

CHAPTER 3
PERFORMANCE
MANAGEMENT

Performance Management

The bi-state compact that formed TRPA charges the agency with establishing a regional plan for the Lake Tahoe Basin with a mandate to achieve environmental standards, called thresholds, as mentioned in Chapter 1. Environmental threshold standards set long-term environmental goals for the region. Many of the thresholds will take generations to achieve and will require a lasting commitment to environmental improvement over time. The TRPA Regional Plan, and especially this Plan, outlines actions to attain these thresholds that restore Lake Tahoe while balancing economic and community vitality.

To report on thresholds and other transportation performance metrics, TRPA and partners continually collect and assess data to adaptively manage transportation resources across the Tahoe Region. This approach, called transportation system management, links information collected through monitoring and evaluation with the planning process to adjust the strategies that guide the region towards established transportation goals. Transportation system management uses a layered and data driven approach with infrastructure projects and system operations to enhance traveler safety, improve traffic flow, and provide more travel options. Transportation policies and land use planning at Tahoe limit projects that enhance capacity. Tahoe partners and project proponents must therefore rely on managing the system and incorporating transportation demand management strategies into their projects. Effectively using data to determine appropriate demand management strategies is a key component of successful project delivery at Tahoe.

This chapter outlines how Tahoe collects and analyzes the data of all system users, including everyday travelers, commuters, and recreation travelers. This chapter also details how TRPA measures performance and manages for success to provide a reliable, safe, efficient, and convenient transportation network for the Lake Tahoe Region.

MONITORING THE SYSTEM

Data Collection

TRPA collects data from a variety of sources. Historically TRPA has conducted basin-wide travel surveys every two years to better understand basic travel characteristics of both residents and visitors focused on recreation and commercial sites. The data collected — which includes how people are traveling, where they are travelling from and to, and why — is used for evaluating regional performance metrics, project planning, and travel demand modeling.

Travel Demand Data

In 2024, to expand the estimated mode share at commercial and recreation sites to a regional mode share, TRPA engaged ReplicaHQ (Replica), a big data provider, to calculate mode share for 2019 to 2023. 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 truth 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.

Demographic Data

Demographic and socioeconomic data is gathered from the U.S. Census, counties, states, and other organizations, such as the Nevada Gaming Control Board. This data provides more information about residents and employees in Tahoe, helping to ensure projects and programs best serve their needs.

Congestion Data

Roadway congestion is analyzed using traffic analysis data from industry leader, Inrix. Intersection performance is evaluated every four years with the update to the regional transportation plan. Big data from cellular phone service providers and vehicle location and navigation systems also creates new opportunities to better understand and evaluate roadway congestion and travel patterns in the region, and for planning transit services and more sustainable recreation travel options.

Partners

Data collected by partners in the region also informs transportation analyses. For example, Placer County in California collected trip generation rates and parking inventories as part of its Resort Triangle Transportation Plan (RTTP) planning process. These Tahoe specific data are valuable for planning and implementing projects and programs that reduce automobile trips. Tahoe transit providers, Tahoe Transportation District and Tahoe Area Regional Transit, each collect surveys of those riding their buses which informs transit service planning. TRPA and its local partners together developed the Bicycle and Pedestrian Monitoring Protocol. The protocol guides collection of year-round bike and pedestrian data and provides more detailed information, such as daily and/or peak period bicycle counts on some of the most popular trails in the region. See the Trails section of Chapter 2 for more information.

Interactive Tools

TRPA has developed multiple online and interactive tools to make it easier for anyone to find, download, and analyze Tahoe transportation information and data. These tools are also used by partner agencies when applying for grants that require detailed data and analysis. Tools include:

- [LakeTahoeInfo.org](https://www.laketahoelife.com/info): Provides details about all Environmental Improvement Program projects, including all regional transportation plan projects.
- [LinkingTahoe.com](https://www.linkingtahoe.com): Provides regional transportation plans and highlighted transportation projects.
- [TRPA.gov/rtp](https://trpa.gov/rtp): Interactive website for the regional transportation plan.
- [2024 Vision Zero Strategy website](#): Provides crash data, high injury network details and map, and level of traffic stress analysis
- [Project Impact Assessment Tool](#): provides anyone interested in developing property with potential vehicle miles traveled impacts, fees associated with those impacts and possible mitigations.

Note: Website URL's are active as of the publishing of this plan, 2025.

Travel Demand Model

TRPA utilizes the Tahoe Travel Demand Model to analyze travel behavior, estimate daily regional vehicle miles traveled (VMT) and air pollution for a base year and future forecast periods. The model is activity-based, which means it estimates and forecasts travel behavior on the transportation system, providing a better understanding of travel behavior and congestion information into and around Tahoe. It also provides the best available data and methods to determine compliance with required standards, including the Bi-State Compact regional VMT threshold standard, and greenhouse gas reduction targets set in California by CARB through SB 375.

The Tahoe Travel Demand Model is designed to estimate VMT by various party types (residents, day/overnight visitors, external workers, etc.) to determine which targeted investments should be prioritized. The model data represents travel on a typical late summer weekday when school is in session. The model is an aggregate of three separate models, a Resident Model, a Visitor Model, and an External Worker model. Each model has slightly different activity and destination category options: Residents make trips to work, school, and discretionary locales (eating, shopping, and recreation); visitors, second homeowners, and guests make recreation, shopping, and other trips; and external workers make work commute trips. The model estimates the expected travel mode, e.g., auto, transit, walk, or bike, for everyday and recreation users and produces traffic projections for intersections and roadways on a typical summer day and for peak periods during that day. Since these estimates are based on regional data, they are useful for understanding region-wide impacts.

The development of each RTP provides an opportunity to update data sources and model functions. The travel demand model now includes a full active transportation network, allowing bicycle and pedestrian trips to be routed along shared-use paths that were previously analyzed separately. Prior versions of the model had a single roadway network that had to allow all modes and did not allow for nonmotorized facilities. This update splits what was a single *nonmotorized* mode into *bicycle* and *pedestrian* modes, each with distinct maximum trip lengths and cost functions, to better represent the differences between bicycle and pedestrian travel. Additionally, now a part of the travel demand mode, assigns active transportation trips to dedicated nonmotorized facilities and roadways with active transportation accommodations, better reflecting real world travel patterns and directly showing the impact of improving active transportation facilities. Another substantial update was a revision of our origin-destination trip patterns to better reflect current trip patterns. Big data allowed for TRPA and its consultants to view how travel patterns have changed in recent years, and these changes are incorporated into the model. Most significantly, the recalibration shifted trips from the south shore casino core to recreation areas, reflecting the continuing shift in visitor travel over the past several decades. These updates increase TRPA's ability to better assess impacts to the transportation system. This will help ensure that regionally significant development projects, redevelopment projects, and transfers of use in the region support the goals of this regional transportation plan and assist in its implementation. This development also supports SB 743 requirements for the region's California jurisdictions. More information on data, the model, and the development forecast can be found in Appendix F.

MANAGING FOR SUCCESS

TRPA and partners continually collect and assess data to adaptively manage transportation resources across the Tahoe Region. Monitoring programs link data to the planning process and allow partners to

adjust the transportation strategies that move the region toward its goals established by the Regional Plan, Regional Transportation Plan, and other local, state, and federal requirements.

The adaptive management system is dynamic and involves the following components:

1. Metrics
2. Goals aligned with the Regional Plan and RTP/SCS
3. Performance
4. Underlying causes in performance changes
5. Stakeholder engagement
6. Definition of success

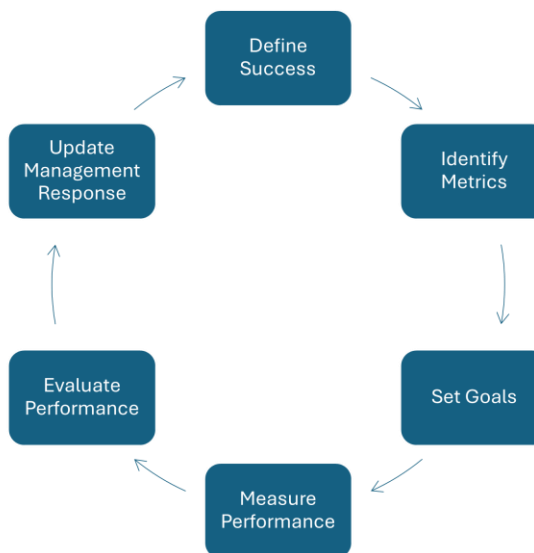


Figure 30: Adaptive Management System

The adaptive management framework was created with the guidance of the Transportation Performance Technical Advisory Committee (TPTAC). In April 2021, the TRPA Governing Board adopted a new

Transportation and Sustainable Communities threshold category and a VMT per-capita standard (TSC-1). Along with the adoption, a technical advisory body was identified to prepare and transmit to the TRPA and Tahoe Metropolitan Planning Organization (TMPO) governing boards a report including past performance and recommendations. The TPTAC includes one representative from each county, the City of South Lake Tahoe, state transportation, local and regional transit providers, transportation demand management associations, non-governmental organizations, and a member of the public. The TPTAC is responsible for evaluating the performance of primary metrics and providing recommendations for programmatic direction every two years. The first biennial report, 2024 Transportation Performance and Recommendations (Appendix I), continues to guide the region’s transportation adaptive management framework with performance recommendations.

Performance Monitoring

TRPA approaches transportation planning through infrastructure and operations planning for roadways, trails and sidewalks, and transit services; strategically awarding funding based on those plans; and performance monitoring to track and report on the achievement of the goals of this plan and the Regional Plan.

The Congestion Management Process is built into the adaptive management framework, managing congestion through a mobility approach on the entire transportation system, including automobiles, transit, trails, corridor improvements, transportation technology that improves operations, parking management, and other approaches that improve the connection of people to places. See Appendix G for more information on TRPA’s Congestion Management Process.



Active transportation is monitored biannually with 52 counters placed on paved paths and bicycle lanes throughout the Tahoe Basin. Most recently TRPA staff developed a new tool that proactively identifies levels of stress for cyclists and an experience index for pedestrians.

Transit Monitoring through an identified protocol including transit performance measures, targets and data collection methods.

This work is a cyclical process, with lessons learned from performance monitoring informing future planning and funding. This ensures that future transportation planning in Tahoe is responsive, adaptive, and evolves with changing transportation needs in the Region.

MEASURING AND MONITORING WHAT MATTERS

The Lake Tahoe Regional Plan and RTP share six major transportation goals that serve as the backbone to ensure the system serves all users and measures what matters. The goals reflect the multimodal nature of the transportation system in the Lake Tahoe area and support the broader Regional Plan. The projects in the plan help to improve performance in all categories measured. Identified performance metrics highlight key system performance in the multimodal transportation system, while capturing user experience, monitoring effectiveness of management responses, and analyzing explanatory sub-metrics as needed.

Policy Highlight

Policy 6.2: Maintain monitoring programs for all modes to assess the effectiveness of the long-term implementation of local and regional mobility strategies on a publicly accessible reporting platform.

Primary metrics are tracked across categories of travel in the Tahoe Region: *Transit*, *Active Transportation*, and *Automobile*. For each of these three categories, a set of primary metrics were identified by regional partners as priority metrics. Safety, the final performance category, measures injuries and fatalities of auto and not auto travel. Safety metrics capture the user experience to ensure a safe transportation system for all.

Metrics

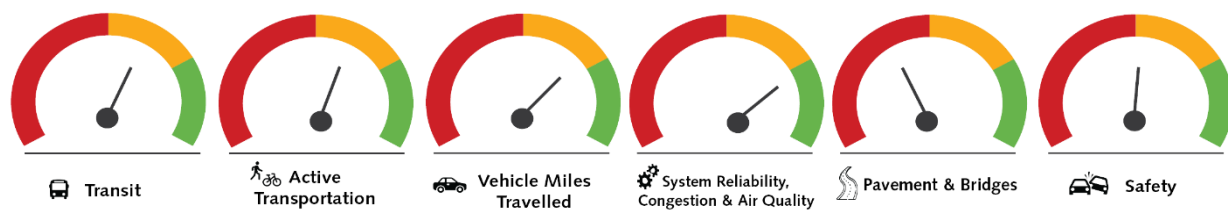


Figure 31: Primary Metrics

Transit

Total transit ridership is the total number of trips on transit service in the region. After declining in 2019 and during the COVID-19 pandemic, ridership has steadily increased, and in 2023, ridership exceeded 2019 levels. Much of the recovery is attributable to regional microtransit, which began serving the region in 2021.

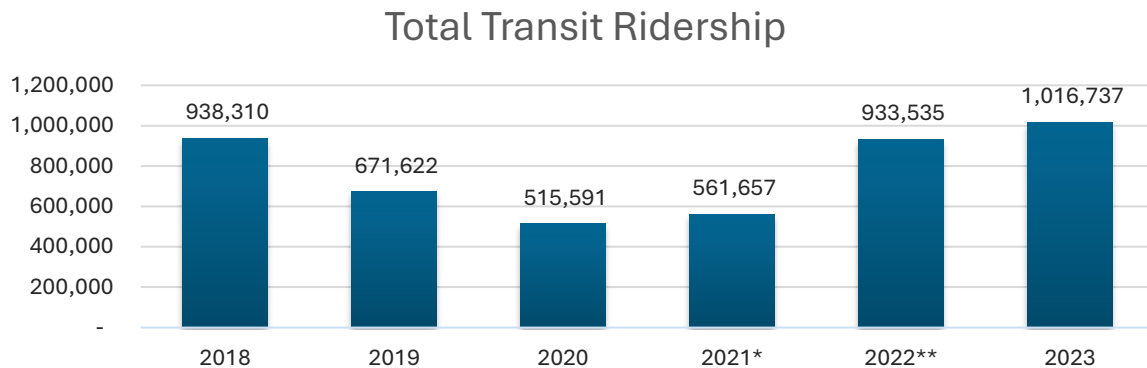


Figure 32: Total Transit Ridership 2019 - 2023

Population/neighborhoods served by frequent transit service, which is defined as 20-min service or less, or **basic service**, which is defined as 60-min service is another transit metric. There are currently no transit options operating at 20-minute **frequent service**, with most of the region's transit falling into the **basic service** definition due to limited operating dollars. As described in Chapter 2, the plan only identifies foreseeable funds for the region's existing transit levels over the 25 years, which falls short of several transportation goals.

Active Transportation

Active Transportation includes tracking bicycle and pedestrian mode share along with low-stress bicycle and pedestrian lane miles to capture number of users and the user experience.

Bicycle/pedestrian mode share is the proportion of all trips made by walking or biking. Exact bicycle and pedestrian trips are difficult to determine, but the overall trend is positive, as shown in Figure 33. While most of the measured use occurs during the summer, 13 percent of total counts are observed during the winter months (December through March), which underscores the importance of maintaining



Photo: California Tahoe Conservancy

bicycle and pedestrian facilities for use year-round.

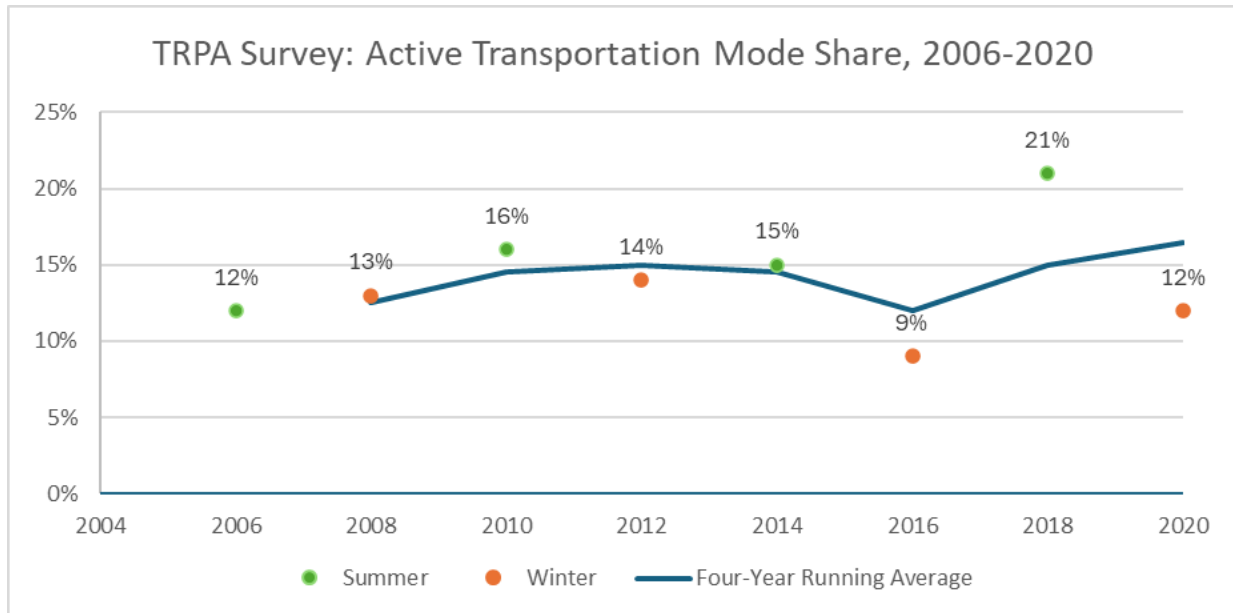


Figure 33: TRPA Survey: Active Transportation Mode Share 2006-2020

Historic mode share estimates focused on travel to and from commercial and recreation areas and was collected via surveys between Summer 2006 and Winter 2020 as shown in Figure 33. 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 as shown in Figure 34.

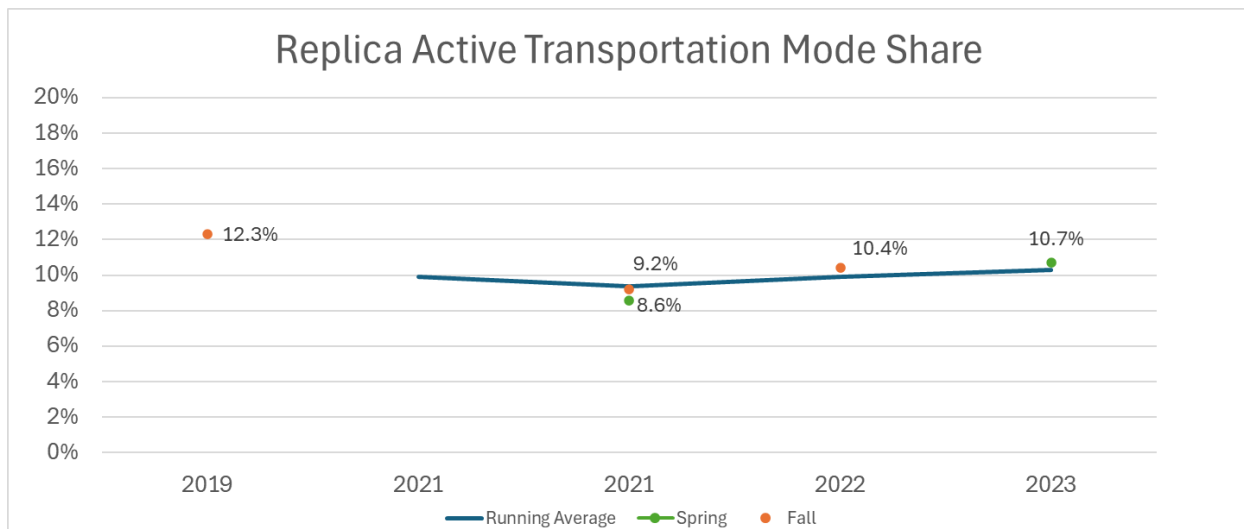


Figure 34: Replica Active Transportation Mode Share 2019 - 2023

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

underrepresents non-auto mode share in the peak summer period. In 2025, Replica is expected to release data for all four seasons, and it is expected this analysis will be more robust for future periods. TRPA is also supplying transit and bicycle/pedestrian count data to Replica to incorporate into their inputs in future modeled periods. TRPA is committed to seeking the best available data in a rapidly changing field. While this Plan is updated every four years, data updates occur on an ongoing basis and will be reflected in the biennial transportation performance report.

Low-stress bicycle and pedestrian lane miles refers to the availability of bicycle and pedestrian facilities and their relative comfort level for users. This metric is quantified through a Bicycle Levels of Traffic Stress (BLTS) and Pedestrian Experience Index (PEI) analysis. For BLTS, 1 indicates a low level of stress and 4.5 the most stressful. For PEI, the lower the index percentage, the worse experience it is for the pedestrian. These analyses, as detailed in the Trails section of Chapter 2 and the 2024 Active Transportation Plan, determined which street segments and intersections should be prioritized for active transportation and safety improvements.

Table 8. 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

Table 9. 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

Automobile

Automobile metrics tracked include average daily vehicle miles traveled, system reliability, and bridge and pavement condition.

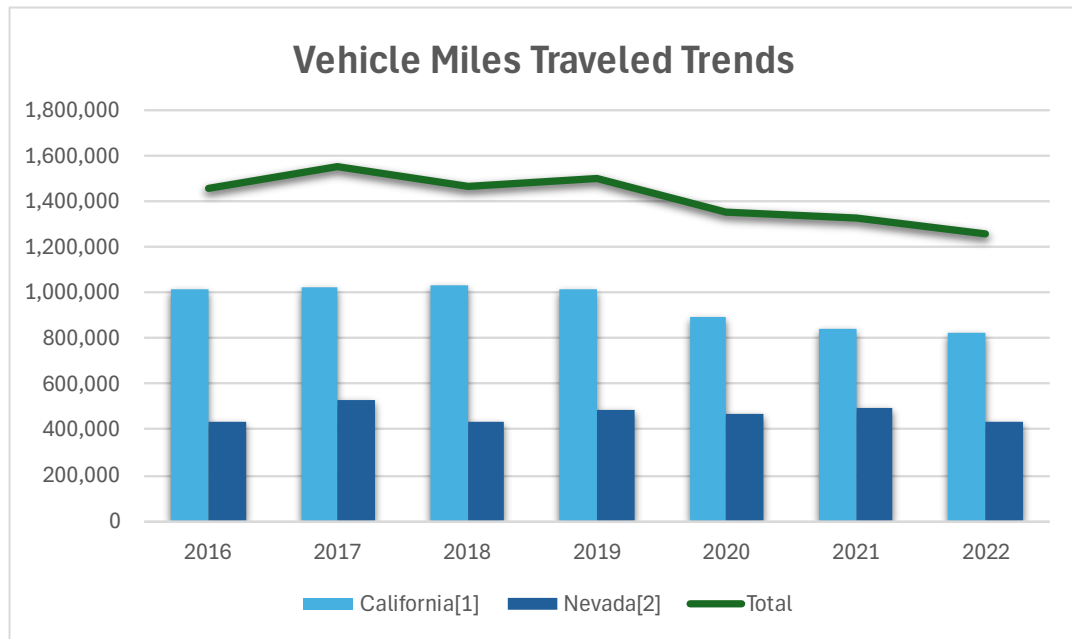


Figure 35: Vehicle Miles Traveled Trends, 2016 - 2022

Average daily Vehicle Miles Traveled (VMT) per capita is a newly adopted Regional Environmental Threshold Standard, which must be reduced by 6.8 percent from the 2018 baseline of 12.48 VMT/capita, to 11.63 VMT/capita, by 2050. VMT is trending down overall regionally and meeting performance goals established with the adoption of the Plan forecasted to achieve a 2050 regionwide VMT per capita of 8.55.

System Reliability

System reliability includes median travel time and congestion. Median travel time is defined as the midpoint of how long it took to travel the length of the segment meaning that 50 percent of trips were faster than this time and 50 percent were slower. Congestion affects travel time and residents' quality of life and visitor experience in the Tahoe Region, shaping the opinions people have about the transportation system. Over the past several years, while median travel times around the Tahoe Region have generally remained steady or decreased, likely due to reduced travel and major events such as the COVID-19 pandemic, the Caldor Fire, weather conditions, construction, and fuel prices, this is not always what is felt at a specific spot on a busy summer day or holiday weekend. Transportation performance reported every two years tracks the average median travel time as federally required and also incorporates hot spots to better understand specific community needs.

Roadway Pavement and Bridge Condition

Roadway pavement and bridge condition refers to the percent of bridge and roadway paved lane miles that are considered in **good** and **poor** condition on the national highway system, another federally required performance metric. Maintaining good condition of our roadways and bridges whether on the national highway system or the local system is a high priority to ensure everyone can travel safely every day, ensure that goods are moved effectively, and that all emergencies are handled efficiently.

Safety

Fatalities and serious injuries are tracked on an annual basis, as total amounts and as a rate per 100 million vehicle miles traveled, per federal requirements. The number of non-motorized fatalities and non-motorized serious injuries are also tracked, as these road users face a higher risk of injury in collisions. The safety performance measures help to assess fatalities and serious injury on all public roads regardless of ownership or functional classification. In addition to the federally required assessment, TRPA adopted a regional Vision Zero strategy in February 2024 that included an in-depth crash data analysis, developed with collaboration across agencies and robust public outreach. Through this strategy, TRPA adopted a regional goal of zero roadway fatalities and serious injuries by 2050. This strategy seeks to advance a safe, healthy, and accessible transportation system for all road users, supporting the Safety goal and policies of the Plan. While this is just the first step, local agencies are also prioritizing safety improvements in their jurisdictions. The City of South Lake Tahoe is working on a Vision Zero Action Plan and has adopted a goal of zero fatalities and serious injuries by 2035. Douglas County received a Safe Streets and Roads for All grant in FY 2024 to develop a Comprehensive Safety Action Plan. TRPA and its regional partners are committed to working towards improving safety for all road users, with a focus on reducing fatal and serious injuries.

Optimizing Transportation through Performance Management

Performance management allows for optimizing the transportation system rather than expanding it. The continual evaluation of the system is needed for adaptively managing it which now occurs on a short-term basis through development of biennial Transportation Performance Reports where best available data is used, project and program success are tracked, and adaptive management is identified to address any barriers. This process ensures the long-term vision of a reliable, safe, efficient, and convenient transportation network for the Lake Tahoe Region is achieved.



Photo: Generikal