

Monterey County Bicycle Sharing Feasibility and Implementation Plan

Prepared for:

Transportation Agency for Monterey County (TAMC)

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EXECUTIVE SUMMARY

The Transportation Agency for Monterey County (TAMC) has requested a Bicycle Sharing Feasibility and Implementation Plan for a bikesharing system in Monterey County that increases the use of bicycles for relatively short-range travel, reducing the negative impacts of private automobile use and encouraging a shift to other modes like transit and walking. This report first describes the current practice of bikesharing in North American cities, highlighting key attributes of a bikesharing system and considerations for system implementation and operation. The next section identifies a potential service area for bikesharing in Monterey County, proposes two initial configurations of bikes and stations, and estimates the demand for ridership on the proposed systems. The third section presents a variety of operating models, identifies potential funding sources and partners, and estimates costs and revenues for the proposed systems; the section also addresses impacts of bikesharing on the local economy. The final section presents recommendations for two bikesharing systems (one in the Monterey/Pacific Grove area and one in Salinas), next steps toward implementation, and a discussion of associated challenges and opportunities

State of the Bikesharing Practice

Most bikesharing systems currently being implemented in the United States are known as “third generation” systems. They incorporate unmanned kiosks with electronic user interfaces that allow users to check bikes in and out with an electronic identification or payment method, most commonly a credit / debit card or radio-frequency identification (RFID) key. Bike sharing stations include automatic docks that lock the bikes in place and an electronic payment kiosk. Stations typically accommodate ten to twenty docks, but are customizable in modules of one to three docks, depending on the hardware provider. Bikesharing bicycles feature unique designs that increase visibility and differentiate them from other traditional bicycles: they are designed to be durable, low-maintenance, and easily adjustable for a wide range of users. These bikes comfortably accommodate short, transportation-oriented, in-town trips but are less suited for longer road or touring trips. The hardware provided by various vendors is not currently interoperable.

Users can choose from a variety of membership types, ranging from single-day to annual. Short-term users can walk-up, register at a kiosk, and use their credit or debit card to unlock a bikesharing bike for use. Longer-term users register online and receive by mail an RFID key to track their account and check out bikes directly from the docks. Membership fees reflect the length of the membership period. Users are typically allowed an unlimited number of rides during their membership period and may check out and return bikes at any station in the system. Rides under 30 minutes are included in the membership fee, and longer rides incur an hourly use fee that increases with the duration of the trip to encourage turnover and high utilization of the bicycles.

Demand Evaluation

The demand evaluation process involves three stages that progress from a broad, countywide analysis, to a detailed ridership forecast at the station level. First, the Countywide Demand Screening uses broad measures of demographic and built environment characteristics to determine relative bikesharing suitability across all of Monterey County. This screening identifies Monterey and Pacific Grove as the highest-suitability area for a successful bikesharing system and also highlights Salinas for further analysis; other areas such as downtown Marina and Sand City could support stations in the future if land use

becomes denser and incorporates a mix of residential and commercial uses. Next, the Detailed Ridership Suitability Analysis provides a finer-grained view of appropriate areas for bikesharing in the Monterey / Pacific Grove and Salinas areas to inform the selection of specific station locations. Finally, the Bikesharing Ridership Regression Model is applied to each station location to provide a ridership estimate that accounts for the attributes of each individual station as well as each network of stations as a whole.

Based on this analysis, this report proposes two networks with the following attributes:

Monterey / Pacific Grove

- Coverage – Initial service area covering coastal portions of the City of Monterey and Pacific Grove.
- Scope – 24 stations, each with ten docks and five bicycles, for a total of 120 bicycles and 240 docks. This system may be expanded in a proportion of roughly one bike for every two docks to meet additional demand; new stations should allow space for at least ten docks and five bicycles.
- Ridership Forecast – Such a system is estimated to attract total monthly ridership of about 3,000 trips per month, or about 25 rides per bike per month. Ridership estimates at individual stations range from about 90 to 280 rides per month, with an average of about 125 rides per month per station. Additional sensitivity analyses provide a low range estimate of approximately 1,600 monthly rides and a high range estimate of approximately 5,800 monthly rides.

Salinas

- Coverage – Initial service area covering Downtown Salinas and neighboring areas.
- Scope – 16 stations, each with ten docks and five bicycles, for a total of 80 bicycles and 160 docks. As before, this system may be expanded in a proportion of roughly one bike for every two docks to meet additional demand; new stations should allow space for at least ten docks and five bicycles.
- Ridership Forecast – Such a system is estimated to attract total monthly ridership of about 900 trips per month, or about 11 rides per bike per month. Ridership estimates at individual stations range from about 47 to 85 rides per month, with an average of about 60 rides per month per station. Additional sensitivity analyses provide a low range estimate of approximately 450 monthly rides and a high range estimate of approximately 1,750 monthly rides.

Because these networks are separated by a distance that exceeds the length of most bikesharing trips, either network could be implemented independently or both networks could be implemented together under a common program.

Financial Feasibility Analysis

United States bikesharing programs operate under a variety of models, including non-profit, publicly owned and operated, publicly owned and privately operated, advertiser operated, and university operated; many programs are hybrids of these models. Successful bikesharing programs have formed partnerships among local governments, employers, nonprofits, universities, real estate developers, bike retail and rental operations, and other local businesses. Bike share programs in the U.S. are funded by a combination of user fees; sponsorships; advertising; private donations; Federal, state, and local funds;

along with various loans; private foundation grants; and individual donations. Of these funding sources, user fees, sponsorships, and advertising are the most common. None of the programs reviewed in the United States generate sufficient revenue from user fees alone to support both full capital acquisitions and ongoing operations and maintenance costs. However, several programs do appear to have financially sustainable operations *after* their capital acquisitions are fully or partially funded by other sources.

Cash flow models based on the above system parameters results in the following financial estimates:

Monterey / Pacific Grove

- Initial Capital Expenditures – \$45,000 per station or about \$1.1 million in aggregate for one-time capital costs including bicycles, docks, membership cards, software, maintenance equipment, etc.
- Operating and Maintenance (O&M) Expenditures – \$1,500 annually per bicycle or \$180,000 annually in aggregate, including program administration, insurance, software operations, customer service, wireless communication for stations, bike mechanics, bike parts, station parts, vehicle maintenance, and a contingency for replacing bikes due to theft, vandalism, and wear and tear, among other costs.
- Membership and User Fee Revenue – While expenditures relate to the number of bikes and stations and are assumed to be constant across scenarios, membership and user fee revenues vary with the level of system utilization:
 - *Base Scenario* – \$65,000 annually, or about 36 percent of estimated annual O&M expenditures of \$180,000, leaving approximately \$115,000 annually required from other sources.
 - *Low Range Scenario 1A* – \$32,000 annually, or about 18 percent of estimated annual O&M expenditures of \$180,000, leaving approximately \$148,000 annually required from other sources.
 - *High Range Scenario 1B* – \$125,000 annually, or about 70 percent of estimated annual O&M expenditures of \$180,000, leaving approximately \$55,000 annually required from other sources.

Salinas

- Initial Capital Expenditures – \$45,000 per station or about \$720,000 in aggregate for one-time capital costs.
- Operating and Maintenance (O&M) Expenditures – \$1,500 annually per bicycle or \$120,000 annually in aggregate
- Membership and User Fee Revenue –
 - *Base Scenario* – \$19,500 annually, or about 16 percent of estimated annual O&M expenditures of \$120,000, leaving approximately \$100,500 annually required from other sources.

- *Low Range Scenario 1A* – \$9,500 annually, or about 8 percent of estimated annual O&M expenditures of \$120,000, leaving approximately \$110,500 annually required from other sources.
- *High Range Scenario 1B* – \$37,500 annually, or about 31 percent of estimated annual O&M expenditures of \$120,000, leaving approximately \$82,500 annually required from other sources.

Potential positive impacts of bikesharing to the local economy include:

- Additional retail purchases by cyclists at businesses in close proximity to bicycle sharing stations
- Increased access and exposure to local businesses and employment opportunities
- Job opportunities, including maintenance staff, administration, supervisors, and service staff
- Reduced automobile usage and reduced personal transportation costs
- 50 to 75 percent more direct, indirect, and induced jobs per dollar than typical road projects
- Increased value of adjacent property
- Improved health, which may reduce health care costs and improve job performance
- Increased enthusiasm for bicycling and increased activity at bicycle retail and rental shops

Impacts on local bike rental shops are mixed, with some shops reporting increased business and others reporting declines. In the proposed system, relocating bikesharing stations away from bike rental shops is not recommended due to potential adverse effects on ridership and system connectivity. The following measures may mitigate potential negative impacts:

- Structure pricing to incentivize short trips that are distinct from trips served by bike rental shops.
- Place stations in close proximity to existing transit stops to reinforce transportation-oriented trips.
- Develop a marketing campaign describing the bikesharing program as distinct from bike rentals.
- Develop maps that advertise both bikesharing stations *and* bike rental shop locations.
- Partner with local bike businesses to provide maintenance services.
- Offer bike shop and rental discounts to bikesharing program members.

Program Recommendations

The characteristics of the Monterey program should address the specific goals of the entity that emerges to lead it. The proposed system of 24 stations in a contiguous area of Monterey and Pacific Grove is recommended to introduce bikesharing to Monterey County and establish a sustainable system that can be expanded as demand warrants. As an alternative or addition, a system of 16 stations in Salinas may be considered. Opportunities exist for local bike rental shops to own or operate a bikesharing system; however, a nonprofit or government-owned/privately-operated model is likely most appropriate. A progressive pricing structure that encourages short trips and directs users to bike rental shops for longer trips is recommended. The most critical next step for implementation is to identify a lead organization for the bikesharing program that can establish program goals, conduct public outreach, and begin applications for funding. The organization should continue to coordinate with regional organizations and local jurisdictions; conversations with California State University, Monterey Bay might yield additional opportunities for on-campus stations compatible with the larger system. Once a hardware vendor and operator have been selected, they can assist with siting and permitting of specific stations.

1. STATE OF THE BIKE SHARING PRACTICE

System Typologies

Bike sharing typically refers to a system in which individuals can enjoy the benefits of access to a bicycle on an as-needed basis without the burdens of private bike ownership, such as purchase and maintenance costs, storage, and parking. Self-service systems, characterized in the literature into three “generations” of increasing technological sophistication, allow users to pick up and drop off their bikes without the help of an attendant, and commonly provide multiple bike stations so that users may pick up a bicycle from one location and drop it off at any another in the system.¹ The “lending library” model is another approach under which a staff member helps the user borrow from a fleet of bikes, typically stored in a single location.

First and Second Generation Systems

“First generation” bike sharing systems are free to all users and place unlocked bicycles, painted in a single, bright color, unsystematically throughout the area.² The White Bike Plan in Amsterdam, Netherlands, began in 1965, and was followed by programs in La Rochelle, France, Cambridge, United Kingdom, and Portland, Oregon.^{3,4} Bike theft and damage quickly became problems, however, and both the Amsterdam and Cambridge systems failed. Only La Rochelle’s Vélos Jaunes system, which enjoys strong community support, continues to operate today.⁵

The “second generation” of bike sharing systems continued to employ distinctively colored and designed bikes, but also addressed the theft problem with locked bikes on designated city racks, requiring a coin deposit to unlock the bike.⁶ Throughout the 1990s, systems were launched across Europe and eventually spread to some U.S. cities. Unfortunately, the small deposits (typically \$3 to 4 USD) and anonymity of users meant that bikes were often used for long time periods or even not returned at all, resulting in a less reliable system – bikes were not available when and where users needed them.⁷

¹ P. DeMaio and L. L. C. MetroBike, “Bike-sharing: Its History, Models of Provision, and Future,” in *Velo-city 2009 Conference*. Retrieved October, vol. 13, 2009, 2009.

² Susan A. Shaheen, Stacey Guzman, and Hua Zhang, “Bikesharing in Europe, the Americas, and Asia,” *Transportation Research Record: Journal of the Transportation Research Board* 2143, no. -1 (12, 2010): 159-167.

³ Ibid.

⁴ DeMaio and MetroBike, “Bike-sharing: Its History, Models of Provision, and Future.”

⁵ Shaheen, Guzman, and Zhang, “Bikesharing in Europe, the Americas, and Asia.”

⁶ Ibid.

⁷ Ibid.

Third Generation Systems

The information technology (IT)-based, automated-kiosk bike sharing systems currently being deployed in the U.S. are known as “third generation.” These systems incorporate unmanned kiosks with electronic user interfaces that allow users to check bikes in and out with an electronic identification or payment method, such as a mobile phone, magnetic credit card, passcode, or radio-frequency identification (RFID) key. The electronic nature of the system allows docks to lock and unlock automatically, incorporates theft-deterrence via a membership with ID, credit card information, or a larger deposit, and informs operators of the status of the overall system, including the number of available docks and bicycles at each station. Furthermore, automatically collected usage data enable more sophisticated operational monitoring and program evaluation. Systems equipped with solar-powered and wireless kiosks, or on-bike GPS may also be referred to as “fourth generation,” but are not fundamentally different from third generation systems. Three major system vendors, Public Bike System Company, B-cycle, and DecoBike have provided hardware for systems currently operating in the U.S. The Collegiate Bicycle Company has also deployed a small campus system at UC Irvine, and Bike Nation has plans to deliver systems in Southern California by the end of 2012. Details of these systems’ specific hardware attributes are discussed under “Third Generation System Attributes,” below.

Bike Lending Library Systems

Another model for bike sharing provision is a “lending library” or manual check-in/out system, in which bikes are kept in a secure location and a staff member assists users with the checkout process. Users sign up for a membership online or in person, and are then eligible to borrow bikes from the library. Bicycles are typically checked out from and returned to a single location, and are often made available for longer time periods than under a third generation system.

Examples

Bruin Bikes, a lending system at UCLA, provides a bike, helmet, U-lock, and lights to students for \$45 per academic quarter. The student picks up the bike at the beginning of the quarter and then is responsible for using and parking it securely throughout the quarter. The program also makes electric bikes available under a similar model.⁸

The Santa Monica Bike Center, in addition to providing conventional hourly or daily bike rentals, has two programs for bike sharing with local employees. The Bikes@Work program allows users to check out bikes from the center for up to 90 minutes at a time on weekdays after paying a \$45 per year membership fee.⁹ Under this program, the user must check out and return the bike at the center’s single location within the 90-minute period. The center also lends out older model bikes that are no longer part of the normal rental fleet to area employers for direct use by their employees. The employer pays \$45 per year per bike, picks up the bike(s), and stores them at the employment site. The employer is also responsible for providing helmets, locks, lights, and other equipment, as needed. This program might be a more convenient alternative than walking from the workplace to the center to check out a bike. Additionally,

⁸ <http://www.recreation.ucla.edu/insidepage.aspx?uid=f960c0ee-80b8-4ff2-850e-d88265bbb65e>

⁹ <http://bikeandpark.com/city/santa-monica/ride-for-fun>

employees may save on the membership fee by sharing a few bikes within the workplace, rather than buying a separate \$45 membership for each employee.

Pros and Cons

There are several advantages to manual, lending-library systems over third generation systems. Depending on the availability of a secure storage location, they are likely less capital-intensive to start than third generation systems with a comparable number of bikes. There are also fewer technical and logistical barriers to implementation; concerns about permitting, siting, and installing multiple kiosks do not apply, and the system can use widely-available, standard bicycles that can be acquired and potentially repaired at lower cost than the proprietary bikes needed for third generation systems. Requiring users to return all bikes to a single location also reduces the need for costly redistribution of bikes to maintain system balance. Finally, a lending library approach allows for a more flexible fleet. Bicycles need not all be identical, so the library can offer bikes to meet various needs, such as cargo bikes, tricycles, elliptical bikes, or even electric bikes.

Lending library systems also suffer some drawbacks. Each bicycle will likely be used less frequently and by fewer people than it would under a third generation system. Bikes are assigned to a single user for multiple hours, or even days, weeks, or months, so the rate of turnover is lower than in a third generation system priced to encourage quick trips. Bikes must typically also be returned to a single location, limiting the area served by the system and decreasing public visibility; establishing multiple locations would require additional staff and introduce the possibility of a need for costly rebalancing. Finally, lending libraries must be staffed during operating hours, making 24-hour operations impractical and costly.

Third Generation System Attributes

System Hardware

Generally, third generation bike stations comprise two main parts: the automatic docks that lock the bikes in place and the electronic payment kiosk. Typically composed of two to four smaller modules, docks are six to eight feet wide and require an additional four to six feet of adjacent clearance for docking and removing bikes from docks. Usually, docks are oriented in a single line, but individual modules can also be configured in rows to accommodate bike loading from more than one side. Electronic payment kiosks may be wired or solar powered. Some stations may also include additional elements such as wireless communications features and panels or signage for maps, advertising, sponsor recognition, and so forth.

Bicycles incorporated into third generation bike sharing systems share some common attributes. For better visibility, shared bikes generally incorporate unusual or distinctive designs, often with bright, uniform color schemes. Many systems favor design elements that provide users convenience or comfort: a step-through frame, which eliminates the top tube of traditional bicycles; enclosed chains, cables, and wires, which protect riders from dirt or grease and protect components; front and rear fenders, which prevent mud and dirt from splashing upward onto the rider; a wide, padded saddle; and an adjustable, non-removable seat post with simple height markings that allow users to quickly find their desired seat height when checking out a new bike. Additionally, safety features typically include hand brakes and front and rear lights activated by pedaling. The bikes are heavy and durable, limiting top speeds. They also feature few or single speeds, and gearing is light to make acceleration and hills easier, but also limiting top speeds. Front racks or baskets and kickstands provide additional convenience.

Docking of bikes is generally uniform across hardware providers. Users can check out bikes with a credit card and access code, a membership card, or a key fob. Short-term users typically pay for a membership with a credit card at the kiosk, and receive an unlocking access code that releases a bike. At subsequent checkouts during the same short-term rental period, the original credit card can be inserted as identification to receive a new code without any additional charge. Long-term users may purchase memberships online and receive by mail a membership card or key fob that can be swiped at the station to release a bike. Upon reinserting the bicycle's locking tab into the dock, the dock locks automatically, and the dock simultaneously records the check-in and emits a light and/or audible signal to confirm the bike is successfully docked.

Currently, the hardware provided by various vendors is not interoperable; the proprietary locking mechanisms, docks, and kiosks from one system will not work with those provided by another vendor. The major vendors provide similar bikes and stations; vendor-specific hardware variations for each vendor are described below.

Public Bike System Company



Source: Flickr user DDOTDC



Source: James D. Schwartz

Currently the manufacturer of equipment for bicycle sharing programs in 10 cities worldwide, the Public Bike System Company (PBSC) uses 3-speed bicycles with chains partially enclosed, and provides a rack with bungee cord rather than a basket.

B-cycle





Source: <http://denver.bcycle.com>

B-cycle has bicycles and docks in 12 cities across the United States. Its bikes have three speeds, a partially exposed chain, and include a cable lock for short-term locking when not docked at B-cycle stations.

DecoBike





Source: <http://www.decobike.com>

Like those of other systems, DecoBike bikes exhibit partially exposed chains. Bicycles are generally single-speed, and the system's bar-like docks latch to the bikes on the frame above the front tire.

Bike Nation



Source: <http://www.bikenationusa.com/>

Bike Nation bicycles exhibit airless tires, which provide more durability, require less maintenance, and reduce the chance of breakdown while in use—at the expense of a heavier, less comfortable ride. They also have a chainless, shaft-driven drive train, which creates less need for ongoing adjustments and maintenance as the bicycle ages. Just as enclosed chain-based mechanisms can, the fully enclosed drive train protects users from elements such as dirt and grease. The disadvantages of a chainless system are that such systems require more complex—and thus expensive—repairs, and they have slightly less pedaling efficiency than chain-driven systems.

Collegiate Bicycle Company



Source: <http://www.parking.uci.edu>

Collegiate Bicycle Company provides equipment for ZotWheels, the bike sharing service at the University of California, Irvine. The system uses single-speed bikes with modified baskets that act as a docking mechanism by which the bikes attach to the single-bar dock. Bike chains are exposed.

System Configuration

In the U.S., systems range widely in size, from as small as two stations and fourteen bikes (Spartanburg B-cycle) to as large as 150 stations and 1,200 bikes (Capital Bikeshare). Even larger systems are in the planning stage for Chicago (300 stations and 3,000 bikes), Los Angeles (400 stations and 4,000 bikes), and New York (600 stations and 10,000 bikes). Existing systems typically have a mostly contiguous network of stations with short distances among the stations. In U.S. systems, stations are typically located at densities of 3.5 to 4.5 stations per square mile.

Across the United States, phasing strategies for unrolling successful bike sharing systems have differed, although they generally involve grouping of stations in some capacity. In Washington D.C., Capital Bikeshare began by introducing bike stations in the large core of the central city and a smaller, nearby cluster in Arlington, Virginia. As the system has gained ridership, it has been gradually expanded. Denver, Colorado's B-cycle system has grown incrementally, starting in a few locations and expanding as organizers raise additional funds and establish new partners. Elsewhere, the San Francisco Bay Area's bike sharing program is establishing a core of 50 stations in the City of San Francisco, with additional, smaller clusters of 10 to 12 stations surrounding several Caltrain commuter rail stations to the south.

A number of factors can play a role in determining the success and growth of a bike sharing system, including: stakeholder and partner support; local involvement; existing bicycle, transit, and walking mode share; cycling infrastructure; topography; and bicycle culture.

Program Management

System Organization

Bike sharing systems exist under various management schemes, as shown in **Table 1**. In some cases, such as Washington, D.C.'s Capital Bikeshare, stations and bikes are publicly owned but operate contractually with a private entity. In other cases, a non-profit both owns and operates the system. For example, in Denver, Denver Bike Sharing, a non-profit corporation, owns and operates the system, while B-cycle LLC, a privately held company, provides the equipment and stations. A similar arrangement exists with Minneapolis, Minnesota's Nice Ride Minnesota program and PBSC. Wholly private ownership and operations agreements exist as well: New York City's Citi Bike, for example, incorporates bikes and equipment from PBSC with operations by NYC Bike Share, LLC and funding from Citibank and MasterCard. There are also opportunities for partnerships with local bike shops and related businesses: in 2011, B-cycle partnered with Mellow Johnny's, a local bike shop in Austin, Texas to host a demonstration of B-cycle's bike sharing hardware, and the shop has expressed interest in supporting a bike sharing system there.¹⁰

¹⁰ http://www.austin360.com/blogs/content/shared-gen/blogs/austin/fitcity/entries/2011/07/13/bcycle_demo_planned_at_mellow.html

TABLE 1 – OPERATIONAL MODELS

		<i>Ownership</i>		
		Public	Private	Non-Profit
<i>Operation</i>	Public			
	Private	Capital Bikeshare (Washington, DC)	Citi Bike (New York, NY)	
	Non-Profit			Denver B-Cycle (Denver, CO) / Nice Ride (Minneapolis, MN)

Costs

While the size and structure of bicycle sharing systems vary, costs per bicycle station exhibit some degree of regularity. Interviews with bike share operators in late 2011 and early 2012 indicate capital costs ranging from \$35,000 to \$40,000 for a station with 11 docks and six bikes to \$53,000 to \$58,000 for a station with 19 docks and 10 bikes.¹¹ Other estimates of bike station costs, including bikes, range from \$44,000 to \$50,000.¹² Annual operating cost estimates range from \$12,000 to \$28,000 per station or \$1,800 to \$2,200 per bike, including normal repairs and maintenance, customer service, and system rebalancing.^{13,14}

Capital Investment and Funding

Bike sharing systems require capital investment, or initial funding, for equipment purchase and installation. Funding for capital costs comes from a number of sources: federal, state and local public funding; private grants; and advertising and sponsorship sources. To date, most systems have utilized a combination of both public and private funding to cover capital costs.¹⁵

At the federal level, bike sharing systems have received funding through a number of programs, including the American Recovery and Reinvestment Act, the Energy Efficiency and Conservation Block Grant

¹¹ Eldridge, RJ and Mauricio Hernandez. "Getting Started with Bike Share." Presented at PBIC Liveable Communities Webinar Series *Bike Sharing in the United States: State of the Practice and Guide to Implementation*. 26 April 2012.

¹² Rixey, Rodney A. "Case Studies in Bike Sharing: Lessons for Santa Monica." 2012.

¹³ Eldridge, RJ and Mauricio Hernandez. "Getting Started with Bike Share." Presented at PBIC Liveable Communities Webinar Series *Bike Sharing in the United States: State of the Practice and Guide to Implementation*. 26 April 2012.

¹⁴ Rixey, Rodney A. "Case Studies in Bike Sharing: Lessons for Santa Monica." 2012.

¹⁵ Alta Planning + Design. "City of Providence Bike Share Feasibility Study Final Report."

Program, the Federal Highway Administration (FHWA), the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, the Federal Transit Administration (FTA)'s Bus and Bus Facilities Livability Initiative Program, and others. Such funding can cover the entirety of a system's capital costs, as in the case of CMAQ funding for Washington D.C.'s Capital Bikeshare, or only a small part, as in the case of Denver B-cycle, which received only 16% of its \$1.5 million capital funding from federal sources.¹⁶

There are also funding opportunities at the state and local level. For example, the Los Angeles County Metropolitan Transportation Authority has designated funds for bike sharing projects through its Call for Projects process.

Additionally, private grants and sponsorships can provide needed funding. Eighty-four percent of Denver B-cycle's startup funding came from sponsors, including Kaiser Permanente, which was designated the system's "presenting sponsor." Nice Ride Minnesota received roughly a third of its \$2.75 million startup costs from Blue Cross Blue Shield of Minnesota's tobacco settlement fund.¹⁷

System Users

Although short-term users tend to comprise the largest number of memberships, annual members tend to make most of the system's trips. In the Capital Bikeshare system, in the first year (2010-2011), 17,000 annual members (15% of total users) made 75% of all trips; 96,000 short-term users (85% of total users) made 25% of all trips. At Denver B-Cycle in the second season (2011), 2,700 annual members (6% of total users) made 60% of all trips; 42,300 short-term users (94% of total users) made 40% of all trips.

Membership and Use Fee Revenues

Once a system is implemented, operating revenues contribute substantially to the total cost of operation. Typically, these revenues come from daily, weekly, monthly, or annual membership fees and per-use charges assessed to system users. In the case of Capital Bikeshare, revenues totaling \$2.47 million from September 2010 to April 2012 covered almost all of the system's \$2.54 million operating expenses.¹⁸ In 2010, Denver Bike Sharing reported revenues of \$390,000 from its membership and use fees.¹⁹ Long-term members typically make the majority of trips, while short-term members pay the majority of usage and membership fees. For example, in the Denver Bikeshare's 2011 season, annual members constituted 34% of membership fees, 9.6% of usage fees, and made 60% of trips, while 24-hour members made up 65% of membership fees, 87% of usage fees, and made only 39% of trips.²⁰

¹⁶ Alta Planning + Design. "City of Providence Bike Share Feasibility Study Final Report."

¹⁷ Alta Planning + Design. "City of Providence Bike Share Feasibility Study Final Report."

¹⁸ <http://www.usnews.com/news/articles/2012/04/17/bike-sharing-systems-arent-trying-to-peddle-for-profit>

¹⁹ http://www.denverbikesharing.org/files/DBS_2010_Annual_Report.pdf

²⁰ Burnap, Parry. "Denver Bike Sharing." *NACTO U.S. Bike Sharing Workshop*. 22 March 2012.

Title Sponsor / Station Sponsorship

Currently, most bike systems' operating revenues do not fully cover costs of operations; thus, additional funding from public agencies, private grants, or advertising and sponsorships are usually required to sustain operations. New York City's Citi Bike, for example, currently seeks to be the first fully privately funded bike sharing system in the country. Together with user revenue, sponsorship funding from Citibank (\$41 million) and MasterCard (\$6.5 million) is projected to cover both capital and operations costs; any additional profit will be split between NYC Bike Share and the City.²¹ In its 2010 operating season, NiceRide collected about \$230,000 in station sponsorships, dedicating one side of the map panel to thank a station sponsor who contributed \$10,000 or more.²² Denver B-cycle received 26% of its 2010 revenue and 40% of its 2011 revenue from sponsorships.²³

Bike Redistribution

Because of directional peaking in demand for bike sharing bikes, some stations become full or empty during peak operating periods. For example, during morning rush hour, stations near large employment centers may become full, meaning there are no docks for users to check in additional bikes. When this happens, system operators can rebalance the system by loading extra bikes into a truck or step van and delivering them to other empty or nearly-empty stations. Bike redistribution is a costly part of bike share system operation; in the case of Capital Bikeshare, nearly half of the operating costs in the first year were due to the need to redistribute bicycles among the stations.²⁴

Security, Safety, and Liability

Although European systems such as Paris' Vélib have experienced difficulties with vandalism and theft, U.S. systems have had very few problems, as shown in **Table 2**. In their first season of operation, Capital Bikeshare, Nice Ride, and Denver B-cycle collectively lost only four bikes.²⁵ Requiring members to register and place a deposit or credit card hold before renting a bike provides accountability and a disincentive to steal or lose the bike. The mechanism that locks the bike to the dock is also secure; none of the lost or stolen bikes went missing while docked at the station. A cable lock built into the bike, as in the case of some B-cycle bikes, might help to prevent theft while the bike is not docked at the station, but is not as secure as the station dock.

Safety concerns have also been limited. The experience of the Capital Bikeshare system indicates that bikesharing users have fewer crashes—nearly half as many in the first season of operation—than the

²¹ <http://a841-tfpweb.nyc.gov/bikeshare/faq/#how-much-is-the-sponsorship-worth-and-how-long-is-it-for>

²² Rixey, Rodney A. "Case Studies in Bike Sharing: Lessons for Santa Monica." 2012.

²³ Burnap, Parry. "Denver Bike Sharing." *NACTO U.S. Bike Sharing Workshop*. 22 March 2012.

²⁴ Holben, Chris, District Department of Transportation, Washington, D.C. Personal interview. 24 January 2011.

²⁵ Rixey, Rodney A. "Case Studies in Bike Sharing: Lessons for Santa Monica." 2012.

general population. None of the Capital Bikeshare crashes resulted in serious injuries, whereas some other bike trips resulted in serious injuries or fatalities.²⁶

Nevertheless, bike sharing systems take steps to improve safety and limit liability. Members typically accept a liability waiver and safety warning when registering for the system. Regular system maintenance and the introduction of safe bicycling education programs can contribute to a system's overall safety record. Insurance is also available to mitigate risk.

²⁶ <http://www.streetsblog.org/2011/06/16/from-london-to-d-c-bike-sharing-is-safer-than-riding-your-own-bike/>

TABLE 2 – BIKE SHARING LOSS AND DAMAGE

(first season)

System	Bikes in System	Stolen/Lost	%	Vandalized/ Damaged	%
CaBi	1,110	2	0.18%	0	0.00%
BIXI	3,000	12	0.40%	75	2.50%
Nice Ride	700	1	0.14%	3	0.43%
Denver B-Cycle	500	1	0.20%	1	0.20%
Vélib¹	20,600	4,000	19.42%	8,000	38.83%

[1] Velib reported 8,000 lost/stolen and 16,000 vandalized/damaged bikes in its first two years.

Seasonality

Bike sharing systems operate in cities of all climates all over the world. While operations are feasible in moderate climates year round, in some cities cold weather conditions can necessitate the removal of bike stations at certain times of the year. As such, bike sharing stations are often designed to be non-permanent, which allows them to be removed from the street when cold weather and snow plowing is a concern (e.g., Nice Ride Minnesota). Capital Bikeshare operates year-round, however, and closes only in the case of severe weather – kiosks are set to allow bike returns but not to check out new bikes.

Time of Day

Bike sharing systems can operate at all times or only certain times of the day as necessitated by budget, community concerns, weather, and other factors. For example, Washington D.C.’s Bikeshare, Nice Ride Minnesota, and Denver’s B-cycle are available for use 24 hours per day, seven days per week. Elsewhere, systems operate from 5:00 AM to 10:00 PM, 11:00 PM, or midnight (as in San Antonio, Denver, and Boulder) or other limited hours.

Customer Service

Typically, the vendor or operator provides a customer service call center and, in many bike sharing systems, the operator handles membership as well as other customer service functions. For example, Denver B-cycle, operated by Denver Bike Sharing, maintains regular customer service hours of 9:00 AM to 5:00 PM weekdays, while Capital Bikeshare’s operator provides a 24-hour, 7-day call center in three languages.

Maintenance

Although damage and vandalism to bikes is generally rare in existing American bike sharing programs, normal use of bicycles requires bike sharing operators to maintain their system. Many bicycle sharing systems have a central maintenance facility for major repairs; redistribution vehicles can be used to bring bikes to such facilities. Systems also employ field “checkers” to inspect bikes regularly and make minor repairs and adjustments at stations themselves. To address user-determined maintenance issues, many

bike stations have kiosks with built-in buttons that notify a need for maintenance at a given kiosk or dock when pressed. Bikesharing bikes are purported to have a useful life of five years, but since most systems have been operating for two years or fewer, this is an estimate.

Bikesharing systems operate in a variety of coastal, humid, or salty conditions including Miami, FL (DecoBike), Boston, MA (Hubway), and Minneapolis, MN (Nice Ride Minnesota). DecoBike has reported that the salty, marine environment of Miami does have a significant impact on the bikeshare fleet. DecoBike steam cleans its bicycles regularly to free them of crusted salt and beach sand, and selects particular component materials, such as aluminum, composites, or stainless steel, to address the effects of a salty, humid operating environment. After two years of operations, Deco Bike has not had any issues with its aluminum frames.

Monitoring and Performance Evaluation

With advances in technology, monitoring and performance evaluation is now a feature of many bike sharing systems. As noted, third generation systems can both collect and make use of a wide variety of data: total number of trips, total number of bikes used, and membership counts, among others. Capital Bikeshare offers such data in a continuous and open manner online, and Nice Ride Minnesota uses the winter months—when its system is not in service—to analyze data and adjust future operations accordingly. Denver B-cycle releases its system data to the public in its annual report. Such data are not necessarily available in bike lending library systems, which require a manual, labor-intensive data collection effort or a separate system entirely to obtain such data.

As technology continues to improve, on-bike GPS systems are becoming possible. These systems introduce the ability to track or recover lost or stolen bikes and the possibilities of real-time data collection on speed and route selection. Of course, with additional data collection capabilities come additional privacy concerns that must be addressed and incorporated into operational practice.

System Implementation

Typically, bike sharing systems undergo a pilot test prior to the official launch of the full system to ensure proper functioning of the bikes and kiosks, and can be arranged with the system vendor as part of the Request for Proposal Process. Other pre-launch considerations include determining an appropriate fee structure, educating the public, and marketing.

Fee Structures

Currently, user payment procedures frequently involve two parts: membership fees and usage fees, as shown in **Table 3**. Membership fees differ, but can be charged on a short-term (daily or weekly) or long-term (monthly or yearly basis), and users can pay for their membership either by mail, web, or at a station kiosk. After users become members, they can typically check out a bike for free for the first 30 to 60 minutes with an additional fee charged every 30 minutes thereafter.

Since membership and usage fees usually require a credit card transaction, some systems have sought ways to provide services to those without credit cards or bank accounts. For instance, Capital Bikeshare offers Bank on DC, a program that helps low-income users without bank accounts obtain a debit card and access the system.

TABLE 3 – TYPICAL MEMBERSHIP AND USAGE FEES

		<i>Program</i>		
		Capital Bikeshare (Washington, DC)	Denver B-Cycle (Denver, CO)	Nice Ride (Minneapolis, MN)
<i>Fees</i>	Membership Fees	Annual: \$75 Annual w/ Monthly Installments: \$84 30 Day: \$25 3 Day: \$15 24 Hour: \$7	Annual: \$80 30 Day: \$30 7 Day: \$20 24 Hour: \$8	Annual: \$65 Annual (Student): \$55 30 Day: \$30 24 Hour: \$6
	Usage Charges	First 30 minutes free; additional minutes ≤\$2 per 30 minutes based on membership and total usage time	First 30 minutes free; 30-60 minutes \$1; each additional 30 minutes \$4	First 30 minutes free; 30-60 minutes \$1.50; 60-90 minutes \$4.50; each additional half hour \$6

Source: capitalbikeshare.com; denver.bcycle.com; niceridemn.org

Education

Because bike sharing is a relatively new concept, bike sharing system implementation typically incorporates an education component to raise awareness and understanding of the system’s capabilities and availability. Education on proper system use, user responsibilities, and safe bicycling is also important. A number of elements can make up such a component. Clear signage facilitates the system’s use for new and veteran users alike; a web presence can provide answers to vital questions and describe the system to those unaware of its capabilities; community outreach, social media, and word of mouth also are effective.

Marketing

Marketing is also a part of many bike sharing system implementation plans. Currently, bike sharing’s novelty helps it attract free press; Denver Bike Sharing’s 2010 annual report, for instance, declared that over 775 news stories ran on the system in the previous year.²⁷ Social media sites such as Facebook and Twitter allow new possibilities for user interaction, and deals provided through social discount sites such

²⁷ http://www.denverbikesharing.org/files/DBS_2010_Annual_Report.pdf

as Groupon and Living Social have been successful. In Washington D.C., Capital Bikeshare has attracted 8,000 new members via its social discount site promotions.²⁸

Promotions and contests are often part of existing systems' marketing efforts. Capital Bikeshare, for instance, held a "Winter Weather Warrior Contest," which awarded its most frequent user during winter months with a free membership extension, additional memberships for friends, and gift card prizes. Another prize was awarded to those who used the bicycle system every day during the same period. In Denver, "Tour de B-cycle" provides those who visit all local B-cycle stations in one day with recognition and prizes.

Other marketing opportunities exist as well, including cross-promotions with sponsors, user experience video contests, and joint promotions with other modes of transit and respective websites.

²⁸ Weber, Erik. "GGW debates: Is CaBi getting a good deal on Living Social?" <http://greatergreaterwashington.org/post/10024/ggw-debates-is-cabi-getting-a-good-deal-on-living-social/>. 12 April 2011.

2. DEMAND EVALUATION

The demand evaluation process involves three stages that progress from a broad, countywide analysis, to a detailed ridership forecast at the station level. First, the Countywide Demand Screening uses broad measures of demographic and built environment characteristics to determine relative bikesharing suitability across all of Monterey County. Next, the Detailed Ridership Suitability Analysis focuses on the City of Monterey/Pacific Grove and the City of Salinas, the highest-suitability areas from the countywide screening, to provide a finer-grained view of appropriate areas for bikesharing. Then, specific station locations are selected for each area. Finally, the Bikesharing Ridership Regression Model is applied to each station location to provide a ridership estimate that accounts for the attributes of each individual station as well as the network of stations as a whole.

Countywide Demand Screening

Methodology

The countywide demand screening process combines five variables selected from the EPA's Smart Location Database (SLD) into a bikesharing Suitability Screening Score that indicates the relative suitability for bike sharing across the entire County of Monterey. The variables selected address housing, population, and employment density, land use diversity, and urban design. High population and intersection density (a measure of urban design) are correlated with bikesharing ridership in the academic literature, and housing density, employment density, and land use diversity intuitively reflect a built environment suitable for shorter trips that could be served by bike sharing.^{29,30} The "D" variables shown in **Table 4** were selected from the EPA's SLD. The variables are available at the census block group level, dividing Monterey County into over 200 block groups.

These variables were then converted to a 50-meter raster grid. Each variable was also reclassified in equal intervals on a scale of 1 to 20. In the case of population density, two outliers were excluded from the reclassification range and included in the highest category (20 points). The five layers were then summed to create a single composite Suitability Screening Score on a theoretical scale of 5 to 100 points. Since no census block group scored in the highest category for all variables, the range of actual scores was 5 to 52. These composite scores were divided into five groups, ranging from "least suitable" (5 to 8 points) to "most suitable" (34 to 52 points) and plotted on a map of Monterey County to provide a visual indication of relative bikesharing suitability in the County (see **Figure 1**).

²⁹ Buck, Darren and Ralph Buehler. "Bike Lanes and Other Determinants of Capital Bikeshare Trips." *TRB 2012 Annual Meeting*. 15 November 2011.

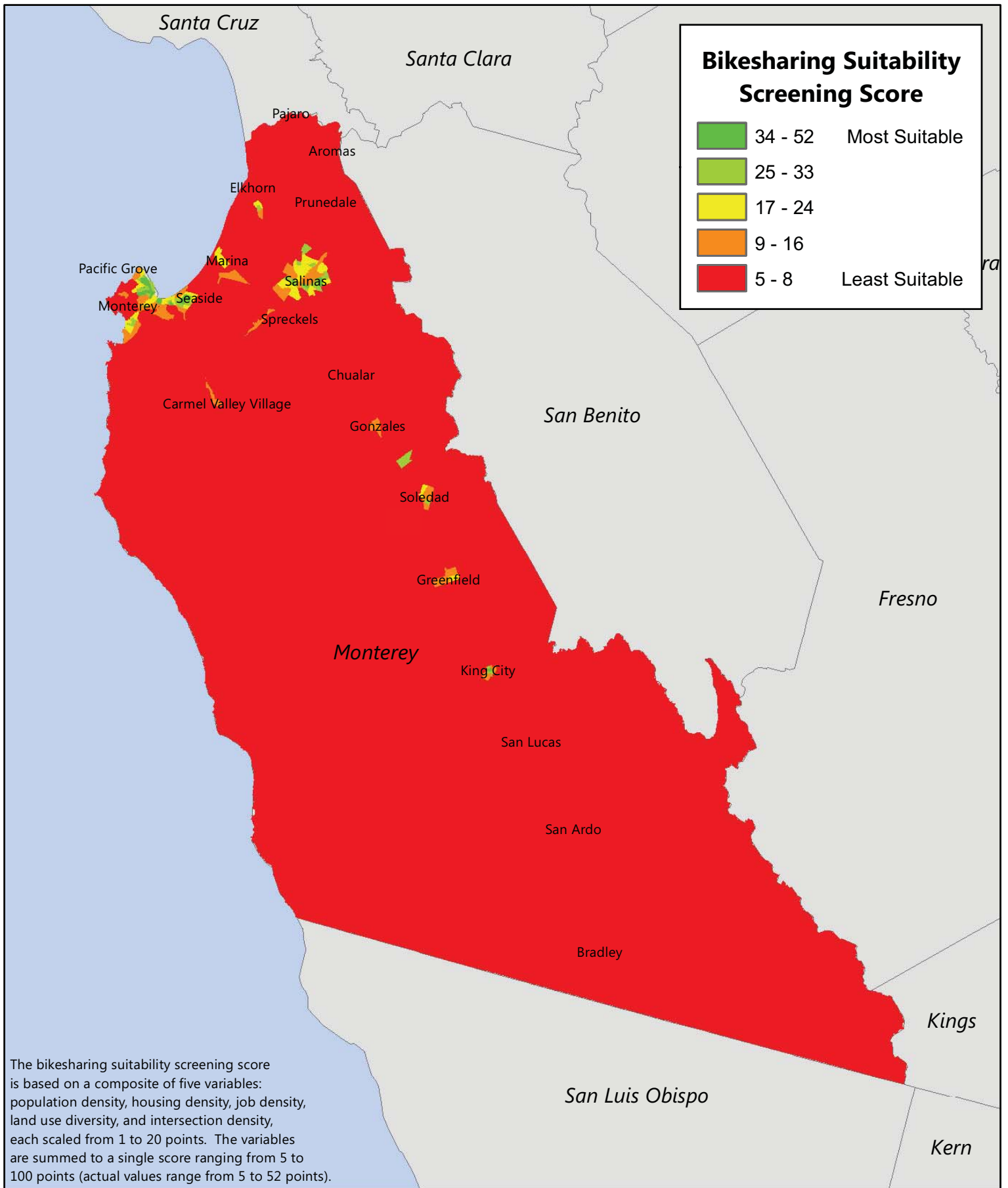
³⁰ Daddio, David William. "Maximizing Bicycle Sharing: An Empirical Analysis of Capital Bikeshare Usage." 2012.

TABLE 4 – “D” VARIABLES

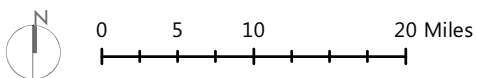
Factor	Metric	Source Data
Density	D1 _a : Housing density (units per unprotected acre) in 2010	Housing units: Census 2010
Density	D1 _b : Population density (people per unprotected acre) in 2010	Population: Census 2010
Density	D1 _c : Job density (jobs per unprotected acre)	Jobs: Census LED 2008
Land Use Diversity	D2: Entropy index of commercial/industrial/institutional, retail, recreational, and residential within a block group	Jobs and housing units: ESRI Business Demographics 2009
Urban Design	D3: Intersections per sq. mile (weighted by intersection type)	US Census TIGER/Line Shapefile 2009

Source: “EPA’s Smart Location Database: A National Dataset for Characterizing Location Sustainability and Urban Form.”³¹

³¹ Ramsey, Kevin and John Thomas. “EPA’s Smart Location Database: A National Dataset for Characterizing Location Sustainability and Urban Form.” *U.S. Environmental Protection Agency Office of Sustainable Communities*. 6 January 2012.



Source: 2011 TIGER/Line; 2010 EPA Smart Location Database



Selection Criteria

A desirable service area for bike sharing will contain not only areas with the highest Suitability Screening Score, but also a large, relatively contiguous, high-scoring area that can accommodate a network of bike sharing stations with a variety of attractive destinations. A contiguous service area also reduces the cost of servicing bikes and stations and of redistributing bicycles to ensure the system remains in balance. The area surrounding Pacific Grove, the City of Monterey, and Seaside offers a large cluster of high-suitability areas that could be accessible by bike. To a lesser degree, Salinas also offers a cluster of moderate- to high-suitability; local interest in an "Open Streets" or "Ciclovía" initiative that would temporarily close streets to automobile traffic in favor of walking and biking suggests a latent interest in additional cycling activity in Salinas.³² These areas will be the targets for more detailed suitability analysis and ridership forecasting.

Other areas in the County do not currently appear to support a comprehensive bikesharing program, but could be part of future expansion of a Monterey bikesharing system. Activity centers near Sand City's Edgewater Shopping Center and downtown Marina currently attract relatively large numbers of transit riders who could benefit from the additional last-mile connectivity provided by a bikesharing system; however, existing land uses and densities do not suggest a viable bikesharing service area. The area around Edgewater Shopping Center is characterized primarily by "big box" retail establishments (e.g., Target, Ross, Sports Authority, etc.) with large surface parking lots, uses not traditionally associated with bicycling or bikesharing trips. Marina also lacks sufficient density of residential units, retail locations, leisure destinations, or other attractors to support a comprehensive network of bikesharing stations. Edgewater Shopping Center and Marina are both adjacent to the Monterey Peninsula Recreational Trail, and many Salinas streets include bike lanes or bike routes. Future land use changes, such as more dense housing and mixed-use commercial and residential areas, could justify expanding the bikesharing system to these areas, and additional bike lane and trail connectivity would further support bikesharing ridership. Bikesharing stations installed before these land use and density changes have taken place could still increase the visibility of bicycling and help to brand these communities as bike-friendly, but ridership would likely be lower than in the better-suited Monterey/Pacific Grove area.

Still other Monterey County communities are less suited to bikesharing. Although King City contains a small parcel with one of the higher suitability scores, it is surrounded by areas of low suitability, and does not appear large enough to provide a network of attractive bike sharing station locations. The green area between Soledad and Gonzales is excluded from more detailed study because it contains the Salinas Valley State Prison, which, while a dense employment center, is purposefully isolated from other destinations and inmates are not allowed privileges that provide mobility like bikeshare.

³² http://www.salinasneighborhoods.org/wp-content/uploads/2012/07/Ciclovía_Proposal-1.pdf

Detailed Ridership Suitability Analysis

Methodology

The detailed ridership suitability analysis applies a modified version of Maurer’s (2012) ridership study of the Nice Ride MN system³³ to the detailed analysis area around Pacific Grove, the City of Monterey, and Seaside, and, separately, to the analysis area around the City of Salinas, as identified in the countywide demand screening process. The Nice Ride analysis tested the relationships between a variety of socioeconomic, commute, and built environment characteristics and the number of station-level monthly rentals in August 2010. The analysis identified several statistically significant variables associated with high ridership levels, including non-white population³⁴, income, alternative commuters, high-income jobs, and total jobs, among others. This analysis adds population density and slope of terrain, applying the variables shown in **Table 5** to develop a suitability score.

For the detailed ridership suitability analysis, each of the variables listed above was rasterized (converted to a grid) and reclassified into a scale of ten categories, with ten being the most suitable for bicycle sharing ridership. The variables were reclassified based on natural breaks in the data. Variables with a “positive” direction in Table 5 were assigned higher scores for higher values of the variable, while those with a negative direction received lower scores for higher values. For example, Census blocks with the highest concentration of high-income jobs were assigned a 10 for that variable, while grid cells with the steepest slopes received a score of 1 for that variable. The raster layers were then summed and multiplied by a scaling factor for slope to eliminate areas with steep terrain, regardless of other measures of suitability, to create a single composite score that indicates the relative suitability of particular grid cell for bike sharing ridership. Finally, these scores were divided into five groups, ranging from “least suitable” to “most suitable” and plotted in **Figures 2 and 3**. Please note that these scores are developed independently for each analysis area and cannot be directly compared between the City of Monterey / Pacific Grove and the City of Salinas.

³³ Maurer, Lindsay Kathryn. “Feasibility Study for a Bicycle Sharing Program in Sacramento, California.” TRB 2012 Annual Meeting. 15 November 2011.

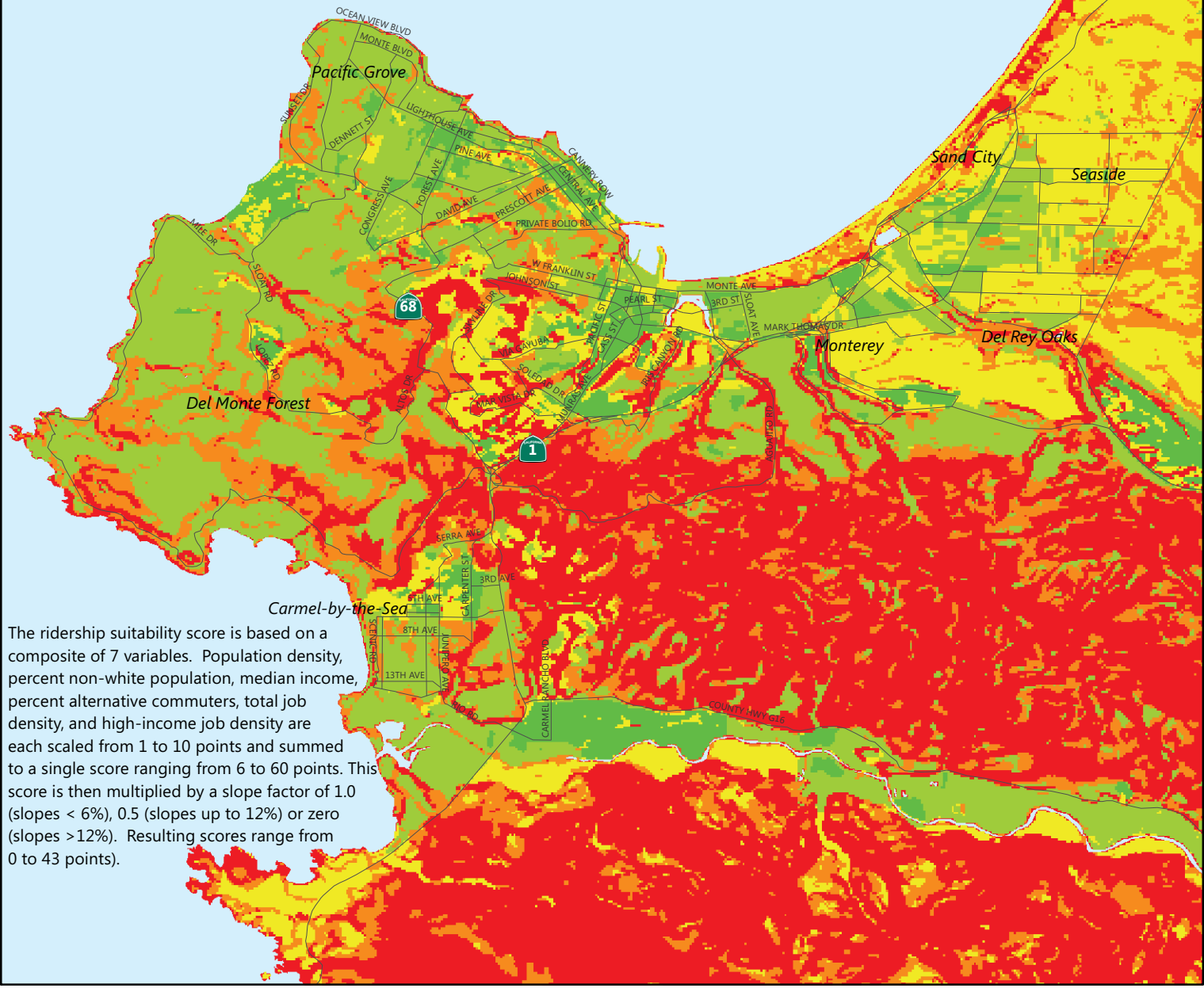
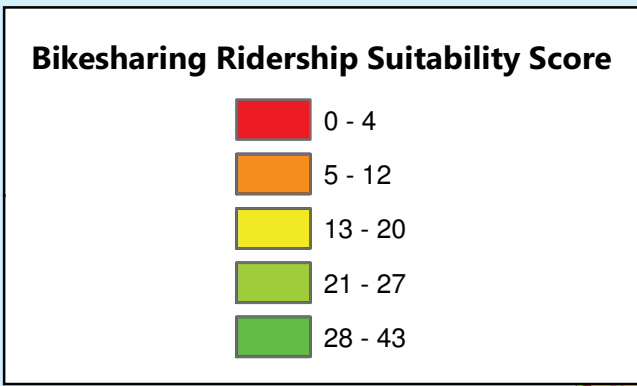
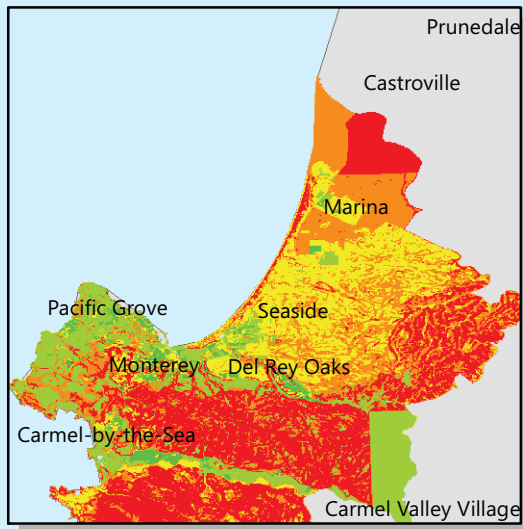
³⁴ Bicycling in general and bikesharing in particular have traditionally struggled to attract lower-income individuals and people of color. This statistical reality is documented in the research findings underlying the detailed ridership suitability analysis. As explained in greater detail below in this report, this means continued focused efforts are required to attract and retain racially diverse bikeshare program participants.

TABLE 5 – RIDERSHIP SUITABILITY ANALYSIS

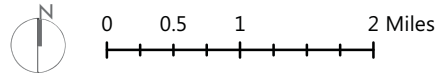
Factor	Metric	Direction	Scale	Source Data for TAMC
Non-white population	Proportion of population of a race other than "white alone"	Negative	2010 Census Tract	U.S. Census Bureau, 2006-2010 American Community Survey
Income	Median household income	Positive	2010 Census Tract	U.S. Census Bureau, 2006-2010 American Community Survey
Alternative commuters	Proportion of workers who commute by bicycle, walking, or public transportation	Positive	2010 Census Tract	U.S. Census Bureau, 2006-2010 American Community Survey
High-income jobs	Workers per acre (by place of employment) earning more than \$3,333 per month	Positive	2010 Census Block	U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2010
Jobs	Total "appropriate" jobs per acre*	Positive**	2010 Census Block	U.S. Census Bureau, Longitudinal Employer-Household Dynamics, 2010
Population	Total population per acre	Positive	2012 Census Block	US Census TIGER/Line Shapefile 2010 with 2010 Census Data
Slope	Change in elevation across grid cell	Negative	N/A	AMBAG LiDAR Data

*For the TAMC detailed suitability analysis, "appropriate jobs" are defined as LEHD variables CNS05 – CNS20. This includes all jobs except those in the categories "Agriculture, Forestry, Fishing and Hunting," "Mining, Quarrying, and Oil and Gas Extraction," "Utilities," and "Construction."

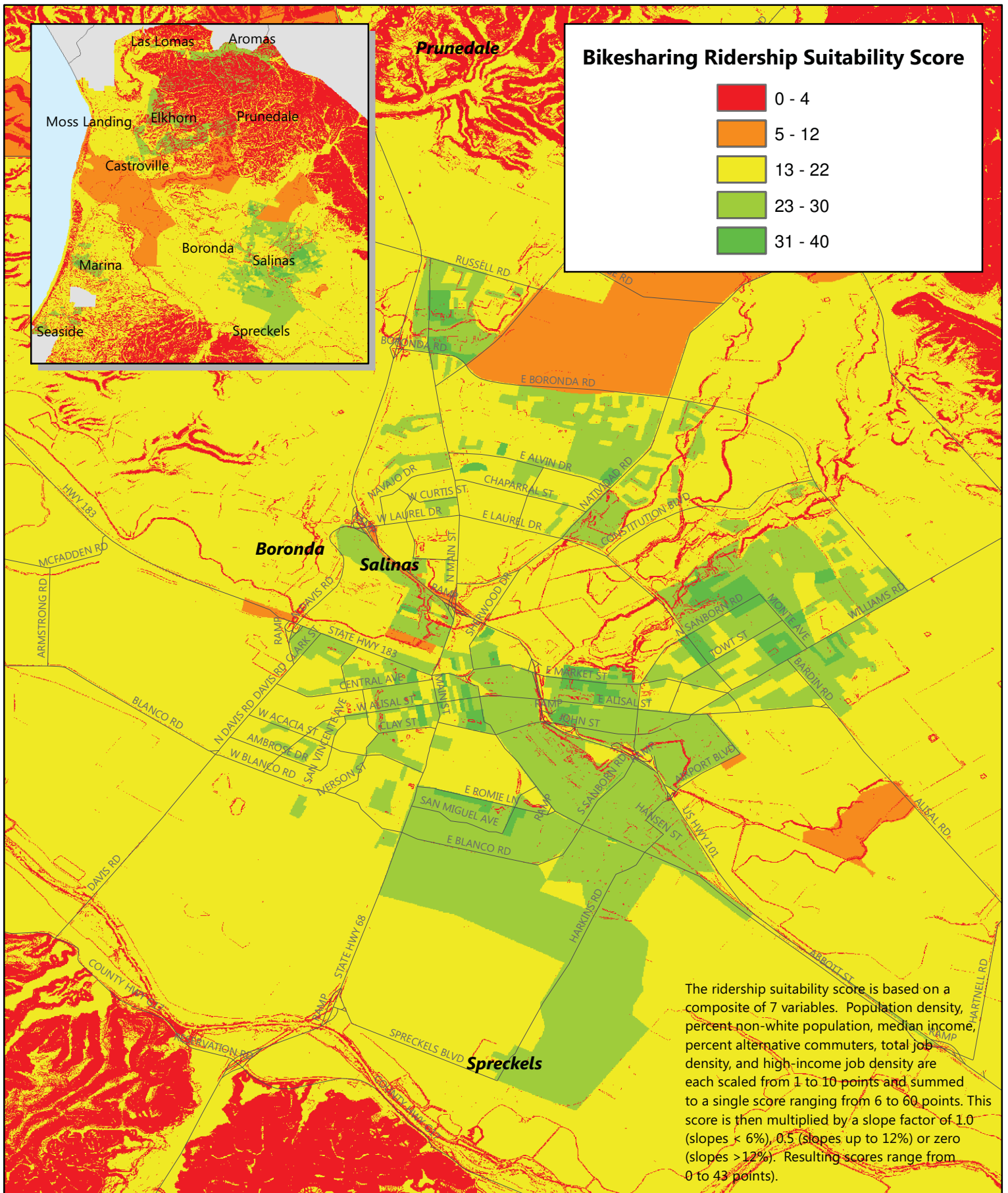
**Although Maurer finds a negative correlation between total job density and ridership, this analysis uses the variable in the positive direction, consistent with intuition and theory.



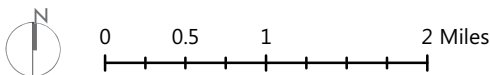
The ridership suitability score is based on a composite of 7 variables. Population density, percent non-white population, median income, percent alternative commuters, total job density, and high-income job density are each scaled from 1 to 10 points and summed to a single score ranging from 6 to 60 points. This score is then multiplied by a slope factor of 1.0 (slopes < 6%), 0.5 (slopes up to 12%) or zero (slopes > 12%). Resulting scores range from 0 to 43 points.



Source: 2009 TIGER/Line; 2006-2010 American Community Survey; 2010 Longitudinal Employer-Household Dynamics; AMBAG LiDAR Data



Source: 2009 TIGER/Line; 2006-2010 American Community Survey; 2010 Longitudinal Employer-Household Dynamics; AMBAG LiDAR Data



Discussion

Interpretation

The detailed Ridership Suitability Score represents the bikesharing ridership suitability of a particular grid cell relative to every other grid cell in the analyzed area. Because the Ridership Suitability Score is based on a different methodology than the countywide Screening Suitability Score, and is relative only within the analysis area, it cannot be directly compared to the Screening Suitability Score; rather it provides an additional criterion for selecting appropriate bike sharing station locations at a more detailed scale. For example, a moderate- or low-suitability parcel in the detailed analysis area may still be more suitable for bike sharing than some moderately high-suitability areas identified in the countywide demand screening analysis.

The concentration of high-suitability parcels along the north side of the Monterey Peninsula suggests a good potential service area. Several clusters of the highest-suitability parcels are joined by regions of high and moderate suitability, and the highest-suitability areas are located near enough to one another to permit travel among them by bicycle. In Salinas, a cluster of high-suitability areas in downtown Salinas, coupled with dense residential areas in Alisal provide a core service area. High-density areas to the north and east of the City suggest high suitability, but have highly segregated land uses and are relatively distant from downtown for cyclists and do not contribute to a contiguous service area.

Limitations

Despite its usefulness in identifying suitable bikesharing locations, the Ridership Suitability Score is a simple combination of a limited number of factors, and must be interpreted along with additional information and local knowledge. The variables selected are based on ridership data from the Nice Ride system in Minneapolis, MN, which is generally more urban than Monterey and may have potential riders with different characteristics than those in Monterey.

The Ridership Suitability Score is focused solely on maximizing the number of check-outs at bike sharing stations based on empirical relationships in other cities between bikesharing ridership and the Score's input variables; however, goals other than maximizing ridership might be relevant to the selection of a service area and the placement of stations. Although a low non-white population share and high median household incomes are positively associated with ridership in the Nice Ride data, stations placed in lower-income areas or areas with a higher non-white population might be desirable to better serve these communities and address economic and racial equity concerns. Placing a station in a lower-ridership suitability area in order to serve a particular attraction or to fill in a gap in the station network might also be desirable.

Bicycling in general and bikesharing in particular have traditionally struggled to attract lower-income individuals and people of color.³⁵ African-Americans make up only 1 percent of Boston Hubway users and only 3 percent of Capital Bikeshare users, while 81 percent of Denver B-Cycle users are white and only 21

³⁵ Federal Highway Administration. "Bikesharing in the United States: State of the Practice and Guide to Implementation." September 2012. <http://www.bicyclinginfo.org/promote/bikeshareintheus.pdf>.

percent have annual household incomes below \$50,000.³⁶ Bikesharing programs are making concerted efforts to serve these communities. Capital Bikeshare has partnered with Bank on DC to offer discounted memberships and debit and credit accounts to unbanked individuals who would not otherwise have access to bikesharing;³⁷ the program has also reached out to the homeless community, providing discounted memberships to those enrolled in job training sessions.³⁸ Denver and Boulder B-Cycle and NYC Bike Share have also partnered with local housing authorities to increase access to their programs; Minneapolis' Nice Ride system has eliminated the credit card hold held as a deposit, which presented a barrier to some potential users.^{39,40}

³⁶ <http://dc.streetsblog.org/2012/10/03/why-isnt-bike-share-reaching-more-low-income-people/>

³⁷ "Capital Bikeshare Launches Bank on DC Program." 16 December 2011.
<http://www.capitalbikeshare.com/news/2011/12/16/1140>

³⁸ DePillis, Lydia. "Capital Bikeshare Rolls Out Homeless Pilot." 20 March 2012.
<http://www.washingtoncitypaper.com/blogs/housingcomplex/2012/03/20/capital-bikeshare-rolls-out-homeless-pilot/>

³⁹ Schmitt, Angie. "Why Isn't Bike-Share Reaching More Low-Income People?" 3 October 2012.
<http://dc.streetsblog.org/2012/10/03/why-isnt-bike-share-reaching-more-low-income-people/>

⁴⁰ "Frequently Asked Questions: What about low income New Yorkers?"
http://citibikenyc.com/faq#_What_about_low_income

Bikesharing Ridership Demand Modeling

Fehr & Peers analyzed the effects of demographic and built environment characteristics near bikesharing stations on bikesharing ridership levels in three operational U.S. systems and applied the resulting regression model to a proposed network of stations in Monterey. This section describes the development of the regression model, the selection of proposed bikesharing station networks for Monterey / Pacific Grove and Salinas, and the ridership forecast for the proposed station networks.

Bikesharing Ridership Regression Model

A regression analysis was performed using stations in the Capital Bikeshare, Denver B-Cycle, and Nice Ride MN systems as observations (n=265) and the natural log of average monthly rentals by station as the dependent variable. A consistent dataset of independent variables (see **Table 6**) was collected across all three systems and compiled using a custom GIS toolbox. The variables considered include demographic, built environment, transportation network, and system-specific factors, such as population and employment densities; income, race, commute, and vehicle access variables; proximity to parks and colleges; access to bikeways, bus stops, and other bikesharing stations; and a city-level precipitation variable and system indicator variables.

Multivariate linear regression models were refined in order to 1) maximize the predictive power of the model as a whole, as measured by the model R-squared, 2) incorporate a variety of independent variables, and 3) maintain statistical significance and intuitive direction of the included variables. The preferred model (see **Table 7**) has a good measure of fit (adjusted R-squared of 0.753) and includes measures of population density, retail job density, share of alternative commuters, median income, share of non-white population, and other bikesharing stations within 3200 meters. The stations-within-3,200-meters variable is particularly important to bikesharing ridership. The variable had a strong positive correlation with ridership in all model specifications tested, and continues to be significant both in isolation and when controlling for the effects of the other regression variables. This variable suggests that bikesharing systems can support ridership by locating stations in a dense, contiguous network.

TABLE 6 – REGRESSION VARIABLE DEFINITIONS

Variable	Definition	Source
Dependent		
<i>ln(Monthly Rentals)</i>	Natural log of the number of rentals during each system's first operating season, by station; normalized by number of months in first operating season	Bike sharing system operators
Independent		
<u>Demographic Factors</u>		
<i>Population</i> ¹	Total population (in 100s of persons)	U.S. Census Bureau, 2010
<i>Jobs</i> ¹	Total jobs (in 100s), by work area	Longitudinal Employer-Household Dynamics, 2010
<i>High-Income Jobs</i> ¹	Number of jobs (in 100s) paying more than \$3,333 per month, by work area	Longitudinal Employer-Household Dynamics, 2010
<i>Retail Jobs</i> ¹	Total retail jobs (in 100s)	Longitudinal Employer-Household Dynamics, 2010
<i>Alternative Commuters</i> ²	Proportion of workers who commuted by bicycle, walking, or public transportation (100s of workers)	U.S. Census Bureau, 2010
<i>Median Income</i> ²	Median household income (in 1,000s of dollars)	U.S. Census Bureau, 2010
<i>Non-White Population</i> ²	Proportion of population that is of a race other than "white alone"	U.S. Census Bureau, 2010
<i>Low-Vehicle Households</i> ²	Proportion of workers who commuted by bicycle, walking, or public transportation (100s of workers); weighted average by 2010 Census Tract	U.S. Census Bureau, 2010
<u>Built Environment Factors</u>		
<i>College</i>	1 if a college is located within 400 meters, 0 otherwise	U.S. Census Bureau TIGER/Line Shapefile 2009 – Area Landmarks
<i>Park</i>	1 if a park is located within 400 meters, 0 otherwise	DC Office of the Chief Technology Officer; Open Street Map
<u>Transportation Network Factors</u>		
<i>Bikeways</i>	Length of existing bike lanes and paths (in 100s of meters)	District Department of Transportation; Denver GIS; Minnesota Department of Transportation
<i>Bus Stops</i>	Number of bus stops (in 10s of stops)	Washington Metropolitan Area Transit Authority; District Department of Transportation; Denver GIS; Metropolitan Council GIS
<i>Stations Within [X] Meters</i>	Number of bike sharing stations within [X] meters	Bike sharing system operators
<u>System-Specific Factors</u>		
<i>DC Flag</i>	1 if station is in Capital Bikeshare system, 0 otherwise	
<i>DN Flag</i>	1 if station is in Denver B-Cycle system, 0 otherwise	
<i>MN Flag</i>	1 if station is in Nice Ride MN system, 0 otherwise	
<i>Precipitation Days</i>	Average days per system operating month with precipitation 0.01 inches or more	National Climatic Data Center

¹ Summed proportionally by area intersecting 2010 Census Blocks

² Weighted average by area of buffer intersecting 2010 Census Tracts

TABLE 7 – PREFERRED REGRESSION MODEL

Variable	Coefficient	Standard Error	p-Value
<i>Population</i>	0.013	0.002	0.000***
<i>Retail Jobs</i>	0.031	0.011	0.008***
<i>Alternative Commuters</i>	1.863	0.268	0.000***
<i>Median Income</i>	0.010	0.002	0.000***
<i>Non-White Population</i>	-2.100	0.184	0.000***
<i>Stations Within 3200 Meters</i>	0.033	0.003	0.000***
<i>Constant</i>	3.536	0.155	0.000***
Independent Variable	ln(Monthly Rentals)		
R ²	0.758		
Adjusted R ²	0.753		

*, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Bikesharing Station Locations

General locations for bikesharing stations were selected based on the Ridership Suitability Score, and review of aerial imagery, bike infrastructure, and attractive origins and destinations. The following considerations guided placement of bikesharing stations:

- Contiguous network – ensure that each station has a clear connection to the rest of the station network; avoid isolated stations, even in otherwise suitable areas.
- Station proximity – attempt to locate stations within a quarter-mile to half-mile from each other.
- Bike facilities – locate stations near designated bike facilities. The Monterey Bay Coastal Trail provides good connectivity among stations along the waterfront and through Cannery Row. In Salinas, bike lanes along Pajaro Street and Rossi Street improve biking conditions in central Salinas, while bike lanes on Alisal Street provide an essential crossing of US-101.
- Terrain – locate stations along relatively flat or gently rolling terrain.
- Institutions – locate stations to serve the Naval Postgraduate School, Monterey Peninsula College, and the Defense Language Institute Foreign Language Center at the Presidio of Monterey. In Salinas, the National Steinbeck Center, Hartnell College, and Monterey County Courthouse are key institutions.
- Density – locate stations near dense commercial and residential areas.
- Attractions – provide access to active local and regional attractions, such as Lovers’ Point Park, the Monterey Bay Aquarium, Cannery Row, Fisherman’s Wharf, the Monterey Conference Center, and the Monterey Sports Center.

- Transit – provide connections to existing transit services. Monterey-Salinas Transit (MST) operates nearly 60 bus routes in Monterey County, almost half of which serve Monterey and Pacific Grove. The Salinas Transit Center also serves 16 routes. Bikes sharing service can provide:
 - Connections when a transfer would be required for a short second leg
 - Extended range for transit riders to access destinations beyond a comfortable walking distance from transit
 - A complement to transit for trips that are too long to walk but short enough that waiting for transit is undesirable

Figure 4 shows the proposed locations for 24 bikes sharing stations in Monterey and Pacific Grove. **Figure 5** shows the proposed locations for 16 bikes sharing stations in Salinas. These locations represent a general concept for two proposed bikes sharing station networks that should ultimately be refined based on additional input from stakeholders, TAMC, and the bikes sharing operator or hardware vendor.

Bikes sharing Ridership Forecast

Applying the Ridership Regression Model to the identified locations results in station-level ridership estimates for each of the 24 proposed bikes sharing stations in Monterey and Pacific Grove and separately for each of the 16 proposed bikes sharing stations in Salinas. The Scenario 1 and 2 Model Estimates are the actual predicted values based on the model regression coefficients applied to the regression variable values for each station. The Scenario 1A and 2A estimates are one standard error below the Scenario 1 and 2 Model Estimates, while the Scenario 1B and 2B estimates are one standard error above. Because of the model's logarithmic form, the standard error to the upside results in a larger range than the standard error to the downside. This is consistent with experience from the bikes sharing operators interviewed, who noted that ridership grows at a faster than linear rate relative to expansions in the system. Maurer (2012) also found a logarithmic bikes sharing ridership relationship.⁴¹ The Scenario 1 estimate for Monterey / Pacific Grove is equivalent to slightly less than one ride per bikes sharing bike per day, while Scenario 1B estimates approximately 1.6 rides per bike per day, within the expected range of one to two rides per bike per day based on other operational bikes sharing systems and well below Capital Bikes share's rate of over three rides per bike per day. The Scenario 2 estimate for Salinas is lower, at an average of 0.4 rides per bike per day, while Scenario 2B estimates approximately 0.7 rides per bike per day. **Table 8** lists the ridership estimates for each station and **Figures 6 and 7** display the Base Model (Scenario 1 and 2) Estimates graphically. The model forecasts ridership in the Monterey / Pacific Grove network to be highest at the Presidio and along Cannery Row, with more modest ridership levels toward the edges of the system. In Salinas, forecast ridership is highest in Alisal, which has high residential population densities and is connected to Downtown Salinas by bike lanes on Alisal Street.

⁴¹ Maurer, Lindsay Kathryn. "Feasibility Study for a Bicycle Sharing Program in Sacramento, California." TRB 2012 Annual Meeting. 15 November 2011.

Figure 4 – Monterey / Pacific Grove Proposed Bikesharing Stations and Existing Bike Rental Locations

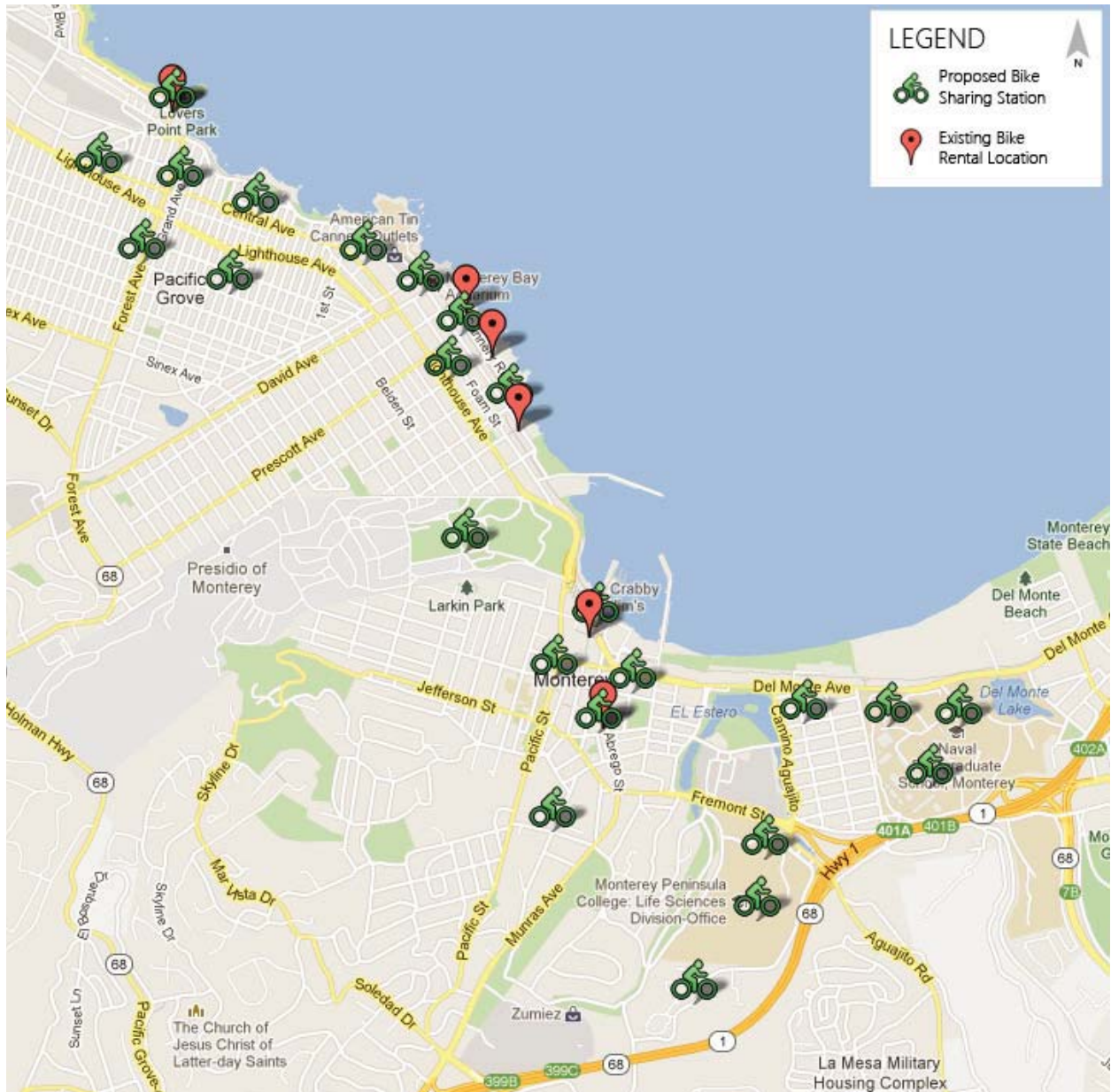


Figure 5 – Salinas Proposed Bikesharing Stations

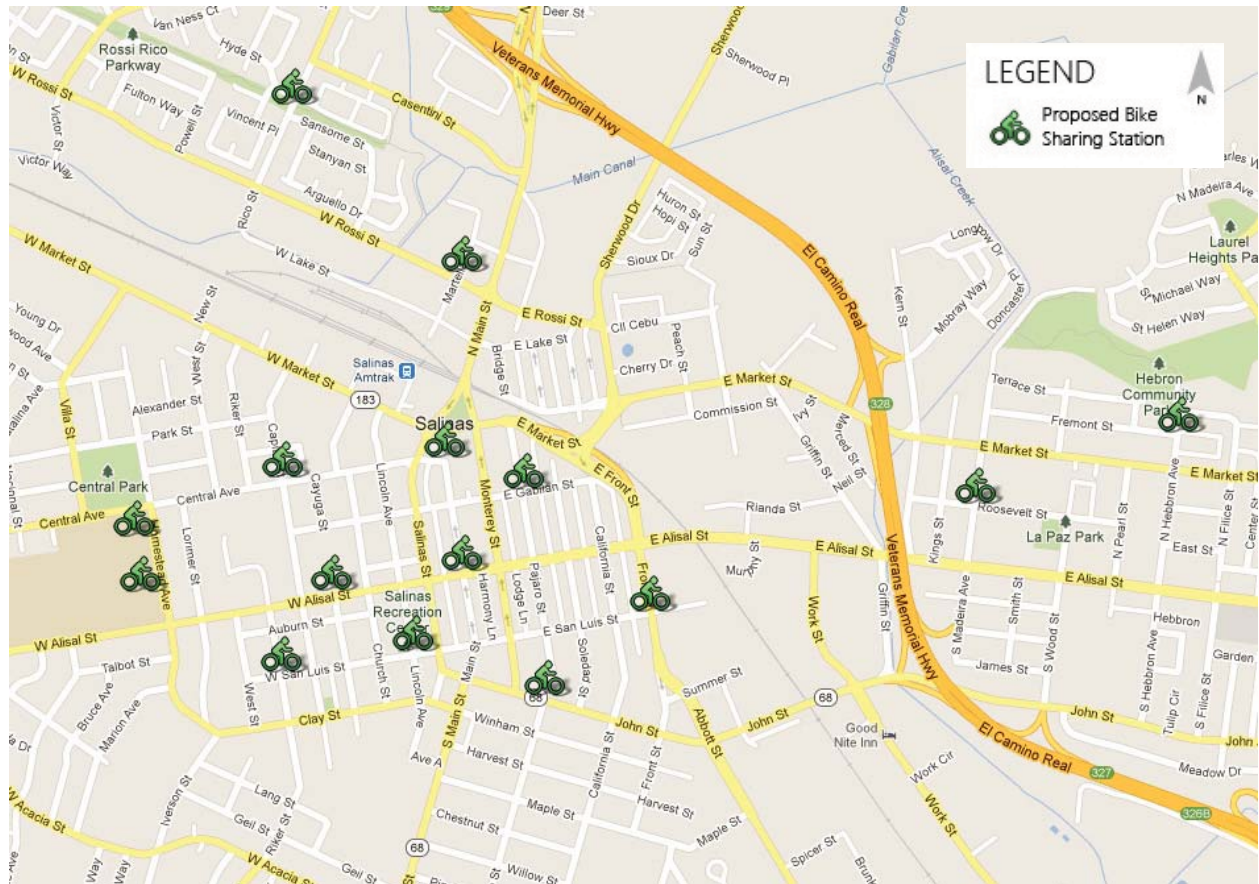
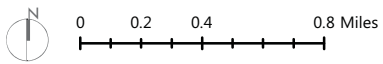
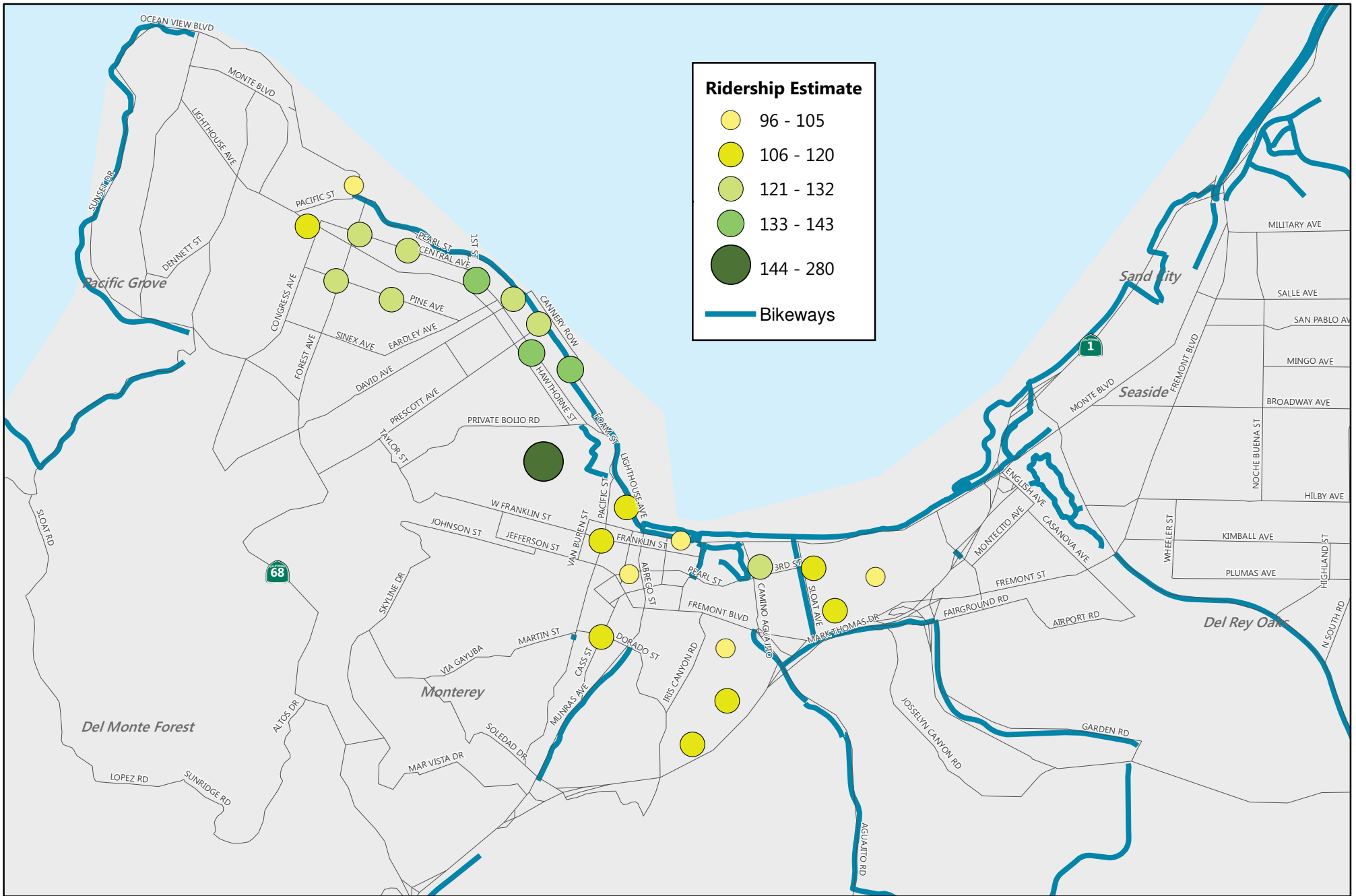
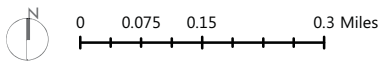
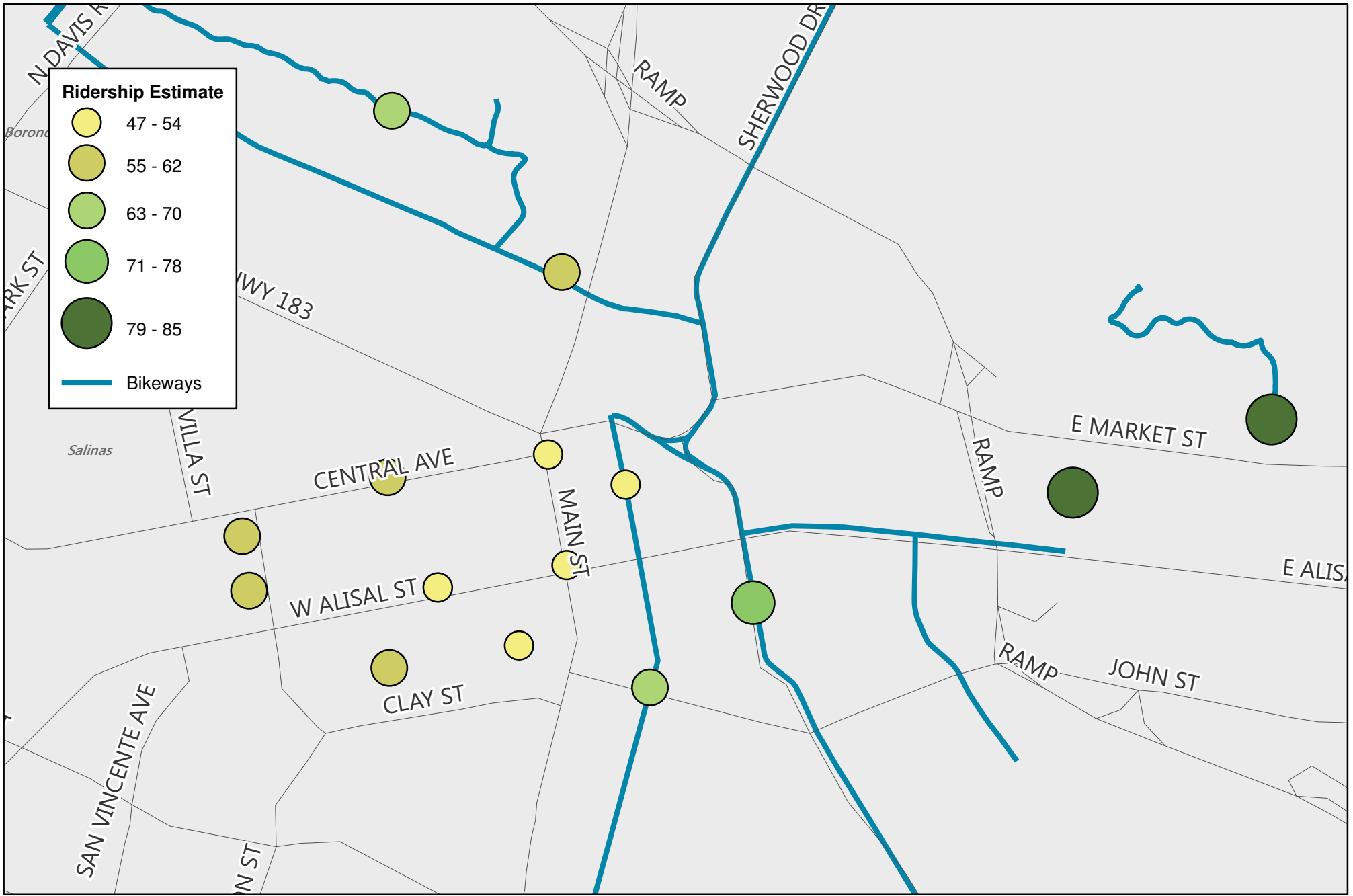


TABLE 8 – MONTHLY RIDERSHIP ESTIMATES

Station #	<i>Monterey / Pacific Grove Network</i>			<i>Salinas Network</i>		
	Scenario 1 (Model Estimate)	Scenario 1A (Low Range)*	Scenario 1B (High Range)*	Scenario 2 (Model Estimate)	Scenario 2A (Low Range)*	Scenario 2B (High Range)*
1	123	63	237	47	25	92
2	130	68	252	58	30	112
3	132	68	255	55	28	105
4	116	60	225	65	34	125
5	104	54	201	59	30	113
6	135	70	260	47	24	90
7	125	65	242	50	26	97
8	130	67	250	55	29	107
9	143	74	276	75	39	145
10	138	71	266	62	32	120
11	120	62	231	49	25	94
12	100	52	193	52	27	101
13	280	145	540	85	44	165
14	116	60	224	85	44	164
15	98	51	190	55	28	106
16	129	67	249	–	–	–
17	118	61	229	–	–	–
18	127	66	245	–	–	–
19	118	61	229	–	–	–
20	105	54	202	–	–	–
21	116	60	225	–	–	–
22	96	50	185	–	–	–
23	116	60	223	–	–	–
24	111	58	214	–	–	–
Total	3,027	1,568	5,842	900	466	1,737
Minimum	96	50	185	47	24	90
Average	126	65	243	60	31	116
Maximum	280	145	540	85	44	165

* Scenario A and B estimates are one standard error below and above the Base Scenario Model Estimates, respectively.





3. CAPITAL AND OPERATING FUNDING SOURCES

Bicycle sharing programs use a variety of sources to fund initial capital and ongoing operating expenditures. The intent of this chapter is to summarize by broad category the range of bicycle sharing programs currently in operation and describe how they are funded. This chapter also includes a listing of potential Federal, State of California (State), regional, and other sources that could be used to fund a bicycle sharing program in the City of Monterey (City), as well as a listing of potential program partners.

Overview

There are more than 450 bicycle sharing programs in operation throughout the world (a dramatic increase from 60 programs in 2007), representing several different general “business models.” While each individual program has certain unique attributes, generally they can be categorized according to their primary sources of revenue.

Currently, there are three main bicycle sharing program models in operation in the United States: the nonprofit model, the publicly owned/privately operated model, and the privately owned-and-operated model. Of these models, nonprofits appear to be the most popular. Of the 19 information-technology (IT)-based programs in the United States, nearly 60 percent were nonprofit.^{42 43} Of note, a vendor-operated model, which does not exist in the United States, will be launching in Anaheim and Los Angeles, likely within the next year.

A few years ago, the most popular models for bike share relied primarily on advertising revenues (on bikes, equipment, transit vehicles, and other public property) to fund the program. This model has been described as “street furniture” and is still used for Paris’ “Vélib” program. In the United States, recent examples of the advertising or street furniture model, such as the SmartBike DC program in Washington, DC, and the proposed San Francisco bike share program, have been either terminated (SmartBike DC) or have chosen a different model to pursue (San Francisco: publicly owned and operated).

However, while the specific advertising model used in Paris and formerly used in DC has not been popular in the United States, publicly owned/privately operated systems with title sponsors have seen significant success. For example, the City of Boston partnered with New Balance to help launch the Hubway bicycle sharing program. On an even larger scale, the proposed CitiBike program in New York City, a partnership between Citi Bank and the City of New York, is set to launch next year (2013) and will become the largest bike share operation in North America.

Bike share programs in the United States are funded by a combination of user fees; sponsorships; advertising; private donations; Federal, state, and local funds; along with various loans; private foundation grants; and individual donations. Of these funding sources, user fees, sponsorships, and advertising are

⁴² IT-based programs represent the “third generation” of a bike sharing system, evolving from the “free bikes” system (first generation) and “coin-deposit” system (second generation).

⁴³ Shaheen, Susan A., Ph.D., Martin, Elliot W., Ph.D., Cohen, Adam P., Finson, Rachel S. Public Bikesharing Operations in North America, Mineta Transportation Institute, pp.27-28, June 2012.

the most common. None of the programs reviewed in the United States generate sufficient revenue from user fees alone to support both their full capital acquisitions and ongoing operations and maintenance costs. However, several programs do appear to have financially sustainable operations *after* their capital acquisitions are fully or partially funded by other sources.

Key Findings

- **The most popular business model in the United States is the nonprofit model.** The nonprofit model is operated by a nonprofit that is created especially to run the bike share program or by an existing nonprofit that absorbs management of the program into its existing mission. The nonprofit model may rely on grant money or private donations to fund start-up costs. Operating costs typically come from membership and user fees, as well as contributions from the jurisdictions in which the program is being operated, along with continued support from foundations, local businesses, and private donations. It does not appear there are any bike share models where the revenue from subscriptions and usage fees entirely covers the operating costs, but there are several programs that expect to come close in the next few years (e.g., Denver; Boulder; Broward; Washington D.C./Arlington).
- **Other bike share business models also have been implemented and offer unique advantages and disadvantages.** Some programs are operated as joint ventures between public agencies and advertising firms, others are operated by local or regional transportation agencies, and still others are operated by universities or private companies. It does not appear there are any programs operating under these business models that are financially self-sufficient. By way of example, DecoBike in Miami launched the first truly for-profit bike share venture in 2011 with a business model proposing complete self-sufficiency from user revenue. However, since its launch, DecoBike has asked the City of Miami to allow advertisements on their kiosks. As of August 2012, the City of Miami had not agreed to the request but appeared to be leaning toward allowing DecoBike to advertise.⁴⁴
- **There are numerous Federal, State, regional, and local funding sources that may be available to fund a bike sharing program in Monterey County.** In many cases, the nexus between bike share programs and eligible projects as defined by the funding source needs to be articulated and a case for project eligibility will need to be made.

⁴⁴ Information obtained from an online article on the Miami Herald Web site (www.miamiherald.com) by Debra Leibowitz and published June 15, 2012.

Potential Funding Models

More than 450 bike share programs have been implemented worldwide and a variety of business models have been employed. The business model is distinct from the operating system. Operating systems such as Bixi / Alta Bike Share, Inc., and B-cycle provide an operating framework and can be adopted and used regardless of the business model. Depending on the contract with the operating system, the operator of the program may or may not be affiliated with the operating system.

Below, EPS briefly describes each of the most common business models and provides an example where the model has been used. Most of the bike share programs currently in operation are hybrids of one or more of the models described below. The selected case studies are categorized by their primary model. The advantages and disadvantages of each model also are noted.

Nonprofit Model

The nonprofit model is operated by a nonprofit that is created especially to run the bike share program or by an existing nonprofit that absorbs management of the program into its existing mission. The nonprofit model may rely on grant money or private donations to fund start-up costs. Operating costs typically come from membership and use fees, as well as contributions from the jurisdictions in which the program is being operated.

Example#1: Minneapolis' "Nice Ride" Program

Nice Ride Minnesota was launched on August 3, 2010, and consists of 146 stations and more than 1,300 bicycles. The program stretches across Minneapolis and St. Paul and is operated and overseen by Nice Ride Minnesota. Minneapolis has extensive bicycle infrastructure and is ranked a "Gold" Bicycle Friendly Community by the League of American Bicyclists for the quality of its bicycle network, supporting facilities and programs. The program comprises more than 4,000 annual members and more than 35,000 casual members.

The initial Phase 1 capital costs for Nice Ride Minnesota totaled \$3 million, including \$45,000 per kiosk.⁴⁵ The funding sources for the initial capital costs included Federal funds, corporate sponsorship, and the City of Minneapolis. These funds included a \$1.75 million one-time contribution from the Federal Government's Non-motorized Transportation Pilot Program (NTP), which was made available through Bike Walk Twin Cities, a program administered by Minneapolis' Transit for Livable Communities, \$1 million from Blue Cross Blue Shield (using proceeds from the historic tobacco settlement), who is Nice Ride Minnesota's title sponsor, and \$250,000 from the City of Minneapolis Convention Center Fund. The annual operating costs in 2010, the first year of operations, totaled about \$300,000.

The Phase 2 expansion plan, which is expected to increase the system by approximately 50 new stations, has received commitments from Blue Cross Blue Shield (up to \$1.5 million), Bike Walk Twin Cities (\$500,000), Central Corridor Funders Collaborative (\$250,000 for stations near light rail stations), and the

⁴⁵ Schlabowske, Dave, Communications Director, "Bike Sharing, what is it and how does it work?" Bicycle Federation of Wisconsin, Bicycle Blog, February 10, 2011.

Macalester College High Winds Fund (\$30,000). In addition, Transit for Livable Communities (TLC) committed \$1 million for Phase 2 capital from the NTP.⁴⁶

Example #2: Des Moines' B-Cycle Program

Des Moines' B-cycle, launched in 2010, is still considered a pilot program because it includes only 5 stations and 22 bikes. Des Moines is considered a very bicycle-friendly city and includes nearly 200 trails leading in and out of downtown.⁴⁷

Capital costs for Des Moines' B-cycle are \$30,000 to \$35,000 per station (depending on whether they are solar, alternating current [AC], or solar/AC combined). Currently, of the five stations in Des Moines, two are solar, one is solar/AC combined, and two are AC-only. The total capital cost for Des Moines' B-cycle was approximately \$120,000, with the largest single contributor giving only \$20,000.⁴⁸ In addition to user revenue, Des Moines receives sponsorship funds for each docking station or "hub" from nearby businesses. In addition to hub-specific sponsors, Des Moines' B-cycle has received support from Nationwide, Wellmark, Principal Financial Group, Prairie Meadows, Des Moines Area Regional Transportation Authority (DART), the Polk County Health Department, the City of Des Moines Department of Parks and Recreation, Drive Time Des Moines (a commuter club), and the Greater Des Moines Convention and Visitors Bureau.⁴⁹

Recent funding from the Downtown Community Alliance expanded the system from its initial 4 stations and 18 bikes to its present 5 stations and 22 bikes.⁵⁰ Eventually, Des Moines hopes to have 100 bicycles for rent throughout the city at between 12 and 14 kiosks.⁵¹ Carl Voss, Des Moines' B-cycle volunteer Director, indicated that the minimum number of bikes for a feasible program is 35 to 50 bikes, but that growth will be difficult because of resource constraints. However, because of the program's reliance on part-time volunteer workers, opportunities to raise community support and seek grants, donors, and sponsorship remain limited.⁵²

Example #3: Spartanburg's B-Cycle Program

Spartanburg, South Carolina's B-cycle bike sharing program is operated by the Partners for Active Living. The program was launched on July 7, 2011, and now includes four docking stations and 28 bikes and

⁴⁶ "Nice Ride Minnesota Announces Phase 2 Funding," Nice Ride Minnesota Web site, March 1, 2011.

⁴⁷ "B-Cycle Program Rolls into Downtown Des Moines," The Greater Des Moines Partnership, September 8, 2010.

⁴⁸ Forte, Gabriel, Amogh Garg, Indrajeet Ghatge, David Hanna, Kandy Hricik, Cleveland Bike Share: The Potential and Possibility, Case Western Reserve University Weatherhead School of Management—MBA Practicum in Sustainable Value and Social Entrepreneurship (ORBH 430B), Spring 2012.

⁴⁹ Des Moines' B-cycle Web site (desmoines.bicycle.com).

⁵⁰ Ibid.

⁵¹ "Des Moines Officials Introduce Bike-Sharing Program," Des Moines Register, September 9, 2010.

⁵² Forte, Gabriel, Amogh Garg, Indrajeet Ghatge, David Hanna, Kandy Hricik, Cleveland Bike Share: The Potential and Possibility, Case Western Reserve University Weatherhead School of Management—MBA Practicum in Sustainable Value and Social Entrepreneurship (ORBH 430B), Spring 2012.

operates year-round. League of American Bicyclists ranks Spartanburg as “bronze” on their Bicycle Friendly Community Ranking because of a limited bicycle infrastructure and density, though the program has enjoyed significant success with its 100 annual members and 450 casual members.

The program is funded by the Mary Black Foundation (a local grantmaking organization founded to improve the health and wellness of Spartanburg, South Carolina, residents), the JM Smith Foundation (part of a local, private healthcare and technology company), as well as the City of Spartanburg. Funding from the Mary Black Foundation has included \$35,000 in 2011 to support installation of two B-cycle stations.⁵³

Example #4: Denver’s B-Cycle Program

Denver’s B-cycle is operated by Denver Bike Sharing, a nonprofit founded to promote health, quality of life, and preservation of the environment. The program was launched on April 22, 2010, and at the end of 2011, consisted of 52 stations and 732 bicycles. The initial seed money for the project came from the host committee of the Democratic National Convention, which donated \$1 million from a budget surplus to create a large-scale bicycle sharing company.

In 2011, Denver Bike Share sold 2,675 annual memberships and 42,320 short-term memberships (e.g., 24-hour passes, 7-day, 30-day). League of American Bicyclists ranks Denver as “silver” on their Bicycle Friendly Community Ranking primarily because of Denver’s limited biking infrastructure.

Capital grants and contributions make up 18 percent of Denver Bike Sharing’s total resources, with operating grants and contributions providing just 4 percent. Membership fees (23 percent), usage fees (14 percent) and sponsorship (40 percent) make up the majority of remaining resources.

Government funds used by Denver Bike Share include an Energy Efficiency and Conservation Block Grant (EECBG) for \$210,000, Transportation Community Preservation Program (TCPP) grant revenue, as well as funds from Colorado’s Vehicle Registration Tax and FASTER Program.⁵⁴

Denver Bike Share plans to expand by up to 30 stations in 2012, using an additional \$1.1 million in Federal and state grants.⁵⁵

Example #5: Boulder’s B-Cycle Program

Boulder’s B-cycle was launched on May 20, 2011, and currently maintains 110 bikes throughout 15 stations. The majority of Boulder B-cycle’s docking stations are located around the heavily trafficked, commercial district surrounding Pearl Street, which is northwest of the University of Colorado at Boulder campus.

⁵³ Mary Black Foundation Web site (maryblackfoundation.org), Grant History.

⁵⁴ “Denver Launches First Large-scale Citywide Bicycle Sharing Program in the U.S.,” Denver B-cycle Web site (denver.bcycle.com), April 22, 2010.

⁵⁵ Denver Bike Share 2011 Annual Report, Denver B-cycle. No specific grants are mentioned.

In 2011, Boulder's B-cycle had 1,170 annual members and had sold more than 6,000 24-hour access passes. League of American Bicyclists ranks Boulder as "platinum" on their Bicycle Friendly Community Ranking, which is the highest ranking in the country, because of their 300+ miles of bike lanes, routes, designated shoulders and paths, as well as topography.

Capital expenditures (initial fleet of bikes, stations) totaled approximately \$525,000 and were funded primarily by grants (\$446,250), including \$250,000 through an EECBG, funds from the City of Boulder, and gifts from individuals (amounting to approximately \$100,000) and local businesses and residents (\$78,750).

Ongoing operational expenditures on stations, bikes, and B-cards are funded through sponsorships (64 percent), as well as membership and usage fees (36 percent).⁵⁶

Advantages and Disadvantages

In some cases, it may be beneficial to have a nonprofit operate the system because liability is transferred from the local jurisdiction to the nonprofit, which has limited assets and is less likely to have a lawsuit filed against it. It is not clear at this early stage what, if any, the liability concerns might be for the Transportation Authority of Monterey County (TAMC).

In addition, by creating a nonprofit as opposed to having a jurisdiction-run model, staffing costs can remain lower because of a lack of salary and pension requirements that might be present in a public agency.

The nonprofit model is often dependent on the local jurisdiction for some portion of its funding, and funding commitments from the jurisdiction may be unreliable in challenging budget cycles. However, the flexibility of the nonprofit models has shown to allow programs across the country to approach their funding challenges in different ways. For cities or other jurisdictions that may not be fully convinced that bike share is a productive use of funds, nonprofit structure allows the program to be grown independently of a government body.

Publicly Owned/Private Operated Model

In the publicly owned/private operated model, a city will contract with a private operator such as Alta Bike Share or B-cycle to provide management of ongoing operations. Public entities are usually charged with funding the initial capital investment (stations and bikes) and administering the program before contracting with a private operator. Public entities have used a variety of fund-raising techniques for capital costs, including taxation, advertising, sponsorships, and Federal and state grants. While the number of active programs using this model is limited at the time of this report, New York City and Chicago are both set to launch programs using this business model within the next year.

⁵⁶ Information compiled from several sources, including personal interview with Bob Koenig of Boulder B-cycle, August 2012; US Department of Energy; and the 2011 Boulder B-cycle Annual Report.

Example #1: Washington D.C.'s Capital Bikeshare

Currently the largest bike share program in the United States, with more than 1,670 bikes dispersed across 175 stations, Capital Bikeshare also is perhaps the most successful. When the program launched in 2010, stations were initially located primarily throughout D.C.'s northwest quadrant. Capital Bikeshare has since expanded into Arlington, Virginia, as well as in the Northeast, Southeast, and Southwest quadrants of DC. Capital Bikeshare is operated by Alta Bicycle Share, operates year-round, and has exceeded 200,000 members.⁵⁷

Capital Bikeshare uses several funding sources, although it collects nearly all of its funds needed for daily operations from user fees. D.C.'s \$6 million capital costs were largely covered by federal grants such as one from the U.S. Department of Transportation's Federal Highway Administration under their CMAQ fund. To start the Arlington program, funding was received from the Virginia Department of Rail and Public Transportation, Arlington County transportation funding, and sponsorships by the Crystal City Business Improvement District (BID) and the Potomac Yard Transportation Management Association.

A large part of Capital Bikeshare's success has stemmed from investment in bike infrastructure, such as bike lanes, in conjunction with station construction. In addition, Washington, D.C., enjoys enormous numbers of tourists each year, many of whom come to sightsee on the National Mall and nearby Tidal Basin. Because parking has long been in short supply in the area, Capital Bikeshare has been able to educate visitors of the convenience of the system and therefore has seen membership from non-residents grow dramatically.

Example #2: Chattanooga's Bicycle Transit System

Bike Chattanooga, which is operated by Alta Bicycle Share, currently consists of 300 bikes and 28 docking stations. The program connects downtown Chattanooga from the North Shore to the South Side, linking attractions and meeting places such as the Chattanooga Choo-Choo Hotel, the Convention Center, Hunter Museum of Art, and the Tennessee Aquarium.

Bike Chattanooga, a Bicycle Transit System, is a City of Chattanooga project that is managed by a subdivision in Chattanooga Parks and Recreation: Outdoor Chattanooga. Capital costs for the program were funded by a \$2 million FTA CMAQ grant that was awarded to the City of Chattanooga in partnership with Chattanooga Area Regional Transportation Authority (CARTA).

Ongoing operational funding stems from a combination of public and private funds, including the City of Chattanooga, Outdoor Chattanooga and the City of Chattanooga Parks and Recreation Department, CARTA, the Active Living and Transportation Network, the Chattanooga-Hamilton County Regional Planning Agency, as well as BlueCross BlueShield of Tennessee, the Chattanooga History Center, Gaining Ground's Local Food Program, and the Tennessee Aquarium.

⁵⁷ Capital Bikeshare Web site (capitalbikeshare.com).

Advantages and Disadvantages

Publicly owned/privately operated bike share programs allow initial capital fundraising to include Federal, state, and local funds, while not requiring a public agency to adapt their staffing and organizational structure to operate a bike share program. This model is similar to the nonprofit model in that it uses a wide variety of funding resources; however, by maintaining ownership of the program, the public agency maintains a greater degree of control over expansion of the system and is better situated to use bike share as part of a larger transit structure. In addition, by grouping bike share more clearly with other modes of public transportation, the bike share program is seen less as a project expected to break even financially (or even turn a profit) and more as a public service that can subsidize ridership fees.⁵⁸

Advertising/Street Furniture Model

The advertising model has enjoyed immense popularity in Europe, Canada, and in early iterations of bike share programs in the United States. However, over the past few years, programs in the United States have opted for the nonprofit model. In the advertising model, a public-sector agency partners with advertising companies, such as Clear Channel Outdoors or JC Decaux. The agency creates a bike sharing system operated by the advertising company in exchange for the right to sell advertising in transit shelters, public street furniture, billboards, in the public right-of-way, and even on the bikes themselves.

Example #1: Paris' "Vélib" Program

The City of Paris has a 10-year contract with SOMUPI, a joint venture owned by JC Decaux, an outdoor advertising company, and Publicis, a large advertising and communications corporation. SOMUPI is responsible for covering the entire cost of implementing and managing Vélib. The cost of implementing the system was approximately \$135 million. As of 2009, the Vélib bike share program has 20,600 bicycles and 1,450 stations spread across 33.44 square miles. SOMUPI operates the system in exchange for advertising on nearly 2,000 billboards.

As of 2008, Vélib had 190,000 long-term members and 80,000 daily users with 115,000 rentals per day. The system operates 24 hours a day, year round. Bikes are maintained by SOMUPI staff. Sign-up and access is available online and in-person at a station. In addition to operating costs, SOMUPI pays a \$5.1 million annual fee to the City of Paris (\$51 million over 10 years), and subscription and rental fees also go to the City of Paris (expected to total around \$45 million per year). All advertising revenue goes to SOMUPI. Advertising revenue is anticipated to be approximately \$90 million per year. If SOMUPI meets the contractual standards of operation, the venture is entitled to 12 percent of Vélib's subscription and rental revenues, plus payment by the City of Paris of an amount equal to 12 percent of advertising sales.

Example #2: D.C.'s "SmartBike" Program

SmartBike DC, though cancelled in 2009, was an advertising-based model, wherein D.C.'s Department of Transportation (DDOT) contracted with Clear Channel Outdoors, the advertising company that developed

⁵⁸ For example, DecoBike in Miami, a for-profit venture, charges far more for bike rental than any publicly-owned bike share company in the country, thus limiting the scope of potential users.

the SmartBike program.⁵⁹ Clear Channel ran the SmartBike program under the direction of DDOT. The program operated 120 bicycles and 10 stations across an area of 6 square miles. Annual subscriptions were available for \$40. Daily or monthly only subscriptions were not available; nevertheless, there were 1,050 long-term subscribers in 2008, the first year of operation. A single rental could not exceed 3 hours. The system operated from 6:00 AM until 10:00 PM. Bike maintenance was performed in-house by SmartBike staff. Cyclists could sign up online, by phone, and by standard mail.

DDOT was able to fund the first 10 stations with revenue from the 20-year advertising contract on 744 bus shelters. All revenues from subscriptions and usage fees were paid to DDOT. Implementation costs were approximately \$4,500 per bicycle, or \$540,000 total.

Advantages and Disadvantages

The advertising model is a convenient, cost-effective way for local jurisdictions to introduce a bike share program and has the benefit of proven effectiveness, but also it results in more advertising in the public domain. In some cities, such as Portland, Oregon, the advertising model is not an appropriate model because advertising is not allowed in transit shelters in the downtown area—the area that holds the highest revenue potential. It is not clear whether or not the advertising model is feasible for the TAMC program. Additional research would be required to understand whether attractive advertising spaces exist on public property and the terms of existing advertising contracts, if any.

Some claim that incentives to invest in fleet maintenance and repairs are misaligned in the advertising model. The more the advertising agency spends on fleet maintenance, the greater the reduction in their profit. If the TAMC program were to pursue this model, the business plan and the contract could control for this conceptual misalignment through performance requirements or financial incentives and disincentives.

Publicly Owned-and-Operated Model

In the publicly owned-and-operated model, the public agency, typically a city, may establish a program by selecting an existing operating system (e.g., Bixi) or choosing to create and implement a system of its own design. Program revenue is usually reinvested in the program, but even so, the public agency may have to supplement the program's subscription and user fees with general fund revenue or other dedicated funding sources. In a quasi-government model, the city is the client of a local or regional transportation agency. The transportation agency may be asked by the client to operate the program as a way of providing increased transit options to residents. Funding options for the transportation agency model are the same as for the public-sector model.

Example: Montréal's Bixi Program

Montréal's program is operated by Stationnement de Montréal, the city's parking authority. The program manages 2,400 bicycles and 300 stations and is available 24 hours a day, 7 days a week, from May to November. The city selected the Bixi system, which is initiated, funded, and managed by the parking

⁵⁹ The program was terminated after D.C. officials and Clear Channel failed to reach an agreement over expanded service. "SmartBike Expansion Gets A Flat," The Georgetown Metropolitan, June 19, 2009.

authority. Bixi staff maintains the bicycle fleet. Implementation costs were approximately \$15 million. The parking authority initially did not want to rely on advertising revenue and expected to recoup its start-up costs through 10 years of membership and rental fees. The authority receives 20 percent of its revenue through the tourism industry and additional funding through corporate sponsorship. EPS has not been able to identify the mechanism by which funding is generated through the tourism industry. However, as of June 2009, in an indication that this business model is not sustainable, the city was working with Astral Media Outdoors to sell advertising space at the Bixi stations. Real-time, station-specific bike availability is accessible through the Web and smart phones.

Advantages and Disadvantages

Public agencies want to provide successful transit service that increases the mobility of residents, employees, students, and visitors for a variety of social, economic, and environmental reasons. As its own operator, the city or the transportation agency has total control over the program and is free to adjust the program to further this mission. Public agency ownership also allows greater coordination with the public agency's other transit systems, which could be an important concern in the TAMC program in improving connectivity with existing and potential future MST bus routes.

A disadvantage of the public agency model is that without an ongoing outside source of operating revenue, there are structural operating deficits. Furthermore, public-sector funding is subject to annual budget fluctuations and is likely to face budget constraints. In addition, the public agency may not have experience operating a bike share program.

University Model

Bike share programs that follow the university model typically are operated by the university itself, and service is usually limited to students, staff, and faculty for intra-campus use.

Example #1: UC Irvine's "ZotWheels" Program

UC Irvine's Parking and Transportations Services launched a fully automated bike sharing program called ZotWheels in November 2009. Currently, ZotWheels operates 28 bikes at four stations on campus. An annual membership fee of \$40 allows students to check out a bike for up to three hours at a time using membership cards. Members sign an online waiver of liability form and take an online bicycle safety course.

Parking and Transportation Services did not adopt an off-the-shelf operating system. Rather, it worked with Central Specialties Ltd. to design the program and the San-Diego-based Collegiate Bicycle Company, which is a bicycle design, wholesale, and consulting company to design the bicycle fleet. ZotWheels bicycles are tailored to UC Irvine with a custom UCI logo, custom UCI colors, and custom graphics. Parking and Transportation Services' own IT department designed the software that operates the program. An interactive map illustrates where bikes are available. The check-out and check-in history of the bike is tracked using RFID technology that is linked to the member's contact information. Messages reminding the member to return the bike within the 3-hour rental period are sent. The member also will receive a message that their bike has been checked back in and the transaction has been completed. If the bike is lost, stolen, or severely damaged, a \$200 charge is assessed.

Bicycle maintenance is provided by the campus' retail bike shop and the Collegiate Bicycle Company. Not including staff time, which has not been specifically tracked, start-up costs were approximately \$150,000. Membership fee revenue does not cover a significant amount of the annual operating expenses. The Parking and Transportation Services division pays the remaining costs out of its operating budget, which is funded by the sale of parking permits and citations.

Advantages and Disadvantages

There are three institutions of higher education within the immediate service area being discussed for TAMC's initial program: Monterey Peninsula College, Defense Language Institute, and the Monterey Institute of International Studies. The university model is most applicable in a relatively contained campus setting, which might be more appropriate for California State University at Monterey Bay (CSUMB). The process of signing up may be simplified as universities already have students' pertinent information and already issue ID cards, many of which are RFID technology-enabled.

In this model, the university does not need to rely on the jurisdiction to provide a service. However, there could be potential conflicts if the jurisdiction in which the university is located also operates a program that uses a different system. There are also opportunities for universities like CSUMB to provide a system that is complementary to and compatible with a system provided under one of the other models. Additionally, the university could also facilitate student memberships within a broader regional program.

Potential Funding Sources

Whichever model is pursued, start-up costs will need to be funded and operational costs will need to be generated on an on-going basis. Start-up costs are often the least difficult to procure because there are myriad grants available for capital costs, and corporate sponsors are often willing to be part of the start of an innovative program. Operational costs must be raised year after year. If subscription fees and user fees do not cover the operational costs, and it is unlikely that they will, a reliable funding source is needed. For example, the City of Barcelona raised parking revenue by expanding its paid parking areas as a means of paying for its system.

The funding sources below are typically relevant but have not necessarily been previously used to fund bike share programs. In this sense, in some instances, they are untested sources and the nexus between the focus of the funding source and the bike share program may need to be articulated and approved before grant approval. In addition, it is important to note that this list does not represent a comprehensive set of funding sources but rather has been tailored to reflect those funding sources most viable for TAMC to pursue. Public funding sources (federal, state, and regional sources) also have been summarized in tabular format as shown in **Table 9**.

Federal Sources

- **Moving Ahead for Progress in the 21st Century.** On July 6, 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law. MAP-21 governs the funding of Federal surface transportation programs for fiscal years (FY) 2013 and 2014 and is the first long-term highway authorization enacted since the Safe, Accountable, Flexible, and Effective Transportation Equity Act—Legacy for Users (SAFETEA-LU) was enacted in 2005. Specific Federal funding programs under MAP-21 that could likely fund the capital costs of a bicycle sharing program include the programs described below.
 - **Transportation Alternatives (TA).** MAP-21 establishes a new program, Transportation Alternatives (TA), to provide funding for a variety of alternative transportation projects including bicycle and pedestrian projects that were previously eligible through separately funded programs under SAFETEA-LU. At approximately \$800 million per year, the TA program represents 2 percent of total MAP-21-authorized funding. Specific TA programs that may fund the capital costs of a bicycle sharing program include: transportation alternatives (formerly called the Transportation Enhancement [TE] program) and the Safe Routes to School program.⁶⁰

Fifty percent of TA funds will be distributed to geographical areas based on population. The remaining TA funds will be eligible to local governments, school districts, tribal governments,

⁶⁰ MAP-21 refers to the overall funding program and the eligible uses under the former TE program by the same name: transportation alternatives.

and public lands agencies through a competitive grant application process. However, a state DOT can redirect any or all of these remaining TA funds from local agencies to fund any other highway program. Further, in a state of emergency, a state DOT can transfer all TA funding towards the rebuilding of damaged transportation infrastructure.⁶¹

- **Surface Transportation Program (STP).** The Surface Transportation Program (STP) will provide an annual average of \$10 billion in flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

Fifty percent of STP funds will be distributed to geographical areas based on population, with the remainder to be used in any area of a particular state.⁶²

⁶¹ “Moving Ahead for Progress in the 21st Century Act (MAP-21): A Summary of Highway Provisions.” U.S. Department of Transportation, Federal Highway Administration, Office of Policy and Governmental Affairs, July 17, 2012.

⁶² Ibid.

Table 9
Monterey Bicycle Sharing Analysis
Federal, State, and Regional Funding Sources [1]

Item	Acronym	Agency	Program Funds Avail.	Matching Requirement	Eligible Applicants	Eligible Act.		Comments
						Cap.	O&M	
Federal Sources								
Transportation Alternatives Program	TA	DOT	\$809 million (FY 2012-13)	20% local match (subject to a sliding scale)	State and local governments; transportation/transit authorities	X		TA funds will be available for a variety of alternative transportation projects including the construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation such as sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure. States are allowed flexibility in transferring a portion, and in some cases, all, of TA funding to other transportation projects.
Surface Transportation Program	STP	DOT	\$10 billion (FY 2012-13)	20% local match (subject to a sliding scale)	State and local governments; transportation/transit authorities	X		STP funds may be used by States and localities for projects to preserve or improve conditions and performance on any Federal-aid highway, bridge projects on any public road, facilities for nonmotorized transportation, transit capital projects, and public bus terminals and facilities.
State Sources								
Bicycle Transportation Account	BTA	Caltrans	\$7.2 million	NA	Local agencies	X		Provides state funds for city and county projects that improve safety and convenience for bicycle commuters.
Transportation Development Act: Local Transportation Funds	TLF	DOT	NA	NA	Local agencies	X		Local Transportation Funds (LTF) are derived from a ¼ cent of the general sales tax collected statewide. The State Board of Equalization, based on sales tax collected in each county, returns the general sales tax revenues to each county's LTF.

Table 9
Monterey Bicycle Sharing Analysis
Federal, State, and Regional Funding Sources [1]

Item	Acronym	Agency	Program Funds Avail.	Matching Requirement	Eligible Applicants	Eligible Act.		Comments
						Cap.	O&M	
State Sources (continued)								
Regional Surface Transportation Program	RSTP	DOT	\$320 million (76% must be spent in 11 urbanized areas of greater than 200,000 residents)	20% local match	Local agencies	X		Funds may be used to to cover capital costs for transit projects eligible for assistance under the Federal Transit Act and publicly owned intracity or intercity bus terminals and facilities.
State Safe Routes to School Program	SR2S	Caltrans	\$24.25 million	10% minimum	Cities and Counties	X		Safe Routes to School (SR2S) funds may be used to improve infrastructure (must be located in the vicinity of a school), and support programs that promote walking and bicycling through education/encouragement programs aimed at children, parents, and the community.
Environmental Enhancement and Mitigation Program	EEM	Caltrans	\$10 million	None	Local agencies and Non-profit organizations	X		Projects are generally limited to \$350,000 each. Projects must directly or indirectly relate the environmental impact of the modification of an existing or new Transportation Facility.
Coastal Conservancy	NA	Coastal Conservancy	NA	NA	Government agencies and non-profits	X		Funds may be used to improve access to coastal areas and may include transportation infrastructure projects.
Regional Sources								
AB2766 Motor Vehicle Emission Reduction Grant Program	AB2766	MBUAPCD	\$1.4 million	Not required but matching funds increase competitiveness in application process	public agencies		X	Funds will be allocated based upon a project's ability to reduce future emissions and VMT by technology, demonstration, outreach, behavioral change and/or incentive, or alternative fuel infrastructure. The evaluation will also take into account Transportation Control Measure (TCM) implementation.

"fund_summ"

Source: Various funding source online resources; EPS.

[1] This list of funding sources is not comprehensive but reflects those funding sources most viable for TAMC to pursue.

Potential Program Partners

Most bike share programs function as hybrids of different business models and will depend on the support (financial and other) of a variety of potential partners.

Cities

In most bike share programs, the city is the program sponsor as cities are often eager to establish their position as leaders of the environmental and quality of life movements. However, even in the nonprofit and other models, the support of the cities within the service area will be critical to the success of the program. In exchange for healthier residents and employees who are less auto-dependent, cities can provide support in the grant application process by serving as the applicant in partnership with a nonprofit, by considering reduced parking requirements for development projects that contribute to the Program, and by providing land for bikesharing stations.

Employers

Employers may be willing to participate in the program by providing space for a bikesharing station, and/or by sponsoring an annual program sponsorship. Another possibility is that employers could support the program by ensuring a minimum number of subscriptions. An example of this can be seen in Minneapolis with BlueCross BlueShield. In exchange for their support, employers benefit through healthier employees, community service publicity, and reduced demand for on-site parking.

Nonprofits

Nonprofits in the service area whose missions relate to healthy behavior, encouraging transit use, and reducing auto demand may be interested in providing support by partnering with a public agency to apply for grants and other funding sources.

Universities

Colleges in the initial service areas include Monterey Peninsula College, Hartnell College, the Defense Language Institute and the Monterey Institute of International Studies. These institutions do not have to be exclusive operators as suggested above in the University model description. Rather, they may be willing to participate in the Program as partners or sponsors by ensuring a minimum number of subscriptions, facilitating sign ups, by providing space(s) for a bikesharing station, and/or by providing an annual Program subsidy. In exchange, the universities would benefit through healthier students, community service publicity, and reduced demand for on-site parking.

Bike Retailers/Vendors

As shown on **Table 10**, there are five bike rental locations in the City of Monterey that currently rent bikes for periods ranging from one hour to one month and focus on the tourist market. There is also one bike retailer in the City of Monterey and five bike retailers in Salinas. Each rental location or retailer could be approached regarding potential partnerships, particularly with respect to providing repairs and maintenance to a bicycle sharing program's fleet. In exchange the bike shops would be providing a community benefit and would receive no-cost publicity. Other options include providing small discounts for bike share members at select bicycle shops, both encouraging local patronage and providing an economic benefit to members. This membership discount has been utilized in Washington, D.C. through Capital Bikeshare with great success.

Hotels

Hotels in the area may be willing to participate in a bicycle sharing program by recommending the program to guests and offering flyers and/or informational packets to visitors. A centrally located hotel may be willing to provide space for a bikesharing station. In exchange, the hotels can offer the program as an amenity and claim "green" practices. There are national examples of hotel participation in bike share programs. Hotel San José in Austin offers bike rentals by the hour or by the day as a guest amenity. Ace Hotel in Portland also offers bikes that have been customized for Portland weather that can be checked out by its guests. Courtyard by Marriot in Boulder became the first hotel to install a bikesharing station on its property (through Boulder B-cycle).

Private Real Estate Developers

Private real estate developers may be willing to participate in a bicycle sharing program by providing bike sharing facilities and/or equipment in exchange for parking reductions, which can improve the financial feasibility of their developments. One example of a residential development that is proposing reduced parking is in San Francisco's SoMa District, where a developer has proposed a 260-unit residential tower *without any* permanent parking. The developer, Patrick Kennedy, is instead providing ample bike parking and has expressed interest in being included in an early phase of San Francisco's proposed bike share program.

In addition, developers are seeking ways to promote themselves as environmentally friendly and "green". Though exchanges for reduced parking may not be as attractive an offer in Monterey County, partnering with a bike share program would certainly give positive publicity and may help with other certifications, such as LEED, which can improve the marketability of new development.

Local Businesses

Local businesses may be able to help with pro bono branding, marketing, printing, accounting, and legal consulting in exchange for the publicity that would stem from assisting the program and its operators.

Table 10
Monterey Bicycle Sharing Analysis
City of Monterey and City of Salinas Bicycle Rental and Retail Shops

Item	Address	Zip Code	Telephone	Rental Rates [1]	
				Per Hour	Per Day
Bicycle Rental Shops [2]					
<i>Monterey</i>					
Adventures by the Sea	299 Cannery Row	93940	(831) 372-1807	\$7	\$30
Adventures by the Sea	210 Alvarado St.	93940	(831) 372-1807	\$7	\$30
Bay Bikes	486 Washington St.	93940	(831) 655-2453	\$5-16	\$20-64
Bay Bikes	585 Cannery Row	93940	(831) 655-2453	\$5-16	\$20-64
Blazing Saddles	750 Cannery Row	93940	(831) 776-9577	NA	\$25-79
Bicycle Retail Shops					
<i>Monterey</i>					
Aquarian at Bay Bikes	486 Washington St.	93940	(831) 655-2453	NA	NA
<i>Salinas</i>					
J&J Skateboards & Bikes	315 W Market St.	93901	(831) 998-8452	NA	NA
Bobcat Bicycles	141 Monterey St.	93901	(831) 753-7433	NA	NA
Doug Chandler Performance	517 Abbott St.	93901	(831) 422-3270	NA	NA
Bear Bikes	1288 N Main St.	93906	(831) 444-8460	NA	NA
Toys"R"Us	370 Auto Center Circle	93906	(831) 443-4455	NA	NA

"shops"

Source: Primary Internet research conducted by EPS.

[1] Rental rates current as of August 2012.

[2] Adventures by the Sea maintains a fleet of over 250 bikes, as well as a surrey service and hotel delivery service;
 Bay Bikes maintains a fleet of roughly 250 bikes.

4. CASH FLOW ESTIMATES

This chapter presents illustrative cash flow models for the purpose of evaluating estimated one-time capital and ongoing operational expenses and potential revenues to fund a bicycle sharing program in the Cities of Monterey and Pacific Grove and in the City of Salinas. The cash flow models are based on monthly ridership projections prepared by Fehr & Peers (Base Scenario: Scenarios 1 and 2) and include sensitivity scenarios in which demand is both lower (Scenarios 1A and 2A) and higher (Scenarios 1B and 2B) than estimated in the Base Scenarios.

The cash flow model for Monterey / Pacific Grove is based on a proposed system of 24 stations, and 10 docks and five bicycles per station (a total of 120 bicycles). A network of this scope is estimated to generate 3,000 bike share trips each month under the Base Scenario. The cash flow model for Salinas is based on a proposed system of 16 stations, and 10 docks and five bicycles per station (a total of 80 bicycles). A network of this scope is estimated to generate 900 bike share trips each month under the Base Scenario. Such usage levels would mean that each bike is ridden on average less than once per day. By contrast, systems such as Washington DC's Capital Bikeshare have generated annual ridership in excess of three trips per bike per day. Though every system is different and ridership depends on myriad factors ranging from population density to tourism activity to weather conditions, these estimates are reasonably representative of potential usage in the envisioned service areas of Monterey / Pacific Grove and Salinas.

The cash flow models also incorporate a number of assumptions based on case study research of other bicycle sharing programs currently in operation as described in detail in this chapter. It is anticipated that these preliminary cash flow models will be used as a basis for further evaluation as TAMC continues to explore the feasibility of a bicycle sharing program in the City.

Bike Sharing Program Expenditures

The following section describes initial capital and ongoing operations and maintenance expenditures estimated for the potential bike share programs. The expenditures described in this chapter remain constant for the Base Scenario and sensitivity scenarios.

Initial Capital Expenditures

A review of recently launched bicycle sharing programs in the United States suggest per station costs (which includes bikes and installation) of between \$35,000 and \$40,000 for stations of comparable size to those assumed for a potential bike share program in the City. Programs such as Denver B-cycle and Minnesota's Nice Ride show capital costs of between \$45,000 and \$60,000, although the stations are generally larger than those envisioned for TAMC.⁶³

As an initial conservative estimate, the cash flow model includes capital expenditures for the potential bike share program in Monterey / Pacific Grove to be \$45,000 per station, or about \$1.1 million in aggregate

⁶³ Capital costs for Denver B-cycle cited in Denver Post article by Charmaine Robledo published September 6th, 2010. Nice Ride's capital cost information can be found on their website, niceride.org, in a published response to questions from the community about the program.

based on a proposed system of 24 stations.⁶⁴ This estimate is based on initial installation costs and the following anticipated equipment needs: 120 bicycles; 240 locking stations (docks); membership cards (RFID cards that subscribers would "swipe" at a station to check out a bike); software; user-interface technology; maintenance and rebalancing equipment; storage racks; and traffic barriers. The cost estimate also includes the following one-time non-capital costs: development of system map and map racks; and marketing, legal, and accounting services. A Salinas program of 16 stations, 80 bicycles, and 160 docks would incur capital expenditures of about \$720,000 in aggregate.

Ongoing Operating and Maintenance (O&M) Expenditures

The bike sharing program will require ongoing operational expenses including: equipment maintenance and replacement (because of loss, vandalism, theft, or unusual damage); bicycle rebalancing; program administration (e.g., membership maintenance, program promotion); marketing; security and access management; and liability insurance.

In this preliminary cash flow model, the annual operating costs are assumed to be \$1,500 per bicycle annually (\$125 per bicycle per month) or \$180,000 annually in aggregate for Monterey / Pacific Grove and \$120,000 annually in aggregate for Salinas, assuming all the operating efficiencies of a full program. Ongoing operating costs per bicycle are based on figures provided in the Nice Ride Minnesota Business Plan.⁶⁵ The annual operating cost includes a contingency amount for replacement of bikes resulting from theft, vandalism, and normal wear-and-tear.

The \$1,500 per year estimate includes the following annual expenditures:

Operational Costs

- Program Administration Salaries and Benefits
- Insurance
- Internet and Phone Service
- Office Furniture
- Office Lease
- Postage and Printing for New Subscriber Packages and Annual Mailing
- Ongoing Promotions Annual Budget
- Software License and Back-End Operation
- Customer Service Help Desk
- Credit Card Processing Fees
- Wireless Communication between Locking Stations
- Hosting Services
- System Operating Cards

⁶⁴ Land acquisition costs for the bicycle sharing stations are expected to be zero. This analysis assumes that the stations will be located in public right-of-way. Capital costs could increase with the need to acquire land to site any of the stations.

⁶⁵ Twin Cities Bike Share Project Business Plan: Nice Ride Minnesota, 2008.

- Misc. Supplies and Expenses

Maintenance Costs

- Full-Time Bike Mechanics
- Electronics Technician(s)
- Contractor Overhead, if applicable
- Bicycle Parts
- Locking Station Batteries
- Other Locking Station Parts
- Communications (Cellular)
- Vehicle Maintenance

Replacement Because of Theft and Major Vandalism (Requiring Replacement)

- Bicycle Theft and Major Vandalism Replacements
- Locking Station Replacements

Bike Sharing Program Revenues

The following section describes potential revenues generated for both the Monterey / Pacific Grove program and the Salinas program under the Base Scenario and two sensitivity scenarios in which demand is both lower (Scenarios 1A and 2A) and higher (Scenarios 1B and 2B) than estimated in the Base Scenario. To bracket potential revenues generated by program users,

- The Base Scenario assumes 3,000 trips per month for Monterey / Pacific Grove and 900 trips per month for Salinas.
- Scenario 1A assumes 1,500 trips per month (1,500 fewer trips than the Base Scenario) for Monterey / Pacific Grove while Scenario 2A assumes 450 trips per month (450 fewer trips than the Base Scenario) for Salinas.
- Scenario 1B assumes 5,800 trips per month (2,800 additional trips relative to the Base Scenario) for Monterey / Pacific Grove while Scenario 2B assumes 1,750 trips per month (850 additional trips relative to the Base Scenario) for Salinas.

The monthly ridership projections for the Base Scenario and sensitivity scenarios were estimated by Fehr & Peers as described in Chapter 2, above. This larger upside and smaller downside estimate is consistent with bikesharing forecasting literature and the experience of other bikesharing systems, in which ridership grows at a faster than linear rate due to the network effects of system expansion.

Initial Capital Funding

Initial capital costs for bike share programs currently in operation typically involve a combination of Federal, state and local grants and funds, and sponsorships. Although a funding source for initial capital costs has not been identified for a potential bike sharing program in the City, there are a number of Federal and other funding sources available. Securing grant funding is always a competitive process, but tends to be easier to acquire relative to securing ongoing O&M funding.

Ongoing O&M Funding

Typically, ongoing operations and maintenance funding is generated predominantly through membership/user fees and sponsorships. For example, both Denver B-cycle and Boulder B-cycle fund over 75 percent of their total operations budget through membership/user fees and sponsorships.⁶⁶

The preliminary cash flow model estimates membership and user fee revenue generated according to the monthly ridership projections in the Base Scenario and two sensitivity scenarios, and then estimates revenues required from other sources (e.g., sponsorships, advertising), as described further below.

Membership Fees

Bicycle sharing program users pay for a daily pass, or can subscribe for a longer term (e.g., per month, per semester, per year). As shown in **Table 11**, other select bike share programs in the U.S. charge \$5 for a one-day pass, \$30 to \$75 for an annual membership, and about \$3 for use above and beyond the first half-hour of use. In this analysis, EPS has assumed the following pricing scenario based on programs of similar scope to the potential City program.⁶⁷

- Daily membership: \$5.
- Annual membership: \$50.
- Extended usage fee: For daily users, \$2 for the first 30 minutes beyond the first half-hour (the first half-hour is included in membership costs); \$6 for trips of 60 to 90 minutes; and \$8 additional for each subsequent half-hour.^{68,69} For annual users, \$1 for the first 30 minutes beyond the first half-hour; \$5 for trips of 60 to 90 minutes; \$11 for trips of 90 to 120 minutes; and \$8 additional for each subsequent half-hour. Refer to Table 11 for an illustration of the extended usage fee by user and by time interval.

⁶⁶ Denver Bike Share 2011 Annual Report states that over 77% of total revenue comes from sponsorship and user/membership fees. Boulder B-cycle's 2011 Annual Report states that all of their operating costs are covered by a combination of user/membership fees and sponsorship.

⁶⁷ For the purposes of this study, EPS chose not to calculate weekly or monthly membership options because of those pricing brackets' relative insignificance to the overall revenue of a bike share program. For example, for DC's Capital Bikeshare, monthly members maintain approximately 1% of the total membership.

⁶⁸ Many bike share programs allow users to take a bike for up to one-half hour at no additional charge beyond the cost of their daily, monthly, or annual pass. To discourage users from keeping the bikes all day rather than leaving them in circulation for other users, most programs charge a small fee after the bike has been out for a certain length of time.

⁶⁹ Because of data limitations, all trips lasting longer than 4 hours are grouped into a single time interval (4 – 24+ hours). As a conservative estimate, EPS assumes all trips longer than 4 hours will incur a \$54 charge. In actuality, each additional 30 minute interval beyond 4 hours and 30 minutes would incur an additional \$8 charge.

Table 11
Monterey Bicycle Sharing Analysis
Bicycle Sharing Program Membership Fees

Program	City	State	Membership Options [1]				Extended Usage Fee [1]
			Daily	Weekly	Monthly	Annual	
Boulder B-cycle	Boulder	CO	\$5	\$15	-	\$40	First hour is free; \$4 every 30 min. thereafter
Broward B-cycle	Broward (County)	FL	\$5	\$25	-	\$45	\$.50 first 30 min; \$3 every 30 min. thereafter
Bike Chattanooga	Chattanooga	TN	\$6	-	-	\$75	1st hour is free; \$5 every 30 min thereafter
Denver Bike Share	Denver	CO	\$6	\$20	\$30	\$65	No fee first 30 min; \$1 30-60min; \$4 every 30 min thereafter
Des Moines B-cycle	Des Moines	IA	\$5	-	\$30	\$50	1st hour is free; \$1.25 each additional 30 min
Nice Ride Minnesota	Minneapolis/St. Paul	MN	\$5	-	\$30	\$60	First 30 min. free; \$1.50 30-60 min; \$4.50 60-90 min; \$6 every 30 min thereafter
Omaha B-cycle	Omaha	NE	\$5	-	\$32	\$64	First hour free; \$1.34 each additional 30 min.
Spartanburg B-cycle	Spartanburg	SC	\$5	-	\$15	\$30	First hour is free; \$1 each additional 30 min.
Average			\$5	\$20	\$27	\$54	

"fees"

Source: Bike share program operators and websites; EPS.

[1] Membership and extended usage fees current as of August 2012.

Net Cash Flow

Monterey / Pacific Grove Base Scenario: Scenario 1

As shown in **Table 12a**, based on the pricing structure described above, the Base Scenario generates approximately \$65,000 annually in membership and extended usage fee revenue, or about 36 percent of estimated annual O&M expenditures of \$180,000, leaving approximately \$115,000 annually required from other funding sources, such as sponsorships, advertising, gifts in kind (private or corporate donations), grant funding or other source.

Salinas Base Scenario: Scenario 2

As shown in **Table 12b**, based on the pricing structure described above, the Base Scenario generates approximately \$19,500 annually in membership and extended usage fee revenue, or about 16 percent of estimated annual O&M expenditures of \$120,000, leaving approximately \$100,500 annually required from other funding sources, such as sponsorships, advertising, gifts in kind (private or corporate donations), grant funding or other source.

For the reader's reference, this analysis compares annual membership and extended usage fee revenue generated under the Base Scenarios with selected, existing bicycle sharing programs throughout the nation.⁷⁰ As shown in **Table 13**, the Scenario 1 estimated membership and extended usage fee revenue of \$65,000 represents approximately 36 percent of total estimated annual operating expenditures for the Monterey / Pacific Grove system. Scenario 2 estimated membership and extended usage fee revenue of \$19,500 represents approximately 16 percent of total estimated annual operating expenditures for the Salinas system. Further, this analysis estimates about \$1.80 in estimated annual membership and extended usage fee revenue per trip for both systems and about \$540 per bicycle in the Monterey / Pacific Grove system and \$240 per bicycle in the Salinas system. In comparison, selected existing bike share programs' annual membership and extended usage fee revenues represent 38 to 59 percent of their respective annual budgets and generate approximately \$2.60 to \$3.20 per trip and approximately \$540 to \$1,325 per bicycle.

While not a comprehensive evaluation because data is not readily available for many existing bike share programs, this comparison of membership and extended usage fee revenue generally indicates that the estimated revenue projections appear to be a reasonable – and perhaps, conservative – estimate based on projected ridership of the Monterey / Pacific Grove bicycle sharing program. The Salinas program revenue estimates are substantially lower on a per-bike basis than revenues for existing bike share programs.

Monterey / Pacific Grove Sensitivity Scenarios: Scenario 1A and 1B

To bracket potential revenues generated by program users, Scenario 1A assumes 1,500 fewer trips per month (1,500 total monthly trips), while Scenario 1B assumes 2,800 additional trips per month (5,800 total

⁷⁰ Selected, existing programs were chosen based on publicly-available data and represent the best available data at the time of the analysis.

monthly trips) relative to the Base Scenario. As shown in Table 12a, the sensitivity scenarios generate a range of \$32,000 (Scenario 1A) to \$125,000 (Scenario 1B) in annual membership and user fee revenue, or about 18 percent to 70 percent of annual operating expenditures of \$180,000. Under Scenario 1A, an additional \$148,000 in annual revenues from other sources would be required; Scenario 1B would require an additional \$55,000 in annual revenues from other sources.

Salinas Sensitivity Scenarios: Scenario 2A and 2B

To bracket potential revenues generated by program users, Scenario 2A assumes 450 fewer trips per month (450 total monthly trips), while Scenario 2B assumes 850 additional trips per month (1,750 total monthly trips) relative to the Base Scenario. As shown in Table 12b, the sensitivity scenarios generate a range of \$9,500 (Scenario 2A) to \$37,500 (Scenario 2B) in annual membership and user fee revenue, or about 8 percent to 31 percent of annual operating expenditures of \$120,000. Under Scenario 2A, an additional \$110,500 in annual revenues from other sources would be required; Scenario 2B would require an additional \$82,500 in annual revenues from other sources.

Table 12a
Monterey Bicycle Sharing Analysis
Monterey / Pacific Grove Illustrative Cash Flow Model

Item	Initial Capital Costs (Year 1)	Annual Operations & Maintenance [1]		
		Base Scenario Scenario 1	Sensitivity Scenarios	
			Scenario 1A	Scenario 1B
Trips/Month [2]		3,000 Trips/Month	1,500 Trips/Month	5,800 Trips/Month
Members/Year [3]		4,000 Members/Year	2,000 Members/Year	7,700 Members/Year
Annual Expenditures				
Capital Costs [4]				
Number of Bikes	120	-	-	-
Number of Stations	24	-	-	-
Capital Costs per Station	\$45,000	-	-	-
Total Capital Costs	\$1,080,000	-	-	-
Operating & Maint. (O&M) Costs [5]				
Annual O&M Cost per Bike	-	\$1,500	\$1,500	\$1,500
Total O&M Costs	-	\$180,000	\$180,000	\$180,000
Annual Revenues				
Membership/User Fees [6]				
Daily Subscriptions				
Daily Subscribers/Year [7]	-	3,600	1,800	6,930
Price/Day	-	\$5	\$5	\$5
Annual Total	-	\$18,000	\$9,000	\$34,650
Annual Subscriptions				
Annual Subscribers/Year [7]	-	400	200	770
Price/Year	-	\$50	\$50	\$50
Annual Total	-	\$20,000	\$10,000	\$38,500
Extended Usage Fees				
Avg Fee per Trip [8]	-	\$0.75	\$0.75	\$0.75
Annual Trips [9]	-	36,000	18,000	69,600
Annual Total	-	\$26,905	\$13,453	\$52,017
Total Membership/User Fees	-	\$64,905	\$32,453	\$125,167
Other Sources [10]				
Advertising/Sponsorships	TBD	TBD	TBD	TBD
Gifts in Kind	TBD	TBD	TBD	TBD
Grants	TBD	TBD	TBD	TBD
Total Other Sources	\$1,080,000	\$115,095	\$147,548	\$54,833
Total Revenues	\$1,080,000	\$180,000	\$180,000	\$180,000
Net Cash Flow	\$0	\$0	\$0	\$0

"cash_flow"

Source: Fehr & Peers; EPS.

Table 12a
Monterey Bicycle Sharing Analysis
Monterey / Pacific Grove Illustrative Cash Flow Model

- [1] Assumes the operating efficiencies of a full program.
- [2] Base Scenario ridership estimated by Fehr & Peers. Sensitivity scenarios bracket potential revenues by assuming 1,500 fewer trips (Scenario 1A) and 2,800 additional trips (Scenario 1B) relative to the Base Scenario.
- [3] The estimated number of members per year relative to monthly ridership projections is calculated in Table 14.
- [4] Assumes zero site acquisition costs. The \$45,000 per station estimate for start-up costs includes the following capital costs: bicycles; locking stations; membership cards (RFID cards that subscribers would "swipe" at a station to check out a bike); software; user-interface technology; maintenance equipment; storage racks; and traffic barriers. The estimate also includes the following non-capital costs: development of system map and map racks; marketing, legal, and accounting services.
- [5] Cost estimate based on the Nice Ride Minnesota Business Plan, which estimates an annual operations and maintenance cost of
- [6] For the purpose of this analysis, it is assumed membership fees will cover the initial 30 minutes of usage. An additional extended usage fee will be incurred for every subsequent 30-minute interval. Refer to Table 17 for additional information.
- [7] Assumes daily subscriptions are 90% and annual subscriptions are 10% of total membership. Refer to Table 15 for more information.
- [8] Extended usage fee per trip based on a pricing model described Table 16.
- [9] The extended usage fee was applied to the monthly ridership projections (trips) multiplied by 12.
- [10] Based on case study research, all bike share programs will require supplemental funding from other sources of revenue. Specific amounts from other sources cannot be determined at this time but they will likely comprise some combination of the revenues listed. Other sources of revenue may also be available.

Table 12b
Monterey Bicycle Sharing Analysis
Salinas Illustrative Cash Flow Model

Item	Initial Capital Costs (Year 1)	Annual Operations & Maintenance [1]		
		Base Scenario Scenario 1	Sensitivity Scenarios	
			Scenario 1A	Scenario 1B
Trips/Month [2]		900 Trips/Month	450 Trips/Month	1,750 Trips/Month
Members/Year [3]		1,200 Members/Year	600 Members/Year	2,300 Members/Year
Annual Expenditures				
Capital Costs [4]				
Number of Bikes	80	-	-	-
Number of Stations	16	-	-	-
Capital Costs per Station	\$45,000	-	-	-
Total Capital Costs	\$720,000	-	-	-
Operating & Maint. (O&M) Costs [5]				
Annual O&M Cost per Bike	-	\$1,500	\$1,500	\$1,500
Total O&M Costs	-	\$120,000	\$120,000	\$120,000
Annual Revenues				
Membership/User Fees [6]				
Daily Subscriptions				
Daily Subscribers/Year [7]	-	1,080	540	2,070
Price/Day	-	\$5	\$5	\$5
Annual Total	-	\$5,400	\$2,700	\$10,350
Annual Subscriptions				
Annual Subscribers/Year [7]	-	120	60	230
Price/Year	-	\$50	\$50	\$50
Annual Total	-	\$6,000	\$3,000	\$11,500
Extended Usage Fees				
Avg Fee per Trip [8]	-	\$0.75	\$0.75	\$0.75
Annual Trips [9]	-	10,800	5,400	21,000
Annual Total	-	\$8,072	\$4,036	\$15,695
Total Membership/User Fees	-	\$19,472	\$9,736	\$37,545
Other Sources [10]				
Advertising/Sponsorships	TBD	TBD	TBD	TBD
Gifts in Kind	TBD	TBD	TBD	TBD
Grants	TBD	TBD	TBD	TBD
Total Other Sources	\$720,000	\$100,528	\$110,264	\$82,455
Total Revenues	\$720,000	\$120,000	\$120,000	\$120,000
Net Cash Flow	\$0	\$0	\$0	\$0

"cash_flow"

Source: Fehr & Peers; EPS.

Table 12b
Monterey Bicycle Sharing Analysis
Salinas Illustrative Cash Flow Model

- [1] Assumes the operating efficiencies of a full program.
- [2] Base Scenario ridership estimated by Fehr & Peers. Sensitivity scenarios bracket potential revenues by assuming 450 fewer trips (Scenario 2A) and 850 additional trips (Scenario 2B) relative to the Base Scenario.
- [3] The estimated number of members per year relative to monthly ridership projections is calculated in Table 14.
- [4] Assumes zero site acquisition costs. The \$45,000 per station estimate for start-up costs includes the following capital costs: bicycles; locking stations; membership cards (RFID cards that subscribers would "swipe" at a station to check out a bike); software; user-interface technology; maintenance equipment; storage racks; and traffic barriers. The estimate also includes the following non-capital costs: development of system map and map racks; marketing, legal, and accounting services.
- [5] Cost estimate based on the Nice Ride Minnesota Business Plan, which estimates an annual operations and maintenance cost of
- [6] For the purpose of this analysis, it is assumed membership fees will cover the initial 30 minutes of usage. An additional extended usage fee will be incurred for every subsequent 30-minute interval. Refer to Table 17 for additional information.
- [7] Assumes daily subscriptions are 90% and annual subscriptions are 10% of total membership. Refer to Table 15 for more information.
- [8] Extended usage fee per trip based on a pricing model described Table 16.
- [9] The extended usage fee was applied to the monthly ridership projections (trips) multiplied by 12.
- [10] Based on case study research, all bike share programs will require supplemental funding from other sources of revenue. Specific amounts from other sources cannot be determined at this time but they will likely comprise some combination of the revenues listed. Other sources of revenue may also be available.

Table 13
Monterey Bicycle Sharing Analysis
Comparison of Revenue: Proposed Monterey Programs and Selected Existing Bike Share Programs

Item	Proposed Monterey / Pacific Grove Bike Share Program (Base Scenario)	Proposed Salinas Bike Share Program (Base Scenario)	Selected Existing Programs [1]			
			Denver B-cycle (2011)	Boulder B-cycle (2011)	Capital Bikeshare (Arlington Portion Only) (FY 2012)	Nice Ride Minnesota (2010)
<i>Source</i>	<i>Table 12a</i>	<i>Table 12b</i>	<i>[2]</i>	<i>[3]</i>	<i>[4]</i>	<i>[5]</i>
Annual Budget	\$180,000	\$120,000	\$1,476,929	\$489,177	\$643,000	\$557,410
Total Annual Trips	36,000	10,800	196,578	18,500	147,956	100,817
Total System Bicycles	120	80	520	110	286	600
Annual Membership/Usage Fee Revenue						
Membership Fee Revenue	\$38,000	\$11,400	\$356,103	-	-	\$227,365
Extended Usage Fees	\$26,905	\$8,072	\$206,944	-	-	\$97,348
Total Annual Membership/Usage Fee Revenue	\$64,905	\$19,472	\$563,047	\$374,220	\$379,000	\$324,713
Comparison Metrics						
Membership/Usage Revenue as % of Total Budget	36.1%	16.2%	38.1%	76.5%	58.9%	58.3%
Membership/Usage Revenue per Trip	\$1.80	\$1.80	\$2.86	\$20.23	\$2.56	\$3.22
Membership/Usage Revenue per Bicycle	\$541	\$243	\$1,083	\$3,402	\$1,325	\$541

"comp"

Source: Various sources (see footnotes below); EPS.

- [1] Selected, existing programs chosen based on availability of data and represents the best available data at the time of the analysis.
- [2] 2011 Denver B-cycle Annual Report: denverbikesharing.org/files/DBS_2011_Annual_Report.pdf.
- [3] 2011 Boulder B-cycle Annual Report: boulder.bcycle.com/LinkClick.aspx?fileticket=wrnQ-L2GXgl%3D&tabid=429;
GivingFirst website: givingfirst.org/BoulderB-cycle/financials
- [4] Arlington County FY 2012 Summary Report on Capital Bikeshare:
bikearlington.com/tasks/sites/bike/assets/File/Arlington_Bikeshare_FY12_Sum_Report.pdf;
Capital Bikeshare dashboard: cabidashboard.ddot.dc.gov/CaBiDashboard/#Home
- [5] Nice Ride Minnesota 3-Month Update: niceridemn.org/news/2010/09/15/21/3_month_update; Comparison of Nice Ride Minnesota 2010 Performance to the 2008 Twin Cities Bike Share Project Business Plan Projections: projectadvisoryteam.files.wordpress.com/2011/01/comparison-of-2010-performance-to-2008-business-plan-assumptions-updated.pdf; Vars, Mitch. "2010 Season Comes to a Close with Over 100,000 Rides." Nice Ride Minnesota website, News Archives.

Methodology for Estimating Membership Revenue

The steps for estimating annual membership revenue are described in this section. Note that, where applicable, figures depicted in the description below refer to the Base Scenario, but the same methodology was applied to both sensitivity scenarios.

In order to estimate potential annual membership revenue for cash flow purposes, EPS first estimated the potential program membership based on the monthly ridership projections provided by Fehr & Peers. Data from currently operating programs indicates that bicycle sharing programs in the U.S. averaged a total membership (daily, monthly, annually, etc.) ratio to total program bikes of 33:1. That is, for every bike operating in a bike share program in the U.S., there are 33 members of some kind.⁷¹

Applying this ratio to the number of bikes in the proposed programs yields a total annual membership of 4,000 for Monterey / Pacific Grove. To validate this total membership figure against other U.S. bicycle sharing programs, EPS calculated a ratio of total annual trips to total members. Annual trips of 36,000 for the Monterey / Pacific Grove Base Scenario (based on monthly ridership projections of 3,000) and a total annual membership of 4,000 yields a ratio of approximately 9:1 annual trips to total members. As shown in **Table 14**, annual trip to total membership ratios in other U.S. bicycle sharing programs range between 5-12:1 total trips to total members, confirming that a 9:1 ratio is within an acceptable range. For Salinas, a comparable 9:1 ratio of annual trips to total members yields total membership of approximately 1,200.

To calculate the estimated allocation of members between daily and annual membership, case study research indicates annual membership comprises a small percentage: approximately 5 to 30 percent of total membership. Data from other bike share programs indicate that casual users, purchasing a membership for one to seven days, comprise the great majority of bike share patrons. For example, Capital Bikeshare had sold over 100,000 one-day memberships by the end of 2011 (the program launched in September 2010), while maintaining an annual membership base of only around 20,000 individuals (less than 20 percent) during this same period. Similarly, Boulder's system had over five times as many daily users as annual members last year. For reference, **Table 15** provides a select listing of bicycle sharing programs and their relative share of casual and annual users as a percentage of total members.

As a preliminary estimate, the cash flow model assumes that annual membership would comprise 10 percent of total membership, with the remaining percentage (90 percent) allocated to daily membership. To the extent that annual membership is greater, total membership-generated revenue would increase.

In addition to daily and annual membership fees, bike share programs commonly charge for extended use. For example, while membership commonly covers the first 30 minutes usage, additional 30-minute increments require an additional charge. As a preliminary assumption, the cash flow model assumes that membership will cover the initial 30 minutes of usage and an additional fee will be charged for every subsequent 30-minute period. This pricing structure is based on current programs throughout the U.S. as shown in Table 11.

⁷¹ Public Bikesharing Operations in North America. Mineta Transportation Institute. June 2012.

Table 14
Monterey Bicycle Sharing Analysis
Estimated Membership of Proposed Bicycle Sharing Program

Program	City, State	Trips per Month [1] (Rounded)	Trips per Year [2] (Rounded)	Total Members [3] (Rounded)	Annual Trips per Member
<i>Formula</i>		<i>a</i>	<i>b = a * 12</i>	<i>c</i>	<i>d = c / b</i>
Proposed Bicycle Sharing Program					
Base Scenario 1	Monterey / Pacific Grove, CA	3,000	36,000	4,000	9
Sensitivity Scenario 1A		1,500	18,000	2,000	9
Sensitivity Scenario 1B		5,800	69,600	7,700	9
Base Scenario 2	Salinas, CA	900	10,800	1,200	9
Sensitivity Scenario 2A		450	5,400	600	9
Sensitivity Scenario 2B		1,750	21,000	2,300	9
Case Studies [4]					
Capital Bikeshare	Washington DC/Arlington, VA	97,700	1,171,600	124,800	9
Nice Ride	Minneapolis, MN/St. Paul, MN	25,900	310,900	39,000	8
The Hubway	Boston, MA	15,200	182,500	33,600	5
Denver B-cycle	Denver, CO	22,800	273,100	43,300	6
San Antonio B-cycle	San Antonio, TX	3,900	47,200	3,800	12
Boulder B-cycle	Boulder, CO	2,100	25,000	4,000	6
Spartanburg B-cycle	Spartanburg, SC	300	3,700	550	7

"membership"

Source: Fehr & Peers; Toole Design Group; EPS.

- [1] For the proposed bicycle sharing program, Base Scenario and sensitivity scenario trips per month (monthly ridership projections) were estimated by Fehr & Peers.
- [2] Assumes 365 days of operation. Figure is based on daily ridership totals converted to monthly totals as 4 case studies are seasonal and 2 year-round programs had not been in operation for an entire year when this data was collected. Annual trips for the proposed program in Monterey are based on monthly ridership projections multiplied by 12 months.
- [3] Membership figures for case studies are based on research by the Toole Design Group. Membership figures for the proposed bicycle sharing program are calculated using an annual trip per member ratio of 9:1 (for example: trips per year (36,000)/9 = total members (4,000)). That is, the ratio assumes every member (within all membership types) will take 9 trips per year. As shown in the case study data, a 9:1 ratio is within the range of annual trips per member for other bicycle sharing programs.
- [4] Case study trip and membership data is based on research by the Toole Design Group (2012).

Table 15
Monterey Bicycle Sharing Analysis
Daily and Annual Membership Estimates

Program	City, State	Bicycle Sharing Program Membership			Percentage of Total Membership	
		Total [1] (Rounded)	Casual Members [2]	Annual Members	Casual	Annual
Proposed Bicycle Sharing Program [3]						
Base Scenario 1	Monterey / Pacific Grove, CA	4,000	3,600	400	90%	10%
Sensitivity Scenario 1A		2,000	1,800	200	90%	10%
Sensitivity Scenario 1B		7,700	6,930	770	90%	10%
Base Scenario 2	Salinas, CA	1,200	1,080	120	90%	10%
Sensitivity Scenario 2A		600	540	60	90%	10%
Sensitivity Scenario 2B		2,300	2,070	230	90%	10%
Case Studies [4]						
Capital Bikeshare	Washington DC/Arlington, VA	124,800	105,644	19,200	85%	15%
Nice Ride	Minneapolis, MN/St. Paul, MN	39,000	35,000	4,000	90%	10%
The Hubway	Boston, MA	33,600	30,000	3,600	89%	11%
Denver B-cycle	Denver, CO	43,300	40,600	2,659	94%	6%
San Antonio B-cycle	San Antonio, TX	3,800	2,800	1,000	74%	26%
Boulder B-cycle	Boulder, CO	7,500	6,200	1,171	83%	16%
Spartanburg B-cycle	Spartanburg, SC	1,200	1,074	127	90%	11%
Des Moines B-cycle	Des Moines, IA	2,300	2,251	30	98%	1%

"breakdown"

Source: Toole Design Group; EPS.

[1] Total members, as shown in Table 14.

[2] Casual membership is defined as any membership option other than annual (e.g., daily, weekly, monthly, etc.). Based on case study research, multiple-day, weekly, and monthly memberships represent an insignificant percentage of total membership revenue for U.S. bike share programs. As such, this analysis groups all non-annual memberships into one category.

[3] Assumed membership breakdown based upon case studies of currently operating U.S. bike share programs.

[4] EPS uses the listed case studies in order to verify that the percentage of annual membership of total membership is a reasonable assumption. As shown, the ratio is within the range exhibited by the case studies.

To calculate estimated revenue from extended use fees, EPS obtained trip time data provided by Capital Bikeshare. From this data, EPS projected the percentage of rides (both by daily and annual members) that can be expected to incur extended user fees beyond the initial membership fee. Capital Bikeshare, though far larger than the proposed Monterey program, provides a close comparison to Monterey because of its large number of tourist users. As shown in **Table 16**, approximately \$0.75 in extended use charges can be expected for every trip taken.

As described, this pricing structure of membership and extended usage fees results in approximately 36 percent of total annual O&M expenditures recovered through membership and user fee revenue under the Base Scenario for the Monterey / Pacific Grove system. This percentage is similar to that seen with some of the most successful bike share programs in the country. For example, Denver B-cycle stated in its 2011 Annual Report that user fees produce 37 percent of their total revenue, and, in their 2011 Annual Report, Boulder B-cycle cited that 36 percent of total operating costs were covered by user fees. In Salinas, membership and extended usage fees are estimated to meet approximately 16 percent of total annual O&M expenditures under the Base Scenario.

Table 16
Monterey Bicycle Sharing Analysis
Extended Use Cost per Trip Estimate

Item	Percent of Trips by Time Interval [1]	Estimated Cost per Time Interval [2]	Average Extended Usage Cost per Trip [3]
Usage Time			
0-30 Minutes	91.1%	\$0.00	\$0.00
30-60 Minutes (Annual Members) [4]	1.2%	\$1.00	\$0.03
30-60 Minutes	3.5%	\$2.00	\$0.04
60-90 Minutes	1.8%	\$6.00	\$0.11
90-120 Minutes	1.2%	\$14.00	\$0.16
120-150 Minutes	0.5%	\$22.00	\$0.11
150-180 Minutes	0.4%	\$30.00	\$0.13
180-210 Minutes	0.1%	\$38.00	\$0.05
210-240 Minutes	0.1%	\$46.00	\$0.06
240+ Minutes [5]	0.1%	\$54.00	\$0.05
Total	100.0%	NA	\$0.75

"ext_use"

Source: Capital Bikeshare; EPS.

- [1] Percentages based on system data available from Capital Bikeshare's website (capitalbikeshare.com). These percentages represent the allocation of total trips (by all membership types) by time interval between August 2011 and July 2012. Although the majority of trips are within the first 30 minute time interval, roughly 9 percent of all trips accrue additional usage fees. In comparison, Nice Ride Minnesota members incur charges on 11 percent of all trips (2011 data) and Boulder B-cycle members incur charges on 17 percent of all trips (2011 data). This analysis uses Capital Bikeshare figures as a more conservative estimate of potential extended usage charges.
- [2] For the purpose of this analysis, EPS assumes that membership fees will cover the initial 30 minutes of usage and an additional charge will be incurred for every subsequent 30-minute interval. For reference, Table 17 presents the proposed extended use fee structure and Table 11 presents the extended use fee structure utilized by current bike share programs.
- [3] Calculated as a weighted average of all extended usage fees by time interval. As a conservative assumption, this extended usage fee per trip has been applied in the cash flow model to daily users only. It is assumed that the majority of trips extending beyond the first 30 minutes will be incurred by daily members, with a negligible number of trips extending beyond the first 30 minutes incurred by annual members.
- [4] The extended usage fee varies for annual and daily members. A majority of the trips in the proposed bike share program are assumed to be taken by annual members and of these trips, nearly 99% are assumed to be within the no-cost first 30 minute interval. The remaining trips by annual users are assumed to be within the 30-60 minute interval.
- [5] Because of data limitations, all trips lasting longer than 4 hours (240 minutes) are grouped into a single time interval. As a conservative estimate, EPS assumes all trips longer than 4 hours will be incur a \$54 charge. In actuality, each additional 30 minute interval would incur an additional \$8 charge.

5. ECONOMIC IMPACTS OF BICYCLE SHARING PROGRAM

In this initial evaluation of a bicycle sharing program, EPS has prepared a high-level qualitative assessment of the program's potential economic impacts to the local economy. As a later phase of evaluation, it may be worthwhile to conduct a full-scale quantitative analysis focused on the economic output of a bicycle sharing program (i.e., jobs created, estimated economic activity generated in the local economy). This chapter summarizes existing literature regarding the most frequently cited economic impacts, as well as potential impacts specific to the local bicycle rental and retail industry and suggested measures to mitigate these potential impacts.

Economic Impacts

While the *health* benefits of increased bicycle usage through a bicycle sharing program have been widely studied, the study of the *economic* impacts of a bicycle sharing program is still in its nascent stage. That is, there is not a wealth of studies quantifying specific impacts to the local economy from which to draw conclusions for a bicycle sharing program in Monterey County. There are, however, a couple of studies that have begun to quantify bicycle sharing program impacts as well as numerous sources that depict the economic impacts of bicycle sharing programs derived primarily from anecdotal evidence. Key findings regarding the most frequently cited economic impacts are presented below.

- **A recent study estimates cyclists spend nearly \$40 per person per season (30-week period) in additional retail purchases at businesses in close proximity to bicycle sharing stations.** A recent study conducted by the University of Minnesota's Humphrey School of Public Affairs and published in the University's July 2012 edition of *Catalyst*, appears to be one of the first studies to quantify additional economic activity resulting from a bicycle sharing program. The study, which analyzed economic activity associated with the Nice Ride Minnesota program in the Twin Cities, estimates that cyclists spend an additional \$150,000 in aggregate per season (30-week period) at restaurants and other businesses located in close proximity to Nice Ride stations. This additional economic activity translates into about \$37 per person per season, or \$1.25 per person per week.⁷² The study concludes that these findings could influence the way bike-share agencies structure their sponsorships and business partnerships.⁷³
- **Bicycle sharing spurs economic development by increasing access and exposure to local businesses and employment opportunities.** A 2011 member survey conducted by LDA Consultants on Washington DC's Capital Bikeshare program reported that almost half of survey respondents made a trip in the past month that they would not have made without the bike share program. Half of the survey respondents used the bike share program for non-work purposes including social and entertainment trips and personal errand and appointment trips, while 40 percent of respondents used the program to get to and from work.⁷⁴ Small businesses in Minneapolis's downtown retail area

⁷² Schooner, Jessica E. "Sharing to Grow: Economic Activity Associated with Nice Ride Bike Share Stations." May 24, 2012. Presented at the 23rd Annual Transportation Research Conference.

⁷³ "Nice Ride spurs spending near stations." July 2012 Center for Transportation Studies *Catalyst* publication.

⁷⁴ Capital Bikeshare 2011 Member Survey Report, LDA Consulting, June 14, 2012.

actively support the local bicycle sharing program “because it’s an economic development tool [and] it gets people to come out to lunch from office towers a mile away.”⁷⁵ Bicycling increases exposure to storefronts and retail businesses. A study in Toronto, Ontario found that people who biked or walked to a main commercial area of the city spent more money in the area per month than people who drove there to shop.⁷⁶

- **Bike-share programs create a range of job opportunities.** Bike-share programs require staff to maintain the bicycles, redistribute them when necessary and administer and oversee the systems’ central computer network. From the beginning, smaller implementations of bicycle sharing programs can contribute 10-20 full- and part-time jobs to the local economy, while larger implementations can contribute 30-50 full- and part-time jobs.⁷⁷ Job types are varied as the program requires everything from mechanics and warehouse staff, to call center technicians, service staff, sector managers and supervisors who interact with the public.⁷⁸
- **Bicycle sharing programs reduce automobile usage and overall personal transportation costs.** In Capital Bikeshare’s 2011 Member Survey, approximately 40 percent of users reported a reduction in their number of car trips after joining bike share and users saved an average of about \$820 per year on their transportation costs including car payments, insurance, oil, gas, maintenance and parking.⁷⁹ For the Nice Ride Minnesota program, 20 percent of users indicated replacing car travel with the Nice Ride bike share program.⁸⁰ Savings from transportation can then be spent elsewhere, often in other areas in the local economy.⁸¹
- **Bicycle sharing programs generate about 50 to 75 percent more direct, indirect and induced jobs per dollar than typical road projects.** As explained in Smart Growth America’s Transportation Funding and Job Creation, released in 2011, per dollar spending on public transportation projects (including bike share programs and bike infrastructure investments), created 75 percent more jobs per dollar than road projects. Further, a 2010 case study conducted by the Political Economy Research Institute (PERI) at the University of Massachusetts, Amherst on Baltimore, Maryland found that bike infrastructure projects create about 50–60 percent more jobs than road construction or repair projects per \$1 million.⁸²

⁷⁵ Fried, Ben. “Sponsors Sold on Health, Economic Benefits of Minneapolis Bike-Share.” Streetsblog.org website. February 8, 2010.

⁷⁶ “The Benefits of Capital Bikeshare for Developers, Property Owners, and Employers.” Metropolitan Washington Council of Governments. May 27, 2011.

⁷⁷ DeMaio, Paul and Russell Meddin. “Bike Sharing Creates Job[s].” The Bike-Sharing Blog website. August 24, 2012.

⁷⁸ Velib’ Website, “Velib Press Kit,” Velib’ website.

⁷⁹ Capital Bikeshare 2011 Member Survey Report, LDA Consulting, June 14, 2012.

⁸⁰ Nice Ride Minnesota Member Survey November 2010.

⁸¹ “Economic Recovery: Promoting Growth: The Benefits of Public Transportation.” American Public Transportation Association. 2011.

⁸² “Recent Lessons from the Stimulus: Transportation Funding and Job Creation.” Smart Growth America. February 2011.

- **Bicycle paths have been linked with increasing the value of adjacent property.** While there is no known research regarding the influence of bike sharing programs in particular on adjacent property values, there is research on the positive impacts of bike paths and adjacent property values. In 2002, the National Association of Realtors and the National Association of Home Builders surveyed 2,000 homebuyers and found that a path for biking, walking or jogging was "the second most important neighborhood amenity" for them, behind highway access. In 2006, the University of Delaware conducted a literature review and studied the impact of bike paths within the State of Delaware on residential property values. The majority of studies examined indicated that the presence of a bike path/trail either increases property values and ease of sale slightly or has no effect, provided the bike path/trail is well-maintained, well-used, and well-integrated into the surrounding neighborhood. The model developed to study the impact of bike paths in Delaware on proximate property values show that a bicycle path would be expected to slightly increase property values by about \$8,800 (in 2006 dollars).⁸³ Increased property values, in turn, result in increased municipal tax revenues for local taxing entities.
- **Bicycle sharing program usage may lead to improved health, which may reduce health care costs and improve job performance.** Bike-sharing programs tend to introduce new people to bicycling and make bicycling a part of peoples' lives in new ways. Thus, bike-sharing programs offer significant options for improvements in personal health and quality of life. Improved health outcomes can also come with cost savings for city and state health care providers. According to a study by the California Department of Health Services, a 5% improvement in the rates of physical inactivity and healthy weight over five years could save California more than \$6 billion, while a 10 percent improvement could save nearly \$13 billion.⁸⁴ That is, a significant cost savings could be realized in conjunction with increased physical activity. In addition, Dutch studies have found correlations between the level of activity and worker productivity. Workers who met recommended levels of vigorous physical activity (at least 20 minutes each time, three times a week) had four fewer sick days per year, on average, than their counterparts who did not.⁸⁵

Potential Impacts on Local Bicycle Industry

Bicycle sharing programs are not intended to be a replacement to renting or buying bicycles. Bicycle sharing programs are intended to encourage the use of bicycle for trips that are too long to walk and too short to drive (or are not accessible by transit). Ideally, bike sharing complements other forms of transportation and is a critical component of the transit system, solving the "first and last mile" between other transit stops. However, bike rental and retail shops may be apprehensive of bike sharing programs' potential to infringe on their market share. While a minimal amount of literature exists on this topic, there are some findings that may be applicable to a bike sharing program in the City of Monterey. Key findings

⁸³ Racca, David P. and Amardeep Dhanju. "Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas." University of Delaware, College of Human Services, Education, and Public Policy. November 2006.

⁸⁴ Chenoweth, David. "The Economic Costs of Physical Inactivity, Obesity and Overweight in California Adults: Health Care, Worker's Compensation, And Lost Productivity." California Department of Health Services. April 2005.

⁸⁵ Proper, K., et al. "Dose-response relation between physical activity and sick leave." British Journal of Sports Medicine, 2006. 40(2): p. 173-8.

related to the impacts of bicycle sharing programs on local bike rental and retail shops are provided below.

- **Bicycle sharing programs have had mixed impacts on the local bike rental industry.** In response to the implementation of Nice Ride Minnesota, bike rental shops in Minneapolis expected to lose business. Anecdotal evidence suggests mixed results with one bike rental shop's business increasing by 10 to 15 percent, while another bike rental shop's business was "noticeably down." This particular business has responded by offering city bike tours to increase business. According to the bike rental shop owner whose business increased, Nice Ride has not competed because of bike-sharing programs and bike rental shops' differing business models: rental shops provide better deals for longer use, while Nice Ride bikes are better for quick commutes.⁸⁶ Freewheel Bike Shop in Minneapolis has noted that bike rental business has increased, with customers taking bike sharing bikes to access their rental location where they switch to lighter, more comfortable hybrids; meanwhile, Calhoun Bike Rental estimates that summer 2012 rentals were down 15 to 20 percent.⁸⁷ Alamo Bike Shop in San Antonio has also noted a decline in bike rentals, though "brutal summer temperatures" may have also been a factor.⁸⁸

OpenFile, a community-powered news organization operating in six Canadian cities, found similar mixed results related to bicycle sharing programs implemented in Montreal, Toronto, and Ottawa. Bike rental shops in downtown Montreal have witnessed declines in rental activity. However, most of these businesses have modified their business model in order to suit the new market reality. For example, some businesses have stopped offering 1-hour-or-less rental options, and focused instead on 4-hour, 24-hour, and weekly rentals, as well as promoting the sale of bike accessories and bike maintenance services. Bike rental shops in Toronto and Ottawa, where the local bike rental industry is not as saturated as Montreal's, were supportive of the bike share program and incurred little to no impact to their business, with the exception of those located in tourist centers.⁸⁹

- **Bicycle sharing programs have fueled an increase in bicycling enthusiasm leading to increased activity at bicycle retail shops.** Bike retail store owners were initially nervous about the impacts of the Capital Bikeshare program in Washington DC on their sales. However, these concerns have been assuaged with an increase in both bicycle sales and bicycle repair services.⁹⁰ Bike store owners say bike sharing is *helping* their business by fueling an explosion in bicycle enthusiasm. Interestingly, the

⁸⁶ Hunter, Sally. "Nice Ride Helping Bike Rental Shops?" Minnesota Daily, April 2011.

⁸⁷ http://www.oregonlive.com/portland/index.ssf/2012/09/portland_bike-share_plan_worri.html

⁸⁸ Ibid.

⁸⁹ Oatley, Bronwyn. "Is Bike Sharing a Bad Break for Bike Shops?" OpenFile website. June 19, 2012.

⁹⁰ Di Caro, Martin. "From A to B: Bike Shop Owners See Big Returns from Capital Bikeshare." Wamu.org. June 29, 2012

bikeshare program's shortcomings (i.e., bicycles are heavy and slow; on busy days, there may be no bikes available at a nearby dock, or no open slots to return a bike, forcing a user to find another dock), have led users to buy bikes of their own. There were similar concerns in Paris when the Vélib rental system started. However, a 2008 report in Bike Europe, a website for bike professionals, cited a 39 percent growth in sales of city bikes possibly attributed to the huge popularity of the Vélib system.⁹¹

Mitigation Measures

Although bicycle sharing programs appear to increase overall enthusiasm for bicycling and may contribute to increased sales at bicycle retail shops, these programs also appear to have the potential for negatively impacting bicycle rental shops. There are several bike rental shops in close proximity to some of the proposed stations (see Figure 3). Bikesharing is a distinct system from traditional hourly or daily bike rentals. Annual bikesharing members making frequent, short trips can take advantage of multiple stations for starting and ending their trips and can check out a bike in 5 to 8 seconds. Casual, walk-up users looking for a short-duration rental or for multiple quick trips on a single day can check out a bike in as little as 90 seconds. Cyclists desiring bikes with more features, longer rental periods, advice on local riding routes, organized tours, or more personal customer service may prefer a traditional bike rental location.

Relocating bikesharing stations away from the bike rental shops is not a viable mitigation strategy for potential overlaps in the services provided by bikesharing and traditional bike rental. These stations are located near the Monterey Peninsula Recreational Trail, which provides key east-west connectivity and allows users to travel around the bottleneck presented by steep terrain and the Presidio of Monterey; the stations are also located near dense activity centers that support high bikesharing ridership. The relocation or removal of these stations would likely sever the connectivity of the overall station network and result in lower ridership levels, threatening the success of the system as a whole. As such, it will be important for a bicycle sharing program in the City of Monterey to consider other measures to mitigate potential negative impacts. Mitigation measures may include but are not limited to those outlined below.

1. **Structure Pricing to Incentivize Short Trips.** Pricing should be designed to keep bikes in circulation and provide maximum utility so short trips are encouraged. This strategy will reinforce the business model of a bicycle sharing program (i.e., short-term rental) as distinctly different from the longer-term rental offerings of bike rental establishments.
2. **Place Stations in Close Proximity to Existing Transit Stops.** Site stations in locations that help to provide the "first and last mile" to and from transit stops. Similar to the first strategy, this

⁹¹ Ibid.

strategy also reinforces the different business models of the bicycle sharing program and bike rental shops.

3. **Develop Marketing Campaign that Describes Purpose of Bike Sharing Program.** Develop a marketing campaign that informs the public and local businesses of the purpose of the bike-share program. That is, ensure that the bicycle sharing program is marketed as providing “first and last mile” trips rather than longer trips. It should be noted that the type of bicycles purchased as part of a bicycle sharing program indirectly reinforce this message in that they are much heavier than the typical rental bike and therefore not conducive to longer rides.
4. **Develop Maps that Advertise Bike Share Station and Bike Rental Shop Locations.** As part of implementation of the bicycle sharing program, maps – whether they are large-scale permanent maps provided at bicycle sharing stations, personal-sized paper maps provided at stations or nearby businesses or online maps - should contain a system-wide map of bicycle sharing stations as well as the location of bicycle rental establishments. This strategy provides no-cost advertising for bike rental establishments.
5. **Allow Bike Shops to Provide Bike Maintenance Services.** If desired, the bicycle sharing program entity could enter into agreements with local bike establishments to provide ongoing maintenance services on bicycle sharing program bicycles. This strategy will provide an opportunity for bike shops to increase bike maintenance service revenues, which may offset a loss in bike rental revenues.
6. **Bike Shops Could Provide Discounts to Bike Sharing Program Members.** The bicycle sharing program entity could work with local bike establishments to provide discounts to bicycle sharing program members, if desired. The intent of this strategy is to reinforce the bike rental service and bike and accessory sales as distinctly different from the bike sharing program service and to potentially attract new customers and thus increase overall bike rental and retail sales revenues.

6. Program Recommendations

This chapter provides recommendations for bikesharing program characteristics, outlines next steps, and discusses challenges, opportunities, and strategies for pursuing a bikesharing program in Monterey County. The chapter presents two recommended networks of stations: one in Monterey / Pacific Grove and one in Salinas; either network could be implemented independently, or the two could be implemented at the same time or in sequence.

There is a variety of indicators of success for a bikesharing program, any one of which might justify pursuing a program. Goals for a bikesharing program could include maximizing the number of riders or miles traveled, improving the reach of transit service, enhancing quality of life and mobility, or achieving enough revenue to cover the program's own operating costs. Programs like Denver B-cycle also track economic, environmental, and health benefits, such as savings on the cost of gas and parking; pounds of carbon dioxide, volatile organic compounds, and nitrogen oxides avoided; and calories burned. Promoting the region as a leader in "green" and "active" living can have positive image benefits. Finally, a bikesharing program can support the goal of increasing the visibility of bicycling as a healthy, environmentally friendly transportation and recreation option.

For a program to meet any of these measures, it must address the unique characteristics of its local and regional context. The cities of Monterey and Pacific Grove have a combined population of nearly 43,000 people.⁹² Nearly 8 million visitors per year come to Monterey County, many of whom are attracted to the Peninsula's 9,600 guest rooms, Cannery Row, Fisherman's Wharf, Pebble Beach, historic sites, and Monterey Bay Aquarium; the Aquarium alone draws about 1.8 million visitors annually.⁹³ The Naval Postgraduate School, Monterey Peninsula College, and the Defense Language Institute Foreign Language Center at the Presidio of Monterey contribute a sizeable student and military population.

Monterey's climate is mild year-round with summer highs around 70 degrees Fahrenheit and winter lows around 45 degrees. Precipitation averages less than 20 inches annually and falls mainly during the winter months; snow at lower elevations is extremely rare. Steep and hilly terrain on the Monterey Peninsula presents a challenge for bikesharing. Two relatively flat areas in Pacific Grove and Downtown Monterey are divided by hilly terrain in the Presidio; however, the Monterey Bay Coastal Trail provides a level route connecting the two along the coast.

The City of Salinas attracts fewer tourists than Monterey and Pacific Grove, but has a much larger residential population of over 150,000.⁹⁴ The climate in Salinas is slightly warmer than in Monterey and Pacific Grove in summer, but has similar winter lows. The terrain in Salinas is mostly level.

⁹² 2010 Census.

⁹³ Monterey County Convention and Visitors Bureau.

⁹⁴ 2010 Census.

Bikesharing Program Characteristics

Program Size and Extent

The recommended program for Monterey / Pacific Grove consists of 24 bikesharing stations, concentrated along the coast of Pacific Grove and Cannery Row and in Downtown Monterey, with additional stations in other areas of dense activity or near key institutions (see Figure 4). The distribution and extent of stations is designed to cover the high-suitability areas identified in the Detailed Ridership Suitability Analysis and to locate stations where the Ridership Regression Model suggests high potential ridership levels. Stations are located approximately 400 to 800 meters apart, to create a contiguous service area with a variety of attractive bikesharing trip origins and destinations. The stations for the Salinas system, depicted in Figure 5, are also 400 to 800 meters apart on average, though they are more concentrated in Downtown Salinas where a dense mix of uses provides a good core riding area. Stations with about ten docks and five bicycles each are recommended for both systems, consistent with the size of smaller stations from other operating bikesharing programs in cities such as Washington, DC, Spartanburg, SC, and Boulder, CO; if certain stations prove to be more popular, such as those along Cannery Row or in Downtown Salinas, they might warrant additional docks and bicycles as the program expands. A ratio of roughly one bike for every two docks helps to balance the system and ensure that riders will have a place to dock their bikes and users looking to start a trip will find a bike.

Operating Period

Unlike some operating environments, in which bikesharing programs remove their stations from the street and store them in warehouses for the winter, Monterey and Salinas offer a temperate climate year-round. These programs can avoid the expense of storing and reinstalling stations and offer service 365 days per year. Furthermore, the program can operate 24 hours per day; bikes equipped with generator-powered lights make it safe to operate after dark, allowing the system to provide an additional mobility option at a time when transit service is reduced. In the event of an emergency, the system can be shut down, allowing users to check bikes in to stations but not check them out. Capital Bikeshare (Washington, DC) and DecoBike (Miami, FL), among others use this 24/7/365 operating period.

Membership Types and Pricing

The Monterey and Salinas programs should accommodate three primary types of users: annual members, day users, and short-term members. Annual members will be mostly local residents or commuters who pay an annual fee for unlimited access to the system, with usage fees applying to longer trips. Day users could be either tourists visiting for a short time or potential annual members who want to try the system before committing to a longer-term membership. These users would pay a small fee for 24-hour access to the system, with usage fees applying to longer trips. Short-term memberships can accommodate visitors who are staying for longer than a day, and could be offered for 3, 7, or 30 days at lower rates than the 24-hour membership; usage fees still apply.

Pricing can be set to differentiate among a number of factors, such as trip length, membership type, and special user groups. The program should encourage many shorter trips, as opposed to long-duration single rentals to which more traditional bike rentals are better suited, by charging hourly usage fees that increase as trip length increases; trips under 30 minutes would be free with a paid membership. Fees should also differentiate by membership type. "Casual" day- or week-long users tend to be much less

price-sensitive than annual users, perhaps because they are tourists with more disposable income or because they are more interested in longer pleasure rides than in short, transportation-focused trips. For example, only 29% of Nice Ride MN's 2011 revenue came from annual membership and user fees, while 65% came from short-term memberships and user fees. In the Capital Bikeshare program's first year, 98% of trips by annual members were under 30 minutes, a negligible number were over an hour, and the average trip time was 20 minutes; meanwhile, trips by "casual" users averaged 45 minutes in length, 31% exceeded 30 minutes, and 15% exceeded an hour. Usage fees can be differentiated between short-term users and annual members to reflect this difference in price sensitivity. Finally, the program should consider making discounted annual memberships available for special groups, such as students, military personnel, senior citizens, or low-income individuals. Usage fees to these members could also be reduced for short trips of 30 to 60 minutes to enable slightly longer utilitarian trips. **Table 17** provides a suggested pricing structure that can be adjusted depending on the program's particular policy goals.

TABLE 17 – SUGGESTED PRICING STRUCTURE

Membership Type	24-Hour	3-Day	7-Day	30-Day	Annual	Discounted Annual
Membership Fee	\$5	\$12	\$20	\$30	\$50	\$35
Cumulative Usage Fees						
0-30 minutes	Free	Free	Free	Free	Free	Free
30-60 minutes	\$2.00	\$2.00	\$2.00	\$2.00	\$1.00	\$0.50
60-90 minutes	\$6.00	\$6.00	\$6.00	\$6.00	\$5.00	\$4.00
90-120 minutes	\$14.00	\$14.00	\$14.00	\$14.00	\$11.00	\$9.00
each additional 30 minutes	+\$8.00	+\$8.00	+\$8.00	+\$8.00	+\$8.00	+\$8.00

Operational Model

The unique concentration of bike rental locations in the City of Monterey might enable a new model for the provision of bikesharing that more directly involves existing, local bike rental companies. Under one approach, a bike rental company or companies could own and operate the bike sharing system, perhaps with a subsidy from a partner organization or government agency. Under a second approach, the rental company or companies could simply operate the bikesharing equipment that is owned by a non-profit or public agency for a fee.

In the absence of an interested bike rental company to adopt a new model for bikesharing provision, one of two currently-used operational models would be most appropriate for the program, depending on the level of local institutional support for a bikesharing program: the nonprofit model or the publicly owned/privately operated model (see "Potential Funding Models," above).

The nonprofit model could limit liability to the local jurisdiction, allow for lower staffing costs, and avoid the need for increased institutional capacity and expertise in operating a bikesharing program within the local jurisdiction’s staff; however, coordination with local jurisdictions and agencies is still essential for a successful program. The nonprofit model also relies on a local champion organization to take on responsibility for the program.

The publicly owned/privately operated model is also a good option if a local jurisdiction or public agency, rather than a nonprofit, takes responsibility for the program. This option would allow the local jurisdiction to retain more control over the program through contractual agreements with the operator.

In either model, maintenance could be handled by the operator or contracted to local bike shops. A local bike shop could also serve as the operator. Although advertising based models have so far proven unsuccessful in the US, and an entirely advertising-based model is likely impractical for Monterey, the program should nevertheless consider title and/or station level sponsors as an additional revenue source. Finally, a nonprofit or public/private program should collaborate with regional institutional and business partners who might provide funding, space for siting stations, or operational support.

Vendors

The players in the bikesharing space continue to evolve, but several system vendors have emerged as good candidates for the Monterey program. Both B-cycle and Alta Bicycle Share (with Public Bike System Company/BIXI equipment) have proven track records of deploying systems throughout North America. These vendor's bikes and kiosks have been used millions of times in the field by real users and have been refined over time. DecoBike, which operates three for-profit programs on the east coast, also has experience operating its equipment in the field and might be able to provide equipment, operations, or both for a Monterey program. Bike Nation, a Southern California-based company, has developed a bike sharing system that it intends to deploy in Anaheim, Long Beach, and Los Angeles, California. Bike Nation does not currently have any systems in operation, and intends to operate under a for-profit, advertising-based model that might not be possible in Monterey; however, once they have gained experience operating in the Los Angeles area, they may be a viable equipment vendor, operator, or both for Monterey. Finally, two Bay Area companies — Alameda Bicycle, operator of BART Bike Stations, and Bike Link, a secure, on-demand bike parking provider — may also be considered, due to their experience in operating networks of bike-related infrastructure.

Next Steps

Fehr & Peers has identified the following next steps in pursuing a bikesharing program for Monterey:

- Identify a Lead – A local lead organization is necessary for a successful bikesharing program. TAMC staff should engage local jurisdictions, agencies, nonprofits, and bike rental companies to identify an organization with the desire and capacity to establish and manage a bikesharing program.
- Apply for Funding – The lead organization should explore the variety of funding sources available for bikesharing programs (see "Potential Funding Sources, above) and secure financial support for a program.
- Conduct Public Outreach – Successful launch of a bikesharing program requires a variety of public outreach strategies prior to soliciting proposals. An effective public outreach process will educate the public on the concept of bikesharing, collect valuable public input, and build awareness of and support for a public bikesharing program. This can be accomplished by engaging community members to think of ways they might use bikesharing and locations where they would want to see a bikesharing station. Social media campaigns and other marketing can also be beneficial; bikesharing vendors and operators can provide more targeted marketing as the program nears its launch.
- Coordinate Regionally – The lead organization should reach out to other regional agencies, jurisdictions and organizations that might be interested in pursuing a bikesharing program. In multi-jurisdictional systems, such as Capital Bikeshare in Washington, DC and Arlington, VA, a rider clause is included in the procurement contract that enables other regional groups to get the same terms, helping to ensure smooth system expansion and interoperability.
- Select a Vendor and Operator – The lead organization should issue a Request for Proposals (RFP) for bikesharing equipment, operations, or both, depending upon the final operational model.

Under a nonprofit model, the nonprofit might issue an RFP for both equipment and operations, or might undertake operations itself and issue the RFP for equipment only. An RFP under the public/private model would include equipment and operations, and should be flexible enough to allow both equipment and operations to be provided by the same respondent or by two different respondents. Regional coordination is also an important consideration.

- Site and Permit Specific Stations – Figures 4 and 5 provide general recommendations for station locations that should be refined based on support from local businesses and institutions, public input, and site-specific conditions. Outreach to local businesses and institutions might yield interest in sponsoring a station by providing real estate for locations on private property, sponsorship dollars, or both. Stations that cannot be located on private or institutional property will need permits to locate on sidewalks, public parks or plazas, or on the street. Indication of public interest might also suggest additional locations or the relocation of some stations (bearing in mind that a contiguous network is critical for an effective system). Finally, the physical dimensions of stations and access to sunlight for solar-powered stations will limit the potential locations of bikesharing stations. Once a specific hardware system is selected, the vendor and operator can assist with these site-specific concerns.
- Further Analyze Campus-Specific Needs – Institutions like the Naval Postgraduate School, Monterey Peninsula College, and the Defense Language Institute Foreign Language Center have been integrated into the proposed station network because of their proximity to dense activity centers that constitute the rest of the service area. These institutions warrant additional analysis and institutional input on the best way to serve their campuses and integrate their bikesharing stations with the surrounding community. CSUMB, while not immediately within the proposed station network due to the distance between the campus and the core service area, presents additional opportunities for regional bikesharing in Monterey County. If there is financial and institutional support of bikesharing at CSUMB, an on-campus program that primarily serves trips within the campus could be a valuable service to CSUMB students, faculty, and staff. This system could be part of the broader bikesharing program described above, giving bikesharing members access to stations both in the Downtown Monterey area and on the CSUMB campus. Few trips between the CSUMB campus and the core service area would be expected, due to the five mile distance between the two. However, having bikesharing as a first mile/last mile service in both activity centers could encourage more transit trips between the two. For example, students arriving on campus by transit could use bikesharing for trips within the campus, and also make use of the Pacific Grove and Monterey stations when they are in those areas for dining, shopping, or leisure trips. Students arriving by private automobile would also benefit from the ability to park once and use bikesharing for mobility within the campus. Additional analysis of the specific travel needs of the CSUMB community could reveal other trip types that would be well-served by bikesharing.

Challenges and Opportunities Analysis

As the lead organization pursues a bikesharing system for Monterey, it will face a number of challenges and opportunities. This section summarizes potential challenges, opportunities, and policy issues and presents strategies for approaching each one. Detailed descriptions are provided below.

Challenge/Opportunity	Strategy
<i>Permitting</i>	<ul style="list-style-type: none"> • Locate stations on the property of supportive local businesses and institutions • Work with local jurisdictions to permit stations on public land
<i>Sign ordinances</i>	<ul style="list-style-type: none"> • Emphasize system wide and station-level sponsors that promote the program and the sponsor, rather than advertisements • Collaborate with local jurisdictions to develop an appropriate sponsorship look and feel
<i>Theft and vandalism</i>	<ul style="list-style-type: none"> • Collect user billing and contact information • Use sturdy equipment with secure locking mechanisms and proprietary hardware • Locate stations in highly visible, well-traveled areas
<i>Safety and liability</i>	<ul style="list-style-type: none"> • Require liability waiver • Purchase liability insurance • Encourage helmet use • Maintain safe equipment • Educate users on safe bicycling
<i>Existing bike businesses</i>	<ul style="list-style-type: none"> • Emphasize distinction between short trips (bikesharing) and day-long rentals (bike rental shops) with pricing and marketing • Cross-promote bikesharing and traditional bike rental • Engage bike shops as maintenance providers • Offer bike shop discounts to bikesharing members
<i>Equipment delivery delays</i>	<ul style="list-style-type: none"> • Engage vendors early in the planning process • Learn from resolution of Chicago and New York experiences • Allow extra time for system rollout once the RFP process is complete

Permitting

Stations located on public right-of-way will require permitting and coordination with local jurisdictions. Engaging local businesses and institutions is a good opportunity both to identify sites for bike sharing that do not require public land and to garner support from the local community. In cases where it is necessary to locate a station on public right of way, local jurisdictions and agencies should be engaged to develop a streamlined permitting process that can be applied to multiple bikesharing locations and enable the relocation of stations, if warranted by use patterns once the system is operating.

Sign Ordinances

Although advertising can be a valuable source of revenue for a bikesharing program, sensitivity to the system's context is essential. Monterey and Pacific Grove are scenic areas with rich historical background and natural beauty. Monterey Municipal Code §31-8(e) and Pacific Grove Municipal Code §20.04.030(p) both prohibit off-premises advertising, limiting a bikesharing program's ability to collect revenue from signage on stations. Another option for monetizing the bikesharing system's bikes and stations is sponsorship. System-wide sponsors could be rewarded with program naming rights and branding (e.g., Citi Bike in New York) or have their logos included in system branding on on-bike panels and stations (e.g., Blue Cross Blue Shield in the Nice Ride MN system). Map panels on bikesharing stations could also include graphics that thank system wide or station-level sponsors without explicitly advertising a specific product or service. In each case, the bikesharing program should collaborate with architectural review committees in Monterey and Pacific Grove to develop a look and feel that is appropriate to the context and can even provide an iconic branding opportunity for the cities.

Theft and Vandalism

U.S. bikesharing systems have had very few problems with theft and vandalism, especially compared to their European counterparts. Nevertheless, measures should be taken to prevent theft of and damage to the bikes and kiosks. Collecting billing information about users ensures that they are accountable for the bikes they check out and prevent theft by registered users. The bikesharing equipment selected should be durable and secure. Unique bike designs limit the ability of would-be thieves to resell a stolen bike. Secure locking mechanisms that confirm to the user when the bike has been completely docked ensure that bikes are properly locked and resistant to theft. Bike and station hardware should also use proprietary bolts to connect parts so that accessories will not easily be accidentally or intentionally removed. Finally, bike sharing stations should be located in highly visible, well-traveled areas, both to encourage ridership and provide an additional deterrent against theft and vandalism.

Safety and Liability

There have been few incidents with injuries in U.S. bikesharing systems, but safety and liability are important to address. Educating users on safe bicycling practices and encouraging helmet use can help to prevent the dangerous situations that raise liability issues. Information on the program website, posted at kiosks, or featured on bike handlebars regarding safe cycling can be used to educate members about safe bicycling. Maintaining properly-functioning equipment with properly inflated tires, and working shifters, brakes, and lights can further help protect users from incidents and injury. Should an injury occur with bikesharing equipment, a liability waiver can help protect the program against legal action. Users

can be required to sign a liability waiver when they register their membership. Finally, liability insurance can limit the program's financial risk from lawsuits.

Existing Bike Businesses

Although bicycle sharing programs appear to increase overall enthusiasm for bicycling and may contribute to increased sales at bicycle retail shops, these programs also appear to have the potential for negatively impacting bicycle rental shops. The following strategies can help to minimize bikesharing's potential negative impacts on existing bike businesses and to leverage existing local bike expertise to support bikesharing and bicycling in general. Pricing should be structured to encourage the frequent turnover of bikesharing bikes, a type of use that does not compete directly with traditional bike rental. Marketing materials should also emphasize the difference between bikesharing and traditional bike rental and guide users to the appropriate choice. Maps should direct users to nearby bikesharing stations and bike rental and retail stores. Existing bike businesses can also be powerful allies for a successful bikesharing program. Local bike shops could partner with the system operator to perform maintenance on the bikes and to rebalance the system, or even contract to operate the system themselves, bringing local bike knowledge to the table. Bike shops can also provide important bike accessories, like helmets, messenger bags, water bottles, and energy bars. Bikesharing might also encourage local residents to take personal bicycles on longer trips; offering a discount to bikesharing members could attract new customers who are ready to purchase their own bikes to local bike retailers.

Equipment Delivery Delays

A rush to bring two large systems online coupled with software issues has delayed the deployment of bikesharing systems in Chicago and New York City. Hopefully these concerns will be resolved before Monterey would launch a bikesharing system as issues are resolved in these large-system rollouts. Vendors should be engaged as soon as the decision to proceed with a bikesharing system is made, and ample time should be allowed between the completion of the vendor selection process and the system launch date. Fortunately, Monterey does not face inclement winter weather, so the timing of system launch is not as critical as with programs in other cities.