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

June 18, 2024

TAHOE REGIONAL PLANNING AGENCY

with support from Cambridge Systematics

TABLE OF CONTENTS

Introduction…… ……1

Regional VMT Threshold 2

Regional Plan Transportation Goals..... 3

Metrics……4

Chapter 1. Transit Metrics 5

1.1 Transit 5

1.2 Transit Explanatory 8

Chapter 2. Active Transportation 9

2.1 Active Transportation 9

2.2 Active Transportation Explanatary 18

Chapter 3. Auto Metrics 21

3.1 Auto 21

3.2 Auto secondary 31

Chapter 4. Performance Recommendations ……35

4.1 Recommendations 35

LIST OF TABLES

Table 2-1 2023 Tahoe Regional Bicycle Level of Traffic Stress Lane Miles....13

Table 2-2 Pedestrian Experience Index Region-wide and in Town Centers.... 16

Table 3-1 3-Year Average VMT.... 22

Table 3-2 Effective Population Model Inputs Comparison 24

Table 3-3 Entry/Exit Traffic Volumes Comparison 25

Table 3-4 Effective Population 27

Table 3-5 3-Year Average Effective Population.... 27

Table 3-6 3-Year Average VMT Percapita.... 28

Table 3-7 Median Travel Time (minutes) 31

Table 3-8 95th Percentile Travel Time (minutes) 32

LIST OF FIGURES

Figure I Adaptive Management Framework.... 2

Figure 1-1 Total Transit Ridership.... 6

Figure 1-2 Montly Transit Ridership.... 6

Figure 1-3 Population and Neighborhoods Served by Frequent and Basic Service....7

Figure 2-1 Locations of Bicycle and Pedestrian Counters in the Lake Tahoe Region....10

Figure 2-2 TRPA Travel Surveys, Active Transportation Mode Share 2006-2020....11

FIgure 2-3 Replica Active Transporation Mode Share 2019 to 2023....12

Figure 2-4 Bicycle Level of Traffic Stress Segments....14

Figure 2-5 Bicycle Level of Traffic Stress Intersections....15

Figure 2-6 Pedestrian Experince Index Regional and Town Centers....17

Figure 2-7 Bicycle and Pedestrian Crashes 2013-2021 18

Figure 2-8 Number of bicycle facility lane mile facilities incorporating safety improvements....19

Figure 3-1 Vehicle Miles Traveled Trends....22

Figure 3-2 Seasonal Change in Effective Population Placer.ai vs CSLT Room Occupancy....26

Figure 3-3 Seasonal Change in Effective Population from Placer.ai 26

Figure 3-4 Lake Tahoe Region Roadway Segments Monitored for Travel Time 29

Figure 3-5 Season Congestion Data for Nevada SR 431....33

Figure 3-6 Season Congestion Data for Nevada SR 28 34

INTRODUCTION

The Tahoe Regional Planning Agency (TRPA) and partners continually collect and assess data to adaptively manage transportation resources across the Tahoe Region. The monitoring program links data to the planning process and adjusts the transportation strategies that guide the region toward goals established by the Regional Plan, Regional Transportation Plan, and other local, state, and federal requirements.

The transportation measures are grouped into primary and explanatory metrics which explain the performance of different modes of transportation, including walking, biking, transit, and automotive travel. Explanatory metrics, depending on the direction of performance, explain trends among the primary indicators and provide a better understanding of the factors affecting transportation system performance. This multi-level approach enables TRPA to adjust strategies as progress is made toward the goals and targets for the Tahoe Region.

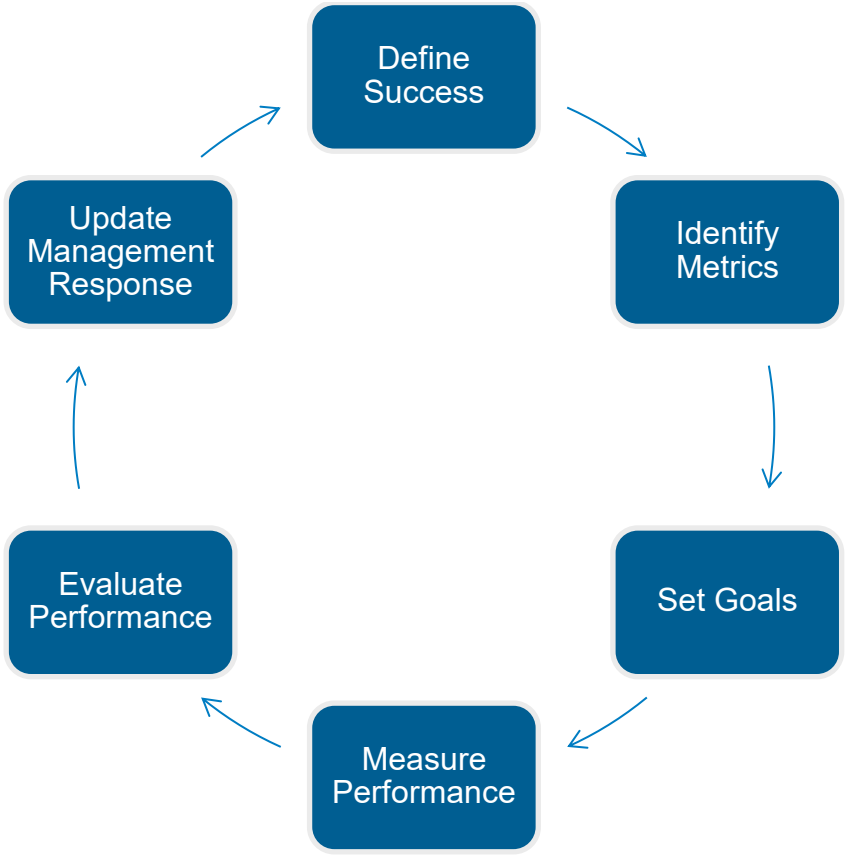
The Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS) Analysis and Recommendations Report is prepared in advance of the RTP/SCS to summarize performance and provide recommendations for the RTP/SCS. The report focuses on trends in seven key metrics in three focus areas identified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

The adaptive management approach provides a management response framework that tailors actions to the findings from the evaluations of the transportation system. The approach thrives in a collaborative process where partners collectively ensure the foundation for decision-making in the Tahoe Region.

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.

Figure I – Adaptive Management Framework



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

Regional VMT Threshold

To ensure the natural beauty and economic productivity of the region persists 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).

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

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

Regional Plan Transportation Goals

The Lake Tahoe Regional Plan and 2020 Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS) share six major transportation goals that 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 the transportation system in the Lake Tahoe area, which has three transit operators providing fixed route and microtransit service, and 135 miles of bicycle/pedestrian facilities. 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 seven primary metrics tracked across three main categories of travel in the Tahoe Region: Transit, Active Transportation, and Auto. For each of these three categories, a set of primary metrics are presented as the top-level numbers of greatest interest at the regional level.

Metrics:

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

Beyond the primary metrics, a secondary set of explanatory metrics may be presented to drill down into the underlying factors that drive the performance of the primary metrics. These explanatory metrics are grouped into three sets:

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

Further information on programs and policies is available at trpa.gov/transportation in the Active Transporation Plan, Vision Zero Strategy, Short Range Transit Plans, and the Regional Transportation Plan.

1 TRANSIT METRICS

1.1 TRANSIT

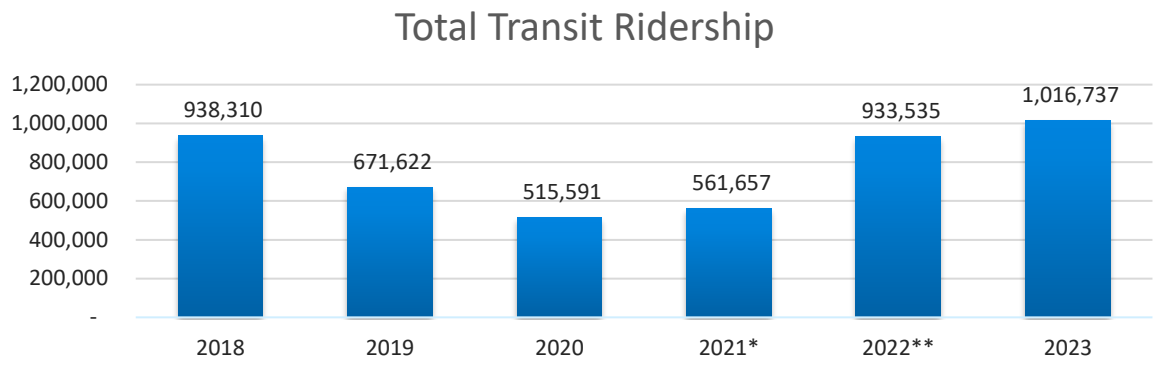
Three operators providethe primary transit services across the Tahoe Region. The North Shore is served by Truckee Tahoe Area Regional Transit (TART) providing microtransit and fixed route services. The south shore is served by Tahoe Transportation District (TTD) which provides fixed route and regional service to the Carson Valley and summer recreation services on the east shore. The South Shore Transportation Management Association (SS/TMA) contracts with South Lake Downtowner, LLC to operate Lake Link which provides microtranist on the South Shore. Expanded transit service reduces reliance on the automobile and supports the 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 coverage and frequency:

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

Total ridership

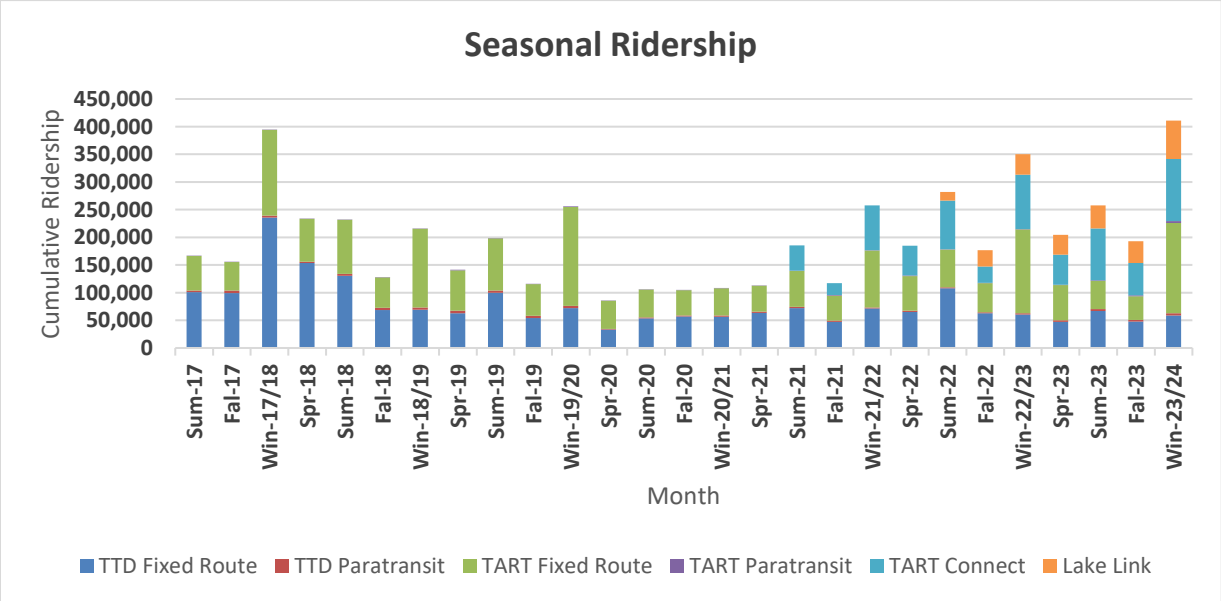
Transit ridership is the total number of people trips on transit service in the region. After declining in 2019 and during Covid, ridership has steadily increased, and in 2023 ridership exceeded 2018 levels (Figure 1-1). Much of the recovery is attributable to regional microtransit which started in June of 2021* on the North Shore and July of 2022** on 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 have 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.

Figure 1-2: Seasonal Ridership



Today these ski shuttle operations are provided by private operators and are not included in the totals. TART fixed route and TART Connect have been trending up since May 2020, with current winter peaks are exceeding 2018 totals. On the South Shore, TTD and Lake Link (providing some of the resort service) combined are returning to 2017/2018 winter peak levels as well.

While ridership is growting, tranist frequency is still waning. Frequent service is defined as 20 minutes or less, and basic service is 60 minutes. Except for one quarter in 2018 on the South Shore along US50, no transit has offered frequent service. Regionally 65 percent 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 it is recommended that the report track changes in coverage, hours of service, and wait time to better assess microtransit performance.

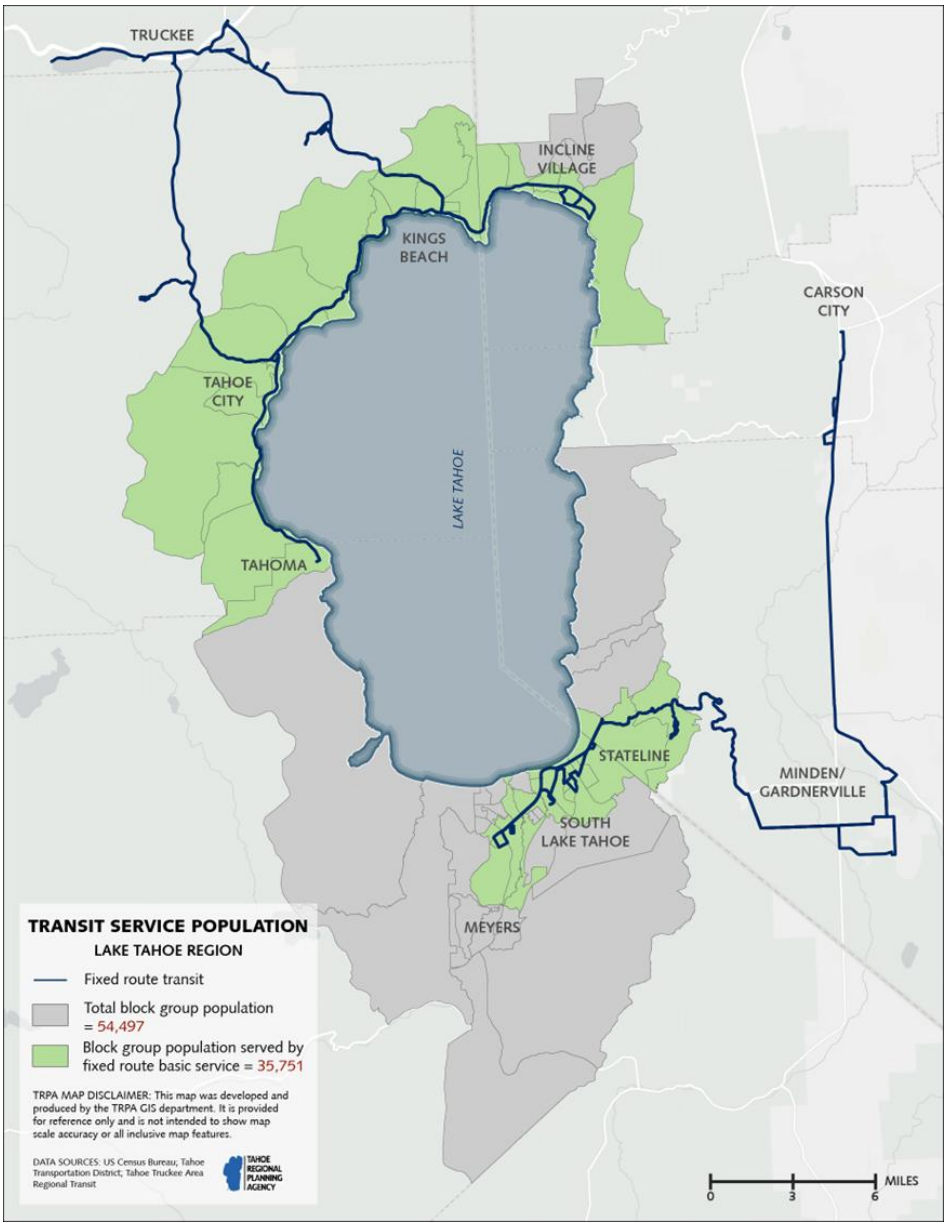


Figure 1-3: Population and Neighborhoods Served by Frequent and Basic Service

1.2 TRANSIT EXPLANATORY

The transit industry, in Tahoe and nationwide is rebounding from the COVID-19 Pandemic. Operating costs are increasing while agencies providing transit services for the public continue to struggle with staffing issues. The national housing crisis is also impacting the Tahoe Region, adding to the challenges of filling operator positions. While federal programs try to promote transit and provide resources for capital investments, local operators are struggling to secure resources for operations and maintenance.

Image: Transit Bus - Now Hiring

2 ACTIVE TRANSPORTATION

2.1 ACTIVE TRANSPORTATION

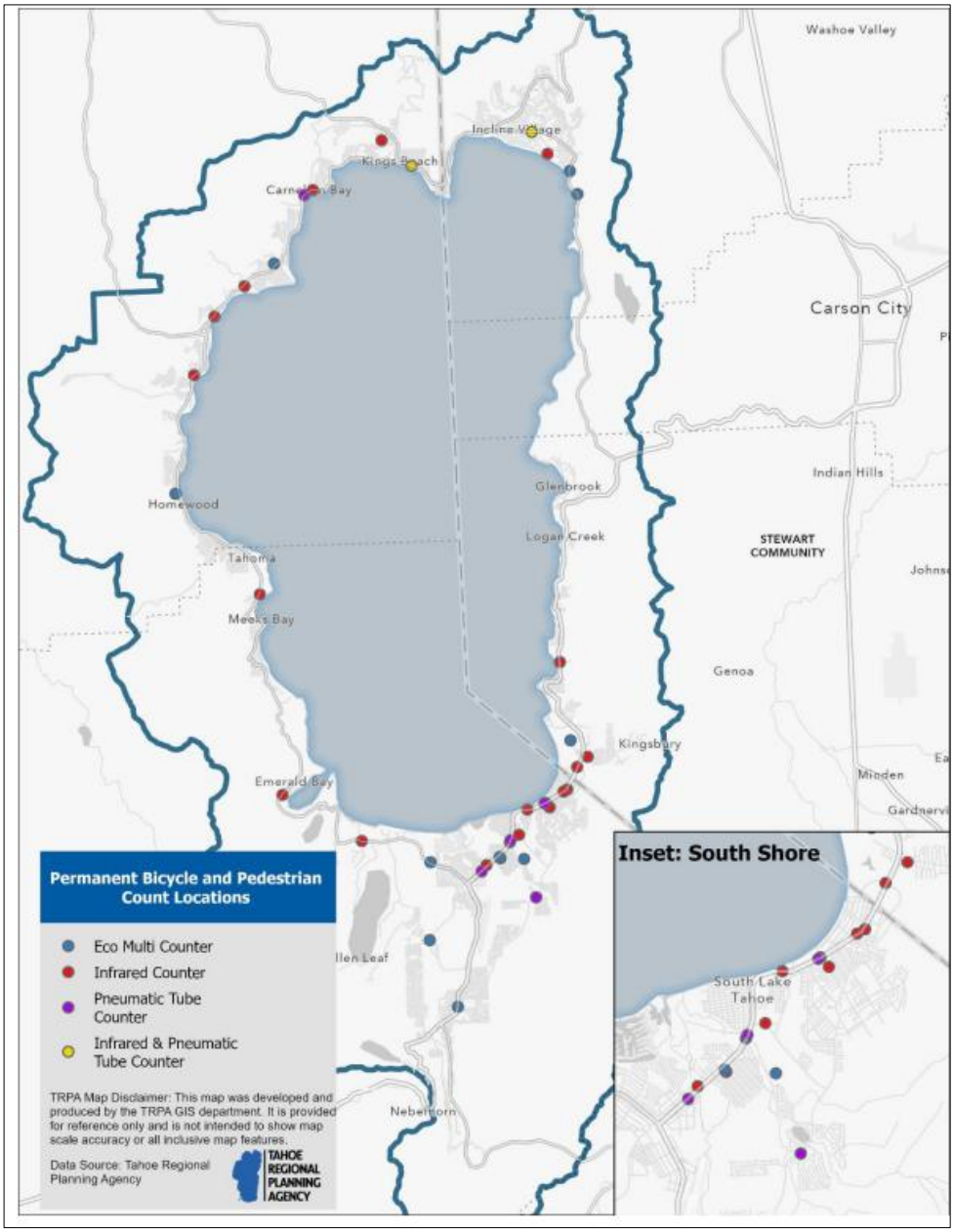
Active transportation is transportation that uses active modes and does not rely on an automobile (i.e., walking, biking, skateboarding, and e-scootering). The active transportation program performance is evaluated based on two primary metrics: (1) utilization; and (2) network quality. Utilization is the proportion of trips in the region taken using active modes, measured by mode share. Network quality is the level of stress bicyclists and pedestrians experience on the active transportation network. Together these metrics consider the RTP goals of connectivity, safety, economic vitality and quality of life, and system preservation.

Mode share (bicycle and pedestrian)

Mode refers to the method of travel (e.g. car, bicycle, walk) used to complete a trip, reported as the proportion of all trips that use an individual mode. A large number of residents and visitors use Lake Tahoe's extensive active transportation facilities, but getting exact counts of all trips in the region is impossible. Data are collected through surveys,combined online sources (a.k.a.,big data), and actual

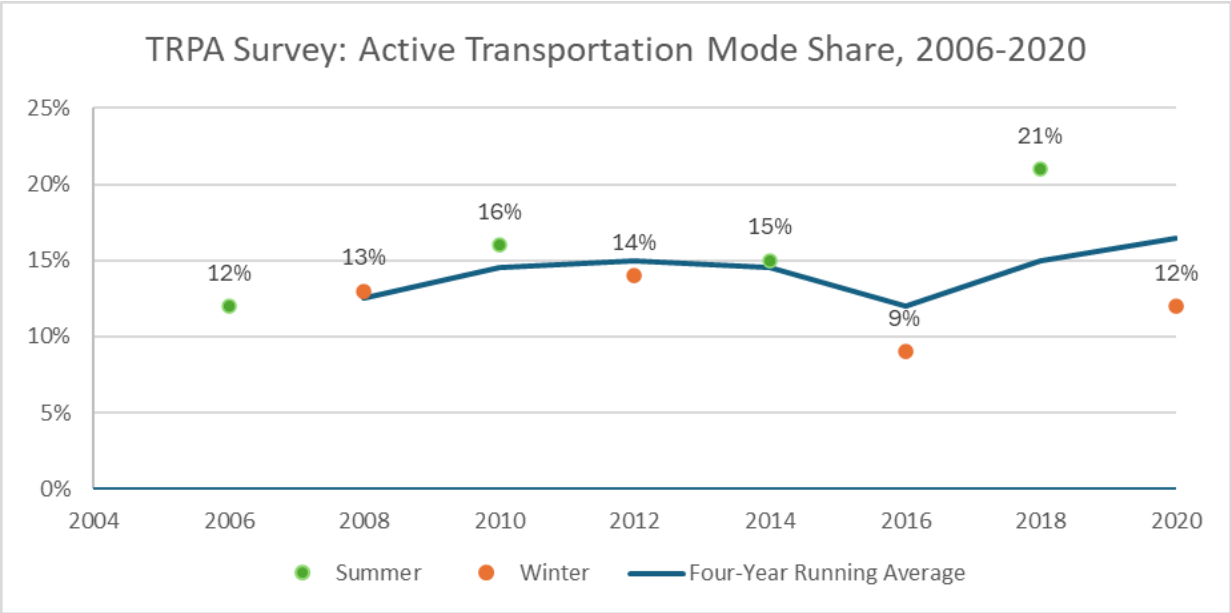
counts via forty-eight active monitoring locations to help to define trends (Figure 2-1). While most of the measured use occurs during the summer, 13 percent of total counts are during the winter months (December-March). The bicycle and pedestrian count data at the monitoring locations are continually 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



Historically mode share estimates focused on travel to commercial and recreation areas and was collected via surveys between Summer 2006 and Winter 2020 (see Figure 2-2).

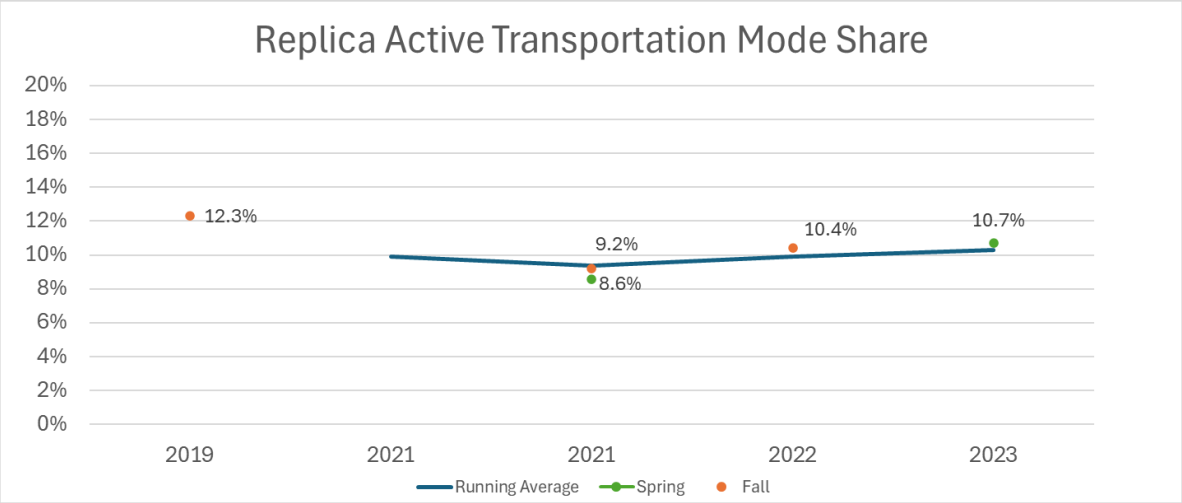
Figure 2-2. TRPA Travel Surveys, Active Transportation Mode Share 2006-2020



The data collected during the TRPA surveys included information such as mode share, origin-destination, and trip purpose at commercial and recreation sites. The surveys showed typical seasonality, with lower bike and pedestrian travel during the winter surveys than in the summer surveys, with an overall trend of increasing non-auto mode share.

To expand the estimated mode share from a commercial and recreational focus to an estimate of total regional mode share TRPA engaged ReplicaHQ (Replica), a big data provider, to calculate mode share for 2019 to 2023 (Figure 2-3). Replica's nationwide activity-based travel demand model 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 truthed data). Their online tool provides information about travel patterns, trip origin and destination, commute patterns, travel mode, and network link volumes. The analysis provides seasonal trip 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 mega-region.

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



Replica's mode share data tell a mixed story about conditions in Tahoe, with non-auto mode share down from 2019, but steadily increasing in the last two years. Because the Replica data are based on the Fall (August, September, and October) and Spring (March, April, and May), the analysis likely underrepresent non-auto mode share in the peak summer period. In 2024, Replica will release data for all four seasons, and it is expected 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 inputs in future modeled periods.

Low-Stress Bicycle and Pedestrian Facilities Lane Miles

The ability to move about without exceeding a users tolerance for traffic stress has been identified as a key determinant of the attractiveness of active transportation networks. This metric quantifies the availability of bicycle and pedestrian facilities and their relative comfort level for users. It reflects considerations of connectivity, safety, economic vitality and quality of life, and system preservation goals.

Bicycle Level of Travel Stress (BLTS) analysis is an approach used by transportation planners and engineers to evaluate the level of comfort of bicycling at a given location. It is a deterministic method of assessing the level of stress that bicyclists might experience when traveling on a particular street, intersection, or other bicycle facility. 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 suggests that safe, low-stress (high-quality) bicycle infrastructure would serve the majority of riders, and likely increase bicycle mode share.

The BLTS analysis uses the Oregon Department of Transportation guidance for conducting segment and intersection BLTS analyses as published in the Oregon Analysis Procedural Manual, Chapter 14. The BLTS analysis takes into account various factors that influence rider discomfort. These include traffic volume, vehicle speed, the presence of bike lanes or other bicycle facilities, land use type, and other roadway characteristics. The analysis results in a numerical score from 1 to 4, with higher numbers indicating higher levels of stress. The project team added a score of 4.5 to the analysis to account for exceptionally stressful locations for cyclists within the Tahoe Basin. (See Figure 2-4). The Pedestrian Experience Index (PEI) incorporates similar built environment data such as the 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.

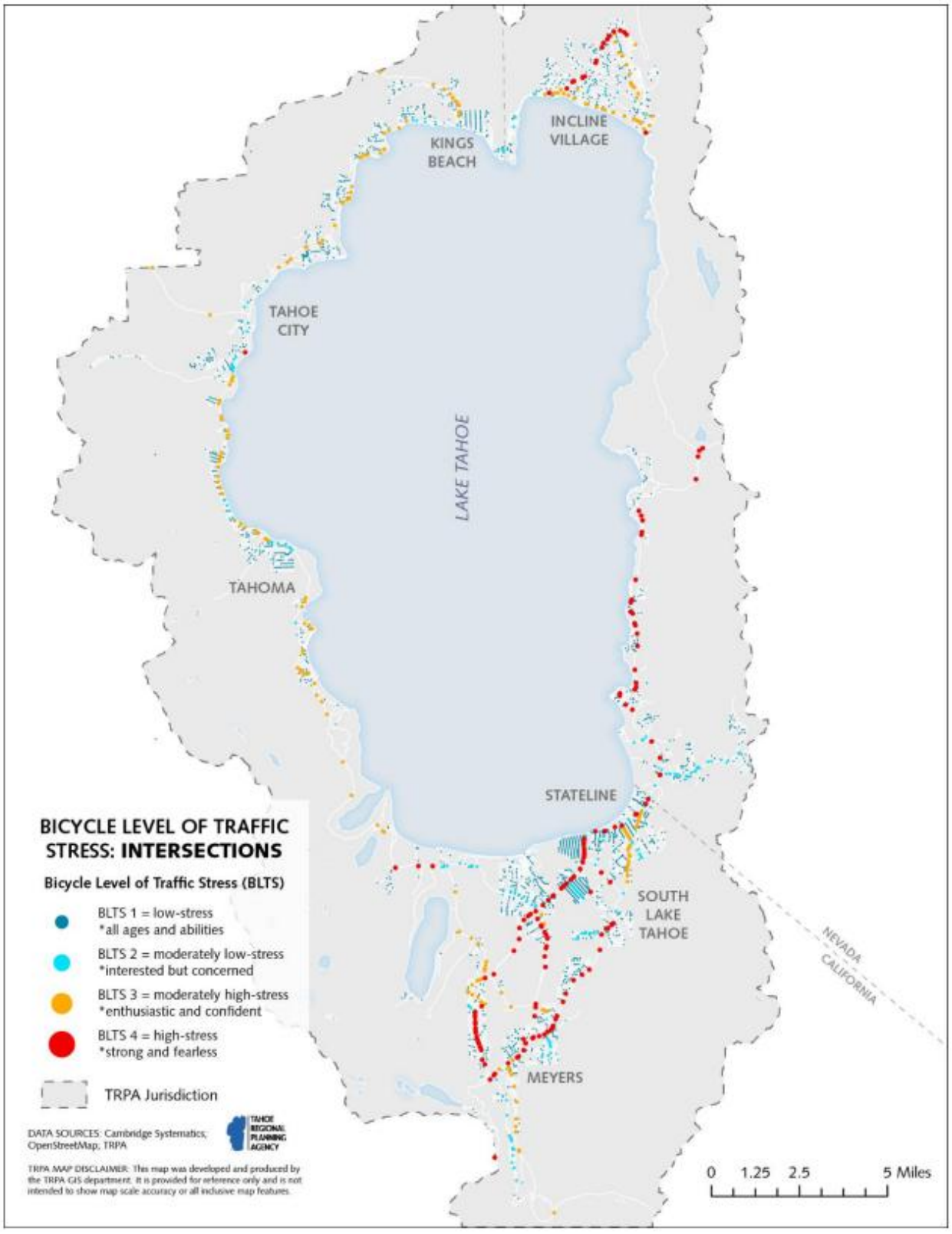
Table 2-1. 2023 Tahoe Region Bicycle Level of Traffic Stress Lane Miles

BLTS	Miles
1	80.33
2	1.75
3	43.86
4	68.49
4.5	36.24

BLTS 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. A summary of the 2023 BLTS for the region is presented in Table 2-1. The total line miles of BLTS includes 55.25 miles of Class 1 shared-use paths. Neighborhood streets are excluded from the analysis.

Figure 2-4. Bicycle Level of Traffic Stress Segments

Figure 2-5. Bicycle Level of Traffic Stress Intersections



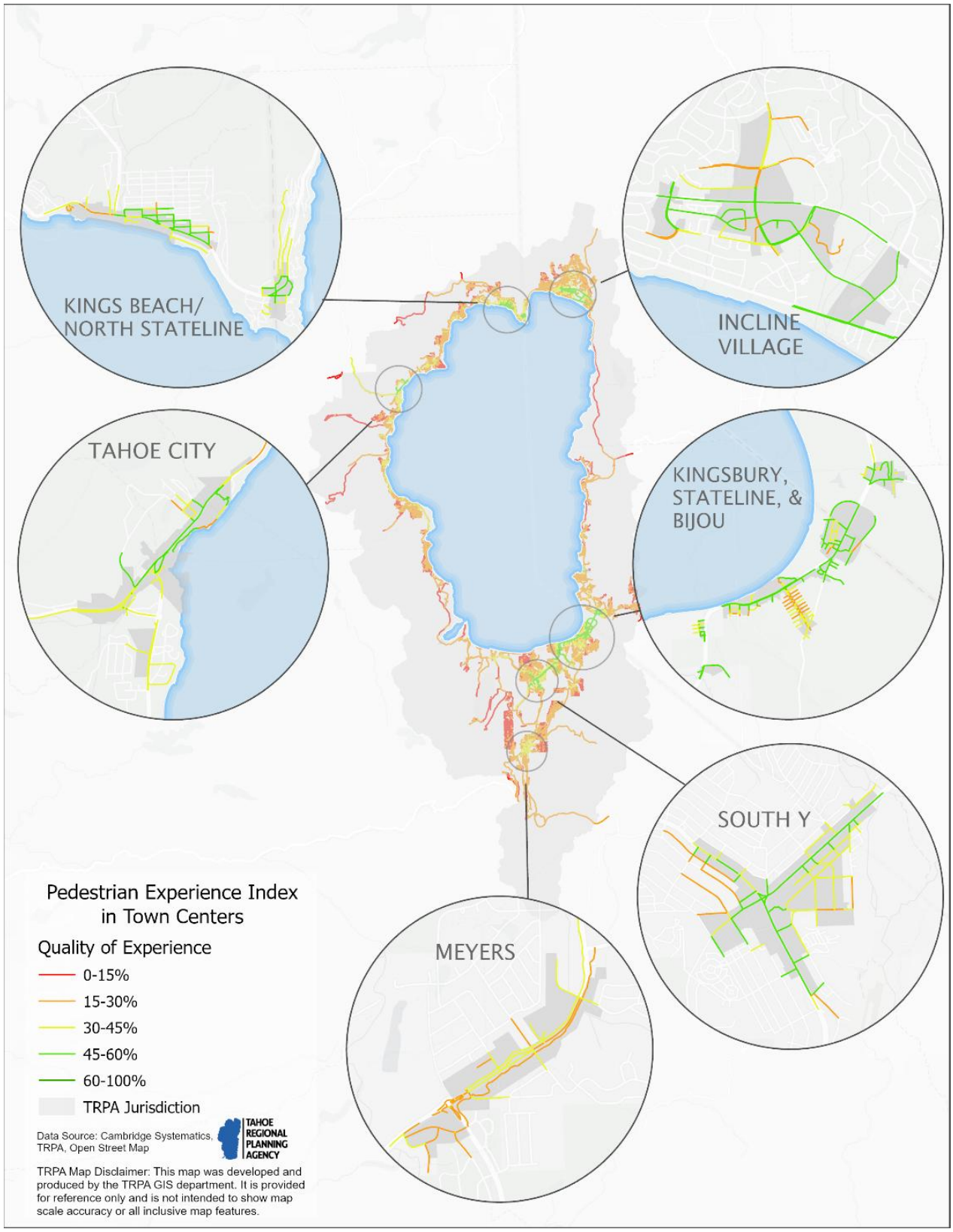
Pedestrian Experience

The Pedestrian Experience Index (PEI) provides an index quantifying the quality of pedestrian user experience of the roadway network. The score is calculated based on the presence of infrastructure such as sidewalks, curb ramps, and mid-block crossings. Scores of zero percent to 45 percent are classified as a low-quality experience (ie. no sidewalk present) and scores from 45 percent to 100 percent reflect a higher quality of experience (Table 2-2). The goal is to increase PEI to 45 percent or higher outside of town centers and within town centers between a 60 percent to 100 percent index rating. Figure 2-6 indicates a higher quality of experince in a few locations around the lake, mainly overlapping with town centers and class 1 paths.

Table 2-2. Pedestrian Experience Index Region-wide and in Town Centers

Region-wide		Town Centers	
Tier	Miles	Tier	Miles
0-15%	186.3	0-15%	0
15-30%	472.3	15-30%	12
30-45%	71.6	30-45%	23
45-60%	**37.4**	**45-60%**	**27**
60-100%	**0.1**	**60-100%**	**0**

Figure 2-6. Pedestrian Experience Index Regional and Town Centers



2.2 ACTIVE TRANSPORTATION EXPLANATORY

Network safety strongly influences users' decision to walk or bike. From 2013-2021 there were approximately 41 fatalities and 183 serious injuries on roadways within the Lake Tahoe Region; an average of 5 fatalities and 20 life-changing serious injuries each year. Analysis of crashes enables of design and implementation of improvements where they are needed most.

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.

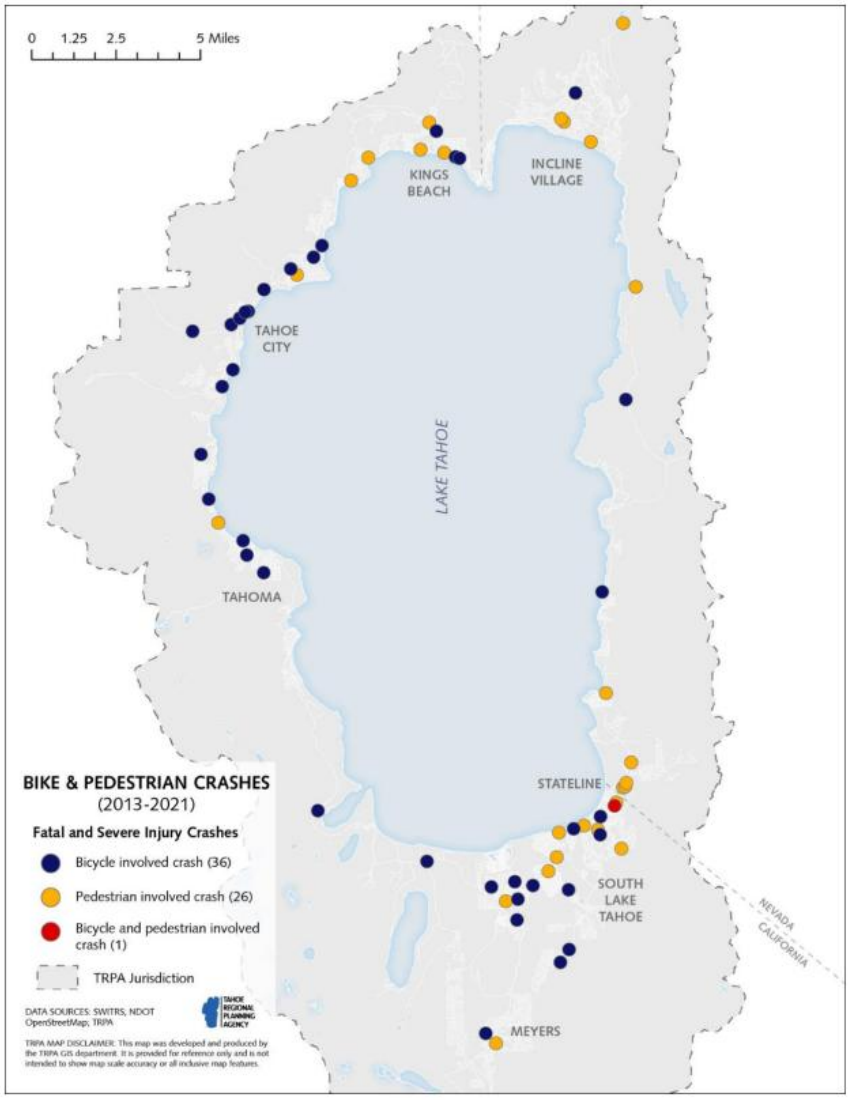
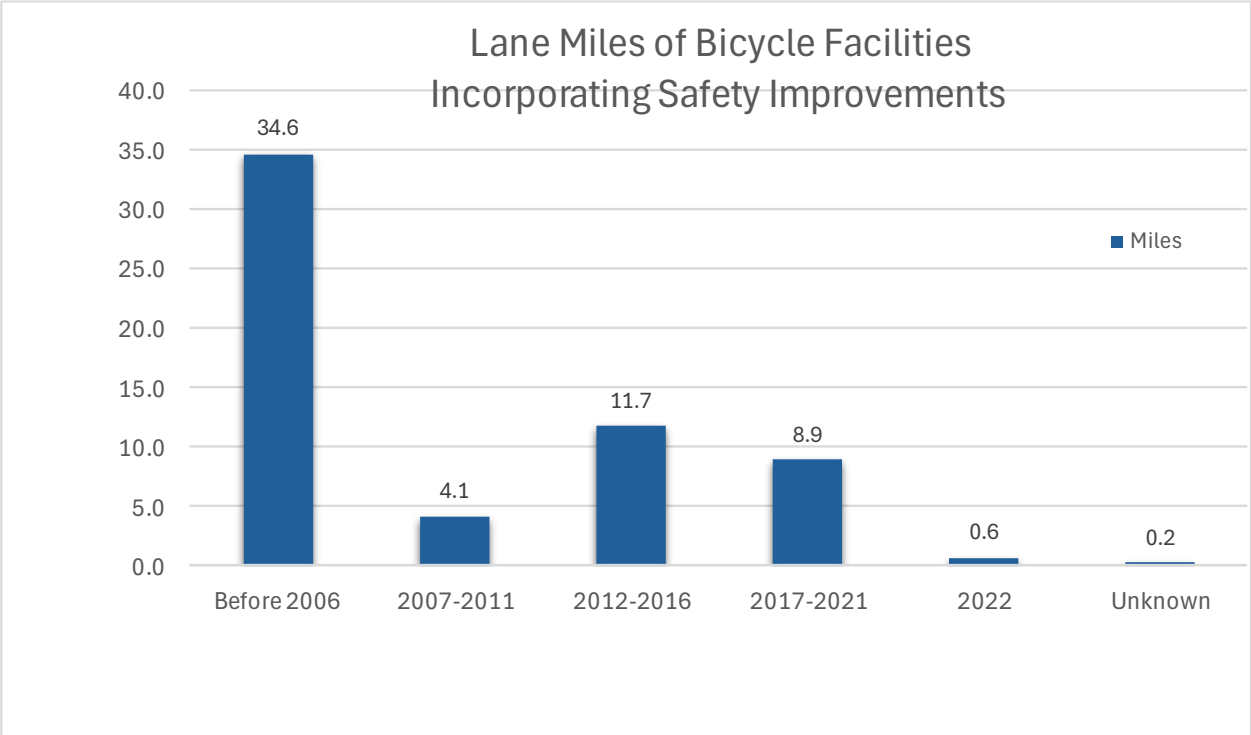


Figure 2-7.
Bicycle and Pedestrian Crashes 2013-2021

In the future, it may be appropriate to summarize the number of bicycle/pedestrian safety related projects completed (Figure 2-9).

Figure 2-8 Number of bicycle facility lane mile facilities incorporating safety improvements



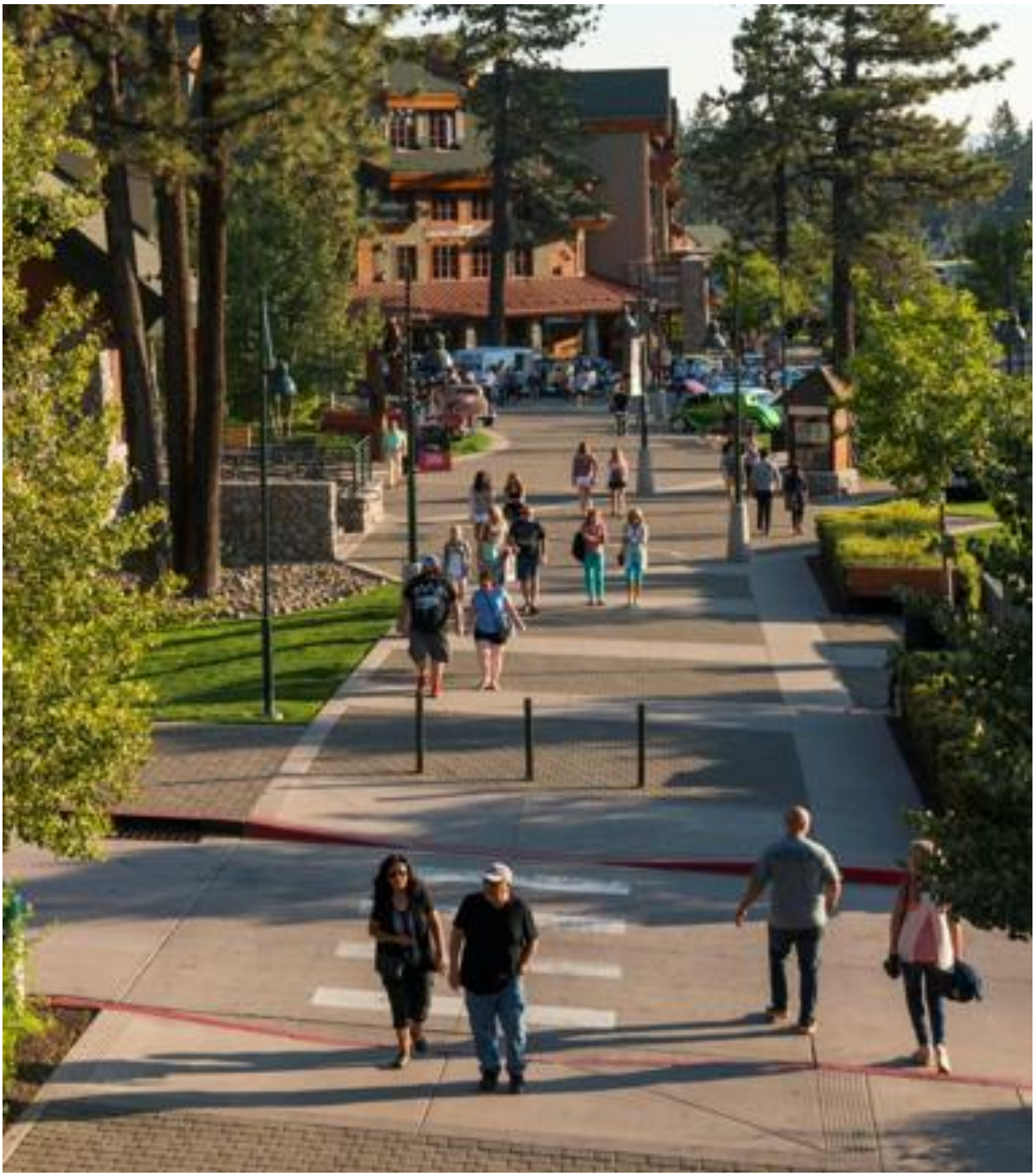


Image: Heavenly Village, South Lake Tahoe

3 AUTO METRICS

3.1 AUTO

Driving is the dominant mode of transportation for residents and visitors alike. Well-managed roadway infrastructure plays a key part in ensuring accessibility and economic vitality of the region. Extreme weather events brought by climate change have imposed additional challenges on the roadway infrastructure. Two primary metrics are used to track the performance of the auto network in Tahoe.

- Average daily VMT per capita
- Median travel time (between key destinations andalong corridors)

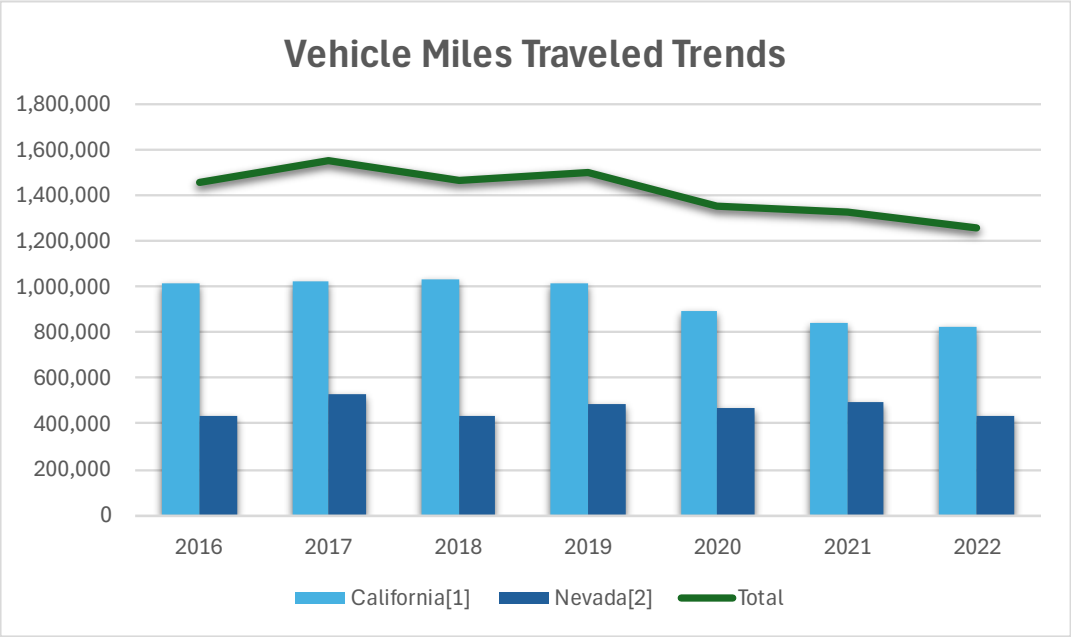
Average Daily VMT Per Capita

VMT per capita is a measure of interaction between land use and the transportation system and its efficiency in moving individuals between the places they need to be. Higher VMT per capita regions are those where individuals are traveling farther distances to get between home, work, shopping, etc. and are generally reliant on the automobile to move between their destinations. Lower VMT per capita

regions are those that are characterized by individuals traveling shorter distances between their desired destinations and where there are options other than the car (e.g. bike paths, transit systems) that are chosen more frequently as a means of taking those trips.

The Lake Tahoe Region has a substantial day and overnight visitor population that generates about half the VMT in the region on an average day. Because VMT in the region is not primarily generated by the resident population, the region uses a different measure of its population when calculating per capita VMT. In calculating the population, Tahoe uses an "effective population" or an estimate of the total number of people in Tahoe on an average day. To estimate the total number of people in Tahoe, inclusive of residents, visitors, seasonal residents, day visitors, and workers, the region uses the Tahoe Effective Population Model (TEPM). The TEPM estimates the number of people present in the Lake Tahoe Region on an average day using information drawn from a variety of sources, including US census data on population, traffic counts at external gateways, tax returns for lodging occupancy, and survey data on travel patterns.

Vehicle Miles Traveled (VMT)



Caltrans and NDOT report VMT for the Lake Tahoe Region as part of the Highway Performance Monitoring System (HPMS). The latest data reported for each state is 2022.

Figure 3-1 Vehicle Miles Traveled Trends

VMT is estimated through the use of local and regional traffic counts. The counts indicated declines in volumes during and after the COVID-19 Pandemic. The decreases in traffic counts and VMT in Tahoe run counter to statewide trends in both California and Nevada, each of which reported statewide VMT increases in both 2021 and 2022. The Tahoe Transportation District is planning a pilot project to add additional traffic counting equipment throughout the region that would provide more frequent and robust data.

The standard uses the three-year average VMT as the basis for assessment to insulate it from variation in VMT related to exogenous factors known to influence annual VMT. When the TSC1 threshold standard was adopted in 2021, the adoption materials noted that the Caltrans VMT estimate for 2019 was still preliminary[1]. Caltrans revised the preliminary estimate for 2019 VMT in Tahoe from 937,268 VMT to 1,014,920 VMT. The increase in reported VMT affects the baseline for the threshold standard. Revised 3-year average estimates are presented below in Table 3-1. A comparison of 3-year average VMT from the earliest period on record (2016-2018) suggests that VMT has decreased by 5.5 percent between 2016 and 2022. The decline in VMT during that period is concentrated on the California side, which declined from just over a million to just over 850,000. On the Nevada side VMT remained stable.

Table 3-1 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

Effective Population

The second component of VMT per capita is an estimate of the total population of the Region on an average day. The first input of the effective population is the resident population. Over the past decade Tahoe's resident population has remained relatively stable. The US Census estimated it increased by 230 residents between 2010 and 2020. The annual estimates of the American Community Survey between 2010 and 2022 also suggest there has been minimal population change.

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

Estimating the visitor population of the effective population begins with summarzing information on rooms rents in the region. Relative to the last estimate of Tahoe's effective population in 2018, hotel occupancy decreased and short-term rental units rented increased in 2022. Traffic counts at regional entry points also decreased slightly. Table 3-3 shows a comparison between 2018 and 2022 inputs.

Table 3-2: 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%
Resident Population American Community Survey 5-year estimates	51,577	53,842	+4%

The 2018 TEPM estimate used StreetLight Data, Inc. (StreetLight) estimates of entry volumes. TRPA has engaged with StreetLight to acquire more recent estimates to recalculate the effective population. Because the effective population estimate of 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 to produce comparable estimates. In 2018, StreetLight-estimated entry volumes were 10 percent 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 134,692, more than 14,000 higher than the StreetLight-derived estimate. Using DOT estimated volumes for 2022 and the updated inputs referenced above the effective population in 2022 would be 131,369, 2.5 percent lower than in 2018.

Table 3-3: 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%

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 Labs, Inc. (Placer.ai), has been obtained by TRPA to evaluate its performance in the region. This platform effectively draws a geofence around an area 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 and the Placer.ai derived visitation numbers aligned well. At the regional level, the platform also aligned well with known seasonal variations in traffic counts and tourist occupancy (Figure 3-2). During the summer peak, the effective regional population increases to 170 perecnt of the annual average, while during the shoulder seasons the populaton drops to just under 80 percent of the annual average. This pattern mirrors the pattern in the monthly average number of rooms rented.

Figure 3-2: Seasonal Change in Effective Population Placer.ai vs CSLT Room Occupancy

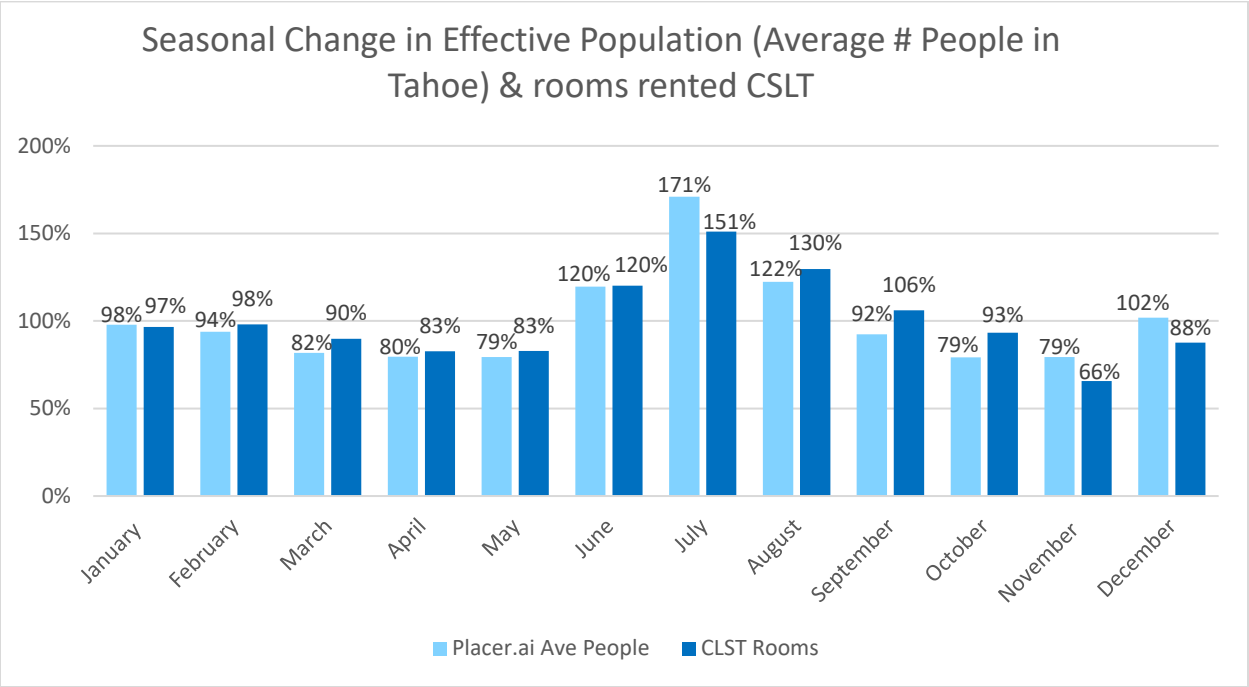
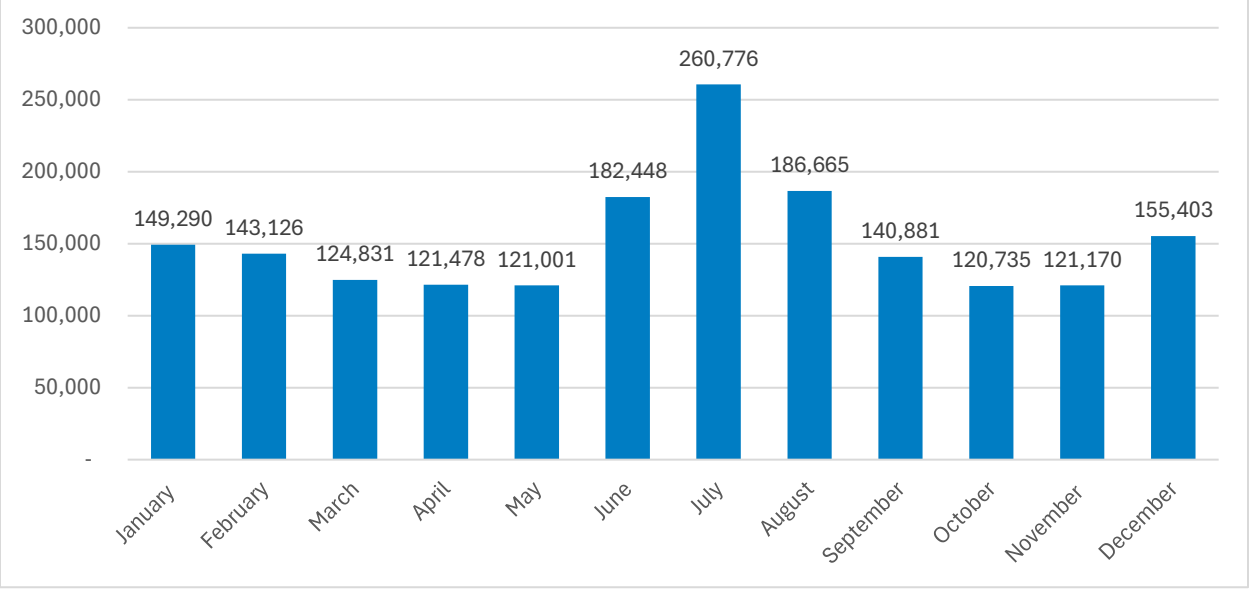


Figure 3-3: Seasonal Change in Effective Population from Placer.ai



Placer.ai derived effective population estimates from 2017 to the present are included in Table 3-4.

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

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

Using Placer.ai as the source for the effective population for the threshold standard would require re-estimation of the baseline. The effective population based on the TEPM for 2018 was 118,856, while Placer.ai suggests the population was 166,983. The potential benefits of using Placer.ai as the source are that it is more readily estimated through time. The reduced computational burden 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 population as estimated from Placer.ai is summarized in Table 3-5. The table suggested that there has been a slight (4%) decline in the average number of people in Tahoe over the last five years.

Table 3-5: 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

Integrating the 3-year average VMT estimates with the 3-year average effective population from Placer.ai provides an estimate of how VMT per capita has changed over the last seven years. The estimate presented in the table below suggests that there has been a slight decline in VMT per capita since the base period when the standard was adopted. The decline was largely driven by lower regional VMT, the impact of which was moderated by fewer average people in the region.

Table 3-6 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%

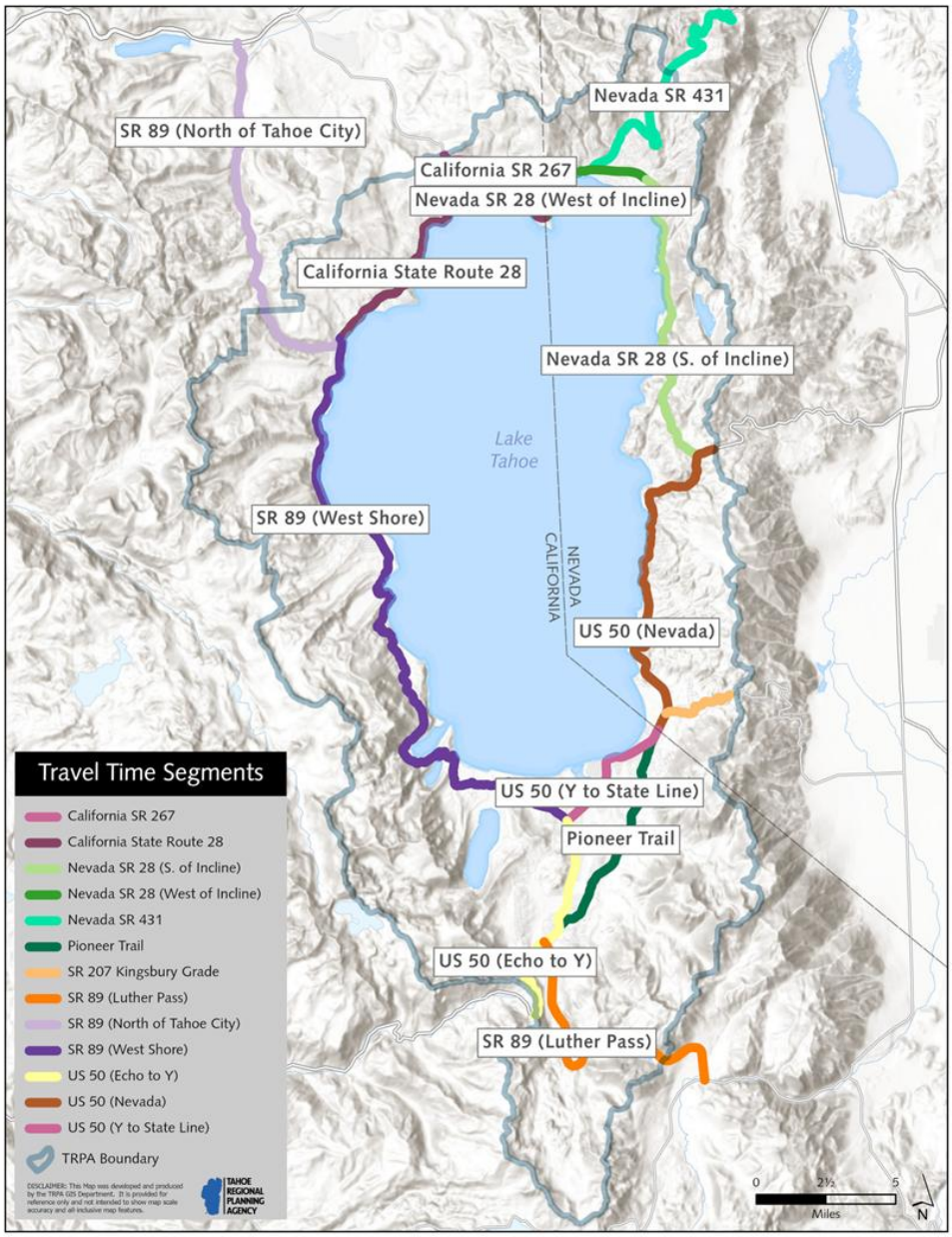
Median Travel Time

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

Median travel times were estimated using the INRIX Regional Integrated Transportation Information System (INRIX) Probe Data Analytics Suite, produced by the University of Maryland Center for Advanced Transportation Technology 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 are comprised of billions of real-time data sourced from connected cars, mobile devices, and cameras and sensors on roadways. All data are anonymized. While there are many travel time- and congestion-related metrics, TRPA uses median travel time for ease of public communication. 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. TRPA evaluates 95th percentile travel times to assess conditions during the slowest travel times of the year. The 95th percentile travel time is the time it takes for slowest 5 percent of trips.

Figure 3-4. shows the locations of the twelve segments covering 104 miles of roadways within the Tahoe Region where congestion is monitored.

Figure 3-4 Lake Tahoe Region Roadway Segments Monitored for Travel Time



Over the past several years, median travel times (see Table 3-7) around the Tahoe Region have generally remained steady or decreased, likely due to reduced travel. Several factors impacted travel times in Tahoe in recent years, including the COVID-19 Pandemic, the Caldor Fire, weather conditions, construction, and fuel prices. Years in which travel times differed from the period of record (2015-2023) mean by 5 percent or more are highlighted, with times above the mean in red and times below the mean in green. Darker colors represent a difference of more than 10 percent. Travel times decreased

between 2020 and 2022 along several segments, likely due to reduced volumes. Median travel times in 2023 returned to pre-pandemic levels. While increases in travel time prior to 2023 tended to be limited to specific corridors and were strongly correlated with construction and weather conditions, 2023 saw more widespread increases, though most were less than 5 percent. Initial analysis suggests that these increases are related to the return to pre-pandemic periods. More detailed analysis will be completed when 2023 traffic counts are released by the DOTs. The auto explanatory metrics section contains an initial analysis of the two corridors that saw the greatest increase in 95th percentile times in 2023; more analysis will be provided in the detailed 2023 Congestion Report that will be released later in 2024 and included in the Regional Transportation Plan.

Image: 2023 Truckee/Lake Tahoe Area Construction Projects

3.2 AUTO EXPLANATORY

After a review of areas with declining travel times in 2023, TRPA updated the analysis using region wide 95th Percentile and seasonal congestion traffic data for both NV431 and CA28.

The 95th percentile travel times (Figure 3-8) increased in most corridors for 2023, with the most pronounced increases in locations that cross mountain passes, provide access to ski resorts, or were undergoing major construction. Segments that had travel times more than 5 percent below the period of record mean are highlighted in green, while those that had travel times more than 5 percent above the period of record mean are highlighted in red. Darker colors represent a difference of more than 10 percent. Overall, the combined median travel time to drive all the segments representing 104 miles of roadways in the Tahoe Region was 160 minutes in 2023, compared to 209 minutes at the 95th percentile. The 2023 median travel time is within 10 seconds of the 2017 median and within one minute of the 2018 median, another suggestion that 2023 may be a return to pre-COVID conditions at Tahoe.

Table 3-7 Median Travel Time (minutes)

Segment	2017	2018	2019	2020	2021	2022	2023
CA 267	4.4	4.5	4.4	4.3	4.3	4.2	4.5
NV 28 (Country Club - US 50)	16.8	18.1	16.7	16.0	15.8	15.9	16.9
NV 28 (California - Country Club)	8.7	8.9	8.7	8.6	8.7	8.7	9.1
CA 28	19.7	19.2	18.9	18.9	19.4	19.7	20.1
CA 89 (CA 28 - I-80)	18.1	17.7	17.9	17.2	17.2	17.3	18.2
CA 89 (CA 88 - US 50)	13.7	14.4	13.5	13.5	13.3	13.2	13.6
NV 207	5.2	5.2	5.2	5.2	5.3	5.3	5.5
NV 431	16.0	15.8	15.8	15.3	15.3	15.7	16.4
Pioneer Trail	12.9	12.9	12.7	12.4	12.7	12.5	13.4
US 50 (Echo Summit - South Lake Y)	13.4	12.9	13.3	13.1	13.2	13.0	13.5
US 50 (South Lake Y - State Line)	11.6	11.0	11.0	10.2	10.3	10.0	10.3
US 50 (State Line - Spooner Summit)	19.3	18.9	18.8	18.1	18.0	17.8	18.5
All Segments	159.8	159.2	156.8	152.9	153.3	153.3	160.0

Table 3-8 95th Percentile Travel Time (minutes)

Segment	2017	2018	2019	2020	2021	2022	2023
CA 267	5.6	5.6	5.5	5.2	5.4	5.1	5.8
NV 28 (Country Club - US 50)	21.3	22.2	19.5	18.7	19.0	19.2	21.2
NV 28 (California - Country Club)	10.3	10.3	10.5	10.4	10.9	10.3	12.1
CA 28	23.4	22.7	23.4	22.9	25.4	25.6	25.5
CA 89 (CA 28 - I-80)	22.0	20.1	21.4	19.6	20.6	20.6	23.9
CA 89 (CA 88 - US 50)	16.3	17.1	15.5	15.8	15.7	15.5	16.7
NV 207	5.9	6.0	6.4	6.2	6.3	6.3	6.9
NV 431	19.8	20.0	20.0	19.0	19.4	20.6	22.4
Pioneer Trail	15.0	15.3	15.3	14.7	16.1	15.4	17.7
US 50 (Echo Summit - South Lake Y)	17.6	16.9	18.0	16.5	18.1	17.5	18.8
US 50 (South Lake Y - State Line)	18.4	16.5	16.4	14.3	14.7	13.4	14.0
US 50 (State Line - Spooner Summit)	23.4	23.0	23.1	21.9	22.4	21.3	24.0
All Segments	199.0	195.7	195.0	185.3	193.9	190.8	209.0

For more detailed congestion statistics, including a breakdown by season and day of week, please refer to the 2022 Tahoe Congestion Report, released in Fall 2023. The most recent trends are available on the travel times dashboard on LT Info at LT Info | Congestion-Travel Time (laketahoeinfo.org) and the full Tahoe 2023 Congestion Report will be updated later this year.

The 95th percentile travel time on NV 431 in 2023 was 5 percent slower than the historical travel times. The detailed review of travel speeds on NV431 suggested that slower than normal speeds were observed during the winter period from November of 2022 continuing through March of 2023. After March of 2023 and through winter of 2024 travel times on the segment returned to the observed historic norms (Figure 3-5).

Figure 3-5. Seasonal Congestion Data for Nevad a SR 431

Source: INRIX, RITIS Probe Data Analytics Suite

Figure 3-4 represents travel speeds along SR 431 over Mount Rose Summit, with the top of the graph corresponding to the Winters Creek Lodge access road (outside of TRPA's jurisdiction) and the bottom corresponding to SR 28 west of Incline Village. The five graphs represent different seasons (starting with Winter 2022-23, from November 2022 to March 2023, on the left), and the vertical bars inside each graph represent hours of the day. Colors on the graph represent median travel speed as a percentage of historical average travel speed, with dark green meaning traffic is moving at or above the historic average and orange meaning traffic is moving at 60-70 percent of the historic average. Looking at seasonal data, SR 431 had many significant slowdowns during the winter of 2022-23, with the mean traffic speed at less than 80 percent of historic average during daytime hours and less than 70 percent of historic average in mid-afternoon. Congestion improved significantly in Spring 2023 and, by May traffic was moving at or above the historic average. Because the slowdowns on SR 431 occurred during winter, and were not observed during the winter of 23-24, the observed slowdowns were likely attributable to the record winter Tahoe experienced in 2022-23.

Figure 3-6. Seasonal Congestion Data for California SR 28

Source: INRIX, RITIS Probe Data Analytics Suite

Figure 3-5 represents travel speeds along SR 28 in Placer County. The top of the figure displays times on the east of the SR28 (Nevada state line) and the bottom with the west (SR 89 in Tahoe City). As with SR 431, there were significant slowdowns in the winter season relative to the historic average. Unlike SR 431, SR 28's slowdowns continued through the summer season, with daily congestion occurring in Kings Beach (top of graph) in all seasons. The western half of SR 28 saw some congestion in the summer, likely due to construction on SR28 that is still ongoing. Additional analysis will be completed when 2023 traffic counts and VMT become available.

4 PERFORMANCE RECOMMENDATIONS

The Technical Advisory Committee proposed the following recommendations for TRPA Governing Board consideration:

Transit

I. Support strategies for **securing and maintaining flexible operating dollars** to increase the frequency and coverage of services.

II. Where microtransit and fixed route are present integrate operations to establish the most **efficient and accessible services** possible.

III. Maximize limited transit operating funds through **support for operators promoting services and improving service efficiency**.

IV. Prioritize funding for transit operations where possible with the TRPA **Regional Grant Program**.

V. Support **workforce housing** for transit employees.

VI. **Update the transit metric** to include microtransit coverage, hours of service, and wait time to better assess progress.

VII. Seek ways to **obtain stop-level ridership and travel time** on public and private services**.**

VIII. Review **TRPA code of ordinances** for opportunities to further the goals and policies of transit.

Active Transportation

I. **Prioritize active transportation projects** in the RTP/SCS and the Regional Grant Program that increase safety, decrease level of traffic stress, and increase the pedestrian experience index.

II. Support funding for local jurisdictions and other partners to **perform maintenance, conduct year-round clearing, and improve wayfinding**.

III. Continue to seek **better sources of data** for mode share and commute trips, and restart the on-the-ground surveys when time and resources permit.

IV. Review **TRPA code of ordinances** for opportunities to further the goals and policies of the ATP.

V. Explore updates to expand the effectiveness of **Trip Reduction Ordinance** to reduce single auto work trips.

VI. Consider **monitoring travel time for pedestrians and bicycles** along corridors that connect popular destinations.

Auto

I. Continue to **implement Regional Plan** policies that reduce reliance on the automobile.

II. Replace average travel time with **median travel time** as a measure of delay along corridors.

III. Promote coordination and dissemination of **real-time traveler information** on construction projects to minimize travel delay.

IV. Consider updating the method for estimating the Region's **Effective Population**.

V. Update the **VMT Threshold baseline** to reflect Caltrans's revised 2019 VMT estimate.

VI. Explore the creation of a **multi-modal level of service** index for the region.

VII. Evaluate other methods for estimating **regional mode share** that is representative of all traveling parties.

These recommendations will be used in preparing the next RTP/SCS, Connections 2050, currently in development. Policies that may be revised to implement the recommendations will be analyzed as part of the RTP/SCS environmental review. The final RTP/SCS project list and funding element will also consider these recommendations. Additional recommendations will be incorporated into future project programming processes such as the Regional Grant Program which supports implementation of regional and local priorities.

Image: Emerald Bay