
Wine Country Interregional Partnership
Phase II



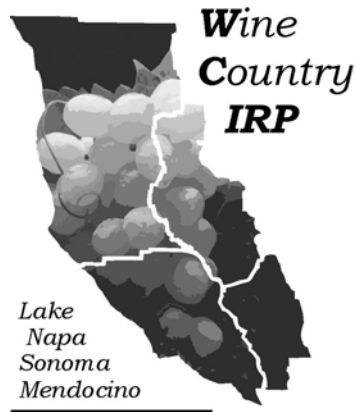
ORIGIN AND DESTINATION STUDY
Mendocino, Lake, Napa and Sonoma Counties

Final Study Report
December 29, 2006

Prepared by:
Mendocino Council of Governments
Nephele Barrett, Associate Planner



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INTRODUCTION

WINE COUNTRY INTERREGIONAL PARTNERSHIP

As the San Francisco Bay Area has expanded both physically and economically, it increasingly impacts traditionally rural areas. Bay Area population and employment growth has outpaced available housing, resulting in dramatic increases in housing prices in recent years. This has had a far reaching effect as younger and lower-end wage earners have moved to more rural areas in the quest for housing affordability. The result is a continually growing jobs/housing imbalance. Rural segments of all four Counties involved in the study area are experiencing housing cost increases and commuters are impacting local roads and highways that are not designed for elevated traffic flows.

The Wine Country Interregional Partnership (IRP) was formed between the wine country counties of Mendocino, Lake, Napa and Sonoma through a grant from the California Department of Housing and Community Development in FY 2001/02 as a vehicle for addressing these issues. The purpose of Phase I of the IRP was to study the jobs/housing imbalance in the four county area and resulted in the final report, "IRP Actions to Address Jobs-Housing Imbalance and Imbalance Impacts", (June 2004). Additional information on the Wine Country Interregional Partnership and the final report for Phase I can be found on MCOG's website at <http://www.mendocinocog.org/irp.shtml>.

STUDY OBJECTIVE/PURPOSE AND NEED

Origin and destination travel information is critical to clearly understand the magnitude of the transportation issues, assess the ability of the current transportation system to meet demands and identify projects and programs to address this demand. The primary purpose of this study was to determine travel characteristics, including trip purpose, frequency, starting and ending points, vehicle types and vehicle occupancy, on several key routes that carry inter-county traffic within the four-county Wine County Interregional Partnership area. Information derived from this study will be used in a future modeling effort which may result in the identification of projects to address the future transportation needs of the region, particularly those resulting from the observed imbalance between jobs and housing.

PROJECT HISTORY

Phase II of the Wine Country IRP was initiated in 2005 to conduct an origin and destination study among the four county region through a two year State Public Transportation Account grant. The Mendocino Council of Governments (MCOG) acted as the lead agency for the project in partnership with the other three wine country counties and Caltrans.

Prior to initiation of the study, a Study Advisory Committee was established to ensure proper representation of stakeholders. The committee was comprised of representatives from MCOG, Lake County/City Area Planning Council, Sonoma County Transportation Authority, Napa County Transportation Planning Agency, Metropolitan Transportation Commission and Caltrans Districts 1 and 4. The committee worked to define a scope of work for the project and identify the locations for the survey to take place. The following cordon locations were identified and are shown on the map in Exhibit 1.

- **Petrified Forest Road (between Napa and Sonoma).** This location on Petrified Forest Road in the Calistoga area was chosen because it is a major connector in the north between Napa and Sonoma provides a direct link to Santa Rosa. It also provides the most direct link from Lake to Sonoma via SR 29 and SR 128, thereby representing cross county travel.
- **State Route 20 (between Lake and Mendocino).** This location near the Lake County line in Mendocino County was chosen in order to catch traffic coming from Lake County into Mendocino County and beyond for employment and other services. This also represents a primary connector between US 101 and Interstate 5.
- **State Route 29 (between Lake and Napa).** This location, in Napa County near Tubbs Lane was chosen in order to capture commuters traveling from Lake County as well as those traveling into Sonoma County. This represents the primary link between Lake County and Napa and Sonoma Counties.
- **State Route 121 (between Napa and Sonoma).** This location, in Sonoma County west of State Route 12, was chosen in order to capture much of the traffic between Napa and Sonoma. This location is between local by-passes of the State Highways on both the Napa and Sonoma (Old Sonoma Road and Napa Road, respectively) sides and thus catches the between-county traffic. Tourists, commuters, commerce all use the route and it is one of the two State highway connectors between Interstate 80 and US 101.
- **US 101 (between Mendocino and Sonoma).** This location, just north of Hopland, was chosen because it represents the primary route connecting Mendocino and Sonoma County which serves commuters traveling within Mendocino County as well as those traveling into Sonoma County and beyond.

The primary tasks included in the project were to obtain traffic counts and classifications at each location and traveler/trip information for each location. A Request for Proposals was developed and distributed by MCOG in April of 2005.

The engineering and planning firm of T.Y. Lin International was selected to complete the project. Unfortunately, setbacks were experienced shortly after initiation of the project when the consultant learned that the original method for distributing surveys—a voluntary roadside survey—would not be permitted by Caltrans due to safety concerns. The scope of work was revised to allow for a license plate survey, the data from which would then be matched to DMV address data for the registered owners. The project experienced continued setbacks including consultant staff turnover and time delays associated with obtaining address data. Eventually, a draft report was produced by T.Y. Lin based on preliminary data collection which is attached to this report as Appendix D. Subsequently, the contract with the consultant was suspended. MCOG staff, in conjunction with the Study Advisory Committee, then proceeded to utilize the raw data collected by T.Y. Lin to proceed with the project.

Exhibit 1 Project Location Map



DATA COLLECTION

Traffic Counts

Traffic count data was obtained through the consultant provided services. Traffic counts over a 24-hour period were taken at each cordon location¹ in both directions. These traffic counts were classified by vehicle type and separated for each hour within the period. Traffic count data was collected during the month of September, capturing summer recreational traffic as well as typical traffic. Complete traffic count data can be found in Appendix A of this report along with a summary table of the data highlights.

License Plate Data/Address Matching

License plate data was also collected by hand through the same subconsultant. The method used for this data collection utilized two individuals for each direction at each location, one to read the license plate

¹ Unfortunately, data collected for the State Route 121 location was collected at the wrong location. Data was supposed to be collected just east of the intersection of SR 121 and Napa Road (where approximately 1/3 of the traffic turns off of SR 121). However, the subconsultant that collected the data did so just west of the intersection. The location of the data collection will greatly impact the results of the trip purpose data collected.

and the second to record the information. The license plate data was categorized by location, timeframe and direction. The data was then entered into an Excel file and submitted to Caltrans. Caltrans personnel then utilized the data to request registered owner addresses from the Department of Motor Vehicles.

TRAVELER SURVEY IMPLEMENTATION

Following the transition from consultant provided services, to in-house services, a traveler survey was designed by members of the Study Advisory Group (SAG). The survey asked travelers for trip purpose, frequency, vehicle type, starting and ending points, and vehicle occupancy information. Over 9,000 of these surveys were distributed. A copy of the surveys can be found in Appendix C.

To determine the effectiveness of the surveys, a sample batch was sent out in June 2006 for the US 101 location. A total of 200 surveys were sent out. When return rates for the initial sample came in at approximately 20%, it was determined to proceed with a complete survey mailing for all locations.

In September and October of 2006, through a joint effort of MCOG and the other SAG members, traveler surveys were distributed to all registered owner addresses collected through the previous license plate survey. Included with the survey was a return envelope posted with a first class stamp. Although the stamp added to the overall cost of the survey, the members of the SAG felt that the stamp would increase the likelihood of the recipients returning the completed surveys. Recipients were given approximately 15 days to complete and return the surveys, although some surveys were received after the due dates as well. Rates of return for each location varied from 10.5% to 19.2%. Out of the 9,794 surveys distributed, a total of 1,595 were returned (not including those returned for improper addresses). The following is a summary of the rate of return for surveys distributed for each location.

Location	Number Surveys Mailed	Number Unusable Returns*	Number Usable Surveys Returned	Percent Usable Return
US 101	1895	101	363	19.2%
SR 20	2103	189	344	16.4%
SR 121	2175	142	228	10.5%
SR 29	1249	124	208	16.7%
Petrified Forest Road	2372	385	452	19%

* Unusable returns include surveys returned for incorrect addresses and surveys returned blank.

Traveler information included in each returned survey was entered into an Access database and categorized by cordon location. Detailed results can be found in Appendix C and are further discussed in the “Traveler Characteristics” section of this report.

Many of the surveys returned included multiple answers for trip purpose, vehicle occupancy, vehicle type, and trip frequency. Because the multiple answers were typically not weighted in any way, multiple database fields were created for these categories, and all answers were entered for analysis of the surveys. For this reason, when calculating the percentages shown in the pie charts in the Traveler Characteristics section of the report, total percentages are based on total number of answers given for each category, rather than total surveys returned.

It should also be noted that when the data from the returned surveys was entered into the database, entries for counties of origin and counties of destination were selected from a drop down list made up of the 20 most frequent answers. All other answers were entered as “other.” Therefore, when viewing the

pie charts in the Traveler Characteristics section of this report, the “other” categories, which in most cases is fairly small, are made up of a number of different counties that appeared randomly and infrequently in the survey results.

TRAVELER CHARACTERISTICS

Because of the geographic separation of the different cordon locations and the differing traveler characteristics, information for each location is discussed and displayed separately. In addition, results of each type of data collection—vehicle registration address/license plate data, 24-hour traffic counts, and traveler surveys—are presented separately. By examining information for each location, one can derive information about the trips made from one county to another within the Wine Country region.

PETRIFIED FOREST ROAD - BETWEEN NAPA & SONOMA COUNTIES

Traffic Count Data

Data for this cordon location was collected at Post Mile 1.6 in Napa County, on the local road, west of the intersection with State Route 128. Complete traffic count data can be found in Appendix A. Some of the more significant pieces of data are summarized below.

Westbound

- The total traffic volume in the westbound direction over the 24 hour period was 6,241.
- Highest rates of travel are between 3:00 and 6:00 p.m. and 6:00 to 8:00 a.m.
- The highest total volume for a single hour occurred between 4:00 and 5:00 p.m. (527).
- The majority of vehicles, 64.4%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double-axle long at 25.1%.
- Only 0.6% of vehicles were buses/RVs².
- Only 3 motorcycles traveled past the cordon location in the westbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 7:00 and 8:00 a.m. (359).
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 4:00 and 5:00 p.m.

Eastbound

- The total traffic volume in the eastbound direction over the 24 hour period was 6,203.
- Highest rates of travel are between 3:00 and 6:00 p.m. and 7:00 to 9:00 a.m.
- The highest total volume for a single hour occurred between 5:00 and 6:00 p.m. (601)
- The majority of vehicles, 66.7%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double-axle long at 22.3%.
- Only 0.4% of vehicles were buses/RVs.

² Although these vehicles were classified in the machine count as buses, large recreational vehicles (RVs) and motorhomes will also register as buses. Based on the number of vehicles classified as such, and knowing the frequency or availability of regular transit service at the survey locations, it is safe to assume that some, if not many, of these would in fact be RVs.

- A total of 44 motorcycles³ traveled past the cordon location in the eastbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m.
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 4:00 and 5:00 p.m.

License Plate/Vehicle Registration Address Data

In this section the data collected by matching recorded license plate numbers with DMV registration data is used. Based on the addresses of vehicle registration, we can derive data trip origin, particularly for analyzing intra-county commutes.

Overall Observations:

- 33.17% of all vehicles recorded at this location during the 24 hour period were registered in Sonoma County.
- 25.86% of all vehicles recorded were registered in Napa County.
- 20.17% of all vehicles recorded were registered in Lake County.
- 3.66% of all vehicles recorded were registered in Los Angeles County.

A.M.

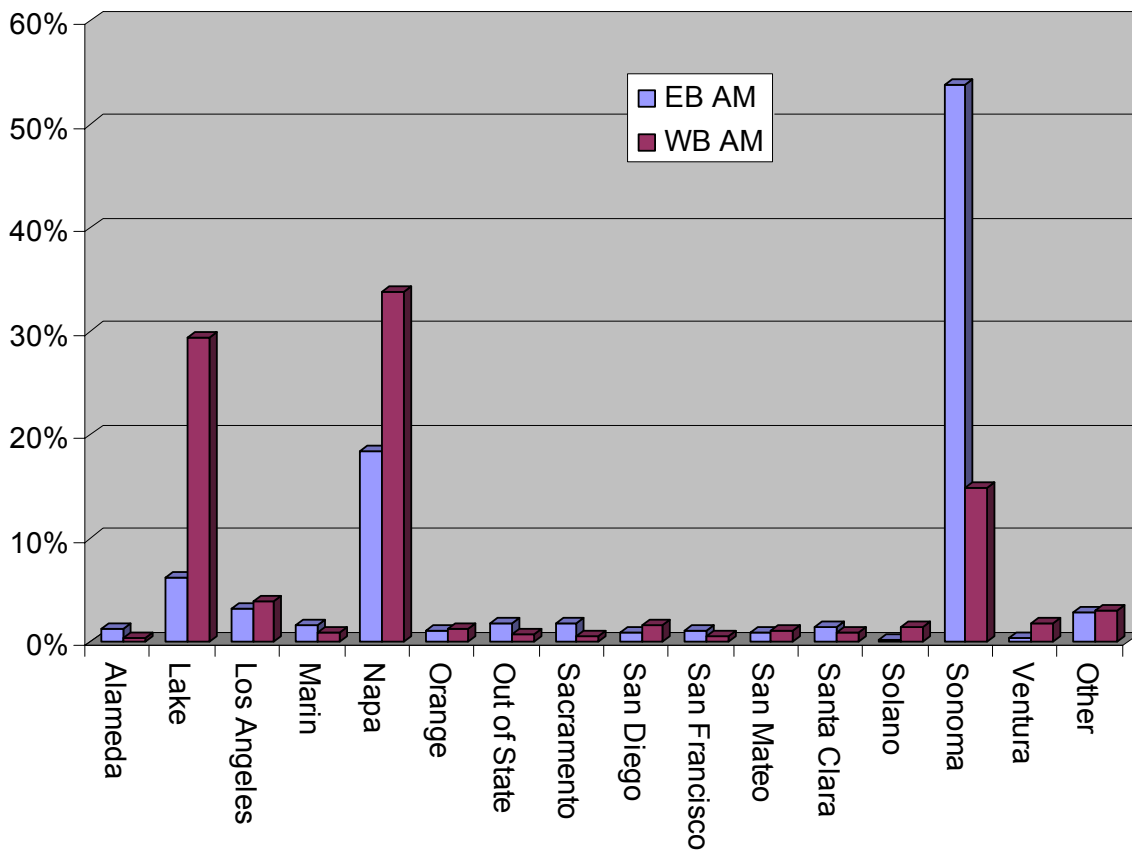
The four largest groups of travelers in the a.m. time frame are as follows:

- Vehicles registered in Sonoma County traveling eastbound (53.81% of eastbound a.m. traffic)
- Vehicles registered in Napa County traveling westbound (33.81% of westbound a.m. traffic)
- Vehicles registered in Lake County traveling westbound (29.33% of westbound a.m. traffic)
- Vehicles registered in Napa County traveling eastbound (18.42% of eastbound a.m. traffic)

Exhibit 2 displays the counties of registration for both eastbound and westbound a.m. traffic at the survey location.

³ The imbalance of motorcycles may be due to pleasure riders riding a loop either on SR 12 to Trinity or US 101 to SR 128.

**Exhibit 2
Petrified Forest Road
Counties of Registration – AM Traffic**



Note: "Other" category contains all counties with less than 1% in both directions.

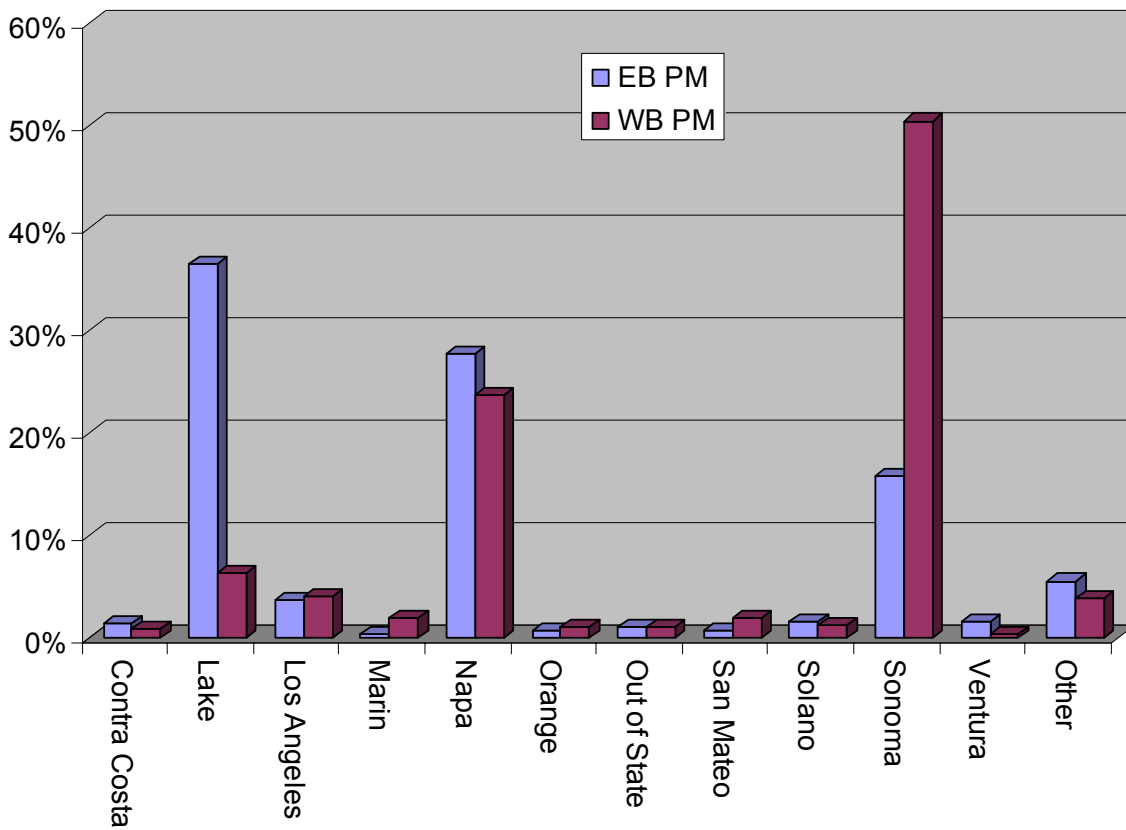
P.M.

The four largest groups of travelers in the p.m. timeframe are:

- Vehicles registered in Sonoma County traveling westbound (50.39% of westbound p.m. traffic)
- Vehicles registered in Lake County traveling eastbound (36.42% of eastbound p.m. traffic)
- Vehicles registered in Napa County traveling eastbound (27.75% of eastbound p.m. traffic)
- Vehicles registered in Napa County traveling westbound (23.74% of westbound p.m. traffic)

Exhibit 3 displays the counties of registration for both eastbound and westbound p.m. traffic at the survey location.

Exhibit 3 Petrified Forest Road Counties of Registration – PM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

Traveler Surveys

A total of 445 useable surveys were returned for the Petrified Forest Road survey location. The following is a summary of the results. Multiple answers were given for many of the survey questions, such as Trip Purpose or Vehicle Occupants. Because of this, total entries have been counted rather than numbers of surveys.

Exhibit 4
Petrified Forest Road – Trip Purpose

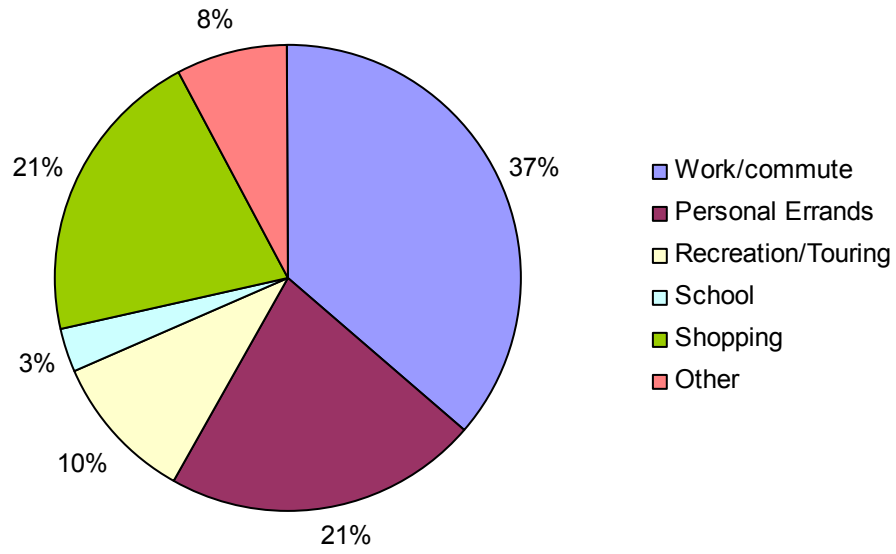


Exhibit 5
Petrified Forest Road – Trip Frequency

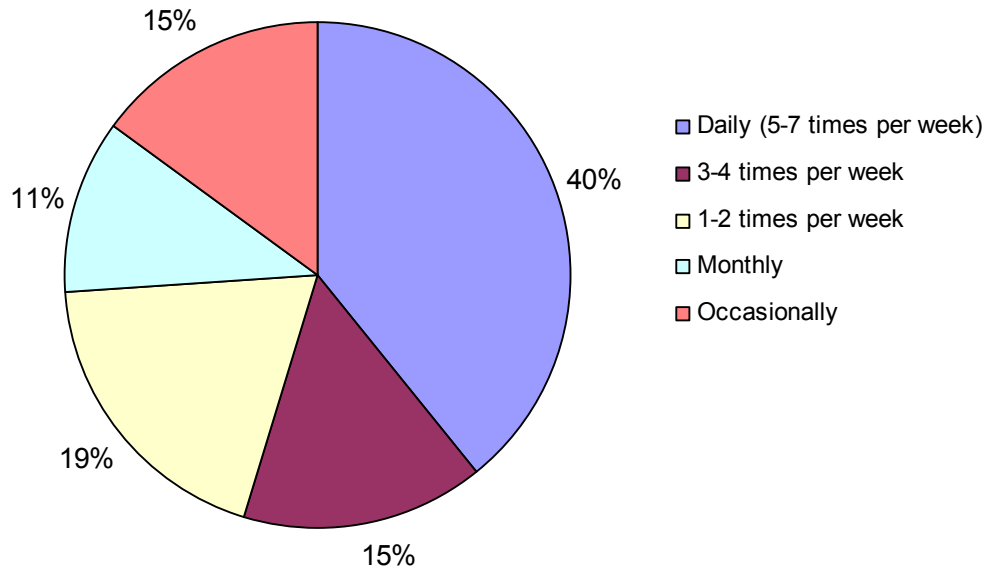


Exhibit 6
Petrified Forest Road – Vehicle Occupancy

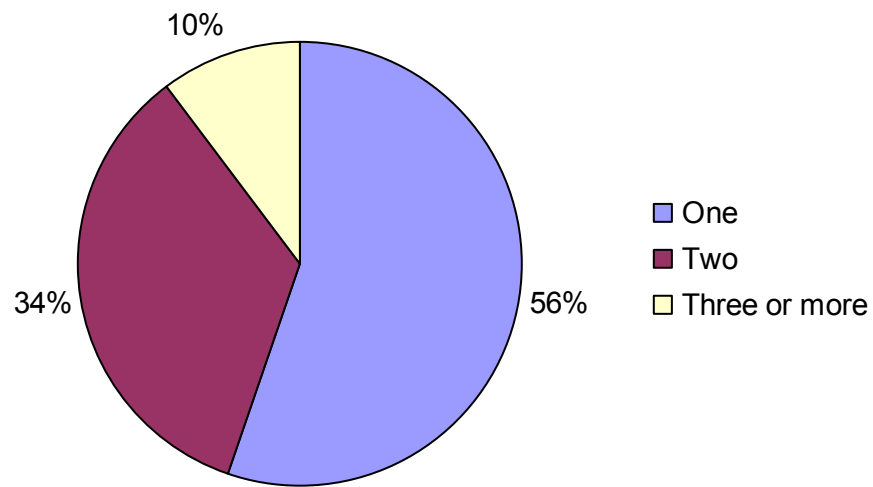


Exhibit 7
Petrified Forest Road – Vehicle Type

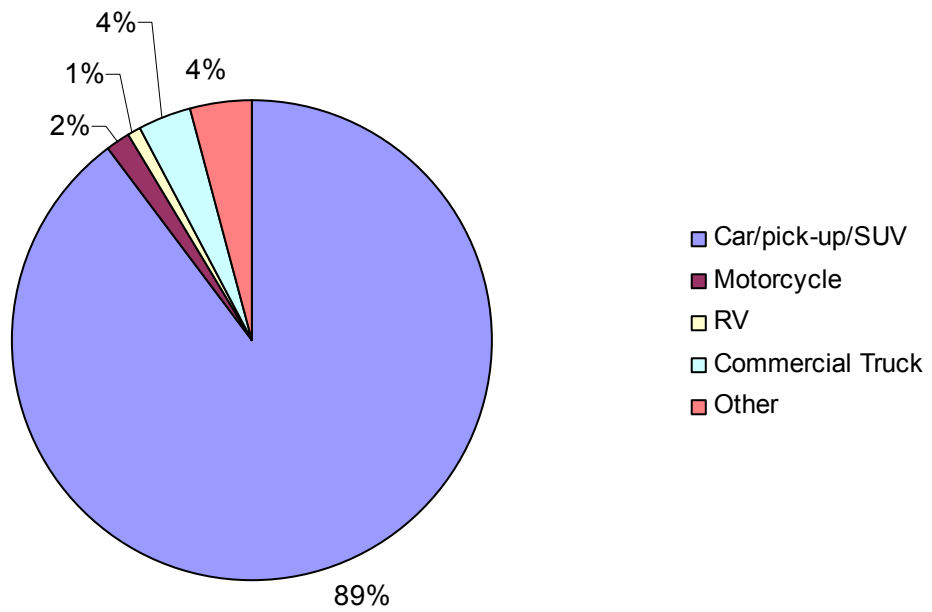


Exhibit 8
Petrified Forest Road – Trip Origin by County

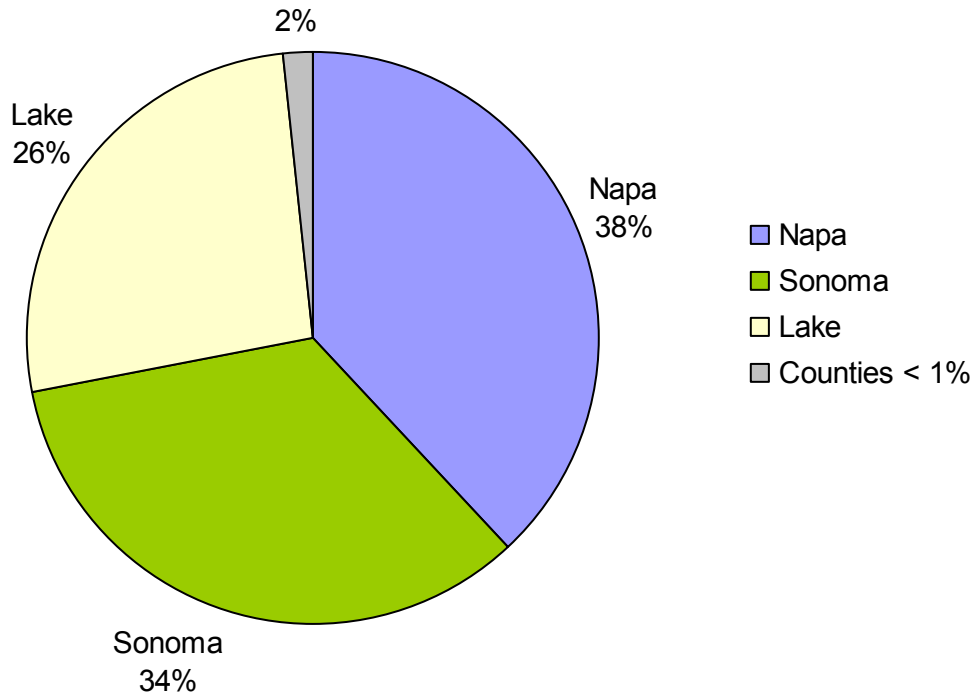


Exhibit 9
Petrified Forest Road – Trip Destination by County

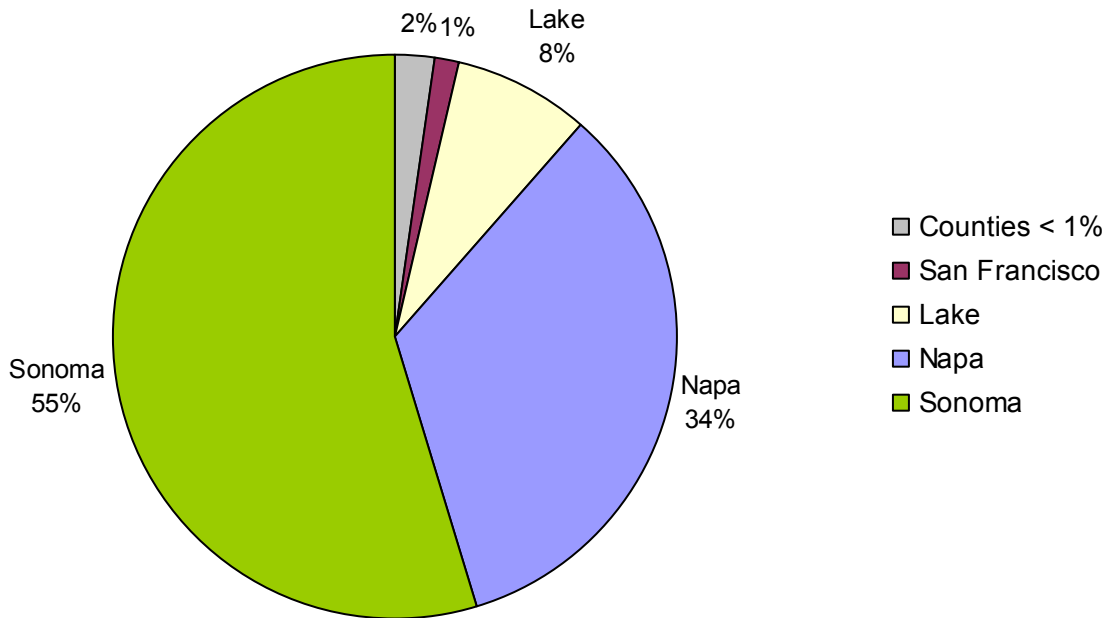


Exhibit 10
Petrified Forest Road - Origin & Destination Comparison
Destinations for Trips Originating in Napa County

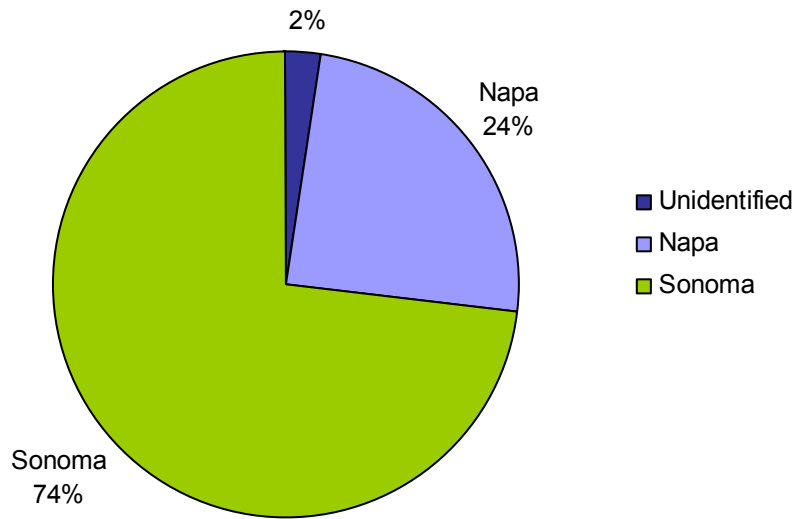


Exhibit 11
Petrified Forest Road - Origin & Destination Comparison
Trips Originating in Sonoma County

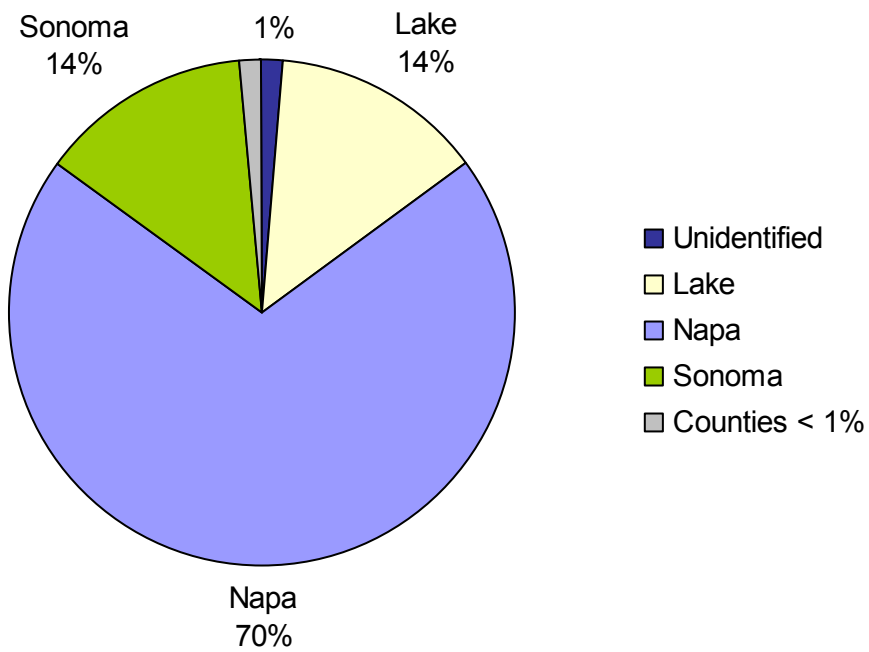
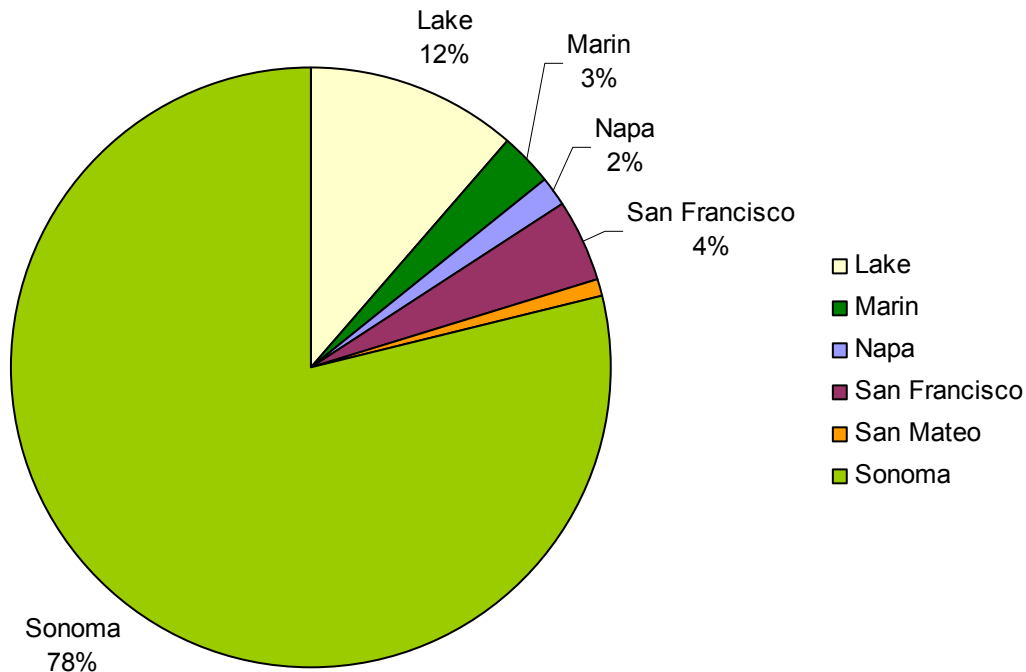


Exhibit 12
Petrified Forest Road - Origin & Destination Comparison
Trips Originating in Lake County



STATE ROUTE 20 – BETWEEN LAKE & MENDOCINO

Traffic Count Data

Data for this cordon location was collected at Post Mile 40.32 in Mendocino County, east of the Potter Valley Road exit. Complete traffic count data can be found in Appendix A. Some of the more significant pieces of data are summarized below.

Westbound

- The total traffic volume in the westbound direction over the 24 hour period was 4,641.
- Highest rates of travel are between 3:00 and 6:00 p.m. and 7:00 and 11:00 a.m.
- The highest total volume for a single hour occurred between 3:00 and 4:00 p.m. (381).
- The majority of vehicles, 58%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double-axle long at 23.2%.
- Only 1.5% of vehicles were buses/RVs.
- A total of 38 motorcycles passed the location in the westbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 7:00 and 8:00 a.m.
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 4:00 and 5:00 p.m.

Eastbound

- The total traffic volume in the eastbound direction over the 24 hour period was 4,004
- Highest rates of travel are between 4:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 5:00 and 6:00 p.m. (428).
- The majority of vehicles, 57.5%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double-axle long at 22.1%.
- Only 1.5% of vehicles were buses/RVs.
- A total of 31 motorcycles passed the location in the eastbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m.
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 5:00 and 6:00 p.m.

License Plate/Vehicle Registration Address Data

In this section the data collected by matching recorded license plate numbers with DMV registration data is used. Based on the addresses of vehicle registration, we can derive data trip origin, particularly for analyzing intra-county commutes.

Overall Observations:

- 49.04 percent of all vehicles recorded at this location during the 24 hour period were registered in Lake County.
- 10.78% of all vehicles registered in Mendocino County.
- 5.61% of all vehicles registered in Los Angeles County.
- 4.45% of all vehicles registered in Sacramento County.

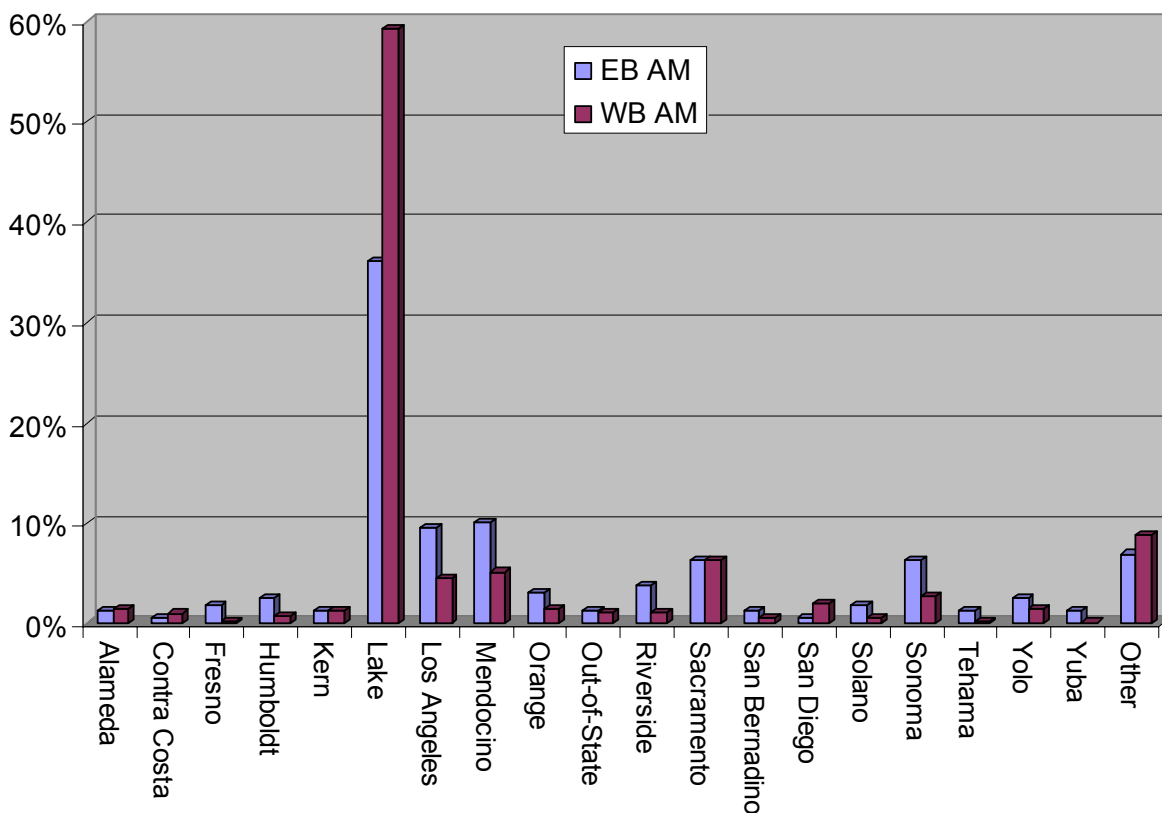
A.M.

The five largest groups of travelers in the a.m. time frame are as follows:

- Vehicles registered in Lake County traveling westbound (59.25% of westbound a.m. traffic)
- Vehicles registered in Lake County traveling in the eastbound direction (36.08% of eastbound a.m. traffic)
- Vehicles registered in Mendocino County traveling in the eastbound direction (10.13% of eastbound a.m. traffic)
- Vehicles registered in Sacramento County traveling in the eastbound direction (6.33% of eastbound a.m. traffic)
- Vehicles registered in Sacramento County traveling in the westbound direction (6.33% of westbound a.m. traffic)

Exhibit 13 displays the counties of registration for both eastbound and westbound a.m. traffic at the survey location.

Exhibit 13 State Route 20 Counties of Registration – AM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

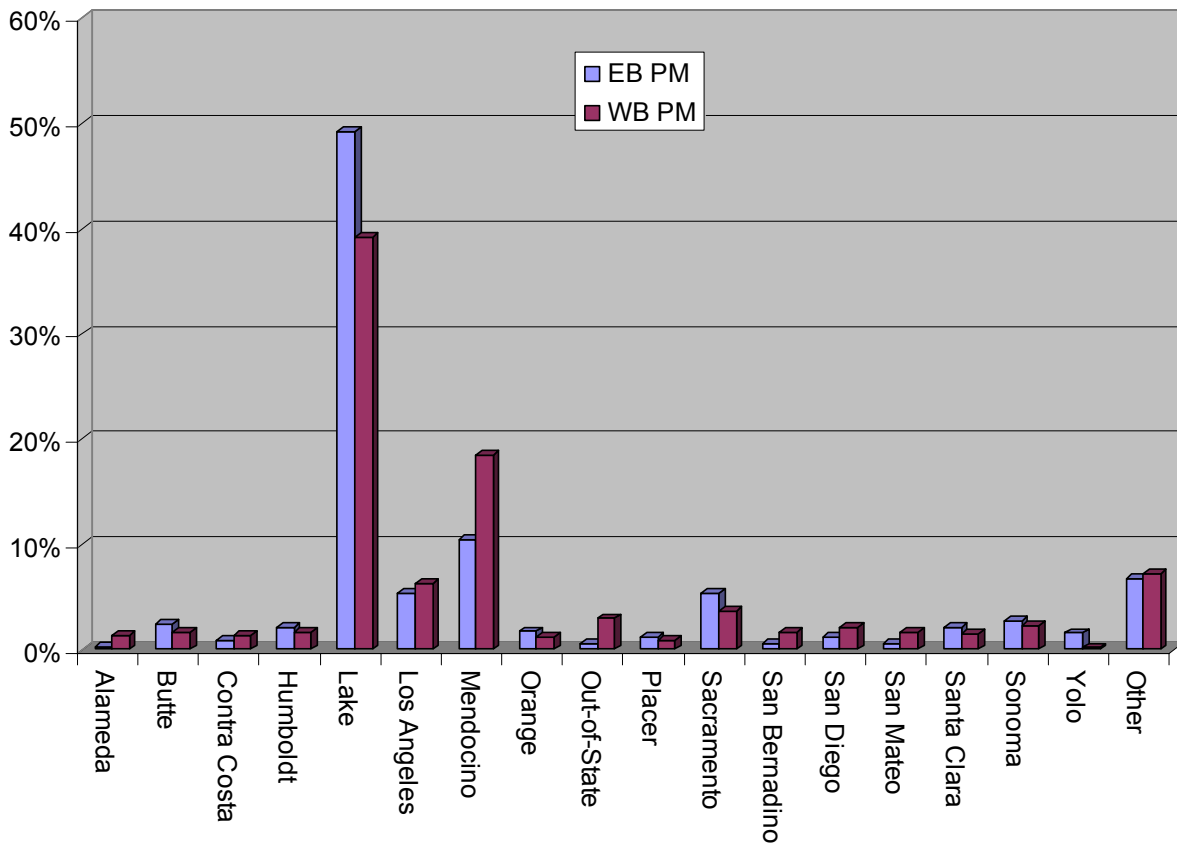
P.M.

The largest groups of travelers in the p.m. timeframe are:

- Vehicles registered in Lake County traveling in the eastbound direction (49.22% of all eastbound p.m. traffic)
- Vehicles registered in Lake County traveling in the westbound direction (39.21% of all westbound p.m. traffic)
- Vehicles registered in Mendocino County traveling in the westbound direction (18.45% of all westbound p.m. traffic)
- Vehicles registered in Mendocino County traveling in the eastbound direction (10.47% of all eastbound p.m. traffic)

Exhibit 14 displays the counties of registration for all p.m. vehicles recorded at this location.

Exhibit 14
State Route 20
Counties of Registration – PM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

Traveler Surveys

A total of 340 useable surveys were returned for the SR 20 survey location. The following is a summary of the results. Multiple answers were given for many of the survey questions, such as Trip Purpose or Vehicle Occupants. Because of this, total entries have been counted rather than numbers of surveys.

Exhibit 15
SR 20 – Trip Purpose

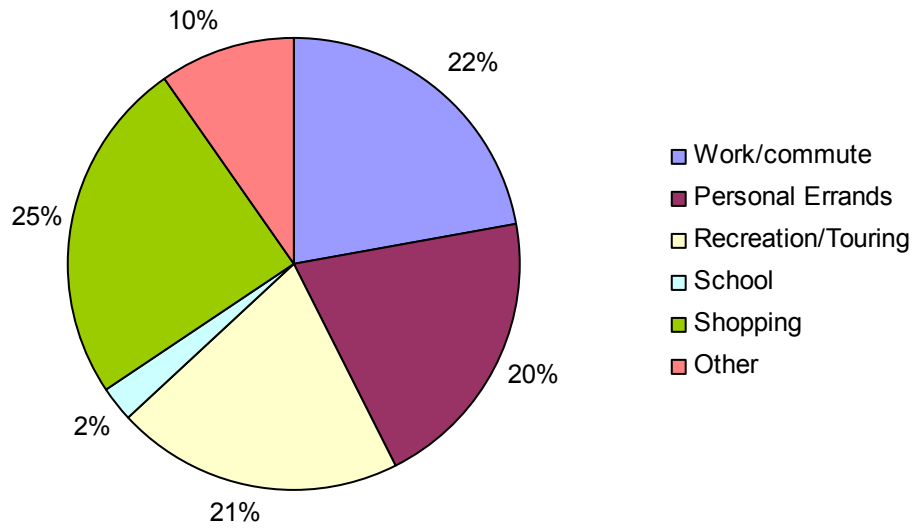


Exhibit 16
SR 20 – Trip Frequency

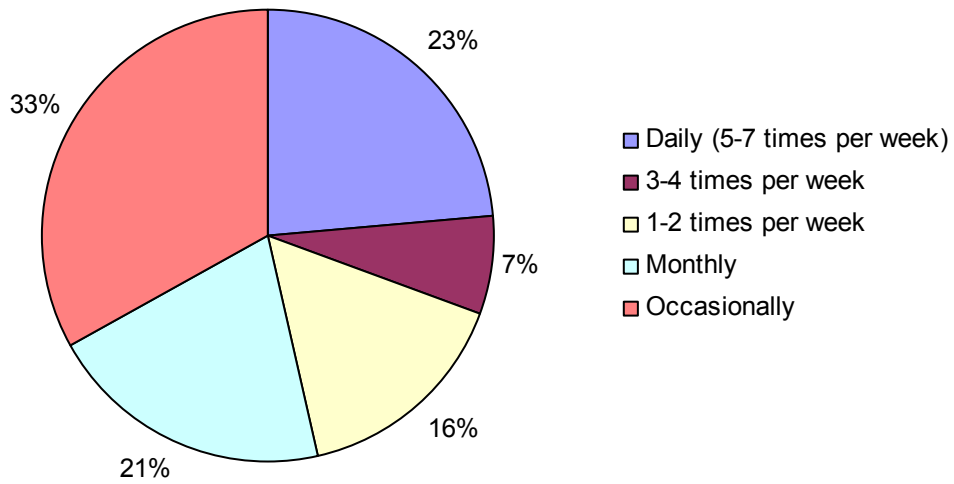


Exhibit 17
SR 20 - Vehicle Occupancy

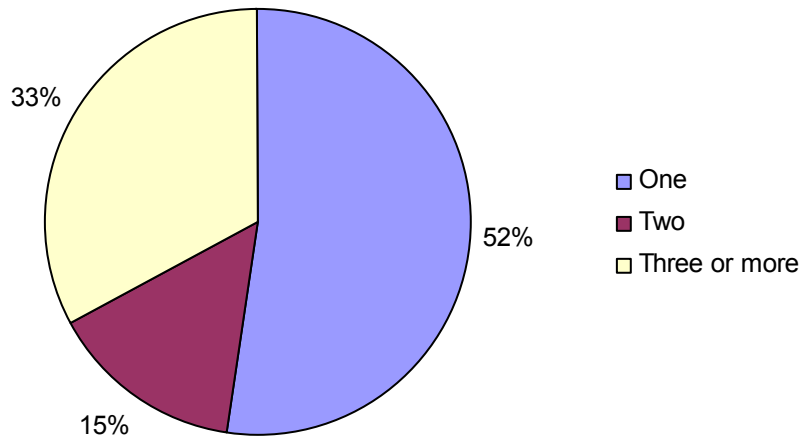


Exhibit 18
SR 20 - Vehicle Type

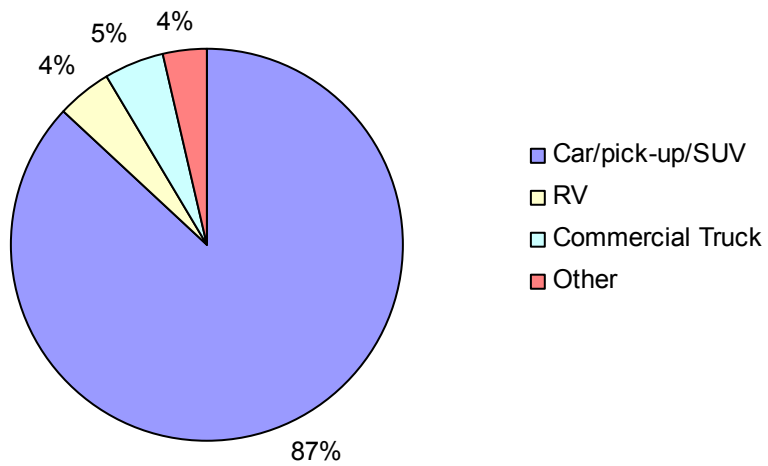


Exhibit 19
SR 20 – Trip Origin by County

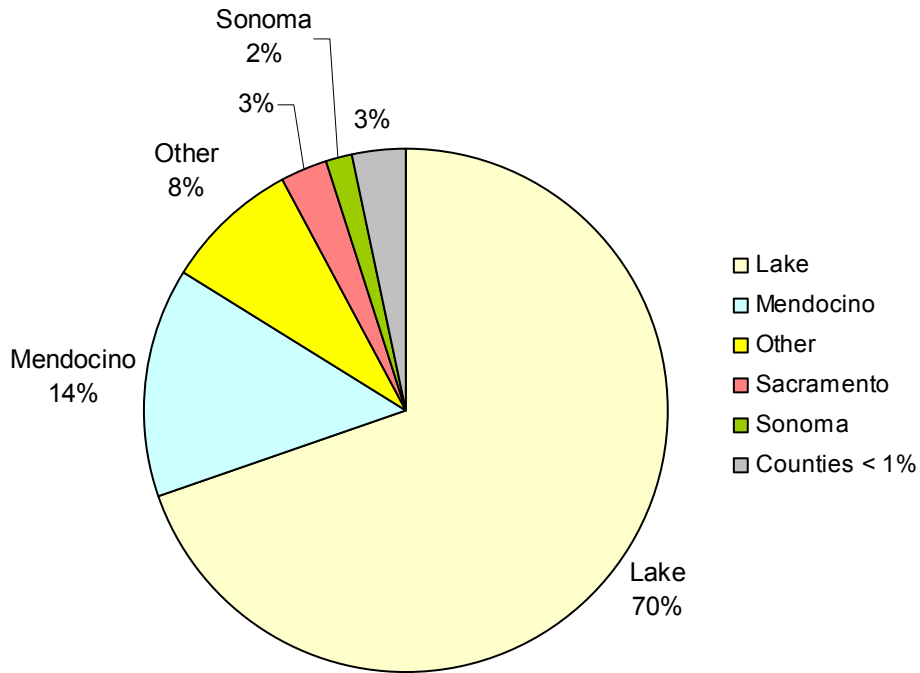


Exhibit 20
SR 20 – Trip Destination by County

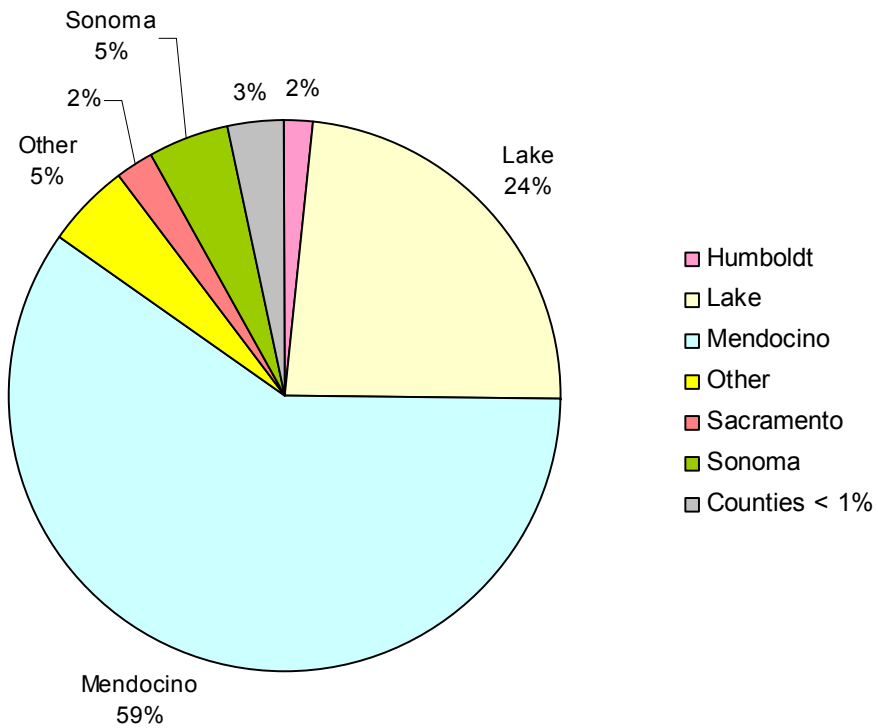


Exhibit 21
SR 20 – Origin & Destination Comparison
Destinations of Trips Originating in Lake County

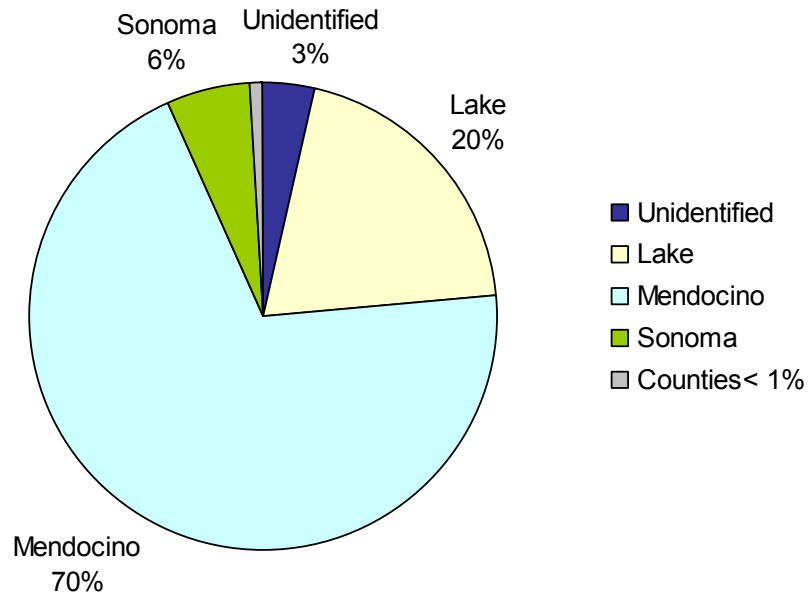
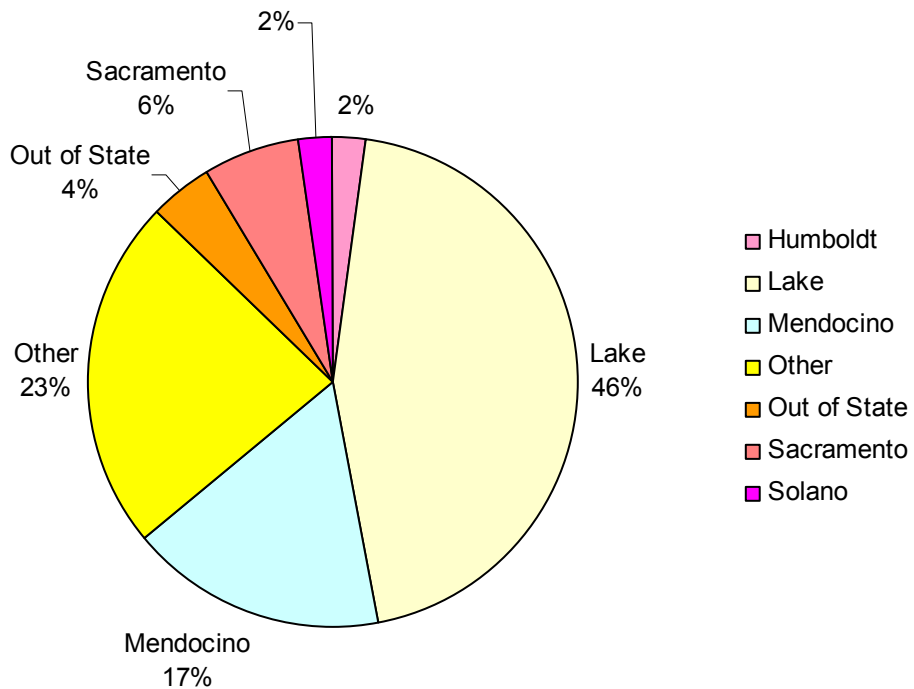


Exhibit 22
SR 20 – Origin & Destination Comparison
Destinations of Trips Originating in Mendocino County



Note: "Other" category is made up of a number of different counties that appeared randomly and infrequently in the survey results, however, in this case, as a whole represent a large proportion of the data set being analyzed.

STATE ROUTE 29 – BETWEEN LAKE & NAPA

Traffic Count Data

Data for this cordon location was collected at Post Mile 39.8 in Napa County, north of Tubbs Lane. Complete traffic count data can be found in Appendix A. Some of the more significant pieces of data are summarized below.

Southbound

- The total traffic volume in the southbound direction over the 24 hour period was 4,331.
- Highest rates of travel are between 6:00 and 9:00 a.m.
- The highest total volume for a single hour occurred between 6:00 and 7:00 a.m. (571).
- The majority of vehicles, 66.5%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 22%.
- A total of 17 buses/RVs passed the cordon location in the southbound direction during the 24 hour period.
- A total of 39 motorcycles passed the cordon location in the southbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 6:00 and 7:00 a.m.
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 6:00 and 7:00 a.m.

Northbound

- The total traffic volume in the northbound direction over the 24 hour period was 4,190.
- Highest rates of travel are between 4:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 5:00 and 6:00 p.m. (594).
- The majority of vehicles, 65.5%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 24%.
- A total of 20 buses/RVs passed the cordon location in the northbound direction during the 24 hour period.
- A total of 40 motorcycles passed the cordon location in the northbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m.
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 4:00 and 5:00 p.m.

License Plate/Vehicle Registration Address Data

In this section the data collected by matching recorded license plate numbers with DMV registration data is used. Based on the addresses of vehicle registration, we can derive data trip origin, particularly for analyzing intra-county commutes.

Overall Observations:

- 30.77 percent of all vehicles recorded at this location during the 24 hour period were registered in Lake County.
- 30.48 of all vehicles recorded registered in Napa County.
- 7.16 percent of all vehicles recorded registered in Sonoma County.
- 5.09% of all vehicles recorded registered in Los Angeles County.

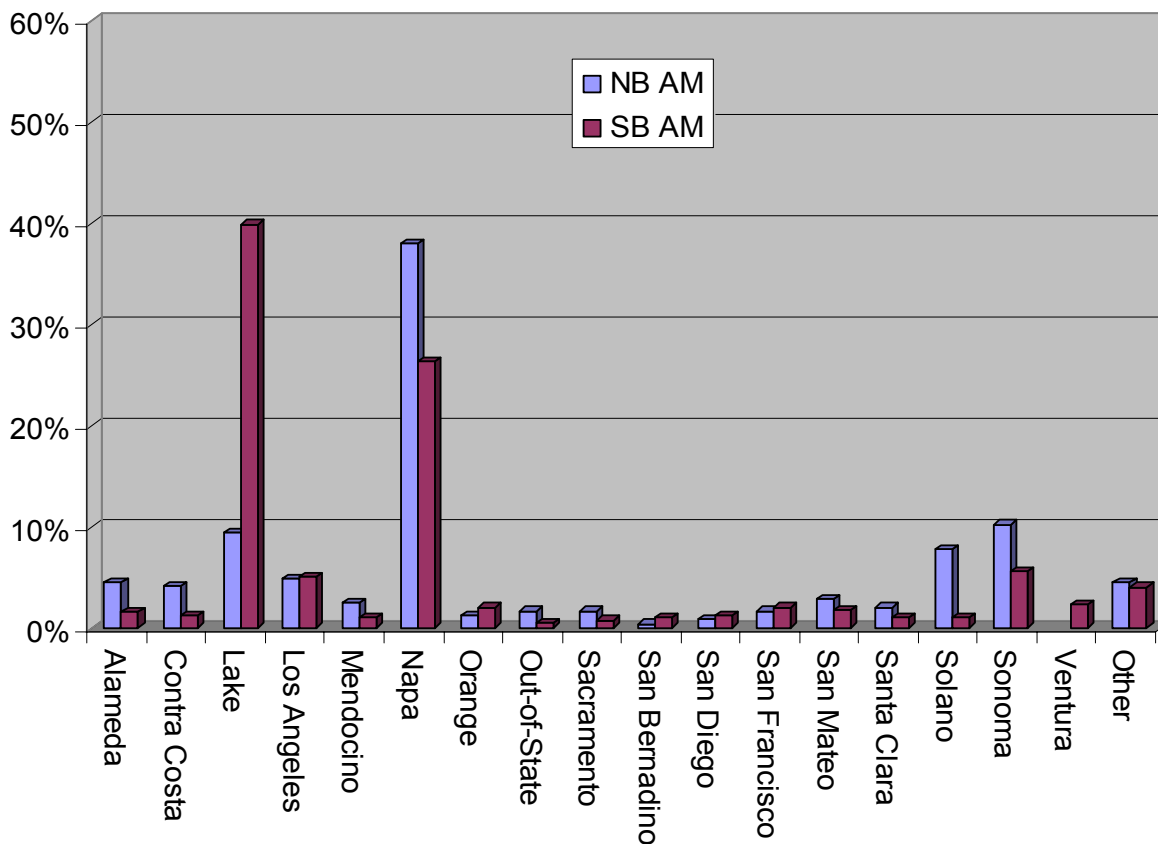
AM

The four largest groups of travelers in the a.m. time frame are as follows:

- Vehicles registered in Lake County traveling southbound (39.95% of southbound a.m. traffic)
- Vehicles registered in Napa County traveling northbound (37.96% of northbound a.m. traffic)
- Vehicles registered in Napa County traveling southbound (26.38% of southbound a.m. traffic)
- Vehicles registered in Sonoma County traveling northbound (10.2% of northbound a.m. traffic)

Exhibit 23 displays the counties of registration for both northbound and southbound a.m. traffic at the survey location.

**Exhibit 23
State Route 29
Counties of Registration – AM Traffic**



Note: "Other" category contains all counties with less than 1% in both directions.

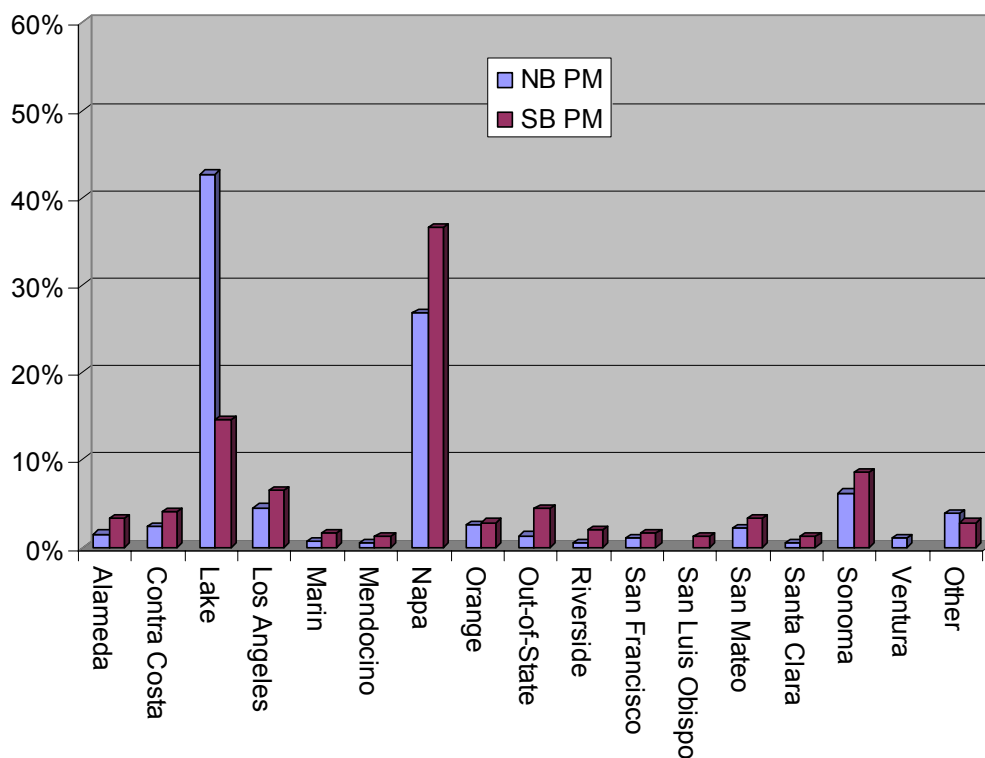
P.M.

The four largest groups of travelers in the p.m. time frame are as follows:

- Vehicles registered in Lake County traveling northbound (42.7% of northbound p.m. traffic)
- Vehicles registered in Napa County traveling southbound (36.59% of southbound p.m. traffic)
- Vehicles registered in Napa County traveling northbound (26.82% of northbound p.m. traffic)
- Vehicles registered in Lake County traveling southbound (14.63% of southbound p.m. traffic)

Exhibit 24 displays the counties of registration for both northbound and southbound p.m. traffic at the survey location.

Exhibit 24
State Route 29
Counties of Registration – PM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

Traveler Surveys

A total of 207 usable surveys were returned for the State Route 29 survey location. The following is a summary of the results. Multiple answers were given for many of the survey questions, such as Trip Purpose or Vehicle Occupants. Because of this, total entries have been counted rather than numbers of surveys.

Exhibit 25
SR 29 – Trip Purpose

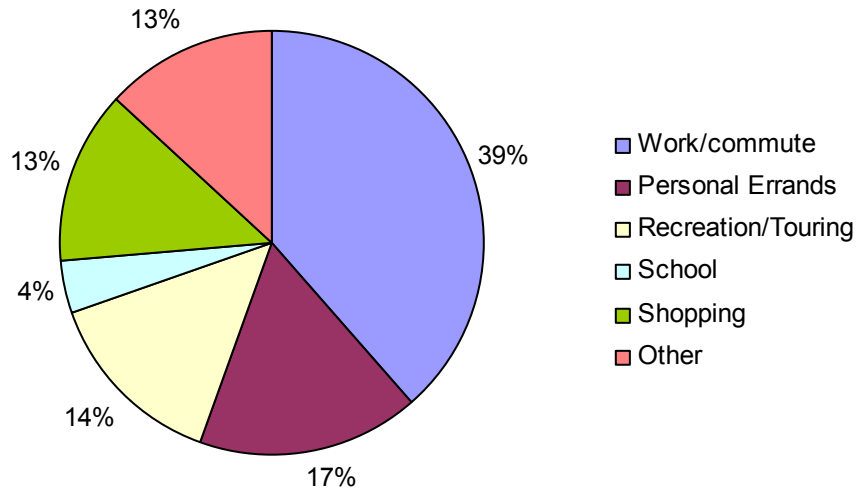


Exhibit 26
SR 29 – Trip Frequency

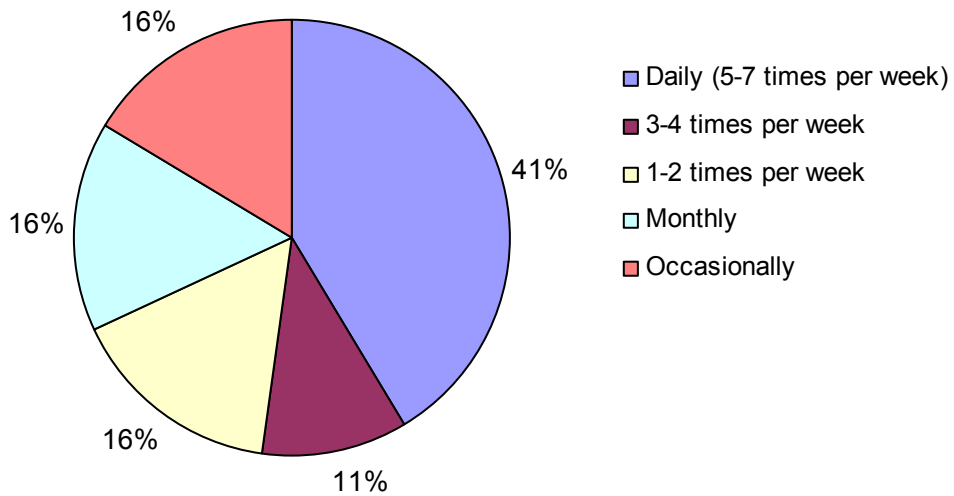


Exhibit 27
SR 29 – Vehicle Occupancy

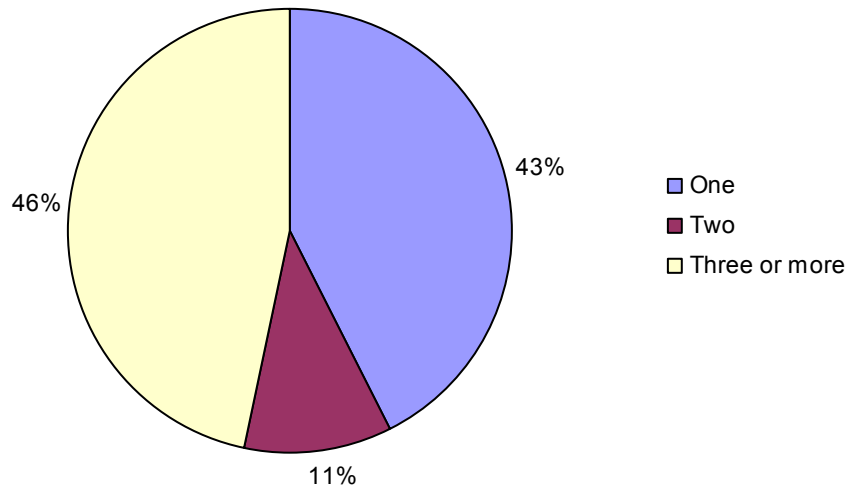


Exhibit 28
SR 29 – Vehicle Type

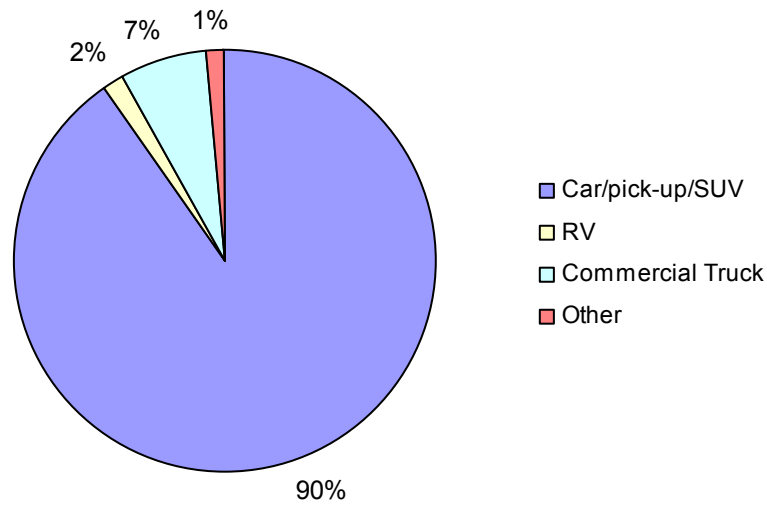


Exhibit 29
SR 29 – Trip Origin by County

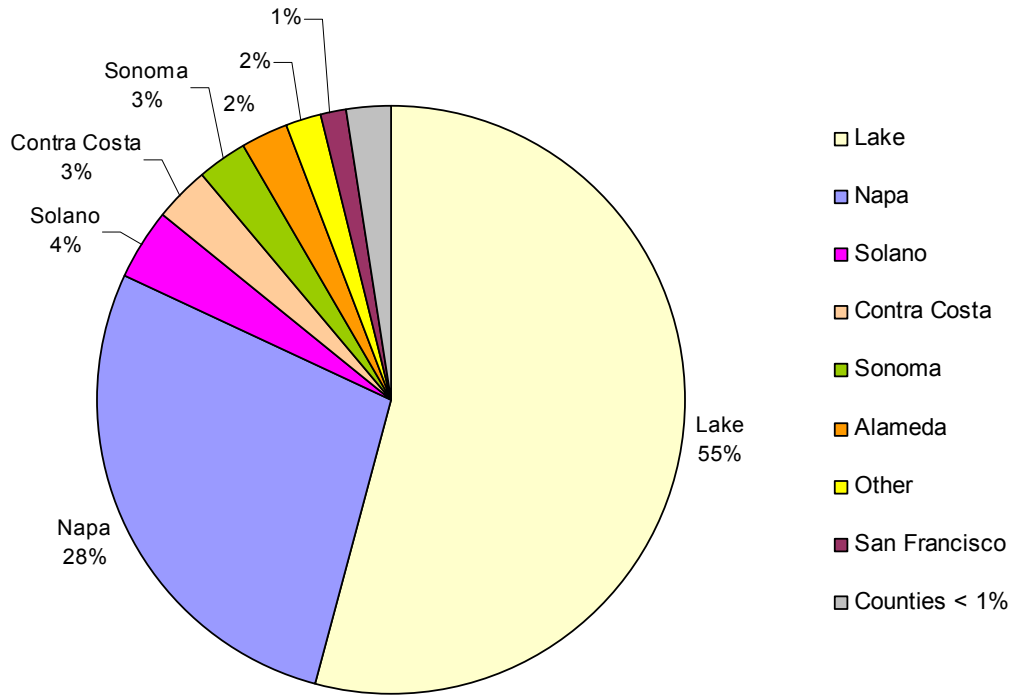


Exhibit 30
SR 29 – Trip Destination by County

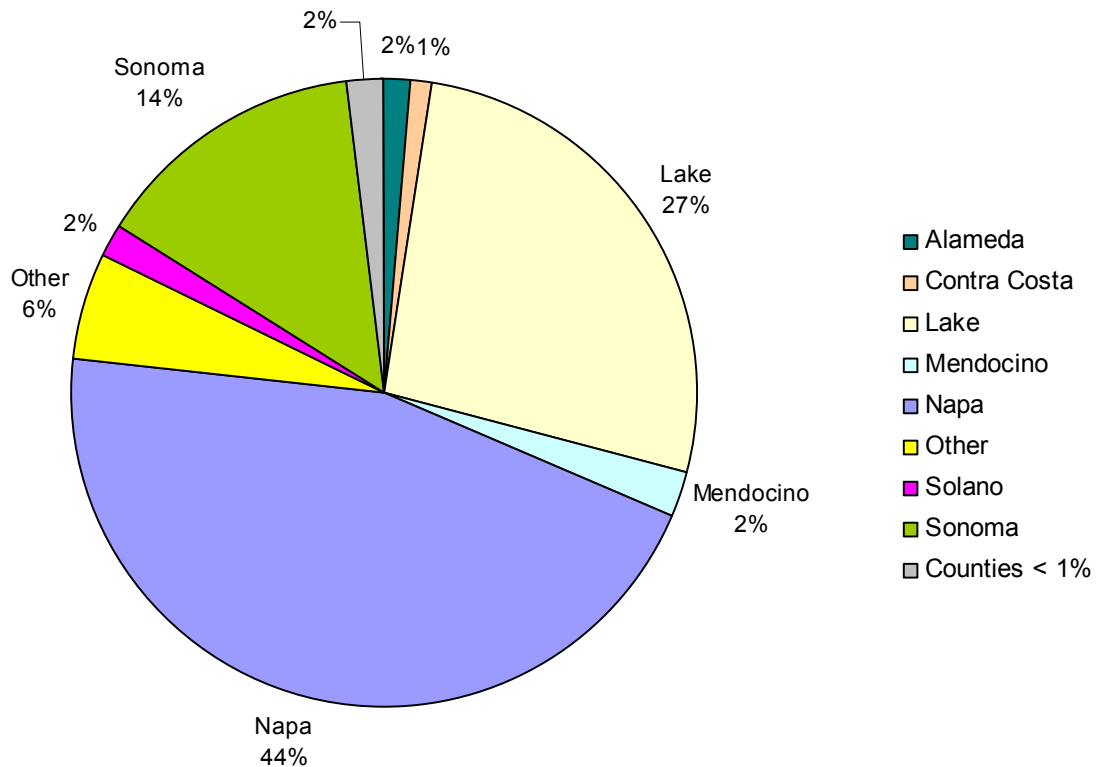


Exhibit 31
SR 29 – Origin & Destination Comparison
Destinations for Trips Originating in Lake County

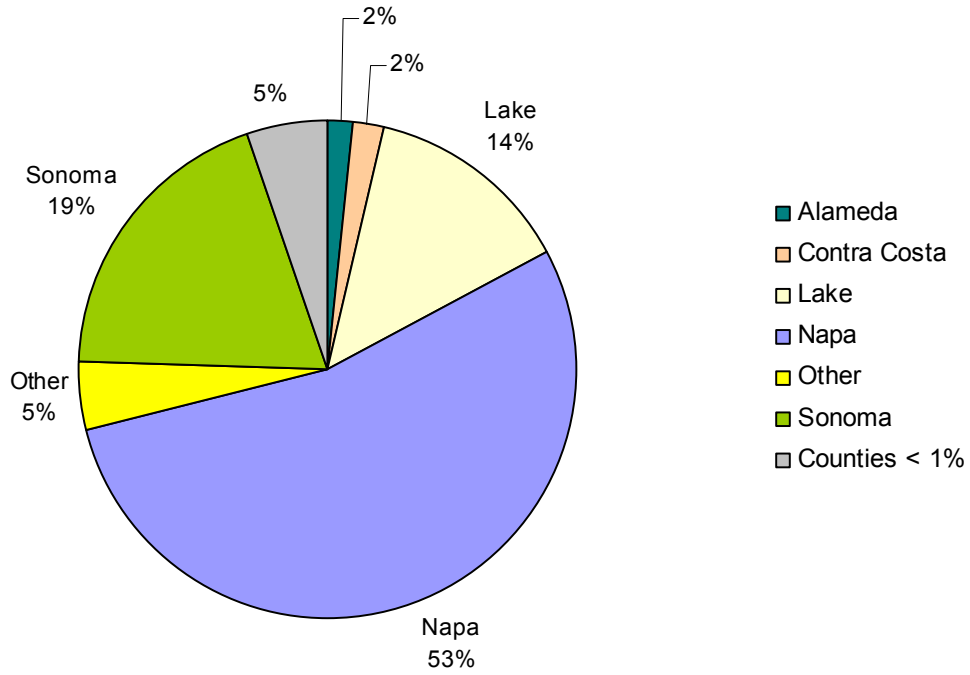
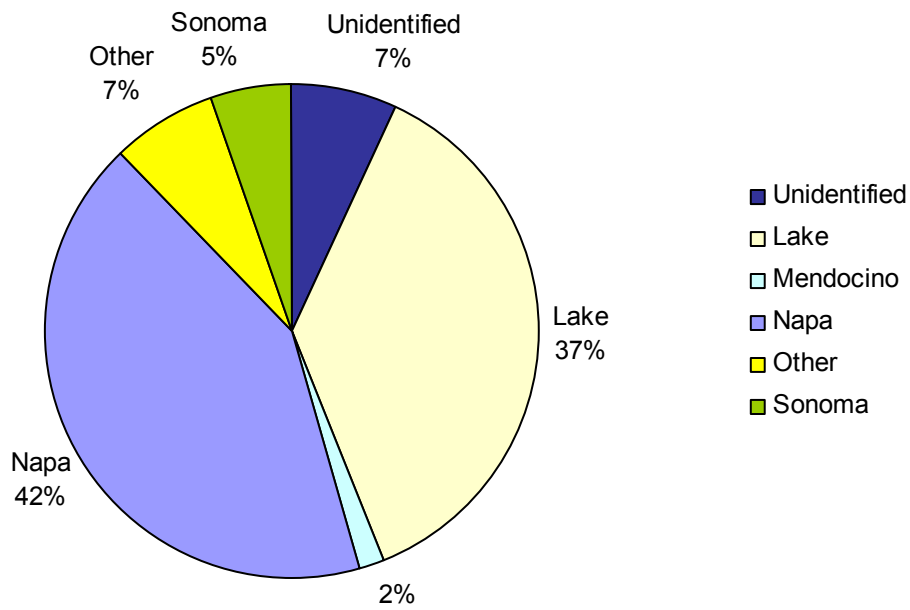


Exhibit 32
SR 29 – Origin & Destination Comparison
Destinations for Trips Originating in Napa County



STATE ROUTE 121 – BETWEEN NAPA & SONOMA

Traffic Count Data

Data for this cordon location was collected in Sonoma County at Post Mile 10.35, west of Napa Road. As mentioned previously, the traffic count and license plate data for this roadway segment were collected at the wrong location. Data was supposed to be collected just east of the intersection of SR 121 and Napa Road (where a significant amount of commute traffic turns off of SR 121). However, the consultant collected the data just west of the intersection. This has a significant effect on the resulting data.

Complete traffic count data can be found in Appendix A. Some of the more significant pieces of data are summarized below.

Westbound

- The total traffic volume in the westbound direction over the 24 hour period was 8,802.
- Highest rates of travel are between 3:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 5:00 and 6:00 p.m. (866 vehicles).
- The majority of vehicles, 63.8%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 22.8%.
- 97 buses/RVs passed the cordon location in the westbound direction during the 24 hour period (it should be noted that there is no regular transit service in this area, therefore it can be assumed that a significant number of these are RVs).
- A total of 61 motorcycles passed the cordon location in the westbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m. (602).
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 3:00 and 4:00 p.m. (258).

Eastbound

- The total traffic volume in the eastbound direction over the 24 hour period was 8,680.
- Highest rates of travel are between 4:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 5:00 and 6:00 p.m. (740 vehicles).
- The majority of vehicles, 67.3%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 20.6%.
- 91 buses/RVs passed the cordon location in the eastbound direction during the 24 hour period (it should be noted that there is no regular transit service in this area, therefore it can be assumed that a significant number of these are RVs).
- A total of 45 motorcycles passed the cordon location in the eastbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m. (549).
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 3:00 and 4:00 p.m. (226).

License Plate/Vehicle Registration Address Data

In this section the data collected by matching recorded license plate numbers with DMV registration data is used. Based on the addresses of vehicle registration, we can derive data trip origin, particularly for analyzing intra-county commutes.

Overall Observations:

- 31.66% of all vehicles recorded registered in Sonoma County.
- 28.08 percent of all vehicles recorded at this location during the 24 hour period were registered in Napa County.
- 9.6 percent of all vehicles recorded registered in Marin County.
- 6.06% of all vehicles recorded registered in Solano County.

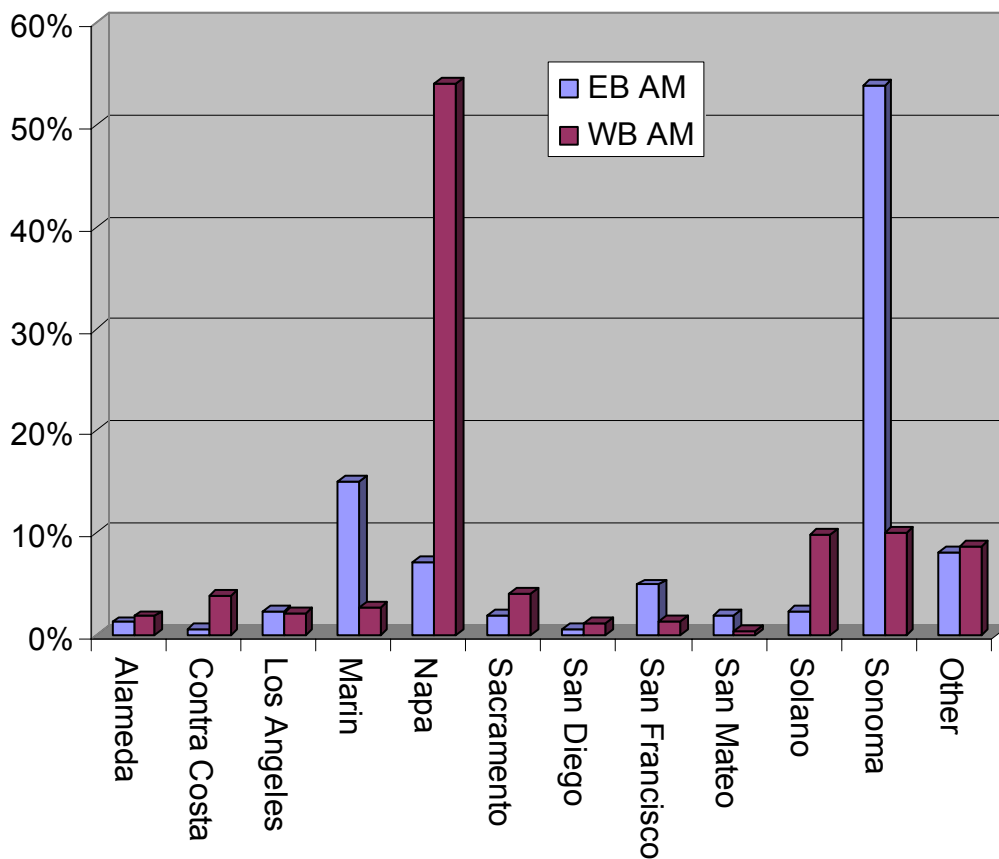
AM

The four largest groups of travelers in the a.m. time frame are as follows:

- Vehicles registered in Napa County traveling westbound (54.09% of westbound a.m. traffic)
- Vehicles registered in Sonoma County traveling eastbound (53.8% of eastbound a.m. traffic)
- Vehicles registered in Marin County traveling eastbound (15.03% of eastbound a.m. traffic)
- Vehicles registered in Sonoma County traveling westbound (10% of westbound a.m. traffic)

Exhibit 33 displays the counties of registration for both westbound and eastbound a.m. traffic at the survey location.

Exhibit 33
State Route 121
Counties of Registration – AM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

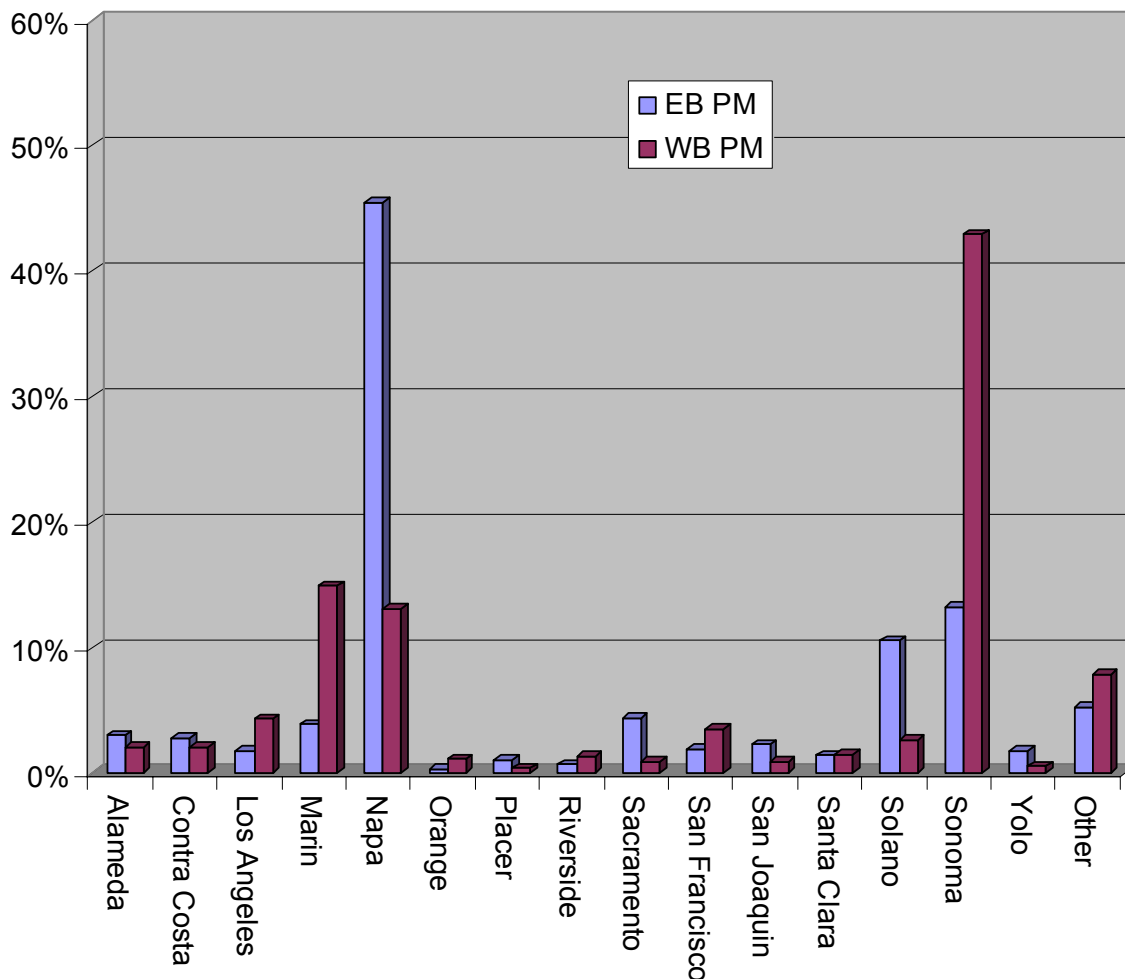
P.M.

The four largest groups of travelers in the p.m. time frame are as follows:

- Vehicles registered in Napa County traveling eastbound (45.42% of eastbound p.m. traffic)
- Vehicles registered in Sonoma County traveling westbound (42.91% of westbound p.m. traffic)
- Vehicles registered in Marin County traveling westbound (14.93% of westbound p.m. traffic)
- Vehicles registered in Sonoma County traveling eastbound (13.2% of eastbound p.m. traffic)

Exhibit 34 displays the counties of registration for both eastbound and westbound p.m. traffic at the survey location.

**Exhibit 34
State Route 121
Counties of Registration – PM Traffic**



Note: "Other" category contains all counties with less than 1% in both directions.

Traveler Surveys

A total of 224 usable surveys were returned for the SR 121 survey location. The following is a summary of the results. Multiple answers were given for many of the survey questions, such as Trip Purpose or Vehicle Occupants. Because of this, total entries have been counted rather than numbers of surveys.

Exhibit 35
SR 121 – Trip Purpose

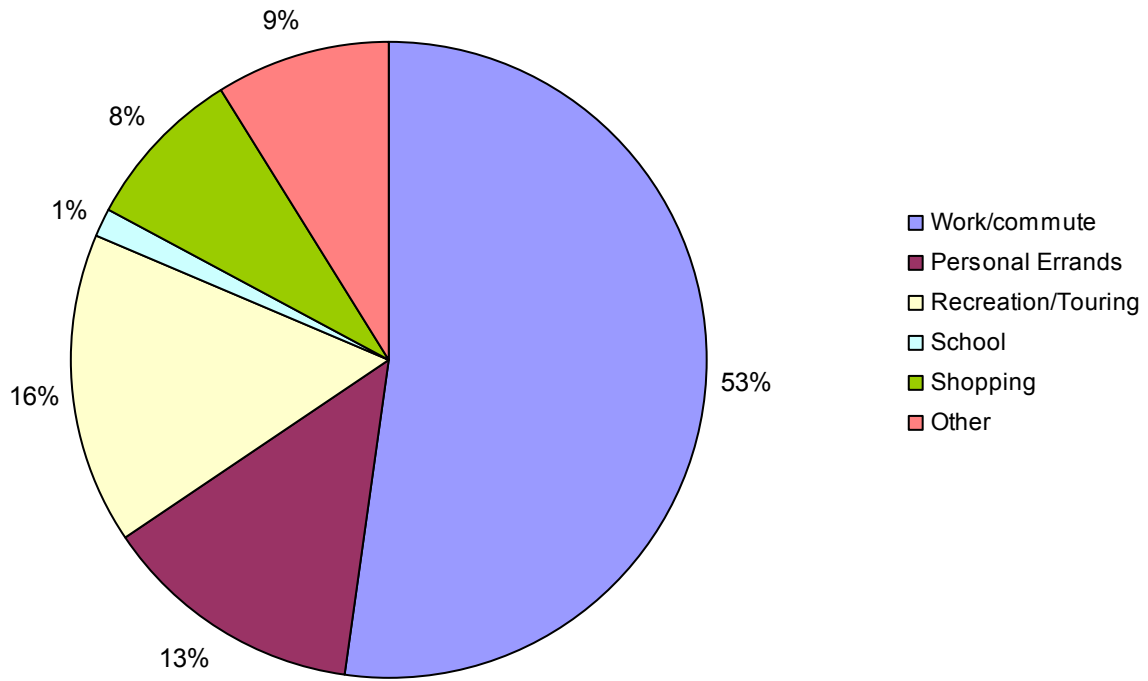


Exhibit 36
SR 121 – Trip Frequency

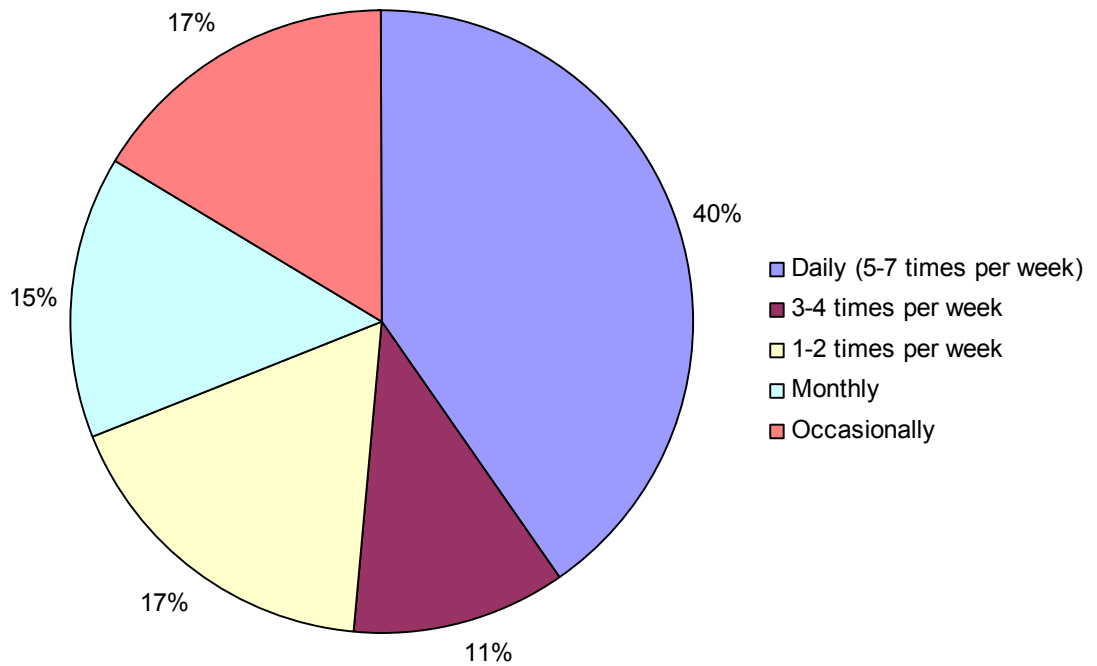


Exhibit 37
SR 121 – Vehicle Occupancy

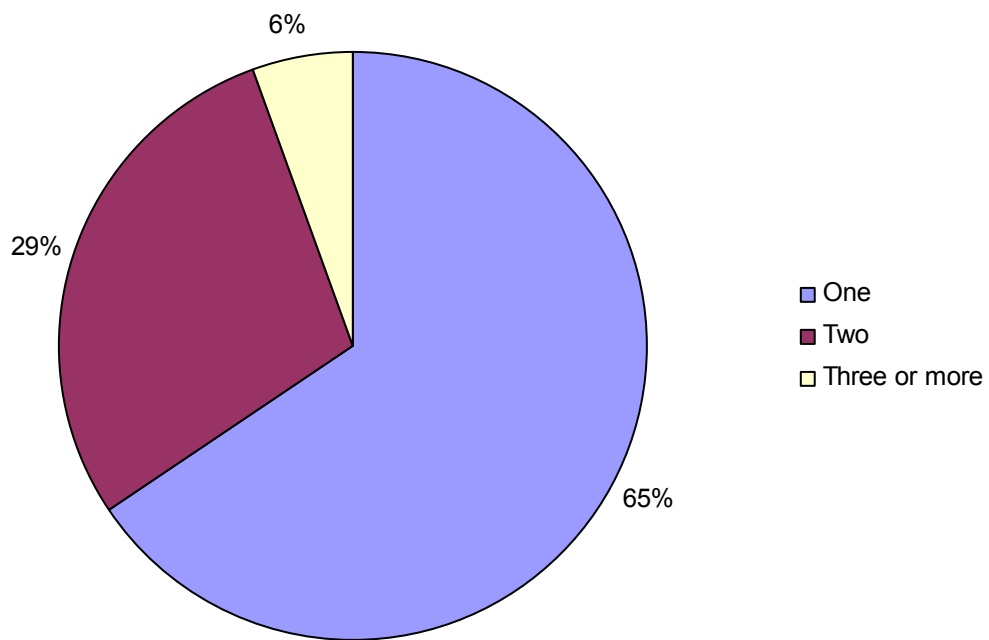


Exhibit 38
SR 121 – Vehicle Type

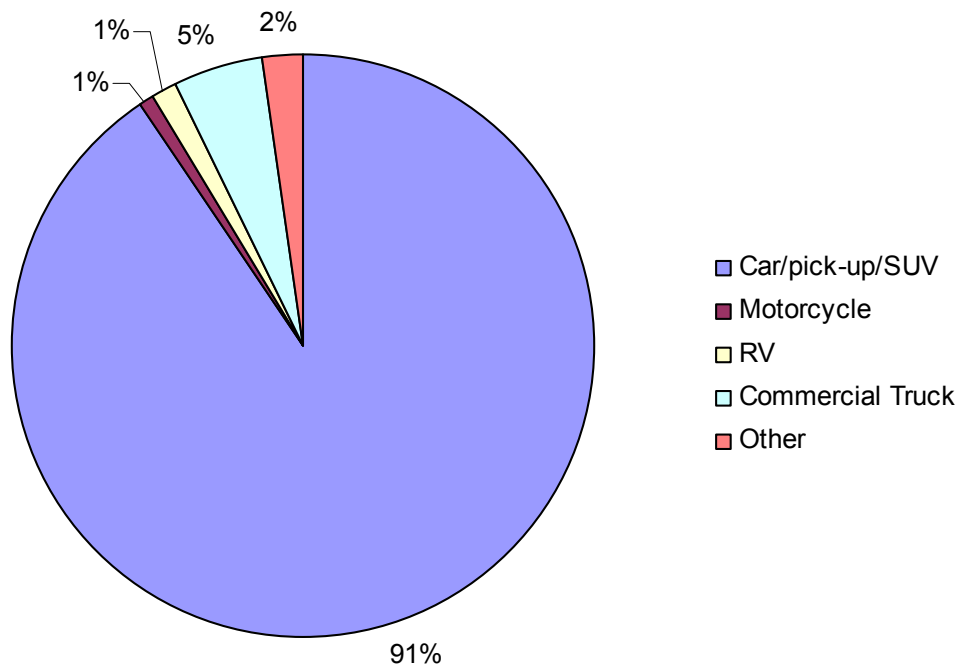


Exhibit 39
SR 121 – Trip Origin by County

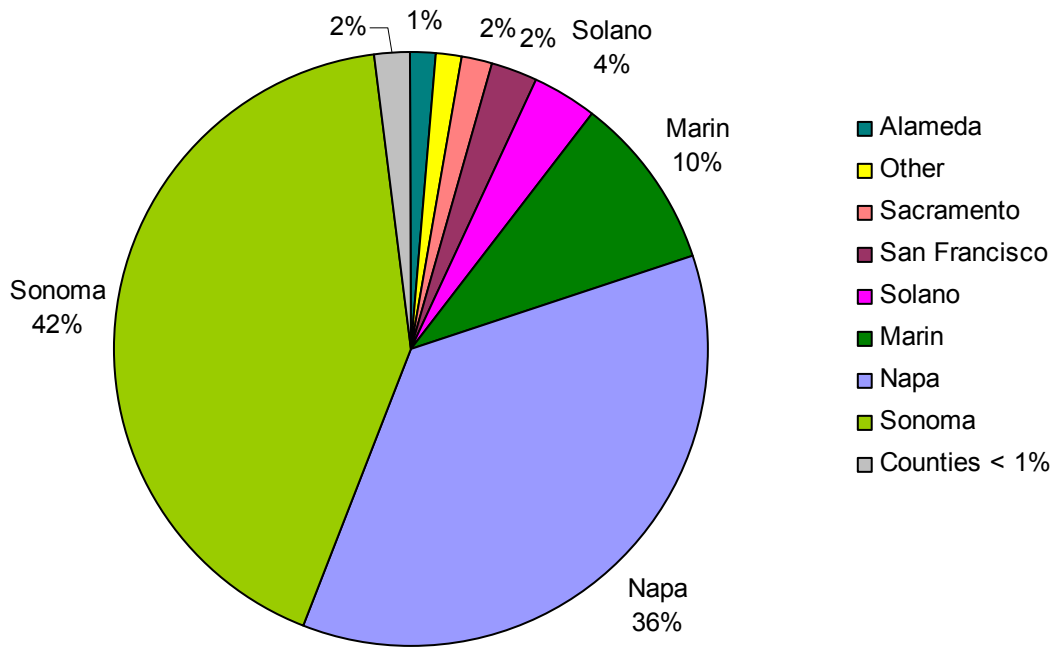


Exhibit 40
SR 121 – Trip Destination by County

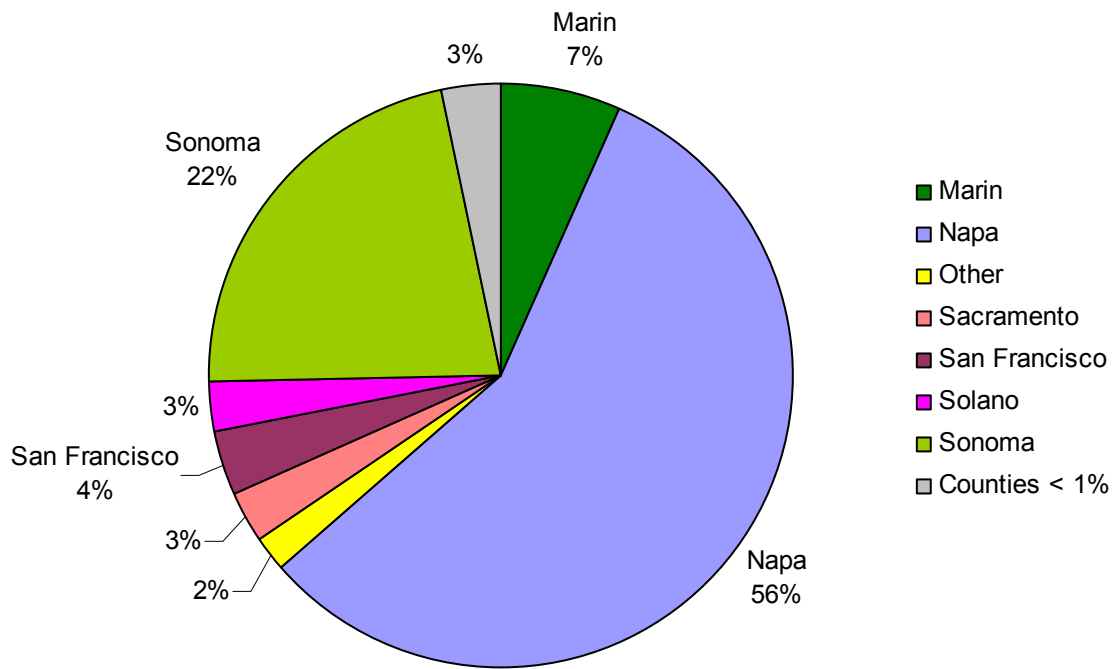


Exhibit 41
SR 121 – Origin & Destination Comparison
Destinations for Trips Originating in Sonoma County

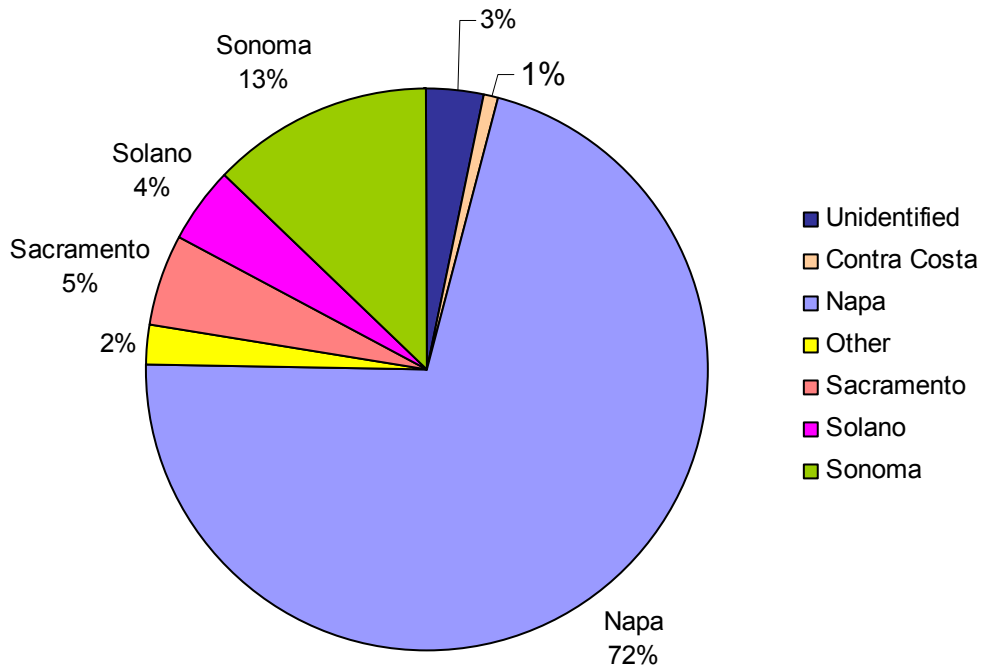


Exhibit 42
SR 121 – Origin & Destination Comparison
Destinations for Trips Originating in Napa County

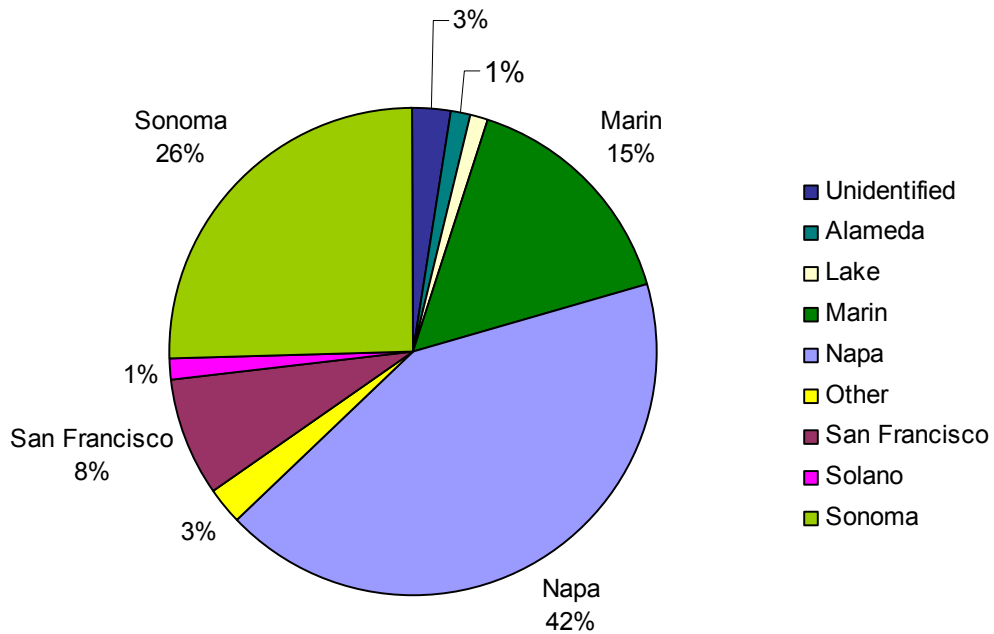
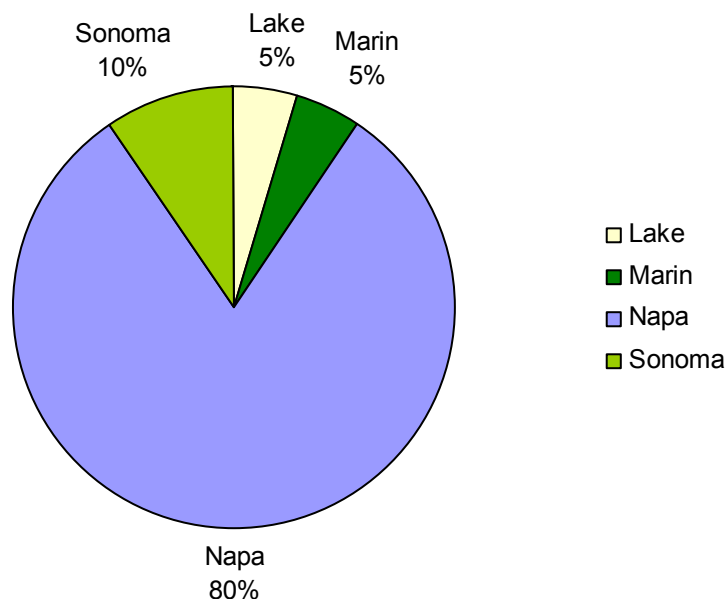


Exhibit 43
SR 121 – Origin & Destination Comparison
Destinations for Trips Originating in Marin County



US 101 – BETWEEN MENDOCINO & SONOMA

Traffic Count Data

Data for this cordon location was collected in Mendocino County at Post Mile 11.5, north of Hopland. Complete traffic count data can be found in Appendix A. Some of the more significant pieces of data are summarized below.

Southbound

- The total traffic volume in the southbound direction over the 24 hour period was 6,906.
- Highest rates of travel are between 3:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 3:00 and 4:00 p.m. (523 vehicles).
- The majority of vehicles, 61.1%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 19.8%.
- A total of 82 buses/RVs passed the cordon location in the southbound direction during the 24 hour period.
- A total of 43 motorcycles passed the cordon location in the southbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 5:00 and 6:00 p.m. (332).
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 3:00 and 4:00 p.m. (187).

Northbound

- The total traffic volume in the northbound direction over the 24 hour period was 6,793.
- Highest rates of travel are between 3:00 and 6:00 p.m.
- The highest total volume for a single hour occurred between 4:00 and 5:00 p.m. (642 vehicles).
- The majority of vehicles, 59.7%, were standard cars, trucks or trailers (single axle).
- The next largest group of vehicles were double axle long at 20.9%.
- 105 buses/RVs passed the cordon location in the northbound direction during the 24 hour period.
- A total of 36 motorcycles passed the cordon location in the northbound direction during the 24 hour period.
- The peak volume of vehicles that could be considered personal use vehicles (single axle cars, trucks and trailers) occurred between 4:00 and 5:00 p.m. (415).
- The peak volume of vehicles that could be considered commercial (double axle and above) occurred between 4:00 and 5:00 p.m. (220).

License Plate/Vehicle Registration Address Data

In this section the data collected by matching recorded license plate numbers with DMV registration data is used. Based on the addresses of vehicle registration, we can derive data trip origin, particularly for analyzing intra-county commutes.

Overall Observations:

- 42.29% of all vehicles recorded at this location during the 24 hour period were registered in Mendocino County.
- 16.9% of all vehicles recorded registered in Sonoma County.
- 6.12% of all vehicles recorded registered in Los Angeles County.
- 3.22% of all vehicles recorded registered in Humboldt County.

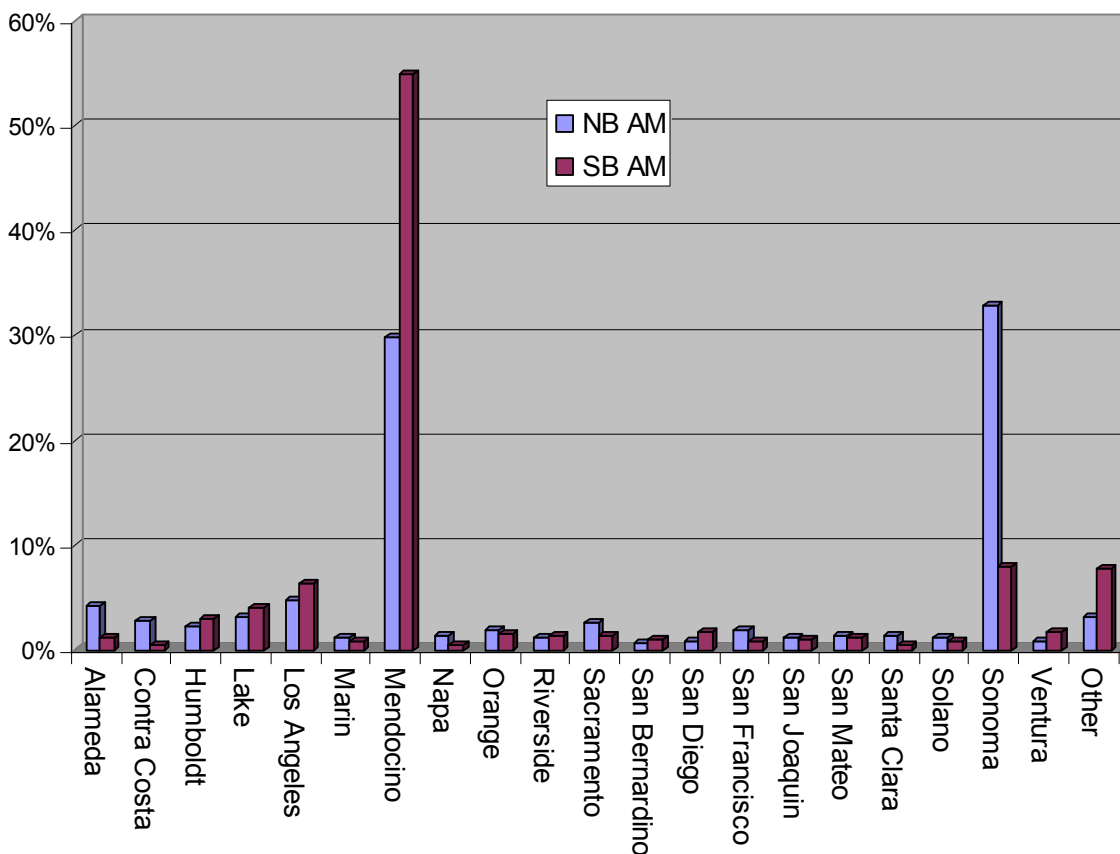
AM

The four largest groups of travelers in the a.m. time frame are as follows:

- Vehicles registered in Mendocino County traveling southbound (54.89% of southbound a.m. traffic)
- Vehicles registered in Sonoma County traveling northbound (32.87% of northbound a.m. traffic)
- Vehicles registered in Mendocino County traveling northbound (29.81% of northbound a.m. traffic)
- Vehicles registered in Sonoma County traveling southbound (7.89% of southbound a.m. traffic)

Exhibit 44 displays the counties of registration for both northbound and southbound a.m. traffic at the survey location.

Exhibit 44 US 101 Counties of Registration – AM Traffic



Note: "Other" category contains all counties with less than 1% in both directions.

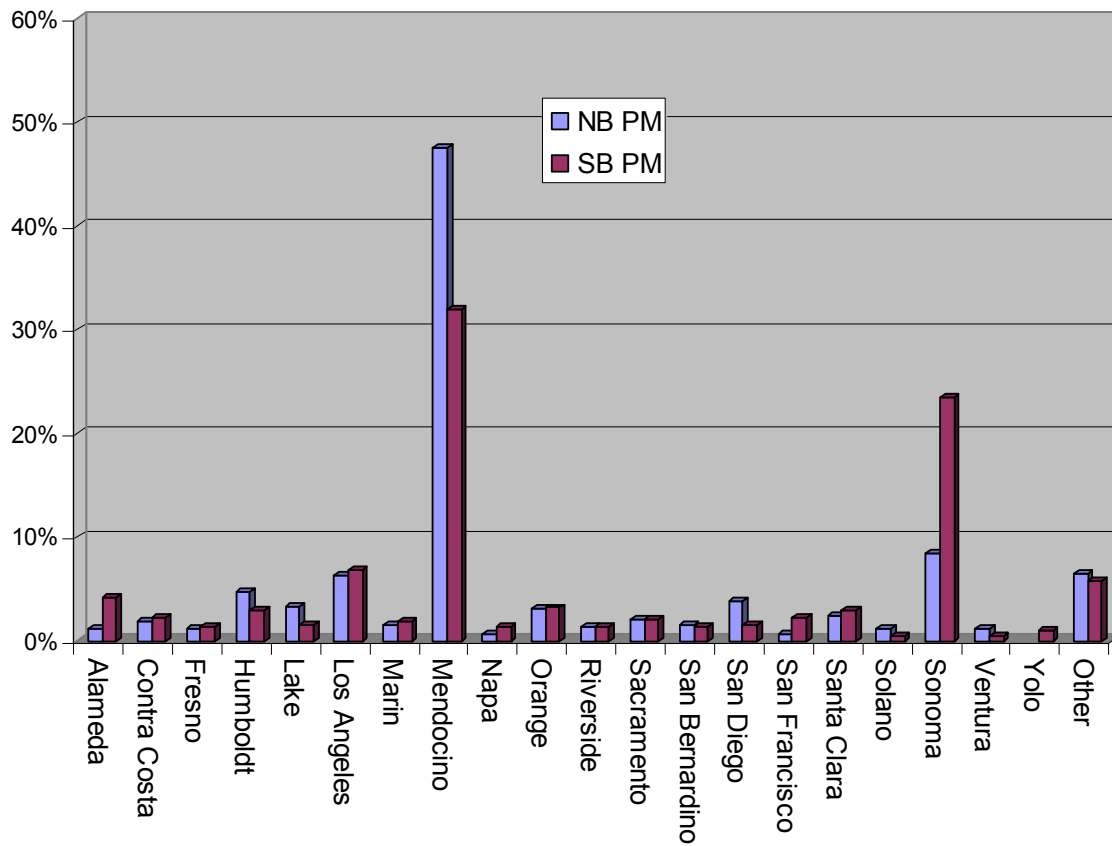
P.M.

The four largest groups of travelers in the p.m. time frame are as follows:

- Vehicles registered in Mendocino County traveling northbound (47.56% of northbound p.m. traffic)
- Vehicles registered in Mendocino County traveling southbound (31.87% of southbound p.m. traffic)
- Vehicles registered in Sonoma County traveling southbound (23.51% of southbound p.m. traffic)
- Vehicles registered in Sonoma County traveling northbound (8.44% of northbound p.m. traffic)

Exhibit 45 displays the counties of registration for both northbound and southbound p.m. traffic at the survey location.

**Exhibit 45
US 101
Counties of Registration – PM Traffic**



Note: "Other" category contains all counties with less than 1% in both directions.

Traveler Surveys

A total of 356 eligible surveys were returned for the US 101 survey location. The following is a summary of the results. Multiple answers were given for many of the survey questions, such as Trip Purpose or Vehicle Occupants. Because of this, total entries have been counted rather than numbers of surveys.

Exhibit 46
US 101 - Trip Purpose

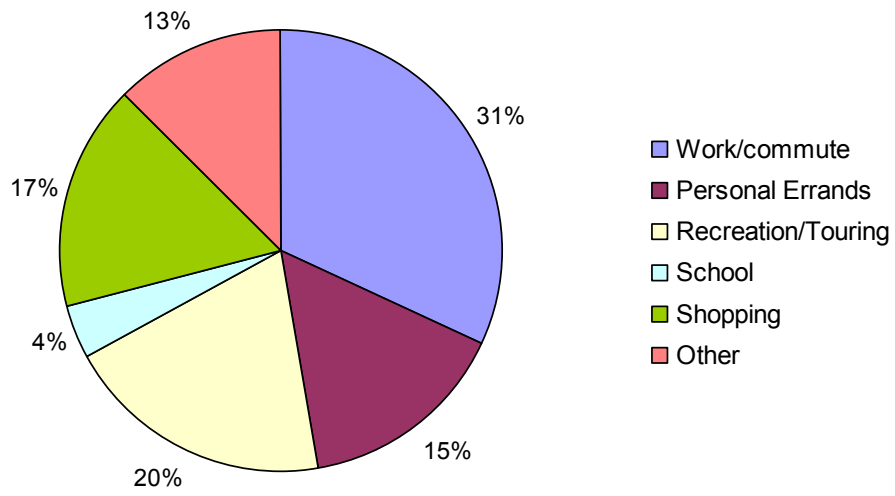


Exhibit 47
US 101 – Trip Frequency

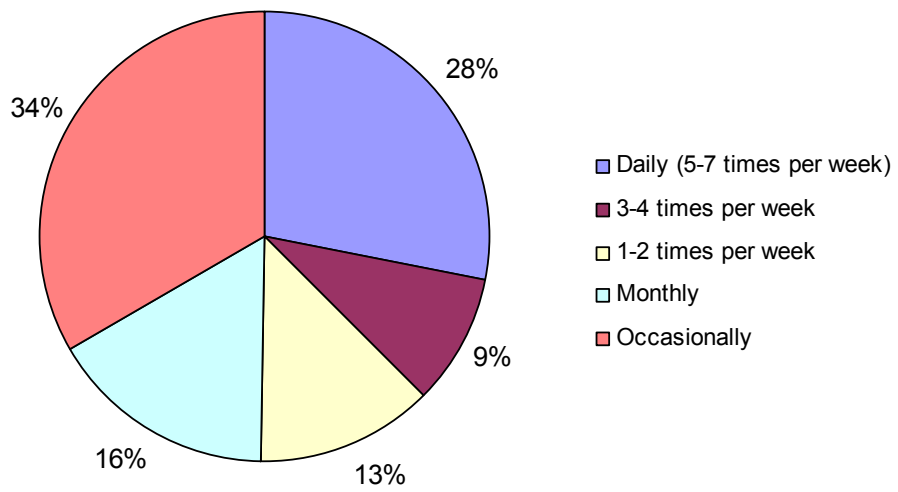


Exhibit 48
US 101 – Vehicle Occupancy

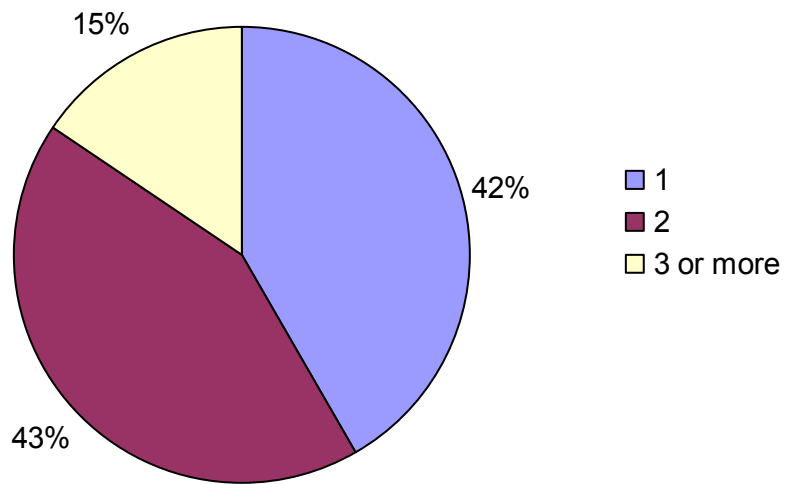


Exhibit 49
US 101 – Vehicle Type

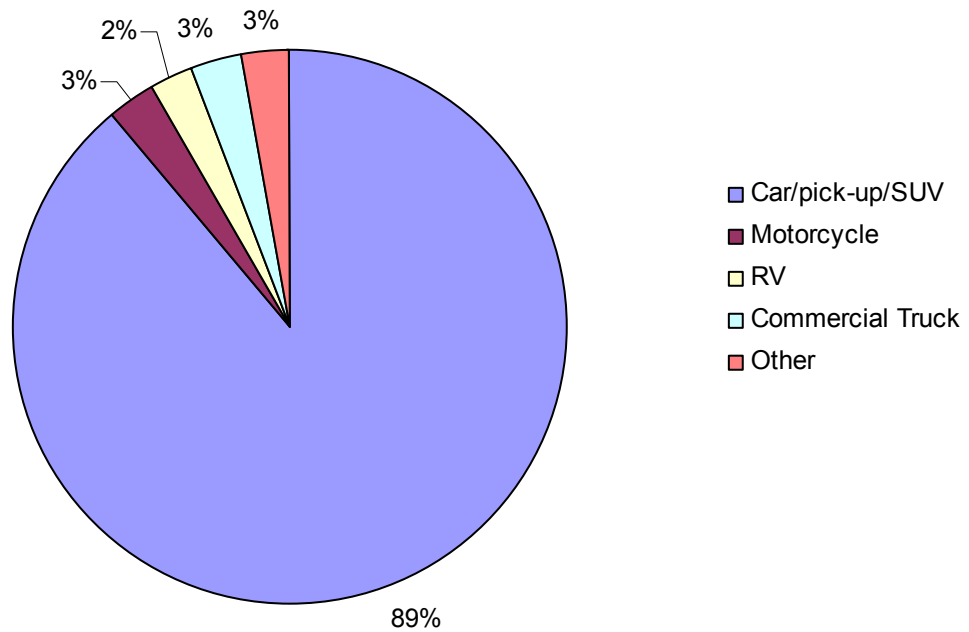


Exhibit 50
US 101 – Trip Origin by County

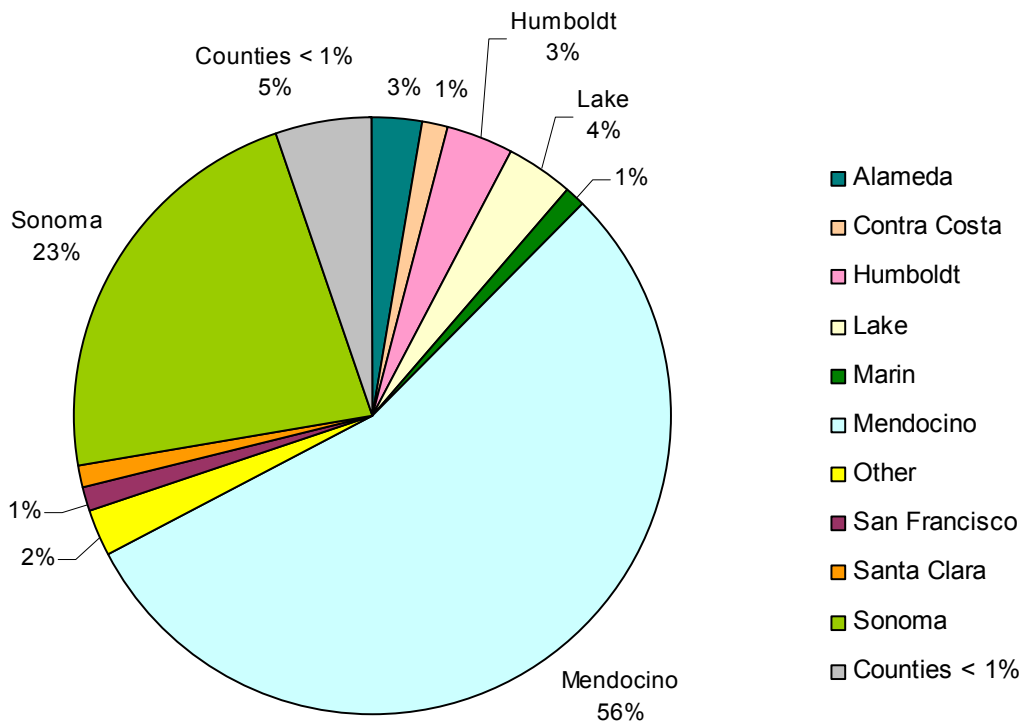


Exhibit 51
US 101 – Trip Destination by County

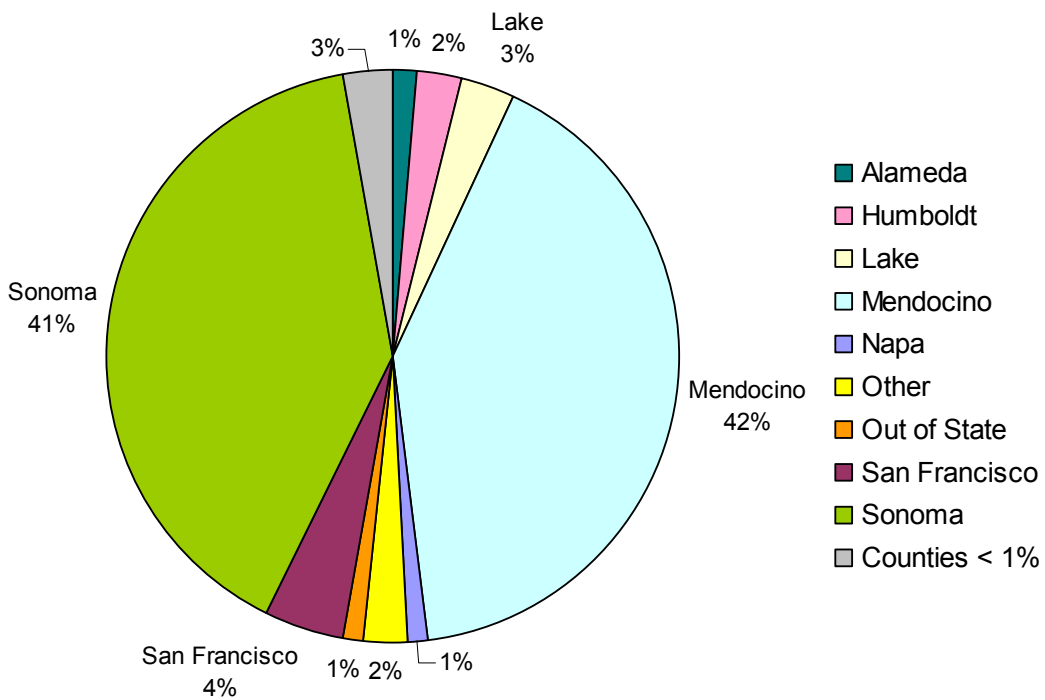


Exhibit 52
US 101 – Origin & Destination Comparison
Destination of Trips Originating in Mendocino County

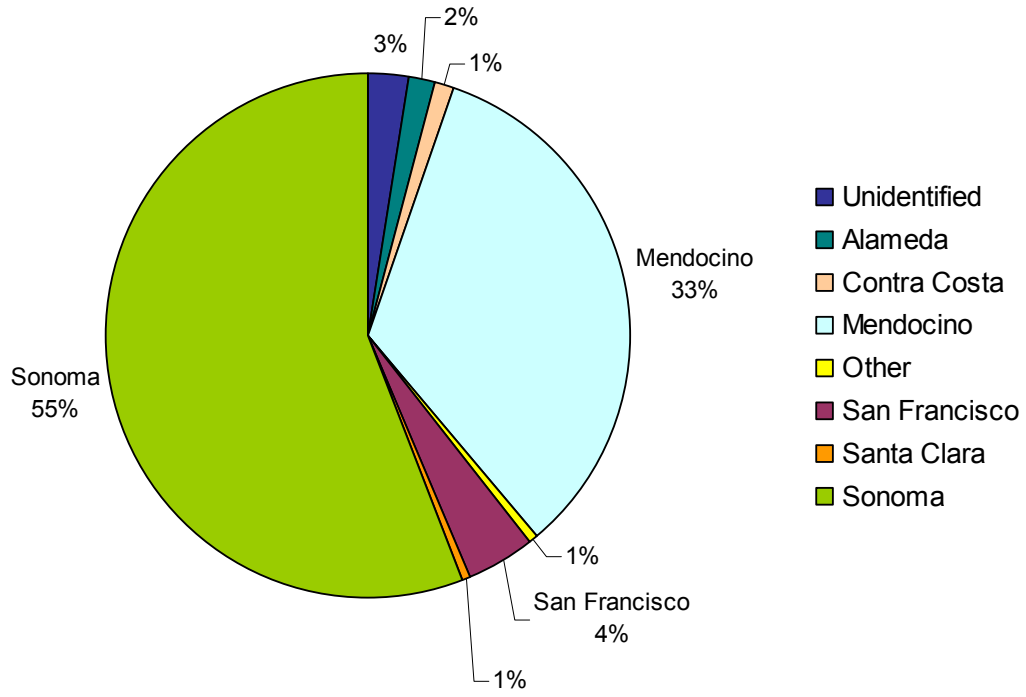
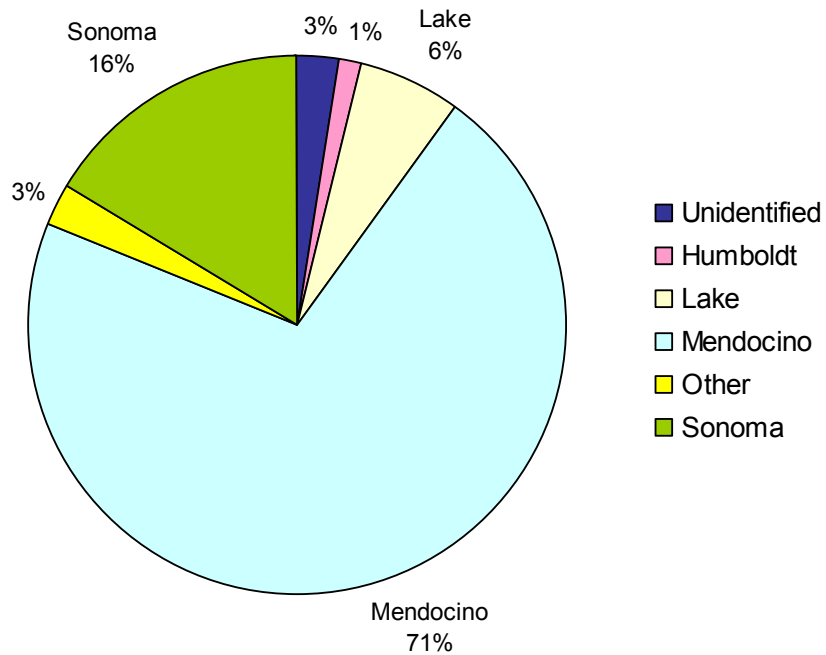


Exhibit 53
US 101 – Origin & Destination Comparison
Destination of Trips Originating in Sonoma County



SUMMARY OF FINDINGS AND RECOMMENDATIONS

The following is a summary of traffic count data collected for all cordon locations.

Exhibit 54
Summary of Traffic Count Data

	Total Volume	A.M. Peak		P.M. Peak		Cars/ Single Axle Trucks/Trailers	Commercial Trucks (2 Axle & Above)
		Time	Volume	Time	Volume		
Petrified Forest Rd - Westbound	6,241	7-8 a.m.	453	4-5 p.m.	527	64.4%	31.6%
Petrified Forest Rd - Eastbound	6,203	6-7 a.m.	429	5-6 p.m.	601	66.7%	34.3%
SR 20 – Westbound	4,641	7-8 a.m.	377	3-4 p.m.	381	58%	38.7%
SR 20 – Eastbound	4,004	11a.m.-12p.m.	234	5-6 p.m.	428	57.5%	39.3%
SR 29 – Southbound	4,331	6-7 a.m.	571	2-3 p.m.	230	66.5%	30.5%
SR 29 - Northbound	4,190	11a.m.-12p.m.	174	5-6 p.m.	594	65.5%	32.4%
SR 121 - Westbound	8,802	7-8 a.m.	607	5-6 p.m.	866	63.8%	34.1%
SR 121 – Eastbound	8,680	7-8 a.m.	607	5-6 p.m.	740	67.3%	30.8%
US 101 – Southbound	6,906	8-9 a.m.	434	3-4 p.m.	523	61.1%	36.8%
US 101 – Northbound	6,793	8-9 a.m.	378	4-5 p.m.	642	59.7%	38%

Note: A.M. Peak data for SR 121 Westbound and Eastbound is not a duplication.

Travel Mode

The majority (ranging from 57 to 66 percent in the traffic count data and up to 91 percent of responses from the traveler survey) of trips are made in personal vehicles – cars, SUVs, or trucks. The traffic count data ranged from 57 to 66 percent while the responses from the traveler surveys were as high as 91 percent. The traffic count data can be considered more accurate as the survey data reflects the fact that non-commercial drivers would be more likely to return the survey.

Exhibit 55 summarizes all vehicle type data collected from the traveler surveys for all cordon locations.

Exhibit 55
Summary of Traveler Survey Data – Vehicle Type

	Car/pick-up/SUV	Motorcycle	RV	Commercial Truck	Other
Petrified Forest Road	89%	2%	1%	4%	4%
SR 20	87%	0%	4%	5%	4%
SR 29	90%	0%	2%	7%	1%
SR 121	91%	1%	1%	5%	2%
US 101	89%	3%	2%	3%	3%

Trip Purpose

While most of the responses to surveys for each survey location resulted in Work/Commute trip purpose making up about 35% of all trips, surveys returned for SR 121 showed a significantly higher amount, 53%, of all trips being made for the purpose of Work/Commute.

Exhibit 56 summarizes all trip purpose data collected from the traveler surveys for all cordon locations.

Exhibit 56
Summary of Traveler Survey Data – Trip Purpose

	Work/ Commute	Personal Errands	Recreation/ Touring	School	Shopping	Other
Petrified Forest Road	37%	21%	10%	3%	21%	8%
SR 20	22%	20%	21%	2%	25%	10%
SR 29	39%	17%	14%	4%	13%	13%
SR 121	53%	13%	16%	1%	8%	9%
US 101	31%	15%	20%	4%	17%	13%

Vehicle Occupancy

The percentage of trips made with only one occupant ranged from 42 to 65 percent. The SR 121 location, which also had the highest rate of work/commute trips had the highest rate of single person trips at 65%, 9% more than the next highest percentage.

Trips made with 2 vehicle occupants varied more, ranging from 11% (SR 29) to 43% (US 101).

Trips made with 3 or more occupants ranged from as low as 6% (SR 121) to as high as 46% (SR 29).

Exhibit 57 summarizes all vehicle occupancy data collected from the traveler surveys for all cordon locations.

Exhibit 57
Summary of Traveler Survey Data – Vehicle Occupancy

	One	Two	Three or more
Petrified Forest Road	56%	34%	10%
SR 20	52%	15%	33%
SR 29	43%	11%	46%
SR 121	65%	29%	6%
US 101	42%	43%	15%

Trip Frequency

The survey returns resulted in rates in the neighborhood of 40% for daily trips for the Petrified Forest Road, SR 29 and SR 121 locations. SR 20 and US 101 had significantly lower percentages of daily trips at 23% (SR 20) and 28% (US 101).

The rate of trips made 3 to 4 times per week ranged from 9 to 15%. Trips made 1 to 2 times per week ranged from 13 to 19%. Trips made only “occasionally” ranged from 15 to 34% with the SR 20 and US 101 locations having the significantly higher rates of 33% and 34% while the others averaged at about 16% each.

Exhibit 58 summarizes all trip frequency data collected from the traveler surveys for all cordon locations.

Exhibit 58
Summary of Traveler Survey Data – Trip Frequency

	Daily (5-7 times per week)	3-4 times per week	1-2 times per week	Monthly	Occasionally
Petrified Forest Road	40%	15%	19%	11%	15%
SR 20	23%	7%	16%	21%	33%
SR 29	41%	11%	16%	16%	16%
SR 121	40%	11%	17%	15%	17%
US 101	28%	9%	13%	16%	34%

Origin and Destination

Petrified Forest Road - Between Napa & Sonoma

According to the returned traveler surveys, trips on this road are divided fairly evenly between travelers originating in Napa (39%), Sonoma (34%) and Lake County (26%). Of the two highest, Napa and Sonoma, nearly ¾ of each of these represent an exchange between the two counties. Of trips originating in Lake County, over ¾ end in Sonoma County.

SR 20 – Between Lake & Mendocino

Of trips made on SR 20 at the survey location, the vast majority, 70%, originate in Lake County according to the returned traveler surveys, although the survey location is in Mendocino County. Of these trips, 71% end in Mendocino County. Trips leaving Lake County outnumber those ending in Lake County, most likely representing the lack of jobs and services in Lake County.

Only 14% of trips at the location originate in Mendocino County. Of these, 46% end in Lake County, 17% in Mendocino County and 6% travel on to Sacramento County.

SR 29 – Between Lake & Napa

According to the returned traveler surveys, 55% of trips made on SR 29 in the survey area begin in Lake County and 28% in Napa County. Of the trips beginning in Lake County, 53% end in Napa and 18% end in Sonoma. Of trips originating in Napa, 42% end in Napa County and 37% end in Lake. The greater amount of trips away from Lake County can again be attributed to greater availability of jobs and services in neighboring counties.

SR 121 – Between Napa & Sonoma

43% of trips at the SR 121 survey location originate in Sonoma County, 36% in Napa County and 10% in Marin County according to the traveler surveys. Of trips originating in Sonoma, 72% end in Napa County. However, of trips originating in Napa, only 26% end in Sonoma County, while 42% remain in Napa County. Napa County makes up 58% of all trip destinations for the surveys returned.

US 101 – Between Mendocino & Sonoma

Not surprisingly, the majority of trips on US 101 in the survey area originate in Mendocino County (55%). Another 22% originate in Sonoma County. 55% of trips beginning in Mendocino County end in Sonoma County while 33% end within Mendocino County. Of trips beginning in Sonoma County, the majority, 71%, end in Mendocino County.

Recommendations

- Conduct further analysis, possibly in a subsequent IRP phase to further examine or verify the following:
 - Validate vehicle occupancy rates as this will be an important factor in future modeling.
 - Further examine instances where there seem to be uneven county exchanges.
 - Further examine instances where data seems to vary widely from average statistics.
- Repeat data collection for SR 121 location due to incorrect location of current data collection.
- Present findings for governing bodies of IRP agencies. This will provide decision makers with information needed in order to make future funding commitments and proceed with future phases of the Wine Country IRP.
- Provide findings on IRP website and other agency websites for public availability in order to further public awareness of transportation related effects of the jobs/housing imbalance experienced in the four county area.
- Proceed with Phase III of Wine Country IRP, which will develop a four county traffic model between the Wine Country IRP counties—Napa, Sonoma, Lake and Mendocino—that fills in existing gaps in traffic data in northern Sonoma and Napa as well as integrates new information so that it can be compatible with the traffic modeling system used by the Metropolitan Transportation Commission.

Information regarding origin and destination, including trip purpose, is needed for the assumptions to be used in model development. The data generated from this study will be used as background information for assumptions needed for model development.

APPENDICES

APPENDIX A TRAFFIC COUNT DATA

APPENDIX B LICENSE PLATE & VEHICLE REGISTRATION DATA

APPENDIX C TRAVELER SURVEY SAMPLE & RETURN DATA

APPENDIX D T.Y. LIN INTERNATIONAL DRAFT PROJECT REPORT