Bicycle and Pedestrian Counts in Cudahy: Results from Automated Counts in 2013-2014

Herbie Huff, Madeline Brozen,
Norman Wong and Diana Benitez

UCLA Luskin School *of* Public Affairs
Lewis Center • Institute of Transportation Studies

Attribution

This report is made possible with funding from the Centers for Disease Control and Prevention through the Los Angeles County Department of Public Health.

Table of Contents

Listing of tables and figures

Introduction

Where do people bike and walk? Where are there safety problems for pedestrians and cyclists? What is the impact of investments in bike lanes, crosswalks, and other improvements for people on foot and bicycles? These are just a few of the fundamental questions that are answered by bicycle and pedestrian count data. Although ~17% of all trips in the Los Angeles region[1] are made by foot or bike, and 40% of all roadway fatalities in Los Angeles County are people walking or riding bicycles,[2] historically, traffic monitoring has focused exclusively on cars.

Bicycle and pedestrian counts enable these modes to be considered on equal footing with driving, and enable robust understanding of costs, benefits, behavior, and more. In September 2014, the Los Angeles County Department of Public Health (DPH) loaned counting devices to the City of Cudahy to automatically count the levels of walking and cycling at selected locations. The City is currently developing its first Safe Routes to School Plan, funded by DPH. The resulting data provide an understanding of the number of people walking and cycling in Carson, and the distribution of that activity. These data are crucial in evaluating the effectiveness of walking and cycling infrastructure and safety investments in Cudahy. In addition, conducting counts, collecting and sharing the data contributes to a growing body of bicycle and pedestrian count data in the Los Angeles region.

As the administering agency of the counting device lending program, DPH's interest in walking and cycling stems from the public health benefits of these active modes. These data can ultimately be used to better understand how bicycling and walking contribute to broader public health goals, such as reducing obesity and improving mental health outcomes. In addition, for the past 6 years, DPH has funded the development of several bicycle and pedestrian planning efforts. The Department seeks to better determine the effectiveness of the bicycling and walking infrastructure and programs they have helped to plan. Third, count volume data is increasingly becoming a requirement for grant funding applications. Therefore, DPH wants to assist cities in obtaining these data so that this requirement is not a barrier to receiving funds to improve walking and bicycling in communities around the County.

Another goal of the lending program is to contribute to the growing body of bicycle and pedestrian count data in Los Angeles County. Because counts represent data at the most micro- of scales, it can be challenging to assemble the larger data sets that are necessary to discern broader, generalizable patterns, such as those of crash risk or the effectiveness of various types of infrastructure improvements. The Los Angeles County Bike Count Data

---

[1] Analysis of 2009 National Household Transportation Survey (NHTS) for the 6,700 households in the SCAG region, by the Southern California Association of Governments, http://www.scag.ca.gov/Documents/attach2.pdf, page 17. 17% of weekday trips in the SCAG region are by foot or bike; the proportion of trips taken by foot or bike is likely higher in the urbanized portions of the region, but NHTS sample sizes only allow for analysis at geographies of the MSA level or larger.

[2] Between 2008 and 2012, inclusive, 1098 crashes resulting in fatality involved a bicyclist or pedestrian; 2849 total fatal crashes occurred, giving 39% over this five year period. Source: Transportation Injury and Mapping System, http://tims.berkeley.edu/tools/query/summary.php

Clearinghouse at bikecounts.luskin.ucla.edu gathers and makes available a regional database of bicycle and pedestrian counts. All of the data discussed below have been entered into the Clearinghouse, and that database contains the most detailed version of the data, along with supporting metadata, e.g. descriptive information about the count locations and devices.

Methodology and Approach

The counters were placed at 6 locations in the City of Cudahy. In accordance with established standards,[3] DPH advised cities to select locations with the following criteria:

- Locations where counts were conducted in the past
- Locations where you expect to observe high bicycle volumes such as places with existing bicycle infrastructure
- Destinations that attract people: schools, major employment areas, high density residential areas, major transit stops
- Locations where new bicycle and pedestrian facilities are planned to be implemented in the future
- Locations with a history of bicycle or pedestrian collisions

Cudahy also referenced established guidance[4] that recommends counting at a minimum of 1 site per 15,000 residents of a jurisdiction. With Cudahy's population of about 24,000, such guidance dictates a minimum of 2 sites. Cudahy exceeded this with six sites.

The six count locations in Carson were chosen to establish a baseline for citywide bicycle and pedestrian activity. They cover most of the City's major thoroughfares, and there is a location near each of Cudahy's major destinations: these include schools, retail areas on Atlantic Ave, and access to the river on Clara St. Industrial, residential, and commercial areas are all included among the count locations.

Automated Counter Technology

The bicycle counters are made by EcoCounter and are the TUBES model. Two pneumatic tubes are stretched across a roadway and affixed to the ground (see figure 1). High volume traffic streets present a problem to this type of automatic counter. High vehicle volumes or a large percentage of heavy vehicle traffic can physically damage the tubes. When a desired location (e.g. a school or other destination) was on a busy street, the location was slightly modified so the tube counters would not be damaged and fail to provide accurate data.

---

[3] "Conducting Bicycle and Pedestrian Counts: A Manual for Jurisdictions in Los Angeles County and Beyond" available at bikecounts.luskin.ucla.edu

[4] In "Conducting Bicycle and Pedestrian Counts" above and also originally recommended by the National Bicycle and Pedestrian Documentation Project, a collaboration of the Institute of Transportation Engineers and Alta Planning+Design.

The pedestrian counters are also made by EcoCounter and are the ECOPYRO model. The device is a small box that is affixed to a pole near the curb. It sends out an infrared beam and then counts whenever that beam is broken (see figure 2). There must be a solid, non-mirrored and non-glass surface across from where the box is mounted. This means that a pole to mount the pedestrian sensor cannot be located across from a mirrored facade, parking structure with open walls, or building windows. These technical specifications also constrain location selection.

Definitional Notes

Note that all the locations are "mid-block" locations rather than intersection locations. This is again a function of the equipment, which counts bicycle or pedestrian traffic on a specific side of the street. At each location, a total of four devices were installed: one bicycle counter on each side of the street, and one pedestrian counter on each sidewalk.

Also note that throughout this report, "pedestrian" volumes refer to the totals tallied by the ECOPYRO devices, and "bicyclist" volumes refer to the totals tallied by the tube counters. This nomenclature is one of convenience, as technically ECOPYRO counters also count bicyclists on the sidewalk, and the tubes do not count bicyclists on the sidewalk, only counting bicyclists who ride in the street. Manual count data in Los Angeles County show that sidewalk bicycling can vary from nearly 0% of bicyclists to over 50% of bicyclists. Thus, bicyclist volumes should be considered to be an underestimate and pedestrian volumes should be considered an overestimate. It is possible to estimate true modal flows using manual counts of sidewalk bicycling, but the necessary manual counts do not exist for the majority of locations at which DPH-loaned devices were installed.

Figure 1: Bicycle tube counter


Figure 2: Pedestrian counter

Cudahy Count Locations

The map below displays the locations of the automatic counters in Cudahy.

Figure 3 Map of count locations in Cudahy

The table below describes the specific locations of each counter and the context in which they were installed.

ID	Primary Street	Block Endpoint 1	Block Endpoint 2	Bikeway Type	Nearby Special Sites	Vehicle ADT (if known)*
1	Clara St	Otis Ave	Atlantic Ave	none	School	6,500
2	Santa Ana St	Salt Lake Ave	Atlantic Ave	none		11,000
3	Atlantic Ave	Clara St	Elizabeth St	none		25,500
4	Elizabeth St	Atlantic Ave	Wilcox Ave	none	School	6,000
5	Live Oak St	Wilcox Ave	Crafton Ave	none	School	
6	Clara St	Wilcox Ave	Walker Ave	none		16,000

Table 1: Counter location and context

*Traffic volumes rounded to the nearest 500.

Count date and times

The counters were installed September 5, 2014 and removed September 25, 2014.

Note that because bicyclist and pedestrian activity does vary seasonally, the choice of this limited time of year impacts the volumes observed. These counts took place during the school year, and significant school traffic is included in the totals. September's weather is mild and favorable to walking and bicycling. On the whole, these volumes are probably higher than volumes taken in other months of the year.

Over this period, data was recorded every 15 minutes, 24 hours a day, for the duration of installation. The counters do fail for various reasons: the pneumatic tubes can be damaged by vehicles, the ECOPYRO boxes can be tampered with or obstructed, and other reasons. Ideally, someone should look at the data every day, identify problems as they happen, fix them, and keep records of when counters are reset. This was not always the case, and as a result, researchers at UCLA determined the date ranges for which the data are valid by inspecting the data and looking for unusual spikes or drops in the numbers of pedestrians or cyclists. The Appendix shows each counter location, the tubes or sensors located there, and the data windows that were assumed to be valid.

Findings

The maps and table below show the average daily volumes of bicyclists and pedestrians respectively at each location counted in Cudahy. We include the standard deviation around the average as an indicator of the variation in daily bicycling or walking[5].

ID	Nearby Special Sites	Vehicle ADT (if known)	Bike ADT	Std. Dev in Bike ADT	Ped ADT	Std. Dev in Ped ADT
1	School	6,500	210	±60	1050	±265
2		11,000	60	±10	215	±70
3		25,500	no data	no data	1690	±135
4	School	6,000	85	±20	3170	±570
5	School		60	±10	1310	±400
6		16,000	no data	no data	790	±80

Table 2: Average Daily Volumes

[5] If we assume that daily walking and bicycling are distributed normally on a bell curve, there is a 95% chance that the true daily average falls in the range stated on these maps. The assumption of normality is supported by features of the data set, such as means and medians that are nearly equal to one another. When counters were producing valid data for a longer period of time, and when sheer volumes are higher, these 95% intervals tend to be smaller. We make note of these intervals to underscore that bicycling and walking vary, generally more than auto traffic. This is why it is important to count for an extended period of time and to examine the variation in the data. Also note: we treat the daily sums as a random variable and do not account for underlying systematic variations such as those due to day-of-week, month-of-year, or weather. In general, the counting periods are not long enough to examine those factors.

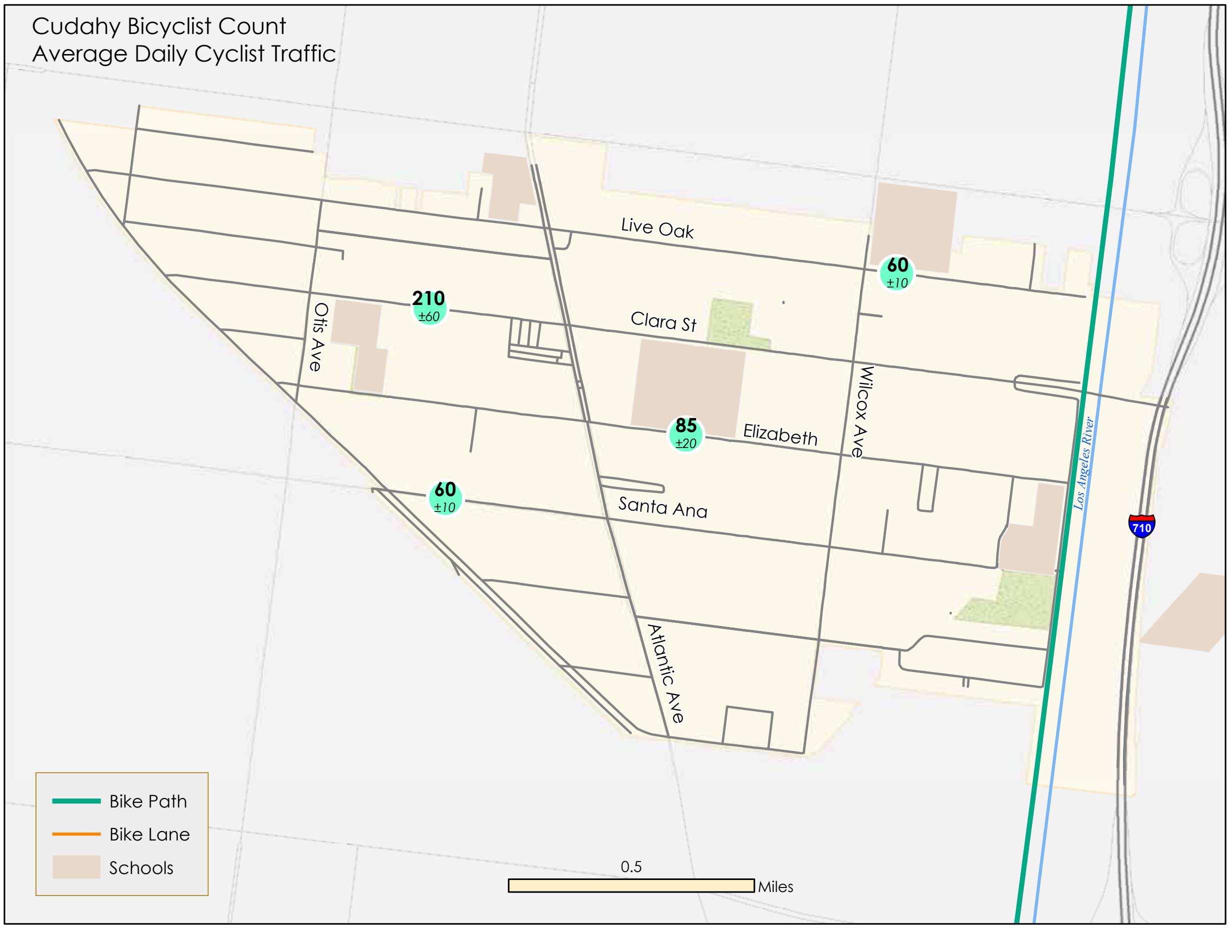

Figure 4 Average Daily Cyclist Volume Map

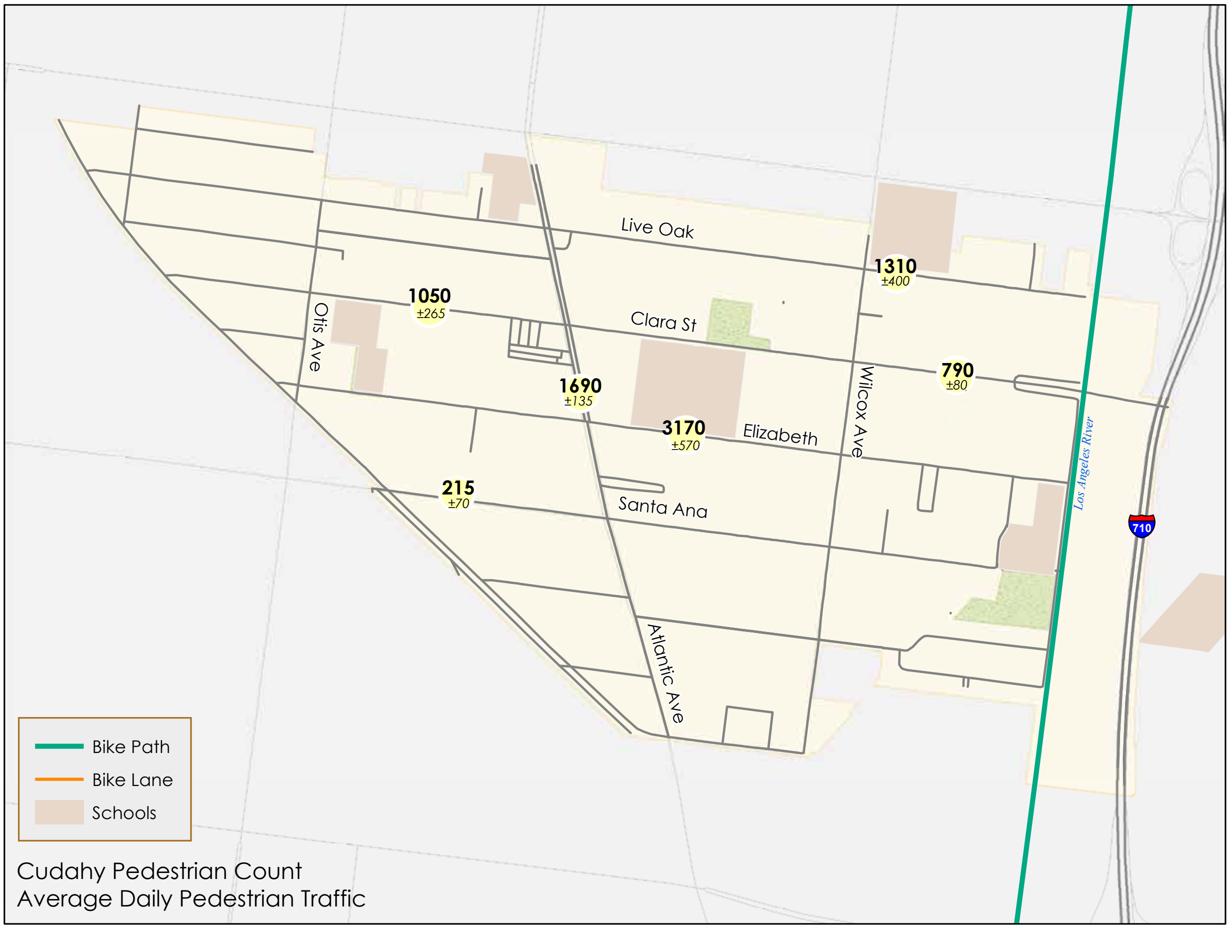

Figure 5 Average Daily Pedestrian Volume Map

The bicycle count data display evidence of the importance of the Los Angeles River. The highest volumes are seen on Clara St., which connects to the river. This site had the fourth highest bicycle traffic of the 35 sites counted by DPH-loaned devices. The other sites show modest volumes between 60 and 80 bicyclists per day. The range of daily bicyclist volumes seen in other cities that used the devices is a low of 20 per day and a high of 240 per day, so 60-80 per day is neither particularly low nor particularly high relative to volumes in peer cities.

Conclusion and Next Steps

These counts should inform better decision-making by the City of Cudahy. They apply to decisions about maintenance priorities, capital improvement priorities, and execution of education and encouragement programs, among others. The exact use of the data depends upon processes and resources specific to the City with which we are not intimately familiar, but we can still state some examples for illustrative purposes.

The City decides which streets to prioritize for repaving, and should raise the priority of streets with a lot of bicycle traffic. The City decides how to address traffic safety problems on its streets, and should analyze bicycle and pedestrian volumes alongside historical crashes for these modes to identify areas of high crash risk, and prioritize these. The City could reference bicycle and pedestrian count data when allocating parks improvements funds. In general, these counts give the City the power to implement improvements where they will serve the greatest number of bicyclists or pedestrians.

These counts easily dispel the myth that ‘nobody’ walks or rides bikes. They underscore the relevance of many best practices in planning for a sustainable, healthy transportation system. With thousands of people walking on several of the streets counted in Cudahy, the importance of safe, hospitable street design for walking cannot be denied. The high bicycle volumes near the river suggest that there is an opportunity for the City to strengthen that connection, and enable greater flows of visitors to Cudahy and greater connections and opportunities for Cudahy residents who might travel to work or play anywhere that the river goes. The counts lend support to reduction or removal of minimum parking requirements, since these regulations penalize people who walk and bike and subsidize those who drive. The high volumes near Cudahy’s schools underscore the importance of partnering with schools on any City effort related to active transportation. Finally, the sheer magnitude of the pedestrian volumes indicates that Cudahy should prioritize walking, broadly, in its transportation policies and programs.

The City should continue to count as it changes and implements its Safe Routes to School Plan. Counts demonstrate the value of those improvements. Future bicycle and pedestrian counts will enable the City to conduct before-and-after analyses of new infrastructure improvements. As the City better understands the cost-effectiveness of these investments, they can be considered on equal footing with any other transportation system investment.To best preserve the City’s ability to understand trends over time, the City should count at the same locations. The City might also consider expanding the count program to include additional locations. The City should continue to contribute to the Clearinghouse at bikecounts.luskin.ucla.edu and thus to do its part in advancing greater knowledge for better biking and walking policy. Finally, simply having the count data positions the City to make the case for grant funds for bicycle and pedestrian improvements, and the high pedestrian volumes mean that Cudahy should be quite a strong contender for competitive funds.

Appendix

This table contains detailed information about each counter location, the tubes or sensors located there, and the data windows that were assumed to be valid. The pyro counters provide pedestrian volumes while the tubes provide cyclist volumes.

ID	Tube/ Sensor ID	Valid data range	Mean	Median	Std Dev	Tube/Pyro sum	Tube / Pyro Std Dev
1	Pyro 3	9/5 11:30 - 9/25 11:00	**669.8**	**699**	**143.2**	1055	263
	Pyro 4	9/5 2:00 - 9/25 11:00	**384.9**	**355**	**221**		
	Tube 4	9/5 14:00 - 9/10 18:15	**118.2**	**122**	**13.6**	210.9	72.2
	Tube 5	9/5 11:45 - 9/12 6:45	**92.7**	**77**	**58.6**		
2	Tube 10	9/5 15:30 - 9/25 11:00	**29.2**	**27**	**7.2**	58	10
	Tube 12	IN only: 9/5 15:45 - 9/15 9:00. IN and OUT: 9/17 17:15 - 9/25 10:15	**28.4**	**26**	**7.1**		
3	Pyro 10	9/4 15:15 - 9/25 10:15	**764.1**	**758**	**91.1**	1692	133
	Pyro 12	9/4 14:00 - 9/25 13:45	**928.1**	**955**	**97.2**		
4	Pyro 5	9/5 10:45 - 9/25 11:45	**1682.5**	**1958**	**449**	3168	567
	Pyro 8	9/5 10:00 - 9/25 13:30	**1485.4**	**1550.5**	**345.5**		
	Tube 7	9/5 10:30 - 9/25 11:15	**51.1**	**47.5**	**19.5**	85	22
	Tube 9	9/5 10:15 - 9/25 11:45	**33.8**	**31**	**10.8**		
5	Pyro 6	9/4 10:30 - 9/25 10:30	**859.6**	**1071**	**375.9**	1311	403
	Pyro 11	9/4 11:30 - 9/25 10:15	**451.8**	**522.5**	**144.1**		
	Tube 3	9/5 11:30 - 9/13 16:30	**32.5**	**35.5**	**6.9**	58	10
	Tube 6	9/4 10:45 - 9/25 10:45	**25.1**	**26**	**7.3**		
6	Pyro 7	9/4 2:30 - 9/25 10:45	**293.4**	**304**	**55.8**	789	82
	Pyro 9	9/5 15:00 - 9/25 11:00	**495.4**	**506**	**60.6**		
	Tube 8	No data remaining					
	Tube 11	No data remaining					