

2016 BICYCLE AND PEDESTRIAN MONITORING REPORT

TAHOE REGIONAL PLANNING AGENCY



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Executive Summary

The Winter-Spring and Summer 2016 count results for the *Lake Tahoe Region Bicycle and Pedestrian Monitoring Program* (Monitoring Program) are summarized in this 2016 Data Collection Report. Also with this Report, data from all Monitoring Program seasonal count periods has allowed for historical comparisons and an initial analysis of the annual cycle of bicyclist and pedestrian activity in the Region. The 2016 data for this Report was contributed by four Monitoring Program partnering agencies, and has been compiled and added to the *Lake Tahoe Region Bicycle and Pedestrian Count Database* (Database). The Database will continue to be updated with future data collection efforts. As in 2015, data collection efforts for this 2016 Report were designed to adhere to the data collection procedures established by the *Lake Tahoe Region Bicycle and Pedestrian Monitoring Protocol* (Protocol)¹.

Site Selection

One sidewalk in the Kings Beach area on Lake Tahoe's north shore, and one Class I bicycle/shared-use pathway in South Lake Tahoe, were added to the twelve manual count locations that were identified through the Protocol in 2015. The same four automatic counter locations from 2015 were used in the Winter-Spring and Summer 2016 count cycles. All eighteen Monitoring Program manual and automatic count locations provided 2016 data for this Report.² Bicycle and pedestrian movements were recorded at seventeen additional locations in the 2016 count cycle by Monitoring Program partner agencies. That data was provided via the Tahoe Regional Planning Agency (TRPA) and added to the Lake Tahoe Region Bicycle and Pedestrian Count Database. These locations are discussed in this report, but separately from the Protocol-Monitoring Program locations.

2016 Overall Monitoring Results

- In terms of total volume, the South Lake Tahoe area saw the greatest concentration of total bicyclist and pedestrian volume, as well as the most bicyclist volume. The highest-activity location for bicyclist *and* pedestrian use in the South Lake Tahoe area was consistent in the February and July manual counts: Pioneer Trail and Moss Road.
- In terms of total hourly average volume in the February and July count cycles, the busiest manual count location was SR 28 between Bear Street and Coon Street in Kings Beach on the North Shore, followed by four locations in the South Lake Tahoe area.
- Weekend activity was generally higher at all manual count locations, with weekday PM activity a distant second, followed more closely by AM activity.

¹ Lake Tahoe Region Bicycle and Pedestrian Monitoring Protocol, June 2015

² In Summer 2016, the automatic counter at the West Shore Tahoe Trail - Tahoma Location ceased operating (failed) at 8:30 PM on May 29, 2016. It was determined that that the data collected at the West Shore Tahoe Trail - Tahoma in May 2016 was not representative of active transportation use in the Summer season, as compared to the total data collected from other three automatic counter locations over four months. That data, therefore, was included in the database but omitted from this Report's data analysis.

From the February and July manual counts, it can be inferred that there is a greater difference in the total number of bicyclists than the total number of pedestrians in the interim period when temperatures gradually increase and summertime recreational activity begins.

The Monitoring Program manual count location with the most non-motorized activity was in Kings Beach (on the north shore), followed by four locations in the South Lake Tahoe area. The five highest-activity manual count locations for bicyclists were in the South Lake Tahoe area. The same is true for only two of five pedestrian highest-activity locations.



50

0

1. SR 28 between Bear 2. Pioneer Trail and

Moss Road

and Coon Street

67.5

Way

3. US 50 at Lakeview 4. SR 28 and Carnelian 5. US 50 at Warrior

Drive

Wood Avenue

Historical Comparisons

- There is a pattern of total active transportation activity in each season, as well as a general consistency of highest-use locations from season to season. In terms of total bicyclist and pedestrian volumes, Summer is by far the most active season, with Fall being the second-most active season, and followed more closely by Winter.
- Bicycling had more variation than pedestrian activity from season to season in 2016 and in 2015.
- The five highest total bicyclist intersection movements over four successive seasonal manual counts are all "through" movements, and

they are all located in South Lake Tahoe. There was more change in the highest total pedestrian movement locations in 2016 compared to 2015, but five highest-volume the pedestrian cumulative seasonal movements are all turning movements.

Total Bicyclist Intersection Movements (Summer and Fall 2015 + Winter-Spring and Summer 2016)1.15 th Street and Eloise Avenue(514, eastbound through)2.15 th Street and Eloise Avenue(461, westbound through)3.US 50 and Al Tahoe Boulevard(410, southbound through)4.US 50 and Lakeview Avenue(354, southbound through)5.US 50 and Lakeview Avenue(314, northbound through)								
1.15 th Street and Eloise Avenue(514, eastbound through)2.15 th Street and Eloise Avenue(461, westbound through)3.US 50 and Al Tahoe Boulevard(410, southbound through)4.US 50 and Lakeview Avenue(354, southbound through)5.US 50 and Lakeview Avenue(314, northbound through)	Total Bicyclist Intersection Movements (Summer and Fall 2015 + Winter-Spring and Summer 2016)							
	 15th Street and Eloise Avenue 15th Street and Eloise Avenue US 50 and Al Tahoe Boulevard US 50 and Lakeview Avenue US 50 and Lakeview Avenue 	(514, eastbound through) (461, westbound through) (410, southbound through) (354, southbound through) (314, northbound through)						

Four of the five most active locations for total bicycle and pedestrian activity, year-round, are in South Lake Tahoe. In 2016 there was a slightly more even gender split at manual count locations, overall,

compared to 2015. And locations with more pedestrians than bicyclists generally had a more even gender split. Conversely, locations with more bicyclists than pedestrians generally had a higher percentage of male users.

Total Pedestrian Intersection Movements (Summer and Fall 2015 + Winter-Spring and Summer 2016)

L.	SR 28 between Bear and Coon Street	(980, northbound left turn)
2.	Pioneer Trail and Moss Road	(479, eastbound left turn)
3.	Pioneer Trail and Moss Road	(414, westbound left turn)
1.	SR 28 between Bear and Coon Street	(355, southbound left turn)
5.	US 50 and Lakeview Avenue	(325, westbound left turn)

Conclusions

- The difference in the duration and timing of the manual (video) counts and the automatic counts between Summer 2015 and Summer 2016 (e.g., capturing active transportation use in May, June, and early July, with the automatic counters in 2016) contributed significantly to the increased total volumes and average hourly volumes for bicyclists and pedestrians in the 2016 Summer count cycle, compared to Summer 2015.
- The 2016 data shows a greater difference in bicyclist volumes than pedestrian volumes between the Winter-Spring and Summer seasons.
- South Lake Tahoe count locations indicate higher total bicyclist and pedestrian volume, as well as the most bicyclist volume, relative to other area networks in the Region. The consistency of highest-use locations from season to season may be an indication of greater overall bicycle and pedestrian activity

due to the relatively larger resident populations in the small-area networks of bicycle lanes, sidewalks, multi-use facilities, and local roadways that are connected to those locations.

- There is possibly greater variation in the level of activity throughout the annual cycle at locations serving recreational facilities throughout the Lake Tahoe Region. In Winter 2016, the only trails where snow was removed consistently were all in the City of South Lake Tahoe, and the associated manual count locations might have seen relatively higher levels of bicyclist and pedestrian activity due to accessibility.
- The automatic counts represent a steady and growing demand for bicyclist and pedestrian facilities connecting recreational opportunities to nearby and available public automobile parking. By implication, there may also be significant *latent* demand for improved active transportation routes to recreational opportunities that minimize sharing the roadway with automobiles or riding/walking in the shoulder.

Recommendations

- Expand the geographic coverage of automatic counters within the region, to measure the volume of activity at more locations with different types of facilities and supported uses (not only recreational).
- For manual and automatic bicyclist and pedestrian counts, it would be beneficial for future data analysis to synchronize as much as possible the count periods of each data collection season amongst all participating Monitoring program agencies.
- It may be beneficial to develop Region-specific data extrapolation factors for recreational and commuter-oriented facilities based on regional peak-hour count data for both basic types of facilities. Though the Monitoring Program currently uses them, the National Bicycle and Pedestrian Documentation Project (NBPDP) data extrapolation factors for calibrating bicycle and pedestrian activity are not ideally calibrated for the Lake Tahoe Region (see Appendix E).
- Snow removal practices in the Region should continue to be monitored and considered in the review and analysis of Monitoring Program data collection results.
- It may be desirable in the future to be able to capture and differentiate trips that did not originate on foot or by bicycle at certain locations (e.g., at Lakeshore Boulevard Path). Through future video data collection and analysis, establish a multi-modal trip calibration factor for certain locations by obtaining a reliable sample size of trips that did not originate on foot or by bicycle over a shorter period.
- > Future data collection site selection and analysis could be designed with two complementary goals:
 - 1. Identify and monitor activity within the Region's small-area pedestrian and bicycle activity networks in a more comprehensive approach.
 - 2. More accurately gauge active transportation use and demand *between* the Region's small-area networks so the Monitoring Program can more effectively inform future updates to regional bicycle and pedestrian plans and capital investments.

Site Selection

In the Winter-Spring and Summer 2016 data collection cycles, Monitoring Program counts were conducted at locations best-suited to help TRPA further the main purpose of the Monitoring Program: to collect accurate and reliable data that will help gauge active transportation levels around the Lake Tahoe Region. Automatic counters were utilized at the same four locations as in the 2015 counts. Manual (video) counts were conducted at the same twelve locations as in 2015, and at two new locations as identified below. In total, the following combination of bicycle/pedestrian facility types were monitored in 2016:

- ➢ Nine Class I Bicycle/Shared-Use Pathways,
- ➢ Four Class Ⅱ/sidewalks,
- Four sidewalks, and
- One Class I/Class II facility

Manual Count Locations

The 2016 manual data collection Monitoring Program locations are listed below in terms of their clockwise geographic order around Lake Tahoe, starting on the west shore and ending on the south shore.

- Fanny Bridge Intersection (Sidewalk)
- SR 28 at Carnelian Woods Avenue (Class II/Sidewalk)
- SR 28 (N. Lake Blvd.) and SR 267 (N. Shore Blvd.) (Sidewalk)*
- SR 28 between Bear and Coon Street (Class II/Sidewalk)
- SR 28 and Village Boulevard (Class II/Sidewalk)
- US 50 and Warrior Way (Sidewalk)
- Pioneer Trail and Moss Road (Class II/Sidewalk)
- US 50 and Lakeview Avenue (Class I/Shared-Use Pathway)
- US 50 and Al Tahoe Boulevard (Class I/Shared-Use Pathway)
- US 50 and Sierra Boulevard (Sidewalk)
- South Tahoe Bikeway, behind Motel 6 (Class I)*
- US 50 and Santa Fe Drive (Class I and Class II)
- 15th Street and Eloise Ave (Class I/Shared-Use Pathway)
- Lake Tahoe Boulevard and Sawmill Road (Class I/Shared-Use Pathway)

*=New location added in 2016

Automatic Count Locations

- West Shore Tahoe Trail Tahoma (Class I/Shared-Use Pathway)
- Lakeshore Boulevard Path (Class I/Shared-Use Pathway)
- Round Hill Pines Path (Class I/Shared-Use Pathway)
- Fallen Leaf Path (Class I/Shared-Use Pathway)

All eighteen 2016 Winter-Spring and Summer Monitoring Program count locations are shown in **Figure 1**, respective to their counter technology and monitored facility type. **Figure 2** maps the seventeen additional count locations where Monitoring Program partner agencies collected data in 2016 that are also the subject of 2016 monitoring results and/or historical comparisons contained in this Report.



Figure 1. Monitoring Program Manual and Automatic Count Locations, 2015-2016

Lake Tahoe Region Bicycle & Pedestrian Monitoring Program 2016 Additional Locations - Partner Agencies

2016 Counter Locations

- 1. Truckee River Trail
- 2. North Lake
- 3. 64 Acres
- 4. West Shore
- 5. Rabe Meadows
- 6. SR 89 at Lake Tahoe Blvd
- 7. Lake Tahoe Blvd at 4th St
- 8. Lake Tahoe Blvd at 3rd St
- 9. Lake Tahoe Blvd at Tahoe Keys Blvd
- 10. Lake Tahoe Blvd at Winnemucca Ave
- 11. Lake Tahoe Blvd at Lodi Ave
- 12. Lake Tahoe Blvd at Stockton Ave
- 13. Lake Takoe Blvd at Silver Dollar Ave
- 14. Lake Tahoe Blvd at Sierra Blvd
- 15. Lake Tahoe Blvd at Rubicon Trail
- 16. Lake Tahoe Blvd at Blue Lake Ave
- 17. Viking Rd at Lake Tahoe Blvd









Count Technology

Two kinds of count technology were utilized during the 2016 Winter and Summer and 2015 Summer and Fall count cycles: Passive Infrared (Pyroelectric) and Recorded Video Observations.

Passive Infrared (Pyroelectric) – Automatic Counters

Passive Infrared counters were used at long-term count locations to assess daily, weekly, and monthly trends. These counters identify heat differentials of bicyclists and pedestrians when they pass through the detection area and can be placed on either side of a count corridor. During this count cycle, four passive infrared counters were placed along trails in inconspicuous locations (as shown to the right) to avoid vandalism. These counters do not differentiate between bicyclists and pedestrians and only record the total number of bicyclists and pedestrians to cross in front of the counter.



Passive Infrared Automatic Counter



Installation of Passive Infrared Automatic Counter, West Shore Tahoe Trail - Tahoma.

Recorded Video - Manual Counts

Recorded video allows accurate counting by utilizing video recording and playback technology. Video recording equipment is placed at the desired location during the appropriate observation period. After the observation period, video recorded by the device is downloaded and viewed in the office at a higher rate of speed. This allows for a higher rate of accuracy and efficiency, as the video may be reviewed to assure proper detection, and allows for further analysis later if desired. During the Winter-Spring and Summer 2016 counts, and the Summer and Fall 2015 count cycles, recorded video observations were used for obtaining bicycle and pedestrian volumes, intersection turning movements, and information about gender. In Winter and Summer of 2016, recorded video was utilized for manual counts at fourteen locations in the Lake Tahoe Region, twelve of which were Program count locations in the Summer and Fall 2015 counts.

Count Methodology

Winter and Summer 2016 Data Collection for the Lake Tahoe Region Bicycle and Pedestrian Monitoring Program had three general components: an automatic count effort, a manual count effort, and additional locations provided by TRPA via Caltrans, the City of South Lake Tahoe, TCPUD, and Douglas County.

Monitoring Program results for the 2016 Winter and Summer count cycles, including comparisons to the 2015 Summer and Fall cycles are divided into two sections: Manual Counts and Automatic Counts. For data collected in all 2016 and 2015 count cycles, the best comparisons of results between manual counts and automatic counts are those for average hourly volumes. For comparison purposes, automatic counter data for the periods in which manual counts were conducted was averaged to develop average hourly volumes. These metrics allow for a more direct comparison across all locations regardless of their counter type. Average hourly volumes were used to compare manual and automatic count data.

Automatic Counts

Passive infrared automatic counters mimic a "screenline" count, but do not collect data on directionality or mode and simply log the volume of users who pass through the infrared beam. As such devices, these counters allow for large amounts of data to be collected over a long period. In the Winter and Summer 2016 count cycles, four months of data was collected at three of the four automatic counter locations between May 2, 2016 and September 2, 2016. An equipment failure with the automatic counter at the West Shore Tahoe Trail - Tahoma occurred on May 29th, 2016 and was not discovered for some time, preventing a large portion of data from being collected at that location in the Summer 2016 count cycle. All four automatic counters were installed and began operating on May 2nd, 2016, and were retrieved on September 1st, 2016.

The timing of the automatic counts in Summer 2015 was delayed by the mid-July Program start date, as well as the need to obtain permits from Caltrans to set up equipment in the State right-of-way. Three counters were installed on the 17th of July, and the fourth (West Shore Tahoe Trail - Tahoma) was installed on the 23rd of August. All four counters were retrieved on the 21st of September, 2015.

Manual Counts

In 2015, manual count pedestrian and bicyclist data was collected at the initial twelve locations identified through the Protocol. To allow for accurate comparisons between yearly data, the same locations studied in 2015 were studied in 2016. Also in 2016, two new manual count locations were added: The South Tahoe Bikeway (Shared Use Path) behind Motel 6, and the King's Beach intersection of State Route 28 and State Route 267. All manual count data in the Winter 2016 count cycle was collected February 2nd – February 6th, 2016. All manual count data in the Summer 2016 count cycle was collected July 18th – July 22nd, 2016.

The Summer 2015 manual counts were conducted between August 25^{th} and August 29^{th} , and the Fall 2015 manual counts were conducted between September 21^{st} – September 25^{th} . Manual counts were conducted on mid-week days during the AM and PM peak periods (7AM – 9AM; 4PM – 6PM) and during the weekend mid-day peak (12PM – 2PM).

Data collected for this study includes through movements as well as turning movements, which is consistent with the TRPA Bike and Ped Count database. The SR 28 between Bear St. and Coon St. location was conducted at a mid-block location, a common area for pedestrian crossings. For this reason, this location was also treated as an intersection and counted accordingly. Manual counts also included information on gender.

The following lists describe what types of users were counted manually (through visual review of video data) in the 2016 count cycles in the general category of pedestrians, and what types of users were counted manually in the general category of bicyclists. For consistency, these classifications are the same as in the 2015 count cycles.

Pedestrians

- Baby in stroller
- Baby being carried
- Person using an assistive walking device (walker, cane, knee walker)
- Person walking or jogging
- Wheelchair or assistive power scooter user
- Non-motorized kick scooter rider
- Person on toy (pull cat, big wheel, etc.)
- Rollerblader
- Segway Rider
- Skateboarder

Bicyclists

- Bicyclist (including electric motor assisted)
- Bicyclist walking his/her bicycle on the sidewalk
- Cyclist on three of four-wheeled cycle
- Hand Cyclist
- Unicyclist
- Human passenger in bicycle trailer (each person counted)
- Human passenger on a cycle (each person counted)
- Pedicab operator and passengers (each person counted)
- Recumbent Bicyclist
- Tandem Bicyclists (each person counted)
- Quadcyclists (each person counted)

Impacting Factors

Timing of Data Collection

In 2016 there were two seasonal automatic counter data collection periods over a total of nearly eight months (early May to late August). In 2015, five to nine weeks of data were collected by the automatic counters (mid-July to late September). Manual video data was collected in August in 2015 due to a delayed mid-July Program start date, initial site selection in the first year of the Program, and the process of obtaining permits from Caltrans to place video recording technology within the State right-of-way. The different timing of the Summer 2015 and Summer 2016 manual data collection periods had an impact on the consistency of the statistical results for both seasons and, therefore, the Historical Comparisons analysis in this report. Due to the different timing and duration of the manual *and* automatic counts in the 2015 and 2016 Summer data collection periods, it was not possible to do a significant year-on-year analysis of the two summer count periods.

Snow Removal

In Winter 2016, the only trails where snow was removed consistently were all in the City of South Lake Tahoe, and the associated manual count locations might have seen higher levels of bicyclist and pedestrian activity relative to other count locations that measured activity on a Class I trail or a combination of facilities that includes a Class I trail. Snow removal practices in the Region should continue to be monitored and considered in the review and analysis of Monitoring Program data collection results.

Equipment Failures/Technical Issues

Another potential impacting factor in the Summer 2016 count cycle was the fact that there were six manual count failures from visual obstructions (falling tree limbs, fog, etc.) and camera operation failure. The subsequent need to conduct re-counts at six manual count locations included two weekday counts and four weekend counts. All re-counts, however, were conducted within the same month of July, 2016. Also in Summer 2016, the automatic counter at the West Shore Tahoe Trail - Tahoma Location ceased operating (failed) at 8:30 PM on May 29, 2016. *It was determined that that the data collected at the West Shore Tahoe Trail - Tahoma in May 2016 was not representative of active transportation use in the Summer season, as compared to the total data collected from other three automatic counter locations over four months. That data, therefore, was included in the database but omitted from this Report's data analysis.*

Automatic Counter Technology Calibration

Multiple pedestrians or joggers passing the automatic counters at roughly the same time (often in groups) can register as fewer users. Conversely, bicycles, strollers, and other non-motorized vehicles can be overcounted with this technology. Nor can automatic counters discern multiple users on one vehicle such as a tandem bike. The frequency or degree of the automatic counter under-counting or over-counting is dependent on each individual equipment setup in its count location context. To best account for these known types of errors, a sample manual count was conducted at each automatic counter location, and compared to corresponding automatic counter data. Each unique calibration factor developed with these comparisons was used to adjust the raw automatic counter data (Raw Data x Calibration Factors = Final Data). The calibration factors for the automatic count locations in 2016 and 2015 are shown in **Table 1**.

Location	2016 Calibration Factor	2015 Calibration Factor
Round Hill Pines Path and Elks Point Road	1.351	1.474
Lakeshore Boulevard Path	1.306	1.486
Fallen Leaf Path	1.175	0.974
West Shore Tahoe Trail - Tahoma	1.175	1.250

Table 1. Annual Calibration Factors for Automatic Counters

2016 Monitoring Results

The results of the 2016 Winter-Spring and Summer Monitoring Program counts include a summary of the most active manual count locations by mode, total hourly average volume, and facility type, as well as the hourly, daily, weekly, and monthly volume averages at the automatic counter locations. The seasonal impacts during the Winter-Spring and Summer 2016 count cycles conclude this section of the report.

Manual Counts

Busiest Locations by Mode

The five highest average hourly volume manual count locations in 2016 for bicyclist activity and pedestrian activity are shown in **Figure 3** and **Figure 4**, respectively. All five of the highest-activity manual count locations for bicyclists were in the South Lake Tahoe area. The five highest pedestrian activity count locations in 2016 were less geographically concentrated and included two locations near regional tourist attractions and two locations in the South Lake Tahoe area.





Figure 3. Bicyclist Highest-Activity Locations by Average Hourly Volume (Manual Counts), 2016

Figure 4. Pedestrian Highest-Activity Locations by Average Hourly Volume (Manual Counts), 2016

Busiest locations by Total Average Hourly Volume

The five highest-activity manual count locations by total hourly average volume in 2016 are included in **Figure 5**, below. The busiest manual count location in 2016, in terms of total bicyclist *and* pedestrian hourly average volume, was on SR 28 in Kings Beach on the north shore of Lake Tahoe, followed by four locations in the South Lake Tahoe area.



Figure 5. Highest Total Active Transportation Locations by Average Hourly Volume (Manual Counts), 2016

Figure 6 on the following page graphs the AM, PM, and weekend average hourly volumes in 2016 at all manual count locations. Weekend activity was generally higher at all manual count locations, with weekday PM activity a distant second, followed more closely by AM activity. The relative AM, PM, and weekend average hourly volumes at manual count locations reflect an unusually high proportion of recreation and fitness-related active transportation trips, coupled with an unusually low proportion of local utilitarian trips in the Region.



Figure 6. AM, PM and Weekend Total Active Transportation Average Hourly Volumes (Manual Counts), 2016

Busiest locations by Facility Type

Figure 7 shows the averages of weekday total active transportation (bicyclists + pedestrians) average hourly volumes, grouped by the categories of facility types and facility type combinations that were monitored at the manual count locations.



Figure 7. Weekday & Weekend Active Transportation Average of Average Hourly Volumes by Facility Type, 2016

Seasonal Variation

Table 2 summarizes the raw volume data at each manual count location in 2016 for the February and July count periods, and for both periods combined. From these February and July manual counts, it can be inferred that there is a greater difference in the total number of bicyclists than the total number of pedestrians in the interim period when temperatures gradually increase and summertime recreational activity begins.

Location	Winter 2016			Summer 2016			2016 Total		
Location	Bicycles	Pedestrians	Total	Bicycles	Pedestrians	Total	Bicycles	Pedestrians	Total
15th Street & Eloise Ave	15	32	47	777	103	880	792	135	927
Fanny Bridge Intersection	0	187	187	140	217	357	140	404	544
Kings Beach and 267	0	79	79	116	239	355	116	318	434
Lake Tahoe & Sawmill Road	4	0	4	83	15	98	87	15	102
Motel 6 Shared Use Path	19	41	60	323	23	346	342	64	406
Pioneer Trail South of Stateline	30	503	533	185	472	657	215	975	1,190
SR 28 and Village Boulevard	1	102	103	59	279	338	60	381	441
SR 28 at Carnelian Bay	10	96	106	72	368	440	82	464	546
SR 28 between Bear & Coon Street	1	219	220	106	949	1,055	107	1,168	1,275
US 50 & Al Tahoe Boulevard	35	126	161	388	164	552	423	290	713
US 50 & Lakeview Ave	5	59	64	406	485	891	411	544	955
US 50 & Warrior Way	1	4	5	36	401	437	37	405	442
US 50 & Santa Fe Drive	7	6	13	73	25	98	80	31	111
US 50 & Sierra Boulevard	11	146	157	120	67	187	131	213	344
			1,739			6,691			8,430

Table 2. Bicyclist, Pedestrian, and Total Volumes (Manual Counts), Winter & Summer 2016

For bicyclists, the greatest increase in traffic between the two data collection seasons in 2016 occurred at 15th Street and Eloise Avenue. Pioneer Trail and Moss Road and SR 28 at Carnelian Woods Avenue were the two manual count locations with the lowest percentage increases in bicyclist traffic between Winter-Spring and Summer. No bicyclists at all were recorded at the Fanny Bridge Intersection and at Kings Beach and 267 in Winter-Spring.

For pedestrians, the greatest increase in traffic between the two data collection seasons in 2016 occurred in the Kings Beach area on the north shore, at the count location between Bear Street and Coon Street. US 50 and Sierra Boulevard, the South Tahoe Bikeway, and Pioneer Trail and Moss Road saw slight decreases in pedestrian activity between July compared to February. The fact that no pedestrians were recorded at the Lake Tahoe Boulevard and Sawmill Road location in the February manual count period is not an indication of actual pedestrian demand; snow was not cleared in the winter season and access to the Class I multi-use pathway was subsequently very limited.

Automatic Counts

Hourly, Daily, Weekly and Monthly Averages

Figure 8 shows the average hourly, daily, weekly, and monthly volumes at each automatic counter location in 2016, in order of the highest to lowest hourly combined average over two seasons at each location. In 2016, the Lakeshore Boulevard Path location had more average daily users than there were average weekly users at the West Shore Tahoe Trail - Tahoma location, and more average weekly users than there were than there were average monthly users at SR 28 and the Fallen Leaf Trail.



Figure 8. Average Hourly, Daily, Weekly, and Monthly Active Transportation Volumes (Automatic Counts), Winter & Spring, 2016



Figure 9. Average Hourly, Daily, Weekly, and Monthly Active Transportation Volumes (Automatic Counts), Summer 2016

Seasonal Impacts

The Winter-Spring and Summer 2016 data results indicate that there were seasonal impacts on relative volumes at the automatic count locations, including impacts to the busiest or highest-activity locations. **Table 3** shows data collection results for the four automatic count locations in terms of their total volumes and their average hourly, daily, weekly, and monthly volumes in each seasonal count cycle. Between the two seasonal count cycles in 2016, Lakeshore Boulevard Path experienced the most significant total increase in average hourly volumes, while the Fallen Leaf Path location experienced the greatest total average hourly volume percentage increase.

1 0					
Location	Total Count	Average Hourly	Average Daily	Average Weekly	Average Monthly
Lakeshore Blvd. Path	18,755	7	179	1,247	5,382
Round Hill Pines Path	1,450	2	40	276	1,185
Fallen Leaf Path	1,361	1	13	86	342
West Shore Tahoe Trail - Tahoma	5,291	2	59	418	2,226
	26,857	3	73	506	2,284

Winter-Spring 2016 Automatic Counter Data (1/19/2016 - 5/2/2016)

Summer 2016 Automatic Counter Data (5/3/2016 - 8/24/2016)

Location	Total Count	Average Hourly	Average Daily	Average Weekly	Average Monthly
Lakeshore Blvd. Path	89,059	49	1172	8240	35133
Round Hill Pines Path	20,723	8	182	1278	5456
Fallen Leaf Path	32,562	12	286	2008	8587
West Shore Tahoe Trail - Tahoma*	3,627	6	125	907	3636
	145,971	18	441	3,108	13,203

*Summer 2016 counts May 2 - August 24, except West Shore Tahoe Trail - Tahoma (May 2-May 29) Table 3. Total Volumes, Average Hourly / Daily / Weekly / Monthly Volumes, 2016

Historical Comparisons

Manual Counts

An analysis of the four manual count cycles conducted to date have revealed a pattern of total bicycle and pedestrian activity in each season, as well as a general consistency of highest-use locations from season to season.

The Bicyclist and Pedestrian Annual Cycle

This report for the Monitoring program includes, for the first time, a complete season of data from each of the three seasonal counts in the annual cycle (Winter and Spring were combined as one count season). Significant indicators for the Monitoring Program include the rank and relative order of magnitude of total bicyclist and pedestrian activity from season to season within the annual cycle, and the relative consistency or change in level of activity from season to season at individual count locations.

Table 4 and **Figure 10** confirm that Summer is by far the most active season, with Fall being the secondmost active season, and followed more closely in terms of total bicyclist and pedestrian volume by the Winter (February) counts. These totals also reveal that bicycling had more variation than pedestrian activity from season to season. Four of the five most active locations in terms of total annual activity are in South Lake Tahoe, and one location is on the North Shore (SR 28 between Bear Street and Coon Street). And the most active manual count locations for bicyclists were all in South Lake Tahoe, including the new Class I (Shared Use Path) location behind Motel 6.

Location		Fall 2015			Winter 2016		Sum	mer 2016	Count Total				
Location	Bicycles	Pedestrians	Total	Bicycles	Pedestrians	Total	Bicycles	Pedestrians	Total	Bicycles	Pedestrians	Total	
15th Street & Eloise Ave	355	34	389	15	32	47	777	103	880	1,147	169	1,316	
Fanny Bridge Intersection	189	239	428	0	187	187	140	217	357	329	643	972	
SR 28 (N. Lake Blvd.) and SR 267 (N. Shore Blvd.)				0	79	79	116	239	355	116	318	434	
Lake Tahoe & Sawmill Road	32	21	53	4	0	4	83	15	98	119	36	155	
South Tahoe Bikeway, behind Motel 6				19	41	60	323	23	346	342	64	406	
Pioneer Trail and Moss Road	182	413	595	30	503	533	185	472	657	397	1,388	1,785	
SR 28 and Village Boulevard	48	140	188	1	102	103	59	279	338	108	521	629	
SR 28 at Carnelian Woods Avenue	22	27	49	10	96	106	72	368	440	104	491	595	
SR 28 between Bear & Coon Street	74	369	443	1	219	220	106	949	1,055	181	1,537	1,718	
US 50 & Al Tahoe Boulevard	292	169	461	35	126	161	388	164	552	715	459	1,174	
US 50 & Lakeview Ave	235	170	405	5	59	64	406	485	891	646	714	1,360	
US 50 & Warrior Way	35	12	47	1	4	5	36	401	437	72	417	489	
US 50 & Santa Fe Drive	77	9	86	7	6	13	73	25	98	157	40	197	
US 50 & Sierra Boulevard	136	94	230	11	146	157	120	67 187		267	307	574	
	1,677	1,697	3,374	139	1,600	1,739	2,884	3,807	6,691	4,700	7,104	11,804	

Table 4. Seasonal and Total Annual Manual Count Location Volumes, Fall 2015-Summer 2016



Figure 10. Seasonal Manual Count Location Bicyclist & Pedestrian Volumes, Fall 2015-Summer 2016

Figure 11 further illustrates how the twelve locations that were included in all four seasonal manual counts collectively experienced a sharp increase in bicycle, pedestrian, and total volumes during the Summer 2016 count cycle. This observation, especially the difference between the Summer 2015 and Summer 2016 totals, is likely due to the different timing of the two successive Summer count periods. Because of the timing of the Monitoring Program's inception in 2015, August was the only month recorded in the Summer count cycle that year. If this assumption is correct, it should be proven with the results of counts over the same 4-month period in future Summer of 2017.



Figure 11. Total Volumes for Manual Count Locations by Season, Summer 2015 – Summer 2016

Figure 12 shows the difference in total bicyclist volume, total pedestrian volume, and total active transportation volume at all manual count locations combined between Winter 2016 and Fall 2015, and between Summer 2016 and Winter 2016. Two emerging trends are revealed - volumes in the Fall are generally higher than in Winter, and volumes in the Summer are typically higher than in the Fall at most count locations.

Total Average Hourly Volumes

Figure 13 shows the relative bicycle and pedestrian average hourly volume at the manual count locations for each of the Monitoring Program seasonal counts conducted thus far. Eleven of the fourteen manual count locations experienced at least a 100% average hourly volume increase when comparing the Winter-Spring and Summer figures for 2016. Along with this widespread dramatic increase, three of the five highest-activity manual count locations in Summer 2016 earned the same distinction in Winter-Spring, indicating these are highly used routes for commuting and local trips to/from residential areas.



Figure 12. Seasonal Manual Count Location Volume Differences, Fall 2015-Summer 2016



Figure 13. Average Hourly Volumes by Season (Manual Counts), 2015-2016

Historical Comparison by Mode

The five locations with the highest bicycle volumes were largely the same between Summer and Fall 2015 and Winter-Spring and Summer 2016, but with a new Class I/Shared Use Path location behind the Motel 6 in South Lake Tahoe replacing the Fanny Bridge location. The five most active locations for bicyclists in 2016 and 2015 are listed below.

Winter-Spring & Summer 2016 Bicyclist	Summer & Fall 2015 Bicyclist Highest-Activity
Highest-Activity Locations Average Hourly	Locations Average Hourly Volumes (Manual
Volumes (Manual Counts):	Counts):
 15th St. and Eloise Avenue (132.0) US 50 and Al Tahoe Boulevard (70.5) US 50 and Lakeview Avenue (68.5) Motel 6 Shared Use Path (57.0) Pioneer Trail and Moss Road (35.8) 	 15th St. and Eloise Avenue (59.4) US 50 at Al Tahoe Boulevard (52.2) US 50 and Lakeview Avenue (47.8) Fanny Bridge Intersection (30.6) Pioneer Trail and Moss Road (29.4)

Relative to bicyclists, there was more change in 2016 from 2015 in the most active pedestrian locations, with only three manual count locations remaining in the top five. The five most active locations for pedestrians in 2016 and 2015 are listed below.

Winter-Spring & Summer 2016 Pedestrian Highest-Activity Locations Average Hourly Volumes (Manual Counts):	Summer & Fall 2015 Pedestrian Highest- Activity Locations Average Hourly Volumes (Manual Counts):
 SR 28 between Bear and Coon Street (194.7) Pioneer Trail and Moss Road (162.5) US 50 and Lakeview Avenue (90.7) 	 SR 28 between Bear and Coon Street (67.3) Pioneer Trail and Moss Road (66.3) Fanny Bridge Intersection (49.4)
4. SR 28 and Carnelian Woods Avenue (77.3)	4. US 50 and Lakeview Avenue(35.1)

Consistent with these very large increases in pedestrian activity between 2015 and 2016 at the manual count locations with the most pedestrian activity, **Figure 14** shows that the difference (increase) from Summer and Fall 2015 in the average hourly volume of pedestrians at *all* manual count locations in Winter-Spring and Summer 2016 was greater than that difference for bicyclists and for total active transportation use.

Historical Comparison by Facility Type

Figure 15 shows the total active transportation average hourly volume at each of the manual count locations in 2016 and 2015, grouped by the type of bicycle and/or pedestrian facility present at each location. The different timing of the manual counts in 2016 (February 2-6, July 18-22) relative to the manual counts in 2015 (August 25-29, September 21-25) are probably the reason for the higher observed average hourly volumes in 2016 at most locations, regardless of facility type. **Figure 16** shows the total active transportation average hourly volume during the weekend counts in 2016 and 2015.



Figure 14. 2016 v. 2015 Bicyclist & Pedestrian Average Hourly Volumes



Average Hourly Volumes by Facility Type

Figure 15. Total Active Transportation Average Hourly Volumes by Facility Type (Manual Counts), 2016 v. 2015



Average Hourly Weekend Volumes by Facility Type (Manual Counts)

Figure 16. Total Active Transportation Average Hourly Weekend Volumes by Facility Type (Manual Counts), 2016 v. 2015

Gender Data Historical Comparison

Figure 17 shows how there was a slightly more even gender split among all locations in 2016 compared to 2015. Locations with more pedestrians than bicyclists generally had a more even gender split. Locations with more bicyclists than pedestrians generally saw a high proportion of male users. The two locations with the highest female user increases between 2015 and 2016 had sidewalk and sidewalk/Class II bicycle lane (US 50 and Sierra Blvd. and SR 28 between Bear St. and Coon St.).



Figure 17. Gender Distribution (Manual Counts), 2016 & 2015

Bicyclist and Pedestrian Intersection Movements

The individual intersection movement counts (including all "through" and turning movements) contained within the raw data for the manual count locations are roughly consistent as a proportion of the total movements or average hourly volume at each manual count location in every season. The five highest manual count cumulative seasonal bicyclist intersection movements are listed below. It is worth noting that the five highest total bicyclist movements from four successive seasonal manual counts are all "through" movements, and they are all located in South Lake Tahoe. The two highest cumulative seasonal bicyclist movement location (15th Street and Eloise Avenue). Even at all five highest bicycle movement manual count locations, the Winter-Spring data indicates a severe drop-off in bicycle movement (US 50 and Lakeview Avenue, northbound "through") had zero bicyclists in the Winter (February) 2016 manual count period.

Bicyclist Intersection Movements (Summer 2015 + Fall 2015 + Winter-Spring 2016 + Summer 2016)

- 1. 15th Street and Eloise Avenue (514, eastbound through)
- 2. 15th Street and Eloise Avenue (461, westbound through)
- 3. US 50 and Al Tahoe Boulevard (410, southbound through)
- 4. US 50 and Lakeview Avenue (354, southbound through)
- 5. US 50 and Lakeview Avenue (northbound through)

The five highest manual count cumulative seasonal pedestrian intersection movements are listed below. The five highest total pedestrian movements from four successive seasonal manual counts at the same locations are all turning movements. Two of these five highest manual count movements are located at the same location in the Kings Beach area on the north shore of Lake Tahoe (SR 28 between Bear and Coon Streets). The cumulative counts for these two movements combined, exceed that of the other three highest pedestrian intersection movements. Of the five highest cumulative pedestrian intersection movements, the westbound left turn at Pioneer Trail had the most consistent (smallest variation) count figures in each seasonal count cycle.

Pedestrian Intersection Movements (Summer 2015 + Fall 2015 + Winter-Spring 2016 + Summer 2016)											
1.	SR 28 between Bear and Coon Street	(980, northbound left turn)									
2.	Pioneer Trail and Moss Road	(479, eastbound left turn)									
3.	Pioneer Trail and Moss Road	(414, westbound left turn)									
4.	SR 28 between Bear and Coon Street	(355, southbound left turn)									
5.	US 50 and Lakeview Avenue	(325, westbound left turn)									

Table 5 on the following pages show the seasonal and total counts, to-date, for bicyclist and pedestrian intersection movements at all manual count locations. These counts, including all through movements and turning movements, provide a more accurate picture of alternative travel demand in terms of the predominant directions of travel at individual locations.

Location	Period		Bicycle Movements													Pedestrian Movements							
Eccation	1 child	NBL	NBT	NBR	EBL	EBT	EBR SE	3 L SE	3T :	SBR 1	WBL	WBT	WBR	NL T	EL T	SLT	WLT	NE Q	NWQ	SE Q	SWQ		
	Fall 2015	9	2	0	34	115	7	9	2	28	0	127	22		1 4	1 22	2	: 3	3 1	1	0		
	Summer 2015	10	7	3	24	130	3	13	5	21	0	130	12	13	3 6	5 7	5		3 3	5	2		
15th Street & Eloise Ave	Winter 2016	1	0	1	7	2	0	0	0	1	0	3	0	6	6 2	2 5	1	() 4	8	2		
	Summer 2016	37	20	8	58	267	6	3	84	47	3	201	43	17	7 8	3 40	7	10) 10	3	8		
	TOTAL	57	29	12	123	514	16	25	91	97	3	461	77	37	20	78	15	16	18	17	12		
	Fall 2015	1	12	58	2	22	18	0	19	2	24	30	1	7	7 6	1 63	27	1	1 2	67	1		
	Summer 2015	3	4	38	0	14	40	2	10	0	42	27	0	108	3 47	7 7	1 20	12	2 39	57	0		
Fanny Bridge Intersection	Winter 2016	0	0	0	0	0	0	0	0	0	0	0	0	4	4 3	1 44	108	() 0	0	0		
	Summer 2016	14	14	39	0	1	29	4	22	2	7	2	6	13	3 38	36 36	42		1 1	9	77		
	TOTAL	18	30	135	2	37	87	6	51	4	73	59	7	132	177	214	197	24	42	133	78		
	Fall 2015																						
	Summer 2015																						
Kings Beach and 267	Winter 2016	0	0	0	0	0	0	0	0	0	0	0	0	5	1 0) 15	7	() 1	3	2		
	Summer 2016	11	56	0	0	30	6	3	0	10	0	0	0	1	1 () 8	2	(13	98	107		
	TOTAL	11	56	0	0	30	6	3	0	10	0	0	0	62	2 0	23	9	0	14	101	109		
	Fall 2015	1	7	3	0	10	0	0	0	0	0	11	0		1 () 17	2	: () 0	0	1		
	Summer 2015	3	5	9	0	5	3	0	0	0	3	5	6	Ę	5 2	2 5	3	2	2 0	0	0		
Lake Tahoe & Sawmill Road	Winter 2016	0	2	1	0	0	0	1	0	0	0	0	0	() () (0	() 0	0	0		
	Summer 2016	7	1	6	3	19	8	8	7	1	1	18	4	() .	1 10	1 3	() 1	0	0		
	TOTAL	11	15	19	3	34	11	9	7	1	4	34	10	6	i 3	32	8	2	1	0	1		
	Fall 2015																						
	Summer 2015																						
Motel 6 Shared Use Path	Winter 2016	0	11	0	0	0	0	0	8	0	0	0	0	() () (41	() 0	0	0		
	Summer 2016	0	155	0	0	0	0	0	168	0	0	0	0	12	2 0	1 1	0	0) 0	0	0		
	TOTAL	0	166	0	0	0	0	0	176	0	0	0	0	12	2 0	11	41	0	0	0	0		
	Fall 2015	4	78	5	0	2	7	3	65	0	8	5	5	13	3 133	3 11	101		1 3	6	45		
	Summer 2015	0	57	3	3	7	4	5	75	1	7	5	4	47	7 158	3 54	81		1 30	5	7		
Pioneer Trail South of Stateline	Winter 2016	0	0	0	0	12	0	0	3	2	0	13	0	12	1 32	2 132	107	13	3 28	8	62		
	Summer 2016	11	76	4	11	1	9	1	58	9	3	2	0	1	1 156	5 78	125	29	9 50	16	7		
	TOTAL	15	211	12	14	22	20	9	201	12	18	25	9	192	479	375	414	44	111	35	121		
	Fall 2015	0	11	2	0	14	3	0	5	2	2	8	1	3	1 23	3 26	48	10) 0	2	0		
	Summer 2015	0	5	3	2	8	1	0	12	3	2	8	0	49	9 42	2 6	1 39		1 3	2	0		
SR 28 and Village Boulevard	Winter 2016	0	0	0	0	1	0	0	0	0	0	0	0	8	3 17	24	26	i 1	1 20	3	0		
	Summer 2016	1	6	1	3	21	2	0	6	1	5	11	2	22	2 66	6 73	92	. 6	6 0	3	17		
	TOTAL	1	22	6	5	44	6	0	23	6	9	27	3	110	148	184	205	21	23	10	17		

Table 5. Historical Intersection Movements (Manual Counts), 2015-2016

1	Desired		Bicycle Movements													Pedestrian Movements							
Location	Fenoa	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	NL T	ELT	SLT	WLT	NE Q	NWQ	SE Q	SWQ		
	Fall 2015	1	0	0	0	8	0	1	0	0	0	12	0	5	4	15	1	2	0	0	(
	Summer 2015	0	1	0	0	48	2	1	1	6	1	1 27	8	45	2	60	5	8	8	5			
SR 28 at Carnelian Bay	Winter 2016	0	0	0	0	2	0	0	0	0	0	8	0	37	2	44	6	2	0	5	(
	Summer 2016	0	25	0	0	46	0	1	0	0	0	0	0	22	12	0	48	9	0	208	63		
	TOTAL	1	26	0	0	104	2	3	1	6	1	47	8	109	20	119	60	21	8	218	70		
	Fall 2015	0	0	0	0	39	0	0	0	0	0	35	0	226	10	91	42	0	0	0	(
	Summer 2015	0	22	0	1	11	2	4	8	3	0	20	2	27	198	18	180	0	6	0	10		
SR 28 between Bear & Coon Street	Winter 2016	0	0	0	0	0	0	0	0	0	0	1	0	136	1	36	6	0	24	0	16		
	Summer 2016	0	3	3	0	65	1	0	0	0	0	34	0	591	55	210	38	0	0	24	3		
	TOTAL	0	25	3	1	115	3	4	8	3	0	90	2	980	264	355	266	0	30	24	57		
	Fall 2015	6	114	8	1	2	8	0	127	2	12	! 1	11	37	46	0	57	17	1	10			
	Summer 2015	4	113	2	11	13	10	6	151	0	10	3	11	20	36	11	31	7	0	2	Į		
US 50 & Al Tahoe Boulevard	Winter 2016	1	15	1	1	3	4	1	9	0	0	0	0	24	41	2	26	25	1	3			
	Summer 2016	19	11	4	13	19	19	12	123	18	9	133	8	56	15	29	22	5	6	20	1		
	TOTAL	30	253	15	26	37	41	19	410	20	31	137	30	137	138	42	136	54	8	35	2		
	Fall 2015	2	78	3	22	6	9	0	84	21	2	: 8	0	40	38	4	74	0	6	2	. 6		
	Summer 2015	0	133	24	38	9	12	1	115	0	2	4	0	64	64	47	68	1	3	3			
US 50 & Lakeview Ave	Winter 2016	0	0	0	0	0	0	0	5	0	0	0	0	1	33	1	15	0	8	0			
	Summer 2016	13	103	3	74	0	8	0	150	55	0	0	0	138	30	25	168	0	105	0	19		
	TOTAL	15	314	30	134	15	29	1	354	76	4	12	0	243	165	77	325	1	122	5	27		
	Fall 2015	0	2	1	0	0	0	0	32	0	0	0	0	5	1	1	1	0	0	0			
	Summer 2015	0	1	2	0	9	0	0	25	0	1	21	0	9	25	3	3	0	1	6	(
US 50 & Warrior Way	Winter 2016	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	. (
	Summer 2016	2	0	0	0	5	2	0	2	0	0	25	0	72	73	4	139	0	0	12	. 10		
	TOTAL	2	4	3	0	14	2	0	59	0	1	46	0	86	99	8	145	0	1	20	105		
	Fall 2015	2	22	11	0	1	0	1	34	0	2	! 1	3	1	5	1	0	1	1	0	. (
	Summer 2015	0	48	1	0	1	0	2	25	1	0	1	0	4	7	3	2	0	0	0			
US 50 & Santa Fe Drive	Winter 2016	1	3	0	0	0	0	0	2	0	0	0	1	0	1	0	0	3	2	0	(
	Summer 2016	0	31	2	2	0	1	1	33	1	1	0	1	5	8	1	6	2	0	3	(
	TOTAL	3	104	14	2	2	1	4	94	2	3	2	5	10	21	5	8	6	3	3			
	Fall 2015	8	4	3	0	35	3	0	8	1	1	1 73	0	18	1	23	44	1	6	0			
	Summer 2015	2	6	1	0	29	5	1	9	1	3	53	0	25	12	15	15	1	1	1	. (
US 50 & Sierra Boulevard	Winter 2016	0	3	0	0	0	0	0	5	0	0	2	1	49	9	36	36	6	1	0			
	Summer 2016	7	0	5	0	30	1	2	5	1	14	54	1	4	9	13	19	4	11	6			
	TOTAL	17	13	9	0	94	9	3	27	3	18	182	2	96	31	87	114	12	19	7	1		

Table 5 (continued). Historical Manual Count Intersection Movements, 2015-2016

Automatic Counts

Though they represent a smaller set of locations than the manual count locations, the seasonal differences in average hourly volumes at the automatic counter locations are greater than those at the manual count locations. This general conclusion possibly indicates a greater variation within the annual cycle of recreational facilities use throughout the Region.

Total Average Hourly Volumes

In 2015 and in 2016, the results of the automatic counts reveal a divergence between the level of activity at four largely recreational user locations, with higher average hourly volumes and growth in demand between 2015 and 2016 at two locations with a presumed high proportion of trips that do not begin or end in the bicyclist or pedestrian mode. The automatic counts, therefore, may represent a steady and growing demand (relative to the two locations that have a mix of recreational and utilitarian users) for bicyclist and pedestrian facilities connecting recreational opportunities to nearby and available public automobile parking. This divergence may also indicate the lack of adequate facilities for greater pedestrian and bicyclist connectivity and level of comfort traveling to recreational opportunities in the region.

Figure 18 shows that two of the four automatic counter locations had the same general pattern of seasonal activity, as with most of the manual count locations. The exception amongst the automatic counter locations was Round Hill Pines Path, where there was more activity in the Fall than in the Summer. An equipment failure with the automatic counter at the West Shore Tahoe Trail - Tahoma in Summer 2016 prevented all data from being collected there in this count cycle. All four automatic counter locations experienced dramatic increases in average hourly volumes in Summer 2016 compared to the preceding Winter-Spring count cycle. In Summer 2016, Lakeshore Boulevard Path had average hourly volumes that were more than four times higher than the next highest automatic counter location. Presumably most of that volume can be attributed to homeowner recreation as well as visitation to view homes on the path. The second-busiest automatic counter location in the Fall of 2015 was the Round Hill Pines Path. In Winter and Spring of 2016, however, the West Shore Tahoe Trail - Tahoma saw more activity than the Round Hill Pines Path location. And the Fallen Leaf Trail location was the second-most active location of the four automatic counts in Summer 2016.



*The automatic counter at the West Shore Tahoe Trail - Tahoma Location ceased operating at 8:30 PM on May 29, 2016. The average hourly volume figure for Summer 2016 is based only on the data collected between May 2 and May 29, 2016

Figure 18. Seasonal Average Hourly Volumes for Automatic Counter Locations, 2015-2016
Additional Locations Data

For this 2016 Data Collection Report, four participating Monitoring Program partner agencies provided active transportation data: the California Department of Transportation (Caltrans), the Tahoe City Public Utilities District (TCPUD), Douglas County, and the City of South Lake Tahoe.

Caltrans

In Summer 2016 bicyclist and pedestrian video data was collected by Caltrans at eleven locations within the State's right-of-way (see **Figure 3**). The data was then automatically tabulated with the aid of video recognition software. **Figure 19** shows the resulting total pedestrian and bicyclists counts, and the level of total active transportation at each location over two weekdays and a Sunday. The SR 89 North location had the highest bicycle, pedestrian, and total volumes, followed by Rubicon-Carson, Tahoe Keys Boulevard, 3rd Street, and Lodi Avenue. The Stockton Avenue location had the highest proportion of bicyclists compared to pedestrians, and was the only location that had more bicyclists than pedestrians recorded on any one day (Friday).



Figure 19. Caltrans Bicyclist and Pedestrian Intersection Movement Total Volumes, Summer 2016

Tahoe City Public Utilities District (TCPUD)

TCPUD conducted a manual data collection at four locations on August 3-4, 2016. The locations included the Truckee River Trail, North Lake Boulevard (Lakeside Trail), West Shore Trail (Kaspian Campground), and at the 64-Acre site. **Figure 20** shows how these north shore and west shore locations saw a high proportion of bicyclists compared to walkers and joggers in this late summer manual count.



Figure 20. TCPUD Bicyclists, Pedestrians, and Total Users (Manual Counts), August 3-4 2016

TCPUD also collected total volume data with automatic counters at three of its four count locations between May 4th and October 17th in 2016: the Truckee River Trail, the West Shore Trail, and the Lakeside Trail. **Figure 21** shows that the total volumes at all trail locations increased rapidly between May and July, peaked in July, and decreased relatively gradually between July and October. In every month, the Truckee River Trail had more than double the volume of the West Shore Trail. The Lakeside Trail monthly volumes followed the West Shore Trail volumes more closely, and were roughly equal to the West Shore Trail volumes in the first and last month of the TCPUD automatic counts (May and October).



Figure 21. TCPUD Total Volumes (Automatic Counts), May 4-October 17, 2016

Douglas County

As a continuation of its historical data collection at this site that connects users to Nevada Beach, Douglas County collected daily trail volume data in Rabe Meadows for an entire year, between October 1, 2015 and October 1, 2016. **Figure 22** shows a more complete picture of the same general pattern of trail use intensity revealed in the previous section by the data collected by TCPUD between May and October of 2016.



Figure 22. Rabe Meadows Trail total monthly volumes, October 2015- October 2016

City of South Lake Tahoe

The Lake Tahoe Boulevard and Viking Way intersection movement counts included total bicyclist and pedestrian movements between 6:00 AM and 7:00 PM. Bicyclist and pedestrian movements were recorded every fifteen minutes, including during the motorized vehicle peak-hours (7:15AM to 8:15AM, 2:15 PM to 3:15 PM). **Figure 23** shows a higher proportion of bicyclists compared to pedestrians, as at other City of South Lake Tahoe locations in Summer 2016, but especially during the PM peak period.



Figure 23. Lake Tahoe Boulevard & Viking Way Bicyclist & Pedestrian Volumes, May 3rd, 2016

Historical Comparisons

Many of the locations included in the Summer and Fall data collection cycles did not have available historical intersection turning movement count comparisons within the TRPA Bicycle and Pedestrian Count Database. However, six locations counted during 2015 and 2016 by TRPA, TCPUD and Douglas County have available longer-term historical data that are useful in terms of seeing where the most recent data fits within a retrospective look-back:

- US 50 and Al Tahoe Boulevard,
- US 50 and Lakeview Drive,
- West Shore Trail (Kaspian Campground),
- 64-Acre (West Shore Trail @ Lakeside Trail),
- Lakeside Trail (North Lake Boulevard),
- Truckee River Trail, and
- Rabe Meadows.

Two of the above locations have had multiple 12-hour counts since 1994, and another two locations have been the locus of 12-hour counts since 2014. And Douglas County's Rabe Meadows location has multiple years of daily total active transportation volumes in the summer period between the beginning of July through and the end of September.

US 50 and Al Tahoe

Four previous counts were conducted at this location in October and November of 2014, and in August and September of 2015. **Figure 24** reveals that, due to the different calendar timing of all AM counts todate, including the February and July counts in 2016, it is difficult to determine trends in pedestrian and bicyclist traffic in the AM weekday period. As shown in **Figure 25**, if these data for average hourly volume at this location are viewed as a set of measures or snapshots at different times throughout the year, "the annual cycle" of intensity of use in the AM period in each month (and season) is more evident.



Figure 24. US 50 & Al Tahoe Blvd. Weekday AM Historical Average Hourly Volume, Oct 2014 – Jul 2016



Figure 25. US 50 & Al Tahoe Blvd. Weekday AM "Annual Cycle" Average Hourly Volume, Oct 2014 – Jul 2016

Figure 26 reveals that, due to the different timing of all weekday PM counts to-date, including the February and July counts in 2016, it is difficult to determine any trends in pedestrian and bicyclist traffic through this intersection or on the adjacent Class I facility in the weekday PM period. As shown in **Figure 27**, if these data for average hourly volume at this location are viewed as a set of measures or snapshots at different times throughout the year, "the annual cycle" of intensity of use in the weekday PM period in each month (and season) is more evident.



Figure 26. US 50 & Al Tahoe Blvd. Weekday PM Historical Average Hourly Volume, October 2014 – July 2016



Figure 27. US 50 & Al Tahoe Blvd. Weekday PM "Annual Cycle" Average Hourly Volume, Oct 2014 – Jul 2016

US 50 and Lakeview Drive

Manual counts were first conducted at US 50 and Lakeview Drive in August of 2001. The weekday counts have been conducted consistently only during the PM peak period, so a historical comparison is not possible for AM period. As shown in **Figure 28**, **Figure 29**, **Figure 30**, and **Figure 31**, the weekend and weekday PM volumes represented by the July 2016 counts are lower than the August historical counts. Bicycle and pedestrian data weekend and weekday PM data collection in 2016 occurred in February and in July, rounding out the picture of "the annual cycle" of bicycle and pedestrian use. It seems there is a later (August) peak period of use at this location.



Figure 28. US 50 & Lakeview Drive Weekend Historical Average Hourly Volume, August 2001 – July 2016



Figure 29. US 50 and Lakeview Drive Weekend "Annual Cycle" Average Hourly Volume, August 2001 – July 2016



Figure 30. US 50 and Lakeview Drive Weekday PM Historical Average Hourly Volume, August 2001 – July 2016



Figure 31. US 50 and Lakeview Drive Weekday PM "Annual Cycle" Average Hourly Volume, August 2001 – July 2016

Kaspian Campground (West Shore Trail)

This location is located on the West Shore Trail at the USFS Kaspian Campground, and has been monitored by TCPUD in six different years since 1994. The historical active transportation volume by time of day graph in **Figure 32**, with a thicker red line for the most recent data collected in August 2016, indicates a continuation of trail use peak volume occurring in the late morning roughly between 11AM and 12PM, but earlier and earlier with each count year. The most recent data also confirms that the data collected in August 2006 likely represents a statistical outlier event that may have involved the use of other, connected Campground amenities. It is therefore inappropriate to exclude this data, which might be the most appropriate benchmark for the special event use of the West Shore Trail around the Campground.



Figure 32. Kaspian Campground (West Shore Trail) volume by time of day historical comparison, 1994-2016

64-Acre Site (Truckee River Trail)

The 64-Acre location is on TCPUD's Truckee River Trail at the "64-Acre Tract", approximately 200 yards north of the vehicle entrance at the intersection of the West Shore Trail and Truckee River Trail. TCPUD data collection at this site has always occurred in the month of August on ten different occasions and in six different years since 1994. As shown in **Figure 33**, three of these counts from August 1994, 2005, and 2006 have total and peak volumes that are far below the other seven datasets. It is unclear whether these counts were affected by construction, adverse weather, or other factors. As for the remaining data, including the 2016 dataset represented by a thicker red line, there are generally two peak periods with one between 11 AM and 12 PM and the other between 2 PM and 3 PM. Three of these datasets from August of 1994, 2014 and 2015 show a heavier PM peak volume, unlike the data from the other four counts in August of 1994, 2005, 2006, and 2016.



Figure 33. 64-Acre Site (Truckee River Trail) volume by time of day historical comparison, 1994-2016

Lakeside Trail

The Lakeside Trail location has been monitored by TCPUD since 2014. **Figure 34** indicates that in 2014, 2015, and 2016, the Lakeside Trail location saw similar AM volumes, but in 2014 there was a divergent volume in the PM hour that may represent a statistical outlier (or an event benchmark). This location should continue to be monitored, as more data will help to clarify any long-term trends or event impacts.



Figure 34. Lakeside Trail volume by time of day historical comparison, 2014-2016

Truckee River Trail

The Truckee River Trail location has been monitored in the month of August by TCPUD since 2015. The graph in **Figure 35** indicates that in 2016, this site saw a higher total volume and peak volume than it did in 2015. The pattern of use throughout the day was generally similar, year-on-year, with a spike in use between roughly 11 AM and 12 PM. Future August counts should be conducted to confirm or disprove the steady, year-on-year growth in trail use at this location that could be implied by the data collected in these first two years.



Figure 35. Truckee River Trail volume by time of day historical comparison, 2015-2016

Rabe Meadows (& Round Hill Pines Path)

The Rabe Meadows and the Round Hill Pines Path have been monitored by Douglas County and TRPA/TMPO since 2013, but at different times and for different durations between July and September. The recently constructed Round Hill Pines shared use path connects to Rabe Meadows at the Elks Point Intersection, where TRPA/TMPO has placed an automatic counter since 2015. The addition of this count location (in comparison to the traditional Rabe Meadows counts) helps to illustrate the relative volume of trips through Rabe Meadows to Round Hill Pines Beach or Nevada Beach. As shown in **Figure 36**, volumes collected by TRPA/TMPO for the Round Hill Pines section of path, including the 2016 dataset shown with a thicker red line, are consistently lower than volumes collected by Douglas County even though they were obtained in a warmer period in the summer including the 4th of July. These data continue to indicate the more popular destination is Nevada Beach. The relative convenience of parking near the two count locations may also be having an impact on the different volumes. It is also possible, still, that fewer visitors are aware of the more recently established path to the Round Hill Pines Beach.



Figure 36. Rabe Meadows (& Round Hill Pines Path) volume by time of day historical comparison, 2013-2016

Summary of Findings

2016 Monitoring Results

- In terms of total volume, the South Lake Tahoe area saw the greatest concentration of total bicyclist and pedestrian volume, as well as the most bicyclist volume. The highest-activity locations for bicyclist and pedestrian use in the South Lake Tahoe area were consistent in the February and July manual counts.
- In terms of total hourly average volume in the February and July count cycles, the busiest manual count location was SR 28 between Bear Street and Coon Street in Kings Beach on the North Shore, followed by four locations in the South Lake Tahoe area.
- Weekend activity was generally higher at all manual count locations, with weekday PM activity a distant second, followed more closely by AM activity.
- From the February and July manual counts, it can be inferred that there is a greater difference in the total number of bicyclists than the total number of pedestrians in the interim period when temperatures gradually increase and summertime recreational activity begins.
- For bicyclists, the greatest increase in traffic between the two data collection seasons in 2016 occurred at 15th Street and Eloise Avenue. Pioneer Trail and Moss Road and SR 28 at Carnelian Woods Avenue were the two manual count locations with the lowest percentage increases in bicyclist traffic between Winter-Spring and Summer. No bicyclists were recorded at the Fanny Bridge Intersection and at Kings Beach and 267 in Winter-Spring.
- For pedestrians, the greatest increase in traffic between the two data collection seasons in 2016 occurred in Kings Beach on SR 28 between Bear Street and Coon Street. At three locations in the July count period, there was a decrease in pedestrian activity compared to the February counts (US 50 and Sierra Boulevard, the South Tahoe Bikeway behind Motel 6, Pioneer Trail and Moss Road). There were no pedestrians recorded at the Lake Tahoe Boulevard and Sawmill Road location in the February count period.
- There were order of magnitude differences in active transportation use amongst the automatic counter locations in 2016. The Lakeshore Boulevard Path location had more average daily users than there were average weekly users at the West Shore Tahoe Trail Tahoma location, and more average weekly users than average monthly users at the Fallen Leaf Trail.
- Between the two seasonal count cycles in 2016, Lakeshore Boulevard Path experienced the greatest total increase in average hourly volume (+41.4), while the Fallen Leaf Path experienced the greatest total average hourly volume percentage increase (from 0.5 to 11.9 average hourly volume, or 2,380%).

Historical Comparisons

- There is a pattern of total active transportation activity in each season, as well as a general consistency of highest-use locations from season to season. In terms of total bicyclist and pedestrian volumes, Summer is by far the most active season, with Fall being the second-most active season, and followed more closely by Winter.
- > Bicycling had more variation than pedestrian activity from season to season in 2016 and in 2015.
- With a longer Summer season count in 2016 there was, in general, a slightly more even gender split amongst all locations compared to 2015. In all seasonal count cycles, the manual count locations with more pedestrians than bicyclists generally had a more even gender split. Conversely, locations with more bicyclists than pedestrians were found to generally have a higher percentage of male users.
- As expected, the individual intersection movement counts (including all "through" and turning movements) are roughly consistent as a proportion of the total movements or average hourly volumes at each manual count location in every season.
- The five highest total bicyclist movements from four successive seasonal manual counts at the same locations are all "through" movements, and they are all located in South Lake Tahoe. The two highest cumulative seasonal bicyclist movements were at the same manual count location (15th Street and Eloise Avenue).
- The five highest total pedestrian movements from four successive seasonal manual counts at the same locations are all turning movements. Two of these five highest manual count movements are located at the same location in the Kings Beach area on the north shore of Lake Tahoe (SR 28 between Bear and Coon Streets). The cumulative counts for these two movements combined exceed that of the other three highest pedestrian intersection movements. Of the five highest cumulative pedestrian intersection movements, the westbound left turn at Pioneer Trail had the most consistent (smallest variation) count figures in each seasonal count cycle.
 - Seasonal differences in average hourly volumes at the largely recreational automatic counter locations are even greater than those at the more mixed variety of manual count locations. In Summer 2016 and Summer 2015, Lakeshore Boulevard Path had the highest total volumes and average hourly volumes of the four automatic counter locations. Presumably most of that volume can be attributed to homeowner recreation as well as visitation to view homes on the path. The Fallen Leaf Trail was the second-most active location of the four automatic counter location in Summer 2016. However, the Round Hill Pines Path was the second-busiest automatic counter location in the Fall of 2015. In the Winter and Spring 2016 counts, however, the West Shore Tahoe Trail Tahoma saw more activity than the Round Hill Pines Path.

Conclusions and Recommendations

Based on the data results and the findings summarized above, the following conclusion and recommendations are included below for consideration and use by the Monitoring Program and its customer agencies.

Conclusions

- The difference in the duration and timing of the manual (video) counts and the automatic counts between Summer 2015 and Summer 2016 contributed significantly to the observed increased total volumes and average hourly volumes in the 2016 Summer count cycle compared to Summer 2015.
- The 2016 data suggests a greater difference in bicyclist volumes than pedestrian volumes, overall, between Winter-Spring and Summer. The data at three high-activity locations in the South Lake Tahoe area with fewer pedestrians counted in Summer than in Winter-Spring suggest that many pedestrians counted in the Winter-Spring counts become some of the bicyclists counted in Summer counts, making the case that several of these users do not own a car.
- The relative AM, PM, and weekend average hourly volumes at manual count locations reflect a high proportion of recreation and fitness-related active transportation trips, coupled with a low proportion of local utilitarian trips in the Region.
- The different timing of the manual counts in 2016 (February 2-6, July 18-22) relative to the manual counts in 2015 (August 25-29, September 21-25) are probably the reason for the higher observed average hourly volumes in 2016 at most location, regardless of facility type.
- The consistency of highest-use locations from season to season may be an indication of greater overall bicycle and pedestrian activity in the small-area networks of bicycle, pedestrian, and multi-use facilities (and on local roadway networks) that are connected to those locations.
- In Winter 2016, however, the only trails where snow was removed consistently were all in the City of South Lake Tahoe. The data indicates greater variation in the level of activity throughout the annual cycle at locations serving recreational facilities throughout the Region where snow removal was not provided. Seasonal volumes at these locations may be more dependent on weather conditions and the open/closed status of the facility and the associated recreational attraction. Snow removal on Class 1 shared-use paths encourages increased year-round active transportation use that can result in decreased vehicle miles traveled and GHG emissions.
- Total volume data collected at automatic counter locations close to available parking and recreational attractions (e.g., Lakeshore Boulevard Path) could include a large proportion of trips that originated in an automobile. The automatic counts may represent a steady and growing demand for bicyclist and pedestrian facilities connecting recreational opportunities to nearby and available public automobile parking.
- The gender data collected in 2016 and 2015 could be an early indication that female users may have a stronger preference for facilities with separation between bicyclists and pedestrians (as opposed to

Class I Shared-Use Pathways), as well as facilities that accommodate utilitarian, urban or semi-urban active transportation trips. And for males the data points to the possibility that the opposite finding may be true: there could be a lower overall demand among males for separated bicycle and pedestrian facilities, and for facilities accommodating local utilitarian trips.

Recommendations

The following recommendations are based on the findings and conclusions in this Report.

- Expand the geographic coverage of automatic counters within the region, to measure the total volume of activity at more locations with similar and different types of facilities and supported uses (not only recreational).
- For manual and automatic bicyclist and pedestrian counts, it would be beneficial for future data analysis to synchronize as much as possible the count periods of each data collection season amongst all participating Monitoring program agencies.
- It may be beneficial to develop Region-specific data extrapolation factors for recreational and commuter-oriented facilities based on regional peak-hour count data for both basic types of facilities. Though the Monitoring Program currently uses them, the National Bicycle and Pedestrian Documentation Project (NBPDP) data extrapolation factors for calibrating bicycle and pedestrian activity are not ideally calibrated for the Lake Tahoe Region (see Appendix E).
- Snow removal practices in the Region should continue to be monitored and considered in the review and analysis of Monitoring Program data collection results.
- It may be desirable in the future to be able to capture and differentiate trips that did not originate on foot or by bicycle at certain locations (e.g., at Lakeshore Boulevard Path). Through future video data collection and analysis, establish a multi-modal trip calibration factor for certain locations by obtaining a reliable sample size of trips that did not originate on foot or by bicycle over a shorter period.
- > Future data collection site selection and analysis could be designed with two complementary goals:
 - 1. Identify and monitor activity within the Region's small-area pedestrian and bicycle activity networks in a more comprehensive approach, to help planners better optimize and complete these networks. For example, it may be useful to conduct a more in-depth investigation of the patterns of pedestrian and pedestrian-automobile user activity in the Kings Beach area through additional count locations, direct observation, user surveys, etc., to better understand the typical origins and destinations of pedestrian trips within the local network and identify safety/efficiency concerns potentially impacting trips represented at the most active pedestrian count location in the region: SR 28 between Bear and Coon Street.
 - 2. More accurately gauge active transportation use and demand between the Region's small-area networks, so the Monitoring Program can more effectively inform future updates to regional bicycle and pedestrian plans and capital investments. For example, it may be useful to monitor, where dedicated bicycle facilities do not exist, the level of bicycle use of key intra-regional roadway network links, including the shoulders on US 50 and the travel lanes on CA 28, CA 89, NV 28, NV 431, and NV 207.

Appendix A. 2016 Raw Data Count Tables

2016 Winter TRPA Data Collection

Location						Bio	ydle Mover	ments									Pede	strian Move	ements				Total Mayomonto
Location	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	TOTAL	NL T	EL T	SLT	WLT	NE Q	NWQ	SE Q	SWQ	TOTAL	Total Movements
15th Street & Eloise Ave	1	0	1	7	2	0	0	0	1	0	3	0	15	6	2	9	1	0	4	8	2	32	47
Fanny Bridge Intersection	0	0	0	0	0	0	0	0	0	0	0	0	0	4	31	44	108	0	0	0	0	187	187
Kings Beach and 267	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	15	7	0	1	3	2	79	79
Lake Tahoe & Sawmill Road	0	2	1	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Motel 6 Shared Use Path	0	11	0	0	0	0	0	8	0	0	0	0	19	0	0	0	41	0	0	0	0	41	60
Pioneer Trail South of Stateline	0	0	0	0	12	0	0	3	2	0	13	0	30	121	32	132	107	13	28	8	62	503	533
SR 28 and Village Boulevard	0	0	0	0	1	0	0	0	0	0	0	0	1	8	17	24	26	4	20	3	0	102	103
SR 28 at Carnelian Bay	0	0	0	0	2	0	0	0	0	0	8	0	10	37	2	44	6	2	0	5	0	96	106
SR 28 between Bear & Coon Street	0	0	0	0	0	0	0	0	0	0	1	0	1	136	1	36	6	0	24	0	16	219	220
US 50 & AI Tahoe Boulevard	1	15	1	1	3	4	1	9	0	0	0	0	35	24	41	2	26	25	1	3	4	126	161
US 50 & Lakeview Ave	0	0	0	0	0	0	0	5	0	0	0	0	5	1	33	1	15	0	8	0	1	59	64
US 50 & Warrior Way	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	2	0	4	5
US 50 & Santa Fe Drive	1	3	0	0	0	0	0	2	0	0	0	1	7	0	1	0	0	3	2	0	0	6	13
US 50 & Sierra Boulevard	0	3	0	0	0	0	0	5	0	0	2	1	11	49	9	36	36	6	1	0	9	146	157

Automatic Locations	Total Volume	Average Hourly
Incline Beach	4507	6.5
Rabe Meadows	845	1.2
SR 28 and Fallen Leaf Trail	52	0.1
West Shore Bike Path	2400	3.5
*Counted for the month of Febuary		

2016 Summer TRPA Data Collection

Location						Bic	ycle Movei	ments									Pede	strian Mov	ements				Total Movements
Location	NB L	NBT	NBR	EB L	EBT	EBR	SB L	SBT	SBR	WB L	WB T	WBR	TOTAL	NL T	ELT	SLT	WLT	NE Q	NW Q	SE Q	SWQ	TOTAL	Total Wovements
15th Street & Eloise Ave	37	20	8	58	267	6	3	84	47	3	201	43	777	17	8	40	7	10	10	3	8	103	880
Fanny Bridge Intersection	14	14	39	0	1	29	4	22	2	7	2	6	140	13	38	36	42	1	1	9	77	217	357
Kings Beach and 267	11	56	0	0	30	6	3	0	10	0	0	0	116	11	0	8	2	0	13	98	107	239	355
Lake Tahoe & Sawmill Road	7	1	6	3	19	8	8	7	1	1	18	4	83	0	1	10	3	0	1	0	0	15	98
Motel 6 Shared Use Path	0	155	0	0	0	0	0	168	0	0	0	0	323	12	0	11	0	0	0	0	0	23	346
Pioneer Trail South of Stateline	11	76	4	11	1	9	1	58	9	3	2	0	185	11	156	78	125	29	50	16	7	472	657
SR 28 and Village Boulevard	1	6	1	3	21	2	0	6	1	5	11	2	59	22	66	73	92	6	0	3	17	279	338
SR 28 at Carnelian Bay	0	25	0	0	46	0	1	0	0	0	0	0	72	22	12	0	48	9	0	208	69	368	440
SR 28 between Bear & Coon Street	0	3	3	0	65	1	0	0	0	0	34	0	106	591	55	210	38	0	0	24	31	949	1055
US 50 & Al Tahoe Boulevard	19	11	4	13	19	19	12	123	18	9	133	8	388	56	15	29	22	5	6	20	11	164	552
US 50 & Lakeview Ave	13	103	3	74	0	8	0	150	55	0	0	0	406	138	30	25	168	0	105	0	19	485	891
US 50 & Warrior Way	2	0	0	0	5	2	0	2	0	0	25	0	36	72	73	4	139	0	0	12	101	401	437
US 50 & Santa Fe Drive	0	31	2	2	0	1	1	33	1	1	0	1	73	5	8	1	6	2	0	3	0	25	98
US 50 & Sierra Boulevard	7	0	5	0	30	1	2	5	1	14	54	1	120	4	9	13	19	4	11	6	1	67	187

Automatic Locations	Total Volume	Average Hourly
Incline Beach	89059	48.8
Rabe Meadows	20723	7.6
SR 28 and Fallen Leaf Trail	32562	11.9
West Shore Bike Path	3627	5.6

*Summer 2016 counts May 2 - August 24, except West Shore Bike Path (May 2-May 29)

APPENDIX B 2015-2016 Count Locations Maps (TRPA, TCPUD, Douglas County, CSLT)



2016 Monitoring Program Count Locations

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2015 Monitoring Program Count Locations

APPENDIX C 2015-2016 Manual Count Summaries

15th Street and Eloise Avenue

2015 Pedestrians Observed:	78	2016 Pedestrians Observed:	135
2015 Bicyclists Observed:	713	2016 Bicyclists Observed:	792
2015 Total:	791	2016 Total:	92





15th Street and Eloise Avenue









15th Street and Eloise Avenue

Count Location



2015 Pedestrians Observed:	281	2015 Total:	907
2015 Bicyclists Observed:	626		
2016 Pedestrians Observed:	290	2016 Total:	71
2016 Bicyclists Observed:	423		













Count Location



2015 Pedestrians Observed:	593	2016 Pedestrians Observed:	404
2015 Bicyclists Observed:	369	2016 Bicyclists Observed:	140
2015 Total:	962	2016 Total:	544













Count Location



Lake Tahoe Boulevard and Sawmill Road

2015 Pedestrians Observed:	43	2016 Pedestrians Observed:	15
2015 Bicyclists Observed:	156	2016 Bicyclists Observed:	87
2015 Total:	199	2016 Total:	102
















Lake Tahoe Boulevard and Sawmill Road



2015 Pedestrians Observed:	796	2016 Pedestrians Observed:	975
2015 Bicyclists Observed:	353	2016 Bicyclists Observed:	215
2015 Total:	1,149	2016 Total:	1,190















2015 Pedestrians Observed:	70	2016 Pedestrians Observed:	31
2015 Bicyclists Observed:	156	2016 Bicyclists Observed:	80
2015 Total:	226	2016 Total:	111















SR 28 at Carnelian Woods Avenue

2015 Pedestrians Observed:	206	2016 Pedestrians Observed:	464
2015 Bicyclists Observed:	138	2016 Bicyclists Observed:	82
2015 Total:	344	2016 Total:	546

















SR 28 at Carnelian Woods Avenue



2015 Pedestrians Observed:	337	2016 Pedestrians Observed:	381
2015 Bicyclists Observed:	92	2016 Bicyclists Observed:	60
2015 Total:	429	2016 Total:	441















SR 28 between Bear and Coon Street

2015 Pedestrians Observed:	808	2016 Pedestrians Observed:	1,168
2015 Bicyclists Observed:	147	2016 Bicyclists Observed:	107
2015 Total:	955	2016 Total:	1,275

















SR 28 between Bear and Coon Street



2015 Pedestrians Observed:	421	2016 Pedestrians Observed:	544
2015 Bicyclists Observed:	573	2016 Bicyclists Observed:	411
2015 Total:	994	2016 Total:	955















2015 Pedestrians Observed:	164	2016 Pedestrians Observed:	213
2015 Bicyclists Observed:	246	2016 Bicyclists Observed:	131
2015 Total:	410	2016 Total:	344















2015 Pedestrians Observed:	59	2016 Pedestrians Observed:	59
2015 Bicyclists Observed:	94	2016 Bicyclists Observed:	94
2015 Total:	153	2016 Total:	15 3















SR 28 (N. Lake Boulevard) and SR 267 (N. Shore Boulevard)

2016 Total:	434
2016 Bicyclists Observed:	116
2016 Pedestrians Observed:	318






SR 28 (N. Lake Boulevard) and SR 267 (N. Shore Boulevard)

SR 28 (N. Lake Boulevard) and SR 267 (N. Shore Boulevard)



South Tahoe Bikeway, behind Motel 6

2016 Total:	406
2016 Bicyclists Observed:	342
2016 Pedestrians Observed:	64









South Tahoe Bikeway, behind Motel 6



APPENDIX D Automatic Count Summaries

Lakeshore Boulevard Path

May 3 rd , 2016 – August 24 th , 2016
89,059
22,068
January 19 th , 2016 – May 2 nd , 2016
18,755
5,382
July 18 th , 2015 – September 21 st 2015
19,019
40,184
18,147



Round Hill Pines Path

Dates in field: Total Counted:	May 3 rd , 2016 – August 24 th , 2016 20,723
Average Monthly Volume:	5,135
Dates in field:	January 19 th , 2016 – May 2 nd , 2016
Total Counted:	1,450
Average Monthly Volume:	1,185
Dates in Field:	July 18 th , 2015 – September 21 st , 2015
July Total Counted:	3,587
August Total Counted:	6,736
September Total Counted:	3,233



Fallen Leaf Path

Dates in field:	May 3 rd , 2016 – August 24 th , 2016
Total Counted:	32,562
Average Monthly Volume:	8,069
Dates in field:	January 19 th , 2016 – May 2 nd , 2016
Total Counted:	1,361
Average Monthly Volume:	342
Deter in Field	Lub 40 th 2015 Contamber 21 st 2015
Dates in Field:	July 18", 2015 – September 21", 2015
July Total Counted:	4,567
August Total Counted:	8,385
September Total Counted:	3,168



West Shore Tahoe Trail – Tahoma

Dates in field:	May 3 rd , 2016 – May 29 th , 2016
Total Counted:	3,627
Average Monthly Volume:	4,030
Dates in field:	January 19 th , 2016 – May 2 nd , 2016
Total Counted:	5,291
Average Monthly Volume:	2,226
Dates in Field:	August 24 th , 2015 – September 21 st , 2015
July Total Counted:	-
August Total Counted:	1,724
September Total Counted:	4,432



APPENDIX E 2016-2015 NBPDP Extrapolation Tables

The National Bicycle and Pedestrian Documentation Project (NBPDP)

The National Bicycle and Pedestrian Documentation Project (NBPDP) developed extrapolation factors for bicycle and pedestrian activity across the United States. This tool is used to give a general idea of the daily, monthly, and annual activity at a certain location based upon peak hour counts. The tables below show the extrapolated daily activity for each location in 2016 and 2015 using the NBPDP factors. The weekday activity was extrapolated using the PM (4pm-6pm) peak hours for each site and entering them into the NBPDP extrapolation tool. Weekend daily activity volumes were developed using the peak hour from the weekend data collected (12PM – 2PM) and entering the total volume (bicycles and pedestrians) into the NBPDP extrapolation tool.

2016 Extrapolation Table

Location	NPDD Designation	Weekday PM	Weekend	Weekday	Weekend
Editation	NBPD Designation	Counts	Counts	Extrapolation	Extrapolation
15th Street & Eloise Ave	Path	60	788	450	4355
Fanny Bridge Intersection	Pedestrian District	85	220	638	1650
SR 28 (N. Lake Blvd.) and SR 267 (N. Shore Blvd.)	Path	142	156	1065	862
Lake Tahoe & Sawmill Road	Path	82	46	615	254
South Tahoe Bikeway, behind Motel 6	Path	135	167	1013	923
Pioneer Trail and Moss Road	Pedestrian District	333	132	2498	990
SR 28 and Village Boulevard	Pedestrian District	100	173	750	1298
SR 28 and Carnelian Woods Avenue	Path	86	297	645	1641
SR 28 between Bear & Coon Street	Pedestrian District	357	635	2678	4763
US 50 & Al Tahoe Boulevard	Path	234	229	1755	1266
US 50 & Lakeview Ave	Path	314	459	2355	2537
US 50 & Warrior Way	Pedestrian District	49	379	368	2843
US 50 & Santa Fe Drive	Path	24	40	180	221
US 50 & Sierra Boulevard	Path	83	71	623	392
*NBPDP Extrapolation used from July Counts					

2015 Extrapolation Table

LOCATION	NBPD DESIGNATION	WEEKDAY PM COUNTS	WEEKEND COUNTS	WEEKDAY EXTRAPOLATION	WEEKEND EXTRAPOLATION
US 50 & Al Tahoe	Path	170	206	1275	1138
US 50 & Lakeview Ave	Path	209	309	1568	1708
15th Street & Eloise Ave	Path	96	280	720	1547
SR 28 @ Carnelian Bay	Path	54	118	405	652
Fanny Bridge	Pedestrian District	126	327	945	2453
Lake Tahoe & Sawmill Road	Path	20	30	150	166
Pioneer Trail South of Stateline	Pedestrian District	233	161	1748	1208
US 50 & Santa Fe	Path	29	52	218	287
SR 28 btw Bear & Coon Street	Pedestrian District	149	316	1118	2370
SR 28 & Village Blvd	Pedestrian District	50	100	375	750
US 50 & Sierra Blvd	Path	64	61	480	337
US 50 & Warrior Way	Pedestrian District	31	71	233	533
Incline Blvd	Path	43	120	323	663
Rabe Meadows	Path	14	41	105	227
SR 89 & Fallen Leaf Trail	Path	11	85	83	470
West Shore Bike Path	Path	23	81	173	448

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