under future projected climate scenarios would present a challenge for emergency responders, as some existing lake access points are unavailable during low water conditions. Alternatives 1 and 2 would implement low lake level adaptation strategies which would ensure sufficient shoreline emergency access during low water conditions. Under Alternatives 3 and 4, buoy floats and anchors within buoy fields would be allowed to move farther lakeward during periods of low lake levels, but those alternatives contain no other provisions to allow modifications to facilities or structures to be useable during such conditions.

Under cumulative conditions, boating activity is anticipated to increase because of population growth and corresponding increases in demand consistent with increases in statewide. This could further increase activity in the nearshore, foreshore, and backshore, hindering emergency responders' ability to access boaters and swimmers in the water, as well as increase the demand for emergency response. Because most of the emergency responders' watercraft are located on the water, lake access is not an issue for most first responders. TRPA Code section 84.10.2 establishes a framework to provide essential emergency access and egress to and from Lake Tahoe to protect public health and safety would reduce shoreline emergency access impacts. However, Alternatives 3 and 4 do not contain low lake level adaptation strategies and shoreline emergency access could be hindered during low water conditions. The impacts from Alternatives 3 and 4, combined with the incremental increase in demand for emergency response due to population growth, would result in cumulatively considerable impacts to shoreline emergency access.

Mitigation Measure 15-3 would adopt low lake level adaptation strategies for Alternatives 3 and 4 that would accommodate lake access at a wider range of water level conditions, thereby reducing potentially significant impacts to shoreline emergency access because such strategies would maintain sufficient lake access for emergency response providers during low water conditions. Therefore, the alternatives' contribution to cumulative impacts to shoreline emergency access would **not be cumulatively considerable**.

CULTURAL RESOURCES

Development from all Shoreline Plan alternatives, including reasonably foreseeable development projects (including those listed above) and currently unknown projects, would have the potential to result in a cumulative loss or destruction of historical resources in the region. The intensity of development would be lowest under Alternative 4, and highest under Alternative 2. The potential to disturb historical resources would be greater for alternatives with higher levels of development. However, TRPA requires a project-level evaluation of potential effects on cultural resources (see TRPA Initial Environmental Checklist Section 20); and TRPA, state, and federal lead agencies require mitigation of potential effects on known or unknown cultural resources as a standard practice.

As described in Chapter 16, "Cultural Resources," impacts to known and unknown historical and archeological resources, and ethnic and cultural values would be avoided and minimized through implementation of Mitigation Measures 16-1 and 16-2. These mitigation measures would offset the project's contribution by requiring historic and archeological evaluations before development starts and would require protective measures for significant resources identified. With implementation of Mitigation Measure 16-1 and 16-2, the Shoreline Plan **would not make a considerable contribution** to cumulative impacts on cultural resources.

18 OTHER TRPA-MANDATED SECTIONS

18.1 EFFECTS FOUND NOT TO BE SIGNIFICANT

Where appropriate, topics and specific issues that are not applicable to the Shoreline Plan alternatives have been scoped out of this EIS. Topics that do not require analysis because the Shoreline Plan alternatives either do not involve those elements, or are not geographically or temporally linked to them, are discussed below along with the reason for dismissal.

Light and Glare. Development under the Shoreline Plan alternatives would not produce new sources of light or glare. Piers and boat ramps would be prohibited from having lighting, and other shorezone structures such as buoys, slips, boat lifts, and swim platforms would not include lights. The components of marina expansions regulated by the Shoreline Plan under Alternatives 1, 2, and 3 (or new marinas under Alternative 2) would also not generally be associated with new sources of light or glare, because they would be related to additional moorings. In addition, each future project would require some level of project-specific environmental review that would verify that marina modifications would not result in significant light and glare effects. Boating activities on Lake Tahoe are almost exclusively limited to daytime hours, with the exception of occasional boating during fireworks displays. Therefore, boating would not result to impacts related to light. Reflective materials would not be allowed in construction of any new shorezone structures. Therefore, impacts on light and glare are not addressed in detail in this EIS.

Population and Housing. All shoreline structures would be associated with existing or new primary uses, such as residences, public beaches, or marinas. The Shoreline Plan alternatives would not increase or decrease the amount of or demand for housing, because housing availability and demand are driven by primary land uses not shorezone structures. Therefore, an analysis of housing is not provided in this EIS. Similarly, the Shoreline Plan alternatives would not involve development that would have the ability to redistribute population, or produce population growth in the Region; therefore, impacts on population, including the distribution and displacement of residents, are not further discussed in this EIS.

Recreation Demand. The Shoreline Plan does not propose new development (e.g., residential or tourism development) that would generate new demand for recreation facilities; thus, increased demand for recreation facilities is not addressed in this EIS.

Transit and Other Transportation Modes. Most structures proposed under the Shoreline Plan alternatives would support boating, for which a personal vehicle is generally required; therefore, it is unlikely that any transit demand would be generated by the alternatives. As a result, it is unlikely that the Shoreline Plan alternatives would result in the need for increased transit service. The Shoreline Plan alternatives would not propose new airports, or rail lines, nor would they interfere with or alter existing air or rail travel patterns. Because the alternatives would not affect air or rail travel patterns, the effects on the respective transportation systems are not evaluated within this EIS.

Energy. Shorezone structures allowed under the Shoreline Plan alternatives would not create demand for new sources of energy. There are no energy utilities that would experience substantial new demand, nor new energy connections that would be necessary. Alternative 2 would allow new marinas with a Marina Master Plan, which would undergo project-level environmental review for energy demand and effects on existing utilities; however, it is not expected that there would be considerable consumption of energy associated with operation of a new marina. Construction activities would require mobile equipment to operate but would not consume fuel in quantities that would be significant relative to region-wide fuel consumption. Therefore, energy consumption has not been analyzed in detail as an effect of the Shoreline Plan alternatives in this EIS.

Tree Removal and Forest Resources. None of the Shoreline Plan alternatives would affect old growth forest ecosystems; and, any future tree removal required for the construction of new facilities (e.g., marinas, boat ramps) in the shoreline would be infrequent, minor, and likely similar in magnitude to potential effects under current ordinances. Additionally, modification of shoreline policies and ordinances under any of the alternatives would not change existing policies, Code provisions, project-level environmental review procedures and permitting requirements, sensitive design practices, and standard conditions of approval that address tree removal or the potential introduction and spread of terrestrial invasive species as a result of future projects. Therefore, shoreline ordinance modifications under any of the alternatives are not expected to substantially change conditions related to these resources and issues, and they are not addressed in this EIS.

Flood and Wildland Fire Hazards. A dam constructed at Tahoe City in the early 1900s regulates water flow to the Truckee River from Lake Tahoe at Tahoe City. Because the Shoreline Plan project area is confined to the shorezone and lake levels are regulated by the dam, flooding hazards are not a concern within the shorezone and are not addressed in this EIS. The shorezone does not include lands designated as high fire hazard severity zones. Thus, wildland fire risk is not discussed in this EIS.

Public Services and Utilities. The Shoreline Plan does not involve alterations to or increased need for schools; or for utilities such as power, natural gas, communication systems, water, and wastewater disposal. These issues are therefore not addressed in this EIS.

18.2 RELATIONSHIP BETWEEN THE SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Chapter 3 of the TRPA Code of Ordinances requires a discussion of the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. This requirement recognizes that short-term uses and long-term productivity are linked, and the opportunities acted upon in the near term have corollary opportunity costs in to foregone options and productivity that could have continuing effects well into the future.

This EIS assesses the effects of adoption of a Shoreline Plan for Lake Tahoe. The plan would balance recreational opportunities and preservation of the environment through allocation and regulation of shorezone facilities. Because of the policy-oriented nature of the decisions that are to be made, the EIS is prepared at a programmatic level of analysis commensurate with the level of specificity of the Shoreline Plan alternatives themselves. As such, the analysis focuses on the potential effects of a full-scale buildout of facilities allowed under each alternative and the policies that would guide implementation, as proposed under each alternative, rather than specific projects. However, the Shoreline Plan will be implemented through as-yet-undefined projects that will be accompanied by site-specific project review and environmental documentation following approval of the Shoreline Plan. Those projects will result in the short-term use of the environment, with implications for the maintenance and enhancement of long-term productivity.

All Shoreline Plan alternatives would allow for some new development, construction of which would result in short-term increases in the use of the shorezone. Construction activities would result in the use of energy and resources to prepare project sites and construct new facilities. Development of shorezone structures as individual projects under the Shoreline Plan would result in short-term construction-related impacts such as interference with local traffic and circulation, air pollutant emissions, temporary noise sources, disturbance of wildlife, and construction-related runoff.

New shorezone development projects would require the use of raw land, including installation of pier foundations, clearing of nearshore vegetation, and other construction disturbance. Once committed to new development, it is unlikely that the land would be returned to a natural state in the near or long term. Effects on soils, habitat, and land uses from placement of new structures would be considered permanent. The resulting increase in development in the shorezone would have associated impacts to aquatic biological

resources, recreation, water quality, air quality and climate change, traffic and circulation, noise, and public safety.

Alternatives 1, 3, and 4 would incentivize the demolition of existing piers in stream mouth protection areas and scenic travel units that are not in attainment of thresholds, which would provide for restoration of those lands. Additionally, all alternatives would allow relocation of structures from sensitive areas, which would necessarily result in the demolition or removal of the old structure. Any demolition and restoration actions would result in short-term disturbance of the removal site, including sensitive areas such as stream mouth protection areas and scenic travel units in nonattainment, but would contribute to long-term improvement in the productivity of sensitive areas and result in environmental benefits (e.g., water quality, soils, scenic) to the region.

The Compact committed the region to establish, attain, and maintain environmental thresholds. These environmental thresholds provide standards and guidance for the Regional Plan and complementary plans, such as the Regional Transportation Plan and Shoreline Plan to implement short-term actions to effectuate long-term productivity. Approval of any of the Shoreline Plan alternatives would support the region's commitment to long-term environmental improvement through control of shorezone growth and implementation of environmentally beneficial programs and policies for implementation.

18.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

A commitment of resources is irreversible and irretrievable when the use or consumption of the resource renders it non-renewable or non-recoverable for future use, such as with fossil fuels or electricity. Activities associated with development of shorezone structures implemented under the Shoreline Plan alternatives would result in the irreversible and irretrievable commitment of energy and material resources primarily during construction of individual projects.

The four Shoreline Plan alternatives include varying levels of new shorezone structures, the range of which is detailed in Chapter 2, "Description of the Proposed Project and Alternatives." The increase in shorezone development ranges among the alternatives, with a low development alternative reflected in Alternative 4, to a high development alternative reflected in Alternative 2. The alternatives balance environmental preservation and restoration with new shorezone development and are intended to propose a range of development levels. Under Alternative 4, there would be a two percent increase in the number of piers, and no other new shorezone structures, while under Alternative 2 there would be over 60 percent more piers, almost 80 percent more moorings, and a more than 25 percent increase in the number of boat ramps (see Exhibits 2-9 through 2-11 in Chapter 2).

Each alternative would allow for some new structures, and in the case of Alternatives 1, 2, and 3 would increase boating activity on the lake. Energy and fossil fuels would be expended in the form of gasoline, diesel fuel, and oil for vehicles equipment in support of construction and maintenance. Alternative 2 would also increase boating activity to a point where there would be an increase in fuel consumption from boating, even considering offsets from cleaner boat fleet engines at buildout year 2040. For Alternatives 1, 3, and 4, there would be an overall decrease in fuel consumption related to boat use at buildout of the plan, and the increase in fuel consumption associated with those alternatives would be attributable to construction and the increase in vehicle miles traveled.

Alternatives 1, 3, and 4 would provide incentives to transfer existing piers out of stream mouth protection areas and scenic travel units that are not in attainment. Alternatives 1, 3, and 4 would also allow relocation and transfer of structures in effort to achieve and maintain environmental thresholds and allow boat ramp relocation to adapt to low lake levels. All alternatives would allow exchanges between different mooring types. Construction activities and demolition of existing facilities would generate nonrecyclable materials, such as solid waste and construction debris. Electricity and natural gas would be expended for the construction and operation of new marinas under Alternative 2. Construction of new marinas would also

involve irreversible changes associated with excavation, grading, and construction activities and would affect air quality, coverage, and water quality. These changes would be addressed through project-specific review and environmental analysis and implementation of site-specific mitigation measures; however, the potential for disturbance would represent an irreversible change. In addition, many construction activities would entail the use of concrete, glass, plastic, and petroleum products, as well as an increase in energy consumption, which would be irreversible and irretrievable upon expenditure.

18.4 GROWTH-INDUCING IMPACTS

Section 3.7.2(H) of the TRPA Code of Ordinances requires that an EIS evaluate the growth-inducing impacts of a proposed project. Growth can be induced by eliminating obstacles to growth or by stimulating economic activity in a way that encourages increases in population in the Tahoe region. Growth in the Tahoe region is limited by the development commodities (also referred to as development rights) system through the allocation of residential, commercial, and tourist accommodation commodities that are capped and allocated under the Regional Plan. By regulating these commodities, the Regional Plan limits the number of residents and tourists that the region can accommodate. As described under Impact 4-1 in Chapter 4, “Land Use,” the Shoreline Plan alternatives would not alter the amount of growth forecasted for the region under the Regional Plan.

Although the Shoreline Plan alternatives neither propose nor approve any specific shorezone projects, the alternatives would allow new development and redevelopment of shorezone structures. The types of shorezone structures that would be allowed (piers, buoys and other moorings, boat ramps, and other shorezone features) relate to the recreational experience at Lake Tahoe and would neither accommodate nor facilitate an increase in the capacity of the region to support new residents, tourists, students, or workers. The addition of new public access facilities could attract an increase in the number of day-use visitors to the region; however, longer-term visitation is influenced to a greater degree by the availability of overnight accommodations, which is unaffected by the Shorezone Plan. Visitors would not increase the residential, commercial, or tourist accommodation capacity of the region because that capacity is limited by the Regional Plan. Therefore, while the Shoreline Plan would allow new structures, the structures associated with the Shoreline Plan alternatives—by their nature—would not be growth inducing.

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