Pedestrian and Bicycle Manual Counts Report for Alameda County

2002 to 2011

September 2012

ALAMEDA
County Transportation Commission

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Executive Summary

The Alameda County Transportation Commission (Alameda CTC), along with several regional agencies and educational institutions, has been collecting data on the number of bicyclists and pedestrians throughout the county since 2002. This data, while useful, was not collected in a consistent manner. In 2010, the Alameda CTC established an annual count program with the selection of 63 sites at which to conduct counts every year using the same methodology. The primary goal of the count program is to provide countywide trends in bicycling and walking over time. Where there is sufficient data, the goal is also to assess trends by area of the county.

In 2011, Alameda CTC published the first report analyzing data collected from 2002 to 2010. This report updates the previous one and includes count data collected in September and October of 2011.

Data Sources and Methodology

The count data used in this report was collected during three distinct periods, as shown below.

Figure 1: Standard time periods

Period	Standard Times
Mid-day	12 to 2 PM
School	2 to 4 PM
PM	4 to 6 PM

For both the bicycle and pedestrian data, there are two groupings of data that serve different purposes (see Figure 2 for a summary of the years counted and number of sites, by time periods):

- Near-term **"annual data"** uses the 63 locations, or a subset of them, that were selected in 2010 for the annual count program and were counted again in 2011. As time goes on, this larger set of data will provide more accurate trends in walking and bicycling throughout the county and at the planning area level.
- Longer-term "**longitudinal data"** describes historic trends over either a four- or ten-year period, using a smaller set of count locations that are available for comparison. Sites where data was collected during the same time periods and the same years are considered comparable; for the PM period, these are limited to six common sites for pedestrians and nine for bicyclists. Although they represent a small number of locations, they are useful for tracking the long-term trends, since the earliest year data points allow observing a ten-year trend line.

Figure 2: Annual and longitudinal data sets

	Annual Data		Longitudinal Data	
Count Period	Comparison Years	# of Sites	Comparison Years	# of Sites
Pedestrian				
PM	2010, 2011	62*	2002, 2003, 2010, 2011	6
Mid-day	2010, 2011	44	2008, 2010, 2011	9
School	2010, 2011	17	N/A	N/A
Bicycle				
PM	2010, 2011	62*	2002, 2004, 2006, 2008, 2010, 2011	9
Mid-day	2010, 2011	44	2008, 2010, 2011	9
School	2010, 2011	17	N/A	N/A

* Although counts were conducted at 63 locations in 2011, given changes in the configuration of one intersection, the data for this site was not comparable to the previous year.

Pedestrian Data

While the number of pedestrians counted has increased substantially in the past ten years (since 2002), there was little change in the counts between 2010 and 2011 at the countywide level.

Annual Count Data – 2010 to 2011

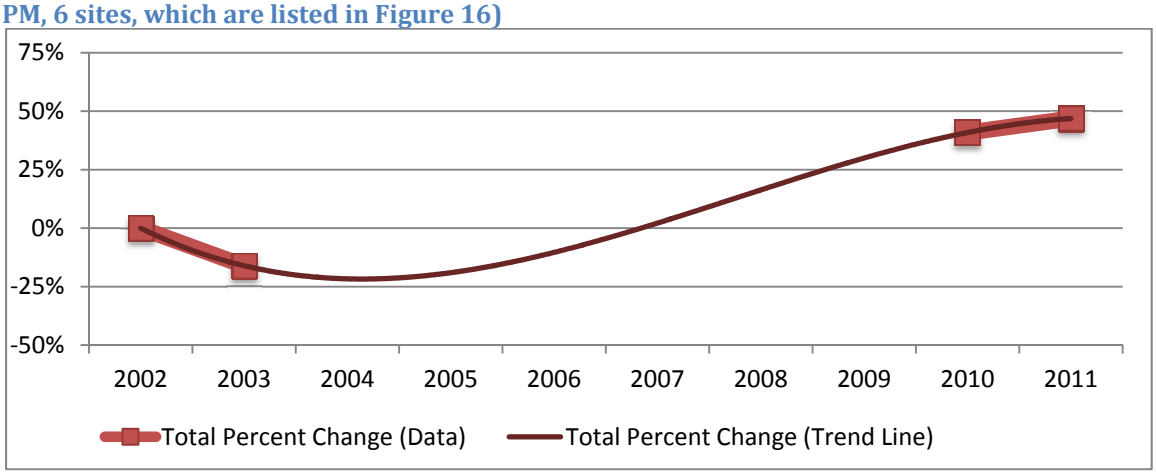
- Pedestrian counts remained stable from 2010 to 2011 across all time periods.
- The PM period data shows essentially no change in the last year.
- Mid-day period pedestrian counts also show essentially no change, with an overall 2% increase.
- School period data, based on counts collected at 17 sites that are all within a half mile of at least one K-12 school, shows no change in pedestrians counted.
- By area of the county, the percent change in pedestrians from 2010 to 2011 shows significant increases in the eastern and southern parts of the county, with the northern and central parts showing little to no increases, respectively.

Longitudinal Count Data – 2002 to 2011

- The long-term trend in PM period pedestrian counts continues to be upward. From 2002 to 2011, pedestrian counts increased by 47% at a set of six common sites (Figure 3 below, and Figure 16, which lists the count sites).

The longitudinal data trends for pedestrians are shown below as the percentage change relative to 2002, with a trend line between 2003 and 2010, when no data is available.

Figure 3: Percent change in PM pedestrian counts relative to 2002 (2002, 2003, 2010, 2011; weekday PM, 6 sites, which are listed in Figure 16)



Bicyclist Data

The bicycle data shows clear, significant increasing trends across all time periods, both between 2010 and 2011, and historically over the last 10 years.

Annual Count Data – 2010 to 2011

- Bicyclists counted in the PM period increased by 27%.
- The mid-day period counts show a 36% increase.
- The school period saw a more modest increase of 6% at the 17 common count sites.
- While the trend in bicycle counts is clearly upward across all time periods, there is considerable variability at the count-site and time-period level.

Longitudinal Count Data – 2008 to 2011

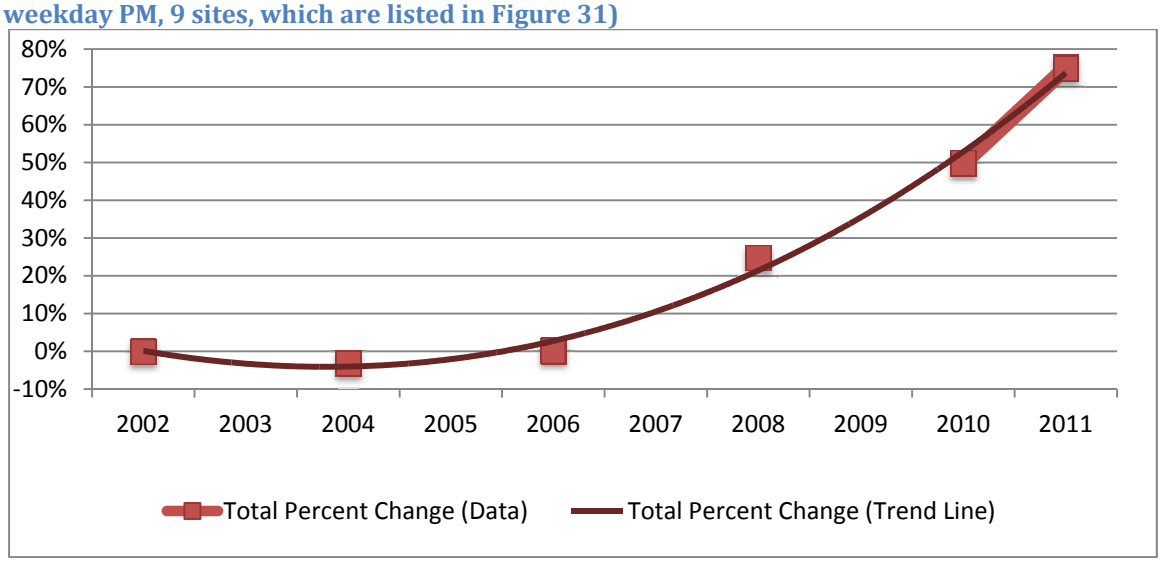
- The mid-day period counts show a 143% increase from 2008 to 2011 at the nine common sites.

Longitudinal Count Data – 2002 to 2011

- The PM period, which has the longest trend data available, saw an overall 75% increase in bicycle counts from 2002 to 2011 at nine common sites.

Figure 4 below shows the percentage increase of PM period counts relative to 2002, as well as a trend line that best fits this data. While there was a slight decrease in counts between 2002 and 2004, since 2004 the number of bicyclists counted has increased steadily and significantly each year.

Figure 4: Percent change in PM bicyclist counts relative to 2002 (2002, 2004, 2006, 2008, 2010, 2011; weekday PM, 9 sites, which are listed in Figure 31)



Gender and Helmet Data

- Females made up only 30% of cyclists counted in 2011. However, the proportion of female cyclists has risen steadily and significantly over the last four years, from 18% in 2008. Increases in female bicyclists were seen during all time periods and in all four areas of the county.
- Helmet usage increased between 2010 and 2011 from 51% to 58%. Increases in helmet usage were seen in all time periods and areas of the county.

Contextual Data and Trends

Population

- The total increase in the population of Alameda County from 2002 to 2011 was 3.7%, as compared to the 47% and 75% increases in pedestrian and bicycle counts, respectively. Therefore, increases in walking and bicycling cannot be attributed in large part to population increases.

Collisions

- While pedestrian collisions decreased 31% between 2002 and 2009, pedestrian volumes in the PM period increased by 41% in a similar time period (2002 to 2010). This suggests a significant decline in the number of collisions per pedestrian in the county.

- While bicycle collisions increased 14% between 2002 and 2009, bicycle volumes in the PM period increased by a much greater percentage — 50% — in a similar time period (2002 to 2010). This suggests a decline in the number of collisions per bicyclist in the county.

Access to BART

- Increased walking and biking in the county has coincided with increases in the percentage of people walking and biking to BART stations in Alameda County.

California Gasoline Prices

- From 2002 to 2011, gas prices rose by 147%, as compared to the 47% and 75% increases in pedestrian and bicycle counts, respectively. This suggests that increasing gas prices could be influencing the increases in walking and bicycling seen in the county.

Background

Purpose

The primary goal of the Alameda CTC bicycle and pedestrian count program is to provide overall countywide trends in bicycling and walking over multiple years. Where there is sufficient data, the goal is also to assess trends at the sub-county levels of North, Central, South and East. Having consistent walking and bicycling data is important for many reasons, including:

- **Baseline Data**: To have a consistent methodology over multiple years so as to compare accurately the trends across the county.
- **Safety**: To understand the changes in collision rates, i.e., the number of bicycle/pedestrian collisions relative to their volumes.
- **Timely Data**: To see trends as they are happening. Annual count data shows trends more immediately than data sources that are collected less frequently.
- **Modeling**: To assist with enhancing the regional and countywide transportation models' ability to predict walking and biking trips.
- **Multi-modal Level of Service (LOS)**: To have better multi-modal metrics to use in assessing climate protection policies.
- **Return on Investment/Planning**: Although many factors contribute to walking and bicycling rates, counts can help show the impact of bicycle/pedestrian capital facilities and programs so as to improve decision-making. For example, it may be possible to assess the changes in school trips as a result of Safe Routes to Schools programs.

Although counting at selected intersections captures only a small subset of people who are biking and walking, it is standard practice to use a set of locations to extrapolate the number of people using these modes. The intent is not to count everyone who is on foot or bike, or even those places with the highest number of bicyclists and pedestrians, at any one time. Rather, the goal is to paint a picture of changes over time.

Manual Count Locations

Since 2002, Alameda CTC and other agencies have collected manual count data for countywide purposes at 99 different locations around the county. Some of these counts were of bicyclists only, some were in different time periods, and the same sites were not counted in each year. Therefore, there is no trend line for all 99 sites. The historic counting efforts included:

- The (former) Alameda County Congestion Management Agency's biennial Level of Service (LOS) Monitoring Report included bicyclist counts at 12 locations, which were conducted by local jurisdictions throughout the county in 2002, 2004, 2006 and 2008.

- The Metropolitan Transportation Commission (MTC) conducted regional bicyclist and pedestrian counts in 2002 and 2003 at 13 and 6 locations, respectively, in Alameda County.
- UC Berkeley's Safe Transportation Research & Education Center (SafeTREC) — formerly Traffic Safety Center — with funding from the Alameda CTC, conducted bicycle and pedestrian counts at a combined 79 locations in 2008 and 2009 to assist in developing a model to predict pedestrian and bicyclist volumes. These locations were mainly, but not exclusively, on Caltrans facilities, since this was the focus of the research project.

In 2010, 63 count locations were selected by Alameda CTC for an annual count program, most of which were a subset of the 99 count locations described above. These 63 sites, or a subset of them, are the focus of this report. The 63 count locations (listed in Appendices A and B, and shown below in Figure 5 and Figure 6) were selected based on a set of criteria that includes the following:

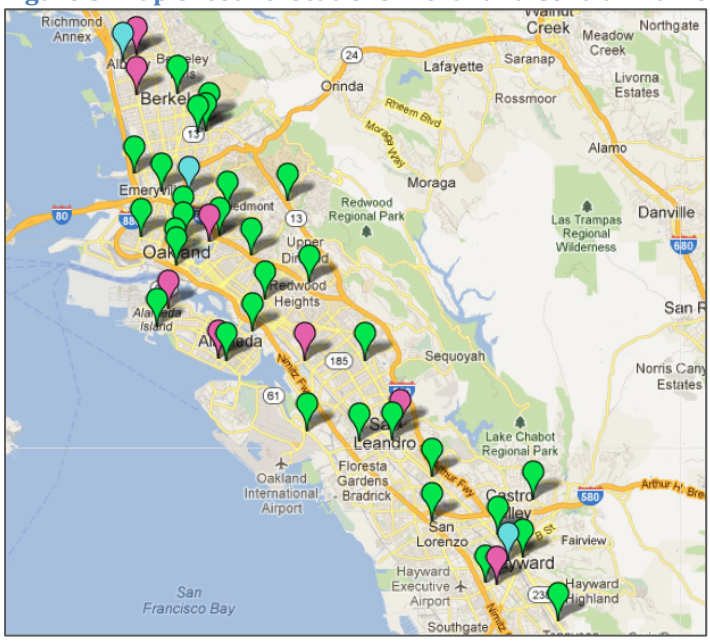
Primary Criteria (in order of importance)

- Locations where counts have been conducted historically, especially those counted in earlier years
- On the Countywide Bicycle or Pedestrian Network. All locations are on one or both networks.
- Distribution of sites by area of the county, based on population (to follow national best practices on the number of counts needed to accurately reflect walking and biking)

Secondary Criteria

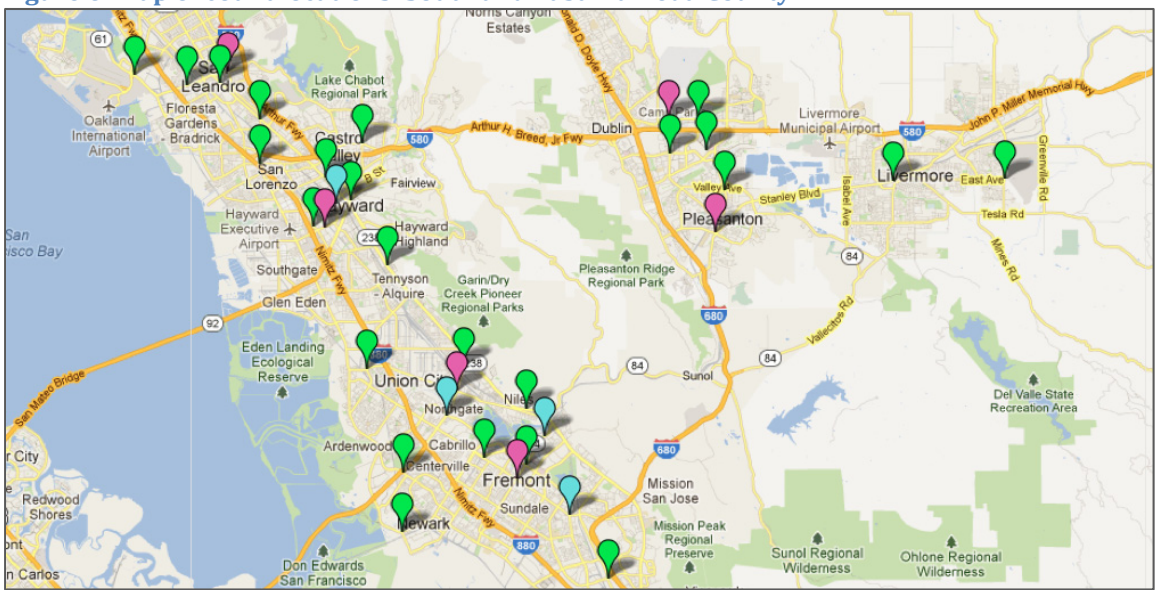
- Variety of land uses – commercial, residential, industrial and offices
- Variety of land use density (within ¼-mile radius) – high, medium and low
- Variety of street types
- Variety of types of crossings: signalized and unsignalized
- Some locations near transit (within a ¼-mile radius)
- Some locations near multi-use trails (within a ¼-mile radius)
- Some locations near schools (within a ½-mile radius)
- Minimum distance between count locations of ¼ mile to reduce interdependence between the sample locations

Figure 5: Map of count locations: North and Central Alameda County



Source: Google Maps.
Note: Marker colors refer to the entity conducting the counts (MTC = pink; Alameda CTC = green, turquoise).

Figure 6: Map of count locations: South and East Alameda County



Source: Google Maps.
Note: Marker colors refer to the entity conducting the counts (MTC = pink; Alameda CTC = green, turquoise).

Data Sources and Methodology

As noted previously, in 2010, a set of 63 sites was established at which to conduct annual counts. In September and October of 2011, data was collected at these same 63 locations. (At one count site in Hayward, the intersection was under construction during the count period, so this data was not used in this report, except in the gender and helmet use sections. Therefore, the total number of sites used for most analysis in this report is 62.)

In the first Counts Report for Alameda County (published in 2011), after the initial year of counting at the 63 sites, a maximum of only 44 pedestrian and 28 bicycle count sites could be compared between 2010 and the previous count years. At the time-period level, few comparisons were available with more than ten sites, and the more years covered, the fewer sites with comparable data there were. Because the accuracy of the trend analysis increases with the number of sites that can be compared for each year and time period, there is a benefit to maintaining as many count sites as possible from year to year. For this reason, the data collection sites used in 2011 matched all the sites used in 2010, providing a wealth of comparable data that was not available previously.

For both the bicycle and pedestrian data, there are two groupings of data that serve different purposes:

- Near-term **"annual count data"** is based on the 63 locations selected in 2010 for annual counts. This larger grouping of locations has now been counted in two years — 2010 and 2011 — and, with some minor changes, will continue to be counted in the future. As time goes on, this larger set of data will provide more accurate trends in walking and bicycling throughout the county and at the planning area level. All 63 count locations are counted during the PM period. They have also been counted during a second time period: either the mid-day or the school period, depending on their location (see Figure 7 for an explanation of time periods).
- Longer-term "**longitudinal data"** describes historic trends over either a four- or ten-year period, using a smaller set of count locations that are available for comparison. Sites where data was collected during the same time periods and the same years are considered comparable; for the PM period, these are limited to six common sites for pedestrians and nine for bicyclists. Although they represent a small number of locations, they are useful for tracking the long-term trends, since the earliest year data points allow observing a ten-year trend line.

Figure 7: Annual and longitudinal data sets

	Annual Data		Longitudinal Data	
Count Period	**Comparison Years**	**# of Sites**	**Comparison Years**	**# of Sites**
Pedestrian				
PM (4–6 PM)	2010, 2011	62	2002, 2003, 2010, 2011	6
Mid-day (12–2 PM)	2010, 2011	44	2008, 2010, 2011	9
School (2–4 PM)	2010, 2011	17	N/A	N/A
Bicycle				
PM (4–6 PM)	2010, 2011	62	2002, 2004, 2006, 2008, 2010, 2011	9
Mid-day (12–2 PM)	2010, 2011	44	2008, 2010, 2011	9
School (2–4 PM)	2010, 2011	17	N/A	N/A

Although morning and weekend counts were conducted at some sites prior to 2010, the more recent counts have focused on the mid-day, school and PM time periods. Therefore, AM and weekend counts are not discussed in this report.

Additional information on the historical manual count data, including the year, lead agency, time period and data collected, are shown in Appendix C.

Automated Count Program

In addition to conducting manual counts, Alameda CTC owns five automated bicycle/pedestrian counters, which allow data to be collected at a variety of locations 24 hours a day. The East Bay Regional Park District (EBRPD) also has 23 automated bicycle/pedestrian counters deployed on trails throughout their district, and they will be installing more as new trails are built. Data from both the Alameda CTC and EBRPD counters has not been incorporated into this report, but it will be included in future reports to portray a more robust picture of walking and biking in the county. In particular, the data will show multi-use trail use around the county. While often used for utilitarian purposes, trails are also heavily used recreationally, so counts on these trails can help track recreational bicycling and walking.

Alameda CTC and EBRPD currently have one or more counters on the following trails in the county with a goal of covering even more trails, and more fully covering each trail, in the future:

- Bay Trail
- Alameda Creek Trail
- Iron Horse Trail
- Encinal Point Trail

- San Leandro Creek Trail
- Oyster Bay Trail
- Tassajara Creek Trail

Alameda CTC is coordinating with the EBRPD and other jurisdictions within Alameda County that currently have or may develop automated count programs in the future, to share data and ensure the most effective usage and siting of the counters.

Input and Responses on 2011 Counts Report

When the first Counts Report (published in 2011) was developed, it was brought to several Alameda CTC committees and the Board for input, along with an overview of the countywide count program. The following input was provided on the count sites and the overall count program in the fall of 2011. The comments have been addressed in this report, or modifications have been made to the overall count program, as indicated in Figure 8.

Figure 8: Count program comments from fall 2011 BPAC, ACTAC and PPLC meetings

Comment	Response/Follow-up
Many questions on the goals and purposes of the count program.	Expanded description in this report.
Concerns that total number of bicyclists and pedestrians counted will influence funding decisions.	Expanded description of goals of count program in the report. The main goal is to measure overall countywide trends across time, and not the absolute number of people walking and biking, or to make funding decisions based on absolute numbers.
Many questions on why the 63 count locations were selected, in particular: signalized versus unsignalized locations, locations with low volumes, and locations that had more usage before improvements were made to nearby routes.	The 63 count sites were reviewed, based on committee and Board input, and some changes are recommended to the 2012 count locations.
Count locations should reflect where people are biking/walking, which may change over time.	Staff will monitor the count locations over time and add or delete locations based on that evaluation.

Comment	Response/Follow-up
May be better to add new sites, rather than continuing to count at historic locations that are less desirable.	A balance is needed. It is important to keep many of the count locations the same to allow comparability over time. However, some sites are being, and will be, modified, as per the above responses.
Work with local staff and organizations on assessing and incorporating their goals for the count program.	As the count program is expanded, input will be gathered from all stakeholders.
Consider how the count locations could be used to assess the effectiveness of Safe Routes to Schools (SR2S) programs, possibly by adding more count locations near schools with active programs.	Some current locations are near schools with SR2S programs, but there may not be enough at a single school, or they may not be close enough to the school, to accurately detect travel changes at a single school location. As the count program is expanded, sites near schools with SR2S programs will be considered for inclusion, and this data will be analyzed more closely.
Consider counting at BART stations.	Some current locations are near BART or other major transit hubs. As the count program is expanded, sites near BART will be considered for inclusion. In addition, BART conducts detailed station access surveys at all stations every ten years, to assess long-term trends. This data on bicycle and pedestrian access to BART for 1998 and 2008 is included in the "Contextual Data and Trends" section of this report.
Include recreational cycling in counts.	Some current locations are along the Bay Trail or other recreational routes. Also, Alameda CTC and the East Bay Regional Park District have a number of automated bike/ped counters deployed along trails, and this data will be added to future reports. As the counts program is expanded, sites along non-trail recreational cycling routes will be considered for inclusion.
Consider newer technologies to make it more effective and efficient to count bicycles and pedestrians than with manual counts.	Movable camera technology and video image analysis are emerging technologies with great capabilities. Staff is monitoring these technologies and will consider using them as they develop and become cost-effective, to the extent they meet the needs of the count program.

Comment	Response/Follow-up
Include collision, population and overall auto traffic count data trends over the same time periods to see how these trends compare with the bike/ped count trends.	Collision, population and gas price trend data has been added to this report in the "Contextual Data and Trends" section. Staff was unable to find readily available and comparable data on auto traffic over similar time periods, but will continue to explore this.
Information on helmet use by gender may be useful for insight and future planning purposes.	While this data is being collected and will continue to be collected in a manner that will allow this analysis, it has not been prioritized for analysis over the many other core pieces of data. Future reports could include this analysis.

Progress on Recommendations in 2011 Counts Report

In addition, a number of recommendations were included in the 2011 Counts Report. The table below (Figure 9) describes each of them, and how both the count program and the 2012 Counts Report have been able to respond to them.

Figure 9: Recommendations from 2011 Report, and follow-up

Recommendations from 2011 Report	Follow-up
Overall, maintain the same methodology, count sites, time periods, data collection details, etc. (as further described in the 2011 Report), as for the 2010 counts.	All recommendations were completed.
Analyze the data by planning area and, possibly, by city.	Data has been analyzed by planning area for the first time in this report.
Apply pedestrian adjustment factors developed by SafeTREC to improve usability of historic data.	This analysis was not conducted, as it was not prioritized over other key analyses, but it will continue to be explored in the future.
Include the automated count data currently being collected throughout Alameda County in the data analysis reports.	While the automated count program has been further developed during the 2011/2012 fiscal year, a summary of data has not yet been developed and included in this report, in part because complete data was not available, and also it was not prioritized over other key analyses. It will be included in a future report.

Pedestrian Count Trends

There was little to no change in pedestrian counts between 2010 and 2011, across all time periods. Longer-term trends show considerable growth in the last decade, with pedestrian numbers increasing by 47% from 2002 to 2011.

Pedestrian count data was collected during three time periods titled "PM," "mid-day," and "school," as described in the "Background" chapter above, and shown in Figure 10 below. For each of these time periods, two sets of data were analyzed. Annual data, collected in 2010 and 2011, includes the full set of 62 sites for the PM time period. Each site was counted a second time in either the mid-day or school period. The longitudinal data set compares the more recent annual data with historic counts, where available.

Figure 10: Pedestrian data sets

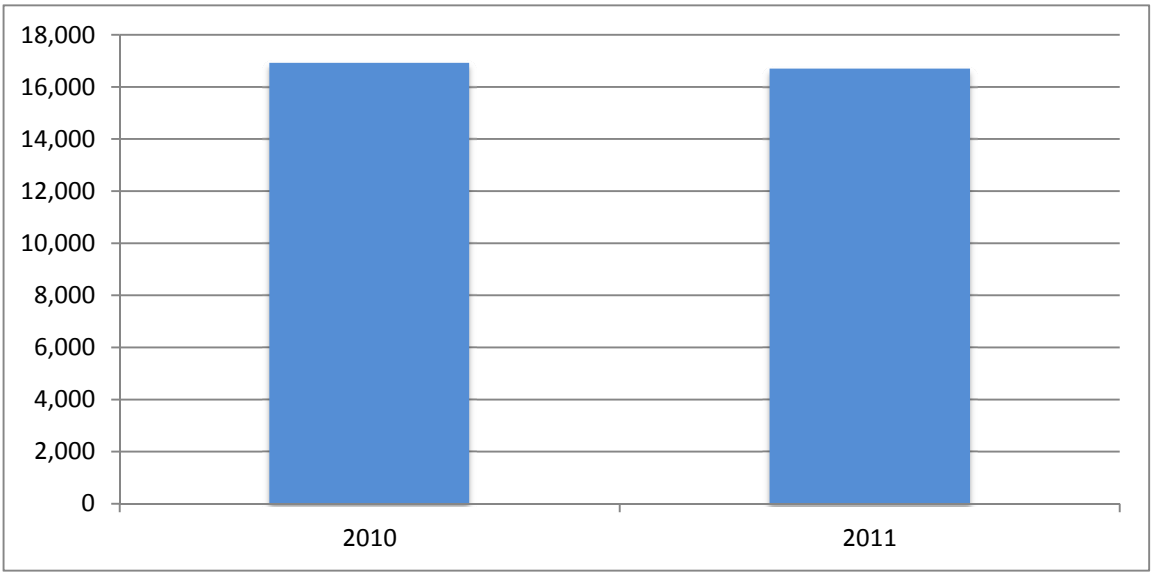
	Annual Data		Longitudinal Data	
Count Period	**Comparison Years**	**# of Sites**	**Comparison Years**	**# of Sites**
PM (4–6 PM)	2010, 2011	62	2002, 2003, 2010, 2011	6
Mid-day (12–2 PM)	2010, 2011	44	2008, 2010, 2011	9
School (2–4 PM)	2010, 2011	17	N/A	N/A

PEDESTRIAN Weekday PM (4–6pm)

Annual Data (2010 and 2011)

As seen in Figure 11, between 2010 and 2011 the number of pedestrians counted remained essentially unchanged, with a mean decrease of 1.4%. Overall, these small fluctuations may be statistically insignificant.

Figure 11: Total pedestrians (2010, 2011; weekday PM; 62 sites)



While there was little change in the number of pedestrians counted countywide, the changes at the planning area level show a different picture, with significant increases in the South and East areas.

Figure 12 shows the percent change in the number of pedestrians from 2010 to 2011 by planning area; Figure 13 graphs the absolute change by planning area; and Figure 14 compares the two in table form. Most notably, while relatively more people were counted walking in the South and East planning areas, as compared to the previous year, the absolute number of people walking in these areas is significantly less than in the North planning area.

Figure 12: Percent change in pedestrians by planning area (2010, 2011; weekday PM; 62 sites)

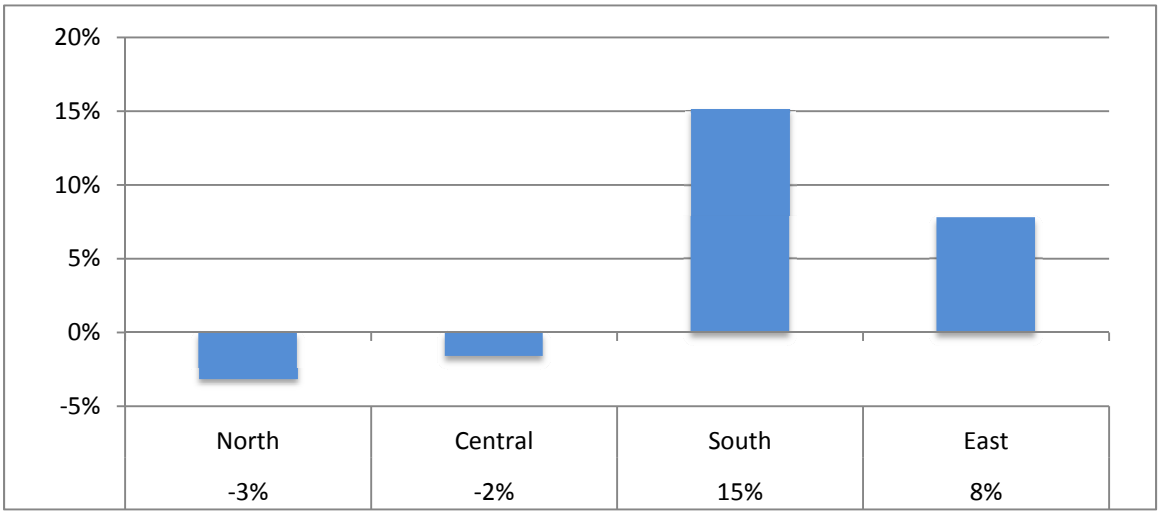


Figure 13: Absolute change in pedestrians by planning area (2010, 2011; weekday PM; 62 sites)

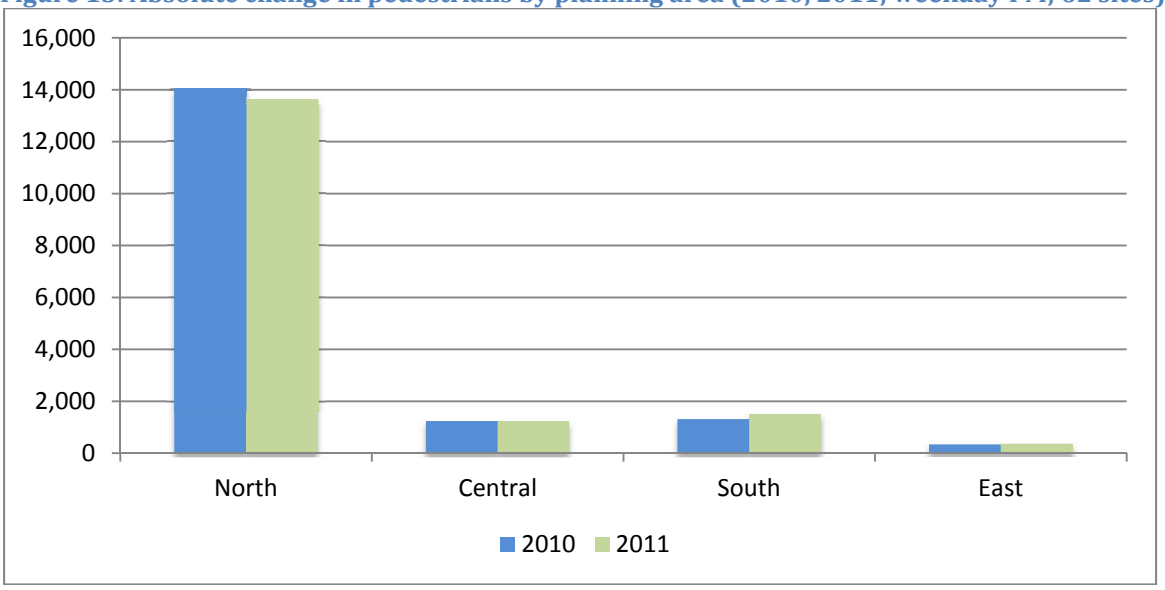


Figure 14: Absolute and percent change in pedestrians by planning area (weekday PM; 62 sites)

	Peds Counted 2010	Peds Counted 2011	Difference between 2011 and 2010	% Change	# Sites Counted
North	14052	13615	-437	-3%	30
Central	1234	1214	-20	-2%	13
South	1307	1505	198	15%	11
East	346	373	27	8%	8

Just as there is variability at the planning area level, there is also variability at the site level, as shown in Figure 15. Of the 62 sites counted in 2011, 35 (or 56%) either saw an increase or showed no change in pedestrian numbers, while at 27(or 44%) the number of pedestrians decreased.

Figure 15: Variability in pedestrian data by site (2010 to 2011; weekday PM; 62 sites)

Site with Greatest % Increase (Paseo Padre and Decoto Road, Fremont)	288%
Site with Greatest % Decrease (Warm Springs and Grimmer, Fremont)	-60%
Number (and percent) of sites that increased*	25 (40%)
Number (and percent) of sites with no change in usage*	10 (16%)
Number (and percent) of sites that decreased*	27 (44%)

* Sites that showed an increase were defined as having a percent change of 5% or greater. Sites with no change in usage were defined as having a percent change between 5% and -5%. Sites with a decrease in usage were defined as having a percent change of -5% or less.

Longitudinal Data (2002 to 2011)

The PM period, with four years of comparable data covering a ten-year time period, has the most longitudinal data available for pedestrians. While there is a gap in the data from 2003 to 2010, it allows a point of comparison for seeing the longer-term trends, which show overall increasing numbers of pedestrians.

Historically, as seen in Figure 16, the numbers of pedestrian counted at six common sites increased by 47% between 2002 and 2011. During this period, there was a drop in pedestrian numbers from 2002 to 2003 and then a rise between 2003 and 2010 (of 68%). The data between 2010 and 2011 mirrors the only slight change previously discussed in the annual count data from 2010 to 2011; in this case, with these six sites, there was a 4% increase in counts between these two years.

Figure 16: Total pedestrians (2002, 2003, 2010, 2011; weekday PM; 6 sites)

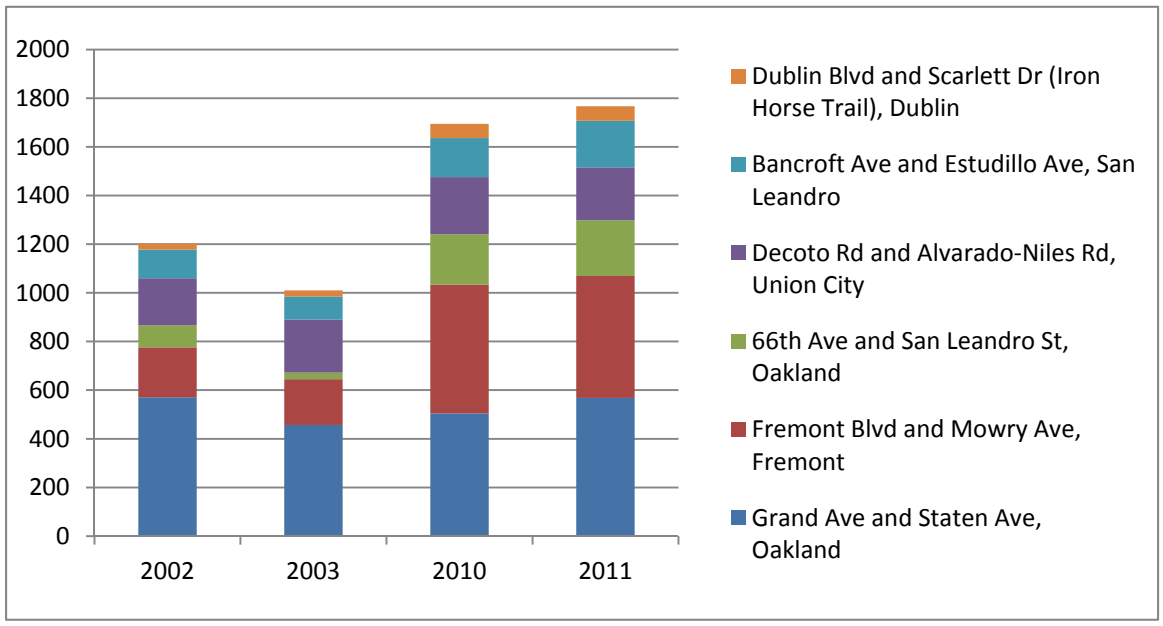


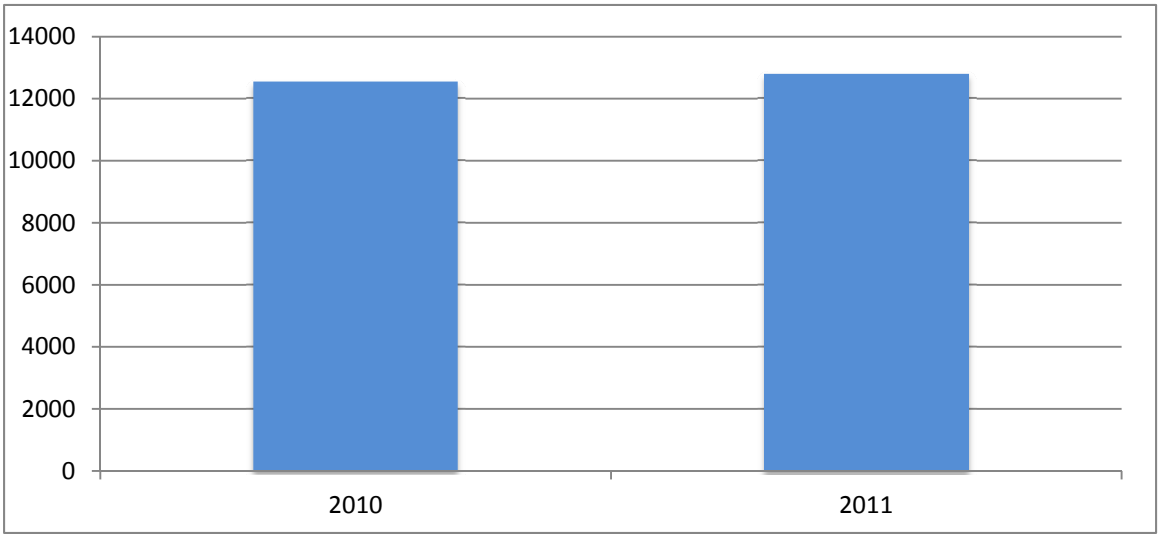
Figure 16 also shows the variability at the site level for the longitudinal data. While the six sites show an overall average increase from 2002 to 2011, the individual sites vary quite a bit. In 2011, the site with the maximum increase (66th Ave. and San Leandro St. in Oakland) was 152% higher relative to the 2002 count. The site with the minimum change (Grand Ave. and Staten Ave. in Oakland) showed a decrease of only 1% from 2002.

PEDESTRIAN Weekday Mid-day (12–2pm)

Annual Data (2010 and 2011)

From 2010 to 2011, there was a slight increase of 2% in pedestrian counts over the 44 sites counted during the mid-day period, as shown in Figure 17.

Figure 17: Total pedestrians (2010, 2011; weekday mid-day; 44 sites)



The table in Figure 18 shows the variability in the counts on a site-level basis. Overall, counts at 30 sites (or 68% of all sites) either increased or did not change.

Figure 18: Variability in pedestrian data by site (2010 to 2011; weekday mid-day; 44 sites)

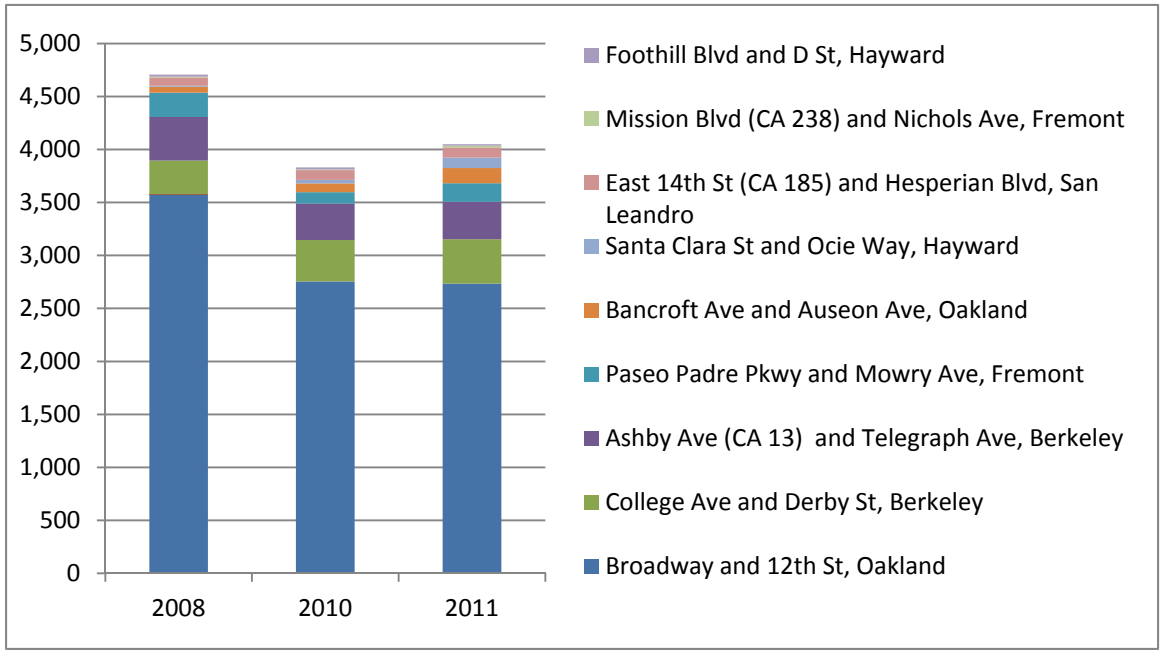
Site with Greatest % Increase (Santa Clara and Ocie Way, Hayward)	197%
Site with Greatest % Decrease (Dublin Blvd and Scarlett Drive [Iron Horse Trail], Dublin)	-32%
Number (and percent) of sites that increased*	21 (48%)
Number (and percent) of sites with no change in usage*	9 (20%)
Number (and percent) of sites that decreased*	14 (32%)

* Sites that showed an increase were defined as having a percent change of 5% or greater.
Sites with no change in usage were defined as having a percent change between 5% and -5%.
Sites with a decrease in usage were defined as having a percent change of -5% or less.

Longitudinal Data (2008 to 2011)

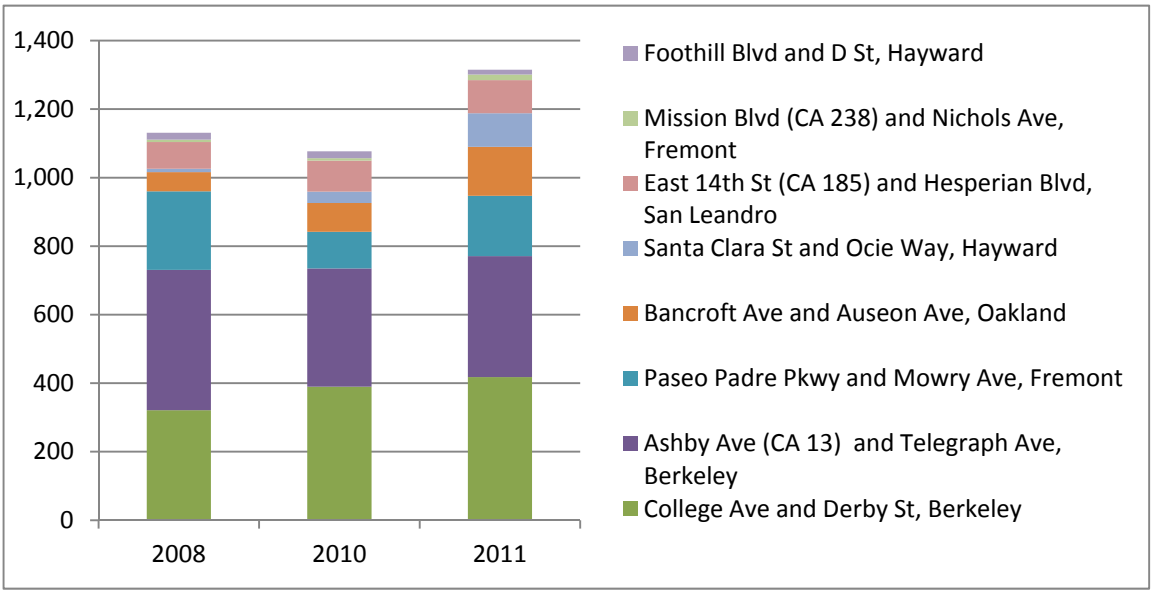
For the mid-day period, the longitudinal data set includes data from nine (of the 44) sites for 2010 and 2011, and also from 2008 (see Figure 19). This longitudinal data shows that from 2008 to 2010, there was a 19% drop in pedestrians counted, while the number counted in 2011 rose 6% from 2010, but still not to the levels seen in 2008. Overall, from 2008 to 2011, the number of pedestrians counted decreased by 14%.

Figure 19: Total pedestrians, including Broadway/12th St. (2008, 2010, 2011; weekday mid-day; 9 sites)



The extremely high pedestrian volumes at the Broadway and 12th Street count site in Oakland dominate the longitudinal data set, so it is useful to show the analysis without that site's data (see Figure 20). Excluding Broadway and 12th Street, the eight remaining sites show a 22% increase from 2010 to 2011, which more than exceeds the 5% decrease in pedestrians counted between 2008 and 2010 for this same group of eight locations. Overall, with the Broadway and 12th Street site excluded, the number of pedestrians counted increased by 16% between 2008 and 2011.

Figure 20: Total pedestrians, excluding Broadway/12th St. (2008, 2010, 2011; weekday mid-day; 8 sites)

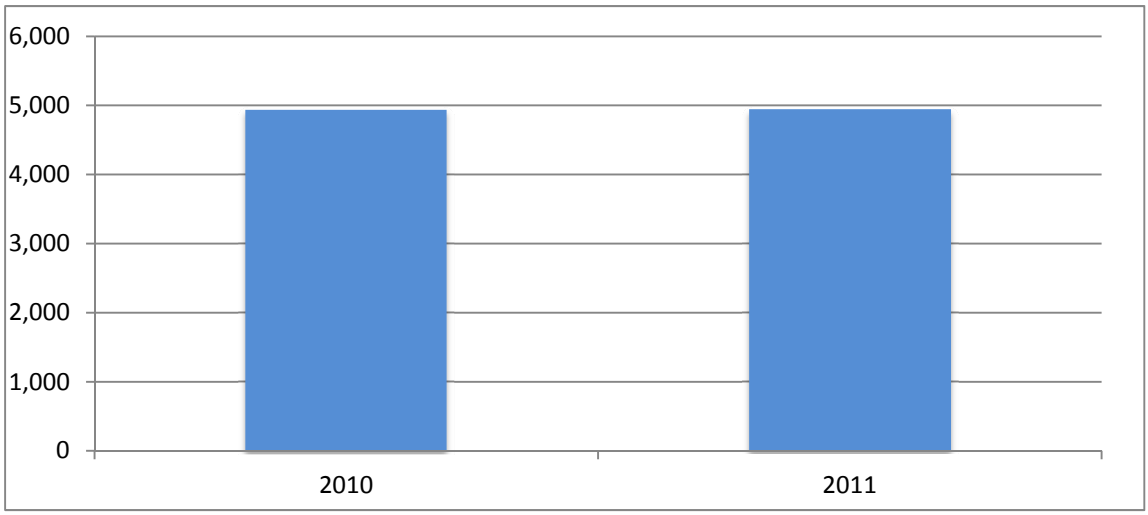


PEDESTRIAN Weekday School (2–4pm)

Annual Data (2010 and 2011)

There was essentially no change between 2010 and 2011 in the number of pedestrians counted during the school period, as shown in Figure 21. All 17 sites included in this analysis are within a half mile of at least one school, and some of them are near more than one school. Additionally, seven of these count sites are within a quarter mile of at least one school.

Figure 21: Total pedestrians at count sites within a half mile of a school (2010, 2011; weekday school period; 17 sites)



There was significant variability among the school period sites, as shown in Figure 22, with 29% of the sites showing an increase in pedestrians from 2010 to 2011, 29% showing no change and 41% showing a decrease.

Figure 22: Variability in pedestrian data by site at count sites within a half mile of a school (2010 to 2011; weekday school period; 17 sites)

Site with Greatest % Increase (Paseo Padre Parkway and Decoto Rd, Fremont)	214%
Site with Greatest % Decrease (Grand Ave and Oakland Ave, Oakland)	-37%
Number (and percent) of sites that increased*	5 (29%)
Number (and percent) of sites with no change in usage*	5 (29%)
Number (and percent) of sites that decreased*	7 (41%)

Note: Percentages do not add up to 100 due to rounding.

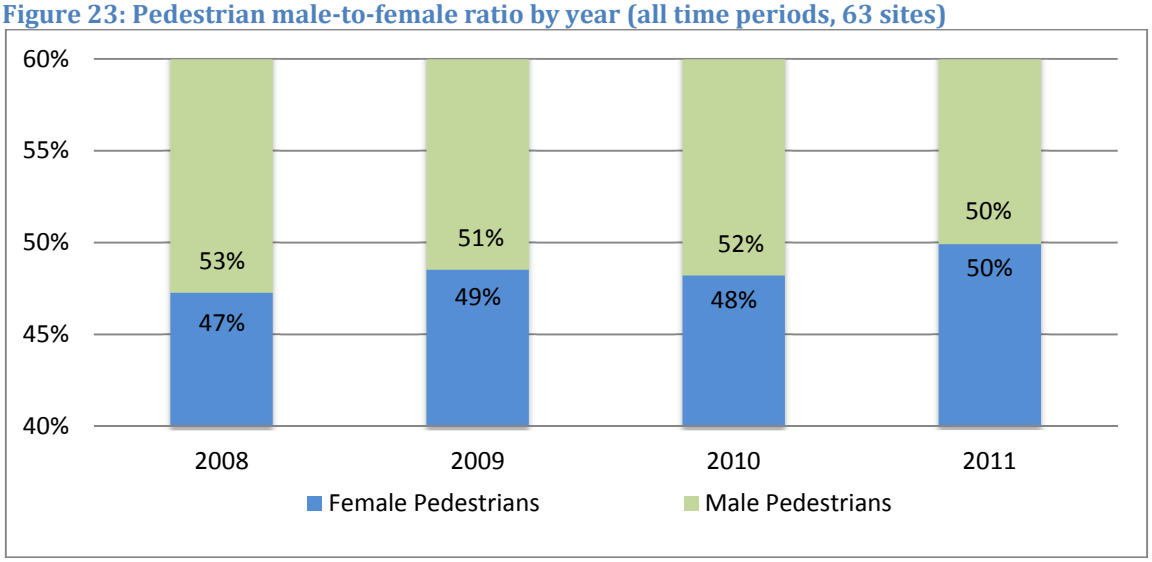
Longitudinal Data

There is no longitudinal analysis for the school period due to the lack of historic count data collected during the time period.

PEDESTRIAN Gender Distribution

The average male-to-female ratio for pedestrians varied within only a few percentage points between 2008 and 2011 (see Figure 23). However, even within this small amount of variation, the percent of females rose, from 47% in 2008 to 50% in 2011.

Figure 23: Pedestrian male-to-female ratio by year (all time periods, 63 sites)

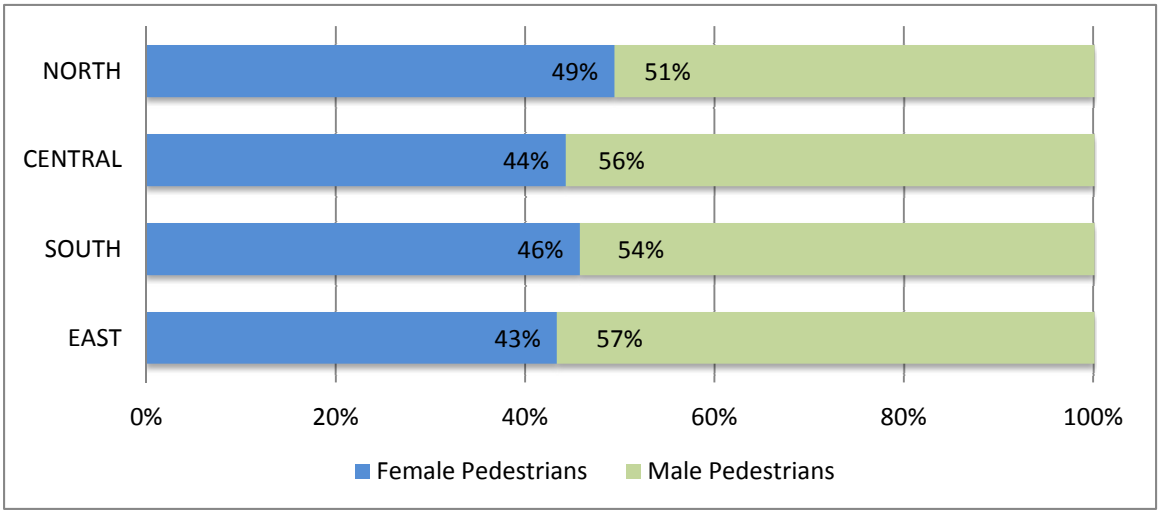


Note: Percentage scale does not begin with zero – it shows values from 40% to 60% only.

* Sites that showed an increase were defined as having a percent change of 5% or greater.
Sites with no change in usage were defined as having a percent change between 5% and -5%.
Sites with a decrease in usage were defined as having a percent change of -5% or less.

There is greater variation when this data is assessed by planning area. Figure 24 shows the male-to-female ratio by planning area, combining data from all four years that data was collected (2008 through 2011). This shows the greatest percent of female pedestrians in the northern part of the county (49%), while the eastern part of the county shows the lowest percent (43%) of female pedestrians.

Figure 24: Pedestrian male-to-female ratio by planning area (2008, 2009, 2010, and 2011 combined; all time periods, all sites)



Bicyclist Count Trends

Bicycle counts increased significantly between 2010 and 2011 during all time periods, continuing the steady trend in increasing bicycling seen since 2002. Notably, the increase in female bicycling has continued, with an increase from 26% to 30% from 2010 to 2011.

Bicycle count data was collected during three time periods titled "PM," "mid-day," and "school," as described in the "Background" chapter above, and shown in Figure 25 below. For each of these time periods, two sets of data were analyzed. Annual data, collected in 2010 and 2011, includes the full set of 62 sites for the PM time period. Each site was counted a second time in either the mid-day or school period. The longitudinal data set compares the more recent annual data with historic counts, where available.

Figure 25: Bicycle data sets

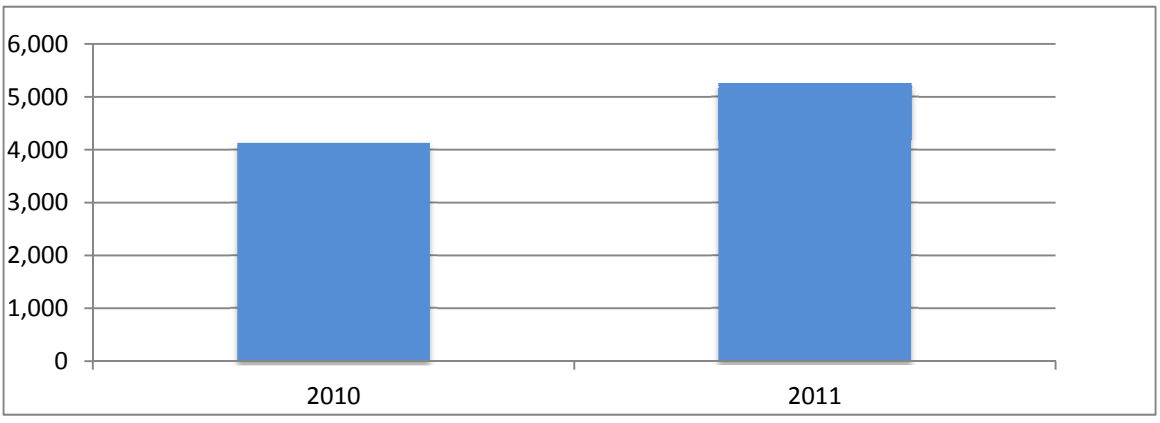
	Annual Data		Longitudinal Data	
Count Period	**Comparison Years**	**# of Sites**	**Comparison Years**	**# of Sites**
PM (4–6 PM)	2010, 2011	62	2002, 2004, 2006, 2008, 2010, 2011	9
Mid-day (12–2 PM)	2010, 2011	44	2008, 2010, 2011	9
School (2–4 PM)	2010, 2011	17	N/A	N/A

BICYCLIST Weekday PM (4–6pm)

Annual Data (2010 and 2011)

For the 62 count sites, there was a 27% countywide increase in bicyclist counts from 2010 to 2011, as shown in Figure 26.

Figure 26: Total bicyclists (2010, 2011; weekday PM; 62 sites)



While there were increases in bicyclists counted in every part of the county, the changes varied by planning area (see Figure 27). The South area of the county showed the greatest percent change, with a 112% increase in bicyclists from 2010 to 2011. The rest of the county also showed increases: 17% in the North area, 53% in the Central area, and 1% in the East planning area.

Figure 27: Percent change in bicyclists by planning area from 2010 to 2011 (weekday PM; 62 sites)

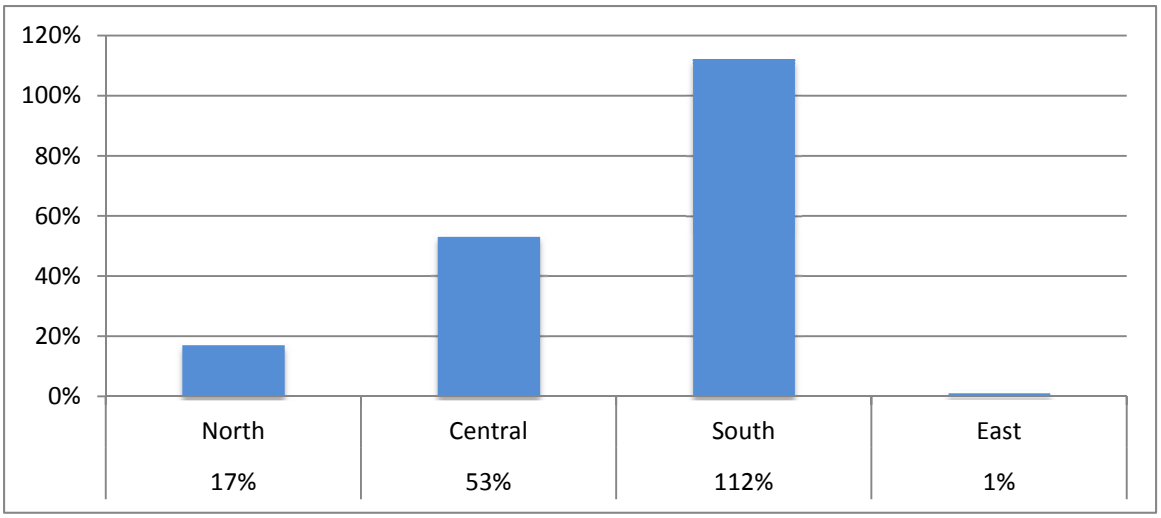


Figure 28 graphs the absolute change by planning area and Figure 29 compares percentage change and absolute change in table form.

Figure 28: Absolute change in bicyclists by planning area (2010, 2011; weekday PM; 62 sites)

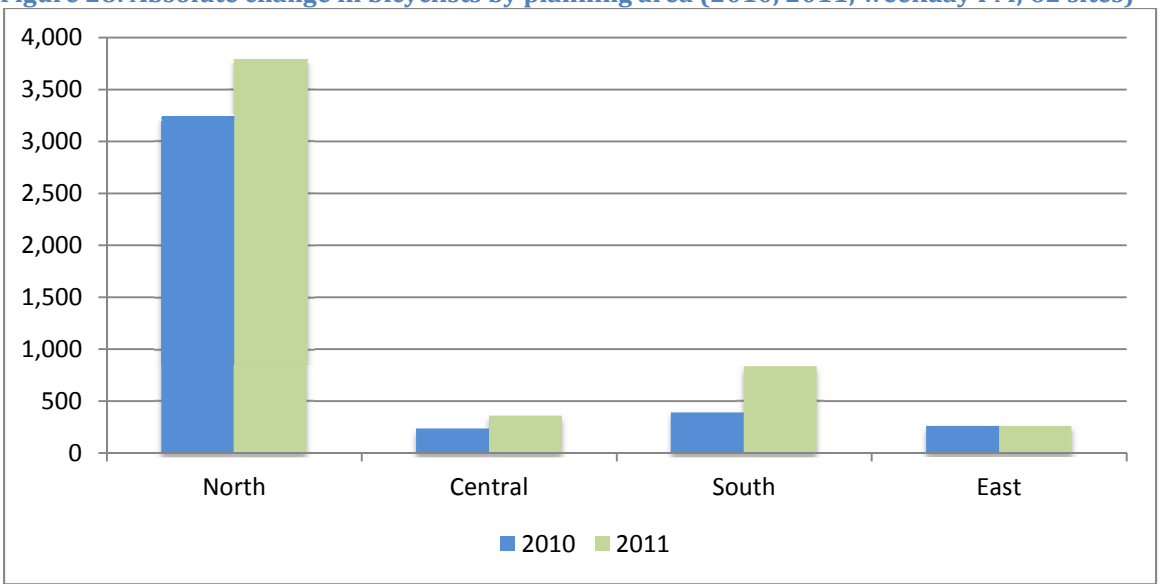


Figure 29: Absolute and percent change in bicyclists by planning area (2010, 2011; weekday PM; 62 sites)

	Bicyclists Counted 2010	Bicyclists Counted 2011	Difference between 2011 and 2010	% Change	# Sites Counted
North	3244	3796	552	17%	30
Central	237	363	126	53%	11
South	394	836	442	112%	13
East	261	264	3	1%	8

Similar to the planning area level, the site level data is also variable. The table in Figure 30 shows the variability in the PM data. Notably, 52 of the 62 sites (or 84%) show either an increase or no change relative to 2010.

Figure 30: Variability in bicyclist data by site (2010 to 2011; weekday PM; 62 sites)

Site with Greatest % Increase (Thornton Ave and Willow St, Newark)	567%
Site with Greatest % Decrease (Atlantic Ave and Webster St, Alameda)	-68%
Number (and percent) of sites that increased*	42 (68%)
Number (and percent) of sites with no change in usage*	10 (16%)
Number (and percent) of sites that decreased*	10 (16%)

Longitudinal Data (2002 to 2011)

The weekday PM is the period for which there is the most longitudinal data, both in terms of the number of comparable sites and the number of years of data that are available. From 2002 to 2011, there was a 75% increase in bicyclists counted at nine sites. While there was a slight decrease in bicyclists from 2002 to 2004, the numbers steadily increased from 2004 to 2011, as shown in Figure 31. Significantly, since 2006, every set of counts (in 2006, 2008, 2010 and 2011) has shown a 25% increase, relative to 2002, from the prior count.

* Sites that showed an increase were defined as having a percent change of 5% or greater. Sites with no change in usage were defined as having a percent change between 5% and -5%. Sites with a decrease in usage were defined as having a percent change of -5% or less.

Figure 31: Total bicyclists (2002*, 2004*, 2006, 2008, 2010, 2011; weekday PM; 9 sites)

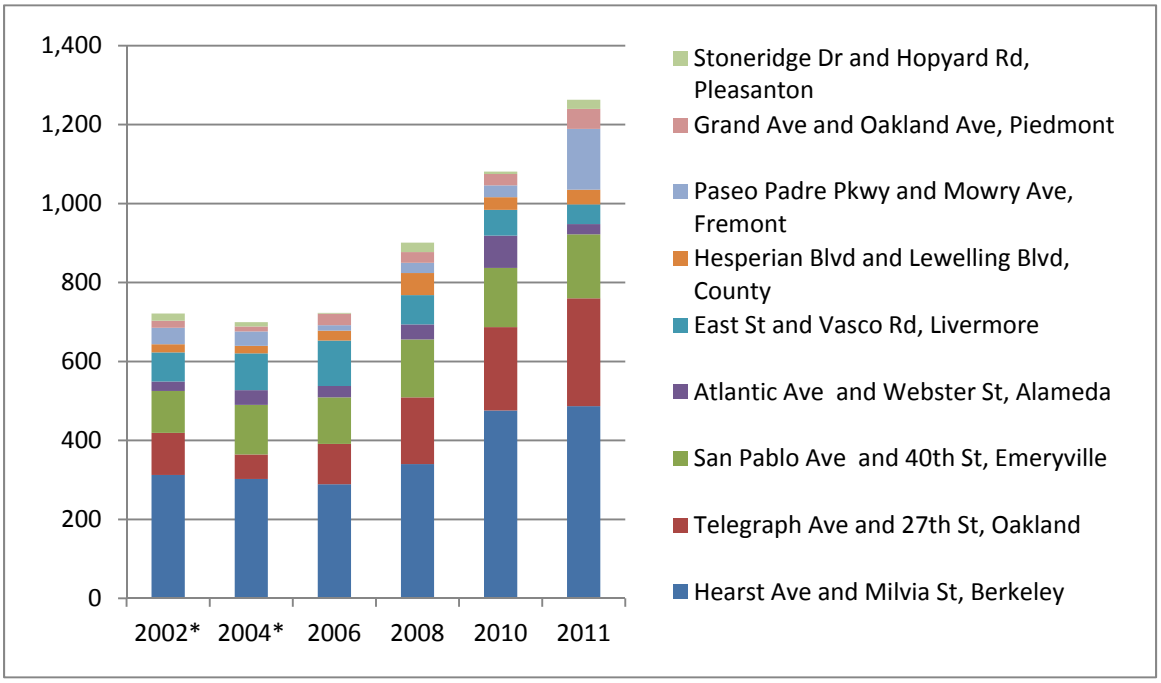


Figure 31 also shows that while, in the aggregate, bicycle use is growing steadily throughout the county, it is considerably more varied at the site level from year to year. In 2011, at the site with the maximum increase relative to 2002 (Paseo Padre Parkway and Mowry Avenue in Fremont), 266% more bicyclists were counted than in 2002. The site with the largest decrease (East Street and Vasco Road in Livermore) saw a 32% drop in bicyclists compared to 2002 and was the only site of the nine locations to decrease between 2002 and 2011.

BICYCLIST Weekday Mid-day (12–2pm)

Annual Data (2010 and 2011)

There was a total increase in mid-day bicyclists of 36% from 2010 to 2011, calculated from 44 sites, as shown in Figure 32. Of these 44 sites, 34 (or 77%) of them increased or showed no change from 2010 to 2011, while only 10 (or 23%) showed a decrease, as shown in Figure 33.

* Data for 2002 and 2004 were estimated to allow their inclusion in this comparison. While one set of data (2008, 2010 and 2011) was counted from 4–6pm, the biennial data from 2002 to 2008 was collected from 3–6pm. An hourly breakdown of the LOS monitoring data was available for the years 2006 and 2008 only. In order to create comparable data for the 2002 and 2004 years, the 2006 and 2008 hourly data was used to estimate the proportion of bicyclists counted during the two-hour 4–6pm period.

Figure 32: Total bicyclists (2010, 2011; weekday mid-day; 44 sites)

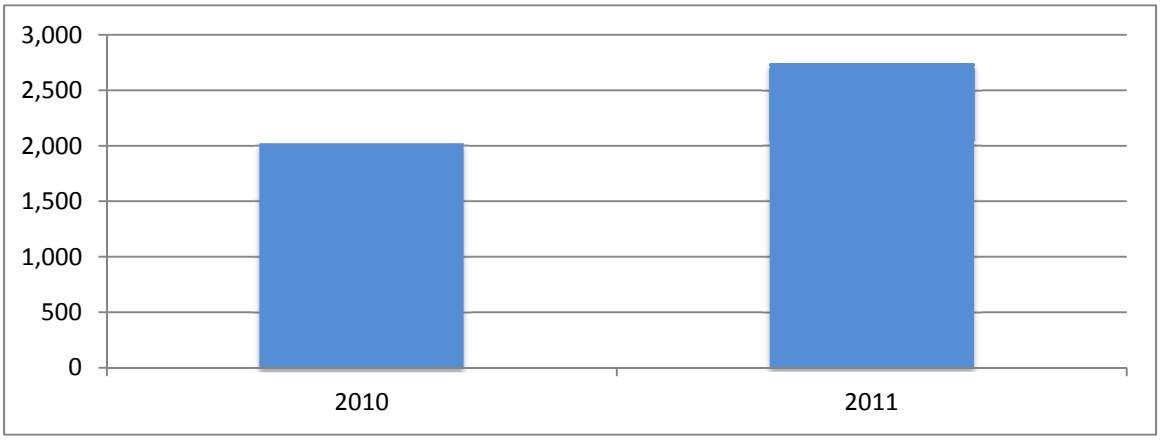


Figure 33: Variability in bicyclist data by site (2010 to 2011; weekday mid-day; 44 sites)

Site with Greatest % Increase (Santa Clara St and Ocie Way, Hayward)	1080%
Site with Greatest % Decrease (Mowry Ave [CA 84] and Cherry Lane, Fremont)	-56%
Number (and percent) of sites that increased*	28 (64%)
Number (and percent) of sites with no change in usage*	6 (14%)
Number (and percent) of sites that decreased*	10 (23%)

Note: Percentages do not add up to 100 due to rounding.

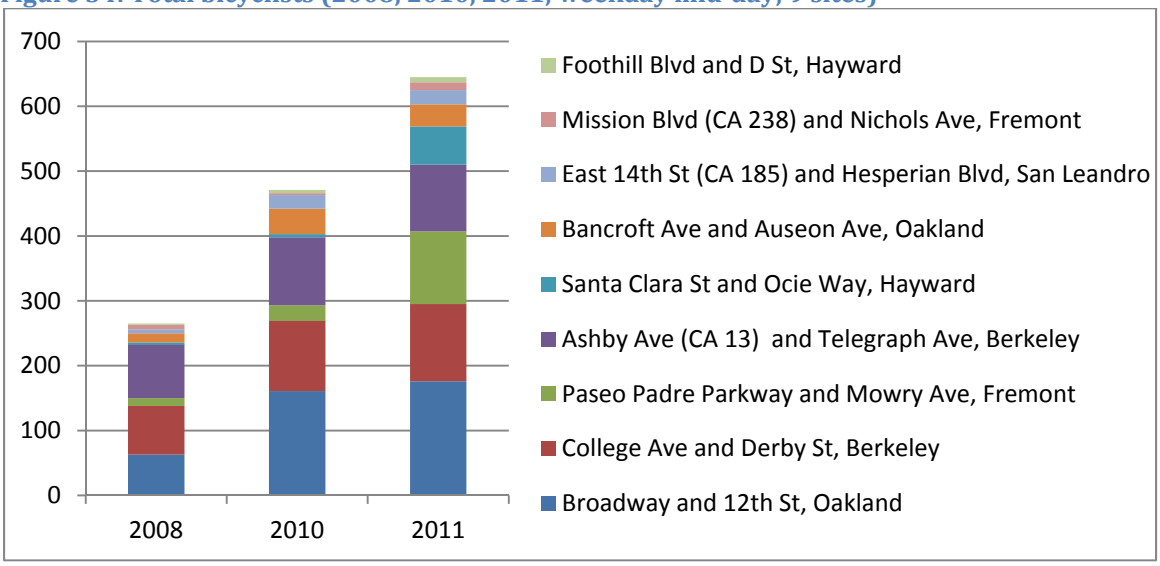
Longitudinal Data (2008 to 2011)

For the mid-day period, there is a smaller subset of locations that are available to show limited historic trends. This longitudinal data set includes nine (of the 44) sites for 2010 and 2011, but also includes data from 2008, when mid-day counts were conducted at these same sites (see Figure 34).

The longitudinal mid-day data shows that bicycle trips increased by 143% from 2008 to 2011. This was after almost doubling between 2008 and 2010, with a total increase of 78%, and then increasing further from 2010 to 2011 by 37%, at these nine common sites.

* Sites that showed an increase were defined as having a percent change of 5% or greater. Sites with no change in usage were defined as having a percent change between 5% and -5%. Sites with a decrease in usage were defined as having a percent change of -5% or less.

Figure 34: Total bicyclists (2008, 2010, 2011; weekday mid-day; 9 sites)



BICYCLIST Weekday School (2–4pm)

Annual Data (2010 and 2011)

The number of bicyclists counted during the weekday school period increased from 2010 to 2011 by 6% countywide, as shown in Figure 35. There was, however, significant variability at the site level, with 13 of the 17 sites (or 76%) either showing an increase or no change in bicyclists and only 4 (or 24% of all sites) showing a decrease, as shown in Figure 36. All of the 17 sites included in this analysis are within a half mile of at least one school, and seven of these are within a quarter mile of at least one school.

Figure 35: Total bicyclists at count sites within a half mile of a school (2010, 2011; weekday school period; 17 sites)

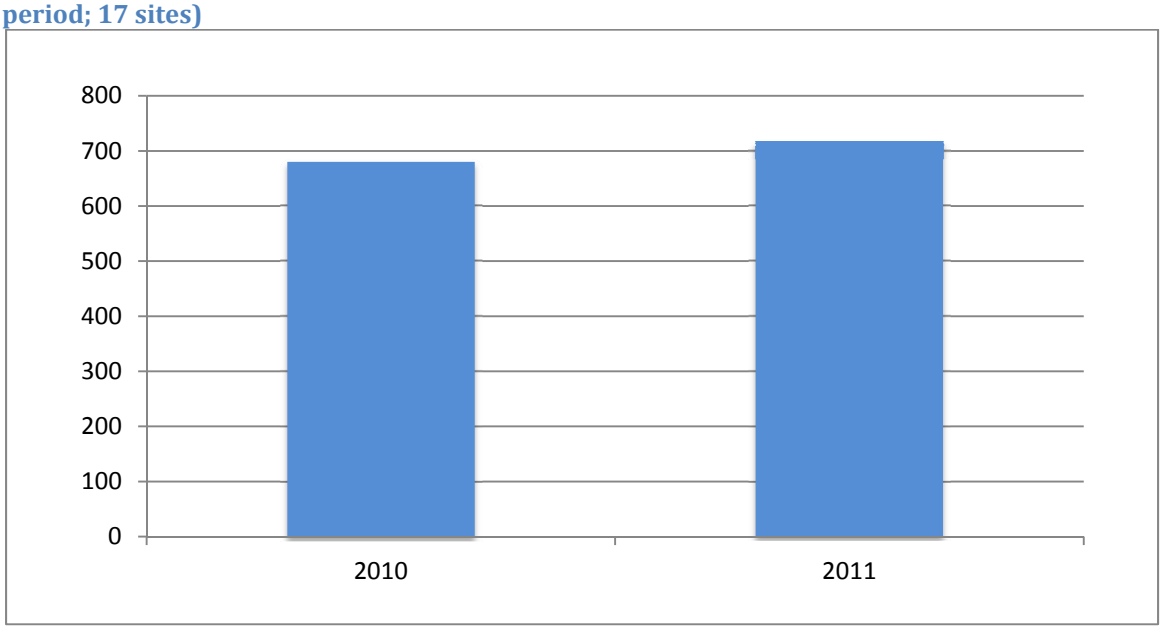


Figure 36: Variability in bicyclist data by site at count sites within a half mile of a school (2010 to 2011; weekday school period; 17 sites)

Site with Greatest % Increase (Chatham Rd and 13th Ave, Oakland)	650%
Site with Greatest % Decrease (Broadway [CA 61] and Calhoun St, Alameda)	-70%
Number (and percent) of sites that increased*	7 (41%)
Number (and percent) of sites with no change in usage*	6 (35%)
Number (and percent) of sites that decreased*	4 (24%)

Longitudinal Data

There is no longitudinal analysis for the school period due to the lack of historic count data collected during the time period.

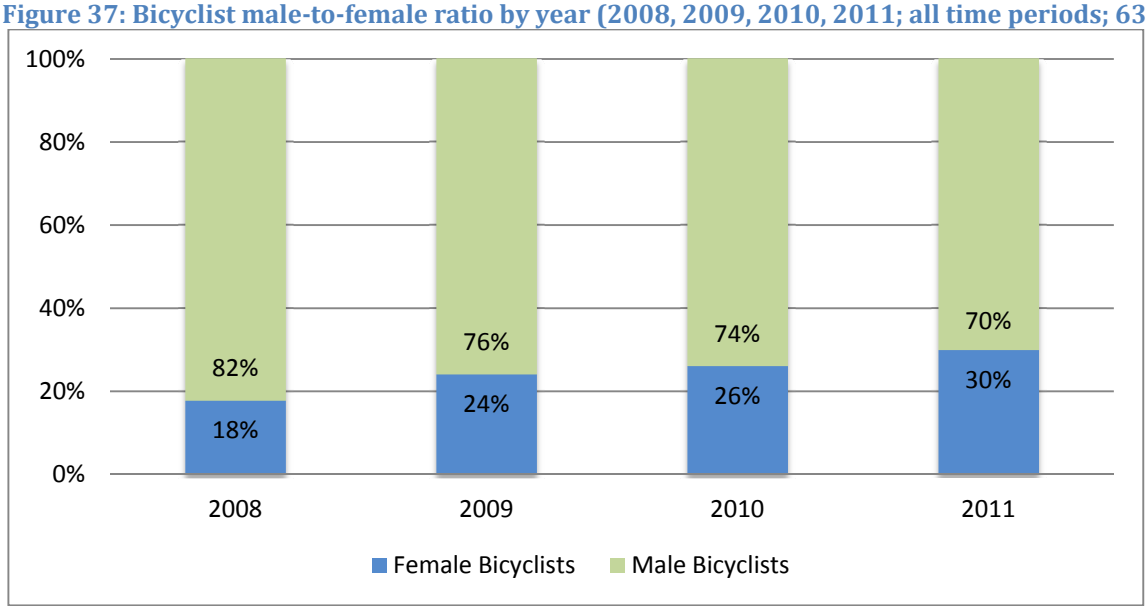
BICYCLIST Gender Distribution

Males are far more likely to bicycle in Alameda County than females, although this is changing. From 2010 to 2011, the percentage of female bicyclists counted increased from 26% to 30% countywide (see Figure 37). This continues a steady trend of increasing numbers of female

* Sites that showed an increase were defined as having a percent change of 5% or greater. Sites with no change in usage were defined as having a percent change between 5% and -5%. Sites with a decrease in usage were defined as having a percent change of -5% or less.

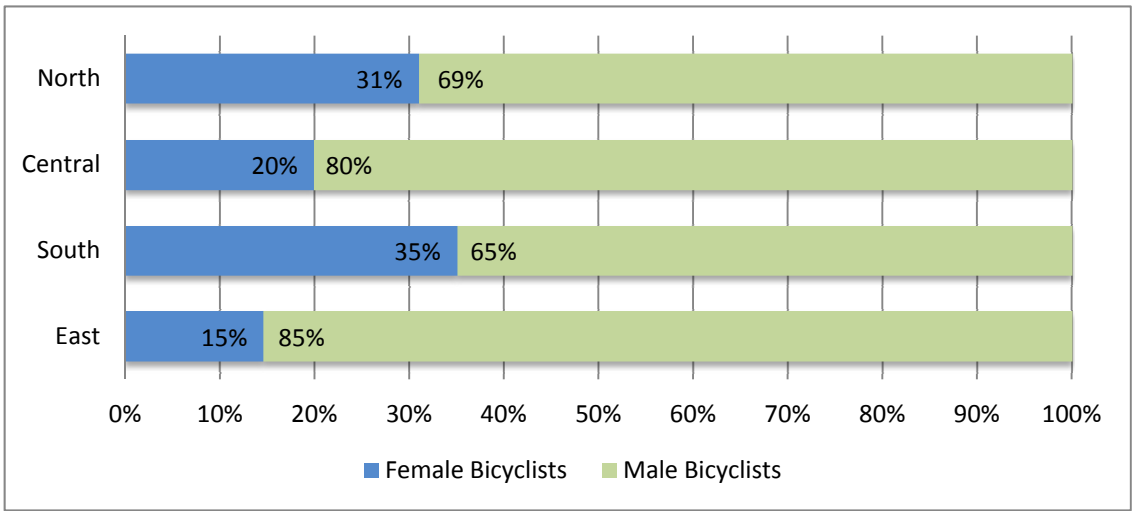
bicyclists. The number of women bicycling has increased every year since 2008, when 18% of all bicyclists counted were women.

Figure 37: Bicyclist male-to-female ratio by year (2008, 2009, 2010, 2011; all time periods; 63 sites)



As shown in Figure 38, there are significant differences in the distribution of female bicyclists throughout the county, with the highest percentages in the 2011 data shown in the South (35%) and North (31%) planning areas. Female bicyclists made up only 20% of the total in the Central planning area and 15% in the East planning area.

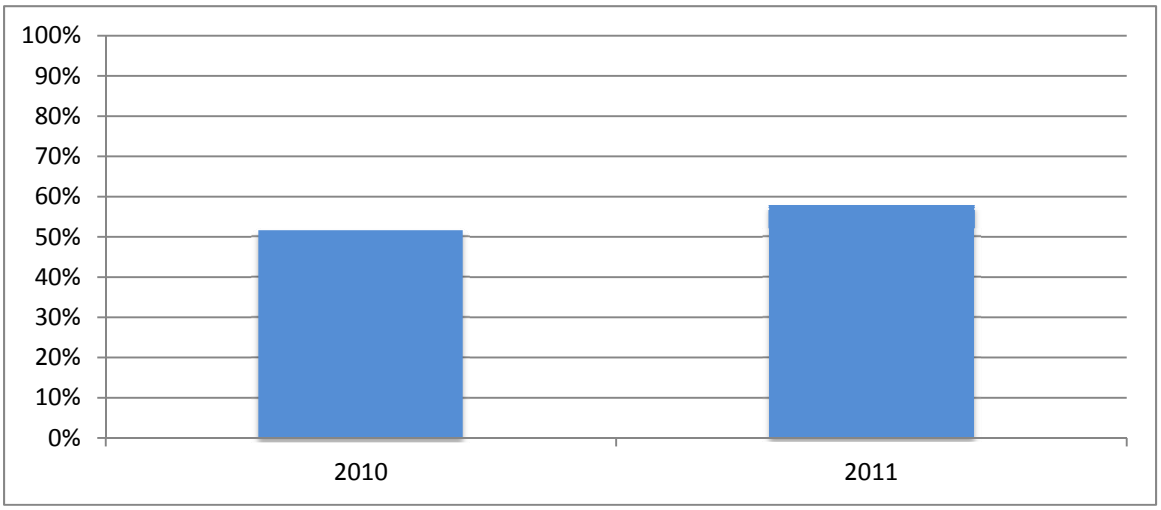
Figure 38: 2011 bicyclist male-to-female ratio by planning area (2011; all time periods; 63 sites)



BICYCLIST Helmet Use

Between 2010 and 2011, helmet use increased from 51% to 58%, according to counts at 63 locations around the county, as shown in Figure 39.

Figure 39: Helmet use (2010, 2011; all time periods; 63 sites)



Helmet use increased across all planning areas and all time periods between 2010 and 2011, as shown in Figure 40 and Figure 41. Significantly, the planning areas that showed the lowest rates of helmet use in 2010 also showed the greatest increases between 2010 and 2011. Data on helmet use was only collected in 2010 and 2011, so historic data is not available.

Figure 40: Helmet use by planning area (2010, 2011; all time periods; 63 sites)

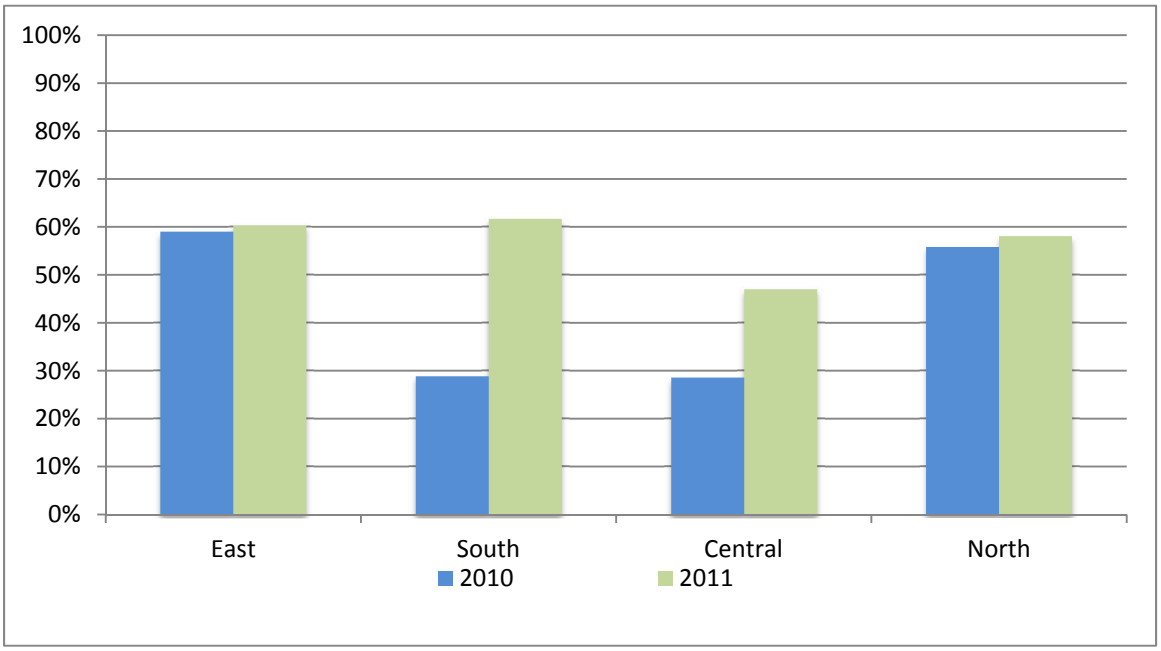
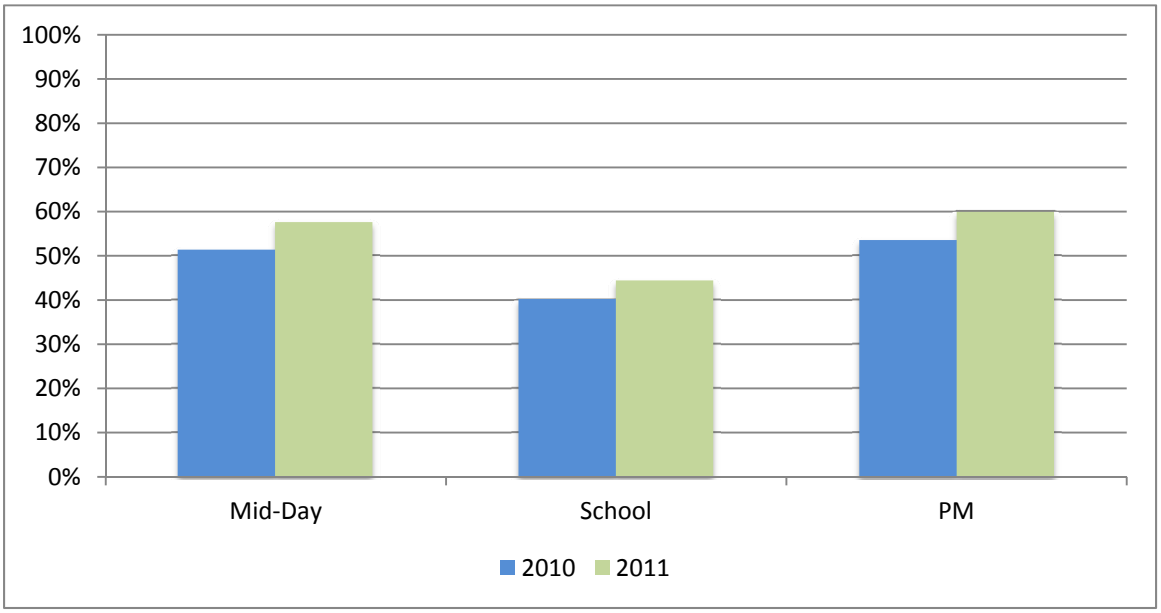


Figure 41: Average helmet use by time period (2010, 2011; 63 sites)



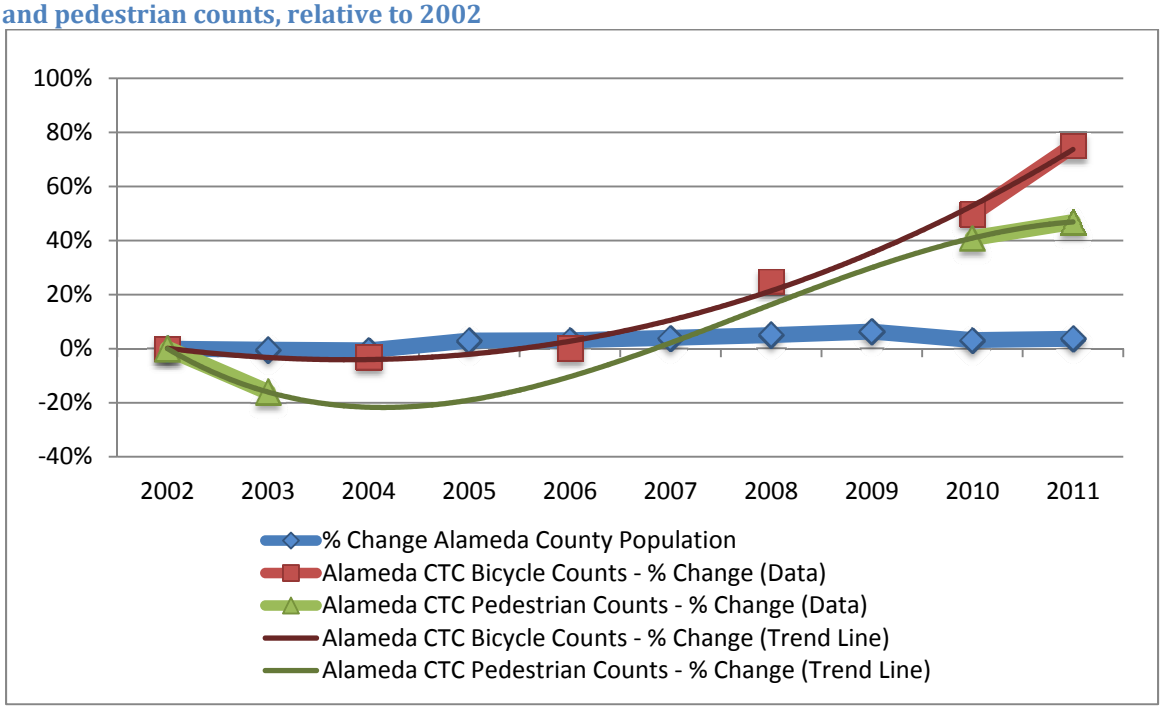
Contextual Data and Trends

It is useful to look at the pedestrian and bicycle count data and trends as they compare to other trends in the county. This section compares the longitudinal bicycle and pedestrian count data to trends in county population, pedestrian and bicycle collisions, pedestrian and bicycle access to BART stations and gasoline prices.

Population

Some portion of growth in pedestrian and bicycle usage could be due simply to population growth in Alameda County between 2002 and 2011. However, the part that population has played in changes in walking and biking must be small since the total increase in population during these ten years was 3.7%, as compared to the 47% and 75% increases in pedestrian and bicycle counts, respectively (see Figure 42).

Figure 42: Percent change in Alameda County population compared with percent change in bicycle and pedestrian counts, relative to 2002

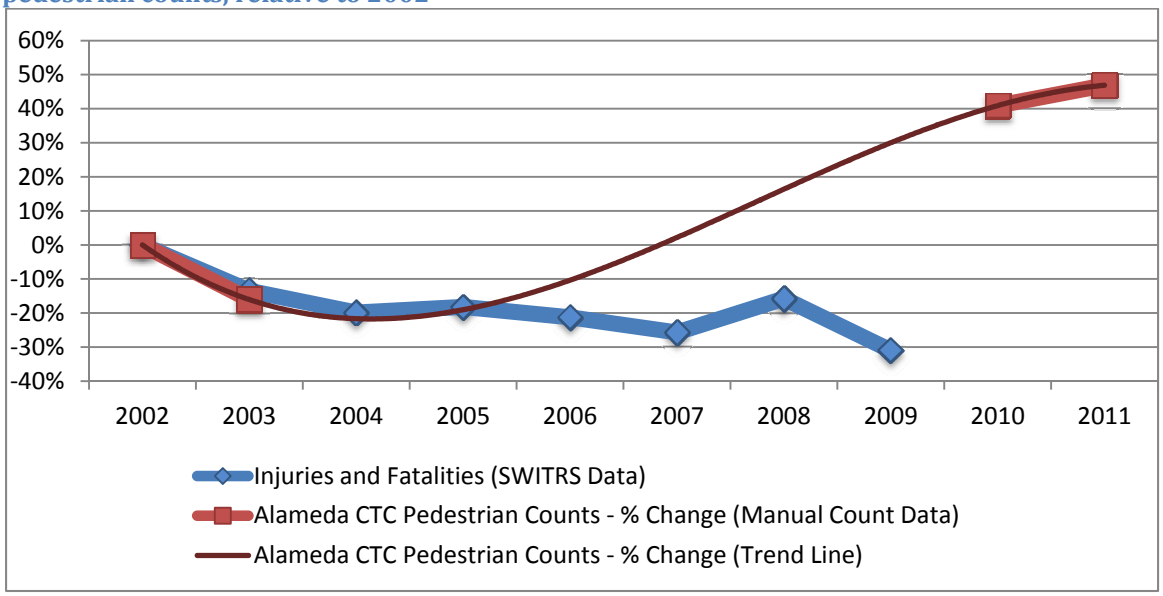


Source: Population – US Census Bureau, California Department of Finance, Demographic Research Unit; Alameda CTC bicycle and pedestrian counts – longitudinal data, PM period.

Collisions

Collision data from the Statewide Integrated Traffic Records System (SWITRS)* was used to compare the trends in bicycle and pedestrian volumes to injuries and fatalities in these two groups. From 2002 to 2009 (the year for which there is the most recent collision data), pedestrian collisions fell by 31%. While there are no 2009 counts to directly compare to this collision trend period, between 2002 and 2010, pedestrian volumes in the PM period increased by 41% at six sites. This suggests a significant decline in the pedestrian collision rate, or the number of collisions per pedestrian. Figure 43 shows the percent change in injuries and fatalities resulting from collisions compared with the percent change in pedestrian volumes, both relative to 2002.

Figure 43: Percent change in pedestrian injuries and fatalities compared with percent change in pedestrian counts, relative to 2002

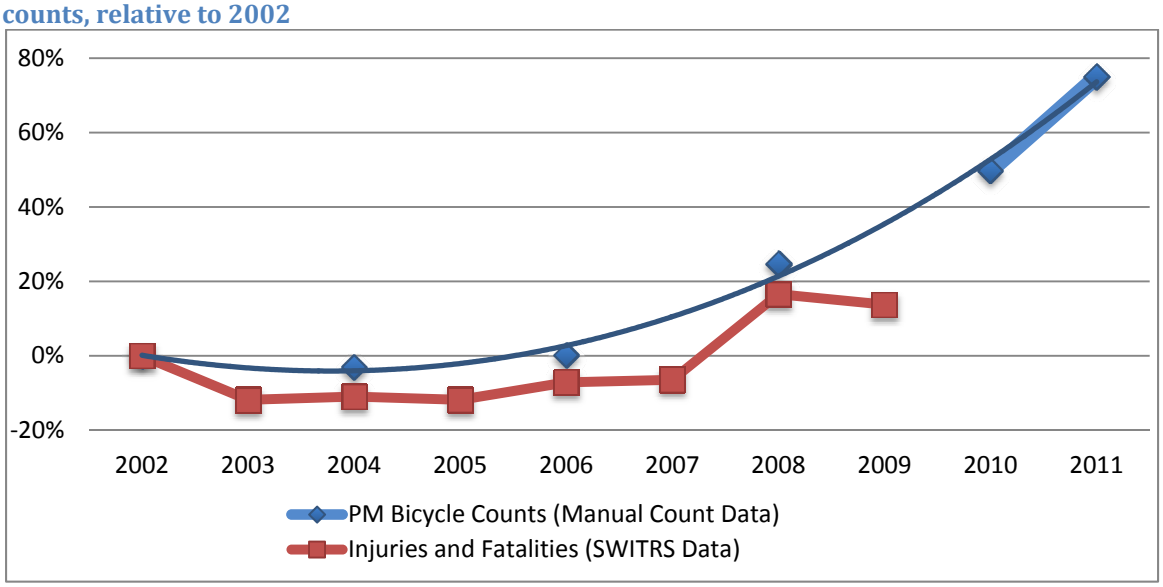


Source: Injuries and fatalities – Statewide Integrated Traffic Records System (SWITRS); Alameda CTC pedestrian counts – longitudinal data, PM period, 6 sites.

From 2002 to 2009, the total number of bicycle collisions has varied, but overall it has risen by 14%. While there are no 2009 counts to directly compare to this collision trend period, between 2002 and 2008, bicyclist volumes increased by 25%, and between 2002 and 2010 they increased by 50%. So, while collisions have increased, they have done so at a slower pace than the increase in bicycling, suggesting that collision rates, or the number of collisions per bicyclist, have dropped. Figure 44 shows the percent change in injuries and fatalities resulting from collisions compared with the percent change in bicycle volumes, both relative to 2002.

* SWITRS data is known to under-report bicycle and pedestrian collisions because it only uses data from traffic collision reports that involve a motor vehicle, and only those in which injuries or fatalities occurred. Often bicycle and pedestrian collisions and near collisions are never reported, so the true number of collisions is unknown.

Figure 44: Percent change in bicyclist injuries and fatalities compared with percent change in bicycle counts, relative to 2002

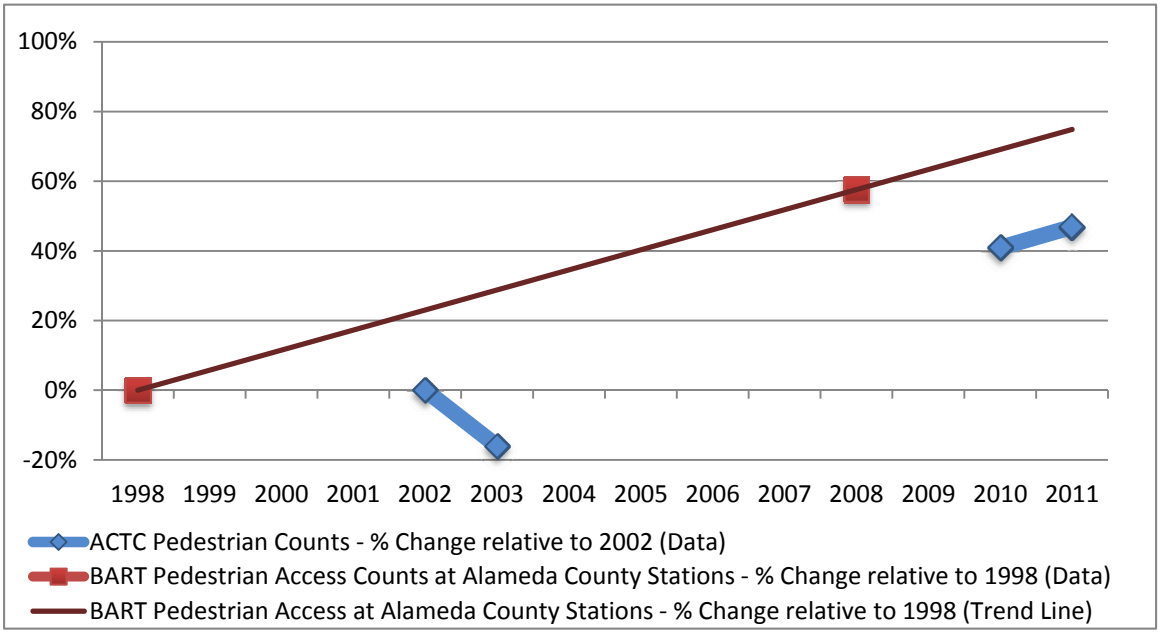


Source: Injuries and fatalities – Statewide Integrated Traffic Records System (SWITRS); Alameda CTC bicycle counts – longitudinal data, PM period, 9 sites.

Access to BART

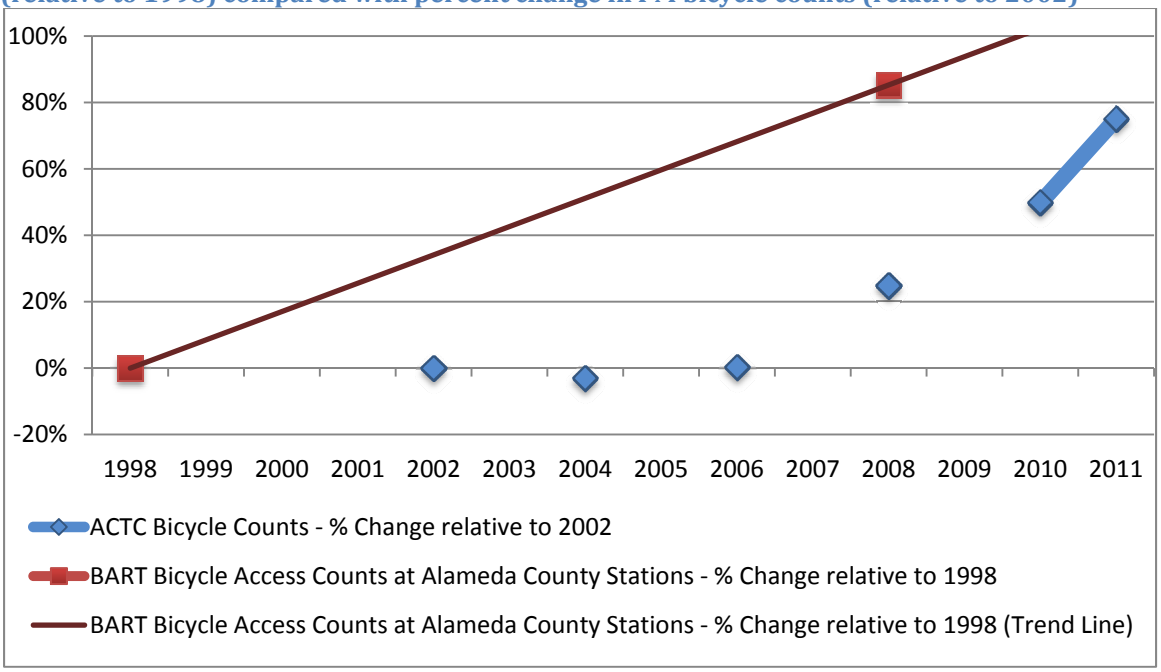
Approximately every ten years, BART collects data on how people access their stations. Figure 45 and Figure 46 show data on bicycle and pedestrian access from the BART 1998 and 2008 Station Profile Studies, as compared to changes in pedestrian and bicycle use throughout Alameda County over a similar time period. As seen in these figures, as pedestrian and bicycle use grows, people are also using these modes as a way to access regional transit, addressing first/last mile transit issues.

Figure 45: Percent change in BART pedestrian access to Alameda County stations (relative to 1998) compared with percent change in PM pedestrian counts (relative to 2002)



Source: BART's *1998 and 2008 Station Profile Study,* as provided in the *Alameda Countywide Pedestrian and Bicycle Plans* – 19 stations; Alameda CTC pedestrian counts – longitudinal data, PM period, 6 sites.

Figure 46: Percent change in BART bicycle access per average weekday to Alameda County stations (relative to 1998) compared with percent change in PM bicycle counts (relative to 2002)

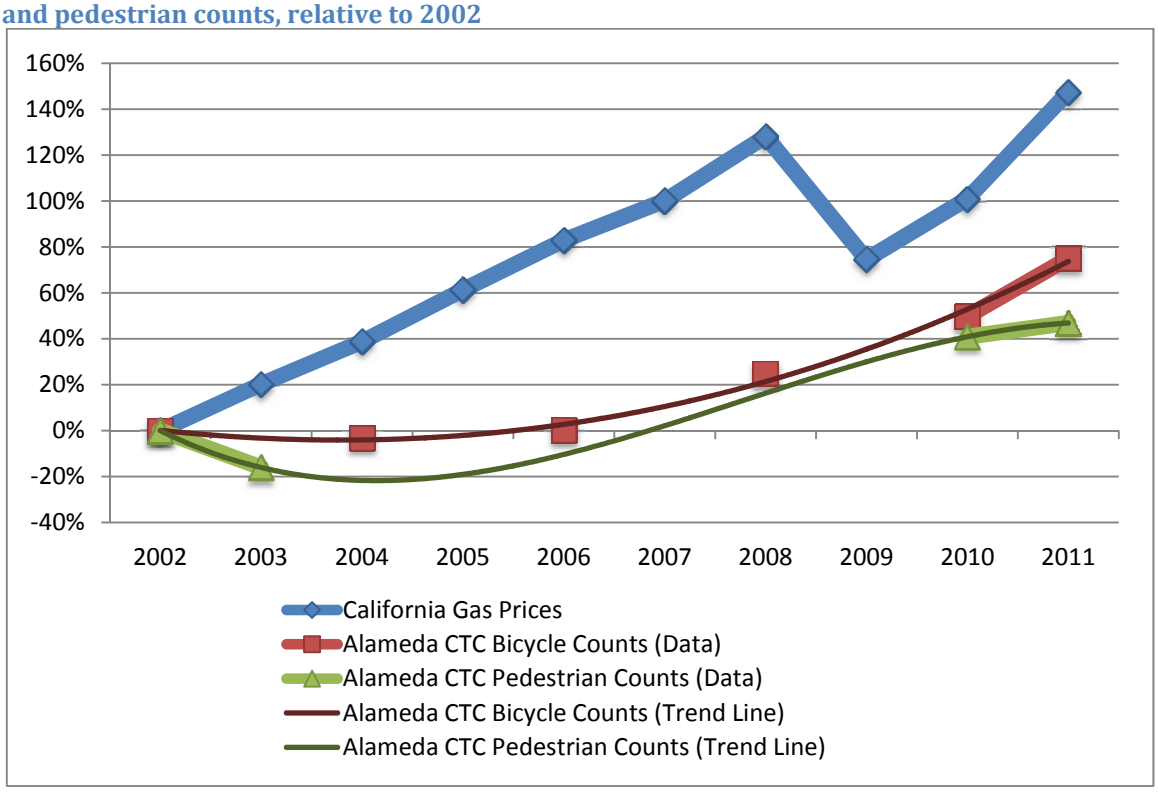


Source: *BART Draft Bicycle Plan 2012* – 19 stations; Alameda CTC bicycle counts – longitudinal data, PM period, 9 sites.

California Gasoline Prices

One factor often cited as a reason that people switch from driving to walking or biking is higher gas prices. Figure 47 below shows the percent change in annual California retail gasoline prices (not including inflation) juxtaposed with the percentage change in Alameda County biking and walking numbers, using the PM period longitudinal data. From 2002 to 2011, gas prices rose by 147%, as compared to the 47% and 75% increases in pedestrian and bicycle counts, respectively, suggesting that increasing gas prices could be influencing the changes in walking and biking.

Figure 47: Percent change in growth of California gas prices compared with percent change in bicycle and pedestrian counts, relative to 2002



Source: Gas prices – Energy Information Administration, Department of Energy 2012; California all grades, all formulations retail gasoline prices (dollars per gallon; uninflated). Alameda CTC bicycle and pedestrian counts – longitudinal data, PM period.

Recommendations

During the process of organizing and analyzing the data in this report, the following recommendations were developed for future data collection and analysis efforts. By implementing these recommendations, Alameda CTC can maintain high quality data, take better advantage of the data already collected and being collected, and better allocate resources in the future.

Count Sites and Data

Collecting the most useful longitudinal data requires:

- Counting at the same key sites – Sites that have been counted several times in the past should continue to be counted, unless the site is being "retired."
- Using standard time periods, seasons, and days of week – To ensure comparability, continue using time periods that have been used in the past and/or time periods that are standard with other jurisdictional data.
- Maintaining data in fine increments, and at least hourly – This approach allows the use of at least a portion of the data, even if the standard time periods shift over time.
- Ensuring contextual data is collected, such as date, time, weather and temperature.
- Continuing to collect auxiliary data such as gender and helmet use.
- Evaluating sites to ensure that sites with major physical, land use or transportation infrastructure changes are either retired or data is modified, and that new, relevant sites are added, as feasible.

Additional Recommendations

- Summarize and include the automated 24-hour bicycle and pedestrian count data currently being collected throughout Alameda County, to supplement manual count data and show a better picture of recreational walking and bicycling, in particular.
- Investigate increasing the number of annual count sites, so that the number of sites matches national best practices on the best representation of changes in walking and bicycling.
- Migrate data into a geographic database (GIS) to improve geographically related analysis capabilities such as distance from schools or transit, main roads, land-use density, Priority Development Areas (PDAs), etc. This will also allow improved visual representations of trends and selection of additional count sites.
- Explore the possibility of conducting weekend manual counts to better capture recreational riding. Weekend data was collected in 2008 at 47 count locations and in 2009 at 36 count locations. Counts were conducted on Saturdays during one of three two-hour count periods

between 9am and 4pm. Initial research suggests that weekend counts are no more expensive to collect than weekday counts on a time-period basis.

- Analyze data for locations near transit and also in PDAs, and track trends over time.
- Compare count trends to changes in bicycle and pedestrian commute modes over time.
- Segregate and analyze those count locations near schools with active Safe Routes to Schools (SR2S) programs, and also compare count data to the evaluation data collected by the SR2S program.
- Explore ways to collect data via automation, such as using video detection at traffic signals. This may allow increased data collection throughout the county at a lower cost.
- Apply adjustment factors to existing collected data. Adjustment factors are being developed and refined by academics and others, which can be applied to existing data that was not collected during identical time periods, days of week and/or seasons. Applying these factors allows the conversion of much more of the existing data into a comparable form. This includes adjusting for season, extreme temperatures, time period and land use. These adjustment factors are currently available for Alameda County only for pedestrian data, but hopefully they will soon be developed for bicycle data as well. Although it may be time intensive to apply them, these adjustments would allow a larger number of data points to more accurately be compared, resulting in a more refined analysis of walking and bicycling trends.

Appendices

Appendix A: Summary data for all manual pedestrian count sites, 2002 to 2011

ID #	Street	Cross street	City	ACTC Planning Area	2002			2003			2006	2008					2009				2010				2011		
					AM	Mid	PM	AM	School	PM	PM* 3-6pm	Mid	School* 3-5pm	School* 3-4pm	PM* 3-6pm	Weekend*	School	School* 3-4pm	PM	Weekend*	Mid	School	School* 3-4pm	PM	Mid	School	PM
1	Atlantic Avenue	Webster Street	Alameda	North															313	140	874			457	938		399
2	Broadway (CA 61)	Calhoun Street	Alameda	North									72	59		34						102	41	83		66	55
3	Central Avenue	Fifth Street	Alameda	North													383	121		138		316	189	229		220	151
7	Park Street	Otis Drive	Alameda	North	85		272														280			189	257		263
95	Buchanan Street	Jackson Street	Albany	North																		443	329	245		459	232
9	Solano Avenue	Masonic Ave (Ohlone Trail)	Albany	North									514	334		397			351	303	407			551	424		384
10	Ashby Avenue (CA 13)	Hillegass Avenue	Berkeley	North															192	162	269			361	216		166
12	Ashby Avenue (CA 13)	Telegraph Avenue	Berkeley	North								410				191					345			306	353		306
14	College Avenue	Derby Street	Berkeley	North								319				628					390			748	418		841
16	Hearst Avenue	Milvia Street	Berkeley	North											312				306	251	339			369	306		366
17	San Pablo Avenue	Virginia Street	Berkeley	North	78		103												101	124	126			149	125		132
22	Hesperian Boulevard	Lewelling Boulevard	County	Central															76	76		139	94	107		116	130
23	Mission Boulevard (CA 185)	Grove Way	County	Central									69	39		58						46	25	35		46	42
24	Redwood Road	Castro Valley Boulevard	County	Central													94	56		180		255	112	204		264	172
27	Dublin Boulevard	Scarlett Dr (Iron Horse Trail)	Dublin	East	19		25	22		25									30	45	41			59	28		60
28	Dublin Boulevard	Hacienda Drive	Dublin	East															36	30	53			42	61		71
30	Powell Street	Christie Avenue	Emeryville	North	20		68														159			104	210		186
31	San Pablo Avenue	40th Street	Emeryville	North							512				504				509	320		456	236	523		478	515
32	Fremont Blvd	Mowry Avenue	Fremont	South	127		205	102		188											484			530	496		501
98	Fremont Blvd (Washington)	Union Street	Fremont	South																	75			77	107		140
33	Fremont Boulevard (CA 84)	Peralta Boulevard	Fremont	South									73	44		90						93	46	84		104	119
34	Mission Boulevard (CA 238)	Nichols Avenue	Fremont	South								7				14					7			15	16		19
35	Mowry Avenue (CA 84)	Cherry Lane	Fremont	South									9	2		11					28			17	20		16
36	Paseo Padre Parkway	Mowry Avenue	Fremont	South							190	229				83			174	117	107			112	176		236
99	Paseo Padre Parkway	Decoto Rd	Fremont	South								89				82						7	2	8		22	31
38	Warm Springs	Grimmer	Fremont	South															5	3	2			5	2		2
97	C Street	Grand Street	Hayward	Central																	65			98	85		93
39	Foothill Boulevard	D Street	Hayward	Central								20				4					20			42	14		39
41	Mission Boulevard	Jefferson Street	Hayward	Central								171				27	110	51		51	42			96	568		46
45	Santa Clara Street	Ocie Way	Hayward	Central								10				63					33			123	98		103
47	Winton Avenue	Amador Street	Hayward	Central	126		94										292	147		34	322			150	305		135
49	East Street	Vasco Road	Livermore	East																	15			12	16		11
50	Railroad Avenue	First Street	Livermore	East															35	49	74			54	70		48
51	Ardenwood Boulevard (CA 84)	Newark Boulevard (E side interchange ramp)	Newark	South									55	29		15					44			31	48		53

ID #	Street	Cross street	City	ACTC Planning Area	2002			2003			2006	2008					2009				2010				2011		
					AM	Mid	PM	AM	School	PM	PM* 3-6pm	Mid	School* 3-5pm	School* 3-4pm	PM* 3-6pm	Weekend*	School	School* 3-4pm	PM	Weekend*	Mid	School	School* 3-4pm	PM	Mid	School	PM
52	Thornton Avenue	Willow Street	Newark	South															0	1		10	8	7		8	7
53	66th Avenue	San Leandro St	Oakland	North	143		91	49		27											78			207	96		229
55	Bancroft Avenue	Auseon Avenue	Oakland	North								56				76					84			119	143		138
56	Broadway	12th Street	Oakland	North								3577				1374			2032	1033	2755			1957	2735		1921
57	Broadway	20th Street	Oakland	North																	1475			1407	1408		1388
58	Chatham Road	13th Avenue	Oakland	North									222	177		18						264	249	92		240	86
59	Doolittle Drive (CA 61)	Airport Access Road	Oakland	North									9	4		4			10	2	8			6	12		10
62	Fruitvale Avenue	Foothill Blvd	Oakland	North																		699	556	914		806	751
63	Fruitvale Avenue	Alameda Ave	Oakland	North													31	12		20		55	22	47		35	62
64	Grand Avenue	Staten Ave	Oakland	North	387		571	380		457											586			504	635		568
65	Grand Avenue	Lake Park	Oakland	North															561	941		637	315	576		569	631
70	MacArthur Boulevard	38th Avenue	Oakland	North															415	445	313			316	277		294
72	Mandela Parkway	14th Street	Oakland	North															91	56	227			377	164		311
75	Mountain	La Salle	Oakland	North													1241	688		1566	964			873	901		825
76	Telegraph Avenue	27th Street	Oakland	North							224				385		212	96		150	265			201	332		294
96	Telegraph Avenue	40th Street	Oakland	North																	630			1034	584		1007
78	Webster Street	7th Street	Oakland	North									936	440		1131						1117	572	1063		1148	1050
79	Grand Avenue	Oakland Avenue	Piedmont	North							161				144		114	92		75		123	90	45		78	54
80	Main St	Bernal Ave	Pleasanton	East	44	152	165														29			70	30		66
81	Owens Drive	Andrews Drive	Pleasanton	East									49	30		31					72			63	57		49
82	Santa Rita Road	Francisco Street	Pleasanton	East													113	56		67	60			32	51		47
83	Stoneridge Drive	Hopyard Road	Pleasanton	East							16								12	17	64			14	77		21
85	Bancroft Avenue	Estudillo Avenue	San Leandro	Central	429		118	391	705	95									130	67	78			160	123		191
87	Davis Street (CA 61)	Pierce Avenue	San Leandro	Central									28	11		33						146	73	106		165	95
88	East 14th Street (CA 185)	Hesperian Boulevard	San Leandro	Central								78				69					91			105	97		102
89	East 14th Street (CA 185)	Maud Avenue	San Leandro	Central									179	79		145						89	70	104		160	112
92	Alvarado-Niles Road	Dyer Street	Union City	South															73	52	38			54	70		89
93	Decoto Road	Alvarado-Niles Road	Union City	South	121		193	157		218											97			235	148		218
94	Decoto Road	7th Street	Union City	South													85	37		51	54			132	55		74
			Total Number of Count Locations:		11	1	11	6	1	6	5	11	12	12	4	23	10	10	21	31	45	18	18	63	45	18	63

Notes:

* Non-standard time period (actual times shown). Standard time periods are: AM = 7-9am, Mid-day = 12-2pm, School= 2-4pm, PM = 4-6pm. Weekend time periods vary, although they were always 2-hour periods.

Green highlighted columns are estimated or use only part of the full time period data.

Appendix B: Summary data for all manual bicycle count sites, 2002 to 2011

ID#	Street	Cross street	City	ACTC Planning Area	2002			2003			2004	2006		2008					2009			2010			2011		
					AM	Mid	PM* 3-6pm (in green), 4-6pm	AM	School	PM	PM* 3-6pm	PM* 3-6pm	PM 4-6pm	Mid	School* 3-5pm	PM* 3-6pm	PM 4-6pm	Weekend	School	PM	Weekend	Mid	School	PM	Mid	School	PM
1	Atlantic Avenue	Webster Street	Alameda	North			36				56	41	29			62	38			26	24	40		82	26		26
2	Broadway (CA 61)	Calhoun Street	Alameda	North											16			24					44	21		13	48
3	Central Avenue	Fifth Street	Alameda	North															54		27		78	79		81	73
7	Park Street	Otis Drive	Alameda	North	20		58															63		81	65		77
95	Buchanan Street	Jackson Street	Albany	North																			64	88		58	120
9	Solano Avenue	Masonic Ave (Ohlone Trail)	Albany	North											150			127		149	135	91		148	122		168
10	Ashby Avenue (CA 13)	Hillegass Avenue	Berkeley	North																123	75	48		93	73		101
12	Ashby Avenue (CA 13)	Telegraph Avenue	Berkeley	North										82				67				105		166	103		154
14	College Avenue	Derby Street	Berkeley	North										75				65				108		167	119		188
16	Hearst Avenue	Milvia Street	Berkeley	North			405				392	374	289			441	340			343	171	235		476	263		487
17	San Pablo Avenue	Virginia Street	Berkeley	North	59		69													95	74	59		86	104		153
22	Hesperian Boulevard	Lewelling Boulevard	County	Central			27				25	36	25			68	56			25	24		43	32		42	37
23	Mission Boulevard (CA 185)	Grove Way	County	Central											24			18					16	5		16	5
24	Redwood Road	Castro Valley Boulevard	County	Central							26	36	29			45	27		27		55		35	28		38	27
27	Dublin Boulevard	Scarlett Dr (Iron Horse Trail)	Dublin	East	11		17	13		18										82	84	40		55	46		70
28	Dublin Boulevard	Hacienda Drive	Dublin	East																31	20	3		13	5		26
30	Powell Street	Christie Avenue	Emeryville	North	9		7															32		43	32		39
31	San Pablo Avenue	40th Street	Emeryville	North			142				168	158	118			196	147			174	42		133	150		113	162
32	Fremont Blvd	Mowry Avenue	Fremont	South	50		90	30		61												29		67	40		68
98	Fremont Blvd (Washington)	Union Street	Fremont	South																		20		32	20		32
33	Fremont Boulevard (CA 84)	Peralta Boulevard	Fremont	South											21			15					35	48		35	48
34	Mission Boulevard (CA 238)	Nichols Avenue	Fremont	South										7				4				3		4	12		21
35	Mowry Avenue (CA 84)	Cherry Lane	Fremont	South											7			11				9		16	4		19
36	Paseo Padre Parkway	Mowry Avenue	Fremont	South			60				52	22	14	12		34	26	29		50	37	24		30	112		154
99	Paseo Padre Parkway	Decoto Rd	Fremont	South										16				15					17	22		27	55
38	Warm Springs	Grimmer	Fremont	South																15	62	17		23	15		19
97	C Street	Grand Street	Hayward	Central																		23		19	41		29
39	Foothill Boulevard	D Street	Hayward	Central										2				1				5		6	8		10
41	Mission Boulevard	Jefferson Street	Hayward	Central			11				23		39	3		25		12	22		15	20		28	22		19

ID#	Street	Cross street	City	ACTC Planning Area	2002			2003			2004	2006		2008					2009			2010			2011		
					AM	Mid	PM* 3-6pm (in green), 4-6pm	AM	School	PM	PM* 3-6pm	PM* 3-6pm	PM 4-6pm	Mid	School* 3-5pm	PM* 3-6pm	PM 4-6pm	Weekend	School	PM	Weekend	Mid	School	PM	Mid	School	PM
45	Santa Clara Street	Ocie Way	Hayward	Central										4				9				5		37	59		54
47	Winton Avenue	Amador Street	Hayward	Central	20		18												27		7	20		24	22		27
49	East Street	Vasco Road	Livermore	East			86				109	125	115			93	74					47		65	40		50
50	Railroad Avenue	First Street	Livermore	East																23	28	22		31	16		30
51	Ardenwood Boulevard (CA 84)	Newark Boulevard (E side interchange ramp)	Newark	South											14			16				33		23	30		51
52	Thornton Avenue	Willow Street	Newark	South			5				12	11				13				14	11		7	6		24	40
53	66th Avenue	San Leandro St	Oakland	North	67		63	27		27												32		45	64		63
55	Bancroft Avenue	Auseon Avenue	Oakland	North										14				16				39		17	34		46
56	Broadway	12th Street	Oakland	North										63				47		79	55	161		134	176		187
57	Broadway	20th Street	Oakland	North																		89		166	92		175
58	Chatham Road	13th Avenue	Oakland	North											4			13					2	8		15	23
59	Doolittle Drive (CA 61)	Airport Access Road	Oakland	North											3			15		16	43	8		20	13		23
62	Fruitvale Avenue	Foothill Blvd	Oakland	North																			33	91		42	59
63	Fruitvale Avenue	Alameda Ave	Oakland	North															72		72		44	65		43	116
64	Grand Avenue	Staten Ave	Oakland	North	52		48	79		98												99		156	111		182
65	Grand Avenue	Lake Park	Oakland	North																126	72		61	87		104	107
70	MacArthur Boulevard	38th Avenue	Oakland	North																14	16	11		10	19		28
72	Mandela Parkway	14th Street	Oakland	North																112	56	65		131	69		129
75	Mountain	La Salle	Oakland	North															18		20	8		11	36		50
76	Telegraph Avenue	27th Street	Oakland	North			136				79	130	102			216	169		145		126	127		211	191		273
96	Telegraph Avenue	40th Street	Oakland	North																		179		327	242		370
78	Webster Street	7th Street	Oakland	North											26			15					39	56		38	98
79	Grand Avenue	Oakland Avenue	Piedmont	North			30				21	40	29			59	27		31		16		16	29		19	51
80	Main St	Bernal Ave	Pleasanton	East	26	20	11															12		15	6		10
81	Owens Drive	Andrews Drive	Pleasanton	East											40			32				16		31	8		20
82	Santa Rita Road	Francisco Street	Pleasanton	East															43		48	8		45	14		35
83	Stoneridge Drive	Hopyard Road	Pleasanton	East			32				19	5	2			32	24			13	31	8		6	5		23
85	Bancroft Avenue	Estudillo Avenue	San Leandro	Central	20		20	42	35	24										24	22	9		21	55		62
87	Davis Street (CA 61)	Pierce Avenue	San Leandro	Central											2			29					34	19		33	43
88	East 14th Street (CA 185)	Hesperian Boulevard	San Leandro	Central										6				34				21		23	22		27
89	East 14th Street (CA 185)	Maud Avenue	San Leandro	Central											8			33					22	23		19	42

ID#	Street	Cross street	City	ACTC Planning Area	2002			2003			2004	2006		2008					2009			2010			2011		
					AM	Mid	PM* 3-6pm (in green), 4-6pm	AM	School	PM	PM* 3-6pm	PM* 3-6pm	PM 4-6pm	Mid	School* 3-5pm	PM* 3-6pm	PM 4-6pm	Weekend	School	PM	Weekend	Mid	School	PM	Mid	School	PM
92	Alvarado-Niles Road	Dyer Street	Union City	South															29	34	14		20	96		132
93	Decoto Road	Alvarado-Niles Road	Union City	South	35		37	38		43											29		78	104		171
94	Decoto Road	7th Street	Union City	South														13		18	6		25	12		26
		Total Number of Count Locations:			11	1	22	6	1	6	12	11	11	11	12	12	10	23	10	21	31	45	18	63	45	18	63

Notes:

* Non-standard time period (actual times shown). Standard time periods are: AM = 7-9am, Mid-day = 12-2pm, School= 2-4pm, PM = 4-6pm. Weekend time periods vary, although they were always 2-hour periods.

Green highlighted columns are estimated or use only part of the full time period data.

Appendix C: Data sources and attributes for historical manual counts

Figure A.1: Pedestrian data sources and attributes for manual counts

Year	Source Agency	# Count Sites	AM	Mid-day	School	PM	Weekend	Data Collection Months	Hourly Data Available	Gender Data Available
2002	MTC	13	7-9 am	12-2 pm	--	4-6 pm	--	Sept, Oct	N	N
2003	MTC	6	7-9 am	--	2-4 pm	4-6 pm	--	--	N	N
2006	Alameda CTC	5	--	--	--	3-6 pm	--	May, June	Y	N
2008	UCTSC/ Alameda CTC	50	--	12-2 pm	3-5 pm	--	9-11am, 12-2pm, 3-5pm	April, May, June, July	Y	Y
2008	Alameda CTC	4	--	--	--	3-6 pm	--	May, June	Y	N
2009	UCTSC/ Alameda CTC	36	--	--	2-4 pm	4-6 pm	9-11am, 12-2pm, 3-5pm	April, May, June	Y	Y
2010	Alameda CTC/ MTC	63	--	12-2 pm	2-4 pm	4-6 pm	--	Sept, Oct	Y	Y
2011	Alameda CTC/ MTC	63	--	12-2 pm	2-4 pm	4-6 pm	--	Sept, Oct	Y	Y

Note: MTC = Metropolitan Transportation Commission, Alameda CTC = Alameda County Transportation Commission, UCTSC = University of California Traffic Safety Center (now SafeTREC)

Figure A.2: Bicyclist data sources and attributes for manual counts

Year	Source Agency	# Count Sites	AM	Mid-day	School	PM	Weekend	Data Collection Months	Hourly Data Available	Gender Data Available	Helmet Data Available
2002	Alameda CTC	12	--	--	--	3-6 pm	--	Unknown	N (estimated)	N	N
2002	MTC	13	7-9 am	12-2 pm	--	4-6 pm	--	Sept, Oct	N	N	N
2003	MTC	6	7-9 am	--	2-4 pm	4-6 pm	--	Unknown	N	N	N
2004	Alameda CTC	12	--	--	--	3-6 pm	--	Unknown	N (estimated)	N	N
2006	Alameda CTC	12	--	--	--	3-6 pm	--	April, May, June	Y (most sites)	N	N
2008	Alameda CTC	12	--	--	--	3-6 pm	--	April, May, June	Y (most sites)	N	N
2008	UCTSC/ Alameda CTC	50	--	12-2 pm	3-5 pm	--	9-11am, 12-2pm, 3-5pm	April, May, June, July	Y	Y	N
2009	UCTSC/ Alameda CTC	36	--	--	2-4 pm	4-6 pm	9-11am, 12-2pm, 3-5pm	April, May, June	Y	Y	N
2010	Alameda CTC/ MTC	63	--	12-2 pm	2-4 pm	4-6 pm	--	Sept, Oct	Y	Y	Y
2011	Alameda CTC/ MTC	63	--	12-2 pm	2-4 pm	4-6 pm	--	Sept, Oct	Y	Y	Y

Note: MTC = Metropolitan Transportation Commission, Alameda CTC = Alameda County Transportation Commission, UCTSC = University of California Traffic Safety Center (now SafeTREC)