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STAFF REPORT

Date: March 17, 2021
To: TRPA Governing Board
From: TRPA Staff
Subject: Presentation of the Draft 2019 Threshold Evaluation

Summary and Staff Recommendation:

Staff will provide a summary presentation of the Draft 2019 Threshold Evaluation and the updated Threshold Dashboard on Lake Tahoe Info. This item is for informational purposes and no action is required.

The 2019 Threshold Evaluation will be made publicly available online on Lake Tahoe Info, at <https://thresholds.laketahoeinfo.org> by March 24, 2021 for that day's Governing Board meeting. Staff will summarize the evaluation findings and provide instructions for accessing and navigating the virtual report to facilitate review by the Governing Board, Advisory Planning Commission, and the public. The final evaluation will be brought to the Governing Board later in 2021 for issuance.

Background:

The threshold standards establish the Region's shared vision for environmental restoration of the Tahoe Region, guide permitting and management actions under the TRPA Regional Plan, and direct public and private investment through the Environmental Improvement Program. In 1982, the TRPA Governing Board adopted more than 150 threshold standards in nine categories: water quality, air quality, noise, vegetation, wildlife, scenic resources, soil conservation, fisheries, and recreation.

Every four years, TRPA leads the development of a threshold evaluation report. It is a snapshot of a point in time that assesses conditions relative to the goals of the adopted threshold standards. The 2019 Threshold Evaluation is the seventh comprehensive evaluation since the Regional Plan was adopted in 1987. The Region has long aspired to more real-time, transparent reporting. The transition from a lengthy paper report to a real-time digital format began with the 2015 Evaluation Report. The 2019 Threshold Evaluation marks a major milestone for the Region and is the first evaluation presented primarily as an online, interactive dashboard at <https://thresholds.laketahoeinfo.org>. The dashboard's format is modeled after best practice for presenting dynamic, complex information to the public, decisionmakers, and stakeholders. The format makes layers of information far more transparent and readily accessible, better links regional actions to outcomes, and allows for real-time updates without waiting for the 4-year reporting cycle. Please see the "*Navigating the Threshold Dashboard on LakeTahoeInfo.org*"

section of this staff report for detailed guidance for accessing the 2019 Threshold Evaluation information.

Overall Threshold Status: The 2019 Threshold Evaluation considers conditions relative to 146 standards in nine threshold categories (Figure 1). Status determinations relative to the standard were made for 113 (77 percent) standards. Of these, 80 percent (90) were found to be “at or better than target” or “considerably better than target.” Fisheries, scenic resources, vegetation, air quality, and noise showed incremental improvement from the 2015 evaluation. In addition, using best science and technology, TRPA was able to improve the reporting and categorization of results for nineteen additional standards in 2019.

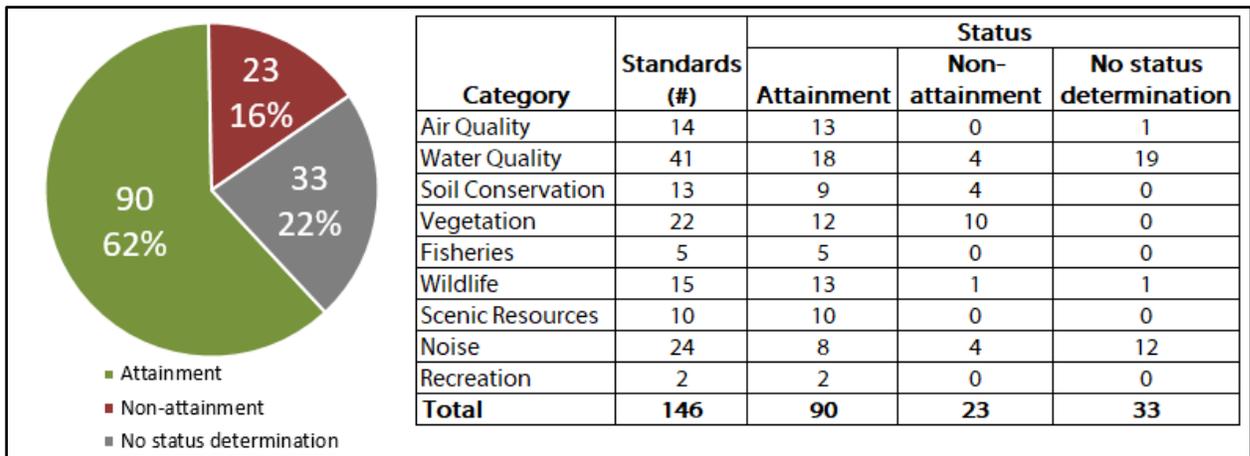


Figure 1. 2019 status determination summary by threshold category for the 146 threshold standards addressed in this evaluation. Standards were placed into one of three categories: Attainment – where conditions are at or better than the standard; Non-attainment – where conditions are worse than the standard; and No status determination - where ambiguity in the standard, reference to an unknown historic baseline, or insufficient data precluded a determination of status. Determinations were made for 77 percent of the standards, with 80 percent of those statuses determined to be in attainment.

Threshold Indicator Trends:

Trend determinations were possible for 79 of the 146 standards evaluated (54% of standards), and most where trend could be assessed are either improving or show little or no change. This reflects two factors, first that many thresholds establish long term goals for the Region and progress occurs slowly and in small increments. For example, the goal for re-establishing old growth forest in Region, can only be attained as fast as trees age, and if all continues to go well, will be attained sometime in the next century. Absent large-scale wildfire the vegetation on our landscape rarely changes meaningfully over four years. Second, more than one-third of the threshold standards establish goals of protecting a resource from degradation or the goal of the standard (and management) is that no change occurs. For these indicators, such as the standard to “Preserve existing naturally functioning SEZ lands,” success means no change; it is a beneficial outcome to maintain conditions.

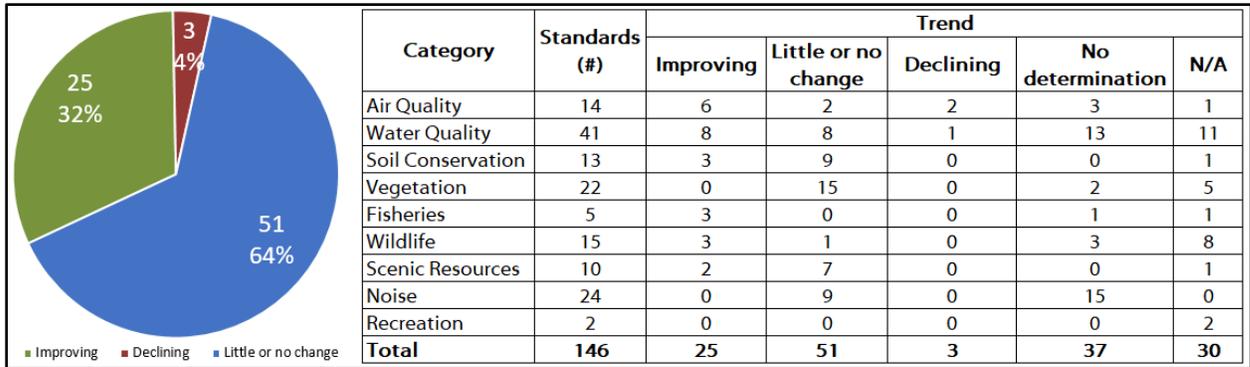


Figure 2. A trend determination was made for 79 of the 149 indicators. Standards were placed into one of four trend categories: Improving – where status was improving relative to the trend; little or no change – where status change was less than 0.5 percent; declining – where status relative to trend increased by more than 0.5 percent; and no determination – where insufficient data exists to assess trend or where status determination was qualitative. Ninety-six percent of the standards with trend determinations were found to be improving or little to no change.

Highlights

The findings of this evaluation are generally consistent with past evaluations. They show progress towards attainment of the standards, and that progress is incremental. Progress is possible only with the partnership of many agencies and the coordinated implementation and investment from every sector – federal, state, local, and private. From within the general summary of results, a few key highlights are worth noting:

Stream Environment Zones (SEZ) – The SEZ threshold standard (SC12) to restore 25% of stream environment zones (SEZ) that have been disturbed or developed is on a path to imminent attainment once the ongoing construction of the Upper Truckee Marsh restoration project is complete. To address emerging threats from more extreme climate events, further SEZ restoration may be needed. The Stream Environment Zone (SEZ) Technical Advisory Committee completed an assessment of the health of SEZ at the regional scale. The first of its kind comprehensive assessment establishes the current condition of SEZ in the Region and is an essential step to developing a new SEZ restoration standard.

Stream Habitat – Fisheries standards (F1-3) establish goals for high-quality stream habitat in the Tahoe Region. This evaluation found the Lake Tahoe Environmental Improvement Program (EIP) achieved its stream restoration goal as identified in the 1982 Threshold Environmental Assessment. Updated technology, remote sensing, and mapping as part of the SEZ baseline assessment enabled an improved assessment of stream habitat. Eighty-five percent of the Region’s stream habitat was rated excellent or good.

Wildlife – the special interest species standards (W1-W15) protect nesting and range habitat from human disturbance and habitat alteration. Peregrine falcons have made a remarkable recovery in the Tahoe Basin and EIP partners worked together to discourage nest disturbance from hiking and climbing activities near peregrine falcon nest sites, resulting in the highest population of peregrine falcon and the highest number of active nests in Tahoe in decades.

Scenic Resources - The visual landscape of the Tahoe Region is one of its most impressive and memorable qualities. TRPA monitors 869 different scenic viewpoints along roadways and the shoreline as viewed from the lake, as well as public recreation areas and along bike trails to protect and enhance the important scenic values of the Tahoe Region. Because of TRPA's scenic shoreland ordinances, building and design standards in new construction and redevelopment, and Environmental Improvement Program project improvements, 93 percent of the evaluated scenic resources met or exceeded the threshold standard. The scenic values for eleven of the resources increased in 2019, while none decreased.

Cause for Concern:

The threshold evaluation is a core element of the adaptive management process for the Region, and this evaluation highlights some areas of concern. First among those is evidence in the evaluation findings of the growing impact of climate change on the Tahoe Region. The growing challenges of managing for climate change are visible in the air quality and water quality thresholds, two areas the region has invested heavily, and those gains are being influenced by climate change.

Air Quality: Air quality in the Tahoe Region continues to be very good. This evaluation found nearly all standards to be in attainment and many have been in attainment since they were adopted. Historically, air quality concerns in Tahoe and other regions, have been dominated by concerns about automobile emissions. The byproducts of combustion include most of the air quality constituents of concern (or their precursors). Increasingly strict federal and state emissions standards have led to cleaner and cleaner vehicles and drops in emissions of most pollutants of concern in Tahoe and throughout the country.

Today's concern is no longer primarily auto emissions but extreme fire events. The evidence of this evaluation shows that the increasing severity and intensity of wildfires in and around the Region is impacting the Region's air quality. This is most visible in acute particulate matter indicators (AQ9 & AQ11). Pollutants of concern to human and environmental health are often measured both as function of ambient exposure, which measures average levels throughout the year, and acute exposure, which measures the highest level of exposure over a short period of time, generally a 24-hour period.

Fine particulate matter is a concern to human health because when inhaled it is associated with a suite of respiratory and health problems. All four particulate matter standards were in attainment in 2019, with annual average concentrations of particulate matter decreasing in the Region. While air quality assessed on an annual basis is improving, the evaluation revealed a diverging trend between the acute and ambient measures. The highest measurements for 24-hour concentrations of both fine particulate matter (PM10) and extremely fine particulate matter (PM2.5) are increasing with higher frequency and intensity wildfires throughout the western United States. The Forest Health sub-program of the Environmental Improvement Program actively implements forest health and fuels reduction projects throughout the Region to address the growing risks from wildfire smoke to the Region's air quality.

Water Quality: The second area of concern is the possible effects of changing climate on the Lake's clarity. The historic decline in clarity is well documented, between late 1960s and 2000 nearly 30 feet of clarity was lost. Aggressive action by managers halted the decline, and since 2000, Lake Tahoe's clarity has remained stable. Annual clarity measurements typically vary

widely, so we look to longer term trends, which are encouraging. The five-year running average from 2015 to 2019 was 20.4 meters (67 feet). Tahoe TMDL implementing partners continue to exceed annual load reduction milestones, charting the course to restore the historic clarity of the lake.

However, recent observations show a diverging trend in clarity. While winter clarity appears stable or improving, summer clarity continues to decline. Research indicates that the summer clarity declines are likely tied to climate change and invasive species. Three climate change driven changes have been observed, and individually and collectively all are thought to be reducing clarity. First, as more precipitation falls as rain and not snow, the temperature difference between inflowing waters and the lake itself changes. Inflowing tributaries generally have higher sediment concentrations than the lake itself. When inflow is primarily snowmelt and generally cold, that inflow plunges down to the depths of the lake and does not impact surface clarity. However, when the inflowing water is warm, it stays near the surface and impairs clarity. Second, the waters of the lake are warming, and as the lake has warmed, it also mixes less frequently. Mixing occurs when the waters at the bottom of the lake come up to the surface, forcing the relatively sediment rich surface waters to the bottom. Amazingly, the deep waters of the lake are even clearer than the surface waters of the lake, so this mixing process has historically improved surface clarity. Third, the warming surface waters have shifted the ecology of the lake and made the surface waters more hospitable to a small, clarity impairing algae, called *Cyclotella*. Increased *Cyclotella* concentrations are associated with lower clarity, especially in summer. *Cyclotella* may also be flourishing, because of the loss of natural predators in the lake, because of the introduction of an invasive species to the lake.

NASA records indicate that 2020 was the warmest year on record, with an average temperature nearly two degrees Fahrenheit higher than average between 1950 and 1980. Climate forecasts suggest that extreme droughts may be more frequent and longer duration. Understanding the drivers of the summer clarity declines is now a priority of the Tahoe Science Advisory Council, and TRPA and partners continue to work closely with the science community to understand the causes and how to influence these declines in the face of climate change.

Threshold Update:

The 2019 Threshold Evaluation includes many standards adopted decades ago. To bring our measurement and monitoring systems current with emerging regional goals and concerns, we are continuing to press forward TRPA's Threshold Update Strategic Initiative. The majority of the current threshold standards were adopted in 1982 based on science that is over 35 years old. In January 2018, the Governing Board directed focused review and update in four priority categories; 1) Air Quality: Vehicle Miles Traveled 2) Soil Conservation: Stream Environment Zones, 3) Recreation, and 4) Vegetation Preservation. In addition, the Board directed staff to work with the Tahoe Science Advisory Council (Science Council) on the updates, specifically to address overlap in the system, and to reassess the structure of the system more broadly. In May 2018, the Governing Board unanimously voted to adopt a system reorganization, modifications that were the result of over a year of work with the Science Council and other partners. Then, in April 2019, the Governing Board adopted further recommendations of the Science Council for a structured system of review and amendment of threshold standards and for evaluating adaptive management. The new system requires threshold standards to be specific, measurable, and outcome based. An early set of threshold standard amendments cleaned up ambiguous threshold standards. As a result, today there are currently 146 standards

evaluated in the 2019 Threshold Evaluation, down from 173 in 2015, with no change in environmental protection. Extensive work has been underway to update the air and water quality categories.

Contact Information:

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Attachments:

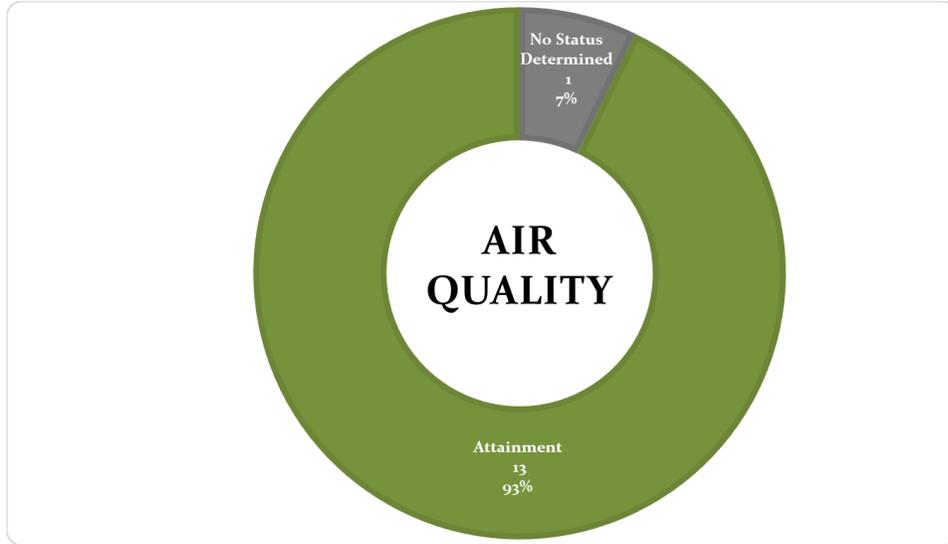
- A. Summary of Findings by Threshold Category
- B. Navigating the Threshold Dashboard on LakeTahoInfo.org

Attachment A

Summary of Findings by Threshold Category

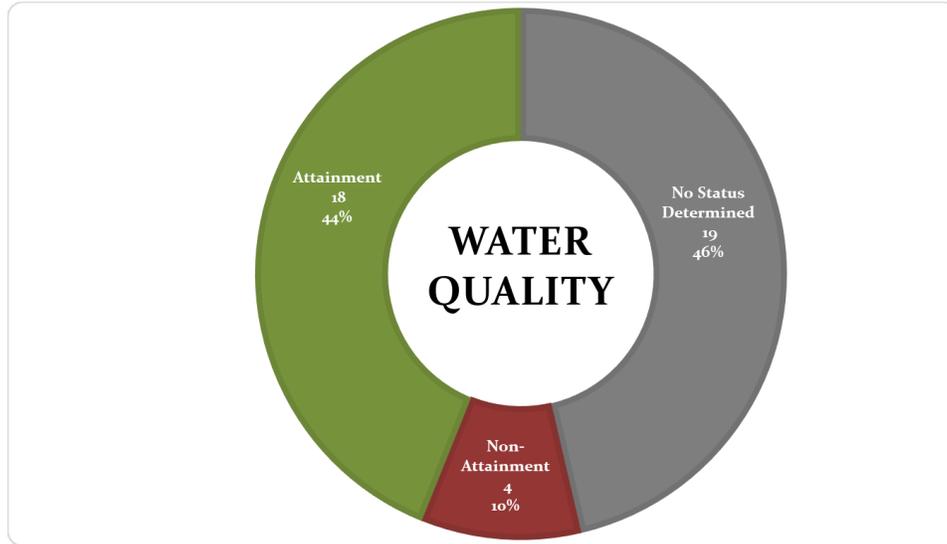
Summary of Findings by Threshold Category: The following sections summarize the findings and conclusions of the 2019 Threshold Evaluation by each threshold category.

Air Quality:



Air quality conditions in the Tahoe Region are very good. Nearly all of the air quality standards are in attainment and observed change suggests that conditions are either stable or improving. These observations are consistent with past threshold evaluation reports. Actions to improve air quality in the Tahoe Region occur at the national, state, and regional scale. The Region’s air quality is influenced by local emissions from residential and industrial uses, the transportation sector, and road dust and regional transport of pollutants from sources outside the Region, including wildfire, topography, and meteorology. Federal and state actions to reduce the emissions of harmful pollutants at state-wide and national scales have contributed to improvement in air quality at Tahoe. While the long-term average conditions are stable or improving, peak observations are reaching record levels as climate change and increasing temperatures take effect. The transport of pollutants into the Region from record-setting wildfires throughout California, Nevada, and the western states are increasing impacts from particulate matter reaching the Region from surrounding areas.

Water Quality:



In water quality, the surface runoff standards (WQ 19-22) and load reduction standards (WQ 34-41) were generally improving or stable. The gains made are a direct result of the work of TMDL implementing partners who continue to meet and exceed load reduction targets.

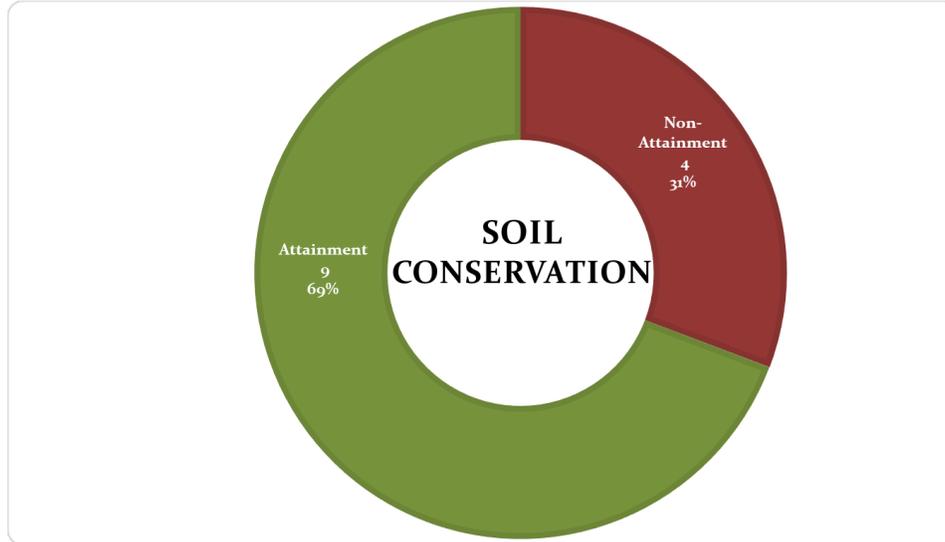
The continued success of the aquatic invasive species (AIS) prevention program is another notable achievement for the water quality threshold. Thanks to the inspection of more than 354,000 watercraft prior to launch and the decontamination of more than 88,000 boats, no new AIS have been discovered in Lake Tahoe since the program's inception in 2007.

The evaluation also highlighted the achievements of the AIS control program. EIP partners treated 47 acres of AIS between 2016 and 2019. The region also completed its first ever lake-wide inventory of native and invasive aquatic plants was completed in 2020. The survey documented nearly 30 acres of Eurasian watermilfoil infestation and 8.8 acres of curly-leaf pondweed infestation. The survey helps target future treatment and provide a baseline from which to evaluate the success of future treatments.

The long-term decline in clarity was halted about 20 years ago, and annual clarity has remained relatively stable since 2000. However, the average annual clarity value in 2019 was 19.1 meters (62.7 feet), the second worst annual average recorded (18.2 meters/59.7 feet in 2017). The five-year running average from 2015 to 2019 was 20.5 meters (67.3 feet). Recent analysis by the Tahoe Science Advisory Council has highlighted emerging differences in seasonal clarity trends and concerns about the effects of climate change.

Phytoplankton primary productivity in the deep waters of the lake continue to increase which is a concern as it could signal a shift away from the lake's historic oligotrophic state. Understanding the drivers of increasing productivity remains a priority for partners in the Region.

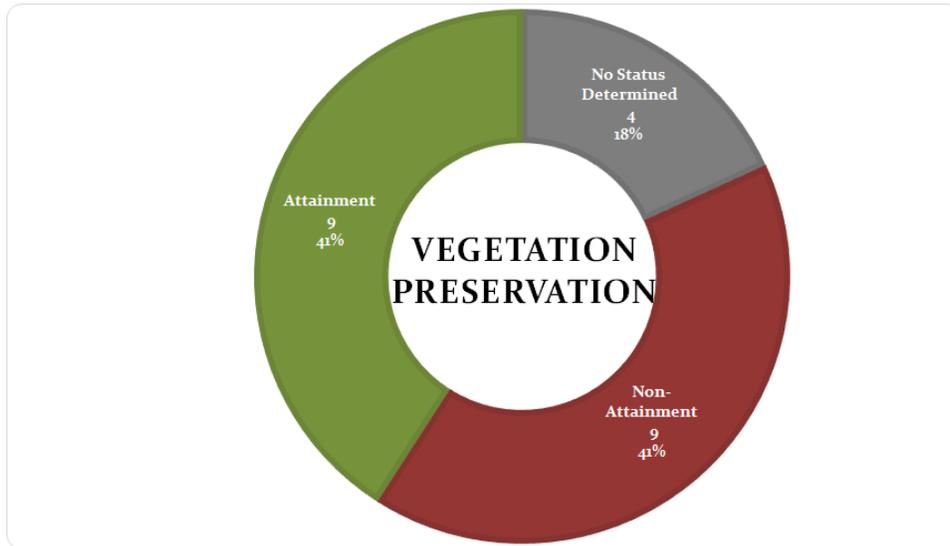
Soil Conservation:



There has been negligible change in the total impervious cover in the Region in the last four years. Between 2016 and 2019, 24 acres of hard impervious cover were permitted through TRPA permit approvals, and nearly 10 acres of existing coverage was removed, restored, and banked during this time. Overall, total impervious coverage within the Region is estimated at 8,259 acres, or 4.1 percent of the Region. Since 2012, eight acres of cover in land capability class 1b (environmentally sensitive) has been removed. All land capability classes are in attainment except for Class 1b and Class 2.

TRPA and partners completed the first ever comprehensive stream environment zone (SEZ) baseline condition assessment in 2020. This assessment establishes a benchmark upon which to measure future conditions and identifies priority areas for restoration projects. The assessment also supports establishment of a new suite of threshold standards for SEZ in the Region, as the Region is nearing attainment of the stream environment zone (SEZ) restoration target established in 1982. To date, 1,057 acres of SEZ have been restored by the Lake Tahoe Environmental Improvement Program partners.

Vegetation Preservation:



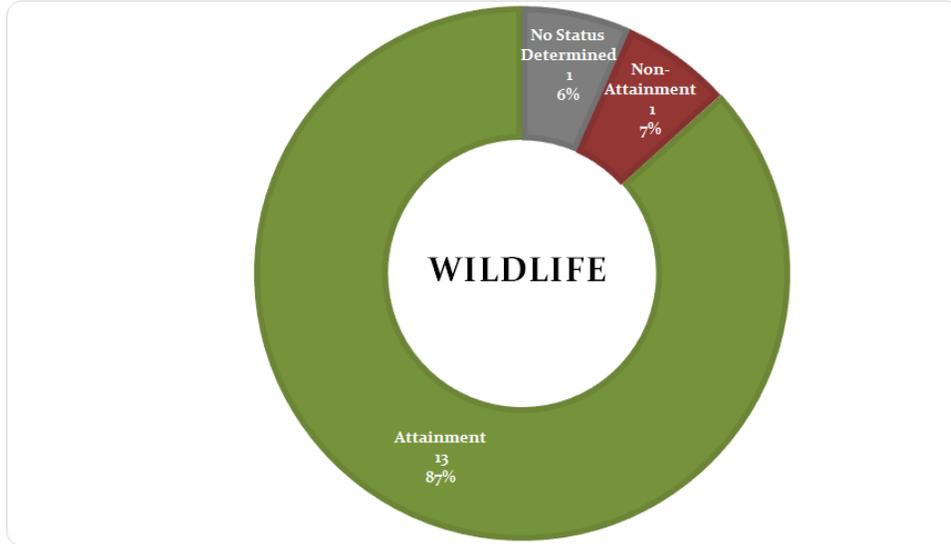
The Tahoe Region's diverse and unique plant communities provide a variety of environmental and ecological functions and values including water quality, wildlife habitat, soil stabilization, and nutrient cycling. Plant communities also contribute to the Region's scenic quality, improve air quality, and facilitate noise control. Past logging practices, development and recreation impacts, as well as climate change, among other threats, pose a threat to the integrity of the Region's vegetation communities and plant species. The standard for Tahoe yellow cress population sites (VP21) was somewhat worse than target in 2019, despite population levels that were more than double those observed during the last sustained period of multi-year high lake levels from 1995 to 2000.

Fisheries:



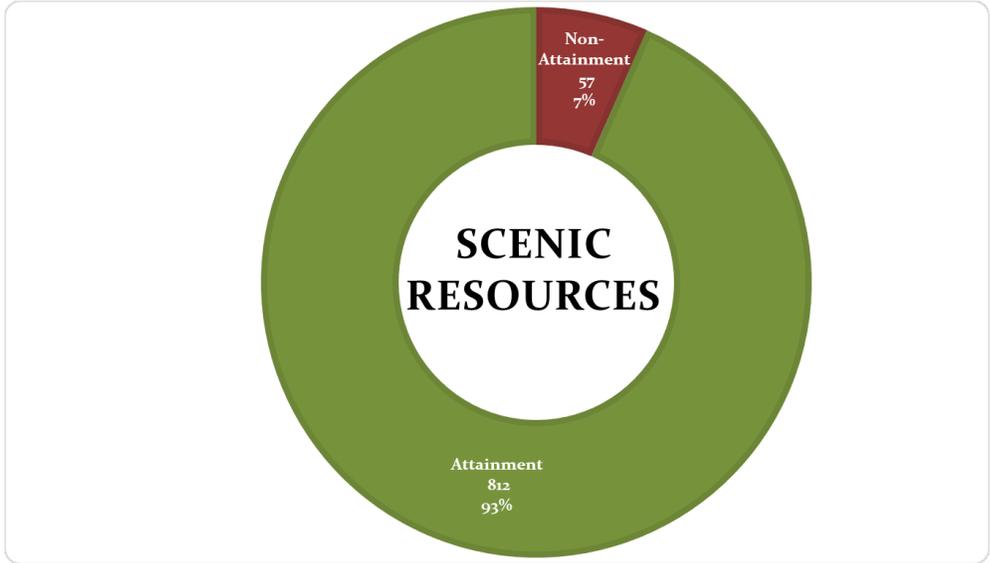
Five fisheries standards are intended to improve and maintain lake and stream habitat. The Region is meeting all the threshold standards for fisheries. Stream habitat condition improved between 2015 and 2019 and moved into attainment as the Lake Tahoe Environmental Improvement Program (EIP) achieved the stream restoration goal set in 1982. The EIP continues to prioritize investments in the restoration and enhancement of streams; EIP partners restored 14,680 linear feet of streams and enhanced 24,140 linear feet of streams between 2016 and 2019. Eighty-five percent of the Tahoe Region's streams are in good or excellent condition.

Wildlife:



The wildlife standards enhance the suitability and extent of riparian habitats and maintain and protect special interest species like bald eagle, osprey, and goshawk. Thirteen of the 15 wildlife standards are in attainment. Over 50 percent of the land area in the Tahoe Region is designated for protection of listed special status species. Populations of most of the protected species are either stable or increasing. Peregrine falcons have made a remarkable recovery in the Tahoe Basin and EIP partners worked together to discourage nest disturbance from hiking and climbing activities near peregrine falcon nest sites, resulting in the highest population of peregrine falcon and the highest number of active nests in Tahoe in decades.

Scenic Resources:

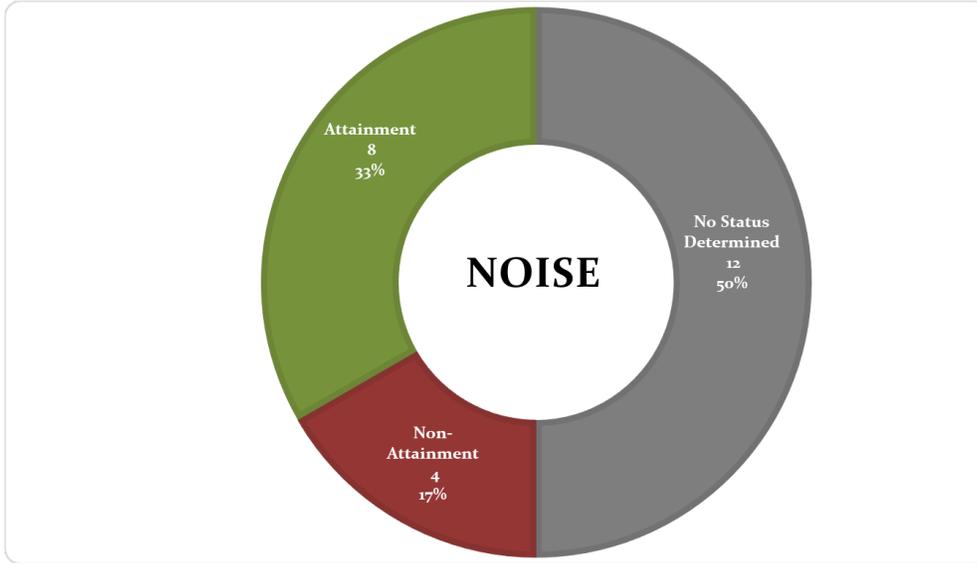


TRPA’s Scenic Quality Program monitors the visual experience from 869 individual scenic units. The ratings for eleven of these sites increased in 2019, while none decreased. Overall, 93 percent (812 of 869) of the evaluated scenic resource units met the threshold standard. A summary of the various scenic resources follows:

- Travel route ratings for roadway travel units: 63 percent in attainment (34 of 54)
- Travel route ratings for shoreline travel units: 67 percent in attainment (22 of 33)
- Scenic quality ratings for roadway travel units: 99 percent in attainment (205 of 208)
- Scenic quality ratings for shoreline travel units: 92 percent in attainment (170 of 184)
- Public areas and bike trails: 98 percent in attainment (381 of 390)

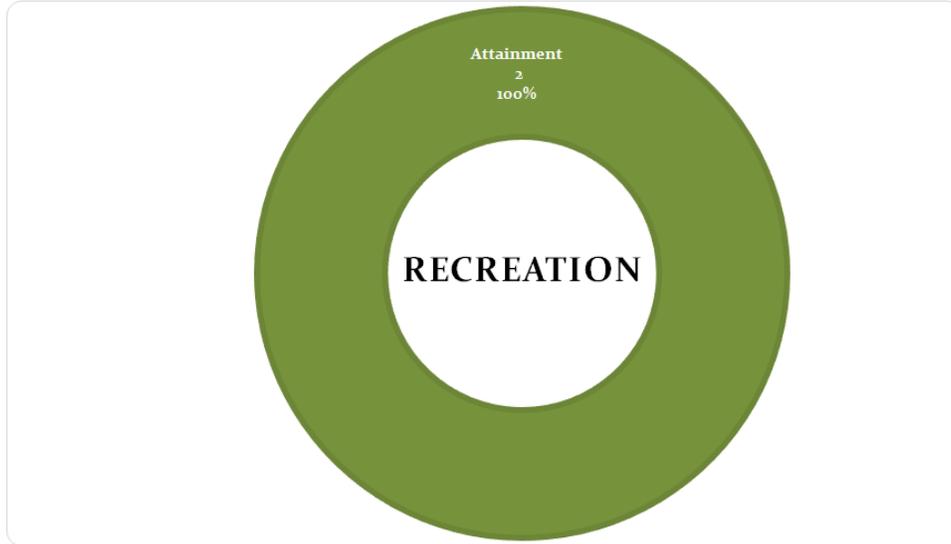
Projects in the Environmental Improvement Program, adoption of the Scenic Shoreland Ordinances, and building and design standards in new construction and redevelopment have protected and improved scenic conditions and community character regionwide. However, roadside parking in recreation corridors and kayak/paddleboard racks along the backshore were noted as having the potential to detract from the high quality of the scenic ratings. TRPA and partners are developing corridor plans to balance the needs of recreational, residential, and transportation users with the protection of natural, scenic, and cultural resources in these areas.

Noise:



The 24-hour average noise levels in each of the land-use categories are in attainment with standards, except critical wildlife habitat. There has been relatively little change in the 24-hour average noise levels. Prior peer reviews of TRPA’s 2011 and 2015 Threshold Evaluations suggested that TRPA’s noise program is “too complex and resource intensive,” and recommended that TRPA review and evaluate the noise threshold standards, particularly the single noise event evaluation criteria, which was deemed “unrealistic.” Based on these reviews, many of the single-noise event thresholds were not analyzed for this evaluation and therefore received a status of “No Determination”. Limited noise monitoring resources were prioritized to noise sources that are more responsive to management actions. For example, with the adoption of the Shoreline Plan in 2018, TRPA has increased its enforcement of the no-wake zone and prohibitions on loud boats to reduce single noise events in the shorezone of Lake Tahoe.

Recreation:



Both adopted recreation policy statements have been implemented as elements of the Regional Plan and are in attainment. Formed in 2017 as a work group of the Tahoe Inter-agency Executives Steering Committee, the Lake Tahoe Sustainable Recreation Working Group is a multi-sector working group of conservation and recreation professionals, private and nonprofit partners, and recreation stakeholders. The primary goal, and ultimate desired outcome is to provide high-quality outdoor recreation experiences, while preserving and restoring the outstanding natural and cultural resources of the Tahoe Basin. A primary objective of the working group is to develop and recommend Basin-wide recreation indicators, thresholds, and a monitoring framework related to user experience and the environmental effects of recreation and to acquire consistent and quality recreation data.

Attachment B

Navigating the Threshold Dashboard on www.LakeTahoeInfo.org

Attachment B. Navigating the Threshold Dashboard on LakeTahoeInfo.org

The Threshold Dashboard is available at <https://thresholds.laketahoeinfo.org/>.

On the main page, users can click into each of the nine threshold categories to view the individual indicators that make up each reporting subcategory.

Users can also use the Index, at <https://thresholds.laketahoeinfo.org/ThresholdCategory/Index> to view the 2011, 2015, and 2019 Threshold Evaluation results at high-level. By clicking on the “Expand Level” button, users can expand this view to the reporting category and individual threshold indicator level.

By clicking on the name of each threshold indicator, users can access the detailed evaluation page, which includes the status and trend determination, key points, and description of how the region is delivering and measuring success for each indicator.

For more detail, users can click on links with each section to view linked documents, monitoring program, EIP projects, and other relevant information. Users can also click on the “View More Details in the Data Center” link at the top of each page to access even more information about each indicator, its monitoring program(s), and how it is evaluated. Users can also click on the “View More Details in the Data Center” link at the top of each page to access even more information about each indicator, its monitoring program(s), and how it is evaluated.

Cumulative Accounting details and Compliance Measures tables can be found under the “About” link at the upper left-hand side of the dashboard.

Throughout the Threshold Dashboard, users are encouraged to click the “Provide Feedback” links to submit comments or questions to TRPA staff, to provide feedback on the dashboard, or to request help with the site.

The Threshold Evaluation uses the following symbols to show the status and trend:

Status						Management Indicator Status
Attainment		Non-Attainment				
						
Considerably better than target	At or somewhat better than target	Somewhat worse than target	Considerably worse than target	Insufficient data or no target established	Implemented	

Trend					
					
Rapid improvement	Moderate improvement	Little or no change	Moderate decline	Rapid decline	Insufficient data to determine trend