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Can Federal Funding Create Bicycle Friendly Cities?

A Comparative Study of Bicycle Planning in Sacramento and Amsterdam

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ABSTRACT

Bicycling in the United States has traditionally been seen as a means for recreation whereas in countries like the Netherlands bicycling is viewed and utilized as an integral part of the transportation system. With increasing health and environmental concerns in the United States it is important to consider transportation alternatives. The passage of ISTEA in 1991 has allowed federal funds to be used for bicycle projects. While availability of these funds can be seen as a step in the right direction, the number of bicycle trips has not increased in response to increased investment. Looking to the Netherlands' example it appears that a multi-faceted approach will be necessary to achieve high levels of bicycling. Without addressing other factors such as land use, culture, safety, and vehicle use, as the Dutch have done, federal investment will likely not have as powerful an effect.

CHAPTER 1: INTRODUCTION

Transportation in the United States has long been dominated by the automobile, with little recognition of alternatives. Bicycling has traditionally been viewed as a recreational activity and has not been taken seriously as a means of transportation. In other countries like the Netherlands bicycling is viewed and utilized as an integral part of the transportation system. There are many benefits to bicycling which make it an ideal alternative for short trips. Bicycling can combat health problems caused by sedentary lifestyles such as obesity. Additionally, bicycling doesn't have the detrimental environmental and economic effects that cars do.

In the United States, there has been an influx of federal funds available for bicycle and pedestrian projects. The federal government has made these funds available but the regions have discretion on whether to apply for the money and how to spend any funds received. With no requirement to spend any portion of the money on bicycling, the influence of these federal funds is not clear. The focus of my research is to examine the effect of federal transportation funds (ISTEA, TEA-21 and SAFETEA-LU) on policies, plans and projects at the regional level and to explore whether the increased funding correlates with an increase in bicycling. Despite a large increase in funding between 1991 and 2000, there was not an increase in the percent of people bicycling to work (according to census data) at the local or national level. This led me to question why such a drastic change in funding and bicycle infrastructure did not result in an increase in bicycling.

As a benchmark for comparison I will look at the Netherlands, focusing on the city of Amsterdam, as a model of how the Sacramento region can achieve high levels of

bicycling. The Dutch have prioritized bicycling not only through funding infrastructure, but also through land use policies that make bicycling and walking safe, pleasant and convenient. Additionally, the Dutch have enacted restrictions on car use that have been effective in incentivizing other modes of transportation such as bicycling.

1.1 Benefits of Bicycling

The current paradigm of car dominance in the United States is having many detrimental effects on our society. The rates at which Americans are driving are unsustainable in terms of environmental impacts and the use of diminishing resources. In the U.S. more than 95 percent of all personal trips are made by car (Toor, Havlick and Spenser, 2004). Americans are not only more likely to drive a car but they are also more likely to drive for longer distances than people in other countries (Ball, 2004). In addition to being the country with the highest utilization and dominance of cars the United States is also the country with the lowest level of transit utilization and infrastructure (Kenworthy and Laube, 1996).

Bicycles are the most efficient form of transportation with the lowest energy input and the lowest output of pollutants and greenhouse gases (Toor et al, 2004).

Additionally, there are health benefits of bicycling, which should be considered as obesity rises to become a leading cause of death in the United States according to the Center for Disease Control and Prevention. Bicycles are a very practical alternative to automobiles especially for trips under two miles.

Many areas in the United States are plagued by poor air quality, due in large part to transportation which is the main source of pollution in American. While the U.S.

government has made strides to change this through the National Ambient Air Quality Standards, the Energy Policy and Conservation Act, and the Clean Air Act Amendments, many areas are still in non-attainment. Motor vehicles are responsible for a large portion of the air pollution; at least 50 percent of cancer causing pollutants, 29 percent smog-forming compounds, 90 percent of carbon monoxide and 31 percent nitrogen oxides (which contribute to acid rain) (Beatley, 2000). Carbon dioxide emissions are almost twice as high in the United States as European cities (Beatley, 2000). Additionally increased car use leads to water and noise pollution, suburban sprawl, degraded habitats and diminishing oil reserves.

High rates of car use have been shown to correlate with the increased likelihood of health problems. Automobile use has contributed to ozone pollution which has been linked to immediate problems like; shortness of breath, chest pain, wheezing, coughing and increased susceptibility to respiratory infections (American Lung Association, 2006). Exposure to ground-level ozone also increases the risk of premature mortality, pulmonary inflammation, the risk of asthma attacks and the need for medical treatment and for hospitalization of people with asthma (ALA, 2006). Additionally year-round exposure may be associated with the risk of developing asthma according to a study cited by the American Lung Association (2006). In 1997, an estimated 26.3 million people had been diagnosed with asthma at some point in their lives (Mansfield, Johnson, Houtven, Yang, Pekar, and Brown, 2003).

Fitness has also declined in America as our cars move more and our bodies move less. In 2001, 64 percent of Americans were overweight and 31 percent were obese (Pucher and Renne, 2003). With poor diets and limited exercise so prevalent in the

United States we should be thinking about how we can encourage people to be more active. According to a study by the Centers for Disease Control and Prevention poor diet including obesity and inactivity became the number two killer of Americans in the year 2000 with 400,000 deaths (16% of all deaths). Obesity and inactivity also increases the risk of diabetes which is the number six killer of Americans. This could result in increasing health care costs.

More directly associated with car use is the necessary infrastructure, which is very costly for taxpayers. Increasing congestion on freeways and roads in California is causing a demand for an increase in costly infrastructure including new roads and parking structures. These costs aren't just absorbed by the user; as tax payers we all pay to subsidize driving. For those who cannot afford a car or who choose lower impact transportation alternatives their taxes are still going to absorb the costs for drivers. This raises the question of equitability in a car dominated society. Urban sprawl and car scaled planning hurt low-income citizens disproportionately as they are more likely to live further from where they work, due to land costs, and less likely to own a car. In addition, as we spend more time in our cars we are more likely to be isolated from our neighbors and our community. Drivers are less likely to interact with strangers while traveling than bicyclists or pedestrians.

At a global level our dependence on cars is affecting our national autonomy. The U.S. accounts for 25 percent of global oil use and almost half of the petroleum it burns goes to cars and trucks (Ball, 2004). Although oil consumption is rising in countries like China and India, Americans still consume 16 times more petroleum per year than the average Chinese (Ball, 2004). This level of oil use can be dangerous for our country's

autonomy when much of it is imported from the Middle East where countries can be very unstable and the status of our international relations is continually in flux. In the last 25 years there have been three significant price hikes in gasoline due to Persian Gulf producers doubling or tripling world oil prices. In 1973, Arab members of the Organization of Petroleum Exporting Countries (OPEC) embargoed countries that supported Israel during the 'October War' causing world oil prices to double between October 1973 and January 1974 (Greene, Jones and Leiby, 1998). A loss of production from Iraq and Iran resulted in another doubling of prices between 1979 and 1980. In 1990, production from Kuwait and Iraq dropped causing prices to go from \$17.50 a barrel to \$33 a barrel (Greene et al, 1998). Dependency on such volatile countries leaves the U.S. in a vulnerable position internationally.

With all the detrimental effects of automobiles, more metro areas are giving serious consideration to sustainable modes of transportation. This entails designing transportation networks that are environmentally friendly, economically viable, and equitable. It involves the integration of all forms of transport: buses, trains, automobiles, bikes and pedestrians. Bicycle mode share (defined as the percent of people bicycling as a means of transportation) in the United States is very low as compared to other countries. Land use and infrastructure that has focused on the needs of automobile users has had negative implications on the walkability and bikeability of our cities.

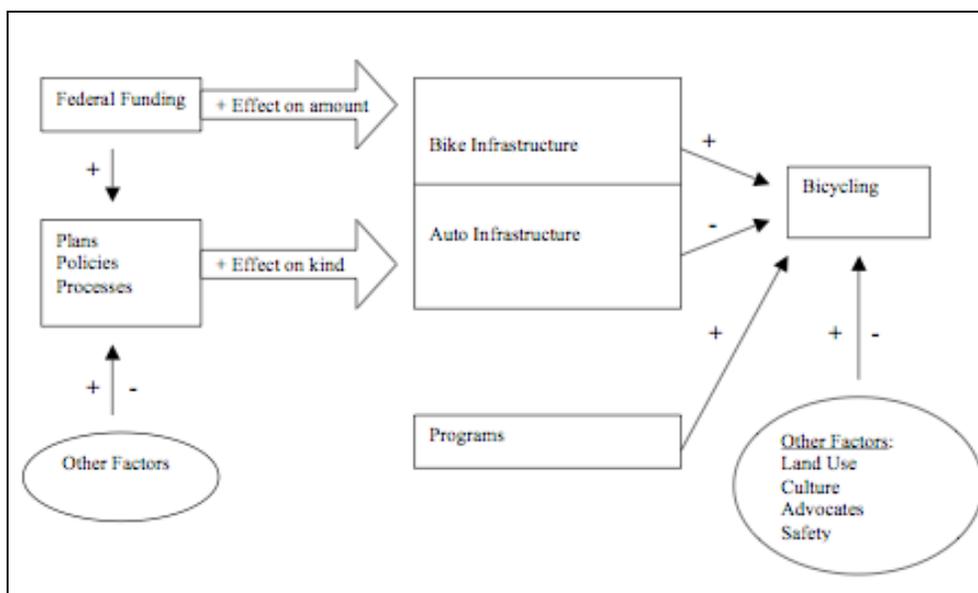
1.2 Approach

In order to determine the affect of federal funds on bicycle projects, I will look at changes in infrastructure, plans, policies, processes (in addition to programs and other

factors) and mode share between 1991 (when ISTEA was implemented) and 2007.

Figure 1 shows the framework that will be used to perform this assessment. Federal funding is assumed to have a positive effect on the amount infrastructure and the kinds of plans, policies and processes developed. Additionally, other factors, such as push from the public, can affect the plans, policies and processes. These plans, policies and processes are then assumed to also have a positive effect on infrastructure. Increased investment in bicycle infrastructure is assumed to have a positive effect on bicycling while increased investment in auto infrastructure is assumed to have a negative effect on bicycling. Programs (such as those that educate on bicycle safety, or social marketing campaigns) are also assumed to have a positive effect on bicycling. Other factors such as land use, culture, advocates, level of safety, climate/topography are explored as having the possibility for both positive and negative effects on bicycling. Because bicycle and pedestrian projects are often interrelated I will address both focusing on bicycles for the purpose of this study.

Figure 1. Visual Representation of Approach



As a case study, the main focus of this thesis is on the area within Sacramento's Metropolitan Planning Organization (MPO), the Sacramento Area Council of Governments (SACOG). As the federally required MPO in addition to the state required Regional Transportation Planning Agency for the region, SACOG conducts transportation planning, including preparing the long-range transportation plan, and channels state and federal funds throughout the region. The six county, 22-city region, has a population of 2,228,923 with almost half residing in Sacramento County.

Figure 2. Map of SACOG's Jurisdictions



I analyzed bicycle and pedestrian related policies (established after the passage of ISTEA in 1991) at the regional, state, and local levels to observe how bicyclists and pedestrians are viewed and integrated into transportation and land use planning. At the regional level I assessed SACOG's long-term planning documents, the 1990 Regional Transportation Plan and the 2006 Metropolitan Transportation Plan. In order to explore

the role that the state plays in shaping and/or supporting the MPO's bicycle and pedestrian effort, an analysis was performed of the California long-range transportation plan (California Transportation Plan 2025) and the state bicycle and pedestrian plan (California Blueprint for Bicycling and Walking). To assess the role played by cities and counties in shaping and/or supporting the MPO's efforts a policy assessment was performed for general plans within the region. Additionally, an evaluation was completed to determine whether each city/county had a bicycle/pedestrian coordinator and a separate bicycle/pedestrian plan. The role of bicycle and pedestrian advisory committees was also taken into consideration.

In looking at the process, the main question was how bicycle and pedestrian concerns are integrated and institutionalized into transportation planning. This was accomplished through an examination of project prioritization, modeling, and bicycle and pedestrian advisory committee influences. To look at infrastructure created in the Sacramento area, I developed a database of bicycle and pedestrians projects between 1991 and 2006 with data available from SACOG (Transportation Improvement Programs, non-motorized projects database, etc.).

Bicycle mode share data was examined to determine whether increased infrastructure correlated with increased bicycling. Data was extracted from the 1990 and 2000 Census Summary File (SF-3), which looks at means of transportation to work for workers 16 and over. Usual means is defined as the one used on the most days in the previous week (U.S. Census Bureau, Census 2000 questionnaire). While this data is helpful to examine changes in travel at the city or regional level, it doesn't take into account non-work trips or trips taken by those under the age of 16. It also doesn't take

into account commute trips involving multiple modes, which is important because the bicycle can fit as one leg of travel for many commutes, short trips, or occasional use of other modes.

Key players were then interviewed in order to explain and fill in gaps in the policy analysis and project funding results. These included SACOG, Caltrans, City, and County staff, advisory committee members, and advocacy groups. The result is an overall analysis of planning, infrastructure and policy in the region.

To better understand the outcomes in the Sacramento region, I compare efforts there to those in the Netherlands. Information on the Netherlands was gathered through existing research and interviews with staff from the transportation departments in Amsterdam and Rotterdam. Interviews of staff from the Ministry of Transport and the Passenger Transport Section of the Transport Research Center were conducted in addition to an interview with the executive director of Velo Mondial, an international bicycling advocacy group that brings together stakeholders to support bicycle planning at the local and national levels. Interviews took place in the Netherlands over the summer of 2006 and focused on exploring the policies, infrastructure, funding, and programs that might have contributed to the high level of bicycling in the country. I will also compare the funding in the United States to that of the Netherlands to ascertain whether the differences can explain, in part, differences in bicycle infrastructure and mode share.

Table 1. Information Sources

Purpose:	Source:
Change in mode share	Travel Diaries
Change in mode share	Census commute to work data
Investments in bike & ped infrastructure	Project Database- SACOG's b/p data
How well b/p's are integrated into policy language at the state level	State Plans
How well b/p's are integrated into policy language at the regional level	Long Range Plans (Regional)
How well b/p's are integrated into policy language at the local level	General Plans (City and County)
Importance of groups, filling in gaps	Interviews
Identified obstacles and barriers in the U.S. Key factors to success in the Netherlands	Existing research

1.3 Organization of Thesis

In order to set the stage for my analysis I will first give a background on bicycling in the United States including the evolution of federal policies related to bicycling and the state of bicycling in the country. I will then look at the Netherlands, concentrating on the city of Amsterdam as a best-case scenario for bicycling. I will address Dutch policy, infrastructure, funding, and programs related to bicycling and discuss key factors behind the country's success. Then moving closer to home I will look at the Sacramento region and discuss policies within a regional, state and local context ending with an analysis on the state of bicycle planning and funding in the Sacramento region. The thesis will conclude with a discussion on where Sacramento stands in the context of lessons from the Dutch model.

CHAPTER 2: BACKGROUND ON BICYCLING IN THE U.S.

2.1 Evolution of Federal Policy Toward Bicyclists

Traditionally the U.S. has funneled almost all of its federal transportation monies into highway construction (Brown and Larsen, 2002). With such a focus on automobile infrastructure it's no surprise that people overwhelmingly choose to drive as a primary means of transportation. Joel Schwartz (2005) argues that automobile dominance is due to consumer choice as opposed to subsidies or coercion but when the consumer isn't given access to alternatives of equal value it's questionable how much their choice is representative of their needs or wants.

Despite these traditions there has been some progress towards a shift in paradigms. The tide began to turn as Americans became more aware of the damage being perpetrated on the environment. In 1970, The National Environmental Policy Act of 1969 (NEPA) was passed requiring federal agencies to consider environmental impacts of major actions for programs they intend to fund. NEPA requires that federal agencies write environmental impact statements (EIS) for proposed projects and has helped balance environmental concerns with economic concerns. NEPA provides the public with information on how projects affect the environment.

In addition, increasing acknowledgement of air quality issues led to measures that funded public transit and required cars to be more efficient and less polluting.

In 1973, the Federal-Aid Highway Act allowed funds to be used for mass transit, and enhanced the eligibility of bicycle and pedestrian facilities. In 1975, the Energy Policy and Conservation Act was passed, putting into effect Corporate Average Fuel Economy

(CAFE) which raised average fuel economy requirements from 18 miles per gallon in 1978 to 27.5 mpg in 1985 (U.S. Department of Transportation, 2006). In 1977, the Clean Air Act Amendments were passed that set standards to regulate the levels of air pollution in areas within the United States. The CAA required states to develop State Implementation Plans (SIPs) which incorporate public input and set regulations for cleaning up polluted areas in the state. In 1982, as part of the CAA, National Ambient Air Quality Standards (NAAQS) were established for harmful pollutants. Primary standards were set to protect human health and secondary standards were set to protect public welfare (United States Environmental Protection Agency, 2006).

Although some progress was made in the 1970s and 1980s it is evident that efforts were focused in the United States on improving dominant modes of transportation, namely auto and transit (to a lesser degree), not walking and bicycling. According to one observer, “non-motorised transportation fell between the cracks and during the 1970s and 1980s more than 30 of the 50 state Departments of Transportation (DOTs) failed to spend a single dollar on improving conditions for bicycling and walking” (Clarke, 1997, p. 341). Actions have included raising fuel economy and lowering emissions, in addition to improving infrastructure and more recently researching alternative fuels; but there hasn’t been a comparable effort to build up other means of transportation. While these measures have helped to set the stage for more environmentally sound policies, there wasn’t strong momentum towards other means of transportation until the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which drastically changed the level of bicycle funding: more than \$1 billion of federal funds were invested in bicycle infrastructure in the first five years of ISTEA (between 1992 and 1997)

compared to a total of just \$41 million in the previous 20 years (Clarke, 1997).

According to Brown and Larsen (2002), this funding has helped increase bicycle sales in the U.S. from 15 million in 1991 to 21 million in 2000.

ISTEA restructured federal-aid highway and transit programs and called for the creation of a National Intermodal Transportation System. According to the US Congress in 1991,

The National Intermodal Transportation System shall consist of all forms of transportation in a unified, interconnected manner, including the transportation systems of the future, to reduce energy consumption and air pollution while promoting economic development and supporting the Nation's pre-eminent position in international commerce (Clarke, 1997, p. 340).

ISTEA gave more flexibility in determining how federal highway funds were used by allowing regions to spend federal transportation funds on bicycle and pedestrian projects. ISTEA created two new funding sources: Transportation Enhancement (TE), funds often administered by the state, and the Congestion Management/Air Quality Improvement Program (CMAQ), which can be used for bicycle and pedestrian projects. Through CMAQ, projects are funded which help meet air quality standards required by the Clean Air Act such as travel demand reduction strategies. Additionally, states can use Surface Transportation Project funds for bicycle and pedestrian projects, although they most often go to road projects (Wilkinson and Chauncey, 2003). ISTEA required that bicyclists and pedestrians be incorporated into regional and state plans and that multiple modes of transportation be considered when dealing with congestion. ISTEA required states to employ a bicycle and pedestrian coordinator and to develop a long-range transportation plan, which incorporates a long-range bicycle and pedestrian facility plan (Wilkinson and Chauncey, 2003).

Through ISTEA more decision-making power was concentrated at the local and regional levels by doubling funding for Metropolitan Planning Organizations. Since 1973, MPOs were required by congress for urbanized areas with a population exceeding 50,000. MPOs are regional planning bodies with the main task of developing Transportation Improvement Programs (TIPs) for their area of jurisdiction and long-range transportation plans. MPOs had little real power until the passage of ISTEA when decision-making became more regionally based. ISTEA also required more public participation in the planning process and connected transportation decisions to effects on land use and vice versa. Increased public participation and power for the MPOs, allows more transportation decisions to be made at the local and regional level where there is intimate knowledge of transportation system needs. The combination of federal funding for bicycle and pedestrian projects and regionally based decision-making increases the possibility of regional investment in bicycle and pedestrian projects but relies on the region's choice to do so.

In 1997, ISTEA expired and the federal transportation program was reauthorized in 1998 with the Transportation Equity Act for the 21st Century (TEA-21). Funding and planning for bicycle and pedestrian facilities and safety programs were continued and expanded under TEA-21 (United States Department of Transportation Federal Highway Administration, 1998). TEA-21 set a guaranteed level of federal funds for surface transportation through 2003. Transportation Enhancement (TE) funds were available for pedestrian and bicycle projects relating to safety education through TEA-21. Other opportunities under TEA-21 included the recreational trails programs (which gave \$270 million toward maintaining trails for motorized and nonmotorized users), the

Transportation and Community System Preservation Pilot (provided funds for various levels of government to reduce the environmental impacts of transportation and the need for costly infrastructure), and funds for transportation planning (US DOT FHA, 1998).

The next authorization bill to pass, in 2005, was with the Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for all Users (SAFETEA-LU), which expires in 2009. SAFETEA-LU again included bicycle and pedestrian provisions in addition to funding for new programs. New programs included the Safe Routes to School program, designed to increase healthy and active lifestyles by encouraging youth to walk and bicycle to school through infrastructure, promotion and education. This program also works to improve safety and reduce traffic, fuel consumption, and air pollution in school areas (US DOT FHA, 2006). The Roadway Safety Improvements program for older drivers and pedestrians was implemented to improve traffic signs and pavement markings in all states (US DOT FHA, 2006). The Roadway Safety Act, funded through the Highway Trust Fund, was created to provide money for promoting bicycle and pedestrian safety. The Nonmotorized Transportation Pilot Program was designed to determine whether increased resources for low impact transportation infrastructure (bicycle lanes, sidewalks, trails, etc.) would significantly increase bicycle and pedestrian mode share and reduce congestion. The four designated communities chosen receive \$6,250,000 per year that can be given to state, local and regional agencies.

Table 2. SAFETEA-LU Bicycle and Pedestrian Programs and Funding Levels

Safe Routes to School	\$612 million FY 2005-2009
Roadway Safety Improvements for Older Drivers and Pedestrians	No dedicated funding
Roadway Safety	\$800,000/ FY 2005-2009
Nonmotorized Transportation Pilot Program	\$25 million for each FY 2006-2009

Although federal funds are now available at the regional level for bicycle and pedestrian projects it is less clear how these funds are being utilized and the effect they are having. One study found that MPO spending on bicycle and pedestrians varied from \$0.08 to \$1.66 per capita annually (Ernst, 2004). Due to this variation it is important to explore what factors, other than availability of funds, contribute to bicycle spending and increased bicycling.

2.2 State of Bicycling in the U.S.

The number of bicycle trips in the United States is far below the number in Europe and even Canada. In 1995, one percent of all urban trips in the U.S. were made by bicycle compared to two percent in Canada and 28 percent in the Netherlands (Pucher and Dijkstra, 2003). Many Americans are currently driving for short trips in which bicycling would be ideal. In the United States 41 percent of all trips made in 2001 were shorter than two miles and 28 percent were shorter than a mile; yet Americans choose to drive for 89 percent of trips between one and two miles and 66 percent of trips up to a mile away (Pucher and Dijkstra, 2003). Converting these short trips to bicycling could help to reduce the negative effects associated with automobile use.

Studies have found a correlation between infrastructure and bicycling but other factors also need to be taken into consideration. According to Jennifer Dill and Theresa Carr, “Higher levels of bicycle infrastructure are positively and significantly correlated with higher rates of commuting...However, bicycle lanes and paths alone are not likely to increase bicycle commuting” (2006, p.7). Previous research has contributed to understanding the factors affecting the rate of bicycling in the United States. John Pucher,

Charles Komanoff, and Paul Schimekc, (1999) offer a useful explanation as to why bicycling is so low in the U.S. relative to elsewhere; the factors affecting cycling in North America include:

- 1) A public attitude and culture not traditionally oriented to bicycling as a mode of transportation
- 2) Public image that sees bicycling as outside the main stream
- 3) Large cities and low density that make bicycling less appealing
- 4) Low cost of car use and public transport
- 5) Relatively high incomes which correlate to decreased bicycle use
- 6) Climates which can be extreme
- 7) Higher danger when compared to other countries and other modes; cyclists are 12 times more likely than motorists to be in a fatal accident (Pucher and Dijkstra, 2003)
- 8) A lack of cycling infrastructure

To increase cycling in North America, Pucher and Dijkstra (2003) argue, there would need to be an increase in the cost of auto use, a clarification of cyclist's legal rights, an expansion of bicycle facilities, a requirement that all roads be bikeable, special promotions, a link between cycling and wellness and a broadening/intensifying of political action. I further explore this by comparing the Sacramento region as an American case study in comparison to Amsterdam, the city with the highest level of bicycling of all major European cities.

CHAPTER 3: AMSTERDAM

The case of Amsterdam demonstrates a set of conditions under which a high level of bicycling occurs. Many factors affect the transportation system in Amsterdam. These factors include high density, mixed use development, scarcity of land, more government control, and a historic urban tradition. To understand the high level of bicycling in Amsterdam it is necessary to look at the effect of bicycle and pedestrian decisions at various levels including Europe-wide policies and attitudes, the push from the federal government, and local decisions to get an idea of the context in which the Dutch are operating from. At both the national and local levels many policies, infrastructure investments, funds, and programs have played an important role in creating the current atmosphere for bicyclists. The description that follows is based on my own interviews in addition to existing research.

3.1 Western European Transportation Strategies

In order to better understand the Dutch transportation model I will first examine Europe-wide policies that could have influenced national policies and contributed to an overall cultural context more inclined to bicycling than in the United States. Many European countries, including the Netherlands, have implemented policies creating disincentives for driving such as imposing higher costs on automobile ownership, higher taxes on gasoline and new cars, and more limited and expensive parking (Beatley, 2000). Additionally, Europeans have made bicycling safer through six key elements. First, they have created better facilities such as; auto-free zones in city centers, well-lit sidewalks, bike paths and lanes (used for practical destinations not just recreation), bicycle streets

(where bikes have the right-of-way), separate bike lights, and lanes that lead into the intersections. Secondly, they have implemented traffic calming measure in residential areas. This has effectively reduced traffic injuries despite increasing bicycle use. Thirdly, urban areas are designed for people not cars. Residential developments include cultural centers, shopping, etc. that can be reached by bicycle and include paths and sidewalks to safely do so. Fourthly, European cities put more restrictions on motor vehicle use; speed limits in cities are lower and parking is limited and more expensive. Additionally, there is more extensive traffic education; students receive instruction on safe bicycling practices by the age of 10. Lastly, traffic rules and enforcement are stricter than in the United States.

3.2 Dutch Bicycle Policy

The Dutch have planned for bicycling and set measurable goals. According to the World Bank, bicycling returned to the mainstream of government transportation policy at the national level in the 1980s. The Dutch created a master bicycle plan based on a policy statement approved by the Parliament. The plan set the goal to get 3.5 billion more kilometers biked in 2010 than in 1986 (an increase of 30%) and to improve public transportation-bicycle connections (World Bank Strategic Planning for Non-motorized Mobility, 1996). The Dutch have implemented many policies that have contributed to their successful multi-modal transportation system. These policies fall into four main categories: safety measures, disincentives to drive, incentives to use other modes, and land use strategies that contribute to reduced vehicle miles traveled (VMT).

Dutch Safety Measures

Safety measures include traffic regulations and enforcement. Dutch traffic regulations favor bicyclists; motorists are always found to be at least partially at fault in accidents involving bicyclists. The Dutch are much stricter in ticketing motorists, pedestrians, and bicyclists and the penalties for violations are much higher (Pucher and Dijkstra, 2003).

Traffic calming in residential neighborhoods has also been a key strategy to reducing pedestrian and bicyclist accidents in the Netherlands. Traffic calming measures include speed limits of 30 kilometers an hour (19mph) or less, and physical barriers like raised intersections/crosswalks, traffic circles, road narrowing, zigzag routes, curves, speed bumps, and artificial closures (midblock street closures). Safety measures have reduced pedestrian fatalities between 1997 and 2001 by 73 percent and bicyclist fatalities by 57 percent (Pucher and Dijkstra, 2003).

Other factors, discussed more in a later section, that have played a role in increasing safety for bicyclists and pedestrians are good facilities for walking and cycling; urban design that is oriented towards people and not cars; restrictions on motor vehicle use; and traffic education (Pucher and Dijkstra, 2003). Education is a key component to increasing safety for bicyclists and pedestrians. Children in the Netherlands receive instruction on best bicycling practices by the age of 10. In addition, traffic education in the Netherlands includes more extensive driver training including how to avoid collisions with pedestrians and bicyclists (Pucher and Dijkstra, 2003). The Dutch even include bicycle training as part of their integration program, according to

Gordon de Munck, consultant in the Passenger Transport Section at the Transport Research Center (Adviesdienst Verkeer en Vervoer, AVV) in Rotterdam (2006).

In Amsterdam, there is a bike campaign every autumn to encourage people to use bicycle lights. This campaign has taken place annually for 4 years; for one week there is promotion and education and after that offenders are ticketed. According Pascal J.W. van den Noort, the Executive Director of Velo Mondial, the first day after the campaign they gave 1,500 tickets. Although extreme, according to Ria Hilhorst and van den Noort, the campaign has been very effective in getting people to use bike lights (2006). In addition, there is free, voluntary registration as part of the campaign which consists of having a number engraved in your bike and receiving “a little passport” for your bike so that if it’s stolen you have the number to give to the police.

Restrictions on Motor Vehicle Use

The Dutch have not been afraid to take rights away from drivers in order to make a safe and pleasant environment for bicyclists and pedestrians. According to Harry Welles, a senior consultant in the Passenger Transport Section at the Transport Research Center (AVV) in Rotterdam, “the major policy instruments for cycling are not cycling instruments but car reduction instruments” (2006). Restrictions include; enforcing a general speed of 50km/hour (31 mph), limiting parking, prohibiting truck and through traffic in residential neighborhoods and making right turns on a red light illegal. According to van den Noort “the more you make it complicated for cars to enter the city the more people will look for alternatives” (2006). Welles agrees, “it’s very frustrating to park your car and expensive to drive your car and that is a major factor to why we bike”

(2006). According to de Munck strategies that have the user paying costs are fairly well accepted, “it’s almost like a market economy, if you want to park your car you have to pay for it, it’s more or less accepted now” (2006). Other policies include variable taxes so that drivers pay at the point of use and pricing policy so that those who drive pay more (Pucher and Dijkstra, 2003). According to de Munck, in order to park in the city center drivers must purchase a license,

Sometimes you have to wait more than a year to get one of those licenses to park your car...but again it’s more accepted, because you are living in the city center of Amsterdam and if you want to have two cars outside the building, that’s the choice you make. Also if you’re in the Netherlands you don’t really need a car if you are living in the city (2006).

According to de Munck there isn’t the opposition to parking pricing policies from business like there is in the United States; shop owners support the policies, “otherwise the rural inter-cities are crowded with cars and that’s not good for shopping...so it is mainly a commercial argument...it is the job owners, the people that own the commercial unit, who very much agree with strong parking policies” (2006). Parking policies like the Dutch have wouldn’t be possible if it were not for supporting planning policies, “one thing to note is of course that we only have our businesses downtown or in the city center. It’s not allowed in the Netherlands to build big malls outside the city next to the highway” (de Munck, 2006).

Land Use Policies that Encourage Bicycling and Walking

As mentioned in previous sections, the Dutch encourage bicycling and walking by designing urban settings to be people oriented versus car oriented. In the Netherlands residential developments include cultural centers, shopping, and service establishments

that are accessible by bike. Unlike the United States, buildings are rarely surrounded by parking lots, which make them more accessible to pedestrians and bicyclists. At the federal level, the Netherlands has implemented national policies, beginning in the eighties, to assure compact cities (Beatley, 2000). An emphasis on mixed-use buildings in Amsterdam draws and retains citizens in the city center and helps to reduce vehicle miles traveled. Mixing residential, work and shopping facilities can increase the chances that people will bike or walk for most of their daily trips.

The Dutch have reduced VMT through their National Physical Planning Policy for individuals' travel behavior. These include 4 components: concentrated decentralization of the 1970s and 1980s; compact-city policy of the 1980s and 1990s; the A-B-C location policy; and the spatial retailing policy (Schwanen, Dijst, and Dieleman, 2004).

Concentration Decentralization. As part of their Second Physical Planning Memorandum, the national government sought to prevent suburban sprawl through developing designated growth centers and prohibiting the growth of small rural settlements (Schwanen et al, 2004).

Compact-City Policy. In the Fourth Physical Planning Memorandum Extra (MVRM, 1991) focus was on: encouraging redevelopment within existing cities and areas adjacent to the larger cities; promoting high density development; and providing subsidies to upgrade housing (Schwanen et al, 2004).

A-B-C Location Policy. In the Fourth Physical Planning Memorandum (MVRM, 1988) the focus was on policies to develop new employment and services in central locations accessible to transit.

- A locations were centrally located and near public transportation.
- B locations were in development nodes accessible to transit and cars.
- C locations had good motorway access.

Spatial Retailing Policy. Unlike the United States with the growth of malls and big box stores on the edge of town, the Dutch enacted legislation in 1973 which prohibited out-of-town shopping malls. This legislation has been effective in keeping shops located within built-up areas, making them more accessible for bicyclists and pedestrians (Schwanen et al, 2004). According to Welles, strong centralized policies of the past have shifted,

We think that if people want to use cars you must give them the opportunity to use the cars. It's shifting our political views...we are frustrating our citizens too much 'you may not use your car you must use bicycles'. Then, 20 years ago, we had a lot of that sort of political culture and now it is all gone. We are now far more looking and hearing for citizens themselves; for what they want (2006).

It will be interesting to see if this shift affects bicycle use in the Netherlands. In the mean time the Dutch have many bicyclists to provide for.

3.3 Infrastructure

Bicycle Lanes/Network

The Dutch have invested a large portion of their transportation dollars into creating bicycle and pedestrian facilities. Infrastructure is created which prioritizes accessibility to practical, versus recreational, destinations. In addition to bike lanes, facilities include: bicycle streets where cyclists have the right-of-way; separate bike turn

lanes; traffic signals with advance green lights for bicyclists (Figure 3); bicycle activated traffic signals; and routes that are faster and more direct for bicyclists than cars.

Figure 3. Advance Green Light for Bikes



From 1978 to 1996 the Dutch more than doubled their bicycle infrastructure from 9,282 kilometers (5,764 miles) to 18,948 kilometers (11,767 miles) (Pucher and Dijkstra, 2003).

Figure 4. Bikes and Cars Share Streets



In order to meet approval bicycle facilities must conform to quality requirements; they must be fast, safe, secure and comfortable (wide enough, flat). The density of the city adds to the effectiveness of the bicycle networks (Hilhorst, 2006). Facilities in Amsterdam include; special bicycle traffic lights (button or automatic), sign posts, and shared cycle/pedestrian paths. The Dutch provide safe and attractive cyclist crossings around obstacles such as highways, railroads and rivers (Pucher and Dijkstra, 2003). Additionally, there are efforts to reduce obstacles for bicyclists and pedestrians during road construction (Hilhorst, 2006) and programs like the public transit bike, where bikes are available for rental at very reasonable price in the parking facilities of most major train stations (Figure 5). A study done in Delft, Netherlands, found that "...it is not necessary for measures to be expensive and on a large scale, for small-scale inexpensive measures also have a positive effect if they aim at improving the continuity of a route" (Hartman, 1997, p. 303).

Figure 5. Rental Bikes Available at Train Station



Bicycle Parking

Due to the high number of bicyclists in Amsterdam and the limited amount of space, parking continues to be a problem. The Ministry of Transportation in Amsterdam (Dienst Infrastructuur Verkeer en Vervoer, DIVV) recognizes that they must look at parking where people live (the Dutch normally park their bikes in their barns, in front of their houses in racks, or in parking garages) and common destinations (bicycle racks on the street, racks and special garages at railroad stations, shopping centers and other public places).

Figure 6. Covered Bicycle Parking



Figure 7. Bicycle Parking at a Train Station



The main train station in Amsterdam has a bicycle garage with three levels that can hold 2,500 to 3,000 bicycles. The city tries to provide bicycle parking for special events with portable structures. Additionally, the city is building a network of garages and lockers (Hilhorst, 2006).

Figure 8. Secure Bicycle Parking Garage at Transit Center



With so many bicycles parked throughout the city there is a problem of abandoned bikes. In order to mitigate this problem bicycles that have been left for 28 days or longer are removed. Abandoned bikes are checked to see if they are stolen in which case they are returned to the owner; the rest are fixed and resold.

3.4 Dutch Funding for Bicycle and Pedestrian Facilities

There are three levels of administration in road infrastructure policy: national, provincial and local. At the national level there is responsibility for motorways and the national road network. Responsibility for main truck routes (including the bicycle paths along side of them) lies at the provincial level. The local level is responsible for the construction and maintenance of local roads, including facilities for cyclists. The central government divides funding among provinces and the provinces divide it among the cities with specific funds for cars and bicycles. Unlike the United States, cities are required to spend a portion of their funds on bicycling (de Munck, 2006). According to *Bicycling Magazine*, the Netherlands invests 10 percent of their transportation budget on bicycle infrastructure while the U.S. invests only 0.2 percent (1992).

3.5 Dutch Bicycle Programs

Bicycle Theft Prevention Measures

Bicycle theft is a huge problem in Amsterdam. According to Hilhorst, late at night a lot of people will just pick up a bike and take it, “the problem is that for years and years it was normal to do it [with the free white bike program which was started in the

Netherlands] and now we say you can't it's bad for the morale because you are stealing, and it's very bad for the bicycle use" (2006). Although it has gone down from 16 percent in 2002 to 10 percent in 2006, that still means that one in 10 bikes are stolen (Hilhorst, 2006).

Theft is an important reason why people don't bike any more; your bicycle was stolen, you have to buy a new one... after three or four times you don't bike any more or buy a cheap one which is unsafe and uncomfortable so you don't like to cycle (Ria Hilhorst, 2006).

There are campaigns in Amsterdam attempting to prevent theft by discouraging people from buying stolen bikes, "if people won't buy them, why would you steal them?" (Hilhorst, 2006). The consequences for stealing a bicycle in Amsterdam are a lot more severe than in the United States as well; if you are caught stealing a bike you are sentenced to three months in jail and if you do it multiple times (20 to 30) you can get a sentence of two years. If you are caught buying a stolen bicycle you are given a criminal record.

In order to return stolen bikes to their owners there are efforts to get people to register their bikes (a number is engraved into the bicycle), police inspections, and efforts to encourage people to report theft in order to determine extremity of the problem (Hilhorst, 2006). The city brings abandoned and stolen bikes to centers where one can go to check whether their bike has been recovered. Bikes that are in good shape and not claimed are sold to second hand stores or students, with the idea that if the city sells bikes "at a lower rate than people sell stolen bikes, it eliminates that market" (van den Noort, 2006).

3.6 Lessons from Amsterdam

The Dutch have been able to achieve high levels of bicycling with support at a Europe-wide level and commitments at both the national and local levels. Key factors to the success of the bicycle in the Netherlands are the high level of funds available and spent on bicycle projects and the requirement to spend a portion of transportation funds on bicycling. Another important factor is that the Dutch have used these funds to build varied infrastructure, placing importance on more than just bicycle lanes. Additionally, the adoption of policies related to safety, vehicle restrictions and land use have made bicycling feasible and desirable. Finally, programs addressing issues like bicycle theft and bicycle safety have contributed to a positive environment for bicyclists.

While Amsterdam has marked differences from Sacramento it is one of the best examples of how bicycles can be a successful part of a comprehensive and multi-modal transportation system. It is useful to compare the two regions to ascertain whether federal funding could catalyze a similar process in Sacramento.

CHAPTER 4: SACRAMENTO

Located in the Central Valley, the Sacramento region has a flat terrain and fairly mild weather most of the year, which makes it ideal for bicycling. Additionally, it incorporates the City of Davis which currently has the highest percentage of bicycle commuters in the nation and is the first and only city in the nation to receive a platinum award as a bicycle friendly city from the League of American Bicyclists. As the state capitol, the City of Sacramento is teeming with political activity and offers opportunities for political change. The Sacramento region's MPO, the Sacramento Area Council of Governments (SACOG), has been fairly progressive in its modeling and public input process with its Regional Blueprint Project, a long range vision for how the Sacramento region will manage an effective doubling of population growth by 2050. SACOG includes six counties: El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba as well as the 22 cities. SACOG is responsible for transportation planning, which involves preparing the region's long-range transportation plan the Metropolitan Transportation Plan (MTP), a 28-year plan, and the short term Metropolitan Transportation Improvement Program (MTIP). SACOG also divvies out state and federal transportation funding for the Sacramento region. SACOG conducted travel diary surveys in both 1990 and 2000, which makes it possible to assess whether bicycle mode share went up in the region after the increased investment through TEA funds.

4.1 SACOG Plans

Long-Range Plans in Relation to Bicyclists and Pedestrians

In order to examine how well bicyclists and pedestrians are incorporated into the Sacramento region's policy language and how this has changed over time, I looked at SACOG's long-range transportation plans for 1990 (Regional Transportation Plan, RTP) and 2006 (MTP). I first read through both planning documents and determined that the main categories in which bicyclists and pedestrians were mentioned were future predictions, goals and objectives, current situation, definition and explanations, needs, projects/programs, funding, eligible projects, project selection process and groups/committees. Next I went back through the documents and coded each bicycle or pedestrian mention by category.

1990 Regional Transportation Plan

Stated strategies in the 1990 RTP for encouraging bicycling and walking included increasing infrastructure, safety measures, and improving access for bicyclists and pedestrians. The RTP also mentioned encouraging cities to prepare or update their bicycle or pedestrian plans and reduce VMT through better land use.

The situation as stated in the 1990 RTP was that bicyclists and pedestrians make up a very small percentage of the mode share; in 1989, 60 percent of trips were taken as drivers, 24 percent were as passengers in motor vehicles, three percent were bicycles, nine percent walked, and one percent took public transit (RTP, 1990). Issues contributing to the low level of bicycling and walking, as identified in the plan, included safety, convenience, needs (infrastructure), funding, and education (awareness of facilities).

The 1990 RTP describes bicycle and pedestrian infrastructure projects such as stripping, signs, widening and adding lanes, path/trail extensions, sound walls, landscaping, bicycle and pedestrian bridges, and lighting medians.

Table 3. Examples of Projects Specified in the 1990 RTP

Sacramento	1. Construct a bikeway along Route 51 (Business 80) corridor	\$1.082 million
	2. Construct the Pocket Canal Parkway	\$1.082 million
	3. Construct the Bannon Creek Bikeway	\$0.399 million
	4. Construct the Power Line Bikeway	\$.379 million
	5. Four additional projects	\$1.800 million
Folsom	The City of Folsom submitted an application to Caltrans for a bikeway project grant from the Bicycle Lane Account.	\$0.090 million
Davis	1. Widen 2nd Street between L Street and the eastern city limits to accommodate bicycle lanes	\$0.231 million
	2. Replace raised sidewalks with bicycle lanes on Richards Boulevard/Interstate 80 over crossing	\$0.125 million
	3. Channelize bicyclists at the 5th and L Streets intersection	\$0.036 million
	4. Construct Interstate 80 bicycle/pedestrian over crossing near Putah Creek	\$2.040 million
West Sacramento	The city is planning for bicycle and pedestrian facilities along the Sacramento River north of the Tower Bridge as part of the Raley's Landing and Lighthouse Marina projects.	Cost estimates not yet available
Yuba County	1. Construct a bicycle lane along Hammonton-Smartville Road between Dunnigan Avenue and Simpson Lane	\$0.584 million
	2. Continue bicycle lane along Hammonton-Smartville Road between Simpson Lane and North Beale Road	
	3. Construct bicycle lanes along Olivehurst Avenue between Seventh Avenue and McGowan Parkway; McGowan Parkway between Oliverhurst Avenue and Powerline Road; and Powerline Road between McGowan Parkway and Seventh Avenue.	

The main sources of funding for bicycle and pedestrian projects, as stated in the RTP, were the Transportation Development Act and the State Bicycle Lane Account. The 1990 RTP did not include any discussion of future predictions, needs, eligible projects, and project selection process or groups/committees categories.

2006 Metropolitan Transportation Plan

In 2006, SACOG's long-range regional transportation plan was called the Metropolitan Transportation Plan (MTP). The situation for bicycle and pedestrian travel in 2006 hadn't changed much since 1990; the overwhelming majority in the region still drove: in 2005, 47 percent of trips were drive alone, 46 percent were traveled two or more to a car, six percent were bicycle or pedestrian trips, and one percent were by transit (MTP, 2006). Additionally, the 2006 MTP predicted an inevitable increase in auto travel in the future. Heavy local auto traffic was seen as discouraging bicycling and walking in some communities and the MTP sought to increase other options with the overarching goal of improving quality of life: to "develop a fully-integrated, multi-modal transportation system to serve as a catalyst to enhance quality of life enjoyed by the current and future residents of the Sacramento region" (MTP, 2006, p. 16). The MTP takes a regional approach to improve the transportation network, and is innovative in that it invests more resources in alternatives to the automobile; as much as \$350 million to regional bicycle and pedestrian projects over the following 23 years. Specifically, the MTP set the goal of getting 15 percent of commuters who travel three miles or less to bike to work: "the Sacramento region, with ideal climate and terrain, could see more travel by bicycling and walking..." (MTP, 2006, p. 3). Stated objectives to achieve this goal were: to increase the safety and security of bicyclists and pedestrians; to provide for all forms of transportation including non-motorized; to promote telecommuting, ridesharing, cleaner forms of transportation and to accommodate bikes on buses; "Major increases in rail, bus, bicycle and pedestrian facilities are envisioned" (MTP, 2006, p. 20).

The MTP describes planned bicycle and pedestrian infrastructure projects such as stripping, signs, widening and adding lanes, multi-modal stations, path/trail extensions, sound walls, landscaping, lighting medians and bicycle and pedestrian bridges. In addition to infrastructure projects there are programs, planned and in place, mentioned in the MTP such as the Travel Demand Management and Community Design Incentive for funding smart growth projects: “the 2006 MTP will use transportation funds for community design, to encourage people to walk, bicycle, or ride transit for local travel” (MTP, 2006, p. 4).

Costs of the projects are mentioned within the MTP but the only funding sources mentioned are the Bicycle and Pedestrian Funding Program and the Community Design grant Program which “can pay for planning grants to local government and for transportation improvements that complement ‘smart growth’ projects, would encourage people to make local trips, use public transit, walk and bike” (MTP, 2006, p.23).

According to the plan, community design strategies and smart growth principles such as infill and redevelopment help to reduce the distance people have to go for everyday trips and therefore make bicycling and walking a more viable option. Eligible projects mentioned within the MTP are on-street bike lanes, traffic calming projects, bicycle and pedestrian paths, and tunnels and bridges.

While both long-range plans have integrated bicycle and pedestrian concerns and interests pretty well, in the 2006 MTP there is a clearer understanding of the nexus between walking, bicycling, land use and health. According to statements within the 2006 MTP, in developing the MTP 2025, SACOG learned that at the regional level people do not change travel modes significantly. Unless community design changes

prove successful, significant shifts from driving to bicycling or walking remain unlikely. There is also increased awareness of health implications with the stated goal to “improve the health of our residents by developing systems that would encourage walking and biking” (MTP, 2006, p. 17).

Other bicycle and Pedestrian Policy Documents

In 2005, SACOG created the Regional Bicycle, Pedestrian and Trails Master Plan, a long-range planning document separate from the RTP dealing specifically with bicyclists and pedestrians. The regional bicycle and pedestrian plan covers: bicycle and pedestrian program goals, criteria for inclusion, project evaluation for the bicycle and pedestrian funding program, the financial plan for the regional network, design guidelines, metrics for improvement and success, and recreational trails. SACOG’s Regional Bicycle, Pedestrian, and Trails Master Plan was mandated by the Metropolitan Transportation Plan for 2025. The master plan is intended to guide the long-term decisions for the Bicycle and Pedestrian Funding Program, adopted by the SACOG Board of Directors in September 2003. The focus of both the master plan and the funding program is to provide facilities for walking and bicycling in the cities and towns within the region, and to provide connections between the cities and towns. The goal is to integrate local plans to create a seamless regional bicycle and pedestrian system. This approach prioritizes local projects by their contribution to the regional network; providing key connections and access between communities, counties, and jurisdictions and improving conditions for bicycling and walking. According to the plan, local surveys have found that people are willing to bicycle more frequently for utilitarian purposes when better bicycle facilities are provided. The executive summary states that the main

objective of the plan is to improve bicycling and walking through: inter-jurisdictional/interregional connections; access within or through the central business districts; access across barriers; improving time and convenience; safety and security for utilitarian trips; capital facilities; complementing projects in adjacent regions and those funded with other regional or state sources; and providing aesthetic, pleasant and comfortable biking and walking.

Discussion

The language for the 2006 plan was more supportive of bicyclists and pedestrians than the 1990 plan (Table 4) a possible indicator that increased attention for bicycling and pedestrians at the federal level is having an effect on planning at the regional level. Additionally, in 2005 SACOG created a separate bicycle plan, another possible sign of an increase in bicycle and pedestrian concerns in the region. Table 5 shows that while bicycles and pedestrians were mentioned less frequently in 2006 (due to the creation of the separate bicycle plan in 2005) they were increasingly being mentioned in the context of action-projects and programs being envisioned and implemented. This could be a sign that regions are starting to take advantage of the federal funds available for bicyclists and pedestrians and increasingly considering their needs in the context of transportation networks. Additionally, the 2006 MTP set a measurable goal for increasing the number of bicycle trips to work. As seen in Table 4, from 1990 to 2006 the transportation plan has evolved to include addressing land use in the context of bicycle and pedestrian planning (community design/smart growth principles) and travel demand management, in addition to describing eligible projects, the project selection process, and the bicycle and pedestrian advisory committee. Overall, the plans discussed show that the state of

bicycle policy is evolving and that bicycling, as a form of transportation, is well integrated into the planning documents (Table 4).

Table 4. Qualitative Comparison of SACOG's 1990 RTP and 2006 MTP

	1990	2006
1. Current Situation	B/p makes up a small percentage of the mode share. Describes b/p facilities and plans within the SACOG region at the city and county level. Explains issues facing the b/p network	Few travel by walking or bicycling; the overwhelming majority drives. Without changes in community design bicycle and pedestrian trips won't change significantly. An increase in bicycling and walking now discouraged in some communities by heavy local auto traffic
2. Future Predictions		An increase in auto travel will be inevitable
3. Goals & Objectives	To reduce VMT through better land use. Encourage bicycling and walking through increased infrastructure, safety measures, and improving access. Encourage cities to prepare or update b/p plans	To increase the safety and security of b/p. To improve community design (through smart growth principles including infill and redevelopment). To provide for all forms of transportation including non-motorized. To promote telecommuting, ridesharing and cleaner forms of transportation . To accommodate bikes on buses
4. Funding	Describes project costs. Main funding sources for b/p projects are the Transportation Development Act and the State Bicycle Lane Account	Mostly describes project costs but mentions the Bicycle and Pedestrian Funding Program and the Community Design grant Program as funding sources for b/p projects
5. Projects/ Programs	Describes b/p infrastructure projects such as stripping, signs, widening and adding lanes, path/trail extensions, sound walls, landscaping, b/p bridges, lighting medians.	Describes b/p infrastructure projects such as stripping, signs, widening and adding lanes, multi-modal stations, path/trail extensions, sound walls, landscaping, b/p bridges, lighting medians in addition to programs; Travel Demand Management and Community Design Incentive for funding smart growth projects
6. Eligible Projects	Not mentioned	On street bike lanes, traffic calming, b/p paths, tunnels and bridges
7. Project Selection Process	Not mentioned	Bicycle and Pedestrian Advisory Committee (BPAC) reviews and makes recommendations to SACOG
8. Groups/ Committees	Not mentioned	Bicycle and Pedestrian Advisory Committee
9. Definitions/ Explanations	Defines terms used and explains the layout of the plan and how assumptions were made. Explains the b/p network.	Defines terms used and explains the layout of the plan and how assumptions were made.

Table 5. Mentions of Bicycle and Pedestrians by Category, 1990 RTP vs. 2006 MTP

	1990		2006	
1. Current Situation	26	12%	10	6%
2. Future Predictions	0	0%	2	1%
3. Goals & Objectives	27	12%	23	14%
4. Funding	11	5%	13	8%
5. Projects/Programs	105	48%	96	57%
6. Eligible Projects	0	0%	3	2%
7. Project Selection Process	0	0%	5	3%
8. Groups/Committees	0	0%	1	1%
9. Def's/Explanations	49	22%	14	8%
Times B/P's Were Mentioned	218	100%	167	100%

4.2 Processes

Forecasting

Forecasting models are an important aspect to prioritizing projects eligible to receive funding. These models are used to predict use of different modes in the future, given a proposed transportation system. These predictions are often used to estimate potential benefits of proposed projects and may be compared to costs in choosing between proposed projects.

Often transportation models are not sophisticated enough to integrate bicycling needs and can underestimate the effect an increase in bicycling facilities can have on congestion in an area. SACOG has included bicycling and walking as separate mode choices in the travel demand-forecasting model for the past 15 years. According to Bruce Griesenbeck, a senior transportation demand modeler at SACOG, they are currently running two models. The first, SACMAT, was developed in the early 1990s and is based on Traffic Analysis Zones (TAZs). SACMAT has about 1,500 TAZs varying from five

acres (dense urban) to a few thousand acres (rural). The model uses a Pedestrian Environment Factor, a numerical index assessing three levels of street and sidewalk environment (the bottom end would be a rural area with no sidewalks, the middle would be a suburban area, and the maximum would be a city).

The second model is newer and will take over SACMAT in approximately two years, according to Griesenbeck. This model is called SACSIM and it is parcel-based and measures street density, giving more direct representation of and sensitivity to the micro environment. However, the two models share limitations:

Both models take into account nonmotorized modes. Neither represents infrastructure like bike lanes, those pedestrian tunnels over freeways, or pedestrian bridge crossing; pedestrian detail is just not there for a number of reasons but mainly because it's so hard to keep track of. It's possible to ask the city or county for the number of miles of sidewalks but it's even hard for them to answer due to gaps, streets with only one side of sidewalks, etc. (Griesenbeck, 2007).

According to the 2006 MTP "SACOG's models were unable to examine definitively localized shifts in bicycling that might accompany community design changes" but nevertheless predicts that at "the regional level the share of bicycle and walk trips in 2025 stays at six percent". Though the model could not predict the effect of community design policies, the plan notes, "Intuitively, the incentives and improvements contained in community design should lead to more bicycling and walking" (MTP, 2006).

Including bicycling as a mode in SACOG's model means that there is an opportunity to take into account the effect bicycle projects will have on the overall transportation system which could boost opportunities to incorporate bicycle

infrastructure if the model is sensitive enough to show small scale changes that bicycle infrastructure might contribute to.

Prioritizing process

It is important to look at how projects are prioritized because it determines the order in which they will receive funding in addition to the level of funding that they will receive. Just because plans identify bicycling as an important mode of transportation, doesn't mean that bicycle projects will be given high priority for funding. If prioritization criteria emphasize congestion, for example, the vast majority of funds will continue to be invested in automobile related infrastructure.

In order to receive funds cities and counties submit proposals that are ranked, based on a set of criteria, by the Bicycle and Pedestrian Working Group, who make recommendations to SACOG staff. The staff decisions are then reviewed by the Grants Program Overview Committee. Their recommendations are given to the Regional Planning Partnership and then are made to the SACOG Board of Directors. The Bicycle and Pedestrian Working Group is made up of people from community groups and people with expertise in planning, project engineering, bicycle and pedestrian issues, air quality concerns, transportation demand management (TDM)¹, and transit. Under this system, bicycle and pedestrian projects fair well. Because automobiles aren't eligible for the funding that bicycle and pedestrian projects are, they don't compete for the funds that SACOG distributes (funding for bicycle and pedestrian projects will be discussed in the

¹ Transportation Demand Management is a general term for strategies that influence travel behavior with the purpose of reducing or redistributing travel demand, primarily focusing on reducing the number of vehicles using highway facilities while providing a variety of other options.

next section). The prioritization process determines which cities will receive funding and for what types of projects.

Table 6. Bicycle and Pedestrian Working Group

Expertise	Appointed by	Number
Planners	Planner's Committee	1
Project Engineers	Regional Planning Partnership	2
Bike/Ped	Bike/Ped Advisory Committee	4 (2 advocates, 2 professions)
Air Quality	Air Districts	1
TDM	TDM Task Force	1
Transit	Transit Coordinating Committee	1
Community Groups	Regional Planning Partnership	1
TOTAL		11

The Bicycle and Pedestrian Working Group scores and ranks bicycle and pedestrian project applications submitted by the Sacramento region jurisdictions after determined eligible by SACOG staff. The Working Group ranks projects based on a point system to determine whether projects will be implemented and whether they will be high, medium or low priority. Key elements they consider are linkage, desirability, implementation, equity, satisfying demand and safety. To determine how well a project links to activity centers, varying point levels are assigned to schools, parks, libraries, community centers, commercial and employment centers and high-density residential areas with a maximum of 20 points available. Linkage to transportation systems are also considered with a maximum of 12 points; six points for connection to other bikeways and two to four points for connections to other modes (depending on capacity and length of trip possible). Points are also given based on how well a project provides links by eliminating barriers (reducing trip distance; points are deducted for directing bicyclists or pedestrians to barriers such as a freeway interchange) and how well a project links to other jurisdictions. The desirability of a project is determined by looking at traffic

characteristics (sidewalks, crossings, volume, speed) and continuity (stops per mile). Scoring the implementation of a project involves looking at right of way and environment (who owns that land, current use and environmental documentation, and the timeline of the project). A project's level of equitability is determined by the distance from existing routes. Additional points are available if there is proof that a project will satisfy demand and safety improvements are documented. For full scoring criteria and point levels see Appendix (Figure 14).

Once the Bicycle and Pedestrian Working Group has ranked projects they are reviewed by SACOG staff who proceed to make their own recommendations based on funding and geographic locations. According to the plan, these recommendations are then discussed by the Grant Programs Overview Committee who reviews the Bicycle and Pedestrian, Air Quality and Community Design funding programs and makes recommendations that are provided as information to the Regional Planning Partnership and then presented to the SACOG Board of Directors (2005). The Grant Programs Overview Committee is made up of 15 people with representatives from the Planners Committee, Regional Planning Partnership, Bike/Pedestrian Advisory Committee, TDM Task Force, Transit Coordinating Committee and Air Districts. According to José Luis Cáceres, transportation planner for SACOG, "the Board of Directors have the last say, but it doesn't go back to the Bike Pedestrian Advisory Committee. It doesn't go back to any of the other groups to select it, so it just has to run the test of this first group, second group and then our board" (2007).

Table 7. Grant Programs Overview Committee

Appointed by	Number
Planners Committee	3
Regional Planning Partnership	4
Bike/Ped Advisory Committee	2
TDM Task Force	2
Transit Coordinating Committee	2
Air Districts	2
TOTAL	15

There is also a Bicycle and Pedestrian Advisory Committee (BPAC) which is made up of SACOG staff, representatives from the six counties within the region, Air Quality Management districts, Caltrans and local bicycle and pedestrian advocacy groups. Members from the BPAC sit on both the Bicycle and Pedestrian Working Group and the Grants Programs Overview Committee.

A possible weakness of the system is that the criteria prioritize large projects that link to other jurisdictions, transportation, and activity centers over smaller improvements that might serve a larger number of people.

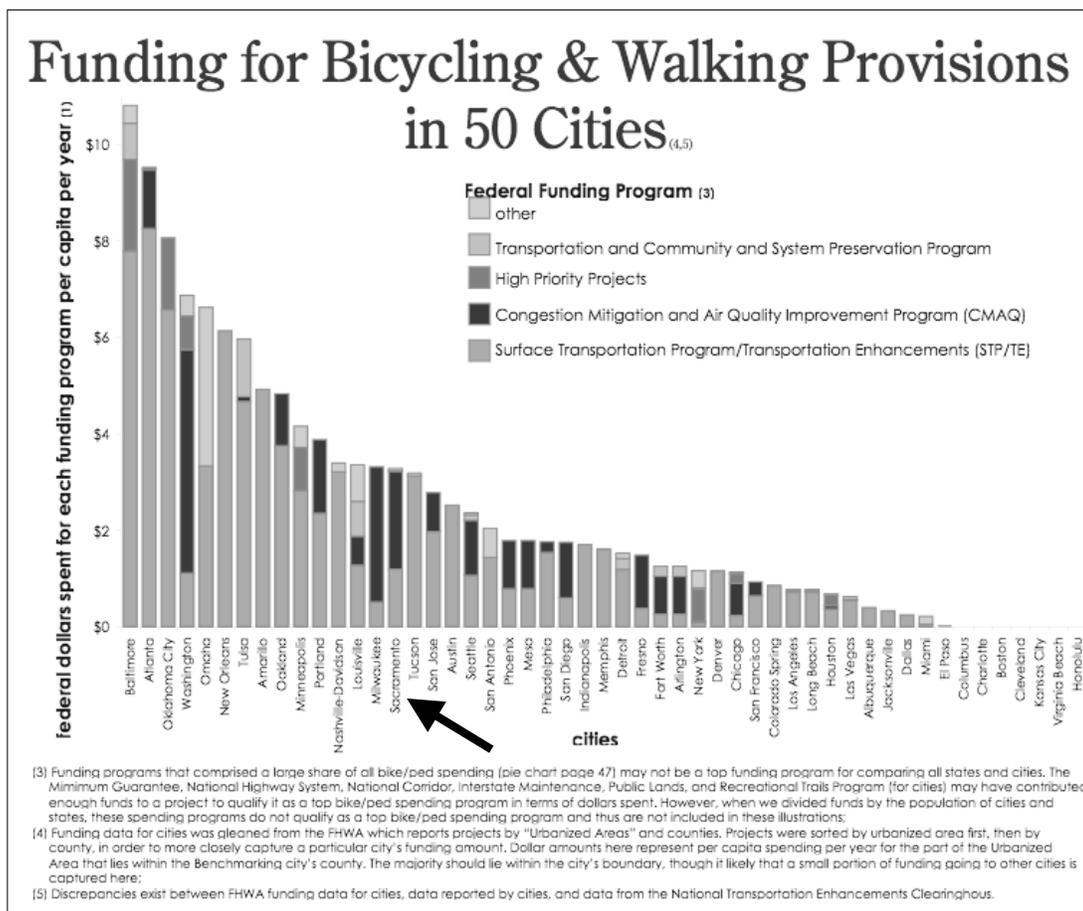
Funding

There are various funds available for bicycle and pedestrian projects at the local, state and federal levels. According to Nancy Kays, formerly a senior project manager with SACOG, the program that has had the most effect is CMAQ, which is funded through federal monies and distributed at the regional level.

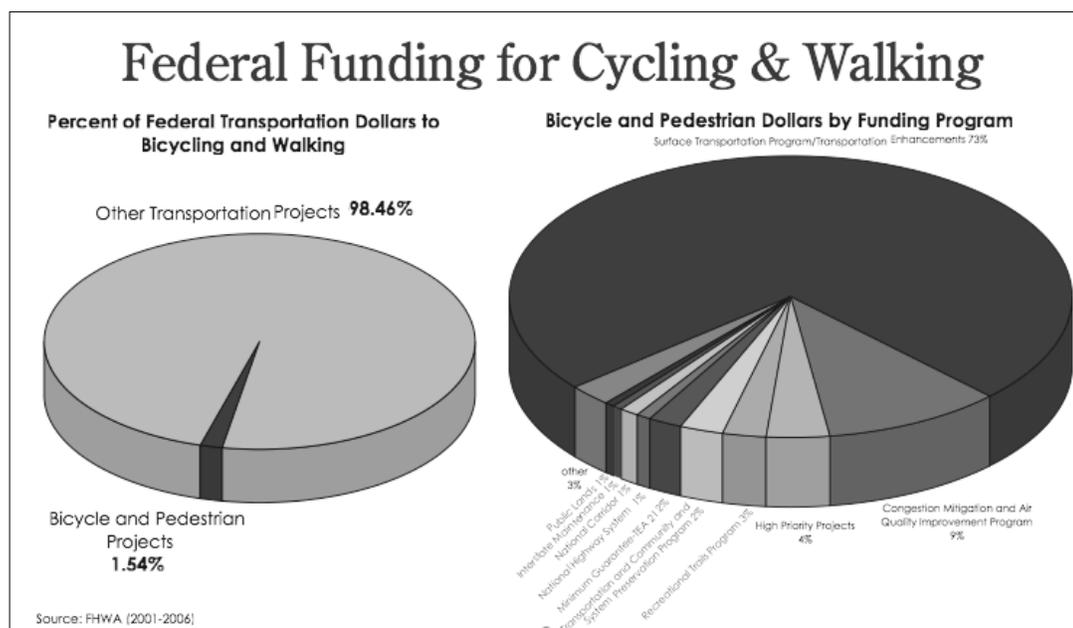
You really could not use CMAQ for anything but air quality beneficial projects. That left you with very few types of transportation projects you could really spend it on. That was very good for bike/pedestrians... we did a whole group of bike/pedestrian projects [in the 1990s] that kind of gave them a leg up, because they're easier to implement, they're smaller, they're cheaper... it's easier to plan them and so forth. So, the fact that CMAQ was established and in a way it almost earmarks money for bike pedestrian (2007).

In the 2000s, according to Kays, SACOG did a new Metropolitan Transportation Plan with more emphasis on bikes and pedestrians and developed the regional Bike and Pedestrian Master Plan that looks at the whole region comprehensively and helps to determine which projects are prioritized to receive available funding. According to Kays, bicycle and pedestrian projects can be paid for through the; bicycle/pedestrian account, Community Design program, Air Quality, and Transportation Demand Management funding programs. At SACOG “the majority of the funding would come from CMAQ by far” (Kays, 2007). As seen in Figure 9, most of Sacramento funding for bicycle and pedestrian facilities comes from CMAQ whereas in most states the majority of funds come from Surface Transportation Program/Transportation Enhancements, 73 percent on average (Thunderhead Alliance, 2007). On average CMAQ funding accounts for 9 percent of all federal bicycle and pedestrian funding (Thunderhead Alliance, 2007). For a list of Federal, State and Local funding opportunities that bicycle and pedestrian projects are eligible for see appendix (Table 19).

Figure 9. Funding for Bicycling and Walking



While there has been a huge increase in the amount invested in bicycle and pedestrian projects it is still a very small portion of overall transportation spending. Figure 10 shows that on average states spend just 1.5 percent of their federal transportation dollars on bicycle and pedestrian projects (2.1% in California), or \$2.50 per capita annually for bicycling and walking. Figure 10 also shows the large variation in spending on bicycling and pedestrian projects; an indicator of the role that states and local jurisdictions play in determining how their federal transportation dollars are spent (Thunderhead Alliance, 2007).

Figure 10. Federal Funding for Cycling and Walking

At the state level, California spends 2.09 percent of transportation money on bicycle and pedestrian projects compared to the state average of 1.54 percent (see Table 8). For distribution of TE funding see appendix Figure 15. The state of California spends \$1.96 per capita in federal funds on bicycle and pedestrian projects (\$2.50 state average) and \$3.10 per capita total (\$3.80 state average). For state policy and provision comparisons see appendix Figure 16.

Table 8. Policy and Provisions: Comparing CA to the State Average

State	% of transportation \$ to bike/ped	Per capita spending on b/p projects		Spending target for bike/ped projects?	State bike/ped staff		Specified State Funding for bike safety programs?	Complete streets policy?
		Federal	Total		# of full-time equivalent	staff/1 million people		
CA	2.09%	\$1.96	\$3.10	No	6	0.18	No	Yes
Average	1.54%	\$2.50	\$3.80	No	2.2*	0.34	No	No

As seen in Table 9, the city of Sacramento spends \$3.28 per capita of Federal funds on bicycle and pedestrian projects (for major cities the average is \$1.83) and \$4.50 total funds on bicycle and pedestrian projects (for major cities the average is \$3.17). Sacramento has 2.8 miles of bicycle facilities per square mile (1.2 city average) and 3.1 miles of planned bike and pedestrian facilities per square mile (2.49 city average). For major city policy and provision comparisons see appendix Figure 17.

Table 9. Policy and Provisions: Comparing Sacramento to Major Cities Average

City	Per capita spending on b/p projects		City bike/ped staff		Facilities: miles/sq. mile		Complete streets policy?
	Federal	Total	# of full-time equivalent	staff/1 million people	current bicycle facilities	planned bike/ped facilities	
Sacramento	\$3.28	\$4.50	-	-	2.8	3.1	No
Mean/Average	\$1.83	\$3.17	4.6	2.8	1.2	2.49	No

Unfortunately, with the availability of increased funds for bicycle and pedestrian projects has come an increased complexity in the application and funding process.

It's a cumbersome process just in general to move from an idea to a full project. You get federal funds you have to jump through these hoops. If you get state funds, congratulations! State funds might still be federal funds. You have to jump through those hoops. Local cities don't necessarily have a lot of money set aside to do the bicycle/pedestrian projects. I mean, money is an issue, but the process is also an issue (Cáceres, 2007).

4.2 State context

In order to explore the role that the state plays in supporting regional efforts to promote bicycling I will assess the state long-range transportation plan and the state bicycling and pedestrian plan.

State long-range plan: California Transportation Plan 2025

The CA Transportation plan mentions bicycling in the context of ensuring a balanced, safe, reliable, affordable and sustainable system of transportation. Bicycling was also seen as an opportunity to improve mobility, reduce demand on the road system, and to improve health and air quality. Issues that the state is facing in regards to making bicycling a viable option are:

- Current land uses
- Variation in the way different demographic groups travel
- Providing transportation for a growing population (California's population is expected to grow by 30%, the Sacramento region by almost 40%)
- Excise tax on gas not keeping up with inflation
- Insufficient funds to maintain and operate bike facilities
- Serving the rural population (who make up only 8% of the state's population but 94% of the land area)

Strategies to incorporate bicycling into the transportation system include; increasing connectivity (private sector and transportation system collaboration) and integrating infrastructure for bicyclists during planning and design phases of projects. Better land use policies including higher density, public transit connections, and mixed use, were also seen as a way to increase bicycling. Other strategies were to provide bicycle education and to incorporate safe, convenient, and connected bicycle facilities in roadway capacity improvements and rehabilitation projects, and to support objectives laid out in the California Blueprint for Bicycling and Walking (by removing barriers, integrating bicycling into transportation models and modeling, and educating on health

and air quality benefits). Planning resources for bicyclists and pedestrians include two state bicycle coordinators (one in Northern California, the other in Southern California), the California Blueprint for Bicycling and Walking, and advisory groups such as the Pedestrian Safety Task Force.

State bicycle and pedestrian policy: California Blueprint for Bicycling and Walking

In addition to the state's overall transportation plan which integrates bicycling and walking, there is also a state bicycle and pedestrian plan. The California Blueprint for Bicycling and Walking was written in response to the Supplemental Report of the 2001 Budget Act, which required Caltrans to submit a report addressing measurable goals for increasing bicycling and walking within the state. According to Ken McGuire at Caltrans, the Blueprint requirement resulted from a proposal by James Corless, Surface Transportation Policy Project and Chris Morfas, California Bicycle Coalition (2007). The Supplemental Report also required goals for reducing pedestrian and bicycling injuries and fatalities and increasing facilities. The report views bicycling and walking as a viable means of transportation which could; provide congestion relief, improve health and air quality, and conserve energy. The report suggests the following techniques to increase bicycling and walking in California: education in non-motorized transportation (for drivers, bicyclists and pedestrians), better law enforcement, traffic management strategies, and land use development that encourages bicycle and pedestrian travel. According to the report, the main condition preventing bicycle and pedestrian travel are safety concerns; California has a high rate of bicycle and pedestrian fatalities compared to other states. The report plans to incorporate non-motorized travel through:

- Traffic tools- integrating transit, traffic calming etc.
- Full consideration- expand focus from cars
- A balanced approach- fully consider all modes
- Dual-purpose corridors- safe areas for cars, bicyclists and pedestrians
- Trails- develop more non-motorized transportation systems
- Short trips- convert trips from car use to bicycles
- Connectivity- connect to the rest of the transportation system
- Safety- lowering traffic speeds
- Overcoming attitudinal and institutional barriers in transportation planning and design

Improvements in bicycle and pedestrian facilities were also seen as important including secure storage and parking, continuous networks, and aesthetic improvements.

Overall, while the language of both the state long-range plan and bicycle and pedestrian plan was representative and supportive of bicyclists and pedestrians, the plans didn't seem to be having a large effect at the local or regional level. The majority of people I interviewed (SACOG staff, city bike coordinators, bicycle and pedestrian advocacy groups, etc.) were either unaware of these plans or had not read them.

4.3 Local influence

In addition to state and regional planning, the quality of bicycle and pedestrian environment depends on local planning. Local governments have control over land use planning and local transportation and are therefore integral to establishing a transportation system that includes and encourages bicycling. In order to assess the level

to which cities and counties are planning for bicycling I looked at general plans within the Sacramento region.

City and County general plans within the SACOG region

To determine the level of bicycle and pedestrian planning and quality of language within the general plans I established a coding system, which included multiple categories:

- Strategies to encourage bicycling
- Benefits of bicycling and walking mentioned
- Infrastructure for bicyclists and pedestrians
- Connecting land use to non-motorized transportation
- Policies that benefit cyclists and pedestrians

Strategies included 19 items such as measures to make bicycling and walking safe, convenient, and pleasurable; as well as incentives and programs to increase funding and identify hazards. Benefits identified were congestion mitigation, demand management, health, air quality, transportation and recreation. Infrastructure included seven variables such as parking, bikes on buses, good signage, a bicycle network, bicycle and pedestrian inclusion in new developments, etc. The planning category looks at whether the city has a bicycle and pedestrian coordinator, a separate bicycle/pedestrian plan and commission or task force specifically for bicyclists and/or pedestrians.

Cities were given points based on the number of items which were covered in their general plan. These totals were divided by the total number of variables in each section to get percentages, which were then ranked; high, medium, low and none. In

order to determine the overall ranking of bicycles and pedestrians by city and county, totals for each category were added up and divided by the total number of points available.

As seen in Table 10, Sacramento was the only county that placed bicycles and pedestrians as a high priority overall in their general plan. Half of the counties received low scores because they didn't include many strategies to improve bicycling and walking in their region, there was little existing infrastructure and little planned for, and there wasn't a recognition of the effect of land use on levels of bicycling and walking.

Table 10. SACOG County General Plan Analysis of Bicycle and Pedestrian Language

County	Strategies	Benefits	Infrastructure	Land Use	Overall	Population	Year
El Dorado	Medium	Medium	Medium	Medium	Medium	178,066	2004
Placer	Low	Medium	Low	Medium	Medium	326,242	1994
Sacramento	High	High	Low	High	High	1,374,724	1993
Sutter	Low	Medium	Low	Low	Low	91,410	1996
Yolo	Medium	Low	High	Low	Medium	188,085	1983
Yuba	Low	High	Medium	Low	Medium	70,396	1994/96

*Source: U.S. Census Bureau- most recent year available

As seen in Table 11, the only city General Plans to receive an overall high score were Davis, Woodland and Rancho Cordova. Many of the smaller, rural cities showed low or no priority for bicycling and walking within their General Plans. Many of these cities mentioned that they are in the process of updating their plans so it will be interesting to see whether there is a change in bicycle and pedestrian language. I was unable to get General Plans for the cities of Auburn, Colfax and Iselton in time to include them in the analysis.

Table 11. SACOG City General Plan Analysis of Bicycle and Pedestrian Language

City	Strategies	Benefits	Infrastructure	Land Use	Overall	Population	Year
Citrus Heights	Medium	Low	High	Low	Medium	88,515	2000
Davis	High	Medium	Medium	High	High	64,348	2001
Elk Grove	Medium	High	Low	Low	Medium	100,760	2003
Folsom	Medium	Medium	Medium	Low	Medium	62,628	1993
Galt	Low	None	Low	Medium	Low	23,173	1989
Lincoln	Low	None	Low	Low	Low	11,205	1988
Live Oak	Low	Low	Low	None	Low	6,229	1992
Loomis	Low	Medium	Low	Medium	Low	6,260	2001
Marysville	Low	Low	None	Low	Low	25,315	1985
Placerville	Low	Low	None	High	Low	9,610	1989
Rancho Cordova	High	Medium	Medium	High	High	55,060	2006
Rocklin	Medium	Low	Low	Low	Low	46,937	2005
Roseville	Medium	High	Medium	Medium	Medium	98,359	1992
Sacramento	Medium	High	High	High	Medium	445,335	1998
West Sacramento	Low	Low	Low	High	Medium	37,897	1990
Wheatland	Medium	High	Medium	Medium	Medium	2,275	2006
Winters	Medium	Low	Low	High	Medium	6,125	1992
Woodland	Medium	High	High	High	High	50,988	2002
Yuba	Medium	Medium	Medium	Low	Medium	48,998	2004

The majority of counties (see Table 12) and cities (see Table 13) recognized bicycling and walking as both a means of transportation and recreation. Additionally, most cited bicycling and walking as a way to improve air quality and reduce the need for travel by automobile (demand management technique).

Table 12. Benefits Associated with Bicycling and Walking in County General Plans within the SACOG region

County	Congestion Mitigation	Demand Management	Health	Air Quality	Transportation	Recreation	Total
El Dorado		√			√	√	3
Placer		√			√	√	3
Sacramento	√	√	√	√	√	√	6
Sutter	√			√	√	√	4
Yolo					√	√	2
Yuba	√	√	√	√	√	√	6

Some recognized bicycling and walking as a congestion mitigation measure (9) and only three General Plans cited bicycling and walking as a way to improve health. It will be interesting to see if the rise in obesity and health consciousness will cause bicycling and walking to be increasingly connected to health benefits as plans are updated.

Table 13. Benefits Associated with Bicycling and Walking in City General Plans within the SACOG region

City	Congestion Mitigation	Demand Management	Health	Air Quality	Transportation	Recreation	Total
Citrus Heights					√	√	2
Davis		√			√	√	3
Elk Grove	√	√		√	√	√	5
Folsom				√	√	√	3
Galt							0
Lincoln							0
Live Oak					√		1
Loomis		√		√	√	√	4
Marysville					√	√	2
Placerville					√		1
Rancho Cordova	√			√	√	√	4
Rocklin					√	√	2
Roseville	√	√		√	√	√	5
Sacramento	√		√	√	√	√	5
West Sacramento		√			√		2
Wheatland	√	√		√	√	√	5
Winters		√		√	√		3
Woodland	√	√		√	√	√	5
Yuba		√		√	√	√	4
Total/Benefits	9	13	3	13	23	19	

Another factor I looked at in determining the level of bicycle and pedestrian integration was whether the cities and counties have institutions to support bicycling and walking. Sacramento and El Dorado counties were the only ones in the region with a bicycle/pedestrian coordinator (Table 14).

Table 14. Bicycle and Pedestrian Planning Resources for Counties in the SACOG Region

County	B/P Coordinator	B/P Commissions	Separate B/P Plan	Population	Year
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El Dorado.	√		√	178,066	2004
Placer			√	326,242	1994
Sacramento	√	√	√√	1,374,724	1993
Sutter			√	91,410	1996
Yolo		√	√	188,085	1983
Yuba			√	70,396	1994/96

Sacramento and Yolo counties both have bicycle or pedestrian commissions and all the counties have a separate bicycle and pedestrian plan, most likely due to the fact that they are a requirement for some funding categories.

At the city level very few cities have bicycle/pedestrian coordinators or bicycle/pedestrian commissions (Table 15), but almost all have separate bicycle and pedestrian plans (Rancho Cordova is currently creating both a bicycle and pedestrian plan).

Table 15. Bicycle and Pedestrian Planning Resources for Cities in the SACOG Region

City	B/P Coordinator	B/P Commissions	Separate B/P Plan	Population	Year
Auburn			√	12,462	
Citrus Heights			√	88,515	2000
Colfax			√	1496	
Davis	√	√	√	64,348	2001
Elk Grove			√	100,760	2003
Folsom	√		√	62,628	
Galt			√	23,173	1989
Lincoln			√	11,205	1988
Live Oak			√	6,229	1992
Loomis			√	6,260	2001
Marysville			√	25,315	1985
Placerville			√√	9,610	
Rancho Cordova	√	√		55,060	2006
Rocklin				46,937	2005
Roseville	√		√	98,359	1992
Sacramento	√	√	√	445,335	1998
West Sacramento			√	37,897	1990
Wheatland				2,275	2006
Winters			√	6,125	1992
Woodland			√	50,988	2002
Yuba			√	48,998	2004

While cities and counties are succeeding in getting bicycle and pedestrian concerns into policy, it is interesting to note that implementation of goals set may be more difficult without someone specifically assigned to carry out programs and projects.

In trying to establish level of bicycle and pedestrian planning in the cities and counties I was able to glean some information from city/county websites or General Plans but for the most part had to call or email the city/county. It was interesting to find that in many cities, employees in the various departments didn't know whether the city had bicycle/pedestrian coordinators, or separate bicycle/pedestrian plans or commissions. I found myself being transferred from department to department in search of someone who might hold this information; a possible sign of how divided an approach we have to transportation planning in the U.S.

Advocacy Groups

Advocacy groups have been instrumental in bringing bicycle and pedestrian concerns to light in the plans, forecasting models, prioritizing process and funding availability mentioned. At the regional and local level, advocacy groups have played a large role in integrating bicycle and pedestrian concerns into planning documents, have provided valuable input in the prioritizing process, and have help pushed cities and counties to apply for funds to improve bicycle and pedestrian safety and facilities. According to Andy Clarke (1997) "Exciting plans and ambitious spending levels...rarely happen without the existence of an active advocacy group which is working cooperatively with its state and local government and generating strong and effective public participation in the planning and implementation process" (p. 345).

The two groups I focused on were the Sacramento Association of Bicycle Advocates (SABA) and Walk Sacramento due to how often their importance was emphasized in interviews. SABA works to increase the number and safety of bicycle trips. SABA was formed in 1991 and was incorporated as a 501(c)(3) nonprofit organization in 2003. Currently SABA has more than 1,400 members in the six county Sacramento region. SABA has been instrumental in getting bicycle facilities built in the region and assuring that bicyclists are considered in policies and planning. Walt Seifert, executive director of SABA, feels that there is a lack of knowledge of bicycle and pedestrian planning among staff and engineers. He believes that a lot of small steps could be done that would be beneficial for bicycling including; getting people across the street safely, improving building orientation, addressing street width, increasing shade and implementing complete streets, the idea that “all streets ought to be safe for everyone” (2007). Walk Sacramento is a group that was incorporated in 1998 to address pedestrian issues. According to executive director, Anne Geraghty, it was patterned after Walk Boston. Both of these groups have played a large role in the region according to Ed Cox, Bicycle Coordinator for the City of Sacramento.

I see a greater awareness, sort of like a mental checklist that people go through to say, well, we're going to propose this, make sure you include SABA, the bicycle advocates, make sure you talk to Walk Sacramento, make sure you get these people to buy into this idea that you're proposing. That was never there before. The advocates have made a big affect on how important an issue is (Cox, 2007).

José Luis Cáceres agrees that advocates have played a strong role, “they’ve sat in on advisory committees; they’ve been invaluable, and even now when we’re selecting projects” (2007). In addition the input from advocacy groups and the public is vital for bicyclists because there is a lack of knowledge of how to provide for them,

Transportation professionals who do not currently rely on bicycling or walking to get around have no direct experience on which to draw when identifying problems, needs and potential solutions on foot or bicycle. Bicyclists do, and are rarely shy about expressing those experiences when given an opportunity (Clarke, 1997, p. 347).

Additionally Transportation Management Associations (TMAs) play a role in encouraging bicycling. TMAs are independent, non-profit membership associations. The Sacramento TMA represents 145 employers and helps more than 87,153 commuters find alternatives to commuting alone to work. The TMA was founded in 1990 by employers that were concerned about the negative impact of Sacramento's traffic congestion and air pollution on their employees' commutes and quality of life.

4.4 State of Bicycle Planning in Sacramento

At the planning level there is a pretty strong acknowledgment of the benefits of bicycling. While the health connection could be stronger there is evidence of movement in that direction. At the local, regional and state levels bicycles are well integrated into plans, unfortunately priority isn't shown in staff positions or policies that would encourage or require bicycle facilities (lanes, parking, showers, lights, etc.) or better land use that would make bicycling easier and more convenient for the average person.

Bicycle and Pedestrian Projects from 1991 to 2006

With the availability of new funds, there was an influx of bicycle projects in the region after 1991. There has been quite a large variance in bicycle/pedestrian spending by county both aggregately (Figure 11) and per capita (Table 16).

Figure 11. Bicycle and Pedestrian Spending by County 1991-2006

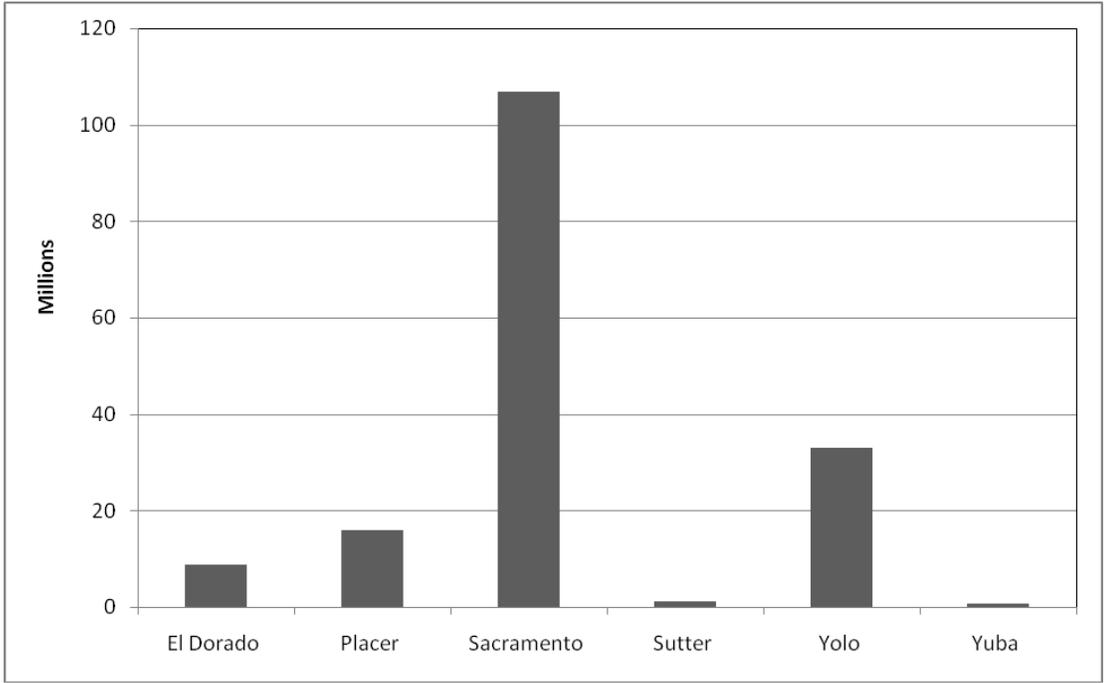


Figure 12 shows bicycle and pedestrian spending has also varied by year.

Figure 12. Annual Bike and Pedestrian Spending, Sacramento Region, 1991-2006

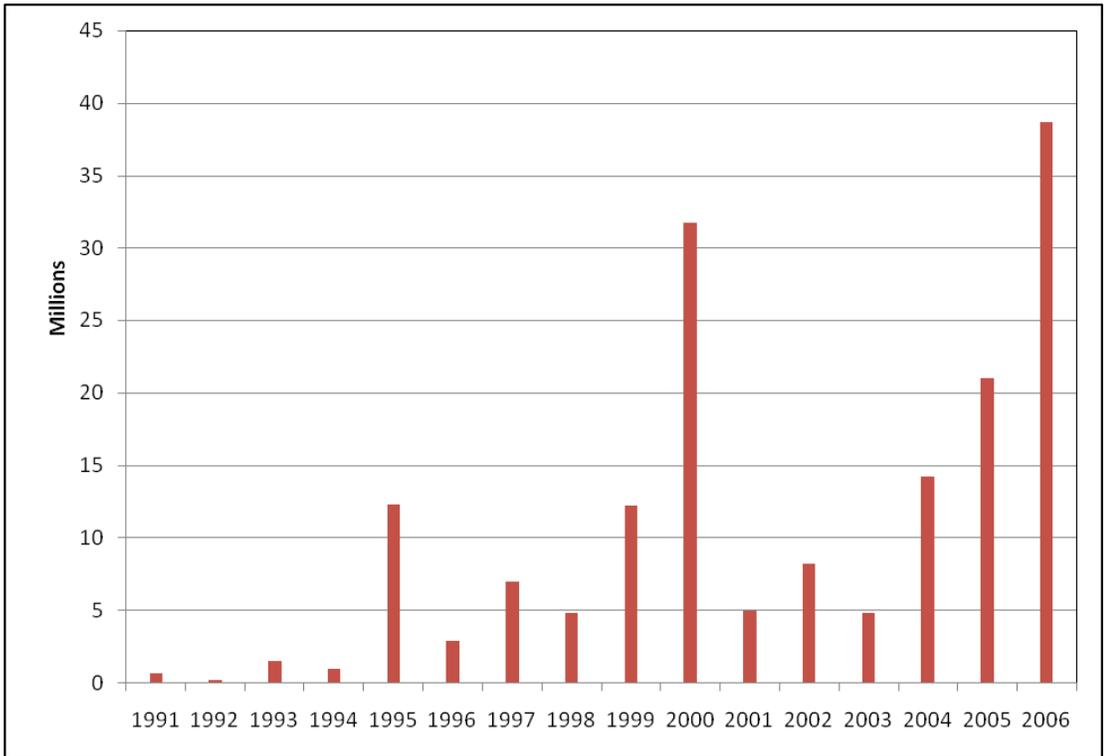


Table 16. Funding for Bicycle and Pedestrian Projects SACOG region 1991-2006

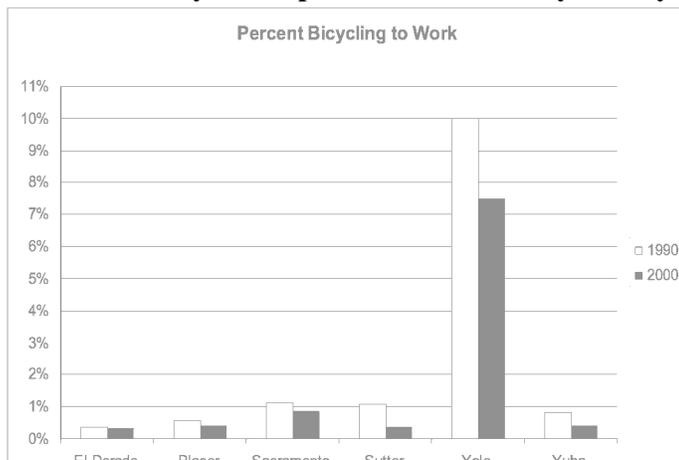
County	City	Spending/ City	Spending/ County	% per Co.	Population	per person
El Dorado		\$ 8,783,238	\$8,783,238	5.3%	178,066	49.33
Placer		\$ 14,607,316	\$15,842,316	9.5%	326,242	48.56
	Rocklin	\$ 910,000				
	Roseville	\$ 325,000				
Sacramento		\$ 78,941,321	\$106,865,321	64.3%	1,374,724	77.74
	Folsom	\$ 9,065,000				
	Galt	\$ 136,000				
	Sacramento	\$ 18,723,000				
Sutter		\$ 620,000	\$1,073,000	0.6%	91,410	11.74
	Yuba	\$ 453,000				
Yolo		\$ 24,528,927	\$32,989,927	19.8%	188,085	175.40
	Davis	\$ 5,476,000				
	W. Sacramento	\$ 376,000				
	Winters	\$ 287,000				
	Woodland	\$ 2,322,000				
Yuba		\$ 763,000	\$ 763,000	0.5%	70,396	10.84
<i>Region Total</i>		<i>\$166,316,802</i>	<i>\$ 166,316,802</i>		<i>2,228,923</i>	<i>74.62</i>

*Spending was not broken down to the city level for every city in the region

While there does seem to be a correlation between spending on bicycle/pedestrian infrastructure and mode share the increase in spending is not associated with an increase in bicycle to work trips over the same period.

The counties with the highest spending (Figure 13) also had the highest mode share (Figure 11) but bicycling in all counties still decreased (see appendix Figure 18 for city level mode share). There were increases, in most areas, in driving and public transit use over the same period, which could explain in part the lack of increased bicycling (see appendix Figures 19 and 20). At the national level, bicycling to work remained at four percent from 1990 to 2000.

**Figure 13. Means of Transportation to Work:
Percent of Bicycle Trips 1990 and 2000 by county**



The pattern that emerged was that high levels of bicycling (in cities like Davis and Sacramento) seemed to be correlated with money received for infrastructure and vice versa. Ken McGuire at Caltrans explained, “when we do projects in Sacramento, it should always be on our mind that we need to accommodate bicyclists in that corridor” (2007). Additionally, smaller cities and counties may not have the staff expertise to elicit the funds required for bicycle infrastructure.

Overall while concern for bicyclists and pedestrians seems to be increasing (as evidenced by a change in language associated with bicycles and pedestrians in policy/planning documents) this doesn’t seem to correlate with travel behavior as seen in census bike to work statistics. Perhaps part of the problem is in the implementation phase. While cities and counties are receiving more funds they don’t necessarily have the staff, resources, or proper channels to carry out implementation. According to McGuire,

We’ve had some issues with these projects being delivered. It’s a problem, and that kind of overshadows our equitable distribution a little bit, because it really looks bad when you’ve given the money out, and no one’s spending, or only a couple of local agencies are spending the money and that just doesn’t look good. So, we have to kind of go back and rethink; what do we want to emphasize when we pick projects? Do we want to emphasize maybe local agencies that have a

good history with us at delivering projects? If we did a continued pattern of not spending the money and not delivering the projects, then that puts the whole program in jeopardy, and that's not a good thing (2007).

CHAPTER 5: DISCUSSION

ISTEA, TEA-21 and SAFETEA-LU funds have given much greater funding flexibility to transportation planners. According to Ed Cox, the funds have “provided us an opportunity to look at projects that can be exclusively pedestrian or exclusively bicycle; prior to that, we really didn’t have that many options” (2007). While TEA funding is a great step in increasing bicycle facilities, funds aren’t addressing other areas. Most of the money is going to recreational paths, which would be less likely to contribute to reducing vehicle trips and any increase in recreational travel by bicycle wouldn’t show up in census travel to work data. Additionally, regionally distributed federal money often goes to large infrastructure projects like longer-distance bike paths which may only serve a minority of cyclists. In terms of increasing use, it may be more important to implement a larger number of local improvements such as: traffic calming, on-street lanes, "complete streets" design, safety and educational programs.

In order to speculate on reasons behind TEA funds mediocre success let’s review Dutch strategies as compared to those of the Sacramento region (Table 17).

Table 17. Policy Comparison of Netherlands and Sacramento Region

	NETHERLANDS	SACRAMENTO REGION
POLICY		
Safety Measures	<ul style="list-style-type: none"> •Strict ticketing •Higher penalties for violations •Traffic calming •Safety education and training •Bike lights campaign 	<ul style="list-style-type: none"> •Safety education is limited and inconsistent •More traffic calming is needed
Restrictions on Cars	<ul style="list-style-type: none"> •Lower speed limits •Limited parking •No right turn on red lights •Variable taxes for drivers •Prohibiting through traffic in neighborhoods •Permits for cars in city center 	<ul style="list-style-type: none"> •Few restrictions, politically challenging to restrict car use •Speed limits much higher
Encouraging B/P	<ul style="list-style-type: none"> •People oriented development •Measurable goals •Plans 	<ul style="list-style-type: none"> •Good language in plans but need more measurable goals •Development mostly car oriented
Land Use	<ul style="list-style-type: none"> •Concentration Decentralization •Compact-city policy •A-B-C location policy •Spatial Retailing policy 	<ul style="list-style-type: none"> •Community Design program, some areas have codes that allow higher density, urban growth boundaries etc. •More is needed
Bicycle Theft Prevention	<ul style="list-style-type: none"> •Marketing campaigns •Cheap used bikes 	<ul style="list-style-type: none"> •Theft not really addressed; not as big an issue
INFRASTRUCTURE		
Bicycle Lanes	<ul style="list-style-type: none"> •11,774 miles of bike facilities (.00071 miles/capita) * •Mostly practical 	<ul style="list-style-type: none"> •City of Sacramento has 269 b/p facilities (.00059) * •Increase in bike lanes, more is needed for highly used streets
Bicycle Parking	<ul style="list-style-type: none"> •Racks at practical destinations •Garages at train stations, shopping centers & public places •Portable for events 	<ul style="list-style-type: none"> •Parking is sparse in most areas
Other	<ul style="list-style-type: none"> •Bike right of ways •Separate bike turn lanes •Advance greens •Bike activated lights 	<ul style="list-style-type: none"> •City of Davis has some advance greens and bike activated lights, few other areas do
FUNDING	<ul style="list-style-type: none"> •Portion required for bikes 	<ul style="list-style-type: none"> •Some funding for b/p is earmarked but none required

*miles per capita for the Netherlands includes just bicycle facilities, whereas for the city of Sacramento both bicycle and pedestrian facilities are included.

Table 17 shows that the Dutch have been a lot more aggressive in their approach to encouraging bicycling. Dutch safety and land use policies address bicycling comprehensively. Additionally, the Dutch have placed restrictions on motor vehicle use and have developed programs to combat bicycle injuries and fatalities, and bicycle theft. Measurable goals make assessing progress in these areas possible. The Dutch require a portion of transportation funds be spend on bicycle projects and have therefore succeeded in establishing facilities that make bicycling attractive and feasible from the bicycle network and parking accommodations to advance green lights and separate bicycle turn lanes.

In order to achieve similar results, the U.S. we will need to significantly increase commitments in each of these areas. For TEA programs to be more successful (in terms of increased mode share) funds should incentivize a multi-faceted approach. Future iterations should require cities and counties to spend a certain amount of the funding on bicycles and allow more flexibility to spend funds on safety education, training, and planning.

Development requirements are another way in which cities could increase bicycling instead of trying to retrofit areas. Including requirements for developers to accommodate bicyclists could be an effective tool as it is costly and politically challenging to go back and retrofit areas. According to Ed Cox, this would benefit developers as well as cyclists,

The bike trail is an amenity for the houses. It's a selling point. People buy a house because they're going to be right next to that bike trail. You go in the neighborhood and they've got this big empty slough of land behind them, you try to put in a bike trail. 'Oh, you can't have that. No, it's bad. It's bad news.' It's the exact same kind of situation from a physical environment, but a completely different one from a political environment and a sense of security (Cox, 2007).

Despite a seemingly unpromising situation, there are reasons for hope including signs of a change in culture, the forming of new partnerships and proposed legislation, which would be beneficial to bicyclists. Ed Cox has seen a shift in bicycle culture,

There's a growing population of people who like to ride on cruiser bikes; they're these big, balloon tire things, and they go bar hopping. That is becoming a trend, particularly in downtown Sacramento, which I have not seen until the last couple of years. Now they're everywhere I look (2007).

In addition, more cross-field collaborations are necessary: with transportation planners, health officials, and city/county planners working together to design areas that are conducive to bicycling. There is reason to believe this is plausible as transportation planners are beginning to seek input from nontraditional sources like health professionals. According to McGuire, the Department of Health Services is now a major player motivated in part by the governor's interest in exercise and fitness, "because everybody marches to that tune. Exercise, fitness, health, etc... that gets the Department of Health Services on board...they're on every committee that we have here at CalTrans" (McGuire, 2007). Transportation planners like Cáceres recognize that it is not their jobs to keep people healthy "we're not doing transportation planning to get people skinny, we're doing a service to help them get from point 'A' to point 'B'" (2007). But they're also seeing ways they can influence health, for example the Community Design program,

We weren't encouraging development of destinations closer together, and actually it's not our job. Cities and counties, it's their job to decide where people live and work. Maybe we can do something about it. That's how we got involved in Community Design and also the Blueprint. Community Design is that if you design a community a certain way, you'll encourage more walking and biking; but we weren't spending money on walking and biking. So, what we would do is we'd funnel money towards that Community Design in the form of bike and pedestrian walkways, and even some financial incentives for Smart Growth Development. Instead of just giving more money to a different mode, we would do it a little bit more intelligently. We set aside \$500 million into MTP for that

kind of work (Cáceres, 2007).

Current Legislation being proposed also gives reason to believe that the situation for bicyclists in the United States may continue to improve. Multiple people interviewed mentioned the importance of AB 1358 Complete Streets Act of 2007, which would require local governments to consider and accommodate all users in the planning and development of their local highways and public transportation systems. According to Kays, federal funding might be more effective if spent on smaller projects which are likely to benefit the majority versus larger projects which are attractive from a regional connectivity perspective but only benefit seasoned cyclists who enjoy longer rides.

I mean, the fact is that more people use local streets and not the big connector projects and the big off-street trails. That may get more bang for the buck. Bike and pedestrian trips tend to be shorter. So, in a way it tends to make more sense to improve your local network (2007).

Additionally, SB 375 (Steinberg) could be an important bill for alternative transportation and smart growth. SB 375 would require guidelines for travel demand models in California, in addition to preferred growth scenarios and environmental review. Cáceres believes that blueprints are important because many people see areas like Europe or even Davis and Sacramento as the exceptions, rather than possibilities.

What really drives bicycle/pedestrian planning isn't that another city did it. It's that your voters want it. They have to see it themselves. So, if you took all the voters in Germany, they might all want it, but what we've done is we've taken the Blueprint to them and a lot of them are wanting it more I think (2007).

According to Kays the Blueprint's emphasis on smart growth planning was about more than environmental concerns,

SACOG was interested in going through the exercise of smart growth planning, because SACOG has to have a land use base on which to put its projects for the future. If that land use base is very sprawly then the transportation has to be matching that. Well, there's just no way there's funding to do that, so everybody was very interested and motivated to look at Smart Growth and higher density developments and preserving open space and that kind of thing (Kays, 2007).

Perhaps with the aid of time and the current atmosphere of change we will see a rise in bicycle use, "status quo is the biggest obstacle. We've always done it this way, why do you want to do it different. To me, it's a mindset that you've got to break" (Cox, 2007). The biggest obstacle to breaking the status quo is car dominance and the lack of political viability for restricting car use. Rodney Tolley in his article within *The Greening of Urban Transport* (1997) stated that building facilities for cyclists as a "bolt-on extra" that can go along side of car use is the wrong approach; it "fails to recognize that the greatest obstacle is not the lack of facilities, but the dominance and speed of the car" (18).

In sum, there are many factors from the Dutch model that can be applicable for understanding how the Sacramento region can more effectively utilize federal funds. For federal monies spent on bicycling to be effective, a multi-faceted, comprehensive approach will be necessary. Bicycle facilities should not only be concentrated on building lanes but should also be spent on smaller improvements that will benefit local utilitarian trips (parking, advance green lights and turns lanes for bicyclists, etc.). Safety will also need to be addressed in a much more serious way; not just through educational programs but through traffic calming and a lowering of speed limits in neighborhoods and bicycle commute routes. Incentives for bicycle use and disincentives for car use will be necessary to achieve any meaningful shift in mode share. In addition, the connection

between transportation choices and land use will need to continually be taken into consideration. Finally, requiring that a portion of TEA funding be spent on bicycle and pedestrian projects will be vital to achieving an increase in bicycle use.

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APPENDIX

Figure 14. Project Scoring Criteria

LINKAGE	
To Activity Centers	Max Pts: 20
Pts are awarded for projects that are adjacent to, or provide access to, activity centers	
Schools & Colleges	20/use
Parks/Libraries/Comm. Cntrs.	10/use
Commercial Centers	5/center
Employment Centers	5/100 employees
High Density Residential	5/site
Notes: Commercial Centers - Sites containing a minimum of 40,000 sqft Employment Centers - Sites containing a minimum of 100 employees High Density Residential - Sites containing 20 dwelling units/acre and a minimum of 100 units	
To Transportation System	Max Pts: 12
Links to other bikeways - Two points are awarded for each existing or planned bikeway to which the candidate bikeway will connect (6 pts Max)	6
Links to other modes - Four points are awarded for a connection with another transportation mode with high capacity or serves longer trips, and that accommodates bicycles by carrying them or providing secure parking. These modes include light rail, or Amtrak stations.	4
Links to other modes - Two points are awarded for a connection with another transportation mode with lower capacity or serves shorter trips, and that accommodates bicycles by carrying them or providing secure parking. These modes include bus stops, or park-and-ride facilities.	2

< 3,000 (Class III recommended)	0
<u>Speed - mph</u>	
>= 45	5
40	4
35	3
30	2
25	1
<25	0
High Existing Usage: Five points are awarded if bicycle counts on the candidate bikeway segment indicate 25 or more bikes per hour (Up to 15 total points maximum)	
<u>Class III</u>	<u>Volume - ADT</u>
	< 1,000
	1,000 - 3,000
	3,001 - 5,000
	5,001 - 10,000
	10,001 - 20,000
	> 20,000
	5
	4
	3
	2
	1
	0
	<u>Speed - mph</u>
	<25
	25
	30
	35
	40
	>= 45
	5
	4
	3
	2
	1
	0
High Existing Usage: Five points are awarded if bicycle counts on the candidate bikeway segment indicate 25 or more bikes per hour	
Continuity	Max Pts: 8
Points are awarded based on the number of stops, or intersection crossings, per mile along the route	
	<u>Stops per mile</u>
	0
	1 - 4
	5 - 9
	>10
	8
	6
	4
	0
IMPLEMENTATION	
ROW/Environment	Max Pts: 10
	<u>Land Ownership</u>
	County/City-owned
	Public (non-county)
	2
	1

Private	0
<u>Land Use</u>	
Unused/Vacant	2
Relocatable Use	1
Non-relocatable	0
<u>Environmental Document</u>	
In Plans Already/Already complete	3
Categorical Exemption	2
Negative Declaration	1
EIR	0
ROW/Environment (con't)	
<u>Project Commencement</u>	
Short Term (1 - 5yrs)	3
Medium Term (6 - 15yrs)	2
Long Term (> 15yrs)	1
No Estimate	0
<u>EQUITY</u>	
Geographic Distribution	Max Pts: 5
Points are awarded based on the candidate bikeway's distance (miles) from the nearest parallel existing route at the closest point	
<u>Distance (miles)</u>	
> 1.5	5
1.2 - 1.5	4
0.8 - 1.1	3
0.4 - 0.7	2
0 - 0.3	1
<u>SATISFY DEMAND</u>	
Max Pts: 5	
5 points will be awarded if demand for new facility is documented (please attach documentation)	
<u>SAFETY</u>	
Max Pts: 5	
5 points will be awarded if safety improvements are documented (please attach documentation)	

Barrier Elimination	Max Pts: 15
Pts are awarded based on the reduced distance cyclists & pedestrians would travel with the project in place (miles)	
> 2.0	15
1.6 - 2.0	10
1.1 - 1.5	6
0.50 - 1.0	4
0.25 - 0.5	2
< 0.25	0
Ten (10) points will be deducted from projects that include, or direct bicyclists and pedestrians to a barrier (freeway interchange, routes through areas subject to flooding, etc.)	
To Other Jurisdictions	Max Pts: 5
Does the project cross jurisdictional boundaries to address a regional issue	
DESIRABILITY	
Traffic Characteristics	Max Pts: 15
<u>Sidewalks</u>	- Pts are awarded based on the type of facility to which the sidewalk provides access
Arterial	9
Collector	6
Local Road	3
Two (2) additional points will be added for each improved crosswalk with a maximum of six (6) add'l pts.	
<u>Class I</u>	- Points are awarded based on the number of vehicular crossings (street &/or driveway)
	<u>Crossings per Mile</u>
<= 2	15
3 - 4	10
5 - 7	5
>= 8	0
<u>Class II</u>	<u>Volume - ADT</u>
> 40,000	10
30,001 - 40,000	8
20,001 - 30,000	6
10,001 - 20,000	4
3,000 - 10,000	2

Table 18. Funding opportunities for which bicycle and/or pedestrian projects are eligible

Local level
Local Transportation Fund (LTF)
Special Taxing Authorities

State Funding
<u>Department of Transportation</u>
State Highway Account
Bicycle Transportation Account (BTA)
Environmental Enhancement and Mitigation Fund (EEM)
Pedestrian Safety Account
<u>Department of Health Services</u>
U.S. Department of Health and Human Services Prevention Block Grant
The California Endowment
The California Wellness Foundation
The Robert Wood Johnson Foundation
The California Office of Traffic Safety
State of California General Fund

Federal-aid Funds
The Transportation Equity Act for the 21 st Century (TEA-21)
Transportation Enhancement Activities (TEA) program
Congestion Mitigation and Air Quality (CMAQ) Improvement Program/ Regional Surface Transportation Program
Safe Routes to School Program (SR2S)
Recreational Trails Program (RTP)
Land and Conservation Fund

Source: CA Blueprint for Bicycling and Walking

Figure 15. Distributions of Transportation Enhancements Funding by Category

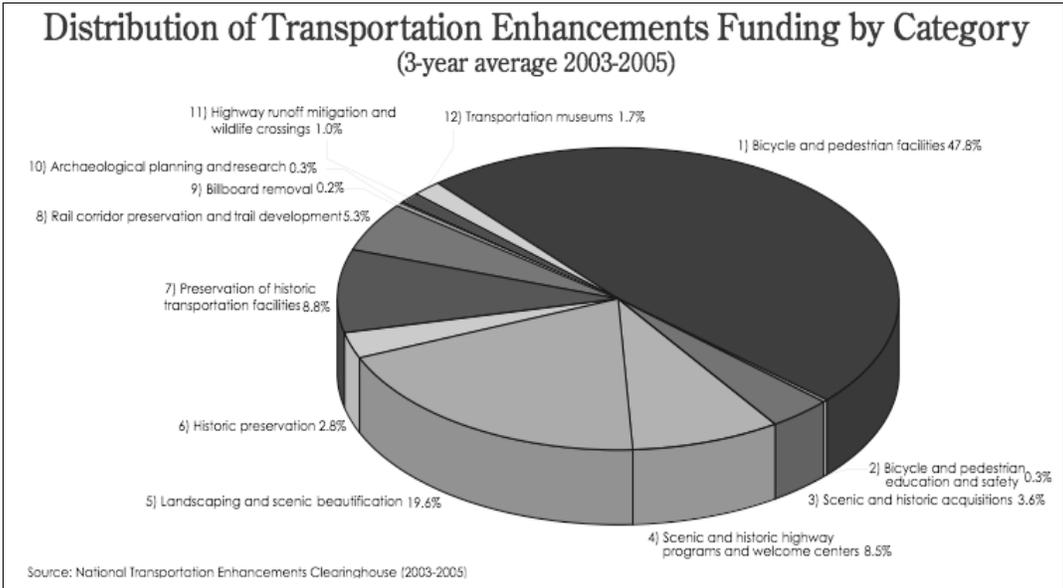


Figure 16. Policies and Provisions in 50 States

Policies & Provisions in 50 States

State	% of transportation \$ to bike/ped (1)	Per capita spending on bicycle & pedestrian projects (1)		Spending target for bike/ped projects?	State bike/ped staff number of full-time equivalent		Miles of converted rail to trails	Hrs./wks. bikes allowed on state-operated trains (out of 168)	Published goals		Specified state funding:		Complete streets policy? (2)
		Federal	Total		to increase bicycling & walking?	to reduce bike/ped fatalities?			for bike safety programs?	for ped safety programs?			
Alabama	1.55%	\$4.03	\$5.01	No	0.5	0.11	58	**	No	No	No	No	No
Alaska	2.73%	\$29.35	\$38.16	No	0.1	0.16	20	**	Yes	Yes	No	No	No
Arizona	4.05%	\$5.22	\$7.21	No	1.0	0.20	73	**	Yes	Yes	No	No	No
Arkansas	0.40%	\$1.18	\$1.59	No	1.0	0.37	24	**	No	No	No	No	No
California	2.09%	\$1.96	\$3.10	No	6.0	0.18	293	168	Yes	Yes	No	No	Yes
Colorado	1.66%	\$2.55	\$3.71	No	1.0	0.23	162	**	Yes	Yes	*	*	No
Connecticut	2.15%	\$2.55	\$3.42	No	0.5	0.15	140	**	No	Yes	No	No	No
Delaware	3.61%	\$11.21	\$22.08	*	*	*	5	*	*	*	*	*	No
Florida	1.06%	\$1.05	\$1.89	No	8.5	0.53	328	**	No	No	*	*	Yes
Georgia	1.17%	\$3.00	\$4.28	No	1.3	0.16	107	133	No	No	Yes	Yes	No
Hawaii	3.99%	\$11.68	\$14.66	No	1.0	0.83	12	**	Yes	No	Yes	Yes	No
Idaho	0.89%	\$2.95	\$4.18	No	1.0	0.77	234	**	Yes	Yes	No	No	No
Illinois	1.41%	\$1.79	\$2.86	No	1.2	0.10	549	168	No	No	No	No	No
Indiana	0.91%	\$1.86	\$2.44	No	0.9	0.15	122	**	No	No	Yes	No	No
Iowa	3.92%	\$5.99	\$10.45	No	1.0	0.34	557	**	No	No	Yes	No	No
Kansas	1.42%	\$2.36	\$3.54	No	0.5	0.19	55	**	No	No	Yes	Yes	No
Kentucky	0.99%	\$2.34	\$2.78	No	1.0	0.25	12	**	No	No	No	No	No
Louisiana	0.57%	\$1.38	\$1.56	No	1.0	0.22	27	**	No	Yes	No	No	No
Maine	1.19%	\$2.19	\$12.14	No	1.0	0.78	155	*	Yes	No	Yes	No	No
Maryland	0.62%	\$0.78	\$1.61	No	5.0	0.94	115	168	Yes	Yes	*	*	No
Massachusetts	1.47%	\$1.52	\$1.96	No	1.0	0.16	155	103	No	No	No	No	Yes
Michigan	1.66%	\$2.58	\$3.68	No	1.0	0.10	1398	**	No	Yes	No	No	No
Minnesota	3.59%	\$3.78	\$7.92	No	6.0	1.22	1327	147	Yes	Yes	*	*	No
Mississippi	0.54%	\$1.73	\$2.14	No	0.5	0.18	52	0	No	No	No	No	No
Missouri	2.65%	\$3.42	\$6.46	No	1.3	0.24	283	168	Yes	Yes	Yes	Yes	No
Montana	1.08%	\$5.89	\$9.12	*	*	*	58	*	*	*	*	*	No
Nebraska	0.78%	\$6.84	\$10.83	No	0.5	0.29	264	**	No	No	No	No	No
Nevada	0.98%	\$1.91	\$2.05	*	*	*	6	*	*	*	*	*	No
New Hampshire	3.54%	\$7.20	\$9.05	No	2.0	1.62	306	**	Yes	Yes	No	No	No
New Jersey	1.23%	\$1.41	\$1.93	Yes	4.0	0.48	211	144	No	No	*	*	No
New Mexico	2.11%	\$3.73	\$5.14	No	1.3	0.73	17	75	No	No	Yes	Yes	No
New York	0.91%	\$1.06	\$2.38	No	15.0	0.79	805	140	No	No	No	No	No
North Carolina	1.08%	\$1.02	\$1.61	Yes	8.0	0.99	51	168	Yes	Yes	No	No	Yes
North Dakota	0.78%	\$5.18	\$6.66	No	0.1	0.16	17	**	No	No	No	No	No
Ohio	1.86%	\$2.83	\$4.37	No	2.0	0.18	744	**	No	No	No	No	No
Oklahoma	1.11%	\$3.47	\$4.31	No	1.0	0.29	51	*	Yes	Yes	No	No	No
Oregon	1.99%	\$3.71	\$4.58	Yes	*	*	209	168	No	No	No	No	Yes
Pennsylvania	1.79%	\$3.23	\$3.59	No	1.5	0.12	1130	146	No	No	No	No	Yes
Rhode Island	5.40%	\$11.13	\$15.92	Yes	1.0	0.95	36	**	No	No	Yes	Yes	No
South Carolina	0.24%	\$0.49	\$1.02	No	2.0	0.50	44	**	No	No	No	No	Yes
South Dakota	0.49%	\$2.07	\$5.21	No	0.3	0.33	110	**	No	No	No	No	No
Tennessee	2.41%	\$4.79	\$5.72	Yes	1.0	0.18	58	**	Yes	No	Yes	Yes	Yes
Texas	1.22%	\$1.87	\$3.70	*	*	*	174	*	No	Yes	Yes	Yes	No
Utah	1.26%	\$2.39	\$3.50	*	2.0	0.90	58	168	Yes	Yes	Yes	Yes	No
Vermont	3.17%	\$11.14	\$12.83	*	1.0	1.64	147	**	No	No	*	*	Yes
Virginia	0.50%	\$0.74	\$1.37	***	***	***	198	***	***	***	***	***	Yes
Washington	1.98%	\$3.45	\$4.86	Yes	4.8	0.81	634	*	Yes	Yes	*	*	No
West Virginia	0.46%	\$1.82	\$1.99	No	1.0	0.55	475	**	No	No	No	No	No
Wisconsin	1.81%	\$3.78	\$4.79	No	3.0	0.56	1533	**	No	Yes	Yes	Yes	No
Wyoming	1.31%	\$8.97	\$11.59	No	0.5	1.01	22	**	No	No	Yes	Yes	No
Mean /Average (3)	1.54%	\$2.50	\$3.80	No*	2.2*	0.34	400*	138*	No*	No*	No*	No*	No*
Median	1.41%	\$2.58	\$4.18	No	0.1	0.33	122	158	No	No	No	No	No
High	5.40%	\$29.35	\$38.16	**	15	1.64	1533	168	**	**	**	**	**
Low	0.24%	\$0.49	\$1.02	**	0.1	0.1	5	0	**	**	**	**	**

Source: FHWA FMIS accounting system (2004-2006), State Surveys, ACS (2005), Rails to Trails Conservancy, Thunderhead Alliance

(1) Funding data here is from a three year average of authorized funding and thus represent all federal funds obligated to projects in the 3-year period and are not necessarily the actual amount spent in these years;

(2) Only policies endorsed as "complete streets policies" by Thunderhead member organizations are included;

(3) All averages are weighted by population or take into account the sums from all cities except for those noted with a *;

(4) For states where the population is less than one million, standardized values will be larger than the value of the variable.

Legend:

* = Officials could not access data

** = Not applicable

*** = Data Unavailable or Thunderhead could not access data

■ = High Value □ = Low Value

Figure 17. Policies and Provisions in Major Cities

Policies & Provisions in Major Cities

City	Per capita spending on bicycle & pedestrian projects (2,6)		Spending target	City bike/ped staff		Number of FTE police on Bikes	Facilities: miles/sq. mile (3)		Published goals:			Complete streets policy? (4)
	Federal	Total		number of full-time equivalent	staff/ 1 million people (7)		current bicycle facilities	planned bike/ped facilities	to increase bicycling & walking?	to reduce bike & ped fatalities?	to increase bike & ped facilities?	
Albuquerque	\$0.40	\$0.51	No	5	10.2	45	1.6	2.6	*	Yes	Yes	No
Amarillo	\$4.92	\$6.16	No	0	0.0	8	1.0	*	Yes	Yes	No	No
Arlington (TX)	\$1.26	\$1.54	***	***	***	***	***	***	***	***	***	No
Atlanta	\$9.53	\$11.69	No	0	0.0	*	0.2	4.5	Yes	Yes	Yes	No
Austin	\$2.52	\$3.62	*	*	*	*	*	*	*	*	*	No
Baltimore	\$10.81	\$17.05	No	1	1.6	*	0.3	5.2	Yes	Yes	Yes	No
Boston	\$0.00	\$0.00	No	0	0.0	*	0.5	*	No	No	*	No
Charlotte	\$0.00	\$0.00	No	2	3.3	60	0.3	1.3	Yes	No	Yes	No
Chicago	\$1.13	\$1.73	No	13.5	5.0	*	1.5	0.7	Yes	Yes	Yes	Yes
Cleveland	\$0.00	\$0.00	Yes	2	4.8	0	0.5	2.3	Yes	No	No	Yes
Colorado Springs	\$0.86	\$1.06	Yes	0.5	1.3	40	0.8	*	No	No	No	Yes
Columbus	\$0.00	\$0.00	No	3	4.3	70	0.4	0.2	No	No	Yes	Yes
Dallas	\$0.25	\$1.07	*	*	*	*	*	*	*	*	*	No
Denver	\$1.16	\$3.04	No	1	1.8	20	2.4	1.6	Yes	Yes	Yes	No
Detroit	\$1.53	\$2.07	No	*	*	*	0.1	0	No	No	No	No
El Paso	\$0.03	\$0.04	*	*	*	*	*	*	*	*	*	No
Fort Worth	\$1.26	\$1.54	*	0.25	0.4	*	0.3	0.8	*	*	*	No
Fresno	\$1.49	\$1.86	No	0	0.0	0	1.1	0.9	Yes	Yes	Yes	No
Honolulu	\$0.00	\$0.00	Yes	1	2.8	40	1.2	3	Yes	Yes	Yes	No
Houston	\$0.68	\$1.03	Yes	4	2.1	*	0.5	0.1	No	No	Yes	No
Indianapolis	\$1.71	\$2.00	No	0	0.0	4	0.1	0.7	No	No	Yes	No
Jacksonville	\$0.33	\$1.01	No	1	1.3	*	*	*	Yes	*	Yes	No
Kansas City (MO)	\$0.00	\$0.00	No	0	0.0	*	0.2	*	No	No	No	No
Las Vegas	\$0.62	\$0.65	Yes	1	1.9	*	2.7	16.2	Yes	Yes	Yes	No
Long Beach	\$0.77	\$1.41	*	5	10.8	9	1.5	1.8	Yes	Yes	No	No
Los Angeles	\$0.77	\$1.41	No	8	2.1	210	0.8	0.7	Yes	No	No	No
Louisville	\$3.36	\$3.79	No	*	*	*	*	0.5	*	*	*	No
Mesa	\$1.79	\$2.97	No	0	0.0	2	1.5	0.1	Yes	Yes	Yes	No
Miami	\$0.22	\$0.26	*	3.2	8.8	**	4.0	14	No	Yes	Yes	No
Milwaukee	\$3.32	\$4.14	No	1	1.8	65	1.4	0.3	Yes	No	Yes	No
Minneapolis	\$4.16	\$7.21	Yes	3	8.6	*	2.1	0.8	Yes	Yes	Yes	No
Nashville	\$3.40	\$4.02	Yes	8.5	16.3	22	0.2	0.2	Yes	Yes	Yes	No
New Orleans	\$6.14	\$8.19	Yes	2	4.6	*	0.1	0.7	No	Yes	No	No
New York	\$1.16	\$4.09	No	8	1.0	200	0.9	5.9	No	No	Yes	No
Oakland	\$4.83	\$7.37	No	3.5	9.4	15	1.4	2.4	Yes	Yes	No	No
Oklahoma City	\$8.06	\$9.78	No	0	0.0	18	0.1	0.2	No	No	No	No
Omaha	\$6.63	\$12.69	Yes	0.75	2.0	12	1.0	1.2	Yes	Yes	Yes	No
Philadelphia	\$1.76	\$3.16	No	0	0.0	200	2.2	2.2	No	No	No	No
Phoenix	\$1.79	\$2.97	Yes	1	0.7	*	1.5	*	No	No	Yes	No
Portland	\$3.88	\$4.78	No	8	15.6	4	1.9	3.2	*	No	Yes	No
Sacramento	\$3.28	\$4.50	*	*	*	15	2.8	3.1	No	No	No	Yes
San Antonio	\$2.04	\$4.19	*	*	*	*	*	*	*	*	*	No
San Diego	\$1.75	\$2.64	No	1	0.8	*	2.4	6.2	No	No	No	Yes
San Francisco	\$0.93	\$1.31	Yes	7	9.7	89	3.2	*	Yes	No	No	Yes
San Jose	\$2.78	\$5.07	No	1	1.1	20	1.2	1.1	Yes	Yes	Yes	No
Seattle	\$2.47	\$3.90	No	6	11.2	*	0.8	4.5	Yes	Yes	Yes	Yes
Tucson	\$3.19	\$3.78	Yes	1	2.0	42	3.2	0.5	Yes	*	Yes	No
Tulsa	\$5.97	\$7.38	No	1	2.7	0	0.5	1.4	No	No	Yes	No
Virginia Beach	\$0.00	\$0.00	No	1	2.3	80	1.0	0.6	Yes	No	No	No
Washington	\$6.87	\$10.50	No	2.5	4.4	*	2.4	4.9	Yes	Yes	Yes	No
Mean/Average (5)	\$1.83	\$3.17	No*	4.6*	2.8	131*	1.2*	2.49*	Yes*	(1)	Yes*	No*
Median	\$1.75	\$2.07	No	1	2.0	22	1.0	1.25	Yes	**	Yes	No
High	\$10.81	\$17.05	**	13.5	16.3	210	4.0	16.2	**	**	**	**
Low	\$0.00	\$0.00	**	0	0.0	0	0.1	0.0	**	**	**	**

Source: FHWA (2001-2006), City Surveys, Census (2000), ACS (2005), and Thunderhead Alliance

(1) 21 cities responded "yes" and 21 cities responded "no" to this question.

(2) Funding data here is from a three year average of authorized funding and thus represent all federal funds obligated to projects in the 3-year period and are not necessarily the actual amount spent in these years.

(3) Bicycle facilities include on-street striped bike lanes, signed bike routes, and multi-use paths; planned bike/ped facilities include the aforementioned plus sidewalks.

(4) Only policies endorsed as "complete streets policies" by Thunderhead member organizations are included.

(5) All averages are weighted by population or take into account the sums from all cities except for those noted with a *.

(6) See note (4) and (5) on page 49 regarding sorting of funding data and discrepancies in funding data.

(7) For cities where the population is less than one million, standardized values will be larger than the value of the variable.

Legend:

* = Officials could not access data

** = Not applicable

*** = Data Unavailable or Thunderhead could not access data

■ = High Value □ = Low Value

Figure 18. Means of Transportation to Work- % Bicycle Trips 1990 & 2000/city

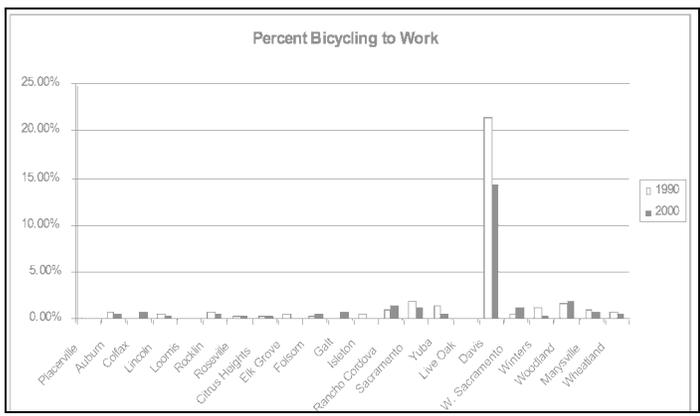


Figure 19. Means of Transportation to Work- % Car Trips 1990 & 2000/county

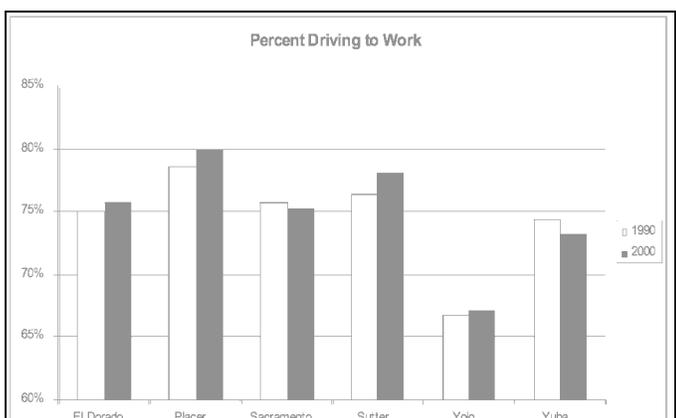


Figure 20. Means of Transportation to Work- % Transit Trips 1990 & 2000/county

