Chapter 2
Current Conditions and Settings

PHYSICAL SETTING

Santa Clara Valley is home to the "Silicon Valley" with roughly 4,100 high-technology firms and about 30% of the Bay Area's jobs. The north County, from Milpitas to San Jose to Palo Alto, is extensively urbanized, housing approximately 90% of the County's residents. The south county is predominantly rural, with the exception of Gilroy, Morgan Hill and the small unincorporated community of San Martin; however development and growth has accelerated in the past decade. Land development patterns in South County vary greatly, from denser mixed-use areas of older city centers to the typical suburban pattern of subdivisions and shopping malls.

Geographic Setting

Santa Clara County is the southernmost of the nine counties that make up the San Francisco Bay Area region. The county is bounded to the south by San Benito County, to the west by Santa Cruz County, to the east by Stanislaus County, to the north-east by Alameda County and to the north-west by San Mateo County. The key geographical feature of the County is the Santa Clara Valley bordered on the east by the Diablo Mountain Range and on the west by the Santa Cruz Mountain Range. The valley is part of a long depression within the central Coastal Ranges of California and is characterized by a relatively flat floor. From the axis of the valley, the terrain gently rises towards the east and west to the toe of the foothills, becoming increasingly steep. Consequently, only the Santa Clara Valley floor, roughly one-third of the county, is the developed or developable land. The remaining two-thirds of the County are the foothills, hills, mountains or preserved space.

Natural Topographic Obstacles

The natural and man-made barriers to bicycle travel in Santa Clara County are depicted in Figure 2-1. Each of these features with respect to bicycling is discussed below. The goal for the bike plan is to provide a crossing of these major barriers - via either a roadway crossing (with bicycle/pedestrian accommodations) or a bicycle/pedestrian bridge or tunnel - every half mile in developed areas.

Mountains/Hills

The terrain affects the ease of bicycling, but for the most part development has occurred in the valley areas of the county. Therefore, most of the non-recreational trips made by bicycle are within areas of relatively flat topography.

Creeks/Rivers

Santa Clara County is fortunate to have many creeks that are still in their natural state, most of which drain to San Francisco Bay. They provide excellent opportunities for Class I trails and many have developed bicycle/pedestrian trails along parts of them, i.e. Los Gatos Creek, Stevens Creek, Calabazas Creek, San Tomas Aquino Creek, Saratoga Creek, Guadalupe River, and Coyote Creek. Many others could potentially have trails. However, creeks sometimes pose as obstacles to bicycle circulation themselves. In the worst cases, creeks have been converted to concrete flood control channels. (In some instances, creeks have been put into a culvert and completely paved over; while this eliminates the barrier for bicyclists, it ruins the natural habitat and ecosystem.) Many communities have provided bicycle and pedestrian access across creeks such as the three bridges across Adobe Creek, which forms the border between Palo Alto and Los Altos. Many more bridges are needed where creeks and rivers form barriers to bicycle and pedestrian circulation. In general, new trails and bridges would be subject to approval of the Santa Clara Valley Water District, which is in charge of water supply, flood protection and watershed management.

Manmade Barriers and Obstacles

Freeways

In Santa Clara County, freeways are often the biggest barriers to bicycle mobility and connectivity. Expensive grade-separated roadways on bicycle/pedestrian only bridges/tunnels are the only ways to cross, resulting in a limited number of locations where bikes can cross the freeway. Cyclists are often forced to take long detours to find a grade separation to get from one side of the freeway to the other. Building bicycle/pedestrian bridges or undercrossings is expensive but necessary to restore the severed access, as well as to mitigate the long detours caused by the freeway. In addition, the freeway crossings that do exist are often difficult and intimidating whether it is an undercrossing or an overcrossing. Biking on the shoulders of the roadways going under freeways tends to be an unpleasant experience due to limited width, darkness, lack of landscaping, accumulation of litter and debris, and the proximity of traffic going at high speeds. Overpasses have the added disadvantage of grade. Both often have ramp intersections designed to accommodate high speed motor vehicle traffic without consideration of bicyclists and pedestrians.

Railroads

Railroad tracks pose similar barriers to bicycles as freeways, except that at-grade crossings are possible and often present. Another advantage railroad tracks have over freeways is that they are narrower, thus it is easier and cheaper to construct grade-separated crossings. Undercrossings are more viable, because they require less vertical clearance and are therefore usually less expensive than overcrossings. New at-grade crossings are by far the most economically feasible but are more difficult to get approved.

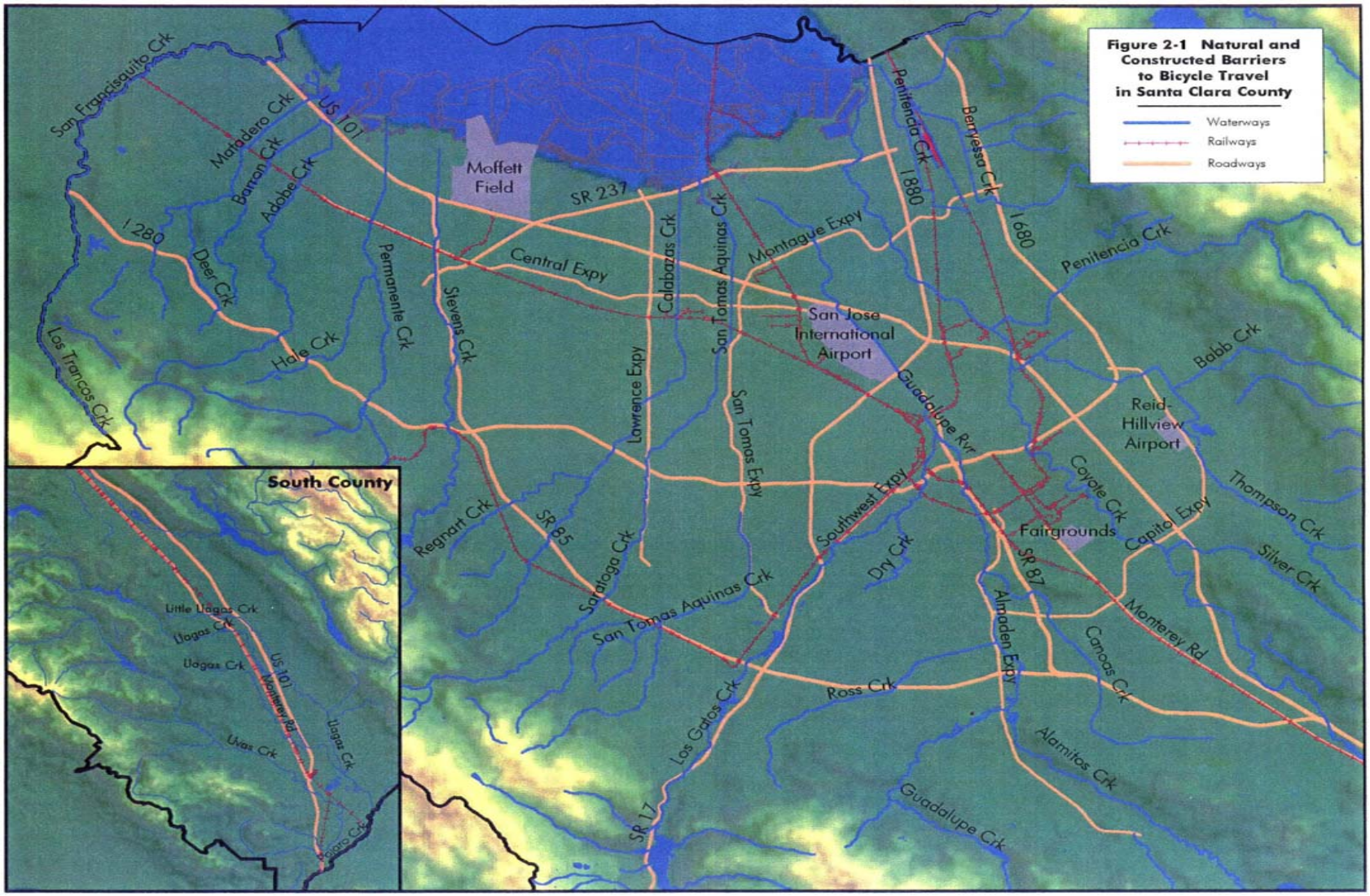


Figure 2-1 Natural and Constructed Barriers to Bicycle Travel in Santa Clara County
Waterways
Railways
Roadways
South County
San Francisquito Crk
Matadero Crk
Barron Crk
Adobe Crk
US 101
Moffett Field
SR 237
I 280
Deer Crk
Permanente Crk
Central Expy
Stevens Crk
Calabazas Crk
San Tomas Aquinas Crk
Montague Expy
Penitencia Crk
I 880
Berryessa Crk
I 680
Los Trancos Crk
Hale Crk
San Jose International Airport
Lawrence Expy
San Tomas Expy
Guadalupe Rvr
Babb Crk
Reid-Hillview Airport
Coyote Crk
Thompson Crk
Regnart Crk
SR 85
Saratoga Crk
Southwest Expy
Fairgrounds
Capitol Expy
Silver Crk
Dry Crk
SR 87
San Tomas Aquinas Crk
Monterey Rd
Almaden Expy
Canoas Crk
Ross Crk
Los Gatos Crk
Alamitos Crk
SR 17
Guadalupe Crk
Little Uvas Crk
Uvas Crk
Uvas Crk
US 101
Monterey Rd
Uvas Crk
Llagas Crk

Expressways

Santa Clara County Roads and Airport Department (County Roads) operates and maintains 62 miles of expressways which are all open to cyclists.

For the most part, the expressways have 8-foot shoulders (per HDM Table 302.1), which make a good bicycle facility for experienced cyclists. In 2003, County Roads developed the Bicycle Accommodation Guidelines (BAG) to identify consistent guidelines for all bicycles on expressway shoulders. The County is reviewing shoulder striping throughout the expressway system for potential improvements to comply with the BAG.

The history of bicycle access to the expressways reflects different city preferences and changing visions for expressway operations. Until 1975, bicycles were prohibited from using all the expressways except Page Mill Expressway in Palo Alto (west of Alma Street) and Almaden, Montague and Capitol Expressways (south of Capitol Avenue) in San Jose. County Roads cooperated with various cities to repeal the prohibition of bicycles on expressways within their respective jurisdictions. First Central Expressway within Mountain View and Foothill Expressway within Palo Alto were opened to cyclists in 1975. The remainders of Foothill Expressway and Central Expressway were opened to bicyclists in 1980. In 1991, the bicycle prohibition was repealed for Lawrence Expressway and San Tomas Expressway within Sunnyvale and Santa Clara, rendering the entire expressway system open to bicycles.

ROAD AND TRAFFIC CONDITIONS

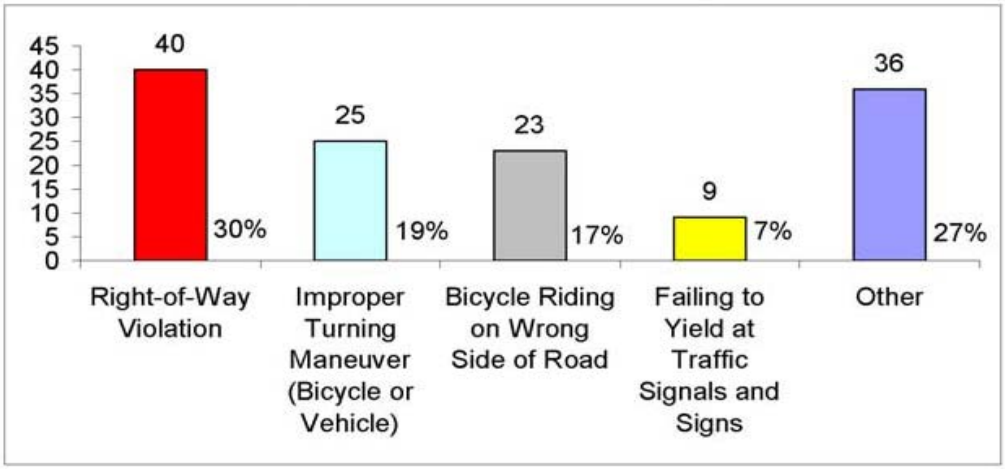
Aside from the physical barriers to bicycle travel discussed above, the traffic conditions in the roadway environment intimidate many bicyclists. The perception of unsafe conditions is the dominant factor for many potential cyclists. They may lack the experience and confidence to bicycle on roads with high traffic speeds and volumes. Overall, distractions such as cell phone use have increased and driving behavior and courtesy have deteriorated, which are deterrents to bicycling. Roadway design has traditionally favored cars over bicycles and pedestrians. In situations where motorists are turning right to exit or enter a freeway or expressway, bicyclists proceeding straight through are often forced to stop and wait for cars to clear, before moving forward, since the majority of motorists are not likely to slow down for bicycles. The BTG contains recommendations on how to avoid these bike-unfriendly designs.

Collisions

Countywide bicycle collision analysis has not been conducted, although it is an Action step under Policy D2 (See Appendix A). Some Member Agencies have evaluated their local bicycle collision data as part of or separately from their bicycle plans. For example, as part of its current bike plan update, the City of San Jose analyzed bicycle and pedestrian collision data from 2002. Some of the findings were as follows: the most common error made by bicyclists was riding on the wrong side of the roadway. Most of the collisions where the bicyclist was at fault involved bicyclists in the 16-25 year age group. When drivers were at fault, it was mostly due to their failure to yield while making a left or right turn. Drivers at-fault were mostly in the 46-55 age group.

The Metropolitan Transportation Commission (MTC) conducted a study on bicycle collisions for the City of Sunnyvale and the findings are presented in the 2004 SafetyTAP report. Based on collision data analyzed for the 1999-2002 study period, the primary collision factor for bicyclists is a right-of-way violation usually made by male motorists in the 30-45 age group. The two main violations identified for right-of-way collisions are drivers executing improper turns without yielding to bicyclists and drivers/cyclists failing to yield to on-coming traffic when exiting a driveway or alley. Male motorists-at-fault account for 83% of these right-of-way collision accidents while cyclists-at-fault were found seven out of eight times to be under 16 years old. In cases where the cyclist is usually at fault, the study supports the data analyzed by San Jose and finds wrong-way riding to be the primary cause for cyclists to cause a collision accident. Figure 2-2 below shows other primary collision factors for bicyclists:

Figure 2-2: Primary Collision Factors for Bicyclists



Source: City of Sunnyvale 2006 Bicycle Plan, Appendix D: MTC SafetyTAP Report, 2004

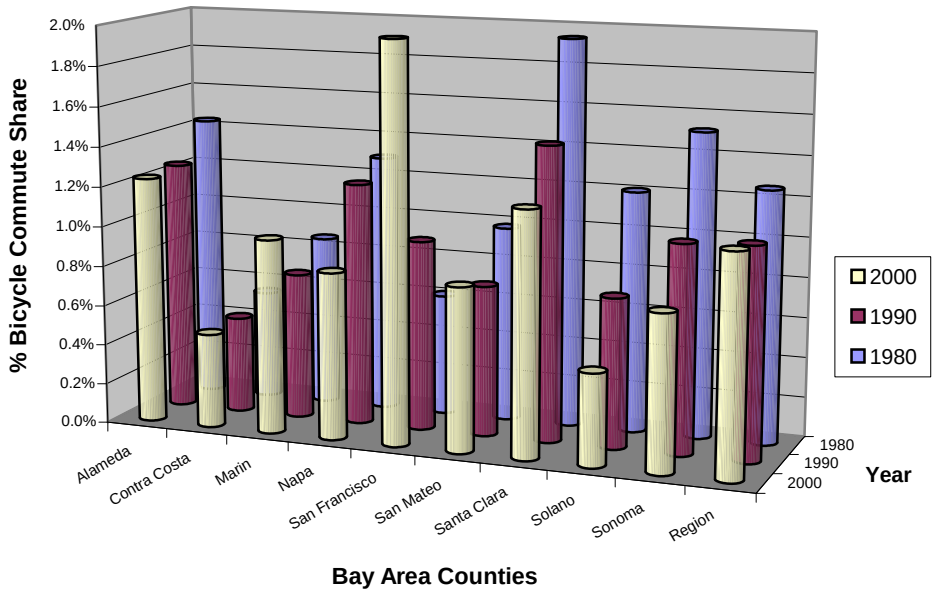
BICYCLE PLANNING DATA

Bicycle Mode Splits and Trip Purposes

The 2000 Census Data for bicycle mode of commute for Bay Area employed residents by County is shown in Figure 2-3. In 2000, 10,000 residents or about 1.2 % of the County's employed residents traveled to work by bicycle. This is a drop from 1.4% in the 1990 Census and 1.9 % in the 1980 Census. This drop is partially explained by the fact that commute distances have increased for Santa Clara County residents. While most counties in the Bay Area experienced similar or slightly less dramatic drops, there was one notable exception: San Francisco experienced the exact opposite trend of Santa Clara County, increasing its bike commute share from 0.6% to 2% between 1980 and 2000.

While over ten thousand residents in Santa Clara County indicated that bicycling was their primary mode for traveling to work, this number reflects only a snapshot of behavior on one particular day in April. In all likelihood, the actual number of residents who bike to work on any given day during the spring and summer months is much greater, since more people bike during the warmer months. Also many people bike one or two days a week and many bike to transit or train stops, which is recorded as a transit trip not a bike trip.

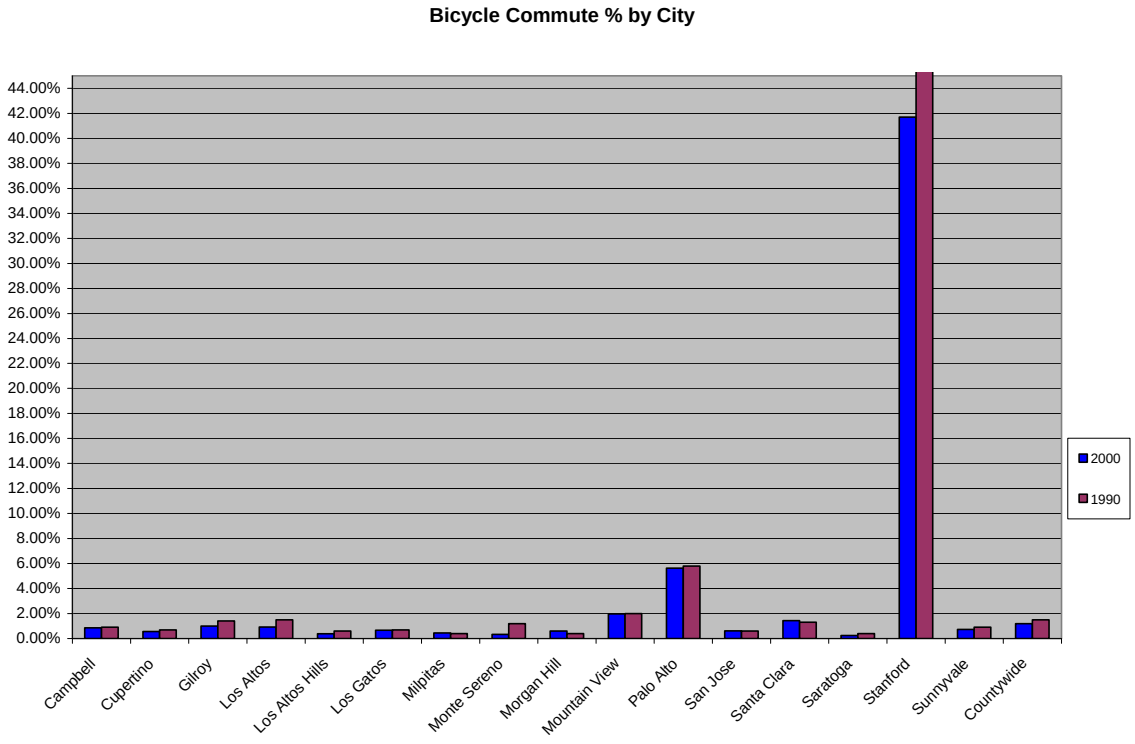
Figure 2-3: Bicycle Commute Share by County of Residence



Source: US Census 2000 Journey to Work San Francisco Bay Area, June 2005

The Cities of Palo Alto, Mountain View and Santa Clara have the highest rates of bicycle commuting within Santa Clara County at 5.6 %, 2.0 % and 1.5 % respectively. These cities have consistently been the leaders in bike commuting in Santa Clara County as shown in Figure 2-4. The unincorporated area of Stanford, given its high percentage of students as well as density (students per sq. mi.) has the highest bike commute rate of 40%.

Figure 2-4: Bicycle Commute Share by City



Source: US Census 2000 Journey to Work San Francisco Bay Area, June 2005

Existing Bicycle Counts and Surveys

Bike/Pedestrian Intersection Counts

VTA conducts bike counts at 10 locations as part of its annual Monitoring and Conformance study. Bicycle count locations were selected on the basis of several criteria including: expected high-volume locations, locations where land use is planned to be intensified and bike activity increased, locations on the cross-county bicycle corridors network and locations of future bicycle corridor gap closures. Counts have been conducted at these locations for the past five years. The 5-year count data is contained in Appendix B1. Overall, counts were higher in the afternoon peak periods than in the morning peak periods[1]; this reflects the fact that evening traffic is heavier in general, whereas morning traffic is usually lighter and consists

[1] The counts are broken down into AM, Midday and PM portions during expected peak periods. AM counts occur between 9:00 and 11:00AM, Midday counts occur between 11:00AM and 1:00PM, and PM counts occur between 4:00 and 6:00PM. The counts have been tabulated for the maximum peak-hour within each two-hour count period

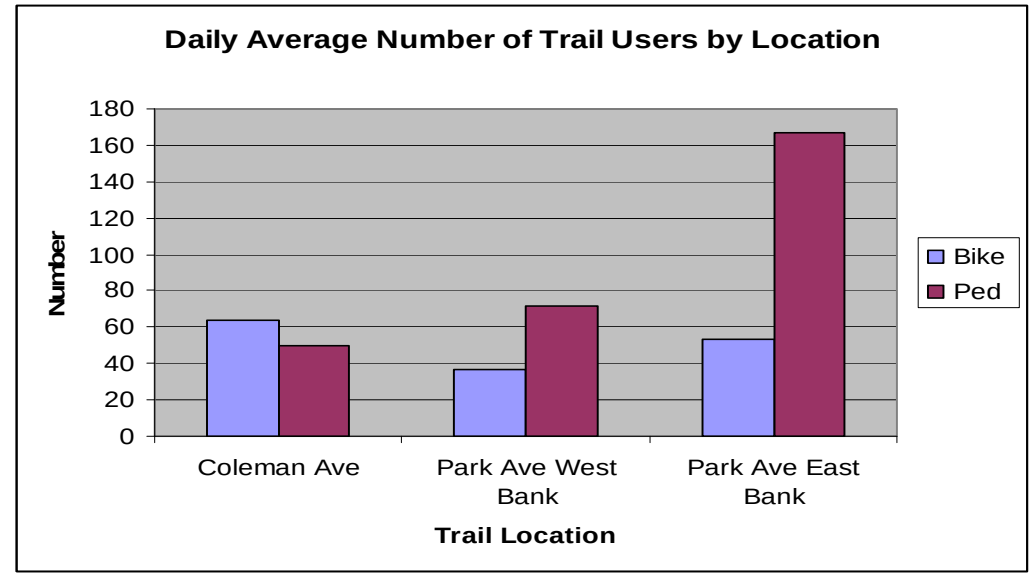
mostly of commute trips. Over the past 5 years, there has been a general increase in bike activity in these intersections as well as a general increase in bike counts during the afternoon peak periods.

MTC also conducted bike intersection counts as part of its regional Bicycle and Pedestrian Data Collection and Analysis Project in October 2002 and 2004. The counts and locations are in Appendix B2.

Trail and Bridge Counts

VTA also conducted a count on the River Oaks bridge in September 2007. VTA staff and BPAC volunteers counted 500 pedestrians and bicyclists between the hours of 7am-7pm. The 12-hour data was then extrapolated to the full 24-hour day by comparing the volumes to that of the vehicle volumes on nearby Garrity Way. It is estimated that there are 800 crossings a day.

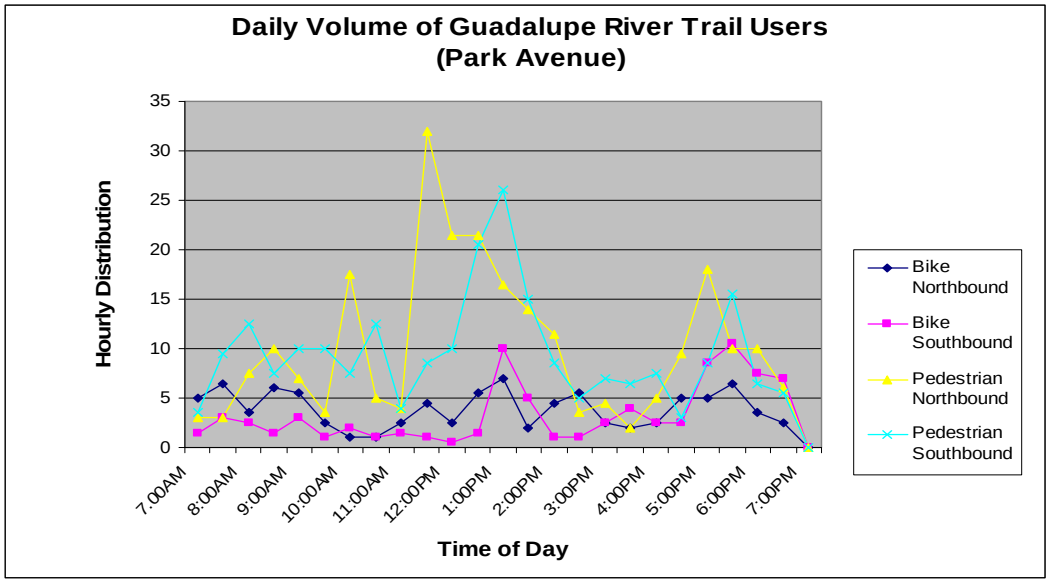
The City of San Jose conducted its first ever Trail Count in September 2007 on Guadalupe River Trail, in partnership with the Friends of the Guadalupe River Park & Gardens and the Silicon Valley Bicycle Coalition. Two count stations were selected; Park Avenue where users traveling on *both* banks of the river were counted and Coleman Avenue where users along the west bank trail were counted. The count was conducted from 7 am to 7 pm for two days; the average 12 hour count for the three locations is plotted below in Figure 2-5. On average, there were over 750 users per day, with 65% using bicycles. Pre-paid postcards were giving to trail users as they passed the counting stations. The responses indicated that nearly 40% were commuting to and from work in North San Jose. The City plans to conduct a similar count in 2008 and anticipates an increase in the counts with the recent opening of under-crossings at Airport Parkway and Highway 101 near the Airport.



Source: San Jose Trail Count 2007, http://www.sjparks.org/Trails/TrailsReports.asp

Figure 2-6 shows the hourly distribution and peak hours of trail users for this trail section. Overall, pedestrians outnumber bicyclists particularly at midday, especially those who travel in the northbound direction.

Figure 2-6: Guadalupe River Trail-Park Avenue Counts



Source: San Jose Trail Count 2007, http://www.sjparks.org/Trails/TrailsReports.asp

Bike Counts on Transit

VTA Survey of Passengers with Bicycles

As the operating agency for bus and light rail in Santa Clara County, VTA collected detailed data related to bicycle usage by transit passengers as part of the On-Board Passenger Surveys conducted in spring 2000. The survey found that 2% of all VTA passengers get to and from the bus stops and rail stations by bicycle. The average VTA cyclist-passenger bikes 15 minutes (estimated 3 miles) to get to a VTA stop or station, and then bikes 9 minutes (estimated 2 miles) after getting off VTA to reach their ultimate destination. Most bicycle-transit trips are commute trips related to work or school.

Most bicyclist-passengers on VTA are concentrated in the central to northern areas of Santa Clara County. Geographic trip origin and trip destination numbers for VTA bicyclist-passengers are shown in Table 2-1.

Table 2-1: Trip Origins and Destinations of Bicycle Riders on VTA

Trip Origin	%
San Jose	55.5
Santa Clara	9.4
Mountain View	5.6
Milpitas	5.0
Sunnyvale	4.9
Other	19.6

Trip Destination	%
San Jose	46.7
Mountain View	10.8
Palo Alto	9.6
Milpitas	6.7
Santa Clara	6.2
Other	20.0

Table 2-2 shows the distribution of cities of residence for the VTA cyclist-passengers.

Table 2-2: Residence Locations of Bicycle Riders on VTA

Residence Location	%
San Jose	63.8
Mountain View	10.1
Sunnyvale	6.6
Cupertino	3.7
Santa Clara	2.5
Alameda County	1.2
South County	1.0
Other	11.1

Statistics on age, ethnicity and household income of the surveyed cyclist-passengers are shown in Table 2-3. However, the most extraordinary statistic is that of the gender of cyclist-passengers, 93% were male and 7% were female.

Table 2-3: Age, Ethnicity and Household Income of Bicycle Riders on VTA

Age	%
13-17	4.3%
18-24	7.8%
25-34	35.7%
35-44	33.3%
45-64	18.1%
> 65	0.8%

Ethnicity	%
White/Caucasian	42.9%
Hispanic/Latino	36.8%
Black/African American	13.5%
Vietnamese	1.1%
Other Asian/Pacific Islander	5.0%
Other	0.7%

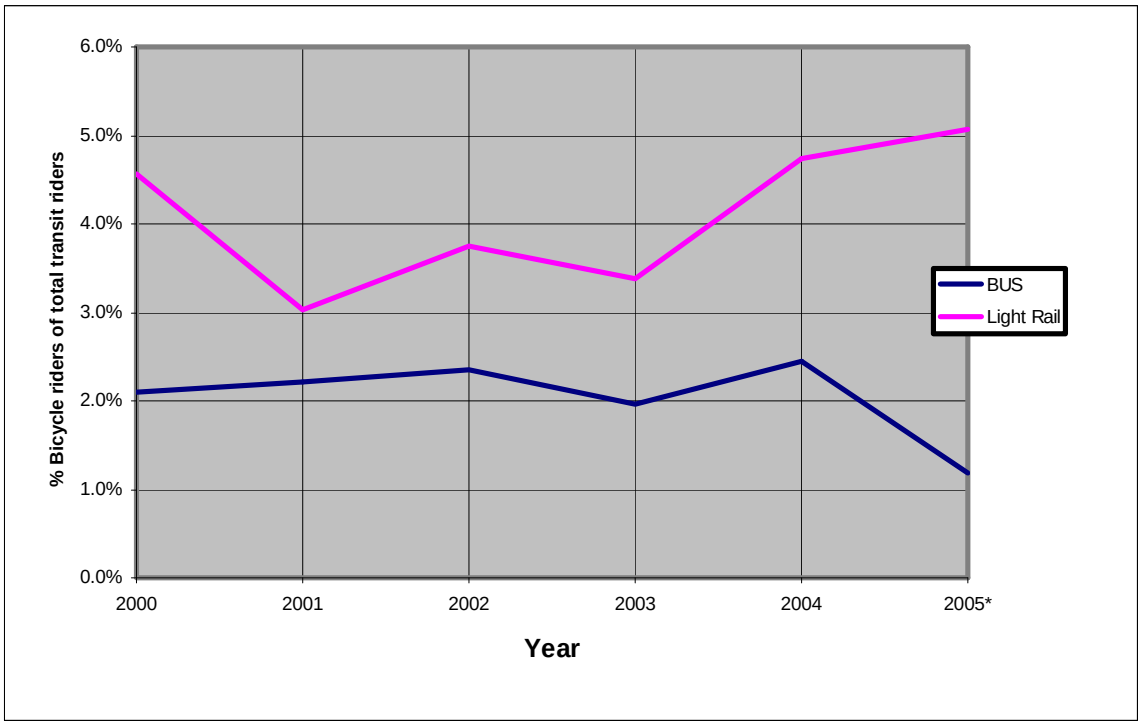
Household Income	%
< $20,000	26.8%
$20,000 -$34,999	27.0%
$35,000 - $49,999	15.9%
$50,000 - $74,999	8.6%
$75,000 - $99,999	13.4%
> $100,000	8.3%

VTA Counts of Passengers with Bicycles

The percentage of passengers bringing bicycles onto VTA buses and using the bus racks has hovered at about 2% of all boardings since the year 2000. Light rail historically achieves a higher bike ridership than the buses, reaching a peak of 5% in 2005. The yearly trends are presented below in Figure 2-7. [2]

[2] The bicycle ridership survey was conducted aboard VTA light rail vehicles for a full 24-hour service day. Operators took count of bicycle boardings by use of a tally card. Data was collected in hourly increments to allow for compilation and analysis of the data for various time intervals, including hourly usage, peak and non-peak usage, and total weekday boardings. In 2005, the bus bicycle ridership survey used a new methodology and technology. The survey was conducted aboard VTA buses for a full 24-hour service day. Using the AMDT (Advanced Mobile Data Terminal) for the first time to count bicycle boardings. Last year in May 2004, there

Figure 2-7: Bus vs. Light Rail Bicycle Ridership



Source: VTA Bicycle Ridership Survey, 2004-2005

The most recent 24-hour bicycle count on board VTA vehicles was conducted in October 2005. Table 2-4 shows the results; the decrease in bicycles on board buses is explained in the footnote. About half of the bicycles are carried during the morning and afternoon peak periods, and the remaining half are carried during the nonpeak periods.

Beginning in 2006, VTA began using the Automated Passenger Count (APC) system. About 30 % of the vehicle fleet (130 buses and 30 light rail cars) is equipped with APC to collect On/Off data on a daily basis; these vehicles are rotated through the system to collect data on all VTA lines. Although this gives VTA a much more current and accurate count of boarding and alightings for all the VTA lines, it does not count passengers with bicycles.

were 2,583 bike boardings observed by 527 bus operators. This year, there were 1,141 bicycle boardings by 281 bus operators that rendered a reliable and representative sampling of VTA bicycle boarding passengers. It is unclear as to what caused the decline in both boardings data and operator participation. Possible causes of the decline in data collected are: (1) technical difficulties on the AMDT and (2) unfamiliarity of operators to the new data collection procedure. However, the data gathered from this study yielded an abundant amount of new information that was not available from last year's method of data collection. Specifically, each boarding event was recorded at the bus stop level using the *Advanced Communications System* that including: (1) bus stop location, (2) bus route.

Table 2-4: Number of Bicycle Riders Boarding VTA Buses and Light Rail (Peak & Non-Peak for a Full Service Day)

Mode	AM Non-Peak 12 am–6 am	AM Peak 6 am–9 am	Midday 9 am–3 pm	PM Peak 3 pm–6 pm	PM Non-Peak 6 pm–12 am	Total	Average Weekday Ridership	% of Riders with bicycles
Bus	67	361	333	237	143	**1,141**	97,351	1.2%
Light Rail	67	253	320	245	222	**1,107**	21,863	5.06%
System Totals	134	614	653	482	365	**2248**	119,214	
% of Total	6.0%	27.3%	29.0%	21.5%	16.2%	100%		%

Source: VTA Light Rail Bicycle Ridership Survey, 2005

Caltrain

The annual Caltrain passenger bike count was conducted in February 2007. The February counts have taken place every year since 1994. Since summer of 2004, Caltrain's overall ridership has experienced steady growth with the implementation of the Baby Bullet express train service in June 2004. This year, ridership counts have moderated yet remained strong due to no new added service *and* a steady stream of regular service. Bicycle usage counts have also followed a more moderate trend with 2,334 bike boardings this year. This is a 2.8% increase compared to last year's significant 22.0% increase. Table 2-5 show the top five trains and stations reported with the most bicycle activity:

Table 2-5: Top Trains and Stations for Bicycle Activity

Top 5 Stations for Bike Usage

Station	AWBR
San Francisco	442
Palo Alto	273
Mountain View	233
Redwood City	163
San Jose Diridon	134

AWBR = Average Weekday Bike Ridership

Top 5 Trains for Bike Usage

Train (departs)	AWBR
217 (6:57 am SJ) *	52
267 (4:39 pm SJ)	51
158 (3:07 pm SF)*	45
323 (5:45 am SJ)	43
220, 227, 280	42

* serves Gilroy

Source: Key Findings Caltrain Annual Passenger Counts, February 2007

Caltrain also conducted an online survey of bicyclist-passengers in 2007. The survey results show that roughly 10% of overall Caltrain users ride their bicycle to the station, as well as from the destination station to reach their final destination. Of the bike and Caltrain users, almost 60% travel on average 4-5 days a week as passenger-bicyclist. Most of these passenger-bicyclists bring their bicycles on board which causes Caltrain to experience increased demand for on-board bicycle storage. In fact, 87% of current Caltrain passengers who arrive by bike bring their bicycles on board while the remaining 13% park their bikes at the stations.

While each train has at least one bicycle car attached (some trains may have two), the capacity of bicycle storage on board will vary depending on the type of train used and the number of bicycle cars attached onto that particular model of train. As such, bicycle storage on-board can range from 16-64 bikes. Such different storage capacity constraints, unfortunately leads to increasing incidences of bicycles being denied boarding on trains because the bicycle capacity becomes filled. About 42% of former and current bike and Caltrain users have reported being "bumped" off a train five times or more during the past year because the bicycle car was full.

Overall, the survey reveals a normal commute trend for bicycles on board transit. More bicycles are carried northward in the morning, and southwards in the evening. Santa Clara County accounts for 43.4% of the bicycle boardings systemwide. The ten stations with the most boardings for 2003, 2005, 2006, and 2007 are shown in Table 2-6. For a more detailed break-down of bicycle boardings and de-boardings on northbound and southbound trains, see Appendix B3.

Table 2-6: Bicycle Boardings at Caltrain Stations

Station	2007	% of Total	2006		2005		2003	
	AWBR	AWBR	AWBR	Rank	AWBR	Rank	AWBR	Rank
San Francisco	442	18.90%	442	1	320	1	263	1
Palo Alto	273	11.70%	265	2	196	2	108	2
Mountain View	233	10.00%	205	3	155	3	99	4
Redwood City	163	7.00%	160	4	127	4	100	3
San Jose Diridon	134	5.70%	130	5	101	5	82	6
Menlo Park	108	4.60%	107	6	80	7	72	7
Hillsdale	107	4.60%	95	7	77	8	NA	
Sunnyvale	98	4.20%	93	8	80	7	72	7
California Ave.	95	4.10%	87	10	85	6	95	5
San Mateo	93	4.00%	90	9	74	9	NA	

AWBR = Average Weekday Bike Ridership

Source: Key Findings Caltrain Annual Passenger Counts, February 2007

Recommended Bike Count Programs

- Bike Counts:
  - Continue with annual CMP Monitoring Program bike counts at ten intersections, AM, midday, and PM peak periods
  - Count bikes and pedestrians at key bridges and cordons once a year; coordinate with neighboring cities if possible
  - Count bikes brought on board buses and LRV once every two years; use data to assist in relieving overcrowding, see page 6-8
  - Prior to a new ABC opening, assist with "before" bicycle and pedestrian counts, on the alternate routes
- Estimate Countywide mode split once every two years for journey to work and other trip purposes.
- Estimate bicycle and pedestrian access-to-transit mode split.
- Identify fund sources for these tasks.
- Evaluate Bicycle Collision Data annually.