SECTION I: THE TRANSPORTATION MONITORING PROGRAM

Since 1983, the Regional Transportation Commission (RTC) has conducted a transportation monitoring program. The RTC collects and analyzes traffic volumes on arterial and collector streets in Santa Cruz County. The collected data assist a wide variety of public agencies and individuals, including local traffic engineers and land use planners.

How Monitoring Data are Used

The initial purpose of the transportation monitoring program was to provide traffic volume information for the *Regional Transportation Plan (RTP).* Since 1988, the transportation monitoring program has expanded to include other types of data collection efforts, including vehicle occupancy counts and truck counts. The RTC also responds directly to traffic counting requests from local jurisdictions. (The California Department of Transportation [Caltrans] and the City of Santa Cruz conduct their own traffic counts.) The following is a list of examples of how transportation monitoring data are used:

- Traffic impact analyses, transportation modeling, traffic control studies
- Analysis of traffic patterns throughout Santa Cruz County
- Determination of traffic patterns near proposed new construction sites
- Assist in analysis of impacts resulting from business location and expansion
- Measurement of traffic volumes as part of Environmental Impact Reports (EIRs)
- Preparation of planning documents or grant applications
- Profile reports on Santa Cruz County, prepared by community groups
- Data for the Federal Highway Administration's Highway Performance Monitoring System (HPMS)

Traffic Volumes

Definition: In this report, traffic volumes are reported as Average Daily Traffic (ADT). ADT is the 24-hour volume of traffic that passes a point on an "average" weekday (Tuesday-Thursday). Caltrans reports data for highways as Annual Average Daily Traffic (AADT), a standard measure of two-way daily volume that adjusts for weekly and seasonal variations in traffic.

Average Daily Traffic (ADT) volume counts are taken throughout the county on arterial and collector streets. Counts are tallied by direction in 15 minute intervals for at least two weekdays. The weekday average is calculated and reported in the traffic volume maps and tables (Appendices A and B). The data is updated throughout the year and available on the RTC's website at http://www.sccrtc.org/commiss.html#tmr. Count results can be affected by a number of factors and may not be strictly comparable from one year to the next at a specific location, but several counts over a number of years at a location indicate a trend, as do counts at many locations throughout the county at two points in time.

How Counts are Performed

Traffic counting equipment is set up on arterial and collector roadways in the county. These computerized counters tally the number of motor vehicles passing a given point over a given period of time. The counters sense motor vehicles through air pressure caused by tires passing over a hose. Vehicle counts vary from year to year at many locations due to fluctuations in factors such as land use patterns, roadway improvements, population changes, time of year count is taken, special events, and weather. Traffic count data on all roadways that have been studied by the RTC since 1983 are included in Appendix B, Table 1.

Where Traffic Volume Data is Collected

- Screenline counts, in support of the Association of Monterey Bay Area Government's (AMBAG) traffic model, were begun in 2004 to determine general traffic volume flow at strategic locations within, and adjacent to, Santa Cruz County. Screenline counts are recorded in Appendix D, and include Caltrans projections as well. These counts are taken every three years.

- Quarterly counts are taken at each of four standard locations at each season of the year. These counts are intended to track both yearly change and seasonal variation of traffic volumes. The four sites are representative of major arterials countywide. These quarterly counts are taken on a two-year cycle.

- UCSC campus minor and major arterials are monitored bi-annually in May and October, when classes are in session. Beginning in 2005, these bi-annual counts were taken every two-years. Detailed data are recorded at standard locations over a seven-day period.

- Sites in excess of 20,000 ADT are monitored every three years. These are road segments with some history of previous monitoring.

- Highway Performance Monitoring System (HPMS) sites are monitored on a three-year cycle and largely reflect past federal preferences for monitoring specific road segments. The RTC routinely provides this data to AMBAG.

- Sites ranging between 10,000 and 20,000 ADT are monitored every four years, and have some history of having been previously monitored.

- Sites ranging between 5,000 and 10,000 ADT are monitored every five years, and have some history of having been previously monitored.

2006 Traffic Volume Counts

In 2006, a consultant for the RTC measured traffic volumes at varied locations within the county roadway system. Santa Cruz County, the City of Santa Cruz, and Caltrans also monitor some roadways within the county. Appendices A and B show updated and historical count data available for roadways in Santa Cruz County. Figure 1 shows the segments of roadway counted (non-freeways) in Santa Cruz County with the highest recorded average daily traffic (ADT) volumes.

Figure 1: Roadways with Highest Average Daily Traffic

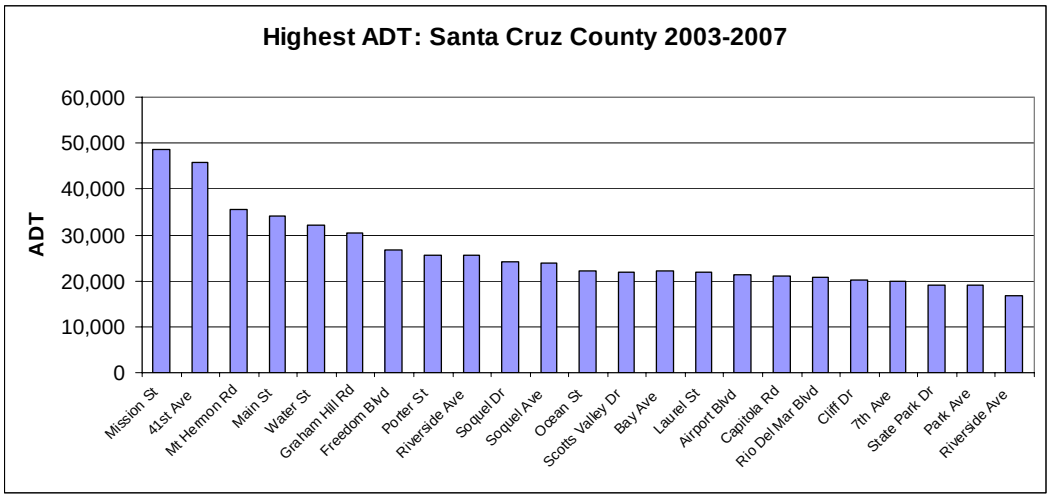


Table 1: ADT for Most Heavily Traveled Roadways

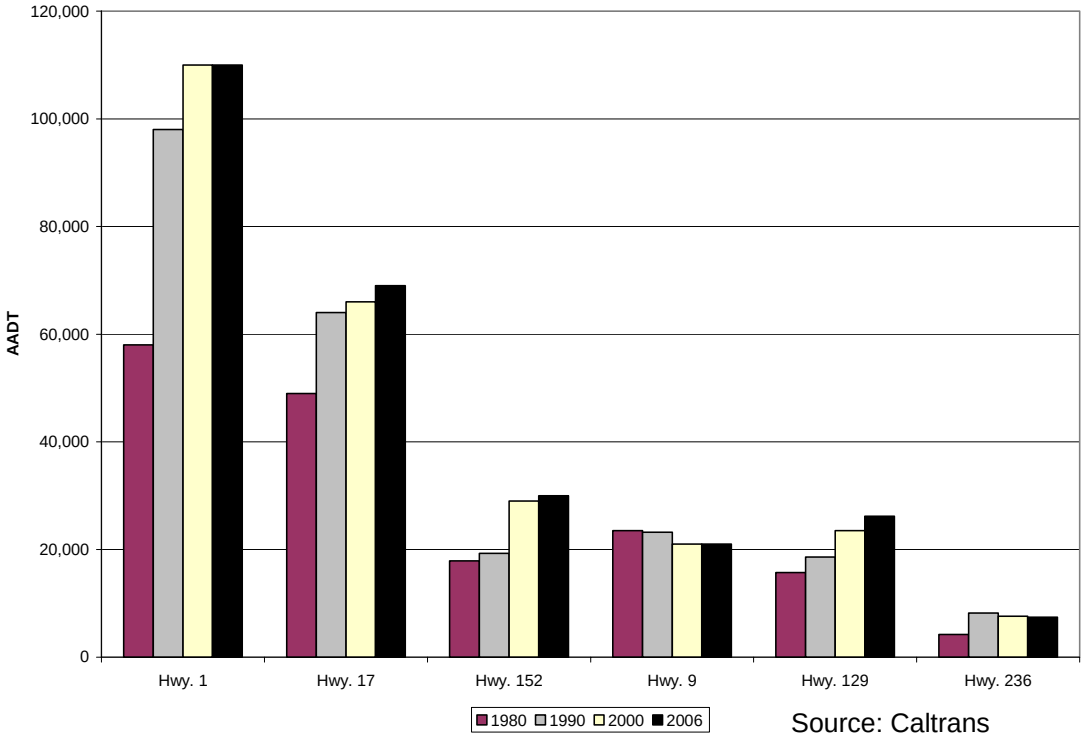
SEGMENT	ADT	LOCATION	JURISDICTION	YEAR
Mission St	48,500	West of Hwy 1	Santa Cruz	2005
41st Ave	45,787	North of Clares St	Capitola	2006
Mt Hermon Rd	35,493	North of Glen Canyon	County	2004
Main St	34,000	East of Freedom Blvd	Watsonville	2005
Water St	32,166	East of Stanford	Santa Cruz	2004
Graham Hill Rd	30,507	North of Mt Hermon Rd	County	2007
Freedom Blvd	26,860	East of Green Valley Rd	Watsonville	2006
Porter St	25,585	South of Main	County	2006
Riverside Ave	25,500	East of Main	Watsonville	2005
Soquel Dr	24,074	West of 41st Ave	County	2006
Soquel Ave	23,818	East of 7th Ave	County	2006
Ocean St	22,297	South of Water St	Santa Cruz	2003
Scotts Valley Dr	22,005	East of Mt Hermon Rd	Scotts Valley	2004
Bay Ave	22,165	South of Hwy 1	Capitola	2006
Laurel St	21,754	East of Front St	Santa Cruz	2004
Airport Blvd	21,249	South of Freeedom Blvd	Watsonville	2004
Capitola Rd	20,940	East of 30th	Capitola	2006
Rio Del Mar Blvd	20,800	North of Clubhouse Dr	County	2006
Cliff Dr	20,139	East of Wharf Rd	Capitola	2006
7th Ave	19,941	North of Eaton	County	2005
State Park Dr	19,194	South of Soquel Dr	County	2006

Park Ave	19,041	North of Hwy 1	County	2004
Riverside Ave	16,652	South of San Lorenzo	Santa Cruz	2004

Highway Traffic Volumes

Caltrans provides traffic volume data for state highways in Santa Cruz County. Caltrans monitors their standard locations every three years four times per year. In between actual counts data is projected. Figure 2 compares the Annual Average Daily Traffic (AADT) totals on segments of state highways in Santa Cruz County, as reported in Caltrans' *Traffic Volumes on California State Highways*. Appendix B, Table 2, shows the Annual Average Daily Traffic (AADT) totals for Santa Cruz County Highways in more detail.

Figure 2: AADT on State Highways in Santa Cruz County

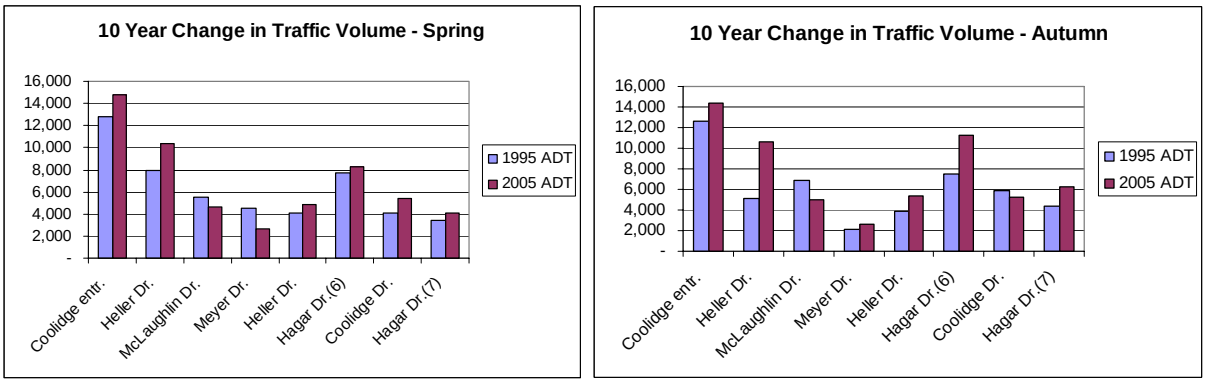


Note: Figure 2 counts and projections are for the following highway segments:
• Hwy 1 - Soquel Ave to Morrissey Blvd • Hwy 152 - On E. Beach St at Main • Hwy 9 – North of Graham Hill
• Hwy 17 – North of Route 1 • Hwy 129 – East of Main • Hwy 236 - Jct. Rte 9 in Boulder Creek

University of California at Santa Cruz Counts

Every two years the RTC and UCSC perform traffic counts on the same campus road segments. In 2005, traffic volume data were collected twice at eight locations on the UCSC campus, first, during the spring, and then again in the fall. The University is one of the largest trip generators in the county and uses the collected data to assess the transportation needs of students, faculty, and staff. Figure 3 compares 2005 counts with those of ten years previous, at the same standard count locations. Appendix B, Table 3 lists the UCSC count information in more detail.

Figure 3: UCSC Traffic Volumes at Standard Locations - 1995-2005



Standard Monitoring Locations:
1 Coolidge Drive at the south entrance
2 Heller Drive at the west entrance
3 McLaughlin Drive at the bridge
4 Meyer Drive south of Kerr Drive
5 Heller Drive north of Meyer Drive
6 Hagar Drive north of Coolidge Drive
7 Hagar Drive north of Steinhart Way
8 Coolidge Drive east of Hager Drive

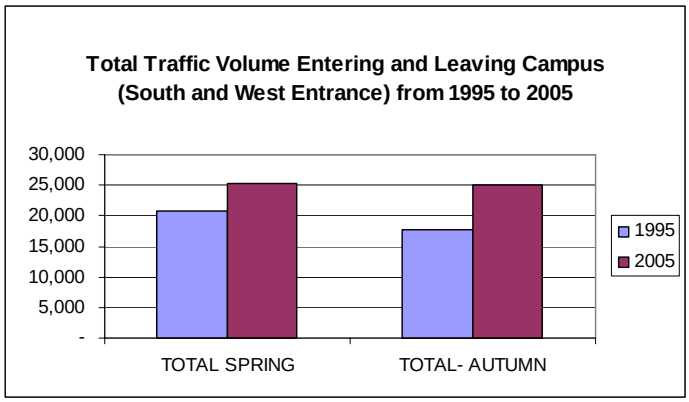
Figure 4 compares the total average daily traffic volume entering and leaving campus from 1995 to 2005 by totaling volumes at the south entrance (Coolidge Drive) and the west entrance (Heller Drive). While traffic in ten years has increased by 18% in Spring and 29% in Fall, UCSC's enrollment has grown from 9,286 to 13,802, a 49% enrollment increase. There are at least three major alternative transportation programs that saw substantial growth from 1995 to 2005 (Source: UCSC TAPS http://www2.ucsc.edu/taps/):

- The UCSC vanpool program has grown from seven to nineteen separate vanpools and in 2006 accommodated about 230 participants.

- The Bike Shuttle was introduced in 2000. It carries bicyclists and their bicycles from Longs Drug, on Mission, up to the UCSC campus. In 2006, the shuttle averaged over 100 bikers per day.

- Comparing fiscal year 94/95 to 04/05, SCMTD bus ridership from UCSC students, staff, and faculty has grown by nearly 82% from 1995 to 2005.

Figure 4: UCSC Campus Traffic Volume Comparison - 1995-2005



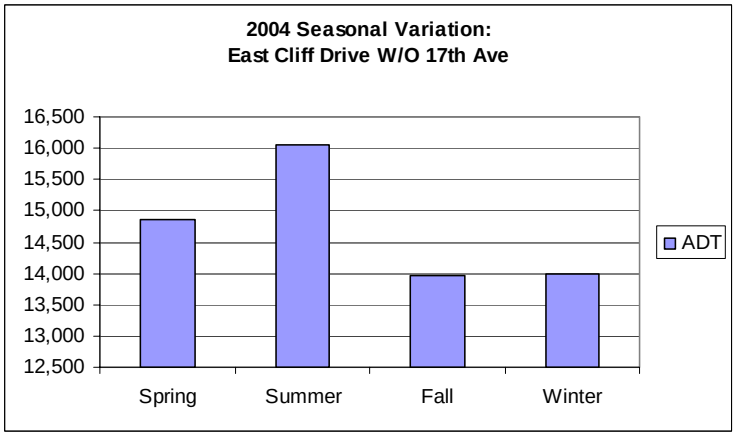
Seasonal Variance

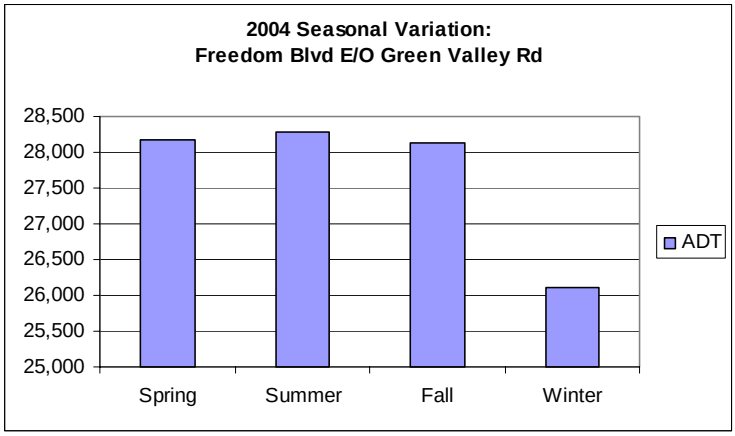
The RTC conducts traffic volume counts at four standard locations during each of the four seasons. These locations are well-used arterial segments in geographically diverse locations. These segments are:

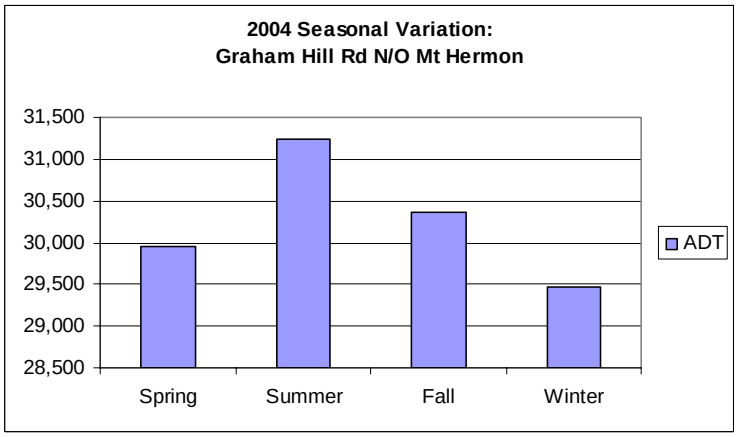
- East Cliff Drive: In the beach area of the county, adjacent to Santa Cruz city limits
- Freedom Blvd: In Watsonville, a major arterial in a commercial district
- Graham Hill Road: A major arterial of the San Lorenzo Valley area, serving minor urban centers such as Felton and Ben Lomond
- Soquel Drive: A well-used arterial that parallels Highway 1

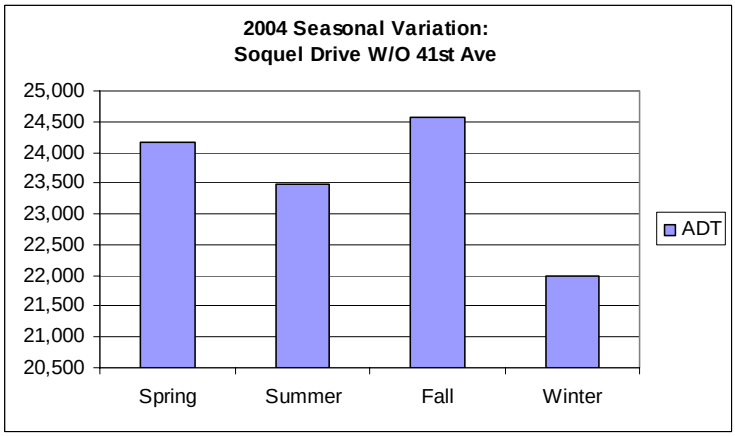
As shown inFigure 5 above, among all of these observed road segments there is a consistent decline in traffic volume during the winter season, a decline ranging from 13% (East Cliff Drive) to 6% (Graham Hill Road). In all but one of these examples (Soquel Drive) the peak traffic volume occurs in the summer season. East Cliff Drive, with its proximity to tourist areas, experiences its most dramatic volume increase in mid-summer.

Figure 5: Seasonal Variation Among Four Standard Arterials









Note: Winter includes December-February; Spring includes March-May; Summer includes June-August; Fall includes September-November

Daily and Hourly Variation in Traffic Volumes

Appendix C illustrates typical traffic volumes on three major arterials (41st Avenue, Capitola Road, and 17th Avenue) counted in 2004, offering both daily and weekly profiles over a twenty-four hour period. In all three of these examples, the highest volumes occur in the afternoon hours, from 1:00 to 6:00 p.m. Tables 1 and 2 graph vehicular traffic flow on commercial arterials, 41st Avenue and Capitola Road, and both

of these profiles show a more or less steady increase in volume up to early afternoon, and then steady decline after the early evening commute.

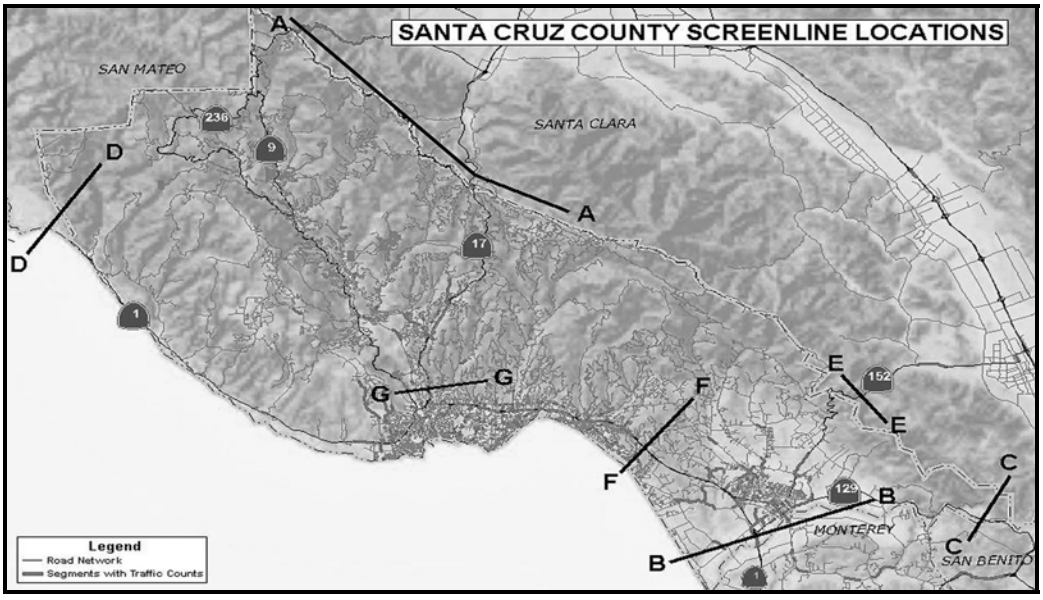
Table 3, representing traffic flow on 17th Avenue, just north of West Cliff Drive, is somewhat less consistent in rise and fall in traffic volume, likely due to the presence of two public schools along this segment of 17th Avenue. Most noticeable in these examples is the early morning peaking of traffic flow between the hours of 8:00 and 9:00 a.m., likely resulting from school-generated traffic. Afternoon school-related traffic is less distinguishable, however.

Though not dramatically apparent on these graphs, Mondays typically show the lowest overall traffic volume of the weekday cycle, while Fridays usually generate the highest weekday volumes. Weekend traffic, of course, varies considerably, depending on location and season.

Screenline Traffic Volumes

In response to AMBAG's traffic model improvements, the RTC now monitors traffic volume counts at cross-sections (of multiple roadways) selected by AMBAG within Santa Cruz County. These screenlines are shown in Figure 6. Appendix D shows the most significant recent counts at these cross-sections, providing a simple picture of overall traffic volumes (bi-directional) throughout the county. "Screenline G," for example, includes Highway 9, Highway 17, Graham Hill Rd, Branciforte Dr. and Glen Canyon Rd just north of the City of Santa Cruz, demonstrates the highest bi-directional flow of vehicular traffic in the county, with daily volume counts of 89,793 motor vehicles.

Figure 6: Screenline Locations



Vehicle Occupancy Counts

Definition: Vehicle occupancy represents the average number of persons per vehicle and indicates the number of "person trips" per "vehicle trip."

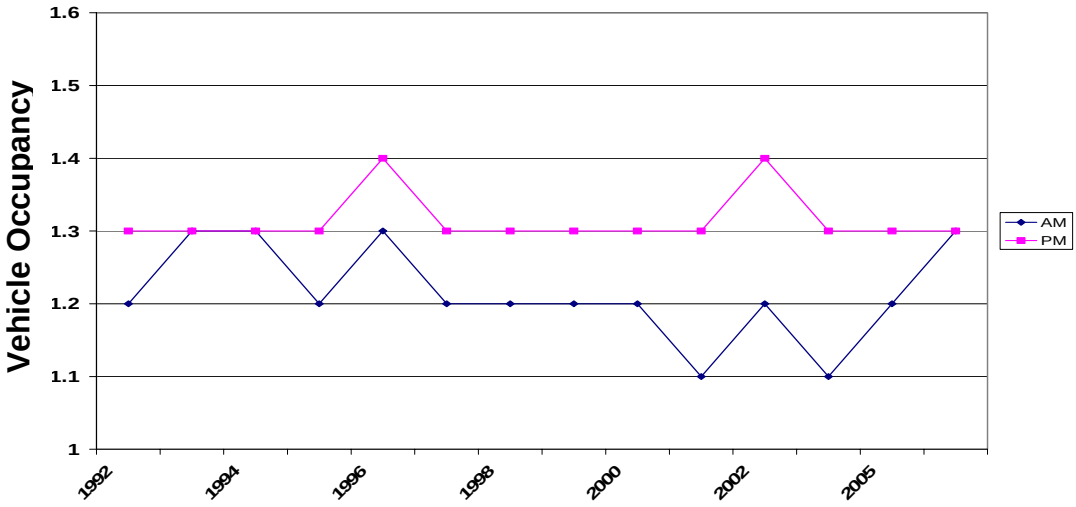
In May 2006, vehicle occupancy and truck counts were taken during peak morning and evening periods on Highway 1 north of 41st Avenue and on Highway 17 at the summit. These counts are performed by two observers in each direction-one observing the fast lane and another observing the slow lane, for a period of three hours. Vehicle occupancy counts provide a means for monitoring the rate of ridesharing (carpooling, vanpooling, or riding the bus) in a corridor. A significant rise in vehicle occupancy increases the efficiency of the existing transportation system. Increased auto occupancy and, therefore, increased passenger miles traveled per vehicle, is a source of substantial fuel savings, cost savings, and reduction in air pollution and congestion. Any significant increase in auto occupancy reduces the need for costly improvements to the road system by increasing the number of people who can travel on the existing system.

Appendix E shows the totals calculated from May 2006 Vehicle Occupancy Counts. Count data was collected in May from 6:45 to 9:45 a.m. and 3:30 to 6:30 p.m. Vehicle occupancy counts show that 85% of vehicles traveling in both directions on Highway 1 during the a.m. peak hours are occupied by just one person; 75% northbound and 80% southbound are single occupant vehicles during the p.m. peak. On Highway 17, counts show that 76% of vehicles traveling southbound and 88% of vehicles traveling northbound during the a.m. peak hours are occupied by just one person; 86% northbound and 82% southbound are single occupant vehicles during the p.m. peak.

Comparisons of the last twelve years of vehicle occupancy data on Highway 17 and Highway 1 are presented in Figure 7 and Figure 8. Although this survey is conducted only one day at each location, it provides baseline information for those segments of highway. Generally, vehicle occupancy is higher during the evening commute period. One possible reason for this difference is the increased number of people running errands and traveling to various activities together. Therefore, the morning vehicle occupancy is often considered more representative of patterns among the commuter population.

Figure 7: Vehicle Occupancy for Highway 17:1992-2006

Figure 8: Vehicle Occupancy for Highway 1: 1992-2006



Operational Data for Highway 1

RTC staff and consultants together with Caltrans, constituting the Project Team, continued work on the preliminary design/environmental study phase of the Highway 1 High Occupancy Vehicle (HOV) Lanes Project. The new lanes, one in each direction from Morrissey Boulevard in Santa Cruz to Larkin Valley/San Andreas Road, would be available to carpools, vanpools, express buses and emergency vehicles during commute hours. Auxiliary lanes are also being considered along the corridor, where appropriate, to extend the weaving and merging distances for motorists entering or exiting the freeway. The purpose of the HOV Lanes Project is: to reduce congestion; to encourage carpooling and the use of alternative transportation modes to increase capacity; and to improve safety.

Staff anticipates the release of the draft environmental documents in late Spring 2008. In the meantime, preliminary traffic performance data regarding the project is available in Appendix F. F-1 shows the anticipated shift in traffic volumes from local arterials to Highway 1 with the HOV Lane Alternative. F-2 thru F-5 show existing conditions and projected changes in morning and afternoon northbound and southbound peak period speed, delay, travel time, and trips in the year 2035 under the No-Build, TSM Alternative (which includes auxiliary lanes and ramp metering, but no HOV lanes), and HOV Lane Alternative scenarios.

Truck Counts

The number of trucks on Highway 1 north of 41st Avenue and on Highway 17 at the summit is shown with the vehicle occupancy counts in Appendix E. Truck volumes on Santa Cruz County's highways are highest in the morning hours. Highway 17 southbound in the morning had the highest overall percentage of truck traffic in May of 2006, approximately 6.6% of all vehicles. Trucks constitute 1.9% of morning traffic northbound and 1.8% southbound on Highway 1. For the purposes of these truck counts, only commercial trucks with more than two axles are categorized as trucks. Pickups and other small trucks are not included in the truck counts.

Caltrans also performs truck counts at various locations on all State Highways within Santa Cruz County. These results are shown in Appendix G.

Vehicle Registration

As shown in Figure 9 and Table 2**,** the number of motor vehicles registered in Santa Cruz County grew 5% between 2000 and 2005 to 219,000 autos, motorcycles, and trucks. The population during this time period has grown 2%.

Figure 9: Motor Vehicle Registration in Santa Cruz County

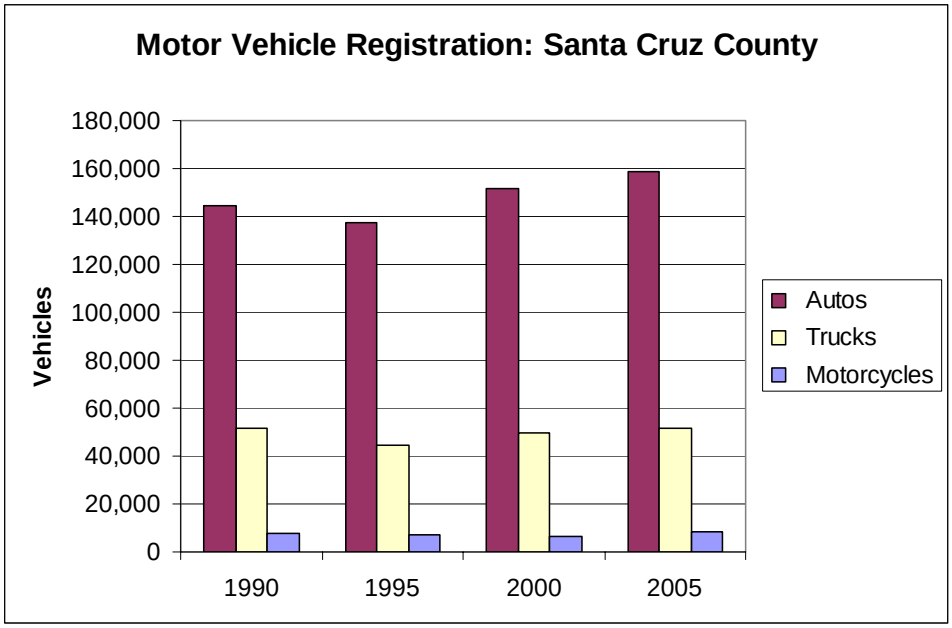


Table 2: Motor Vehicle Registration in Santa Cruz County

Mode	1990	1995	% Change 1990-1995	2000	% Change 1995-2000	2005	% Change 2000-2005
Autos	144,601	137,467	-5%	151,612	10%	158,548	5%
Trucks	51,643	44,240	-14%	49,713	12%	51,888	4%
Motorcycles	7,436	6,905	-7%	6,727	-3%	8,564	27%
TOTAL	203,680	188,612	-7%	208,052	10%	219,000	5%
Population	229,300	241,200	5%	255,602	6%	260,092	2%