2024 BIENNIAL PERFORMANCE REPORT

Tahoe Regional Transportation

TAHOE REGIONAL PLANNING AGENCY

2024 REGIONAL TRANSPORTATION PLAN/ SUSTAINABLE COMMUNITIES STRATEGY TRANSPORTATION ANALYSIS AND RECOMMENDATIONS REPORT

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INTRODUCTION

The Tahoe Regional Planning Agency (TRPA) and partners continually collect and assess data to adaptively manage transportation resources across the Tahoe Basin. This approach links information collected through monitoring and evaluation with the planning process to adjust the strategies that guide the region toward goals established by the Regional Plan, Regional Transportation Plan, and other local, state, and federal requirements.

The monitoring process includes regular reporting of information to evaluate how the transportation system responds to policies and procedures. The transportation measures are grouped into primary and explanatory metrics to explain the performance of different modes of transportation, including walking, biking, transit, and automotive travel. Additionally, TRPA will report different explanatory metrics depending on the direction of performance, to explain trends among the primary indicators and provide a better understanding of the driving factors behind transportation system performance. This multi-level approach enables TRPA to adjust strategies as progress is made toward the goals and targets for the Tahoe Basin.

The Regional Transportation Plan Sustainable Community Strategy (RTP/SCS) Analysis and Recommendations Report is prepared in advance of the RTP/SCS to summarize performance relative to key indicators and provide recommendations for the RTP/SCS. The report focuses on trends in six key metrics in three focus areas identified by the Transportation Performance Technical Advisory Committee (TPTAC). The TPTAC is an advisory body of TRPA staff, regionwide agency representatives, and stakeholders. The committee is responsible for the regular reporting and recommendations that guide the management responses.

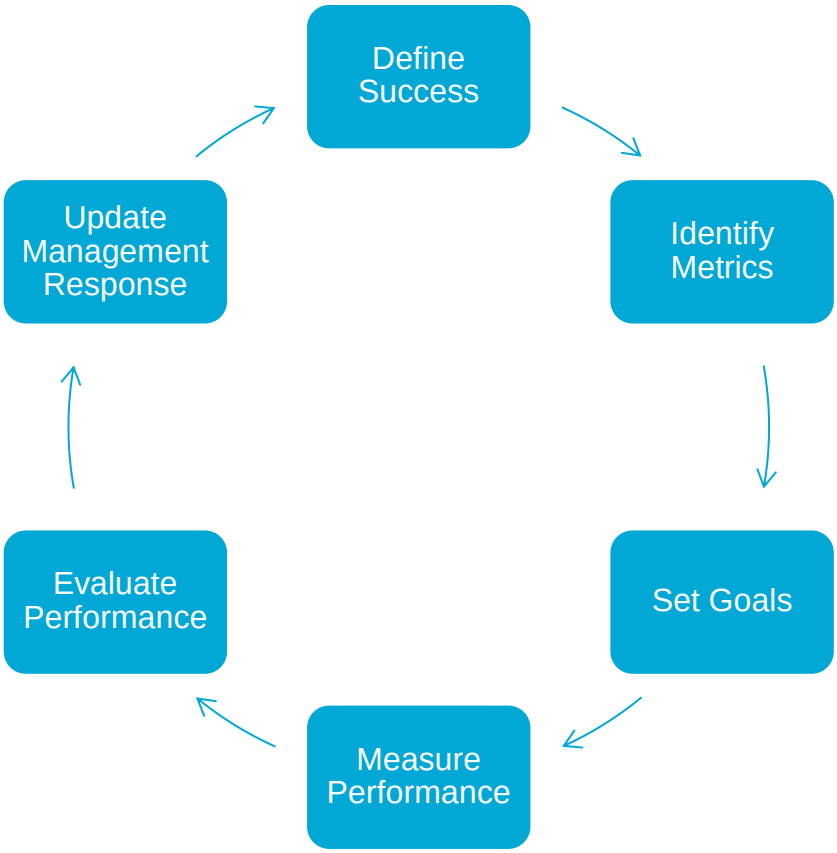
Using the adaptive management approach, where milestones are not achieved, a management response framework is in place to prescribe policies and procedures that react to findings from the evaluations of the transportation system. For the planning process to remain flexible and adaptive rather than prescriptive, this approach requires a collaborative report process between partner agencies to ensure a better foundation for decision-making in the Tahoe Basin. For example, this will include reporting complete information in a timely manner among the different partner agencies.

The adaptive performance management system is a forward-looking, dynamic learning process that involves the following components:

1. Identifying metrics.
2. Setting goals in alignment with the Regional Plan and RTP/SCS.
3. Monitoring and evaluating performance.
4. Identifying underlying causes in performance changes.

5. Engaging stakeholders to update management responses.

6. Defining success.



The following summarizes the transportation goals established for the Tahoe Basin and how stakeholders will be involved in the overall framework.

Regional VMT Threshold

To ensure the natural beauty and economic productivity of the region would persist for generations to come, the Bi-State Compact directs TRPA to establish “environmental threshold carrying capacities,” defined as "an environmental standard necessary to maintain a significant scenic, recreational, educational, scientific or natural value of the region or to maintain public health and safety within the region." The environmental threshold carrying capacities (threshold standards) establish goals for environmental quality and express the shared aspiration for environmental restoration of the Tahoe Region. The standards shape the goals and policies of the Regional Plan and guide millions of dollars of public and private investment in the basin through the Environmental Improvement Program (EIP).

Threshold standards were adopted in nine categories in 1982, establishing goals for restoration and environmental quality in the Lake Tahoe Basin. In 2021 a tenth threshold category “Transportation and Sustainable Communities” was added, under which a single threshold standard was adopted for the

reduction of annual average daily VMT per capita would be measured. Also referred to as "TSC1", the annual average daily VMT per capita must be reduced by 6.8% from 12.48, the 2018 baseline, to 11.63 in 2045. The standard provides a robust measure of the success of the integrated transportation and land use vision of the vibrant town centers connected through a walkable, bikeable, transit-friendly transportation system.

Regional Plan Transportation Goals

The Regional Plan and 2020 Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS) share six major transportation goals, which serve as the backbone of the metric system proposed in the adaptive management framework (AMF). These goals support TRPA's vision for a transportation system that is "interconnected, inter-regional, and sustainable, connecting people and places in ways that reduce reliance on the private automobile." Most of the goals reflect the multimodal nature of transportation in the Lake Tahoe area, which has two transit operators, a microtransit service, and 135 miles of bicycle/pedestrian facilities[1]. The metric system proposed under the AMF responds to these goals via a tiered approach that highlights key system performance in the multimodal transportation system, while capturing user experience and effectiveness of management responses through a set of explanatory sub-metrics.

Environment

Goal: Protect and enhance the environment, promote energy conservation, and reduce greenhouse gas (GHG) emissions.

Connectivity

Goal: Enhance and sustain the connectivity and accessibility of the Tahoe transportation system, across and between modes, communities, and neighboring regions, for people and goods.

Safety

Goal: Increase safety and security for all users of Tahoe's transportation system.

Economic Vitality and Quality of Life

Goal: Support the economic vitality of the Tahoe Region to enable a diverse workforce, sustainable environment, and quality experience for both residents and visitors.

Operations and Congestion Management

Goal: Provide an efficient transportation network through coordinated operations, system management, technology, monitoring, and targeted investments.

System Preservation

Goal: Provide for the preservation of the existing transportation system through maintenance activities that support climate resiliency, water quality, and safety.

The 2024 Performance Report provides summary of six metrics being tracked across three main categories of travel in the Tahoe Basin: Transit, Active Transportation, and Auto. The metrics are:

- Transit
    - Total Ridership
    - Population/neighborhoods served by frequent service, greater than 20-min headways and basic service, greater than 60-min headways
- Active Transportation
    - Bicycle/pedestrian mode share
    - Low-stress bicycle and pedestrian lane miles
- Automobile
    - Total VMT and average daily VMT per capita
    - Median travel time (between key destinations, along corridors)

For each of these three categories, a series of primary metrics are presented as the top-level numbers of greatest interest at the regional level.

Depending on performance and trends, beyond the primary metrics, a series of explanatory metrics may be presented in each category that attempt to drill down into the underlying factors that cause the performance, good or bad, on the primary metrics. These explanatory metrics are grouped into three sets:

- Supply
- Condition and State of Good Repair
- Programming and Information

Performance-based data-driven planning should always consider these underlying explanatory factors in order to determine appropriate management responses that will be likely to improve performance of the primary metrics. Sometimes the management response is clear and obvious from the primary metrics, but more often, the right investments to make are only illuminated by the combination of explanatory factors together. Readers interested in understanding the nuance of transportation performance in the Tahoe Basin should delve into these details to piece the story together and understand why the primary metrics are performing as they are. Especially for understanding management responses and making investment decisions for the next biennium, care needs to be taken to digest this information in concert with companion studies, such as the Active Transporation Plan, Vision Zero Strategy, Short Range Transit Plans and the Regional Transportation Plan.

CHAPTER 1.

TRANSIT METRICS

1.1 TRANSIT

The Tahoe region currently has three operators providing transit with a handful of regional services. The north shore is served by Truckee Tahoe Area Regional Transit (TART) providing microtransit and fixed route services. The south shore is served by Tahoe Transportation District (TTD) which provides fixed route and some regional service to the Carson Valley and summer recreation services on the east shore. Additionally, the south shore has a microtransit service, Lake Link, provided by the South Shore Transit Management Association. Expanding travel options such as transit reduces reliance on the automobile and supports environmental, connectivity, economic vitality and quality of life, and congestion management goals of the RTP. TRPA tracks two primary metrics for transit with the goal of increasing ridership and increasing frequency (the later recently combined for ease of reporting):

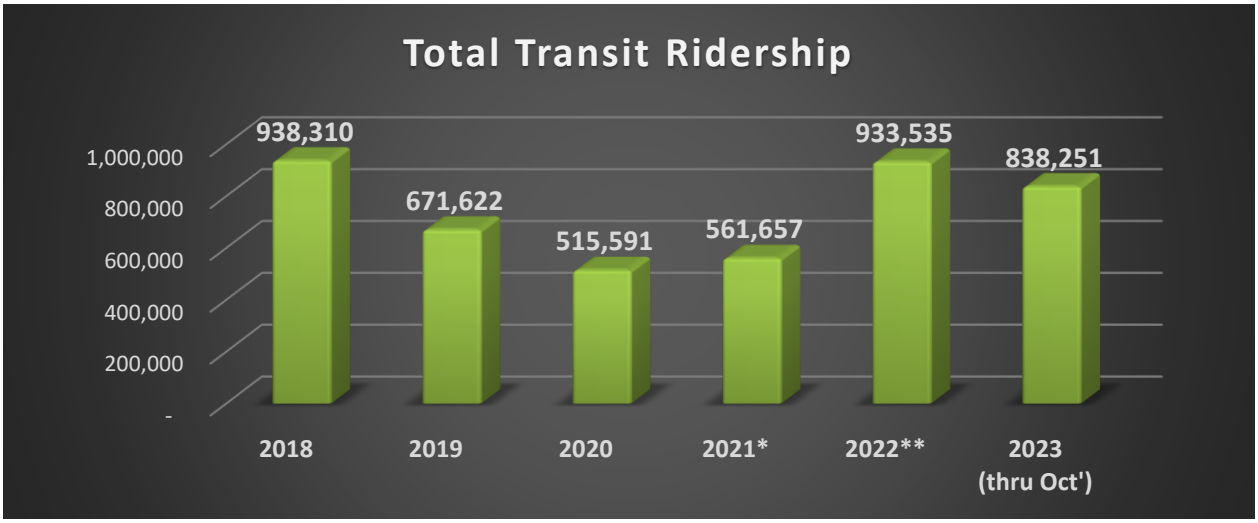
- Total ridership
- Population and neighborhoods served by frequent service (<20-minute headways) and basic service (< 60-minute headways)

Sources for transit ridership analysis leverages transit operator data andpopulation from the US Census Bureau.

Total ridership

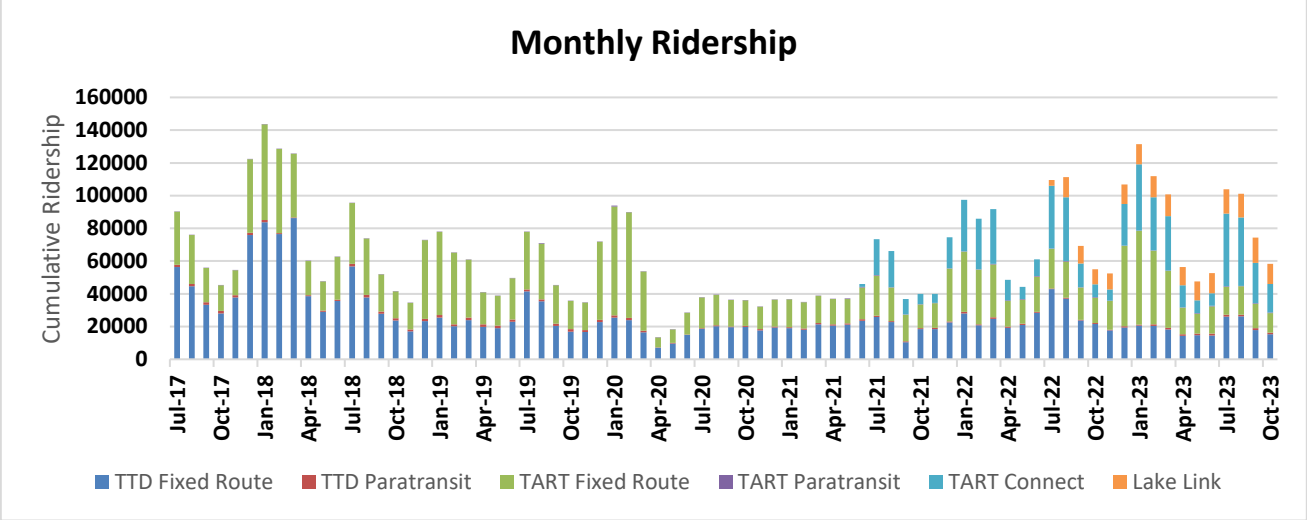
Transit ridership is the total number of people trips on transit service in the region. The data indicates that the region is getting back to 2018 ridership totals (Figure 1-1). The full year of 2023 data will be incorporated for the final report and is expected to exceed 2022 totals. Microtransit, the newest transit service in the region that support fixed routes are Tart Connect, which started in June of 2021* serving the north shore and Lake Link, started in July of 2022** serving the south shore.

FIGURE 1-1: Total Transit Ridership



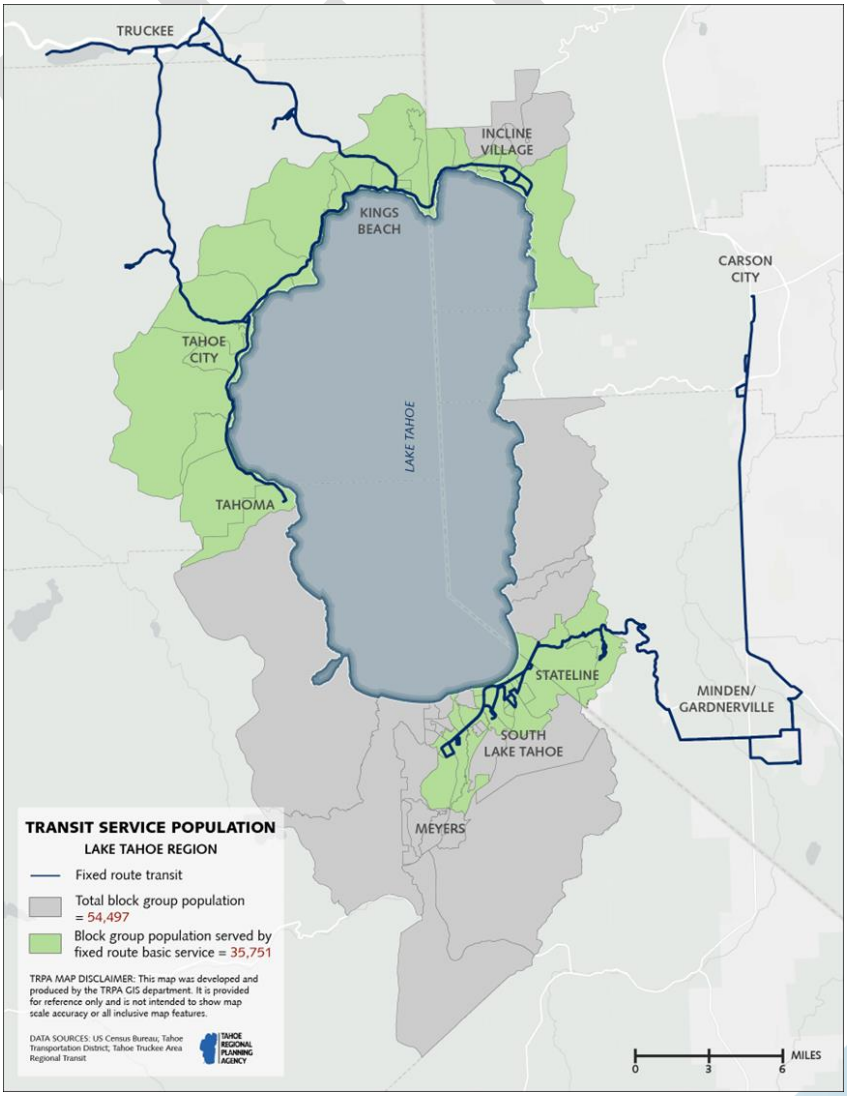
Transit ridership by month and by operator (Figure 1-2) provides insight into the seasonal fluctuations that shape ridership. Winter months consistently show the highest level of ridership. This is due to the influx of employees and users of the regional ski resorts. In 2018 south shore data included ski shuttles operated by the Tahoe Transportation District. Today these operations are provided by private operators where the data is not yet available. The data indicates that TART fixed route and TART Connect have been trending up since May 2020 showing that current winter peaks are exceeding 2018 totals. On the south shore, TTD and Lake Link (providing some of the resort service) combined are getting back to those 2017/2018 winter peaks as well.

FIGURE 1-2: Montly Ridership



For the purposes of this report frequent service is defined as 20 minutes or less, and basic service is 60 minutes. No population, except for one quarter in 2018 on the south shore along US50, has been served by frequent service. Regionally 65% of the population is served by basic service. Microtransit within some zones may be close to 20-minute wait times at certain times of the day however due to this variability this cannot be included in this analysis. Moving forward the report will track changes in coverage, hours of service, and wait time to better assess microtransit.

FIGURE 1-3: Population and Neighborhoods Served by Frequent and Basic Service



1.2 TRANSIT SECONDARY

During the January 19, 2024 Transportation Performance Technical Advisory Committee meeting, the transit metrics, ridership along with coverage of the services was discussed. The transit operators were invited to go deeper into the secondary metrics to provide more background, or secondary metrics, on the trends in their particular region. The transit industry, not just in Tahoe, but nationwide is rebounding from COVID. Operating costs are increasing while agencies providing transit services for the public continue to struggle with staffing issues. The national housing crisis is hitting Tahoe as well, adding to the challenges of filling operator positions. While federal programs continue to try to promote transit and provide resources for capital investments, local operators continue to struggle with securing resources for operations and maintenance. Recommendations are expected to be developed with the committee and will be provided in Chapter 4 for the final draft.

CHAPTER 2.

ACTIVE TRANSPORTATION

2.1 ACTIVE TRANSPORTATION

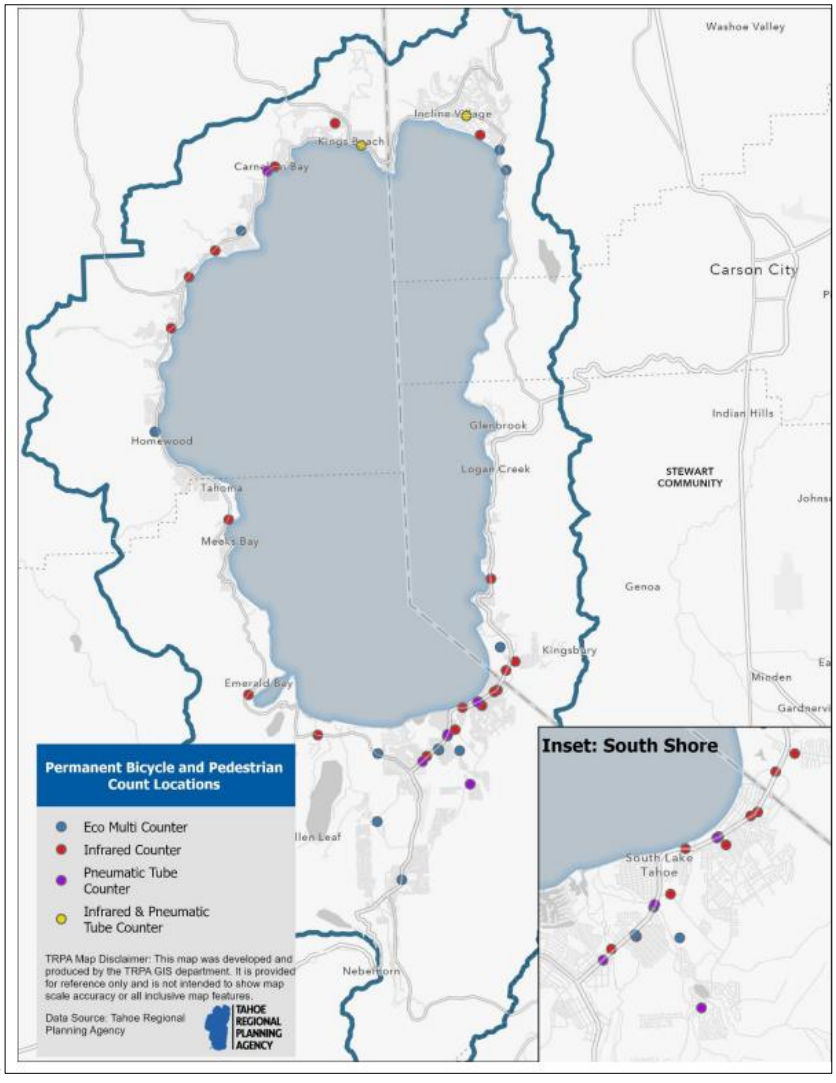
Active Transportation is transportation that does not rely entirely on a car to travel between orgin and destination, ie. walking, biking, skateboarding, and e-scootering. The goal of Active Transportation is to increase non auto trips similar to Transit and also with two primary metrics identified to assess the active transportation network are utilization and network quality. Utilization is measured as the proportion of trips in the Region taken using active modes. Network quality is measured by assessing the level of bicyclists and pedestrian stress on each segment of the active transportation network with the overal goal to reduce stressful segments and intersections. The Active Transportation metrics reflect considerations of connectivity, safety, economic vitality and quality of life, and system preservation goals of the RTP.

Active transportation (bicycle and pedestrian) mode share

Mode refers to the method of travel (e.g. car, bicycle, walk) used to complete a trip. Mode share is the proportion of all trips in a region that use an individual mode. The active transportation measure is

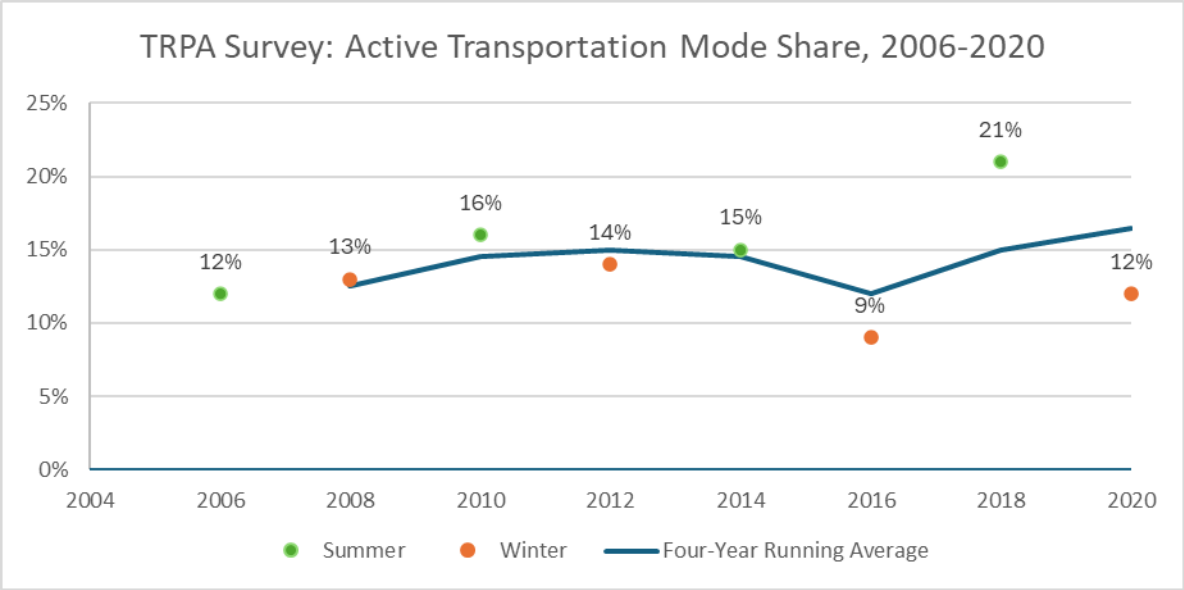
calculated by summarizing all bicycle and pedestrian trips in the region and dividing by the total number of trips. A large number of residents and visitors use Lake Tahoe's extensive active transportation facilities, but getting exact user counts on every segment of the network to calculate mode share, i.e., through sensors, is an onerous data collection effort. Therefore, the report includes overall active transportation mode share as the usage metric. Data is collected through surveys and big data, and validated with actual counts via forty-eight active monitoring locations (Figure 2-1). While most of the measured use occurs during the summer, it may be surprising to know that 13 percent of total counts are during the winter months, December through March. The bicycle and pedestrian count data at the monitoring locations is continually uploaded and available on the TRPA Lake Tahoe Info monitoring dashboard (LT Info | Lake Tahoe Info Monitoring Dashboard).

Figure 2-1. Locations of Bicycle and Pedestrian Counters in the Lake Tahoe Region



This measure tracks the RTP/SCS goal to increase of all trips using non-automobile modes of travel focusing the metric on bicycle and pedestrian travel. To measure active transportation mode share, TRPA conducted surveys between Summer 2006 and Winter 2020 (see Figure 2-2). However the Summer 2022 survey was not conducted. TRPA staff engaged with a big-data provider, Replica, to calcuated mode share for 2019 to 2023 (Figure 2-3) to fill the data gap. TRPA will engage with the Transportation Performance Technical Advisory Committee to discuss options for collecting and analyzing data related to travel mode, and will determine future data collection strategies for mode as part of the recommendations in this report.

Figure 2-2. TRPA Travel Surveys, Active Transportation Mode Share 2006-2020

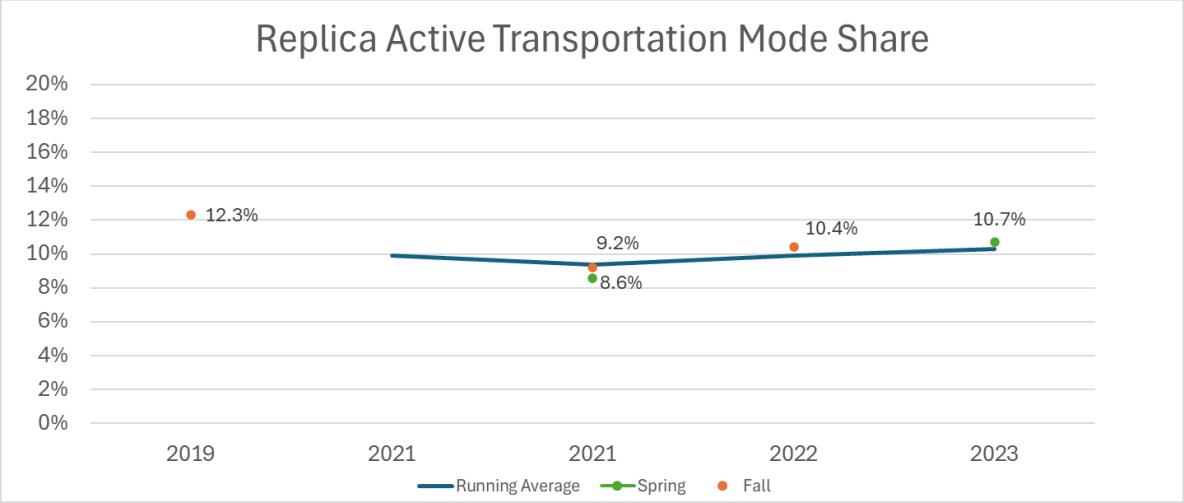


Between 2006 and 2020, TRPA conducted basin-wide travel surveys every two years to better understand basic travel characteristics of both residents and visitors to commercial and recreation destinations in the region. The data collected included information such as mode share, origin-destinations, and trip purpose. The TRPA surveys showed typical seasonality, with lower non-auto mode share during the winter surveys than in the summer surveys, while the overall trend was showing an increasing trend for non-auto mode share. Due to several exogenous factors (inclufing the COVID pandemic, staffing, and budget constraints), the 2022 Summer survey was not conducted. As a result, TRPA staff evaluated several other options for estimating mode share from existing data. This evaluation included examining actual count data for transit ridership, bicycle and pedestrian counts from TRPA

count stations, and roadway vehicle count data from the California Department of Transportation and Nevada Department of Transportation programs. However, because of the varying geographic distribution of these data, an overall mode estimation was not possible.

To get a more complete picture of mode share TRPA staff evaluated big data platforms for transportation data, including location-based services data. TRPA evaluated ReplicaHQ's (Replica) web-based nationwide activity-based travel demand model. Their online tool provides information about travel patterns, including origin and destination, commute patterns, travel mode, network link volumes, and more. Replica's data incorporates travel surveys and third-party data from public and private-sector sources (e.g., location based data from cell phones, GPS and connected vehicles, credit card spending, and ground truth data) to inform their model. The analysis was compiled from their "Places" product that provides seasonal trips tables and demographic and employment tables to simulate travel behavior of residents, visitors, and commercial vehicles in the Tahoe Region, as drawn from their California/Nevada megaregion.

Figure 2-3. Replica Active Transporation Mode Share 2019 to 2023



Replica's numbers for mode share tell a mixed story about conditions in Tahoe, with non-auto mode share down from 2019, but steady and increasing in the last two years. Though active transportation and transit mode share has decreased since prior to the COVID pandemic, these shares are trending higher in recent years. It should additionally be noted that the Replica data are based on the Fall (August, September, and October) and Spring (March, April, and May) periods. And, as described above, most of the non-auto travel in the Tahoe Region occurs during the summer months, so these periods do not directly align with the peak periods for active transportation, and likely underrepresent the non-

auto mode share in the summer period. In 2024, Replica will release data for all four seasons, and we expect this analysis to be more robust for future periods. TRPA is also supplying transit and bicycle/pedestrian count data to Replica to be incorporated into their data inputs in future modeled periods.

TRPA also engaged Cambridge Systematics to estimate mode share with their LOCUS tool. LOCUS is another big data platform. Estimates were produced for the first and third quarters of 2019 and 2023. The estimates suggested a decline in active transportation mode share between 2019 and 2023. While the slight decline in mode share appeared plausible the data also suggested a 30% decline in all trips in the region. The 30% decline in auto trips between 2019 and 2023 is not consistent with other datasets, and much larger than the slight decline estimated by the DOT traffic counters in the Region.

In addition, TRPA staff evaluated other options for travel mode, including the commuting Journey to Work data that are published by the American Community Survey. However, as so much travel in the Tahoe Region is recreation- and visitation-based, and not work-based trips, this source was not used as it would overly inflate the impact of work trips and associated modes (primarily auto).

TRPA staff will engage with the Transportation Performance Technical Advisory Committee to discuss options for collecting and analyzing data related to travel mode, including potentially restarting the annual surveys, and continued use of big data or other sources. This discussion will inform future data collection strategies for mode as part of the recommendations in this report.

Low-stress bicycle and pedestrian facilities lane miles

This metric quantifies the availability of bicycle and pedestrian facilities and their relative comfort level for users. The comfort of the network is a surrogate for active transportation network connectivity. The ability to move about without exceeding their tolerance for traffic stress has been identified as a key determinant of the attractiveness of active transportation networks. It reflects considerations of connectivity, safety, economic vitality and quality of life, and system preservation goals. Measuring low-stress lane miles includes looking at the extent of shared-use paths since they are always low-stress and are used by both bicyclists and pedestrians. However, to more accurately estimate the extent of low-stress bicycle and pedestrian lane miles among the on-road transportation network segments, TRPA uses the bicycle levels of traffic stress (BLTS) and Pedestrian Experience Index. The 2024 Active Transportation Plan outreach found that more than 50 percent of respondents to the question “what type of cyclist do you most closely identify with” answered “interested but concerned” or “enthused and

confident". This indicates that safe, low-stress (high-quality) bicycle infrastructure would capture the majority of riders, thus increasing bicycle mode share. Pedestrian Experience Index incorporates similar built environment data such as presence of sidewalks, sidewalk condition, posted travel speeds, and other metrics to qualify the pedestrian experience for each block face. An online version of the BLTS and PEI map can be found at www.trpa.gov/atp.

The analysis identified 156 stressful intersections and 104 stressful segments. Segments are classified as stressful if they have a BLTS score of 4 or higher. The goal is to continually reduce the level of stress on the entire network.

Figure 2-4. Bicycle Level of Traffic Stress Segments

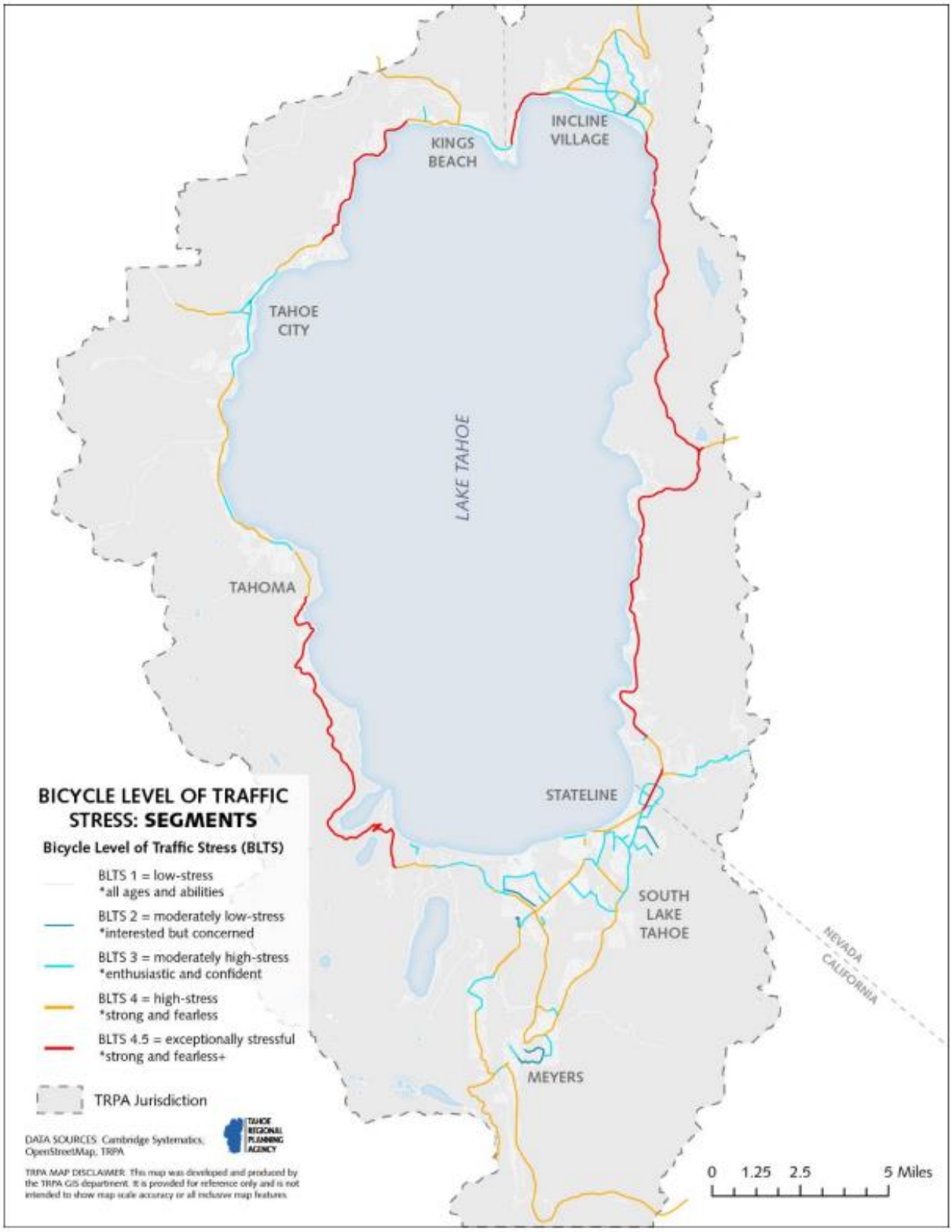
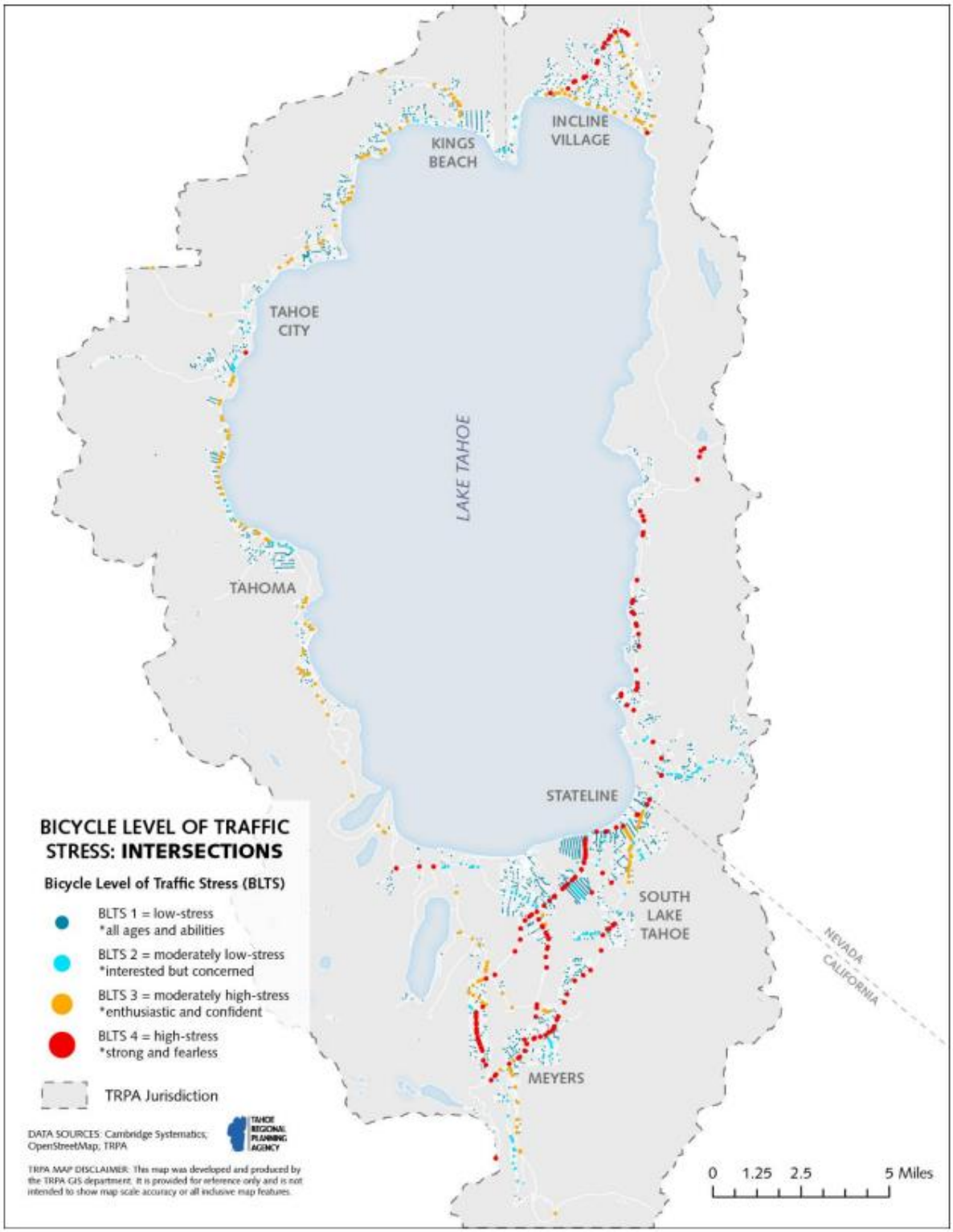


Figure 2-5. Bicycle Level of Traffic Stress Intersections



Increase the total number of "best" quality lane miles for pedestrians

The Pedestrian Experience Index provides an index rating quantifying the quality of pedestrian user experience of the roadway network. The score is derived from existing infrastructure such as the presence of sidewalks, curb ramps, and mid-block crossings. Zero percent to 45 percent being quantified as a low-quality experience (ie. no sidewalk present) and 45 percent to 100 percent being a higher quality of experience. The goal is to increase the pedestrian experience index to 45 percent or higher outside of town centers and increase the pedestrian experience within town centers to reside between a 60 percent to 100 percent index rating. The map indicates a higher quality of experince in a few locations around the lack, mainly overlapping with town centers and class 1 paths.

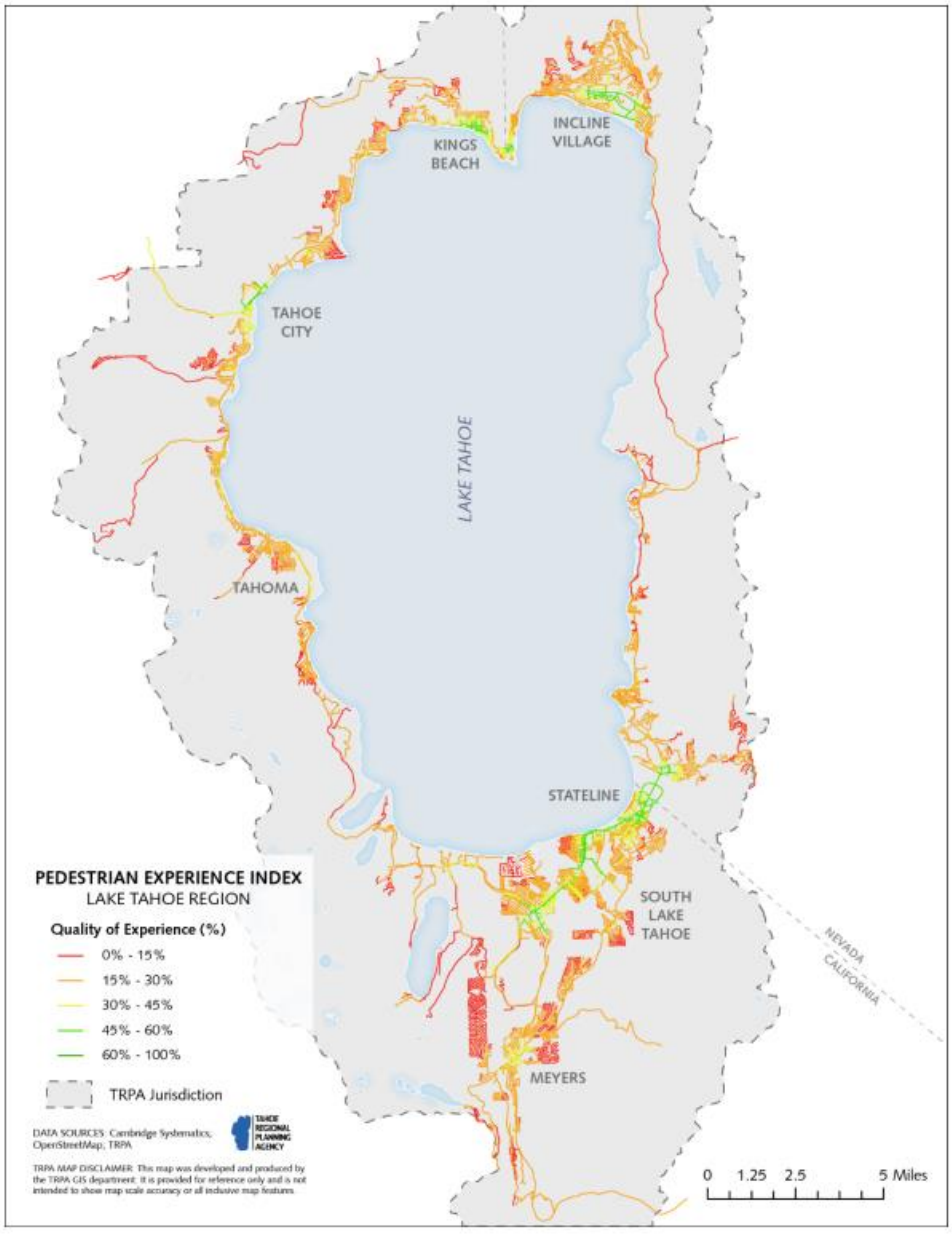
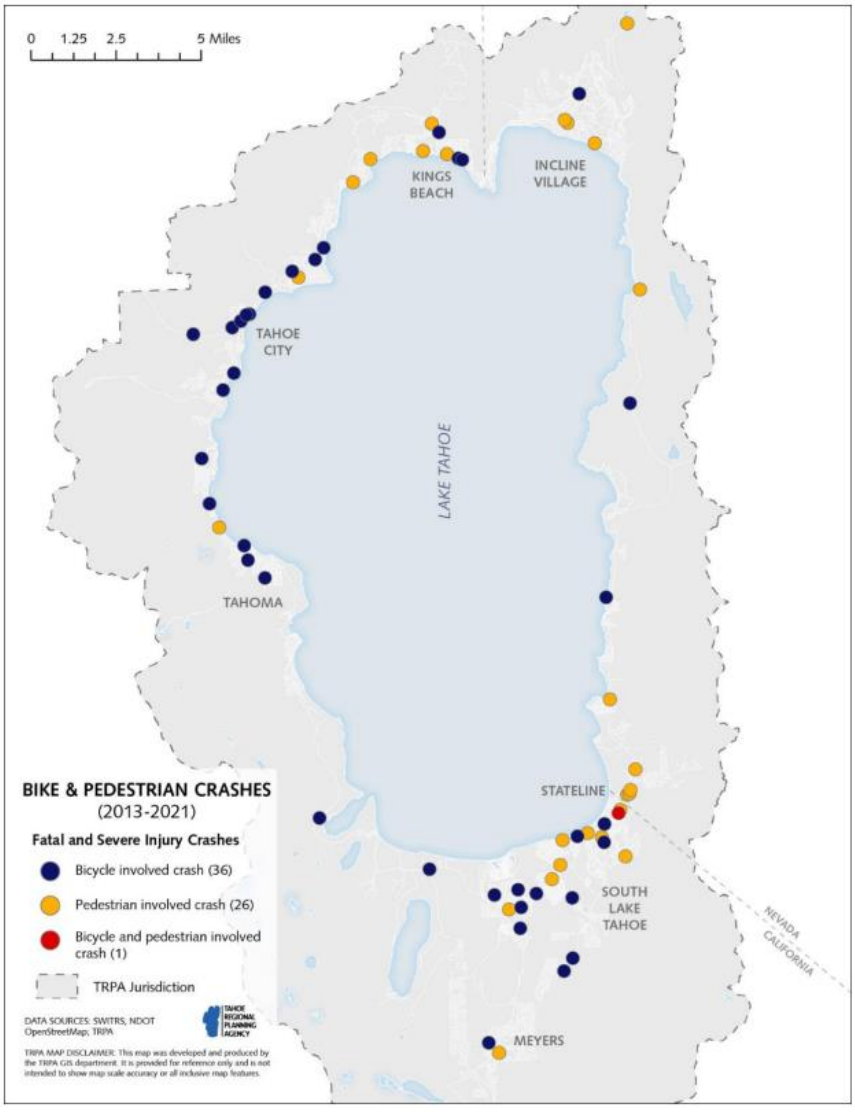


Figure 2-6. Pedestrian Experince Index

2.2 ACTIVE TRANSPORTATION SECONDARY

Given the limited number of facilities with low levels of stress and quality experience, as recommended in the Draft 2024 Active Transportation Plan (https://www.trpa.gov/wp-content/uploads/2024-ATP-PUBLIC-DRAFT-FULL-PLAN.pdf), the 2024 Vision Zero Strategy (Final-2024-Vision-Zero-Strategy.pdf (trpa.gov)) and Federal Transportation Safety Performance Measures it is recommended that the performance report include tracking of crashes and projects implemented with safety related benefits to understand where project improvements need to be focused to get these scores up and increase non-auto trips.

Figure 3-1. Bicycle and Pedestrian Crashes 2013-2021



These details are available on a monitoring dashboard (LT Info | Lake Tahoe Info Monitoring Dashboard) along with a list of priority projects for implementors to focus on in the future. Safety projects have a multi-benefit in that they not only help the region achieve the Vision Zero Strategy they also increase safe non-auto travel opportunties for getting around.

Number of bicycle/pedestrian safety projects completed, and where estimates of total project are not avaiable,

specific project types may be appropriate to summarize, such as the number of bicycle facilities completed.

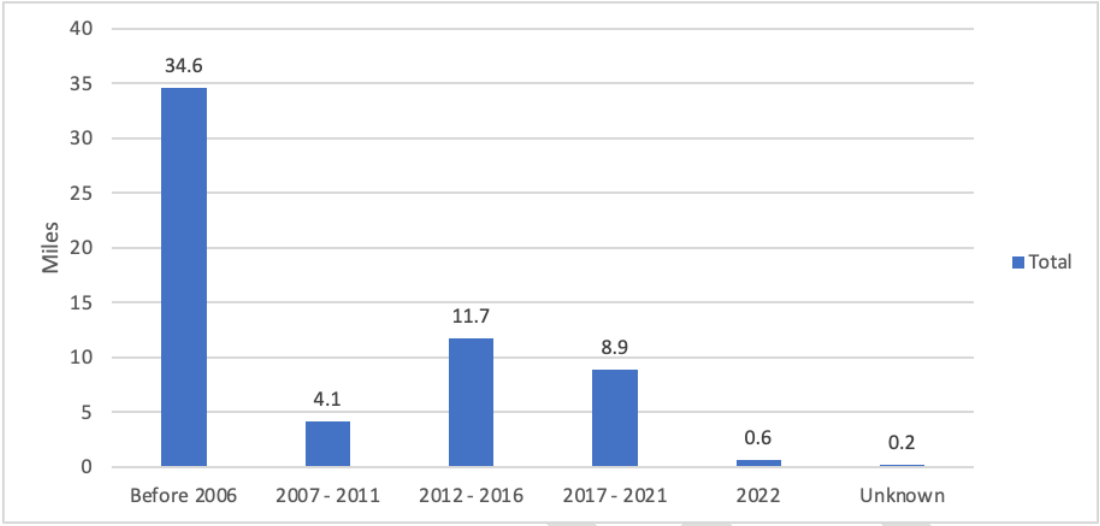


Figure 3-2 Number of bicycle facility lane mile facilities incorporating safety improvements.

CHAPTER 3.

AUTO METRICS

3.1 AUTO

Driving is the dominant mode of transportation for residents and visitors alike in Lake Tahoe. Well-maintained and well-managed roadway infrastructure plays a key part in ensuring accessibility and economic vitality of the region, while also providing a better environment for bicyclists using on-road striped bicycle lanes. Extreme weather events brought by climate change have imposed additional challenges on the roadway infrastructure. The goal to continually reduce vehicle miles travel supports all of the RTP goals. Two primary metrics are used to track the performance of the auto network in Tahoe.

- Total VMT and average daily VMT per capita
- Median travel time (between key destinations, along corridors

Total VMT and average daily VMT per capita

This metric shows the estimated vehicle miles traveled (VMT) in the Lake Tahoe region as reported by the California Department of Transportation and the Nevada Department of Transportation and per-

capita VMT. Since the Lake Tahoe region has a substantial day and overnight visitor population on any given day, the per-capita figure utilizes an “effective population” as estimated by the Tahoe Effective Population Model (TEPM). The TEPM estimates the number of persons present in the Lake Tahoe region on an average (mean) day, incorporating in-region population, traffic counts at external gateways, lodging occupancy figures, and known travel patterns to arrive at an effective population that is used for per-capita measures.

Traffic counts collected by the California Department of Transportation (Caltrans) and Nevada Department of Transportation (NDOT) in the Lake Tahoe region are used for various analysis inlcuding calculating VMT as reported through the Highway Performance Monitoring System (HPMS). Currently the Tahoe Transportation District is planning a pilot project including additional counting equiment throughout the region that would provide more frequent and robust data. The DOT counts indicated significant declines during and after the COVID-19 pandemic. VMT is estimated from and directly correlated to traffic counts, so VMT reported by the states also declined significantly. The reported decreases in Tahoe run counter to the statewide trends in both California and Nevada, each of which reported statewide VMT increases in both 2021 and 2022.

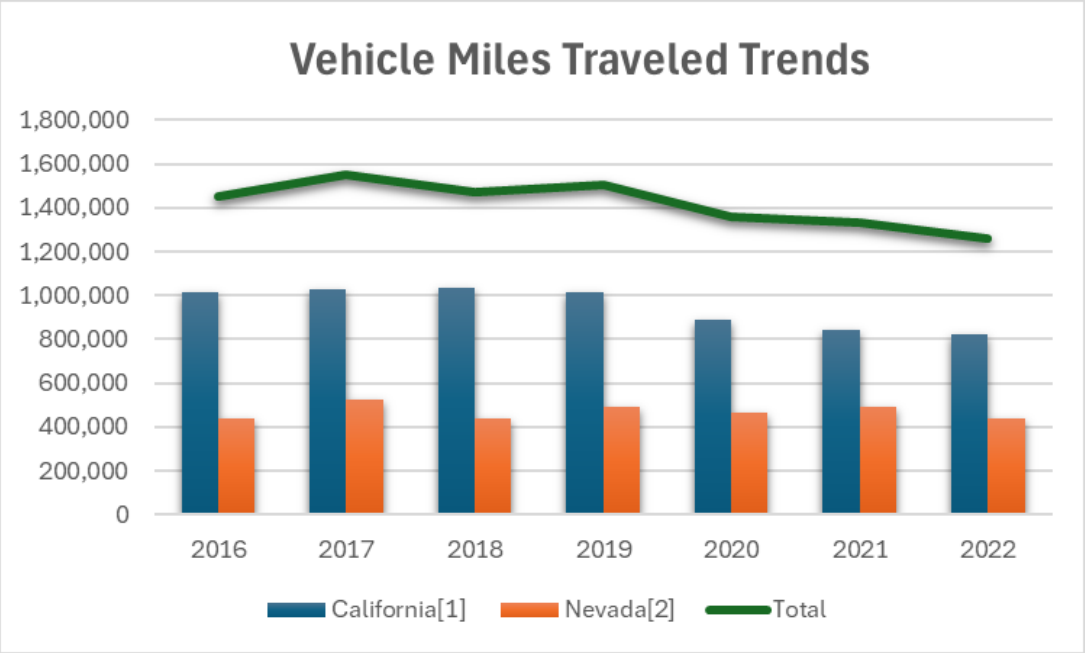


Figure 4-1 Revised summary of HPMS reported Vehicle Miles Traveled by Caltrans and NDOT

[1] Caltrans HPMS Reports (https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system) [2] Nevada DOT HPMS Reports (https://www.dot.nv.gov/doing-business/about-ndot/ndot-divisions/planning/roadway-systems/annual-vehicle-miles-of-travel)

When threshold standard TSC1 was adopted in 2021, the adoption materials noted that the Caltrans VMT estimate for 2019 was still preliminary[2]. Caltrans revised the preliminary estimate for 2019 VMT in Tahoe up from 937,268 to 1,014,920. A revised summary of HPMS reported VMT by Caltrans and NDOT is provided in the table below. The increase in reported VMT affects the basis used to establish the target for TSC1. To insulate threshold standard assessment from internal variation in VMT related to exogenous factors known to influence annual VMT, the standard uses the three-year average VMT as the basis for assessment. Revised 3-year average estimates are presented below.

3-year Average VMT

Years	California	Nevada	Total
2016-2018	1,025,577	466,184	1,491,761
2017-2019	1,024,920	483,216	1,508,136
2018-2020	979,720	463,242	1,442,962
2019-2021	915,707	481,764	1,397,471
2020-2022	851,203	464,947	1,316,150

Table 4-1 3-year Average VMT

VMT per capita estimates can be generated using the HPMS estimates of VMT and Placer.ai estimates for the effective population. The estimate presented in the table below suggests that the has been a slight decline in VMT per capita since the base period when the standard was adopted. The trends suggest that the decline was largely driven by lower regional VMT levels, the impact of which was moderated by fewer average people in the region.

3-year Average VMT per Capita

Period	Effective Population (source: Placer.ai)	HPMS VMT	VMT per capita	% Change in VMT per capita
2017-2019	156,480	1,508,136	9.64	
2018-2020	160,727	1,442,962	8.98	-6.8%
2019-2021	153,170	1,397,471	9.12	1.6%
2020-2022	149,772	1,316,150	8.79	-3.7%

Table 4-2 3-year Average VMT Per Capita

[2] https://www.trpa.gov/wp-content/uploads/2021/04/Attachment-A-VMT-Threshold-Update-Standard-Recommendation-and-Implementation.pdf

Average Daily VMT per capita

Per-capita VMT is a more complicated because it requires estimating the number of people in Tahoe on an average day. Over the past decade or more, Tahoe's resident population has remained relatively stable, only increasing by about 230 residents between the 2010 Census and 2020 Census. 5-year estimates by the American Community Survey between 2010 and 2022 also suggest there has been minimal change. When compared to the last run of the Effective Population Model for a study year of 2018, 2022 hotel occupancy has decreased significantly, despite a modest increase in the number of short-term rental units rented. Traffic counts at regional entry points have also decreased slightly. Table 3-3 shows a comparison between 2018 and 2022 inputs.

Effective Population Model Inputs Comparison (2018/2022)

Value	2018	2022	% Change
Hotel Rooms Rented (Source: County TOT reports)	1,754,130	1,344,276	-23%
Short Term Rentals (Source: County TOT reports)	482,940	552,973	+15%
DOT Entry Volumes (Source: Caltrans, NDOT)	31,325	29,925	-4%
Second Homes (Source: American Community Survey 5-year estimates, subtracting out known short-term rental units)	20,580	19,773	-4%

Table 4-3: Effective Population Model Inputs Comparison (2018/2022)

The 2018 TEPM based effective population estimate utilized Streetlight estimates of entry volumes and TRPA has engaged with Streetlight again to acquire more recent estimates of entry volumes to recalculate the TEPM. Because the TEPM is calibrated based on entry-exit volumes to the region, it is highly sensitive to variability in the estimate and thus requires a consistent data source. In 2018, Streetlight-estimated entry volumes were 10% lower than the DOT estimated volumes. Using the DOT estimated volumes in 2018, while holding all other inputs constant results in an effective population of 132,792, 14k higher than the Streetlight-derived estimate.

Entry/Exit Traffic Volumes Comparison (2018)

Route	Streetlight	Caltrans/NDOT	Difference
SR431 – Mount Rose Summit/ Incline Village	6,186	5,050	-18%
US50 – Spooner Summit	14,044	15,700	+12%
SR207 – Daggett Pass/ Stateline	6,860	5,050	-26%
SR267 – Brockway Summit/ Kings Beach	9,314	10,600	+14%
SR89 – Tahoe City	9,098	10,600	+17%
US50 – Echo Summit/ Meyers	7,632	11,000	+44%
SR89- Luther Pass/ Meyers	1,860	3,200	+72%
Total	54,994	61,200	+11%

Table 4-4: Entry/Exit Traffic Volumes Comparison (2018)

Given the complexity of estimating the effective population through the TEPM, TRPA has been exploring other methods of estimating the effective population. Many big data platforms exist to track visitation and foot traffic to businesses and major destinations, including the Tahoe region. One such platform, Placer.ai, has been obtained by TRPA to evaluate its performance in the region. This platform effectively draws a geofence around a region and counts the number of people inside the geofence during a given time period. Initial evaluation and validation were performed for sites with recorded visitation, which showed that Placer.ai derived visitation numbers aligned well. At the regional level, the platform also appeared to align well with known seasonal variations in traffic counts and tourist occupancy (Figure x). During the summer peak, the effective pop of the region increases to 170% of the annual average, while during the shoulder seasons the populaton drops to just under 80% of the annual average.

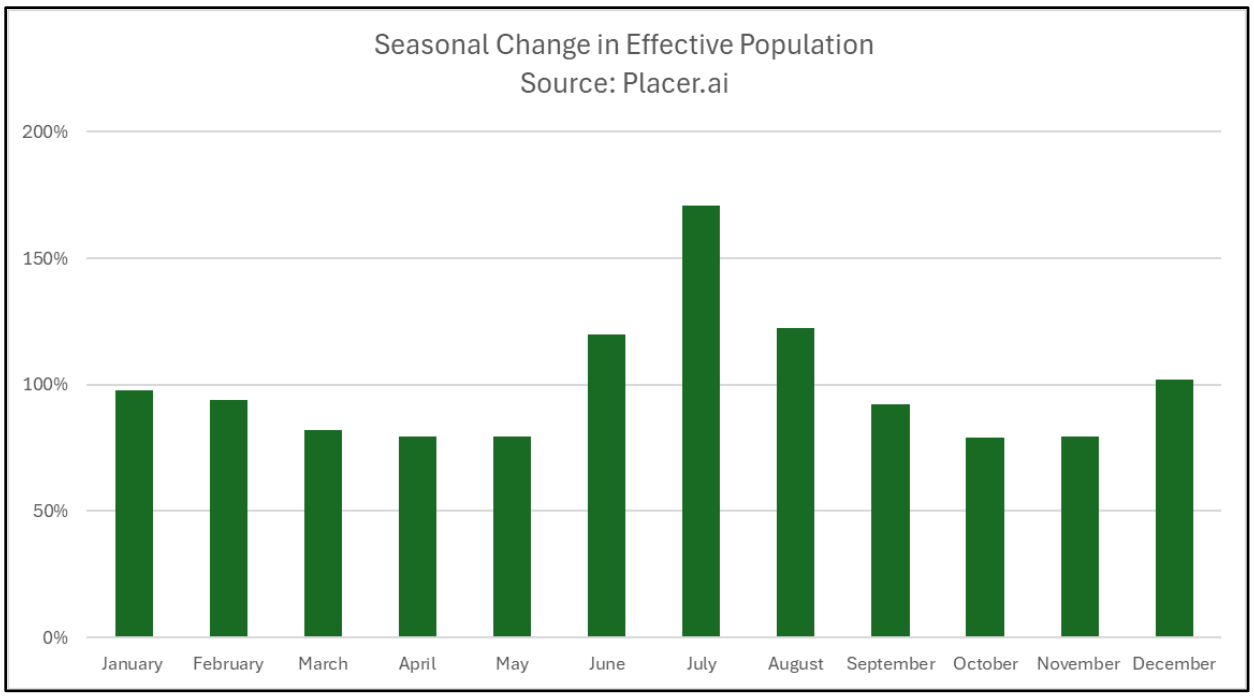


Figure 4-2: Seasonal Change in Effective Population from Placer.ai

Effective population through Placer.ai are available from 2017 to the present and listed in the table below.

Year	**Effective Population (Source: Placer.ai)**
2017	146,051
2018	166,983
2019	156,407
2020	158,789
2021	144,314
2022	146,212
2023	148,778

Table 4-5: Effective Population, Source: Placer.ai

Using Placer.ai as the source for the effective population for the threshold standard would require establishing a baseline for the effective population. The effective population based on the TEPM for 2018 was 118,856, while Placer.ai suggests the population was 166,051. The potential benefits of using

Placer.ai as the source are that it is more readily estimated through time and the more available estimate would enable the use of a three-year average effective population, which would align with the three-year estimate of VMT. The three year average effective populaton as estimated from Placer.ai is summarized below. The table suggested that there has been a slight decline in the average number of people in Tahoe over the last five years.

3-year Average Effective Population (Source: Placer.ai)

Years	Total
2017-2019	156,480
2018-2020	160,727
2029-2021	153,170
2020-2022	149,772

Table 4-6: 3- Year Average Effective Population, Source: Placer.ai

TRPA intends to perform more analysis on this and other platforms to determine their long-term suitability for the region.

Median travel time (between key destinations and along key corridors)

Congestion affects residents' quality of life and visitor experience in the Tahoe region, shaping the opinions people have about the transportation system. This report focuses on median travel time along key corridors. The median travel time is the midpoint of how long it took travelers to travel the length of the segment, 50% of trips were faster than this time and 50% were slower.

Median travel times in the Tahoe region are estimated using the RITIS Probe Data Analytics Suite, produced by the University of Maryland CATT Lab and accessed through a license obtained by the Nevada Department of Transportation. The platform allows analysis of INRIX probe data for congestion monitoring. INRIX data is comprised of billions of real-time data sourced from connected cars, mobile devices, and cameras and sensors on roadways. All data is anonymized. While there are many travel time- and congestion-related metrics that exist, TRPA is using median travel time due to it being simple for the public to understand: the times represented by the median indicate there are as many trips that take less time to travel the corridor as there are trips that take longer. In addition to median times, TRPA also evaluated 95th Percentile travel times to determine the impacts of the near-worst days of the year,

with these measures showing that 95-percent of trips in each cooridor take less time than represented, and 5% of trips take longer. Figure 4-3. shows the locations of the twelve segments covering 104 miles of roadways within the Tahoe Region where congestion data have been measured.

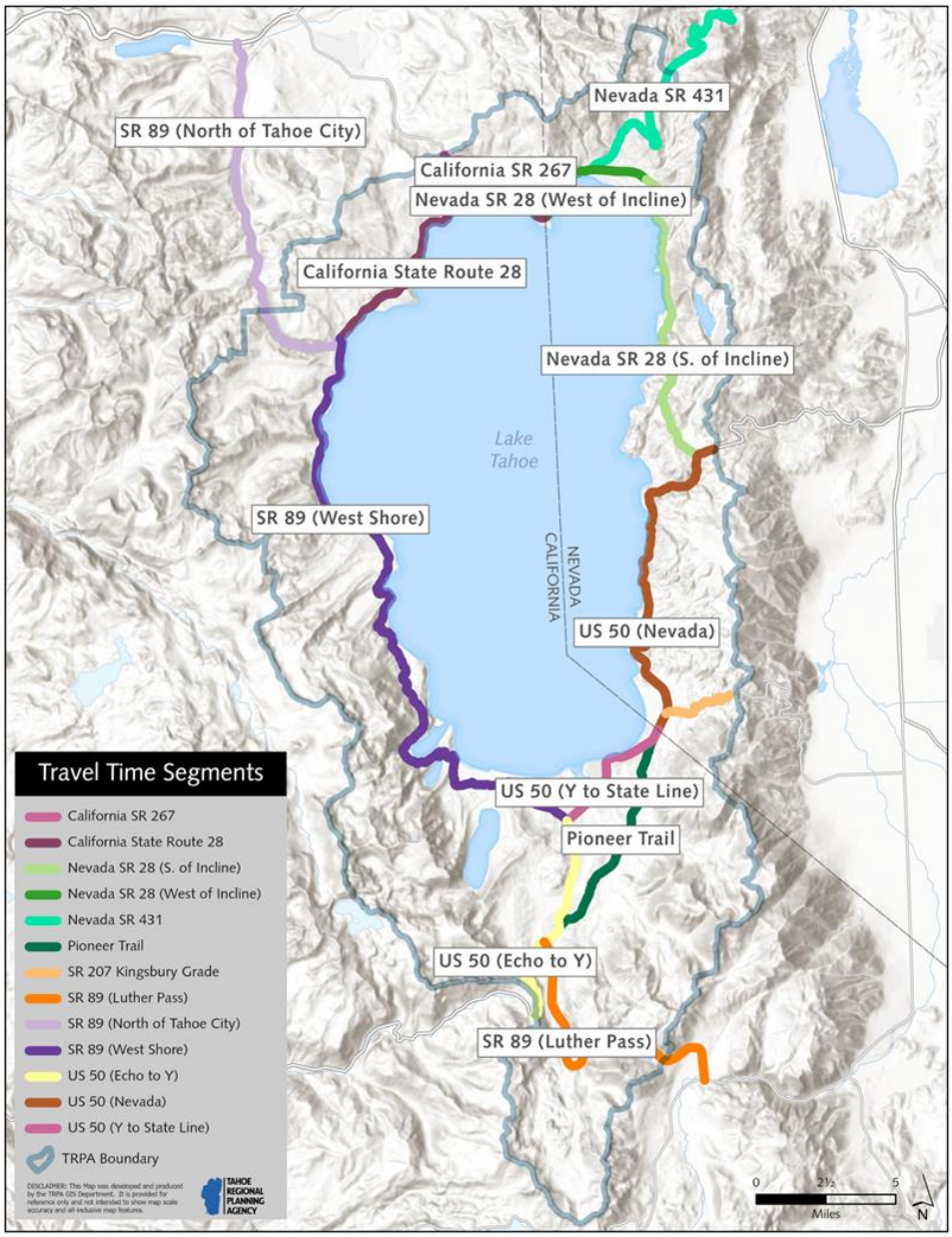


Figure 4-3 Median Travel Time by Segment

Despite major changes in regional visitation patterns and greater perceived effects, median travel times (see Table 4-7) around the Tahoe region have generally remained steady or decreased over the past several years. Increases in travel time tend to be limited to specific corridors and are strongly correlated

with construction and weather conditions. For example, NV SR 28 and NV SR 431 saw slight increases in 2022 relative to 2021. However more detailed analysis of the specific hours and days, reveals that the increased travel times correspond exactly to periods of major construction in these corridors.

Similarly, the 95th percentile travel times (Figure 4-8) indicate some improvements in several corridors, including U.S. 50, Highway 267, and NV 28, while NV SR 28 and NV SR 431 saw increases in 95th percentile travel times for 2022 relative to 2021. Overall, the combined median travel time to drive each of the segments representing 104 miles of roadways in the Tahoe Region was 153 minutes in 2022, compared to 191 minutes at the 95th percentile.

Table 4-7. Median Travel Times Compared to Running 3-Year Average Travel Time

Segment	2018	2019	2020	2021	2022
CA 267	1%	-1%	-2%	-1%	-1%
NV 28 (Country Club - US 50)	8%	-3%	-5%	-2%	0%
NV 28 (California - Country Club)	2%	-1%	-1%	0%	0%
CA 28	-1%	-2%	0%	2%	2%
CA 89 (CA 28 - I-80)	0%	0%	-2%	-1%	0%
CA 89 (CA 88 - US 50)	3%	-3%	-2%	-1%	-1%
NV 207	0%	0%	0%	1%	1%
NV 431	-1%	0%	-2%	-1%	2%
Pioneer Trail	1%	-1%	-2%	1%	0%
US 50 (Echo Summit - South Lake Y)	-1%	1%	0%	0%	-1%
US 50 (South Lake Y - State Line)	-2%	-2%	-5%	-2%	-2%
US 50 (State Line - Spooner Summit)	0%	-1%	-3%	-1%	-1%
All Segments	1%	-1%	-2%	-1%	0%

Table 4-8. 95th Percentile Travel Times Compared to Running 3-Year Average Travel Time

Segment	2018	2019	2020	2021	2022
CA 267	3%	-2%	-4%	0%	-2%
NV 28 (Country Club - US 50)	9%	-7%	-7%	-1%	1%
NV 28 (California - Country Club)	1%	1%	0%	3%	-2%
CA 28	-2%	1%	0%	6%	4%
CA 89 (CA 28 - I-80)	-3%	1%	-4%	0%	2%
CA 89 (CA 88 - US 50)	5%	-5%	-2%	0%	-1%
NV 207	2%	5%	0%	0%	0%
NV 431	2%	0%	-3%	0%	5%
Pioneer Trail	2%	0%	-3%	5%	0%
US 50 (Echo Summit - South Lake Y)	0%	3%	-3%	3%	1%
US 50 (South Lake Y - State Line)	-4%	-4%	-9%	-3%	-5%
US 50 (State Line - Spooner Summit)	1%	0%	-3%	0%	-3%
All Segments	1%	-1%	-3%	1%	0%

For more detailed congestion statistics, including a breakdown by season and day of week, please refer to the Tahoe Congestion Report, last released in Fall 2023. The most recent trends area available on the travel times dashboard on LT Info at LT Info | Congestion-Travel Time (laketahoeinfo.org) .

3.2 AUTO SECONDARY

No secondary metrics are proposed at this time given the current performance of VMT and median travel time.

CHAPTER 4.

PERFORMANCE RECOMMENDATIONS

4.1 RECOMMENDATIONS

The following section on recommendations will be discussed at the April 22, 2024 Technical Advisory Committee to be updated accordingly with committee and public feedback for the final draft.