

**Report to the U.S. Congress on the Outcomes of the  
Nonmotorized Transportation Pilot Program  
SAFETEA-LU Section 1807**

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**Submitted by the Federal Highway Administration**  
*With the Assistance of the U.S. Department of Transportation's  
Volpe National Transportation Systems Center*

**Columbia, MO**



**Minneapolis, MN**



**Sheboygan County, WI**



**Marin County, CA**

*Cover Photos (clockwise from upper left):*

- *Walking School Bus, Columbia, MO (Courtesy of GetAbout Columbia)*
  - *NiceRide Bicyclists, Minneapolis, MN (Courtesy of Bike Walk Twin Cities)*
  - *Cal Park Hill Tunnel, Marin County, CA (Courtesy of WalkBike Marin)*
  - *Safe Routes to School Safety Training, Sheboygan County, CA (Courtesy of Sheboygan County NOMO)*
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## Executive Summary

### Introduction

Section 1807 of the Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) P.L. 109-59 established the Nonmotorized Transportation Pilot Program (NTPP) in August 2005.<sup>1</sup> Over the span of 4 years, the NTPP provided roughly \$25 million annually in contract authority allocated equally among four pilot communities (Columbia, Missouri; Marin County, California; Minneapolis, Minnesota; and Sheboygan County, Wisconsin) “to construct ... a network of nonmotorized transportation infrastructure facilities, including sidewalks, bicycle lanes, and pedestrian and bicycle trails, that connect directly with transit stations, schools, residences, businesses, recreation areas, and other community activity centers.” From its inception, the NTPP was designed as a demonstration program to gather statistical information on transportation mode share shifts before and after the implementation of nonmotorized transportation infrastructure and educational or promotional programs. The program was intended to “demonstrate the extent to which bicycling and walking can carry a significant part of the transportation load, and represent a major portion of the transportation solution, within selected communities.”

Throughout the program to date, the four communities, each with unique physical and demographic characteristics, identified and implemented a locally devised strategy to significantly increase the use of nonmotorized transportation, along with the accompanying safety, environmental, and health benefits. This report represents the culmination of that initial implementation and analytical effort.

Key outcomes of the NTPP described in this report include:

- An estimated 16 million miles were walked or bicycled that would have otherwise been driven in 2010, and an estimated 32 million driving miles were averted between 2007 and 2010.<sup>2</sup>
- Counts in the four pilots saw an average increase of 49 percent in the number of bicyclists and a 22 percent increase in the number of pedestrians between 2007 and 2010.
- In each community, a greater percentage of pedestrian and bicycling trips included transit in 2010 than in 2007.
- Mode share increases in the pilot communities to bicycling and walking and away from driving from 2007 to 2010 outpaced the national average from 2001 to 2008. For the communities in sum, bicycling mode share increased 36 percent, walking mode share increased 14 percent, and driving mode share decreased 3 percent between 2007 and 2010.
- The additional nonmotorized trips in the pilot communities in 2010 reduced the economic cost of mortality by an estimated \$6.9 million.
- While each pilot community experienced increases in bicycling and walking from 2005 to 2009, fatal bicycle and pedestrian crashes held steady or decreased in all of the communities.
- The pilot communities saved an estimated 22 pounds of CO<sub>2</sub> in 2010 per person or a total of 7,701 tons. This is equivalent to saving over 1 gallon of gas per person or nearly 1.7 million gallons from 2007 to 2010.
- Thousands of people were reached by training classes, personalized outreach, and other educational and promotional activities; many people tried bicycling for the first time in their adults lives or ever.

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<sup>1</sup> Since the expiration of SAFETEA-LU on September 30, 2009, the NTPP received additional funds through SAFETEA-LU extensions during Fiscal Year 2010.

<sup>2</sup> 2007 was used as the base year for analysis since that was the first year of consistent data collection among the pilot communities; very few projects were implemented before that time.

- New plans and studies funded through NTPP will continue to improve nonmotorized transportation into the future.
- Education and training for local planners, engineers, and elected officials has helped to institutionalize nonmotorized planning and projects into the future.
- Expanded transportation options for all segments of the population, prioritizing access to schools, shopping, transit, and other community centers.

The remainder of the Executive Summary provides an overview of the four pilot communities, the program investments, evaluation results, and lessons learned.

**Table 1: Pilot Communities**

<b>Pilot Community</b>	<b>Population</b>	<b>Project Name</b>	<b>Key Community Characteristics</b>
Columbia, Missouri	108,500	Getabout Columbia	<ul style="list-style-type: none"> <li>• College town; large institutional employers (university, medical, and insurance)</li> </ul>
Marin County, California	252,409	WalkBikeMarin	<ul style="list-style-type: none"> <li>• Topography is a major challenge with smaller towns situated in valleys separated by steep ridges, limited connecting roadways</li> <li>• Pilot target area focused on eastern, urbanized corridor, including 11 cities and towns</li> </ul>
Minneapolis, Minnesota	382,578	Bike Walk Twin Cities	<ul style="list-style-type: none"> <li>• Largest and most diverse population of the pilot communities and most densely developed</li> <li>• Relatively flat, extreme winter weather</li> <li>• Pilot area includes primary city and portions of adjacent municipalities</li> </ul>
Sheboygan County, Wisconsin	115,507	NOMO	<ul style="list-style-type: none"> <li>• Largest land area of the pilot communities</li> <li>• Limited prior experience with nonmotorized transportation</li> <li>• 15 townships, 10 villages, 3 cities</li> <li>• Manufacturing remains a significant employment sector</li> </ul>

## **Program Investments**

The NTPP funding provided an opportunity for pilot communities to make significant investments in walking and bicycling infrastructure and education.

As shown in Figure 1, program-wide, the vast majority of total program funds (89.2 percent) have been spent on infrastructure, with the next highest share (7.9 percent) spent on outreach, education, and marketing programs. The remaining funds have been spent on bicycle parking (2.1 percent) and planning (0.8 percent). In addition to funding infrastructure and non-infrastructure projects, the communities set aside funds for evaluation, communications support, and program administration. Combined, the four communities spent approximately \$1.6 million on evaluation, \$2.1 million on communications support, and \$6 million on program administration. The Federal Highway Administration (FHWA) also contributed approximately \$360,000 of its own research funds to support NTPP evaluation.



**Figure 1: Percent Funding by Project Type**

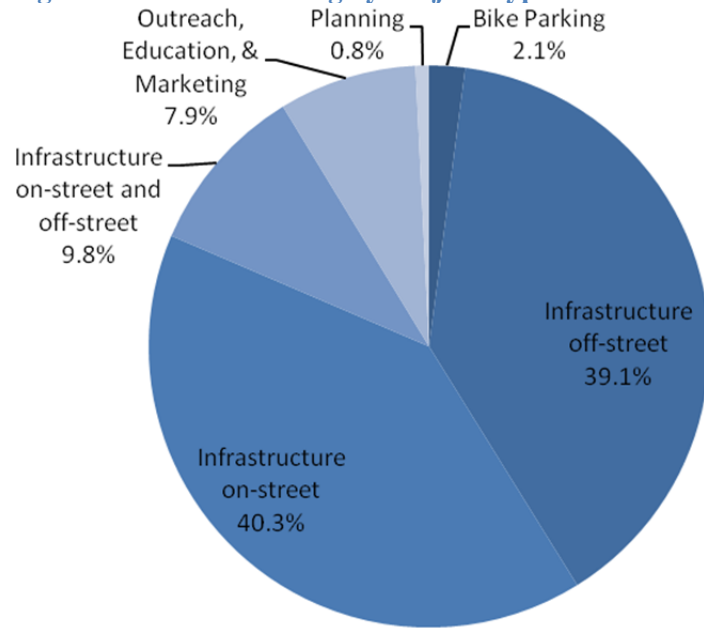


Table 2 shows the extent of planned and completed infrastructure projects funded through the program. In addition to infrastructure projects, strategic and innovative outreach and educational programming have reached thousands of residents, providing information and skills to help increase walking and bicycling activity. These efforts were instrumental in helping to institutionalize nonmotorized transportation projects in each pilot community and continue the cultural shift in travel behavior.

**Table 2: Planned and Completed Capital Projects in all NTPP Communities**

Project Type	Miles/Spaces (funded)	Miles/Spaces (complete)*	% Complete*
On-road facilities	333	214	64%
Off-road facilities	23	7	31%
Bicycle parking	5,727	5,461	95%

\* as of August 2011

Each community had a unique approach to program implementation and project selection, depending on existing facilities, plans, and identified needs. While all of the communities invested heavily in infrastructure, areas with fewer existing facilities focused primarily on laying foundations for comprehensive nonmotorized transportation networks, including through planning, while in other settings, more complicated gap-filling projects were most appropriate.

### Evaluation Results

To respond to the legislation, the FHWA and the pilot communities created a Working Group (WG) composed of representatives from the administering agencies in each of the communities, FHWA, the U.S. Department of Transportation’s Volpe National Transportation Systems Center (Volpe Center), Rails-to-Trails Conservancy (RTC), the Marin County Bicycle Coalition, and the Centers for Disease Control and Prevention (CDC). The WG first met in the fall of 2005 and has held regular teleconferences and annual meetings to discuss progress and challenges and coordinate efforts across the pilot communities. The WG developed and implemented both project-level and community-wide evaluation approaches to assess the travel behavior impacts of the nonmotorized investments. These two concurrent evaluation efforts were as follows:

- **Project-Level Evaluation:** identified the specific impact of individual projects. Each community selected a handful of infrastructure and non-infrastructure projects to evaluate and then undertook counts and surveys to determine their effectiveness.
- **Community-Wide Evaluation:** each community selected several infrastructure projects, both individually and synergistically, and non-infrastructure projects, such as nonmotorized encouragement and marketing campaigns.

This approach relied on directly collected data and supplementary local and national data sources. In coordination with consultants and academic experts, the WG's Evaluation Subgroup guided the data collection effort and helped resolve technical issues as they arose.

For project-level evaluation, each community selected a small subset of projects to receive more in-depth evaluation. For infrastructure projects, counts revealed substantial increases and continual growth in nonmotorized travel activities in each of the studied corridors and intersections. Projects implemented towards the beginning of the program show annual and absolute increases in users over multiple years. In addition to increased nonmotorized travel, anecdotal project-level studies revealed slower driving speeds and safer conditions for pedestrians and bicyclists. Non-infrastructure projects resulted in training and outreach for thousands of participants; improving the awareness of nonmotorized issues and directly benefiting a variety of community members and professionals in each of the pilots.

For community-wide evaluation, bookend counts following the National Pedestrian and Bicycle Documentation Project methodology, showed walking and bicycling increased in each of the communities between 2007 and 2010. These counts point to an increase of 22 percent for walking and 49 percent for bicycling across the 54 count locations. Furthermore, utilizing survey data, the WG found that for most of the communities increased bicycling and walking trips were primarily attributable to utilitarian trips in 2010 compared to 2007,<sup>3</sup> though recreational and exercise activity increased as well.

The WG developed two models, the NTPP and Intercept Survey models, to determine the impacts of the NTPP regarding energy, the environment, and health in terms of trips and vehicle miles averted. These models conservatively estimate that between 2007 and 2010, people walked or bicycled between 32.3 and 37.8 million more miles in the pilot communities than they would have without the NTPP (controlling for population growth). Assuming a one-to-one trade-off between vehicle trips and nonmotorized trips, the WG used the Intercept Survey model to estimate that between 2007 and 2010, 1.67 million gallons of gasoline were conserved and over 30.8 million pounds of carbon dioxide emissions averted as a result of the NTPP. Substantial reductions/savings in other criteria air pollutants that contribute to health problems were also noted.

## Lessons Learned

Through the course of the pilot program, FHWA and the four communities have learned many lessons about nonmotorized transportation planning, implementation, and evaluation. Several lessons are listed below, with greater detail provided in the text of the report.

### Pilot Program Design

- Program status elevates agency commitment
- Funding flexibility supports innovations to meet local needs
- Delivery of small projects should be streamlined
- Short-term results underestimate benefits
- WG approach adds value

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<sup>3</sup> Note that while Columbia, Marin County, and Sheboygan County administered their surveys on weekdays and a weekend day during various times in the afternoon, notably, Minneapolis only administered their survey on a weekday during the commute time period between 4:00 and 6:00 p.m.

### Program Planning and Implementation

- Comprehensive bicycle/pedestrian plans and street design policies provide advantages
- Leveraging funds expands program impact
- Nonmotorized programs must combine capital and programmatic investments

### Building Capacity

- Projects and outreach efforts must be culturally and generationally appropriate
- Education and training for engineers and local staff provide long-term benefit
- Exposure to best practices leads to breakthroughs
- Local examples help build public support

### Stakeholders and Partnerships

- Broad public education and outreach create better understanding of program goals
- NTPP provides opportunities to build relationships with local employers
- Early support from local officials benefits projects through entire process
- New inter-agency and intra-agency connections highlight common goals

### Research and Evaluation

- WG collaboration leads to new evaluation approaches
- Evaluation highlights importance of both community-wide and project-level approach
- Institutionalized location counts are significant
- Count data provide basis to measure community-wide results

## Continuing the Progress

Programs like NTPP reflect the ability of nonmotorized investments to transform communities, improving quality of life, by expanding safe and healthy travel options. The findings from NTPP demonstrate the importance of nonmotorized transportation and how these transportation modes can enrich communities. In March 2010, the U.S. Department of Transportation (DOT) released a *Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations* which stressed the importance of building safe and convenient multimodal transportation systems. The findings from the NTPP affirm the words of the *Policy Statement*:

Increased commitment to and investment in bicycle facilities and walking networks can help meet goals for cleaner, healthier air; less congested roadways; and more livable, safe, cost-efficient communities. Walking and bicycling provide low-cost mobility options that place fewer demands on local roads and highways. DOT recognizes that safe and convenient walking and bicycling facilities may look different depending on the context — appropriate facilities in a rural community may be different from a dense, urban area. However, regardless of regional, climate, and population density differences, it is important that pedestrian and bicycle facilities be integrated into transportation systems. While DOT leads the effort to provide safe and convenient accommodations for pedestrians and bicyclists, success will ultimately depend on transportation agencies across the country embracing and implementing this policy.

## 1. Program Introduction

This Report to Congress summarizes the progress and initial results of the Federal Highway Administration's (FHWA) and the four pilot communities' participation in the Nonmotorized Transportation Pilot Program (NTPP) from its inception through August 2011. Section 1807 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), P.L. 109-59, established the NTPP in August 2005. Over the span of 4 years, the legislation provided approximately \$25 million<sup>4</sup> in contract authority for each of the NTPP's four pilot communities (Columbia, Missouri; Marin County, California; Minneapolis, Minnesota; and Sheboygan County, Wisconsin) "to construct ... a network of nonmotorized transportation infrastructure facilities, including sidewalks, bicycle lanes, and pedestrian and bicycle trails, that connect directly with transit stations, schools, residences, businesses, recreation areas, and other community activity centers."

The purpose of the NTPP as stated in Section 1807 is "to demonstrate the extent to which bicycling and walking can carry a significant part of the transportation load, and represent a major portion of the transportation solution, within selected communities." The legislation also calls for the Secretary of Transportation to "develop statistical information on changes in motor vehicle, nonmotorized transportation, and public transportation usage in communities participating in the program and assess how such changes decrease congestion and energy usage, increase the frequency of bicycling and walking, and promote better health and a cleaner environment."

Finally, the legislation calls for two reports to be submitted to Congress: an interim report and a final report. The Interim Report was submitted on January 9, 2008.<sup>5</sup> This is the Final Report.

The NTPP offers the opportunity to learn more about the extent to which a suite of coordinated, integrated infrastructure projects and educational or promotional programs can yield shifts in travel behaviors and use of different modes of transportation. In particular, the goal of NTPP is to identify and fund the types of infrastructure projects and educational programs that demonstrate significant increases in the amount of bicycling and walking, along with related safety, environmental, and health benefits.

## Program Management

To respond to the legislation, the FHWA and the pilot communities created a Working Group (WG) composed of representatives from the administering agencies in each of the communities, FHWA, the U.S. Department of Transportation's Volpe National Transportation Systems Center (Volpe Center), Rails-to-Trails Conservancy (RTC), the Marin County Bicycle Coalition, and the Centers for Disease Control and Prevention (CDC). The WG first met in the fall of 2005 and has held regular teleconferences and annual meetings to discuss progress and challenges and coordinate efforts across the pilot communities. The WG also created an Evaluation Subgroup to resolve technical issues and implement a common methodology for data collection and analysis.

WG Annual Meetings have addressed issues such as:

- 1) Development of a structure to work together collectively as a program, not as individual projects.
- 2) Challenges of measuring and documenting mode shift and best practices in data collection.
- 3) Small scale/low impact project implementation challenges.
- 4) Challenges and best practices for design and implementation of innovative facilities and programs.
- 5) Optimal management of and synergies between investments in infrastructure and marketing/promotion/education.

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<sup>4</sup> Since the expiration of SAFETEA-LU on September 30, 2009, the NTPP received additional funds through SAFETEA-LU extensions in Fiscal Year 2010.

<sup>5</sup> The Interim Report to Congress can be found at: <http://www.fhwa.dot.gov/environment/bikeped/ntpp/index.htm>.

6) Telling the story of the program and its outcomes.

While the original legislation called for a report at the end of the pilot detailing findings, it did not provide dedicated funding or specific language regarding evaluation, or consideration for the absence of consistent data related to nonmotorized travel behavior at the community level. The key successes of the WG have been to develop a collaborative approach to data collection and evaluation, to maintain a coordinated national program, to establish consistent and credible reporting of results, and to share the progress of the Pilot Program to multiple audiences throughout the years of its existence. Implementation of this approach was funded directly from the pilot project budgets.

In addition to developing infrastructure and programs locally, the communities have contributed to the national field of nonmotorized transportation through experimenting with innovative designs, outreach, education, and data collection and evaluation methods that can be applied by peer communities nationwide. The communities and the WG partners have enhanced local expertise in bike/walk design at all levels and exchanged lessons learned with peers through presentations and panels at national conferences, a website, fact sheets, and other reports.

## Report to Congress

The purpose of this report is to provide Congress with an update on NTPP implementation and evaluation, insights into successes and challenges of the program, and steps forward.

The report is organized into the following chapters:

- 1. Program Introduction;** summarizes program management;
- 2. Introduction to the Pilot Communities:** overview of characteristics of each community;
- 3. Program Investments and Implementation Approach:** summarizes types of investments made by each community;
- 4. Evaluation and Results:** describes the data collection and evaluation methodology;
  - 4.1 Project Level Evaluation and Results:* evaluation of the results of specific projects in each community;
  - 4.2 Community-Wide Evaluation Methods and Results:* presents travel behavior changes in each community and for the overall program;
- 5. Other Benefits:** summarizes program results related to key program goals;
- 6. Insights and Lessons Learned:** observations provided by program participants for peers; and
- 7. Continuing the Progress:** insights on the accomplishments of NTPP in each community and how to expand them to the national context.

## 2. Introduction to the Pilot Communities

This section introduces the pilot communities and provides background information to set the context in which they have approached the program. Each community is unique in physical geography and demographic characteristics, as well as development of systems and policies related to nonmotorized transportation. Additional demographic information is provided in Appendix 2. Because of the various starting points and ranging needs, each community approached program implementation from a local context, resulting in different implementation strategies and program emphases. The diversity of types of communities allowed for a true national demonstration project, testing the impacts of investments in different places at different stages of nonmotorized system development. The program provides opportunities for comparison and models for how to approach nonmotorized transportation in different types of communities around the country.

### Columbia, MO

Columbia is the fifth-largest city in Missouri, and the largest city in mid-Missouri. The city serves as the county seat of Boone County and as the location of the University of Missouri. Columbia's preexisting network of trails, well-organized bicycle and pedestrian advocacy group, dense downtown, and university setting were among the factors that made the city a good candidate for innovative nonmotorized infrastructure and educational activities.

Prior to the start of the program, Columbia had been involved with several efforts to increase nonmotorized transportation. In the 1980s, Columbia led the effort to construct the Katy Trail, one of the Nation's longest rail-trail conversions at over 200 miles in length. In 2004, Columbia was the first city in Missouri to pass a "Complete Streets" policy, focusing on connectivity and requiring that new and redesigned facilities include pedestrian and bicycle accommodation. The Sidewalk Master Plan, last updated in 2006, identified critical connectivity needs; the city allocates a portion of its own funds each year to retrofit areas that do not include nonmotorized facilities. The city and nonprofit partners had also developed a Trails Plan and a Bikeways Plan, which identified priorities, though there was limited funding available for implementation. In 2003, Columbia's PedNet was selected as a Robert Wood Johnson Foundation "Active Living by Design" grantee, developing a nationally distinguished program focused on increasing walking and bicycling to school. The existing plans and commitment from city officials provided a strong foundation for establishment of a focused nonmotorized transportation program.

#### ***Columbia Quick Facts:***

Project Name:	GetAbout Columbia
Population (2010):	108,500
Geographic Area:	53 square miles
Population Density:	2,047 persons per square mile
Sidewalks (2005):	350 miles
Bicycle Lanes (2005):	28 miles
Shared-Use Paths (2005):	25 miles
Avg October Temp (max):	67.5 <sup>0</sup> F
Avg October Temp (min):	45.5 <sup>0</sup> F
Avg October Rainfall:	3.1 inches

#### **Key Community Characteristics:**

- Long history of commitment to nonmotorized transportation
- College town; large institutional employers (university, medical, and insurance)

#### **GetAbout Columbia<sup>6</sup>**

Columbia's pilot program, called GetAbout Columbia, is administered by the city's Department of Public Works (DPW), which capitalizes on local engineering expertise to actively identify new approaches to roadway design. GetAbout Columbia has placed an emphasis on relatively small-scale construction projects, complemented by promotion and education.

<sup>6</sup> <http://www.gocolumbiamo.com/PublicWorks/GetAboutColumbia/>



### *Program Partners and Advisory Committee*

The DPW works closely with other city departments, commissions, and the independent bicycle and pedestrian advocacy PedNet Coalition. The program has also collaborated closely with the University of Missouri in a variety of ways, including: coordinating on facilities management, evaluation activities such as conducting counts and surveys, engineering studies and documentation of experimental designs, and internships for engineering students.

A citizen advisory board of approximately 30 members was appointed at the beginning of the program, to help identify projects and develop the implementation plan. The advisory board divided into three subcommittees: infrastructure, programming, and executive. The advisory board, the local bicycle and pedestrian commission and parks commission, and city staff, all worked together to plan for the program.

### *Strategic Approach*

GetAbout Columbia used existing local sidewalk, bicycle, and trail plans as the basis for NTPP implementation, in order to identify linkages and opportunities to further develop an integrated system with a variety of pedestrian and bicycle facilities. Prior to allocating funds, GetAbout Columbia conducted initial engineering and design analysis on many of the larger capital projects, to help identify any potential obstacles and select the projects best suited to moving forward for final design and implementation. The implementation plan was formally approved by the City Council on July 22, 2008. It was intentionally over-programmed for \$30 million in projects, though only \$22 million in Federal funding was available. The approach was meant to maintain flexibility in the event of varying cost estimates or projects that are unable to move forward for any reason. It proved to be a good strategy, as there were additional projects already identified and vetted when others were not able to move forward.

Participation in NTPP has helped to institutionalize nonmotorized transportation planning and funding in Columbia, and ensure that these types of projects will continue even after the program officially ends. Most capital projects will be maintained by city departments, and the promotional and educational programs are expected to be incorporated into existing work areas as well. The city has also committed to using its own funds to continue the bicycle/pedestrian program manager position after the NTPP is completed, ensuring that the position is funded on a permanent basis. The DPW will continue to coordinate with the Transit Department to improve access, and with ongoing changes to roadway design standards to enhance the nonmotorized transportation options.

### Columbia Pilot Key Highlights

- Bicycling and walking counts showed 26.2 percent and 13.8 percent increases, respectively, between 2007 and 2010.
- Experiments with innovative design, including various types of roadway facilities, designs, and signage to better serve bicyclists and pedestrians and improve safety for all users.
- Emphasis on promotion and education, dedicating a large portion of its budget (as compared with other communities) to efforts that “get the word out” and educate residents about travel options.
- Maximizing opportunities of university town setting, such as influencing travel behavior of young adults.
- Partnerships with law enforcement to improve local awareness of bicycle rights and responsibilities, improving relationships and safety.
- Partnerships with local businesses, leveraging additional funds and local support.

## Marin County, CA

Marin County is located in the San Francisco Bay Area. Much of the land within the county is rural; over 95 percent of the population is concentrated in the eastern, urban corridor of roughly 121 square miles. The urban corridor is the focus of the pilot program. With many miles of bicycle lanes, multiuse pathways, and signed routes, and a temperate climate, Marin County residents are able to bike or walk year-round.

Marin County completed its first Bicycle Master Plan in 1975. There is also a long history of recreational bicycling in the county, both on-road and mountain biking. More recently, there has been growing interest and support for improving walking and bicycling conditions to support more “utilitarian” trips such as going to the store, traveling to work or school, and running errands instead of driving. Several municipalities have adopted “Complete Streets” policies and have been constructing bicycle and pedestrian facilities as part of other projects and development proposals for many years.

Marin County was selected in 2000 as a national pilot community for Safe Routes to Schools, and a 2004 countywide sales tax measure dedicated funding to nonmotorized infrastructure and outreach programs. These initiatives all complement NTPP-related activities, providing additional energy and support for building out the county’s bicycle and pedestrian network, including closing network gaps and creating key connections to transit hubs.

### WalkBikeMarin<sup>7</sup>

Marin’s pilot program, known as WalkBikeMarin, is administered by the Marin County DPW, under direction from the Board of Supervisors. WalkBikeMarin funds projects and programs throughout the urban corridor, which includes 11 incorporated municipalities and three transportation agencies. The NTPP funds and direct project management responsibility are transferred to the municipalities with projects in their jurisdictions.

### Program Partners and Advisory Committee

A “cabinet,” comprised of program management staff, County Supervisors, and local advocates, meets regularly to discuss project and program implementation. WalkBikeMarin also communicates regularly

with local agency staff, California Department of Transportation (Caltrans), and the FHWA California Division to discuss issues related to funding, finances, and project delivery.

WalkBikeMarin worked with local agency staff and community members, consulting local planning documents, Capital Improvement Programs, and other resources, to develop a list of potential projects and programs for NTPP funding. This process yielded over \$220 million in suggested projects. To further refine the list, the Marin County Director of Public Works appointed a 19-member Citizen Advisory Committee to help

#### **Marin at a Glance:**

Project Name:	WalkBikeMarin
Population (2010):	252,409
Geographic Area:	520 square miles*
Population Density:	485 persons per square mile
Sidewalks (2005):	not available
Bicycle Lanes (2005):	35.8 miles
Shared-Use Paths (2005):	33.7 miles
Avg October Temp. (max):	75.0 <sup>0</sup> F
Avg October Temp. (min):	50.5 <sup>0</sup> F
Avg October Rainfall:	1.7 inches

#### Key Community Characteristics:

- Small towns separated by steep valley and ridges, limited connecting roadways
- Long history of commitment to nonmotorized transportation

\* the NTPP program has focused on a smaller portion of the county, the eastern urban corridor (121 sq miles)

<sup>7</sup> <http://www.walkbikemarin.org/index.php>.

categorize the projects and develop ranking and scoring criteria for each category. The committee was comprised of a broad spectrum of the community, including bicyclist, pedestrian, school, business, environmental, transit, health, disability, and local, regional, State, and Federal agency stakeholders. The meetings were open to the public and work products were posted on the project Web site. The scoring criteria focused on:

- Impact in Achieving Modal Shift
- Closing Gaps in the Existing Network and Providing Needed Support Facilities
- Feasibility and Timeliness of Implementation
- Benefit-to-Cost Determination

### *Strategic Approach*

Based on the scoring and ranking process, the Marin County Board of Supervisors authorized \$20 million in project and program funds on April 17, 2007. The WalkBikeMarin strategy was to allocate all available funds at the beginning of the program, allowing maximum time for infrastructure design and construction, and implementation of outreach programming.

WalkBikeMarin was able to allocate all of the funding at once because it had the benefit of previous planning documents, a long list of projects already identified, and an advisory committee process to vet and rank the project list to recommend a funding package.

Allocating all of the funds at once and early in the program had several advantages: reducing the work to issue requests for and review applications, moving project selection more quickly, and limiting the demands on members of the advisory committee. WalkBikeMarin funded projects in multiple entities and jurisdictions, and it can take a long time to transfer funding to implementing agencies. Similarly, because the Federal funding process can be lengthy and complicated, grouping all of the projects at once required less overall paperwork and fewer Transportation Improvement Program amendments.

The original project selection schedule was based on the premise that projects would be open and ready to use by December 2009, to allow sufficient time for education and regular use before the 2010 data collection at the end of the pilot program. This schedule was to allow for extra time in the event that a project schedule slipped. Unforeseen challenges that arose during design delayed completion of some projects beyond this deadline.

Marin County municipalities and agencies have creatively and successfully leveraged a variety of other funding sources to support nonmotorized projects, utilizing Federal, State, regional, and local resources. These have been used to fully fund, or assemble a funding package for, projects ranging from small to very complex. Some complex projects, such as the Cal Park Tunnel and multiuse path, are large and

### Marin County Pilot Key Highlights

- Bicycling and walking counts showed 68 percent and 23.7 percent increases, respectively, between 2007 and 2010.
- Utilizing existing plans and built upon a history of community engagement, to allow WalkBikeMarin to move quickly in identifying projects and allocating funds.
- Emphasis on connections to transit, including longer distance connections to commuter train and ferry services.
- Strategic focus on closing key gaps in the regional nonmotorized network and including bicycle and pedestrian components in larger projects, which might not otherwise be built.
- Successful partnerships and leveraging funds from other sources to expand the reach of the program and deliver a greater number of projects.
- Building new intra-county partnerships, especially around common interests in supporting public health.

required leveraging multiple funding sources in order to be built. Table 3 shows additional funding sources for Marin County.

**Table 3: Additional Funding Sources for Marin County**

<b>Funding Program</b>	<b>Source</b>
Bicycle Transportation Account	State of California
Congestion Mitigation and Air Quality	Federal
Measure A	Marin County ½ cent sales tax
Regional Measure 2	Improvements related to or near toll facilities
State Transportation Improvement Program	State of California
Safe Routes to Schools	Federal and State
Transportation Development Act	State of California
Transportation Enhancements	Federal

Implementation of the NTPP program has led to stronger relationships between the Marin County DPW and many local, regional, and State agencies, such as Caltrans, Metropolitan Transportation Commission (regional metropolitan transportation organization), Transportation Authority of Marin (county congestion management agency), County Department of Parks and Open Space, County Department of Health and Human Services, various municipal staffs and elected officials, Marin Transit, and the Golden Gate Bridge, Highway, and Transportation District. Participation in the program and the relationships it has built have helped to institutionalize nonmotorized transportation planning and funding in Marin County, and ensure that project development will continue after the pilot program ends.

## Minneapolis Area, MN

The Minneapolis area pilot is focused on the city of Minneapolis and also includes portions of 13 adjoining municipalities in three counties including the city of Saint Paul, Fridley, Columbia Heights, St. Anthony, Lauderdale, Falcon Heights, Roseville, Richfield, Edina, St. Louis Park, Golden Valley, Robbinsdale, and Brooklyn Center. The focus in the adjoining communities is specifically on access to and from Minneapolis.

Over the past decade, the city of Minneapolis has made significant investments in bicycle and world-class trail infrastructure. The investments have typically been made on a project basis, rather than as part of a comprehensive plan for bicycle and pedestrian facilities.

Historically, in the Twin Cities region, travel by bicycling and walking has been viewed as a local issue. For this reason, there has been no regional bicycle or pedestrian master plan and Metropolitan Council policy did not allow for Federal transportation funds to be used for local bicycle and pedestrian planning purposes. The NTPP presented the challenge and opportunity of a broader vision and more cross-jurisdictional implementation.

### Bike/Walk Twin Cities<sup>8</sup>

The NTPP program, identified locally as Bike/Walk Twin Cities (BWTC), is administered by Transit for Livable Communities (TLC) based in Saint Paul. Congress selected the nonprofit organization, active in transportation issues, to administer the Minneapolis area pilot. The TLC, founded in 1996 and governed by a 12-member board of directors, administers NTPP through a contract with the city of Minneapolis, which serves as the fiscal agent.

### Program Partners and Advisory Committee

In 2006, the TLC Board of Directors appointed an advisory committee, known as the Bike/Walk Advisory Committee (BWAC), to provide expertise and stakeholder input from relevant disciplines and interests. The BWAC advises the board about funding strategy and process for project selection, assists in

#### **Minneapolis at a Glance:**

Project Name:	Bike/Walk Twin Cities
Population – City (2010):	382,578
Geographic Area:	58.4 square miles*
Population Density:	6,551 persons per square mile
Sidewalks (2005):	1,715 miles**
Bicycle Lanes (2005):	38 miles
Shared-Use Paths (2005):	57 miles
Avg October Temp (max):	58.6 <sup>0</sup> F
Avg October Temp (min):	38.7 <sup>0</sup> F
Avg October Rainfall:	1.9 inches

#### Key Community Characteristics:

- Largest and most diverse population of the pilot communities and most densely developed
- Relatively flat, extreme summer and winter weather
- Pilot area includes primary city and portions of adjacent municipalities

\* statistics are for city of Minneapolis only, though the grant area also includes portions of 13 adjacent municipalities

\*\* sidewalks in linear miles; 92 percent of total centerline miles with sidewalks

reviewing project applications, and makes funding recommendations to the TLC Board. The BWAC conducts open meetings and has a diverse membership comprised of planners and engineers from city, county, regional, and State agencies; transit representatives; pedestrian and bicycle advocates; the health community; directors and managers of various public or non-profit programs; business leaders; and elected officials.

The BWTC works closely with the city of Minneapolis, other municipalities, and other agencies to implement infrastructure projects. Funded municipalities and jurisdictions conduct meetings for all site specific projects, to ensure the public is informed, involved,

<sup>8</sup> <http://bikewalktwincities.org/>



and supportive of the proposed action.

Local planning efforts completed during the program time period include bicycle and pedestrian plans, workshops and corridor studies funded by BWTC, and other studies, trainings, and workshops sponsored by Minnesota Department of Transportation (MnDOT), the Metropolitan Council, Blue Cross and Blue Shield of Minnesota, and other agencies. The NTPP has changed how the region and the participating municipalities view nonmotorized transportation. With a strong grounding in bicycle and pedestrian planning, this work is institutionalized within departments of public works and planning. As a result, projects funded without NTPP funding now increasingly include best practices accommodations for walking and bicycling.

### *Strategic Approach*

The TLC does not implement infrastructure projects. To move projects forward, BWTC developed several new processes to formalize advisory, solicitation, decision-making, and project selection activities. As an external party to implementing jurisdictions, BWTC's role is to work with municipal public works staff to see that funded projects are designed to meet the intention of awards and adhere to best practices and innovative designs. Most BWTC pilot funds were awarded competitively; the TLC board made direct awards in cases where scope or competitive capacity were very limited (e.g., Minneapolis bicycle parking was awarded directly to the city of Minneapolis).

The TLC issued three major solicitations, requesting proposals for projects in the categories of planning, operations, infrastructure, bike/walk streets and livable streets, and innovative demonstrations. For each solicitation, the BWTC staff worked with the Bike/Walk Advisory Committee to research best practices, develop and refine project selection criteria and processes, rank projects, recommend projects to be funded, and promote public awareness of and support for NTPP. For each solicitation TLC also hired technical experts to assess design integrity of proposals and score the projects against the funding criteria. Using the recommendations of the Advisory Committee with input from technical scorers, the TLC Board made all funding decisions.

At the grassroots level, this program has empowered local residents to advocate for improved safety and accommodations for walking and bicycling. Through trainings open to local residents, community meetings about infrastructure project implementation, and the many media stories about the program, there is heightened awareness of the benefits of bicycling and walking and the options and strategies to make travel safer and more convenient.

### Minneapolis Pilot Key Characteristics

- Bicycling and walking counts showed 33 percent and 17 percent increases, respectively, between 2007 and 2010.
- Building new capacity at all levels – grassroots, transportation professionals, businesses and elected officials. This work supports institutional and cultural change.
- Partnering in a large-scale coordinated bicycle and pedestrian data collection; count results support holistic transportation decision making.
- Funding strategic, innovative investments such as bicycle sharing, a bicycle library program, and RFID commuter tracking program, all complementing infrastructure.
- Funding several multi-jurisdictional, community-wide and corridor scale planning studies, helping to identify future projects and continue momentum for the long-term.
- Galvanizing grassroots community outreach via community-based marketing, awareness, and engagement, providing important resources to support nonmotorized transportation use throughout the community.



## Sheboygan County, WI

Sheboygan County, Wisconsin is located on the western shores of Lake Michigan. It has the largest land area of all of the pilot communities, and is comprised of 15 townships, 10 villages, and 3 cities.

Sheboygan's metropolitan area is approximately 15 square miles, with approximately two-thirds of the county's population. Most other residents live in the other two cities. Several large companies are headquartered in Sheboygan County, employing thousands of residents. Most of the municipalities are built on a grid system, with more conventional suburban development at the urban fringe.

In the late 1970s, Sheboygan County began investing in bicycle and pedestrian infrastructure. The Old Plank Road Trail (OPRT), parallel to State Highway 23, is one of the first multiuse trails in the State of Wisconsin, and one of the first in the Nation constructed adjacent to a four-lane divided highway. The county constructed the trail in phases starting in the late 1970s, completing portions between the city of Sheboygan and Plymouth. More recently, the trail has been extended to the Village of Greenbush in the far western part of the county and will eventually be extended to the city of Fond du Lac as State Highway 23 is converted to four lanes in the neighboring county.

Inspired by the OPRT, other communities in the county began developing bicycle lanes in the years prior to the NTPP grant. These facilities were constructed largely in response to the presence of bicycles on area roadways and community desire for a designated space on the road. These and earlier efforts to address bicycle and pedestrian needs were limited and ad hoc rather than part of a coordinated approach, and often focused on recreation as opposed to utilitarian trips. These early facilities helped lay the foundation for the NTPP.

### Sheboygan County NOMO<sup>9</sup>

Sheboygan's pilot program, referred to locally as "NOMO," an abbreviation for nonmotorized, is administered by the County Planning and Conservation Department, under supervision by the Sheboygan County Board of Supervisors. The Planning and Conservation Department coordinates closely with other county departments such as Highway and Law Enforcement. Planning staff also participate in weekly conference calls with the Wisconsin Department of Transportation (WisDOT) and its management

consultant to discuss progress, process, and implementation issues.

#### *Sheboygan County at a Glance:*

Project Name:	NOMO
Population (2010):	115,507
Geographic Area:	500 square miles
Population Density:	213 persons per square mile
Sidewalks (2005):	414 miles
Bicycle Lanes (2005):	1.75 miles
Shared-Use Paths (2005):	35.5 miles
Avg October Temp (max):	58.5 <sup>0</sup> F
Avg October Temp (min):	36.0 <sup>0</sup> F
Avg October Rainfall:	1.2 inches

#### Key Community Characteristics:

- Largest land area of the pilot communities
- Limited experience with nonmotorized transportation
- 15 townships, 10 villages, three cities
- Manufacturing remains a significant employment sector

Primary responsibilities for management of projects sponsored by one of the municipalities go to the agency receiving the award. The NTPP staff is available to assist communities, but responsibility for contract, record keeping, and implementation is transferred to the municipality through a two party agreement with Sheboygan County.

<sup>9</sup> [http://www.co.sheboygan.wi.us/html/d\\_planning\\_nonmotorized\\_project.htm](http://www.co.sheboygan.wi.us/html/d_planning_nonmotorized_project.htm)

### ***Program Partners and Advisory Committee***

In March 2006, the county appointed a 30-person volunteer committee to advise the Board of Supervisors in directing the program. The Citizens Advisory and Technical Committee (CATC) members represent diverse backgrounds and interests including: transportation; education; health care; local businesses; local government; bicyclists; residents; and representatives from the Metropolitan Planning Organization (MPO), State, and Federal departments of transportation. The CATC also formed five subcommittees – Finance, Health and Safety, Public Outreach, Safe Routes to Schools, and Technical. The CATC was active in developing and reviewing the county bicycle and pedestrian plan, and in developing project selection criteria to review proposals for grant funding.

The CATC structure and its strong relationships have helped to improve project design and delivery. Coordinating with MPO staff on the CATC facilitates amendments to the regional transportation plan and transportation improvement program is helping to move projects along more quickly. Relationships with WisDOT, the county Highway Department, and local public works and engineering departments have fostered discussion and education regarding improved design and engineering of facilities to better accommodate bicyclists and pedestrians.

The NOMO works closely with the Highway Department and the city of Sheboygan Department of Public Works to incorporate bicycle and pedestrian access into their projects. In addition, a partnership with the County Sheriff's Department and the city of Sheboygan Police Department is providing training programs on effective pedestrian and bicycle law enforcement, and a "recycle a bicycle" program that works with at-risk youth to rehabilitate abandoned bicycles. While many of these projects are funded through NTPP, there are others funded solely through local sources, such as shoulder paving projects and road diets, which are part of a recently adopted policy to install facilities on county highways that meet a certain average daily traffic threshold.

### ***Strategic Approach***

One of the first tasks of NOMO was to develop a Pedestrian and Bicycle Comprehensive Plan 2035 (referred to as the Plan), which is the first county plan to address the needs of both bicyclists and pedestrians, and to consider them in a transportation rather than recreational context. The Plan provides analysis of facility and programming needs and was used to support project selection decisions associated with NTPP. The WisDOT actively consults the Plan for consistency in projects. The Plan was integrated

### Sheboygan County Pilot Key Characteristics

- Bicycling and walking counts showed 22.7 percent and 11.7 percent increases, respectively, between 2007 and 2010.
- The first comprehensive approach to nonmotorized planning in the county, shifting focus from recreation to transportation, and educating local planners and engineers.
- Focus on improving walking and bicycling access to schools.
- Strong connections with local businesses and major manufacturing employers has encouraged participation and helped to move the program forward.
- Unprecedented community participation and involvement in events such as annual bike/walk to work week, with significant support from local employers.
- Focus on: 1) comprehensive nonmotorized networks in towns and villages; 2) nonmotorized corridors in heart of the city; and 3) gap closures and more direct routes to give advantage to bicycle and walking.

as appropriate into the Year 2035 Sheboygan Area Transportation Plan in 2008 as part of the larger effort to bring the MPO plan into compliance with SAFETEA-LU.

The development of the Plan included 15 public listening sessions throughout the county, with large participation and much positive discussion. For many in attendance, this was the first time they truly considered bicycling or walking as transportation in addition to recreation. The Plan recommends incorporation of pedestrian and bicycle planning into every transportation project undertaken in the county. It prioritized projects into short-, mid-, and long-term categories. Short-term projects were thought to have a good chance of being started within 5 years using either NTPP monies or other funding sources. The original NTPP funds allowed the county to complete a significant percentage of the identified short-term projects.

Overall, Sheboygan County benefits from participation in the NTPP in many ways, including:

- Improved relationships between County Planning, and city Planning Departments, Highway, and local public works departments
- New county-city partnerships
- New county-wide and local policies and plans supporting bicycling and walking
- New partnerships with WisDOT for bicycle/pedestrian project implementation
- New partnerships with businesses, schools, and churches

Sheboygan County will continue to benefit from the NTPP into the future. Policy changes related to incorporation of bicycle and pedestrian infrastructure into road improvement projects have public and political support to continue on the momentum built since 2005 and combine well with the State's Complete Streets policy. The formation of new organizations such as the Sheboygan County Walk Bike Coalition will keep the needs of the walking and biking public in the minds of the population. Growing involvement in biking and walking issues from local organizations on a broad scale, from schools, the YMCA, police departments, and local governments will certainly assist in maintaining the profile of nonmotorized transportation in the county.

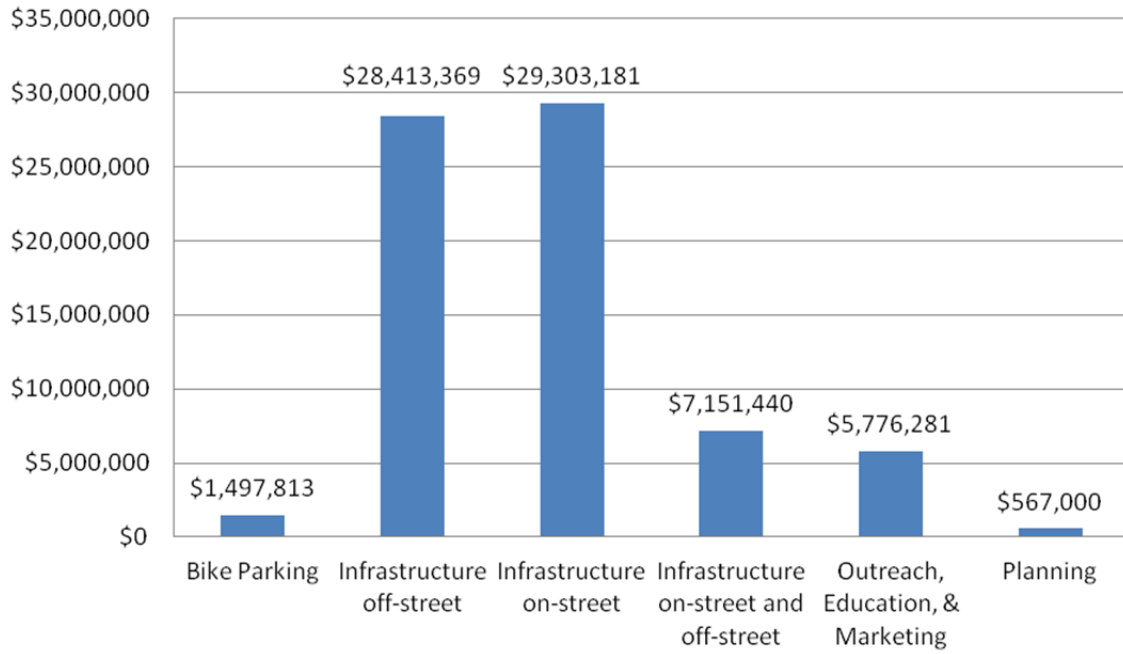
### **3. Program Investments and Implementation Approach**

This chapter discusses overall program-wide investments and the individual implementation approaches taken by each of the pilot communities.

#### **Program Investments**

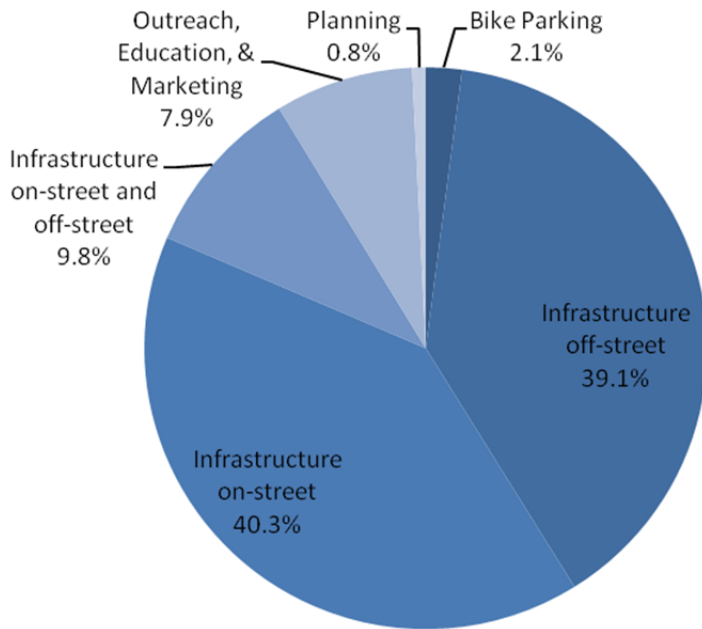
The NTPP funding has provided an opportunity for pilot communities to make significant investments in walking and bicycling infrastructure and education. As shown in Figure 2 and Figure 3, program-wide, the vast majority of program funds (89.2 percent) have been spent on infrastructure, with the next highest share (7.9 percent) spent on outreach, education, and marketing programs. The remaining funds have been spent on bicycle parking (2.1 percent) and planning (0.8 percent). Definitions of the funding types and examples of types of projects are provided below. In addition to funding infrastructure and non-infrastructure projects (shown in Figure 2 and 3), the communities also set-aside funds for evaluation, communications support, and program administration. Combined, the four communities spent approximately \$1.6 million on evaluation, \$2.1 million on communications support, and \$6 million on program administration. The FHWA also contributed approximately \$360,000 of its own research funds to support NTPP evaluation.

**Figure 2: Funding by Project Type**



\*Funds programmed as of December 2010, across all four communities

**Figure 3: Percent Funding by Project Type for All Pilot Communities**



### ***Bicycle Parking***

This category includes bicycle racks, shelters, and lockers at a variety of locations. Secure and convenient bicycle parking can encourage more people to ride, as it prevents theft and damage, and provides easy access to destinations. Racks range in size, holding anywhere from 2 to 15 or more bicycles. Depending on the design, bicycle parking costs start around a couple hundred dollars per bicycle accommodated.

### ***Infrastructure Off-Street***

This category includes infrastructure projects outside of the road right-of-way. Many of these projects are off-road, shared-use paths; the category also includes signage, bicycle sharing, and pedestrian overpass construction. Off-street infrastructure projects often involve complicated engineering, environmental, or land acquisition issues, and can be expensive. It is not uncommon for construction of an off-street multi-use path to cost in excess of \$1-2 million per mile. Many of these projects provide critical connectivity and safety benefits that cannot be achieved with on-street projects.

### ***Infrastructure On-Street***

This category includes infrastructure projects located within the road right-of-way. Most of these projects include sidewalks, bicycle, or shared-use lanes, intersection reconstruction, and lighting, signage, and signal improvements. Some require expanding the existing paved area in the right-of-way, while others reallocate the existing space. The costs for these projects vary widely, depending on complexity, technological features, and whether they require expanding the existing paved area. In many cases where streets have underused space, simple restriping of bike lanes and crosswalks can be implemented at relatively low cost. These projects typically improve safety for all users, while also expanding accessibility to a wide range of destinations and activities.

### ***Infrastructure On- and Off-Street***

This category includes projects with multiple components, including both on- and off-street elements.

### ***Outreach, Education, and Marketing***

This category includes many small projects designed to assist and encourage residents to increase walking and bicycling safety and activity. Activities include: maps, booths at local events, media announcements, guided walks and rides, training courses, personalized travel planning, safety awareness, enforcement, and comprehensive marketing campaigns. These relatively inexpensive projects complement the infrastructure program, providing information and encouragement to use new and existing facilities and change travel habits.

### ***Planning***

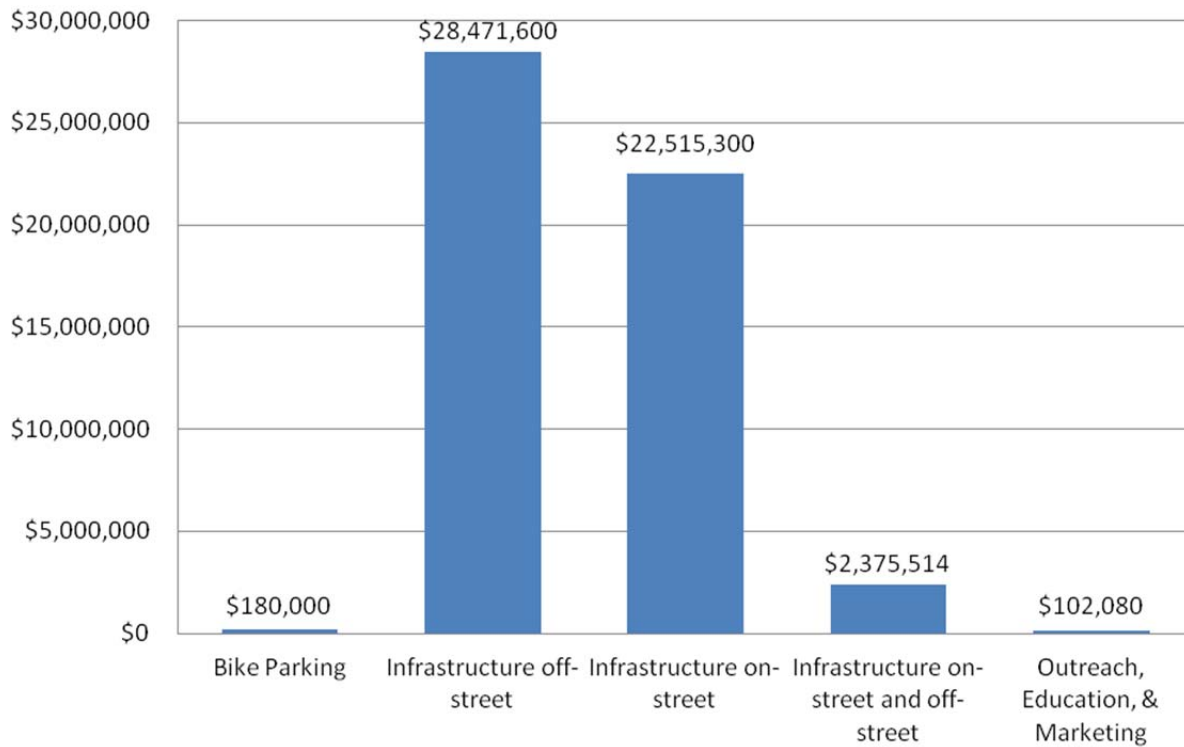
This category includes planning studies, some addressing bicycle and pedestrian improvements along specific corridors, and others focusing more comprehensively on community-wide nonmotorized needs. It also includes some bicycle and pedestrian data collection and study of improved bicycle and pedestrian access to transit. The planning studies have helped to identify and develop projects, some of which were later funded through NTPP. Strategic planning ensures high quality projects into the future, helping to institutionalize and “mainstream” nonmotorized transportation.

## **Expanding the Reach of NTPP Investments**

The NTPP has offered many opportunities for the communities to work with a variety of partners, further deepening preexisting relationships and developing new ones. Partnerships with other governmental agencies, local businesses, universities, schools, and community groups have provided opportunities to try new and innovative projects, combine with other funding sources, and expand the reach of NTPP investments. Most Federal funding programs require a 20 percent match from local sources. Though no match was required of this pilot program, through fall 2010, NTPP projects have leveraged over \$58

million in additional outside funding commitments. In addition to funding, pilot communities have also received “in-kind” donations of staff support, volunteer support, legal services, and easements toward the completion of their projects. Figure 4 shows the total outside leveraged funds for NTPP projects by project type.

**Figure 4: Outside Funds Leveraged for NTPP Projects (as of December 2010)**



### Pilot Community Implementation Approaches

Each community took a different approach to program implementation and project selection. The direction for each community depended on multiple factors, including: the existing nonmotorized infrastructure, urban form, population and demographics, local needs, already identified projects or plans, opportunity to experiment with innovative projects, and ability to complete projects within program duration. While all of the communities invested heavily in infrastructure, communities with fewer existing facilities focused primarily on laying foundations for comprehensive nonmotorized networks, including through planning; in other settings, identifying barriers and addressing more complex gap-filling projects were most appropriate. All of the communities invested in planning, education, outreach, and marketing – these efforts were instrumental in helping to institutionalize nonmotorized transportation in each pilot community and continue the cultural shift in travel behavior.

The communities also used a variety of approaches for identifying projects to fund. Both Marin County and Columbia, with the benefit of existing comprehensive bicycle and pedestrian plans, approved the vast majority of their projects all at once at the beginning of the program. This approach helped to minimize the time commitment required by citizen advisory committee members, and also helped keep more of the construction projects on track for completion by 2010. Minneapolis issued multiple calls for projects to enable a competitive process across 14 jurisdictions. This strategy also built a depth of institutional capacity and community support for more innovative designs and projects. Sheboygan County also issued multiple project calls to first develop a comprehensive bicycle-pedestrian plan and build community awareness of the goals of the program. While the process of issuing multiple calls for projects may have



extended the schedule for full construction of NTPP projects, it also provided opportunities for additional education, outreach, and critical buy-in from stakeholders.

The following subsections discuss the implementation approach in each community.

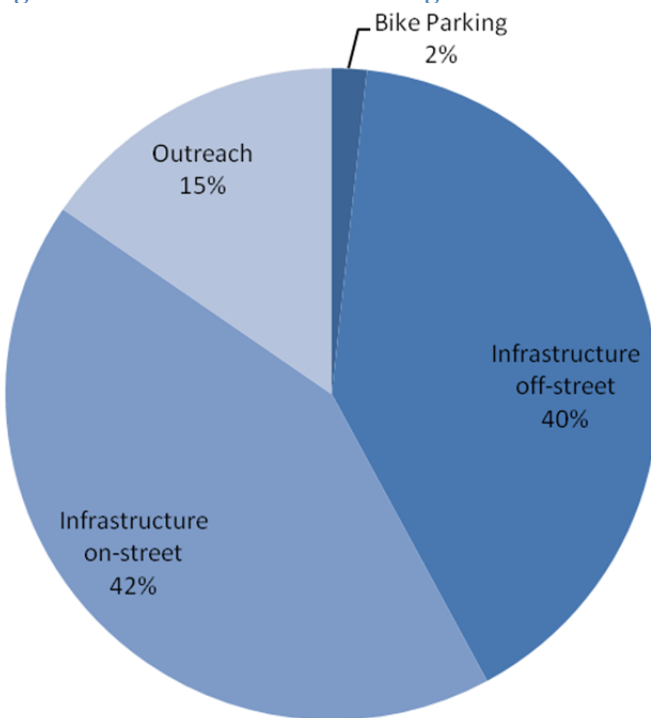
### **GetAbout Columbia – experimental design and behavior change**

The GetAbout Columbia philosophy is to promote a cultural change in travel behavior and attitude toward walking and bicycling, while providing the necessary infrastructure to support such a shift. The presence of a major university in Columbia offers many opportunities to encourage walking and bicycling, as many destinations are closer together and not all students have cars. Transitional times during the academic year provide opportunities to change travel habits and behavior, as they are times when other habits or routines may also be changing.

### **Program Investments**

As with all of the communities, the bulk of NTPP funding in Columbia has gone toward infrastructure projects. GetAbout Columbia has placed a high priority on on-street infrastructure, taking advantage of the existing roadway network. A smaller number of off-street projects provide key strategic linkages, linking important community facilities and improving safety for pedestrians and bicyclists. A breakdown of the GetAbout Columbia budget is provided in Figure 5.

**Figure 5: GetAbout Columbia Budget**



### **Infrastructure**

Columbia has made significant investments in bicycling and walking infrastructure, utilizing both standard and experimental designs. Table 4 provides detail on planned and completed infrastructure.

**Table 4: Planned and Completed Capital Projects in Columbia, MO**

Element	Miles/Spaces (funded)	Miles/Spaces (complete)*	% Complete*
Off-road shared-use paths	7.7	2.4	31%
On-street bicycle lanes	62	50	81%
On-street shared-lane markings	34	32	94%
Sidewalks and crosswalks	4.4	0.9	20%
Bicycle parking	1,130	1,130	100%

\* as of August 2011

In addition to common, standard designs, Columbia has used the NTPP funding as an opportunity to experiment with other creative infrastructure and traveler information approaches. These are intended to improve safety, provide convenient information to travelers, and make best use of limited right-of-way and other resources. Examples of these innovations include:

- Experimenting with colored bicycle lanes indicating where the lane continues and cars must yield to bicycles, and merge areas where bicycles must yield to cars;
- Low-traffic roads designed to give priority to bicyclists;
- Creative ways to share space for bicycle lanes and intermittent on-street parking; and
- Painting wayfinding information directly onto the roadway to improve safety and convenience for bicyclists.

The GetAbout Columbia bicycle rack program provided another opportunity for innovation; successfully concentrating new bicycle parking in the downtown area, promoting good access to businesses and destinations and supporting the local economy. The bicycle rack cost-sharing program between the city and local businesses allows the city to purchase the racks and loan them to local businesses, which in turn are responsible for installation and maintenance, and for ensuring that the racks are publicly accessible. As of summer 2011, 47 businesses had contributed 513 bicycle parking spaces in town. Figure 6 shows one location where the city was able to replace one automobile parking space with eight bicycle parking spaces.

**Figure 6: Downtown Columbia Bike Parking Corral**



### ***Education and Promotion***

GetAbout Columbia has invested heavily in professional marketing that complements the infrastructure improvements. There are four key components to the promotion approach:

- Create awareness
- Foster understanding of the program and a positive attitude
- Entice individuals to experiment and “Try It!”
- Encourage and instill change to become normal behavior

To build awareness, GetAbout Columbia invested in a professional branding and marketing campaign, which included advertisements on the radio, television, and in printed media. Community interest and concern over specific projects often brought “free” media attention, especially to this university town with a nationally known school of journalism. The various efforts were successful in building awareness; GetAbout Columbia conducted attitude and awareness surveys in 2007 and 2010. The surveys found an increase from 67 percent to 83 percent community awareness of the program and activities.

Moving into the future, GetAbout Columbia plans to continue trail projects and sidewalk gap closures, and focus heavily on continuing the use and evaluation of experimental designs.

### ***WalkBikeMarin – filling gaps and leveraging partnerships and funds***

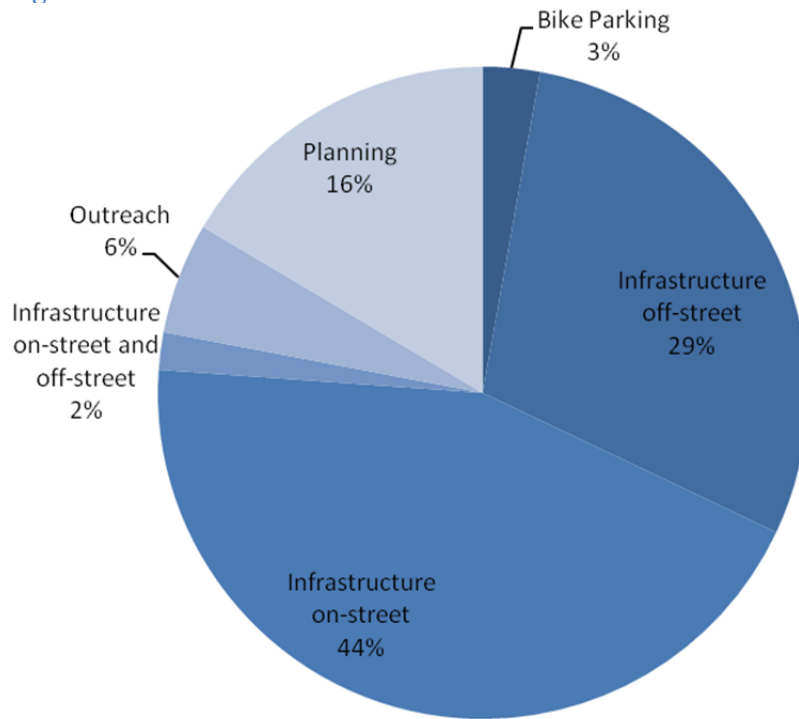
Building off a long history of nonmotorized transportation advocacy and activity, WalkBikeMarin has focused the NTPP resources toward filling in key infrastructure gaps in the network, leveraging existing and emerging partnerships, and using strategic community outreach to complement infrastructure investments. These infrastructure gaps tended to be expensive projects that had not been undertaken previously because traditional grant sources tend to have scoring criteria that reward smaller projects.

The existing plans and citizens advisory committee process allowed WalkBikeMarin to quickly move forward with project selection, and identify the key areas in which to target NTPP funding for the biggest impact. These strategic investments – some very large and technically complicated – fill gaps in the existing nonmotorized transportation network and also support connections to transit for relatively long distance commutes.

### ***Program Investments***

As with all of the communities, the bulk of NTPP funding in Marin County has gone toward infrastructure projects. WalkBikeMarin has placed a high priority on closing existing gaps in its network, developing complete streets, incorporating appropriate on-street bicycle and pedestrian infrastructure into all new construction, and retrofits of existing facilities. A smaller number of off-street projects provide key strategic linkages, connecting to schools, ferries, commercial areas, and providing direct and more convenient routes for pedestrians and bicyclists. A breakdown of WalkBikeMarin’s funding distribution is provided in Figure 7.

**Figure 7: WalkBikeMarin Investments**



**Infrastructure**

WalkBikeMarin has made significant investments in bicycling and walking infrastructure, building projects with the County Department of Public Works and funding projects in the municipalities. WalkBikeMarin has been especially effective in leveraging funds to increase the magnitude of NTPP investments, both through compiling multiple sources for desired projects and incorporating nonmotorized components into larger projects. Many of the infrastructure projects undertaken have been relatively short distance gap closures, often in locations with high levels of engineering complexity, such as reconstruction of the Cal Park Hill railroad tunnel into a level rail-with-trail that connects two communities and is a segment of the North-South Bikeway, extending the length of the county. Further, innovative and collaborative projects were undertaken including mid-block stairway shortcuts in established neighborhoods, bicycle detection at traffic signals, improved transit connections, and multi-jurisdictional corridor studies. Table 5 provides detail on planned and completed infrastructure.

**Table 5: Planned and Completed Capital Projects in Marin County, CA\***

Element	Miles (funded)	Miles (complete)*	% Complete*
Off-road shared-use paths	4.9	3.5	71%
On-street bicycle lanes	5.8	5.0	86%
On-street shared-lane markings	1.2	1.2	100%
Sidewalks and crosswalks	3.7	2.7	73%

\* as of August 2011

**Education and Promotion**

WalkBikeMarin invested approximately \$1 million in education and promotion programs to build awareness, skills, promote public health and safety, and provide incentives to encourage people to increase walking and bicycling.

**Figure 8: Marin County Bus Advertisement**



WalkBikeMarin undertook several safety-related and promotional activities by placing advertisements on buses (Figure 8), in newspapers and magazines. Educational programs included:

- Bicycle repair lessons offered in English and Spanish for adults and youth
- Riding with Youth: classes with parents to teach riding skills to children
- Street skills classes
- League of American Bicyclists: Certified Bicycle Instructor training
- Engineer's bike/ped facility design training courses

WalkBikeMarin interacted with thousands of people through informational booths at community events, and worked closely with households to provide personalized travel planning to assist with identifying ways to walk and bicycle more. Personal Travel Planning is a method of providing customized information, incentives, and motivation directly to individuals, to encourage more trips by foot, bike, bus, train or in shared cars. The “Way to Go” program reached over 14,450 households in four communities; with approximately 15 percent requesting customized information and/or participating program events. The program provided “Walk Bike Ride” maps to each town for walking, bicycling, and transit facilities, as well as other materials such as: newsletters, event calendars, local merchant coupon books, and transit schedules and maps. In all “Way to Go” communities, participants reported a decrease in discretionary automobile trips and increased walking and bicycling, especially for shopping and errands.<sup>10</sup>

WalkBikeMarin also partnered with the county's Health and Human Services department (HHS) by providing funding for the Wellness Collaborative to create the Walking and Biking Toolkit, a resource guide for businesses, nonprofits, and institutional organizations to encourage increased walking and bicycling by their staffs and clients. The collaborative has also been working to make the connection in

<sup>10</sup> Way To Go! Marin Final Program Report and Evaluation 2008 – 2010:  
[http://walkbikemarin.org/documents/WTG/Way\\_To\\_Go\\_Final\\_Report.pdf](http://walkbikemarin.org/documents/WTG/Way_To_Go_Final_Report.pdf)

the community between improved connectivity in the bicycle and pedestrian network and increased physical activity from driving less for everyday trips. In partnership with the CDC, pre- and post-project surveys are being conducted by HHS to evaluate the impacts of improved bicycling and pedestrian facilities connecting the community to three school campuses. From the mode change and distance traveled data, the levels of increased physical activity by the students along with improved air quality and reduced congestion will be measured.

Moving into the future, WalkBikeMarin places a high priority on continuing to fill in and build out the pedestrian and bicycle network; conducting outreach and educational programming; and completing the next phase of high priority corridor studies.

### **BikeWalk Twin Cities – transformational strategies and building capacity**

Building off of extensive existing nonmotorized transportation infrastructure and advocacy, where the existing trail system and sidewalks were already built out, BWTC focused on innovation and on-street connections to complete the network. This required innovative street design and operations, and working with transportation professionals, elected officials, and citizens. All projects were guided by the following overarching program goals:

- Improving existing roadway for all users
  - Facilitating accessible options for short trips
  - Promoting walking and bicycling as year round transportation
  - Providing key network connections
- Creating regional legacy
  - Planning
  - Data collection and performance measures
  - Innovation
- Building local and regional capacity
  - Political leadership
  - Transportation professionals
  - Citizens and neighborhoods, with focus on equity

The TLC Board, with input from external advisors, developed strategic priorities to guide the development of solicitations and awards selection. Projects were submitted by jurisdictions in response to specific solicitation criteria, scored by technical experts, reviewed with recommendations by external advisers, and acted upon by the TLC Board. Project selection priorities included the following:

- Maximizing bicycle use and walking for transportation through mode shift
- Demonstrating commitment to project completion within the program timeline
- Addressing clear and documented need or opportunity
- Addressing cultural and economic gaps; improve access to and within underserved communities and/or corridors
- Demonstrating cost effectiveness and community benefit
- Creating and fostering community ownership and involvement
- Demonstrating innovation and best practices

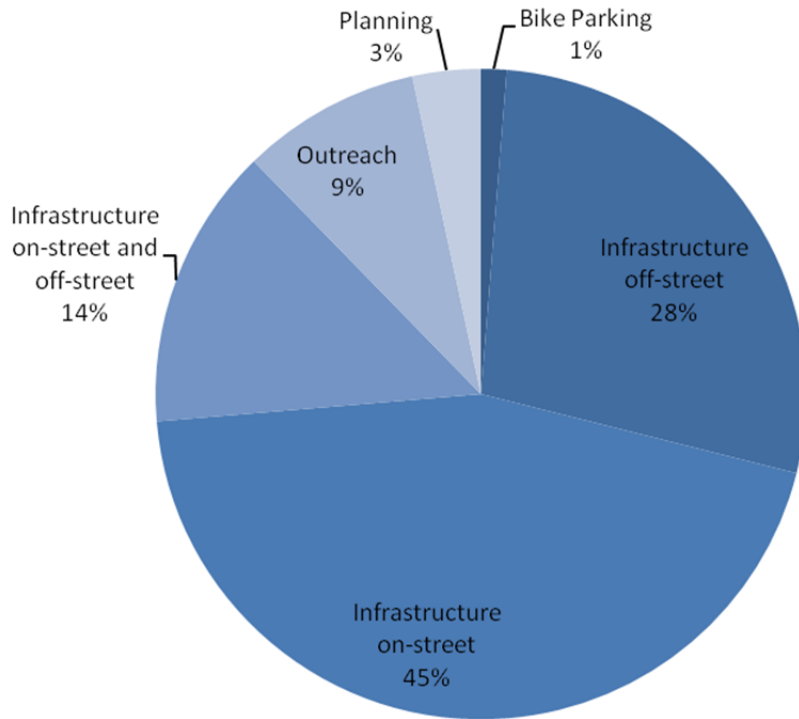
### **Program Investments**

The BWTC has used several strategies to implement the pilot program. These strategies include providing grants to municipalities for infrastructure improvements, planning studies, and awareness campaigns. The BWTC has placed a high priority on relatively low-cost improvements that expand the use of existing roadway areas. The average award for the 21 projects identified as bicycle boulevards or operations where roadways are restriped to include bicycle lanes was less than \$150,000. It has also focused on



funding multiple planning studies, helping to develop high quality projects in each of the jurisdictional areas. With the most diverse population of the pilot communities, BWTC has placed special emphasis on reaching specific populations, including recreational walkers and cyclists, women, and underserved communities (low-income, people of color, immigrants, etc.). A breakdown of the BWTC investments is provided in Figure 9.

**Figure 9: BikeWalk Twin Cities Investments**



**Infrastructure**

The BWTC has made significant investments in bicycling and walking infrastructure in the region, through planning studies and funded construction projects. The BWTC has helped to push forward the state of the practice in the region, funding many “first-time” projects in the Minneapolis area, including:

- Bicycle boulevards (Bike Walk streets)
- Road diets with bike lanes
- Bike-sharing/bicycle library
- Radio frequency identification bicycle validation system
- Cycle tracks
- Bike boxes with advance stop lines
- Shared lane markings (also known as sharrows)
- “Bicycles May Use Full Lane” signs

Table 6 provides detail on planned and completed infrastructure.

**Table 6: Planned and Completed Capital Projects in Minneapolis, MN**

<b>Element</b>	<b>Miles/Spaces (funded)</b>	<b>Miles/Spaces (complete)*</b>	<b>% Complete*</b>
Off-road shared-use paths	2.1	0.3	14%
On-street bicycle lanes	78.2	36.6	47%
On-street shared-lane markings	47.1	17.8	38%
Sidewalks and crosswalks	0.8	0.4	50%
Bicycle parking	3,097	2,831	91%
Bicycle sharing (stations/bicycles)	65/700	65/700	100%

\* as of August 2011

In addition to BWTC funded projects, the program has also made significant contributions to expertise, experimentation, and new types of projects funded by the city and county. In several cases, BWTC has consulted on or helped to guide projects that were funded through other means. One significant example is the Franklin Avenue Bridge near the University of Minnesota campus, originally identified in part of a project award to Minneapolis. The bicycle improvements were later made as part of a scheduled county bridge and intersection improvement project, which, based upon the planned bicycle facilities, reduced travel lanes from four to two to accommodate bicycle lanes and a bicycle advance box.

### ***Education and Promotion***

The BWTC has also placed a strong emphasis on education and promotion, with special attention on outreach to traditionally underserved communities and those typically less engaged with nonmotorized transportation. One innovative example is the Bike/Walk Ambassadors Program, which provides information, presentations, clinics, workshops, and instructional courses on biking and walking as a part of everyday travel. The Ambassadors Program, housed within the city of Minneapolis Public Works Department, provides education and outreach to worksites, schools, higher education institutions, neighborhoods, and city staff. Bike Walk Ambassadors are available in a variety of capacities, with special focus on reaching youth, immigrant communities, communities of color, and women.

Moving into the future, BWTC places a high priority on continuing to enhance the network by filling gaps and providing new routes for access across the region, and also continuing extensive community outreach and communications through neighborhood marketing campaigns and education services.

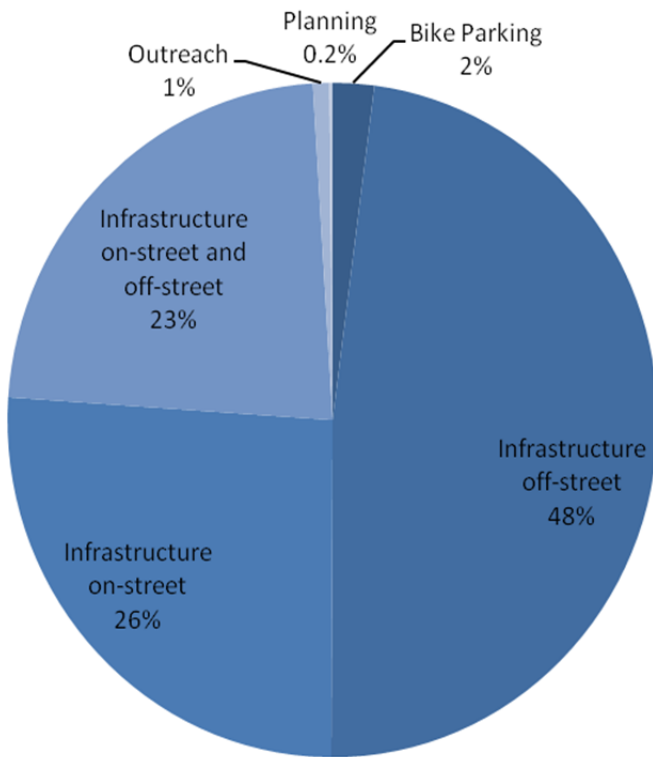
### ***Sheboygan County NOMO – building the network and the movement***

At the beginning of NTPP, Sheboygan County had a strong culture of recreational bicycling, with very little infrastructure or cultural presence devoted to utilitarian bicycling. Many of the communities within the county had comprehensive sidewalk networks (and policies in place), though there were some important gaps remaining. The initial major activity of the Sheboygan County NOMO was to develop the first comprehensive county-wide pedestrian and bicycle plan and begin to build public support and awareness for prioritizing walking and bicycling for transportation. The plan identified priorities to guide investments through NTPP and beyond. It also provided guidelines and standards for pedestrian and bicycle facility design, and presented Wisconsin laws and policies related to nonmotorized transportation. The public process and the projects identified in the plan were used to guide the Sheboygan County NOMO.

### ***Program Investments***

Sheboygan County NOMO investments have focused on filling gaps, building the network, and broad education campaigns to build public support and awareness. The priorities have been to start with the relatively easy projects (both technically and politically), to develop a comprehensive network of bicycle and pedestrian facilities. A breakdown of the Sheboygan County investments is provided in Figure 10.

**Figure 10: Sheboygan County Investments**



**Infrastructure**

Sheboygan County NOMO has invested widely across the county, funding projects in 14 of 16 incorporated communities. Projects have focused primarily on building key network connections, with a strong emphasis on providing facilities near schools.

A signature project that will be constructed in 2012 is the development of a 1.7 mile multiuse path on a portion of abandoned Union Pacific rail corridor. The rail corridor, derelict for over 40 years, runs through the heart of the city and is accessible to many destinations by bicycle or foot. The area within 1 mile of this corridor includes 31 percent of the county population, 20 schools, 34 churches, over 90 manufacturers with over 5,300 employees, and many commercial businesses. The business community is excited that this neglected industrial area will again be a vibrant part of the city, and development of the project has led to several creative and exciting partnerships to help develop a dedicated maintenance fund for the trail. Table 7 provides detail on planned and completed infrastructure.

**Table 7: Planned and Completed Capital Projects in Sheboygan County, WI**

Element	Miles/Spaces (funded)	Miles/Spaces (complete)*	% Complete*
Off-road shared-use paths	8.6	1.3	15%
On-street bicycle lanes	60	58	97%
On-street shared-lane markings and paved shoulders	22	3.4	15%
Sidewalks and crosswalks	14.2	5.4	38%
Bicycle parking	1,500	1,500	100%

\* as of August 2011

### *Education and Promotion*

Sheboygan has used a multipronged approach to promote walking and bicycling, including school and community programs, training classes, workshops, newsletters, media coverage, and use of volunteers. The NOMO program has funded numerous Safe Routes to School programs throughout the county, focusing on bicycle and pedestrian safety. These have included bicycle skills and safety classes in schools, walking school bus programs, and a safe routes plan developed for each school that identifies nearby hazardous areas and recommends countermeasures.

Sheboygan County NOMO has also focused on education for local professionals, most notably local law enforcement officials and municipal engineering staff. The NOMO partnered with the Sheboygan County Sheriff's Department and other local groups to develop and implement a variety of law enforcement training and outreach activities, including a 2-day course on bicycle and pedestrian safety and laws. The course provided opportunities for long-lasting relationships and partnership with the law enforcement community.

Moving into the future, Sheboygan County NOMO places a high priority on continuing key network expansion and connection projects, using more innovative design concepts and continuing to close gaps to provide time and distance advantages for walking and bicycling. One legacy of the program will be the training and exposure to best practices provided to local engineers. Whereas on-road pedestrian facilities were very basic and on-road bicycle facilities were nearly non-existent at the beginning of the program, the county now routinely considers sophisticated bicycle and pedestrian designs for all projects, including those not funded through NTPP.

## 4. Evaluation and Results

When NTPP was initiated in late 2005, the four pilot communities, FHWA, the CDC, and other WG members discussed how to meet the legislative requirements for reporting to Congress. The WG also recognized the benefit of data collection and evaluation to support local decisionmaking, as well as to contribute more broadly to the field of nonmotorized transportation planning and research.

Since the SAFETEA-LU legislation did not set aside dedicated funding for data collection and evaluation, the pilot communities agreed to work together to collect data and analyze results, and as a group, to dedicate a portion of their program funds to meet reporting requirements for this program. The FHWA also contributed additional discretionary research funds to support data collection and evaluation throughout the duration of NTPP.

Table 8 summarizes the legislative requirements for data collection and reporting to Congress, including information on shifts in nonmotorized, public transportation, and motor vehicle travel. The legislation also called on the program to respond to a challenging set of goals related to congestion, connectivity to activity centers, energy use, environmental quality, and health effects.

**Table 8: Evaluation Parameters for the NTPP, as Identified in SAFETEA-LU Legislation**

Need to Provide Statistical Information On
<b>Shifts in Travel Behavior</b>
Frequency of bicycling and walking
Public transportation usage
Motor vehicle usage
<b>Goals or Outcomes</b>
Congestion
Connectivity to community activity centers
Energy usage
Environment
Health

### Program Results

- An estimated 16 million miles were walked or bicycled that would have otherwise been driven in 2010.
- Average increases of 49 percent and 22 percent in the number of bicyclists and pedestrians, respectively from 2007-2010.
- Estimated bicycling and walking mode share increases in the pilot communities from 2007 to 2010 outpaced the national average from 2001 to 2008.
- Thousands of people were reached by training classes, personalized outreach, and other educational and promotional activities; some adults tried bicycling for the first time.
- New plans and studies funded through NTPP will continue to improve nonmotorized transportation into the future.
- Education and training for local planners, engineers, and elected officials have helped to institutionalize nonmotorized planning and projects into the future.
- Expanded transportation options for all segments of the population, prioritizing access to schools, shopping, transit, and other destinations.

The WG developed a consistent and collaborative approach to data collection and evaluation, which included a set of themes to help guide evaluation and address the data requirements. The themes included:

- **Health:** a dual focus on safety and physical activity to reduce obesity as the key aspects of the health goal.

- **Natural Environment:** a focus on reduction of greenhouse gas emissions, specifically emissions of carbon dioxide, and other air emissions as the key aspects of the environmental goal.
- **Transportation Planning:** analysis of how the communities worked with transportation planning processes to implement successful projects.
- **Connections:** improving connections to public transit, schools, residences, businesses, recreation areas, and other community services and recognizing the benefit of new trips that better link walking and bicycling to the services people need.

The WG considered the legislative goals, challenges to evaluation, and themes as it sought to implement a comprehensive and practical approach to data collection, project evaluation, and reporting within a limited budget. The situation necessitated a collaborative effort amongst the pilot communities. From 2006 to 2011, the WG developed and implemented project-level and community-wide approaches to evaluation to capture the impacts of the communities’ nonmotorized investments on travel behavior. The two evaluation approaches and the methods used as part of each approach are provided in Table 9 and are described below. As part of these approaches, the WG utilized nationally recognized evaluation methods, such as those developed by the National Pedestrian and Bicycle Documentation Project, to ensure that data collection and analysis were consistent across the communities and could be reported nationally.

**Table 9: Evaluation Methods Used in Each Approach**

<b>Project-Level Evaluation</b>	<b>Community-Wide Evaluation</b>
Annual bicycle and pedestrian counts (manual)	Annual bicycle and pedestrian counts (manual)
Enhanced counts (additional sites, manual and automated)	Bookend and annual intercept surveys
Bookend and annual intercept surveys	Community-wide “bookend” survey
Attitude/awareness surveys	
Bicycle parking and trail surveys	
Qualitative assessments	

The two approaches are:

- **Project-Level Evaluation:** identifying the specific impact of various projects on areas immediately adjacent to the project. Each community selected a handful of infrastructure and non-infrastructure projects to evaluate. Many of these projects were among the most innovative that the communities pursued. Communities undertook counts and surveys for some of their selected projects.
- **Community-Wide Evaluation:** identifying the impact of infrastructure projects, both individually and synergistically, and non-infrastructure projects, such as promotional and marketing campaigns.

Project-level and community-wide evaluation methods and results are discussed in more detail in sections 4.1 and 4.2.



## 4.1. Project Level Evaluation and Results

The NTPP approach to project-level evaluation is based on a complementary set of activities designed to capture basic descriptive information, observed quantitative data on the use of facilities, and supporting qualitative data on attitudes and behaviors.

The project-level evaluation measures the impact of individual or groups of projects on travel behavior, and simultaneously documents shifts in the planning and policy environments as they relate to nonmotorized transportation. While the community-level evaluation measures the impact of projects at the broad community level before and after project implementation, the project-level approach is intended to yield information about specific locations or investments (both infrastructure and non-infrastructure).

To support the project evaluation, each pilot community developed a Data Collection Plan (DCP) with special emphasis on detailing the process for project level evaluation. These plans served as a guide for capturing, compiling, and analyzing all relevant project level information to be combined and synthesized in a consistent form in the final report to Congress.

The DCPs outlined three levels of evaluation that would yield different types of data. These methods of measurement apply to both infrastructure and non-infrastructure projects:

- **Level 1:** Descriptions of all projects, individually or by project type.
- **Level 2:** Counts of facility users (e.g., bicyclists and pedestrians). For non-infrastructure projects, such as promotional campaigns, training, and similar activities, counts refer to the number of participants. The process for conducting location-specific counts is described in greater detail in section 4.2.
- **Level 3:** Intercept or other targeted surveys of facility users, or users who received a promotional or educational treatment (e.g., users who participated in personal travel planning campaigns).<sup>11</sup>

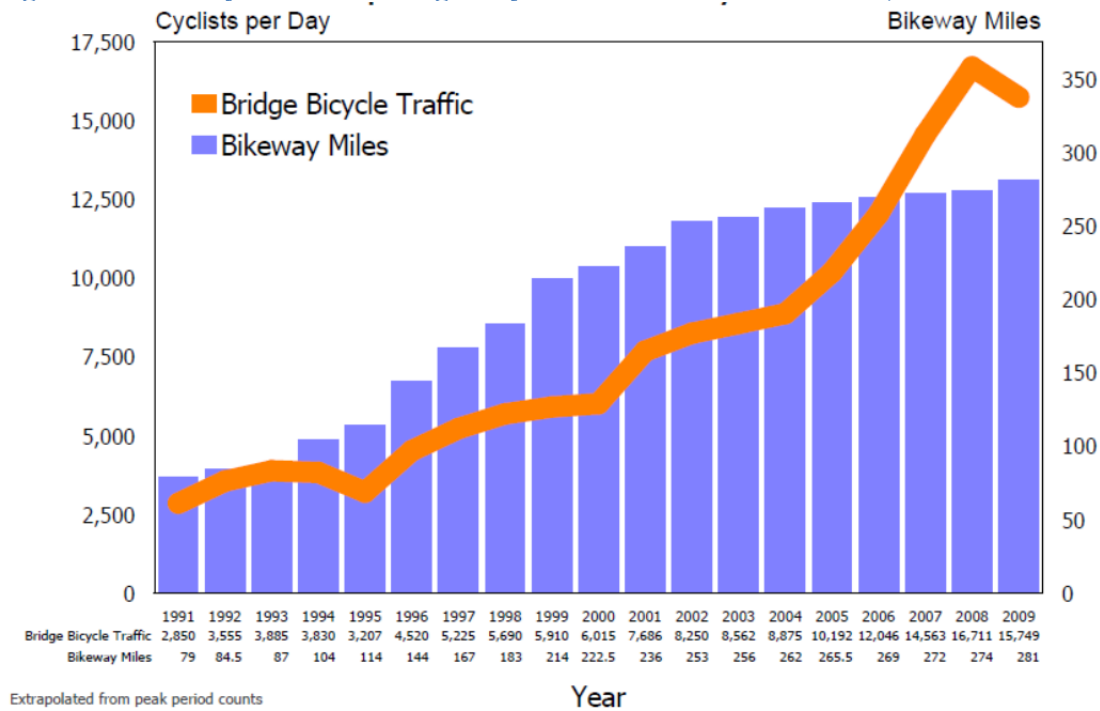
Because of the time and resources needed to collect and analyze quantitative or qualitative data at the project level, each community selected several projects to undergo the more detailed Level 2 or Level 3 evaluation. In addition to the broad program goals, each individual project has its own goals and objectives. For example, the goal of a sidewalk gap closure project might be to increase the number of trips along a particular corridor, to a particular activity center, or between two identified points that were previously disconnected from one another. Such a project is also meant to extend the reach of the sidewalk network, making a relatively small investment to yield a much longer continuous network of facilities. Similarly, a connection to a transit stop can enable a much longer non-automobile trip.

This section provides summaries for a sampling of three important projects or categories of projects for each community. The highlights include information about the projects themselves, benefits they provide, and initial evaluation results where data are available. Note that it often takes time after a project is completed for users to adopt it into regular patterns of use. As shown in Figure 11, bicycle use of the bridges in Portland, Oregon, was relatively light at first. As the bridges became better integrated into the regional transportation network, their use increased significantly.

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<sup>11</sup> In most cases, survey sample rates were too small to be statistically significant for formal results, but remained a useful anecdotal understanding of user needs around given projects and facilities, and could therefore benefit planning and informal program evaluation.

**Figure 11: Bikeway Miles and Bridge Bicycle Traffic Counts - Portland, OR<sup>12</sup>**



Several of the NTPP projects were not completed in time to come into routine use before the September and October 2010 counts. The pilot communities intend to continue to monitor these locations, allowing for ongoing evaluation of their impacts.

The projects highlighted in this report represent the project types funded in all four communities. As noted in Chapter 3, all four communities funded a diverse set of projects, including on- and off-road infrastructure, as well as educational and outreach programming. Although a certain type of project may be highlighted in only one community, other similar projects may have been carried out in another pilot community.

The following projects and project categories are described in the following pages:

#### GetAbout Columbia

- 4.1.1 Intersection and Sidewalk Improvements
  - Providence Road / Stewart Road Intersection
  - Stadium Boulevard Pedway
- 4.1.2 Experimental Infrastructure Designs
  - Windsor Ash Bicycle Boulevard
- 4.1.3 Promotional and Educational Programs
  - Bicycle Skills and Safety Classes
  - Walking School Bus

<sup>12</sup> Source: Portland Bicycle Count Report 2009, <http://bikeportland.org/wp-content/uploads/2010/01/bikecount2009reportfinal.pdf>

## WalkBikeMarin

- 4.1.4 Regionally Significant Infrastructure Projects
  - Cal Park Hill Tunnel
- 4.1.5 Network Gap Closures
  - Alameda del Prado
- 4.1.6 Pedestrian Safety Improvements
  - Medway Road Improvements

## BikeWalk Twin Cities

- 4.1.7 Network Gap Closures
  - Marshall Avenue, Saint Paul
- 4.1.8 Reallocating Roadway Capacity
  - Franklin Ave, Minneapolis
  - 20<sup>th</sup>/Minnehaha, Minneapolis
- 4.1.9 Increasing Access to Bicycles
  - Nice Ride Bicycle Sharing
  - Sibley Community Partners Bike Library

## Sheboygan County NOMO

- 4.1.10 Community-Wide Transportation Networks
  - Village of Cedar Grove Sidewalks and Bike Lanes
- 4.1.11 Nonmotorized Infrastructure Improvements at Schools
  - Howards Grove High School Pathways
- 4.1.12 Promotional and Educational Programs
  - Bike and Walk to Work Week

### 4.1.1 GetAbout Columbia – Intersection and Sidewalk Improvements

GetAbout Columbia has invested in improving walking conditions to connect neighborhoods, commercial areas, downtown, and the University of Missouri campus. Efforts include substantial upgrades to major intersections and sidewalk projects to close critical gaps in the sidewalk network and remove barriers between key destinations.

GetAbout Columbia focused on five intersections along busy commuter corridors, and six key locations to build short pedways, to fill network gaps and provide safe connections to destinations. A pedway is an extra wide sidewalk alongside a major roadway, intended for both pedestrian and bicycle use. The Providence Road and Stewart Road intersection and the Stadium Road pedway projects are briefly highlighted below.

#### Highlighted Project: Providence Road / Stewart Road Intersection

The Providence Road/Stewart Road intersection is a key crossroads, connecting the 8.5 mile multiuse MKT Trail, residential neighborhoods, the university, student housing, and the downtown area. It is a major commuter intersection for all modes, with heavy motor vehicle use and high pedestrian activity going to schools, neighborhoods, shopping, parks, trails, and other destinations.

#### Providence Road/Stewart Road

**Key Elements:** Remodeled intersection geometry, crosswalk construction, signals, sidewalks, striping, and marking to improve pedestrian and bicycle safety, enhanced trail access.

**Date Completed:** May 2009

**Cost:** \$400,000

**Results:** From 2007 to 2010 this intersection has seen a 19 percent increase in weekday walking and a 31 percent increase in weekday bicycling.

The intersection upgrade made improvements to enhance traffic flow, make pedestrian crossing safer, expand access to adjacent neighborhoods and businesses, and reduce traffic congestion and delays.

The enhancements were made by changing the geometry of turn lanes, installing pedestrian crossing signals, constructing new sidewalks, improving trail access and connections, adding lighting and drainage enhancements, modifying signals, and adding striping and markings for bicycle and pedestrian safety. The upgrade project also created a plaza where the MKT Trail meets the Providence/Stewart intersection. This intersection is one of the most widely used by bicyclists and pedestrians in Columbia, and the newly constructed plaza provides a safer place for nonmotorized users to converge.

**Figure 12: Providence Rd / Stewart Rd Intersection**  
(source: GetAbout Columbia)



Counts at this location show that from 2007 to 2010 there was a 19 percent increase in weekday walking and a 31 percent increase in weekday bicycling, based on counts taken from 4-6:00 p.m. on weekdays.

## Stadium Boulevard

**Key Elements:** Eight foot wide pedway along north side of Stadium Drive, with 10 foot portion closer to stadium. Designed to accommodate pedestrians and bicyclists.

**Date Completed:** August 2010

**Cost:** \$726,800 (all NTPP funds)

**Length:** 0.7 mile

**Results:** Significant sidewalk usage, safer walking environment, fewer people avoid walking in the area

## Highlighted Project: Stadium Boulevard Pedway

Stadium Boulevard is a major arterial with high-speed traffic that runs through the University of Missouri campus, tying together multiple destinations including the convention center, hospital, Veteran's Affairs center, and sports complexes. The area handles significant pedestrian and automobile traffic during university football games and other athletic events, despite its lack of sidewalks.

A new pedway is on the north side of Stadium Boulevard. For most of the length the Stadium Boulevard pedway is 8-foot wide to accommodate pedestrians as well as bicyclists, with the block between Maryland Avenue and Monk Drive built to 10-feet wide to also handle game-time crowds. This project also included intersection improvements to provide safe and Americans with Disabilities Act (ADA)-compliant crossings where upgrades were necessary. Construction of the Stadium Drive sidewalk required extensive coordination between the city of Columbia, Missouri Department of Transportation, and the University of Missouri.

**Figure 13: Pre-Football Game Traffic on the Stadium Boulevard Pedway (source: GetAbout Columbia)**



**Figure 14: Bicyclist on the Stadium Boulevard Pedway (source: GetAbout Columbia)**





### 4.1.2 GetAbout Columbia – Experimental Infrastructure Designs

In addition to common, standard designs, GetAbout Columbia has used NTPP funding as an opportunity to experiment with other creative infrastructure and traveler information approaches. These are intended to improve safety, provide convenient information to travelers, and make the best use of limited roadway right-of-way and other resources. Examples of these innovations include:

- Colored bicycle lanes indicating where the lane continues and cars must yield to bicycles, and merge areas where bicycles must yield to cars;
- Low traffic roads designed to give priority to bicyclists;
- Creative ways to share space for bicycle lanes and intermittent on-street parking; and
- Painting wayfinding information directly onto the roadway to improve safety and convenience for bicyclists.

The Windsor/Ash Bicycle Boulevard is an example of one of the design experiments to improve bicycling experience. The project is described below.

#### Highlighted Project: Windsor/Ash Bicycle Boulevard

Also known as “walk-bike” streets, “bicycle boulevards” are typically residential streets where pedestrians and bicyclists are given priority over motorists. These streets provide a quiet, safe, and attractive route for bicyclists and pedestrians - especially bicyclists who do not feel comfortable traveling on high-traffic streets.

Bicycle boulevards typically divert vehicular traffic to other, larger roads in the immediate area to ensure the bike/walk priority. These streets may have special signs and symbols that indicate them as priority walking and bicycling streets. They are most successful in areas with a grid-like or otherwise comprehensive roadway network where a parallel alternate route or routes can accommodate bicyclists and pedestrians choosing not to travel on the busier main route. Residents are usually in favor of them because of reduced and slower vehicle traffic.

The Windsor/Ash Bicycle Boulevard in Columbia is approximately ½-mile long and travels through the Benton-Stephens and North Central Columbia neighborhoods. It provides a critical connection in an area without many safe east-west options, helping bicyclists to bypass two busy streets and access the downtown area, parks, and retail centers. The bicycle boulevard was created by modifying an existing low volume residential street. Elements include:

- Through vehicle traffic diverted to a parallel street;
- Yellow center line and white dashed lines to create six-foot “advisory” bicycle lanes in center of street;
- Shared lane markings centered in the bicycle lane;
- Constructed “safety island” for bicyclists and pedestrians at one of the street crossings;
- Altered traffic patterns to restrict motor vehicles to make only “right-in” and “right-out” turns; and

#### Project Facts

**Name:** Windsor/Ash Bicycle Boulevard

**Summary:** New lane-striping, signage, shared-lane pavement markings, construction of new median which provides safe crossing for nonmotorized users.

**Dates:** Completed Summer 2010

**Total Cost:** \$28,800

#### Results:

- Counts show a 124 percent increase in bicycle traffic and a 4 percent decrease in motor vehicle traffic after the installation of the bicycle boulevard.
- Average vehicle speeds decreased by 7 percent.



**Figure 15: Designs of Privately Funded Bike Boulevard Murals (source: <http://www.columbiamissourian.com/multimedia/photo/2010/07/14/winning-designs/>)**



**Figure 16: Bicyclist on the Windsor/Ash Bicycle Boulevard (source: GetAbout Columbia)**



- Painted street murals at two intersections, designating the start of the bike boulevard (privately funded).

Installation of the Windsor/Ash Bike Boulevard was completed in summer 2010. To assess the impact of the project, GetAbout Columbia performed manual counts of bicyclists and automobiles before installation in April 2009, and after the installation in April 2011. The counts saw an increase in bicycling of 124 percent, and a decrease in automobile traffic of 4 percent, based on counts taken between 7-9:00 a.m. and 3:30-5:30 p.m. Average vehicle speed along the route decreased 2 miles per hour, from 28 to 26 mph.

The bicycle boulevard experiment has been well received; a May 2011 survey of residents along the route found that 74 percent of respondents think the bicycle boulevard is a good idea and 65 percent feel it improves the neighborhood image.

Additional pedestrian and bicycle improvements soon to be installed in the area are expected to increase bicycle traffic on the facility.

### 4.1.3 GetAbout Columbia – Promotional and Educational Programs

GetAbout Columbia focused significantly on outreach, educational, and promotional programs to complement its infrastructure investments. These efforts, which represent a small portion of the overall program budget, strategically complement infrastructure investments. The coordinated approach included special branding, media advertisements, and annual surveys regarding attitudes and program awareness. As a result of the promotion and educational efforts, awareness of GetAbout Columbia has increased substantially over a 3-year period. Overall, the percentage of respondents who were aware of GetAbout Columbia increased from 66 percent in 2007 to 83 percent in 2010.

The NTPP funds have gone toward new and continuing outreach programs; for programs that had previously existed, the additional resources provided an opportunity to greatly expand capacity and programming reach. Promotional and educational programs include events supporting walking and bicycling to work or school, personalized travel planning support, repairing and recycling donated bicycles, guided rides, and a variety of bicycle skills and maintenance classes. Two programs are highlighted here: Bicycle Skills and Safety Classes and the Walking School Bus.

#### Highlighted Project: Bicycle Skills and Safety Classes

GetAbout Columbia has offered a variety of bicycle skills and safety workshops and classes, geared toward children, adults, and local law enforcement officers. From 2008 to 2010, nearly 4,000 people participated in GetAbout Columbia’s educational efforts, skills classes, and workshops. Programs such as “Confident City Cycling,” “Basic Cycling 101,” and “Winter Cycling Basics” target adults, while “Walk Safe, Bike Safe” classes are aimed at elementary school children. “Walk Safe, Bike Safe” created a partnership with the Columbia Public School District and local private schools, providing workshops on bicycle safety, helmet fit, basic maintenance, and signaling.

The Confident Cycling course has four modules that teach a variety of skills, and end with a group ride. The modules include learning basic repairs and maintenance; equipping bicycles for errands, commuting and travel; improving bicycle handling skills; understanding traffic laws pertaining to bicycles; and navigating local roads and trails safely and legally by bicycle. Post-class surveys of the “Confident City

#### Project Facts

**Name:** Bicycle Skills and Safety Classes

**Summary:** A variety of bicycle skills and safety classes aimed at teaching safe and confident riding on city streets.

**Dates:** 2008-2010

**Total Cost:** \$200,000

**Results:**

- Post-class surveys of “City Cycling” class show 24 percent of car trips replaced with walking or bicycling;
- Partnership with the Columbia Public School District;
- 4,000 skills class participants;
- 24 additional League Certified Instructors trained.

Figure 17: Participants Learn Bicycle Maintenance in a Skills Class (source: GetAbout Columbia)



Cycling” course indicate that participants have replaced 24 percent of their car trips with walking or bicycling.

All classes are taught by instructors who have been certified by the League of American Bicyclists (LAB). GetAbout Columbia partnered with the PedNet Coalition, a local nonprofit organization whose work encourages nonmotorized travel, to provide many of the classes. PedNet staff report that in addition to expanding the visibility and reach of their classes, the pilot program has helped to significantly increase the number of trained LAB instructors and helped them gain valuable experience. This investment will help PedNet continue to teach and promote nonmotorized travel beyond the end of the pilot program.

#### Highlighted Project: Walking School Bus

The nationally recognized Columbia Walking School Bus (WSB) has over 400 children participating on 40 routes at 15 schools. The program provides a consistent, safe system for groups of children to walk to school under the supervision of trained adults. It provides safe passage for students who already walk and encourages other children to walk. GetAbout Columbia provided additional funding to expand the program in 2008 and 2009, helping to grow participation, the number of routes, and the volunteer base. Today, the program continues with a separate source of funding and increased stability as a result of the pilot’s efforts.

Adult volunteer leaders all receive training in roadway safety and receive criminal background checks. The Columbia WSB has recruited and trained 120 volunteer leaders; primarily parents, college students (who may receive college credit), or senior citizens.

The WSB routes generally start in a neighborhood within 1 mile of school and follow streets determined by the home locations of participating children. The program provides an opportunity for additional physical activity as part of the daily routine. In general, exercise in the morning has been found to help students focus and

### Project Facts

**Name:** Walking School Bus

**Summary:** Program through which children walk to school under adult supervision.

**Dates:** 2008-2009

**Total Cost:** \$100,000

**Results:**

- 2008: 350 children, 20 routes at 10 Columbia schools.
- 2009: 435 children participating, 40 routes at 15 Columbia schools

**Figure 18: Elementary School Students Participate in a Walking School Bus (source: GetAbout Columbia)**



**Figure 19: Elementary School Students Cross the Street as Part of the Walking School Bus (source: GetAbout Columbia)**





perform in the classroom, and walking to school reduces automobile traffic near schools at pick-up and drop-off time. The WSB also has social and community benefits for children and adults. Figure 18 and Figure 19 show students walking to school as part of the program.

#### 4.1.4 WalkBikeMarin – Regionally Significant Infrastructure Projects

WalkBikeMarin has allocated most of its NTPP funds for projects that are generally local in scope (e.g., on-road bicycle lanes and sidewalk improvements). However, the program has also invested in projects with a broader regional impact. These projects promote bicycling and walking throughout the region by making either localized or broad improvements to the regional nonmotorized transportation network. Some large bicycle and pedestrian infrastructure projects in which WalkBikeMarin has invested include:

- Tennessee Valley/Manzanita Pathway (\$2.8 million in NTPP funds)
- Cal Park Hill Tunnel Rehabilitation and Pathway (\$2.5 million in NTPP funds)
- Regional Steps, Lanes, and Paths Program (\$2.1 million in NTPP funds)
- Commuter Bike Connection (Enfrente Road to South Novato Boulevard) (\$1.4 million in NTPP funds)

The Cal Park Hill Tunnel Rehabilitation and Pathway is one of WalkBikeMarin’s signature investments. The project is described below.

#### Highlighted Project: Cal Park Hill Tunnel

The Cal Park Hill Tunnel project involved reconstruction of a 1,100-foot railroad tunnel and construction of a 1.1-mile nonmotorized path linking the Cities of San Rafael and Larkspur. The tunnel opened to the public in December 2010 and provides direct access to commuter ferry service to downtown San Francisco. A full map of the project area is provided in Appendix 3.

Originally constructed in 1884 and widened in 1924, the Cal Park Hill Tunnel accommodated freight railroad service through the 1970s. After rail service through the tunnel ended, a series of partial collapses in the late 1980s and early 1990s damaged the structure. In 1998, the county and a broad team of organizations began efforts to restore the tunnel for permanent nonmotorized use and accommodated future commuter rail service as an innovative “rail with trail” project. Construction began in December 2007, including excavation of the collapsed tunnel portions, removal of old railroad track and debris, and tunnel walls and ceiling reinforcement.

The \$27.7 million tunnel and 1.1 mile, 12-foot wide paved pathway opened in December 2010.

The contribution of \$2.5 million in NTPP funds was a critical last piece of funding to begin construction on the project.

**Project Facts**

**Name:** Cal Park Hill Tunnel

**Summary:** A 1,100-foot rail-with-trail tunnel providing nonmotorized access between San Rafael and Larkspur.

**Date Completed:** December 2010

**Total Cost:** \$27,700,000

- \$13,200,000 Regional Measure 2 (SMART)
- \$4,600,000 Regional Measure 2 (TAM)
- \$3,000,000 TEA-21
- \$2,500,000 NTPP
- \$1,500,000 Transportation for Livable Communities
- \$900,000 Bicycle Transportation Account
- \$500,000 Transportation for Clean Air
- \$400,000 County/Local

**Results:**

- Reduced bicycling trip time by 15 minutes.
- A four-fold increase in weekday bicyclists from September 2010 to May 2011.

**Figure 20: Tunnel Groundbreaking September 2008 (source: Volpe Center)**



**Figure 21: Cyclists in Tunnel at North Portal (source: WalkBikeMarin)**



The Cal Park Hill Tunnel path is a key element of Marin County’s Route 5, a 14-mile on- and off-road bicycle corridor stretching from Novato through Larkspur. The path provides direct, nonmotorized access between San Rafael and the Larkspur Landing Shopping Center and Golden Gate Ferry Terminal, which provides service to San Francisco. It provides a safe alternative to a circuitous on-road route that required the crossing of a high-speed freeway on and off ramps at an uncontrolled intersection, and reduces bicycle travel time for this route by approximately 15 minutes.

The Cal Park Hill Tunnel path is a truly regional investment, providing a critical link for current and planned transit to San Francisco. Usage of this signature facility is expected to grow when commuter rail service is introduced in the tunnel and as residents become more familiar with the path, its connections to transit, and the expanding bicycle network.

**Figure 22: Cal Park Hill Tunnel Project Map (source: WalkBikeMarin)**



### 4.1.5 WalkBikeMarin – Network Gap Closures

WalkBikeMarin recognizes the importance of developing a continuous and consistent nonmotorized transportation network. Highly localized nonmotorized transportation investments that close gaps in a network can have a broader impact in promoting bicycling and walking than if they were constructed in isolation. In other words, filling in network gaps to ensure safe and continuous walking and bicycling routes is often more important than measuring total distance of new facilities.

WalkBikeMarin is working to close gaps in nonmotorized facilities along its new Bicycle Route 5. The nearly 16-mile corridor runs north-south through Novato, San Rafael, Larkspur, and Corte Madera. Signs direct bicyclists along Bicycle Route 5, which has a mix of on- and off-road bicycle facilities. The Bicycle Route 5 map is provided in Appendix 3. The NTPP partially funded several segments of Bicycle Route 5, including the Cal Park Hill Tunnel path and bicycle lanes along Alameda del Prado, Enfrente Boulevard, and Los Ranchitos Road. The Alameda del Prado project is described below.

#### Alameda del Prado

The wide median and on-street parking along Alameda del Prado between Alameda de la Loma and Posada del Sol in Novato’s Loma Verde neighborhood made for a tight squeeze for motorists and bicyclists traveling along the popular north/south Route 5. Demand is increased in the southbound direction, as the corridor serves as a reliever route for automobiles when the freeway is congested. The varying median width created openings in some spots for vehicles to pass cyclists, but abrupt pinch points created conflicts when the lane needed to be shared.

Marin County constructed new bicycle lanes on Alameda del Prado. These lanes connect the existing bicycle lanes on the city of Novato segments of Alameda del Prado to the north and south of the project area, closing a key gap in Bicycle Route 5. The roadway median, 30-foot wide in some places, was narrowed to a consistent width. This allowed the county to designate one travel lane, a

5-foot bicycle lane, and a parking lane in each direction within the existing right-of-way while retaining a narrower landscaped median. The county also improved pedestrian accessibility by reconstructing sidewalks and adding curb ramps. In addition, the county installed new street lighting and underground utility wires, allowing for the removal of utility poles along the project corridor while American Recovery and Reinvestment Action (ARRA) funds were leveraged to resurface the entire roadway.

The Alameda del Prado corridor has seen significant increases in cyclist activity since completion of improvements in this corridor. Counts performed on weekdays between 4-6:00 p.m. indicate that cyclist usage has increased over 300 percent since 2007, while weekend mid-day counts show that cyclist usage has increased over 500 percent during the same period. Pedestrian activity has also increased, though not to the degree of bicycle usage, most likely due to there being sidewalks in this corridor prior to the improvement project.

#### Alameda del Prado

**Key Elements:** Added bicycle lanes and improved sidewalks within the existing right-of-way along Alameda del Prado in Novato

**Date Completed:** July 2010

**Cost:** \$2,947,358

- \$1,500,000 Rule 20A
- \$828,858 NTPP
- \$396,000 ARRA
- \$180,000 CSA#1
- \$42,000 Bicycle Facilities Grant

**Results:**

- Closed a critical gap and improved safety along the north-south Bicycle Route 5
- Weekday bicycle traffic increased by 366 percent while weekend bicycle traffic increased by 540 percent



**Figure 23: Alameda del Prado before Improvements (source: WalkBikeMarin)**

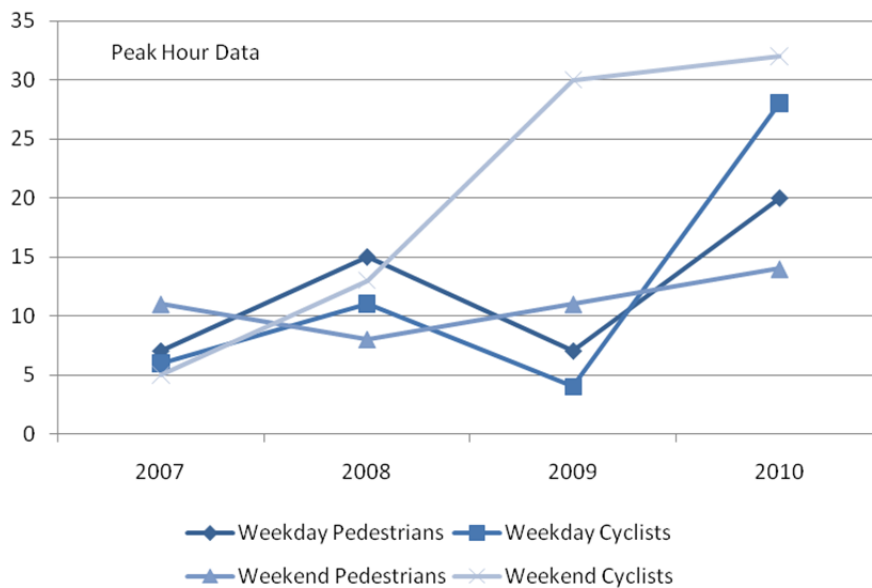


**Figure 24: Bicycle Lanes on Alameda del Prado Improve Connectivity and Promote Safety (source: WalkBikeMarin)**



Figure 25 shows increases in bicycle and pedestrian counts along Alameda del Prado. The increases in bicycle traffic may not have been as significant without the connected nonmotorized transportation network of which the new bicycle lanes along Alameda del Prado are a part. With completion of the NTPP-funded Enfrente project in 2011, which will close another gap in Bicycle Route 5, WalkBikeMarin anticipates that nonmotorized usage will continue to rise.

**Figure 25: Peak Hour Counts of Pedestrians and Bicyclists along Alameda del Prado**



#### 4.1.6 WalkBikeMarin – Pedestrian Safety Improvements

All of the bicycle and pedestrian projects that WalkBikeMarin implemented as part of the NTPP improved walking and bicycling safety, even when safety was not the primary goal. Projects that added capacity (e.g., new bicycle lanes or off-road facilities) or improved existing conditions (e.g., reconstructed sidewalks) all improved safety by providing more and better facilities for pedestrians and bicyclists. In addition, safety was a major theme of the outreach programs to encourage residents to use nonmotorized modes for their transportation needs.

WalkBikeMarin also undertook projects where improving pedestrian and bicyclist safety was the primary focus. Two of these projects, Saunders Crossing and Madrone Crossing involved pedestrian safety enhancements at high-demand locations where pedestrians were at greater risk along Sir Francis Drake Boulevard in San Anselmo. Another project involved walking and bicycling improvements along a Medway Road in San Rafael, which is a busy thoroughfare for all users, especially pedestrians and transit users. The Medway Road Improvements project is described below.

##### Medway Road Improvements

Medway Road between Canal Street and East Francisco Boulevard in San Rafael provides an important connection for pedestrians, bicyclists, and transit users in the Canal neighborhood to access downtown San Rafael. The neighborhood has one of the highest rates of transit usage in the county and Medway Road serves as a primary route for Marin Transit buses bound for downtown San Rafael. Prior to the start of the Medway Improvements project, the sidewalks were narrow and obstructed by utility poles, inhibiting pedestrian mobility and safety. Bicyclists shared travel lanes with automobiles and buses.

Marin County initiated the Medway Road Improvements project to improve pedestrian and bicyclist safety along the 0.2-mile corridor. County officials enhanced pedestrian safety by widening sidewalks, which also allowed for the addition of street furniture and new transit shelters. A separate but concurrent project

placed utility wires underground, allowing for the removal of utility poles that cluttered the sidewalks and freeing up more space for pedestrians. This also made it easier for people in wheelchairs to use the sidewalk. In order to improve bicyclist safety, shared-lane markings were added along the corridor to indicate that motorists and cyclists will be sharing the road.

With Medway Road being a primary connector between the Canal community and downtown San Rafael, there has historically been a high level of pedestrian activity and, to a lesser degree, bicycling. Since completion of the Medway Road Improvements project, weekday pedestrian activity during the peak hour has increased by 54.5 percent, from 244 observed pedestrians in 2007 to 377 in 2010 during the peak hour. Weekend pedestrian activity also increased by 34.8 percent from 198 observed pedestrians in 2007 to 267 in 2010.

##### Project Facts

**Name:** Medway Road Improvements

**Key Elements:** Shared lane markings (sharrows), widened sidewalks, and installed new transit shelters and street furniture. Utilities were undergrounded through a separate project.

**Date Completed:** October 2008

**Cost:** \$1,665,300

- \$900,000 MTC
- \$630,600 NTPP
- \$134,700 Measure A

##### Results:

- Improved bicycle and pedestrian safety and access between the Canal neighborhood and downtown San Rafael
- Weekday pedestrian and bicycle counts show increases in nonmotorized activity

**Figure 26: Medway Road Sidewalk before Improvements (source: WalkBikeMarin)**



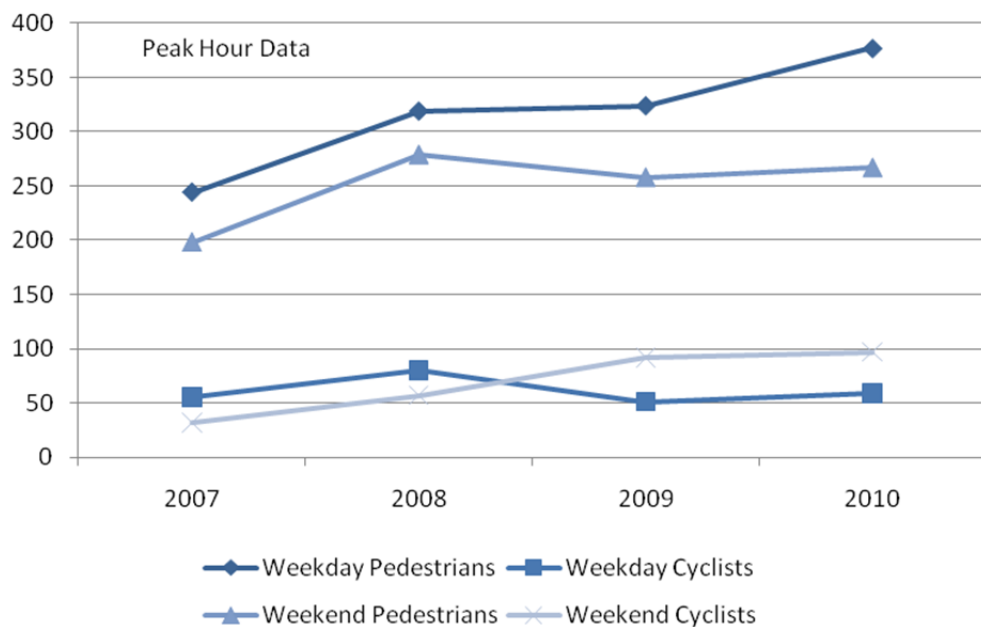
**Figure 27: Widened Sidewalks Improve Pedestrian Safety along Medway Road (source: WalkBikeMarin)**



Weekday bicyclist activity also increased after improvements were made, though not to the degree of pedestrian activity. The county observed 59 bicyclists during the weekday peak hour in 2010, up from 55 in 2007, which is a modest increase of 7.3 percent. However, peak-hour weekend bicycling activity has nearly tripled during the same time period, from 32 observed bicyclists in 2007 to 97 in 2010.

The increases in nonmotorized activity on Medway Road are a sign that pedestrians and bicyclists feel safer in the corridor. By widening the sidewalks and adding shared-lane markings to the roadway, safety has improved, while encouraging walking and biking in a neighborhood whose residents tend to be more dependent on alternative modes of transportation.

**Figure 28: Peak Hour Counts of Pedestrians and Bicyclists along Medway Road**





### 4.1.7 Bike Walk Twin Cities: Network Gap Closures

One of the primary goals of the Twin Cities pilot has been to fill in key gaps in the local walking and bicycling network, focusing on relatively small investments to vastly expand its reach. Minneapolis already had an extensive network but was missing several key linkages, both within the city and at gateway points connecting to neighboring communities. As shown in the full project map in Appendix 3, several of the BWTC investments, though relatively short, make important connections between portions of the existing network.

The BWTC projects that fill key network gaps include:

- Marshall Ave., Saint Paul
- Como Ave., Saint Paul
- Minnehaha 20th Ave. S., Minneapolis

#### Highlighted Project: Marshall Avenue, Saint Paul

The improvements along Marshall Avenue in Saint Paul provide a key linkage between on-street bicycle facilities in Saint Paul and the Grand Rounds Trail system and Midtown Greenway terminus in Minneapolis. This project also filled a gap in the regional sidewalk network, improving bicycle and pedestrian connections between Minneapolis and neighboring Saint Paul.

The 0.39 mile project, completed in October 2010, included reducing travel lanes from four to three, with an uphill bicycle climbing lane on one side and a wide outside lane shared by bicycles and motorists on the other side. This was Minnesota’s first use of “Bicycles May Use Full Lane” signs. A sidewalk was installed on one side, filling a clear need in this heavy transit-use corridor, as shown in Figure 29.

**Project Facts**

**Name:** Marshall Ave – Saint Paul

**Summary:** Key linkage between on-street bicycle facilities along Marshall Ave in Saint Paul and the Grand Rounds Trail system and Midtown Greenway terminus in Minneapolis.

**Length:** 0.39 miles

**Date Completed:** October 2010

**NTPP Funds Used:** \$495,000

**Results:**

- Improved connections for bicyclists, pedestrians, and transit users
- 42 percent increase in bicyclists using adjacent Lake St/Marshall Ave Bridge

**Figure 29: Before and after sidewalk on Marshall Avenue (source: BWTC)**

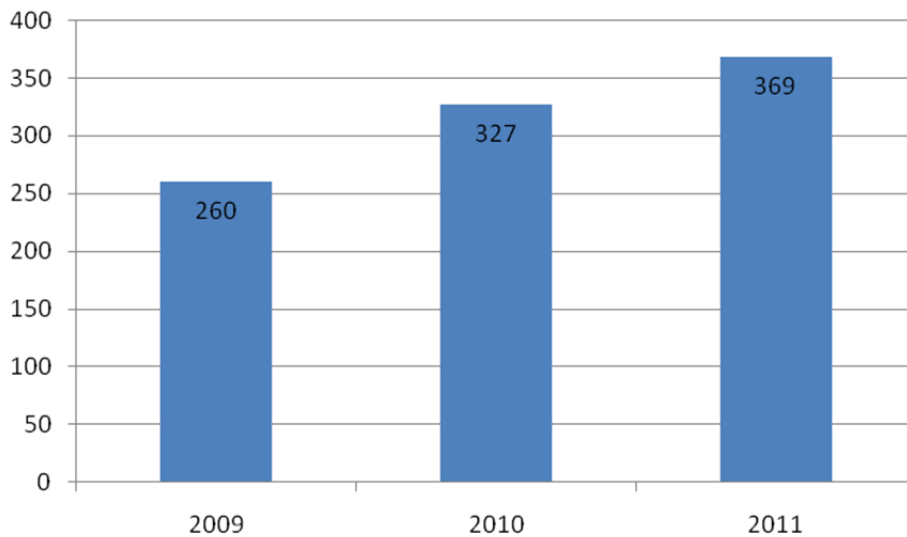


**Figure 30: Bicyclist on Marshall Avenue Bicycle Lane**  
(source: BWTC)



The project was completed after the annual fall bicycle counts; however, TLC conducts monthly counts at the Marshall Lake Street Bridge. As shown in Figure 31, weekday peak hour bicycle counts conducted between 4-6:00 p.m., subject to seasonal variation, have been higher since the facility opened. October and November 2010 counts were 242 percent and 73 percent higher than the same months in 2009; April 2011 counts were 37 percent higher than in 2010.

**Figure 31: 2009-2011 April to July Monthly Average Two Hour Counts of Bicyclists at the Marshall Lake St. Bridge**



#### **4.1.8 Bike Walk Twin Cities: Reallocating Roadway Capacity / “Road Diets”**

Consistent with the goal of improving pedestrian and bicycling conditions and safety, Bike Walk Twin Cities has funded several “road diet” projects, reducing travel lanes and adding striped bicycle lanes where low-to-moderate traffic counts allow. These projects are primarily on four-lane, relatively narrow roads, where limited width does not provide comfortable space for bicyclists. Such conditions present safety concerns, as inexperienced cyclists may ride too close to the curb or choose the sidewalk, creating conflicts with pedestrians.

The key component of the road diet is the reduction of the number and/or width of travel lanes. The freed-up space is reallocated for improvements such as medians, shared left turn lanes, bicycle lanes, curb extensions, and other traffic calming features that improve safety for all roadway users. Road diets have

been found to reduce crashes for all road users while maintaining efficient traffic operations. Two projects are highlighted here – Franklin Ave. E and Minnehaha Ave. and 20<sup>th</sup> Ave. in Minneapolis.

### Highlighted Project: Franklin Ave. “Road Diet”

Franklin Avenue SE in Minneapolis is a key travel corridor located in the diverse Seward neighborhood. The roadway connects residential areas, the University of Minnesota, Augsburg College, the Mississippi River Trail system, and Saint Paul.

Prior to the conversion, Franklin Ave. experienced daily traffic of approximately 10,000 motor vehicles, 1,500 bicyclists, and 800 pedestrians crossing the bridge over the Mississippi River. The four-lane, 44 foot-wide roadway was crowded; many bicyclists squeezed along the high curb in dangerous proximity to vehicles or rode on the sidewalk, creating conflicts with pedestrians.

The road diet allowed for a continuation of bicycle lanes throughout the corridor and other improvements such as bicycle lane separation from right turn lanes and a bicycle box treatment at the intersection at the east end of the bridge.

The BWTC project was awarded to convert a larger roadway section, including the Franklin Ave. Bridge. The bridge roadway was converted by Hennepin County as part of a signalization improvement and bridge maintenance, making the full project a collaborative effort of BWTC, the city of Minneapolis, and Hennepin County. The work on the bridge was completed in August 2010 and the full project completed in June 2011.

The early completion of treatments on the Franklin Bridge led to an immediate 43 percent reduction in the number of bicyclists riding on the sidewalk, which greatly reduced conflicts between the high number of bicyclists and pedestrians that use the Franklin Avenue Bridge. This makes travel safer for pedestrians and bicyclists on the bridge.

#### Project Facts

**Name:** Franklin Ave. SE

**Summary:** Conversion of four-lane road to three with a center turn lane and bike lanes on both sides.

**Dates:** Award 2007; Franklin Ave. Bridge completed August 2010, Franklin Ave. completed June 2011.

**Length:** 0.5 mile

**NTPP Funds Used:** \$50,000

**Results:** Dedicated on-street space for bicyclists removing 43 percent of bicycle traffic off sidewalks, improving comfort and safety for the large volume of pedestrians.

Figure 32: Bicyclists on Franklin Ave. (source: BWTC)





## Highlighted Project: Minnehaha Ave. and 20th Ave. S., Minneapolis

The Minnehaha 20<sup>th</sup> Avenue project provides a connection between key regional bicycle facilities, residential and University areas, commercial and retail destinations, and the Hiawatha Light Rail Line. The 1.5 mile project included restriping to convert from four to three vehicle travel lanes (with center-shared left turn lane), adding bicycle lanes, and providing the region's first bicycle left turn lane. The original section of 20<sup>th</sup> Avenue had a 4-foot shoulder straddling a 2-foot gutter pan with uneven and cracked seams; the new lane configuration provides a 5-foot bicycle lane that is separated from the gutter pan.

In addition to connecting to the Midtown Greenway Trail, this corridor has heavy multimodal transportation use. At 20<sup>th</sup> Ave. just north of Minnehaha Ave., daily traffic consists of approximately 5,000 motor vehicles (12,000 on Minnehaha south of 20<sup>th</sup>), 750 bicyclists, and 1,000 pedestrians. Intercept surveys conducted in fall 2010 found that between 4-6:00 p.m. on weekdays over 90 percent of bicyclists using 20<sup>th</sup> Ave. are commuting to work or school.

The new lane configuration has greatly improved the at-grade crossing for the more than 3,000 daily users of the Midtown Greenway at Minnehaha. The new crossing uses high-visibility pavement markings and overhead signage to alert approaching motorists to watch for and yield to people using the crossing.

### Project Facts

**Name:** Minnehaha 20th Ave. S, Minneapolis

**Summary:** Conversion from four-lanes to three with a center turn lane and bike lanes on both sides, bicycle left turn lane, enhanced trail crossing.

**Length:** 1.5 miles

**Dates:** Awarded 2007; Completed October 2010

**NTPP Funds Used:** \$150,000

#### Results:

- Improved travel options from the university
- Safer crossing at key trail intersection for over 2,000 daily Midtown Greenway users

**Figure 33: Bicyclists crossing Minnehaha at the Midtown Greenway (source: BWTC)**



#### 4.1.9 Bike Walk Twin Cities: Increasing Access to Bicycles

As a complement to improved bicycling infrastructure, the Minneapolis pilot has placed a high priority on increasing bicycle access. Programs provide short-term daily access to bicycles as well as long-term loans to residents who might not otherwise be able to afford bicycles.

These programs are successful in encouraging people to try bicycling, while also replacing short distance vehicle trips with bicycling. The two key projects in this category are the Nice Ride Bicycle Sharing Program and the Sibley Community Partners Bike Library. The two projects complement each other well, serving different demographic populations within the pilot area. From April to November, Nice Ride provides readily-available and highly visible bicycles within a 12-square mile area of Minneapolis. The Sibley Community Partners Bike Library uses relationships with social service organizations to serve clients who have transportation challenges, by providing long-term use of a bicycle to meet their needs. Together, these programs provide access to bicycles, helping to address one of the barriers to use of active transportation.

##### Highlighted Project: Nice Ride Bicycle Sharing

Nice Ride Minnesota bicycle sharing opened in June 2010 with 700 bicycles at 65 kiosks, mostly around the downtown, university, and uptown regions of Minneapolis. In Phase 2, Nice Ride will add more than 50 stations, expanding in neighborhoods around downtown Minneapolis and along the new light rail line into Saint Paul.

The program is an example of a successful public-private partnership, with Phase 1 capital funding coming from BWTC, Blue Cross Blue Shield of Minnesota (BCBS-MN), and the city of Minneapolis. The BWTC and BCBS-MN will be major capital sponsors for the 2011 expansion.

The program provided over 100,000 rides in the first season without a single reported crash; subscribers reported that 23 percent of the trips would have otherwise been taken by car. Users can subscribe by the day, month, or year. The system is designed to support short trips; the

#### Project Facts

**Name:** Nice Ride Bicycle Sharing

**Summary:** Public bicycle sharing program in Minneapolis and Saint Paul.

**Dates:** 2010-ongoing

**Total Cost:** \$3,629,047

- \$1,793,000 NTPP
- \$1,000,000 Blue Cross Blue Shield MN
- \$230,000 station sponsorships
- \$324,000 revenue from fees
- \$250,000 city of Minneapolis

**Results:** More than 100,000 trips in the first season and no reported crashes; survey finds 23 percent of trips would have otherwise been made by car and 89 percent of trips are for transportation rather than recreation.

Phase 1:

- 65 kiosks
- 700 bikes in system
- Service area: 12 sq mi

Figure 34: Birchwood Café Kiosk (source: Nice Ride Minnesota)



first 30 minutes are free, after which time graduated fees are based on 30-minute intervals. Many of the Nice Ride kiosks are strategically located near transit and other key destinations, thereby expanding the reach of the transit system.

There has been extensive data analysis, evaluation, and public outreach involved in the process of launching the program and planning for the Phase 2 expansion. The public bike sharing system provides access and promotes active transportation, creating a presence on the streets and showing bicycling as fun and functional transportation.

### Highlighted Project: Sibley Community Partners Bike Library

The Sibley Community Partners Bike Library (CPBL) provides fully equipped refurbished bicycles for 6-month loan to low-income community members. Each participant receives a helmet, lock, and safety training orientation. The CPBL also provides classes in safe bicycling, bicycle maintenance, and commuting, as well as support in acquiring a bicycle for long-term use at the end of the loan period.

Bicycles are loaned through 1 of 16 community partner organizations directly engaged with low-income community members. All CPBL bikes are lent to low-income community members, with an emphasis on making bikes accessible to community members traditionally less involved in the bike and transportation movement, including communities of color, women, and immigrants. A follow up survey of participants found 25 percent reporting that it was the first time that they had ridden as an adult, or ever.

Program demand has exceeded expectations, with a user waiting list and more community partner organizations expected to come on board. The CPBL has also expanded its services by adding odometers to the bicycles to help users track the distances they ride, as well as to provide program managers with mileage data. The program has been responsive to user feedback, adding a number of bike trailers so participants can transport children.

The CPBL program provides a unique and much needed resource to organizations serving economically disadvantaged clients, empowering them to use active transportation.

#### Project Facts

**Name:** Community Partners Bike Library

**Summary:** Community bike library providing 6-month bicycle loans, classes, and support for low-income residents to acquire a bicycle.

**Dates:** 2010-2011

**Total Cost:** \$201,000 NTPP funds (\$70,000 start-up in 2010)

#### 2010 Results:

- Demand exceeded expectations, hundreds of bicycles loaned out to persons in need, with a user waitlist now in place.
- Survey of patrons found that 25 percent had never ridden a bicycle before the program, 95 percent strongly recommend bicycling and the CBPL program to others.

Figure 35: Bike Library Participant with Bicycle and Trailer (source: Bruce Silcox)





#### 4.1.10 Sheboygan County NOMO – Community-Wide Nonmotorized Transportation Networks

With a land area of 514 square miles, Sheboygan County NOMO considered a broad area in which to invest NTPP resources. The program chose to make several investments in its cities and villages, where relatively small projects would have large impacts on walking and bicycling. Some of these projects connect to existing facilities and other NTPP projects that promote bicycling and walking, including facilities at and near schools. Some of the community-level nonmotorized infrastructure projects include:

- Oostburg Sidewalk Project
- Eastern Avenue Sidewalks
- Howards Grove Sidewalks and Bike Lanes
- Adell Sidewalks
- Cedar Grove Sidewalks and Bike Lanes
- Sheboygan Falls City-wide Projects
- Eisner Avenue Bike Lanes and Sidewalks
- Kohler Village-wide Projects
- Plymouth City-wide Projects

The Cedar Grove Sidewalks and Bike Lanes project is an example of the county’s efforts to improve nonmotorized access and safety in community centers. This project is described in detail below.

#### Project Highlight: Village of Cedar Grove Sidewalks and Bike Lanes

Sheboygan County NOMO funded the Village of Cedar Grove Sidewalks and Bike Lanes project to add bicycle and pedestrian infrastructure where none previously existed. The Village of Cedar Grove is located 16 miles south of the city of Sheboygan. Prior to the project, there were sidewalks along portions of North Main Street, South Main Street, and Union Avenue, but the southern portion of South Main Street had no sidewalks, and the roadway was narrow, endangering bicyclists.

**Project Facts**

**Name:** Village of Cedar Grove Sidewalks and Bike Lanes

**Key Elements:**

- 2,100-foot bicycle lane and new sidewalk along South Main Street
- Local funds were used to reconstruct the roadway; NTPP funds added the nonmotorized elements

**Cost:** \$859,300

- \$431,300 (NTPP)
- \$428,000 (local)

**Completed:** Fall 2008

**Results:**

- New sidewalks connect to existing ones along Main Street and Union Avenue
- Separate project widened the right-of-way, allowing for new bicycle lanes and sidewalks

**Figure 36: The Project Adds Sidewalks, Bicycle lanes, and Sharrows in the Village of Cedar Grove (source: Sheboygan County NOMO)**



**Figure 37: The New Sidewalks and Bicycle Lanes along South Main Street Provide Safe Spaces for Bicycling and Walking (source: Sheboygan County NOMO)**



The Village of Cedar Grove requested NTPP funding for the Sidewalks and Bike Lanes project. The project took advantage of the village's plan to reconstruct and widen a 2,100-foot section of South Main Street by using NTPP funds to construct sidewalks and bicycle lanes along the corridor. These investments provided a safe and convenient way for residents to bicycle and walk to school, restaurants, shops, and employment centers. The project also connected to existing and planned sidewalks and bicycle lanes/sharrows, creating a comprehensive interconnected network for nonmotorized transportation in Cedar Grove.

The village used \$428,000 in local funds to widen the existing roadway, and Sheboygan County NOMO allocated \$431,300 in NTPP funds to construct sidewalks and bicycle lanes along the corridor. Working together to

streamline the process, the village and the county completed construction of the project in the fall of 2008. The completed project enhances pedestrian access and safety for residents living along this segment of South Main Street and provides a dedicated right-of-way for bicyclists accessing shops and businesses in Cedar Grove.

The bicycle lanes and sidewalks project along South Main Street are just one of several NTPP-funded infrastructure investments in the Village of Cedar Grove. Sheboygan County NOMO plans to fund a bicycle and pedestrian path linking a planned residential subdivision to the Village of Cedar Grove High School. In addition, the county has funded new bicycle lanes and sharrows along Union Avenue, North Main Street, and South Main Street just north of the Sidewalks and Bike Lanes project. These projects combine to create a comprehensive bicycling and pedestrian network for Cedar Grove.

#### 4.1.11 Sheboygan County NOMO – Nonmotorized Infrastructure Improvements at Schools

Sheboygan County NOMO has invested a significant portion of its NTPP funds to make nonmotorized infrastructure improvements in proximity to schools, promote bicycling and walking to school, and educate children and parents about bicycling and walking safety. This holistic approach to school-related access and safety encourages students to bicycle and walk safely and often, preparing the next generation for a lifetime of healthy and active transportation. Some of the projects and programs related to schools that Sheboygan County has implemented include:

- Sheboygan County’s annual Bike and Walk to School Day
- Safe Routes to Schools initiatives, including education, promotion, and safety audits
- Traffic calming at multiple school locations
- Cedar Grove High School Pathway
- Howards Grove High School Pathways

The Howards Grove High School Pathways project is an example of the county’s commitment to improving nonmotorized access and safety to schools. This project is described in detail below.

#### Project Highlight: Howards Grove High School Pathways

Sheboygan County NOMO funded the Howards Grove High School Pathways project to address safety and access concerns relating to bicycling and walking to school. Before the pathways were built, bicyclists and pedestrians had no dedicated facilities along the main roadway leading to the school. Providing such a facility improves safety by reducing the potential for conflicts among motorists, bicyclists, and pedestrians.

Howards Grove High School is one of the busiest locations in the Village of Howards Grove. In addition to educating students during the day, the school is used for various community events open to all residents. The athletic complex behind the school hosts games and events after school hours and on weekends. The level of activity makes the Howards Grove High School Pathways project a high priority for the county.

**Project Facts**

**Name:** Howards Grove High School Pathways

**Key Elements:**

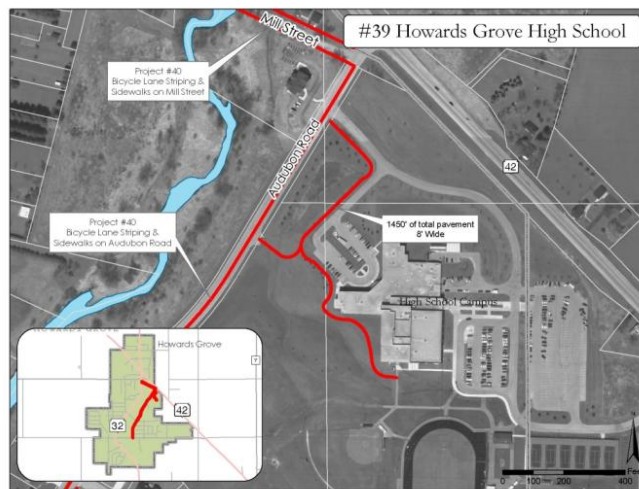
- 1,450 feet pathway for walking and bicycling to and from Howards Grove High School and Athletic Complex
- School has 329 students and serves as a hub of activity in the community

**Cost:** \$104,369 of NTPP funds

**Results:**

- Increased bicycling and walking activity since construction of the paths
- Students and residents use the path to attend athletic events after school and on weekends

**Figure 38: The Howards Grove High School Paths Provide Nonmotorized Access to the School and its Athletic Facilities (source: Sheboygan County NOMO)**





**Figure 39: Students, Faculty, and Staff Use the Path to Walk and Bicycle to School (source: Sheboygan County NOMO)**



The Howards Grove High School Pathways project includes 1,450 feet of pathway that is completely separated from motorists in order to avoid conflicts. The path leads from two access points along Audubon Road to the school and the athletic facilities in the rear. This layout makes it easy for students, school employees, and residents to walk or bicycle from the main road to the school and its athletic facilities.

Sheboygan County constructed the pathways at Howards Grove High School in the spring of 2009. The project cost \$104,369 and was funded exclusively with NTPP funds. The pathway was open for the 2009-2010 academic year, allowing students and school employees to walk and bicycle to the school while avoiding potential conflicts with automobiles.

The school's principal notes that walking and bicycling to school has increased significantly since the pathway opened.

The pathways at Howards Grove High School are just one example of the infrastructure investments in Howards Grove funded through NTPP. In 2009, Sheboygan County also funded and constructed 3,020 feet of new sidewalks and roughly 4.5 miles of bicycle lanes along Mill Street and Audubon Street in Howards Grove. Both of these new facilities directly connect to the pathways at Howards Grove High School. By constructing this interconnected network of bicycling and walking infrastructure, Sheboygan County is improving safety while promoting walking and bicycling in the Village of Howards Grove.

#### 4.1.12 Sheboygan County NOMO – Programs to Promote Walking and Bicycling

In addition to constructing new infrastructure to safely accommodate bicyclists and pedestrians, Sheboygan County NOMO has implemented several programs that encourage residents to choose walking and bicycling for transportation. By highlighting the benefits of bicycling and walking and providing incentives to reduce residents' reliance on automobiles, these programs are an integral part of the Sheboygan County NOMO Program. Education and outreach programs include:

- Annual Bike and Walk to Work Week;
- Bicycle Friendly Workshops;
- Bicycle and Pedestrian Safety Training for Law Enforcement;
- Guaranteed Ride Home Program for Sheboygan County employees;
- ReBike, a bicycle repair and education program to provide bicycles to residents in need; and
- Marketing and branding for Sheboygan County NOMO.

The annual Bike and Walk to Work Week has been a staple of Sheboygan County's bicycle and pedestrian promotion programming. This program is described in detail below.

##### Program Facts

**Name:** Sheboygan County Bike and Walk to Work Week

##### Key Elements:

- Partnership with the Bike Federation of Wisconsin to encourage bicycling and walking to work and other activities
- Employees logged their nonmotorized miles and the top individuals and employers were rewarded

**Timeframe:** Annual event in late spring

##### Costs:

- 2008: \$39,780 NTPP
- 2009: \$10,000 NTPP
- 2010: \$6,000 NTPP
- 2011: \$4,500 NTPP and \$1,500 in corporate donations

##### Results:

- In 2010, 30 businesses partnered with the county to encourage customers to walk or bike to do their shopping.
- In 2011, the individual who logged the most bicycle miles rode 212 miles during the week; the top pedestrian walked 37.8 miles during the week.

**Figure 40: Bike and Walk to Work Week Participants Attend an Event (Courtesy of Sheboygan County)**



### **Bike and Walk to Work Week**

In 2008, Sheboygan County partnered with the Bicycle Federation of Wisconsin to organize the county's first Bike and Walk to Work Week. The program is a high-profile, week-long series of events aimed at increasing the number of people walking and bicycling to work. It encourages interaction between employers and employees regarding nonmotorized commuting. Sheboygan County NOMO reached out to individuals and businesses throughout the county, specifically focusing on the urbanized areas of Sheboygan, Sheboygan Falls, Plymouth, and Kohler.

Sheboygan County NOMO used incentives to encourage residents to change their regular commuting habits during Bike and Walk to Work Week. Each year, the program organizes commuter stations on each day during the week, offering donated coffee and fruit to participants. The program also encourages employers to offer incentives to their employees that choose to participate.

The program also asked employees to log the nonmotorized miles that they accumulated during Bike and Walk to Work Week. In 2011, cyclists who reported their mileage averaged a 5.9-mile one-way commute, and reporting walkers averaged 2.6 miles one-way. In 2011, one individual logged a total of 212 miles of bicycling during the week, and another commuter walked a total of 37.8 miles. Sheboygan County recognized the top individuals and companies in various categories.

Bike and Walk to Work Week does not focus only on commuting – Sheboygan County NOMO encourages residents to bicycle and walk for shopping as well. In 2010, the county organized Bike and Walk to Shop Week in conjunction with Bike and Walk to Work Week and partnered with 30 businesses, many of which provided incentives to their participating customers like in-store discounts and small gifts.

Over the last 4 years, Sheboygan County has seen an overall increase in bicycling and walking during Bike and Walk to Work Week. The county expects the trend to continue as nonmotorized infrastructure improvements are built and encouragement programs continue.

**Figure 41: Bike and Walk to Work Week Logo**



## 4.2. Community-Wide Evaluation Methods and Results

This section describes the various evaluation methods that were pursued in each pilot community. The descriptions provide an idea of what methods are available to replicate and pursue elsewhere when estimating the impact of nonmotorized investments on travel behavior. This section also presents the results of the data collection and evaluation of community-level travel behavior that the WG members performed to fulfill the statistical reporting requirements of the NTPP's enabling legislation. Throughout the program, the analysis has been useful to the communities for planning and monitoring purposes.

### Evaluation Methods

To effectively evaluate the impacts of the NTPP, the WG developed a consistent approach to collect and evaluate data while taking advantage of and encouraging additional data collection and evaluation initiated by individual communities. In addition to the counts and surveys that were administered in all of the pilot communities, some communities conducted additional counts, surveys, and modeling to better understand the impacts and community awareness of the NTPP and its activities. Table 10 displays the range of methods used by the pilot communities to collect the key data required for performance measures to assess travel behavior changes and goals identified in the legislation. In general, the NTPP used directly collected data to fulfill the statistical reporting requirements where possible. When this direct data collection was unnecessary or infeasible, the NTPP supplemented its directly collected data with available local and national sources.

### Community-Wide Evaluation Results Summary:

- Counts in the four pilots saw an average increase of 49 percent in the number of bicyclists and a 22 percent increase in the number of pedestrians between 2007 and 2010.
- An estimated 16 million miles were walked or bicycled that would have otherwise been driven in 2010 and at least 32 million miles were averted between 2007 and 2010.
- On average, people in the pilot communities made 4.7 more utilitarian bicycle trips, for an average total of 10.7 miles, and 23.1 more utilitarian walking trips, for an average total of 16.2 miles, in 2010 than in 2007.
- In Columbia and Marin County, a greater percentage of pedestrian and bicycling trips included transit in 2010 than in 2007.
- Mode share increases in the pilot communities to bicycling and walking and away from driving from 2007 to 2010 outpaced the national average from 2001 to 2008. For the communities in sum, bicycling mode share increased 0.4, walking mode share increased 1.8, and driving mode share decreased 2.2 between 2007 and 2010.

**Table 10: NTPP Evaluation Methods**

Evaluation Method	Columbia	Marin County	Minneapolis	Sheboygan County
Bookend counts	●	●	●	●
Enhanced counts	●	●	●	●
Intercept surveys	●	●	●	●
Awareness, parking, or trail user community level surveys and counts	●	●	●	●
Household surveys	●	●	●	●
Vehicle miles traveled and mode share calculations	●	●	●	●
Bicycle and pedestrian demand modeling			●	

### Bookend Counts

To gauge an on-the-ground increase or decrease in nonmotorized activity, each community conducted counts of bicyclists and pedestrians on days in the fall at pre-determined locations in 2007 and 2010. The methodology for these counts followed the National Pedestrian and Bicycle Documentation Project, developed by Alta Planning and Design and the Institute of Transportation Engineers.<sup>13</sup>

To be representative of nonmotorized activity in the broader community, Alta advised that the pilot communities designate at least one count location for every 15,000 people. Accordingly, the 2007 populations and minimum number of count locations for each community are provided in Table 11. The 2010 counts were conducted in the same locations, for the same 2-hour period, and on roughly the same days as in 2007 to allow for direct comparison.<sup>14</sup> Count data from this process can be compiled to analyze community-wide activity or used on a location-by-location basis. When feasible, each community attempted to place count locations near or adjacent to areas where NTPP projects have been or will be implemented.

**Table 11: Number of Count Locations**

Pilot Community	2007 Population	# of Minimum Count Locations	Actual # of Count Locations Used
Columbia	92,937	7	7
Marin County	248,096	16	20
Minneapolis	351,184	23	23 pedestrian, 30 bicycle
Sheboygan County	114,504	8	8

### Results

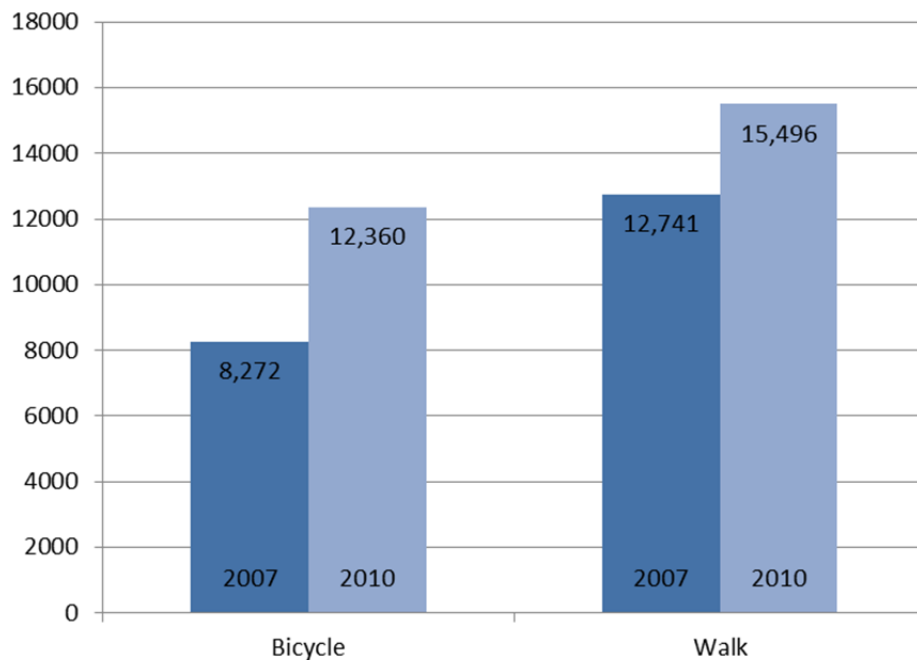
Figure 42 shows the sum total of bicyclists and pedestrians counted in the pilot communities in the fall of 2007 and 2010 at all of the count locations. The observed change in the sum total equates to an increase of 49 percent for bicyclists and 22 percent for pedestrians between the bookend years of 2007 and 2010. Individually, each community observed more bicyclists and pedestrians in 2010 than in 2007 at these locations.

<sup>13</sup> For more information on the count methodology, see: <http://bikepeddocumentation.org/>.

<sup>14</sup> At most of the locations, counts were conducted from 4:00 to 6:00 p.m. on weekdays (in Columbia, Marin County, Minneapolis, and parts of Sheboygan County); however, counts were conducted at a few locations in Sheboygan County from 7:00 to 9:00 a.m. on weekdays. In addition to these weekday counts, weekend counts were conducted from 12:00 to 2:00 p.m. in Columbia and Marin County.



**Figure 42: Total Two-Hour Fall 2007 and 2010 Bicycling and Walking Counts for all Pilot Communities**



### Enhanced Counts

In addition to the common 2007 and 2010 counts, each community performed a variety of additional counts to meet local requirements for information and reporting. Table 12 summarizes the ways in which each community collected additional count data. While much of these data are collected for internal use, some of the results from these enhanced count data are presented below.

**Table 12: Summary of Count Data Collected by Community in Addition to Bookend Counts**

Pilot Community	Additional Locations	Use of Automatic Counters	Annual Counts	Counts on Weekends	Continuous Rolling Counts	Monthly Counts
Columbia		●	●	●		
Marin County	●	●	●	●		
Minneapolis	●	●	●			●
Sheboygan County	●	●			●	

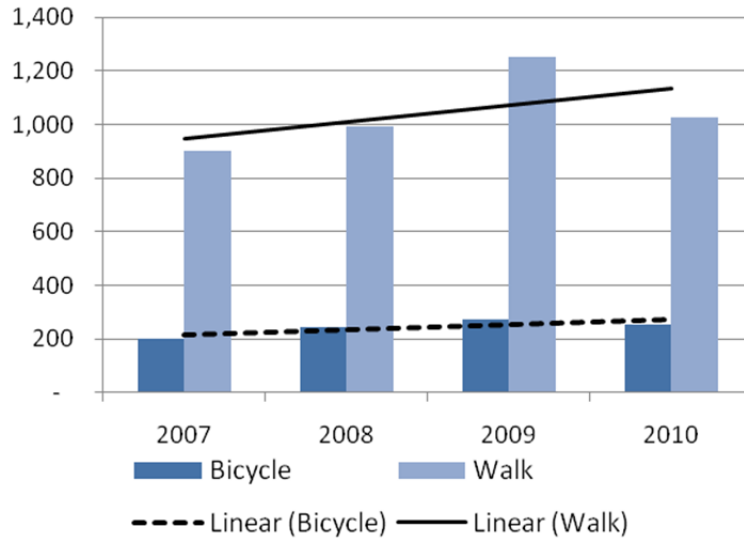
### Results

Three communities elected to conduct counts annually in addition to counts in the bookend years of 2007 and 2010. Figure 43, Figure 44, and Figure 45 shows the total number of bicyclists and pedestrians counted at all count locations during annual 2-hour counts in Columbia, Marin, and Minneapolis in the fall seasons from 2007 to 2010. Columbia and Marin conducted their counts on a weekday (from 4:00 to 6:00 p.m.) and a weekend day (from 12:00 to 2:00 p.m.) whereas Minneapolis conducted its counts only on a weekday (from 4:00 to 6:00 p.m.). As indicated by results from Columbia and Minneapolis, count totals can fluctuate year to year due to external variables such as weather conditions or special events on the designated count day. However, the trend line shows an overall increase of bicycling and walking in each community. Between 2007 and 2010, bicycling counts increased by 26 percent and walking counts increased by 14 percent in Columbia. Over the same years, bicycling counts increased by 68 percent and

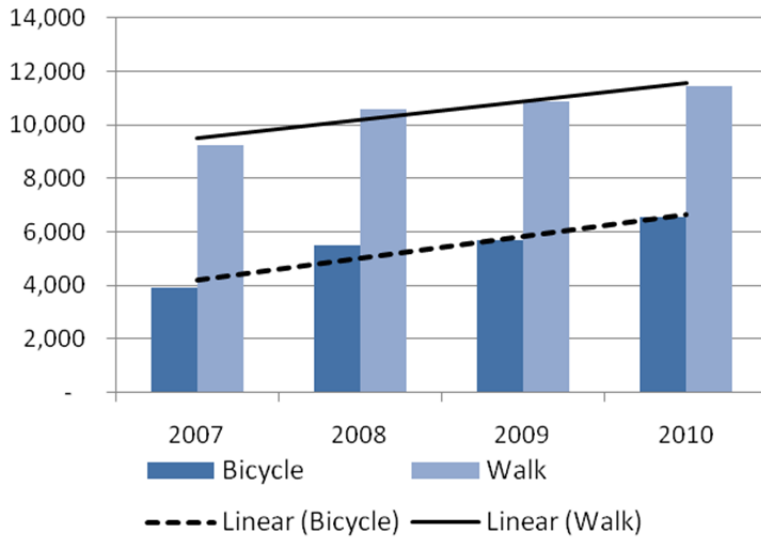


walking counts increased by 24 percent in Marin. In Minneapolis, bicycling counts increased by 33 percent and walking counts increased by 17 percent.

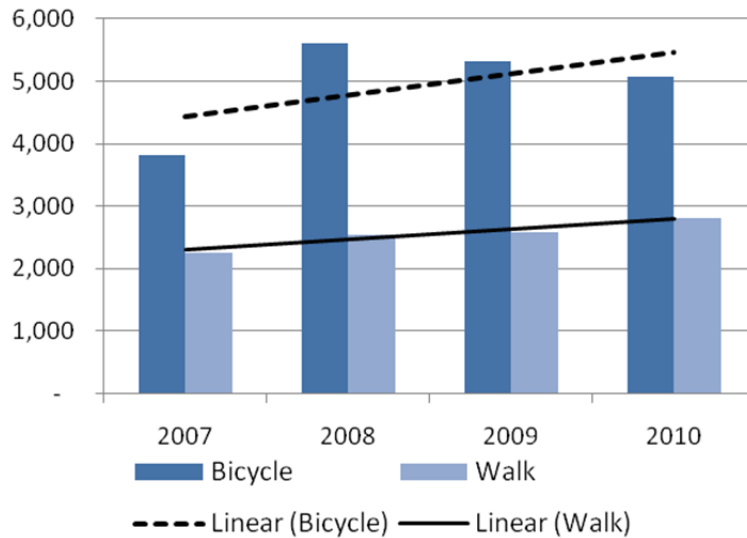
**Figure 43: Annual Two-Hour Count Results in Columbia**



**Figure 44: Annual Two-Hour Count Results in Marin**



**Figure 45: Annual Two-Hour Count Results in Minneapolis**



### Intercept Surveys

In addition to counts at the locations noted in Table 11, each community administered intercept surveys consistent with the National Pedestrian and Bicycle Documentation Project<sup>15</sup> at a minimum of six locations in the fall of 2007 and the fall of 2010.<sup>16</sup> Minneapolis administered a shortened version of the survey in both the spring and fall of 2010.

### Results

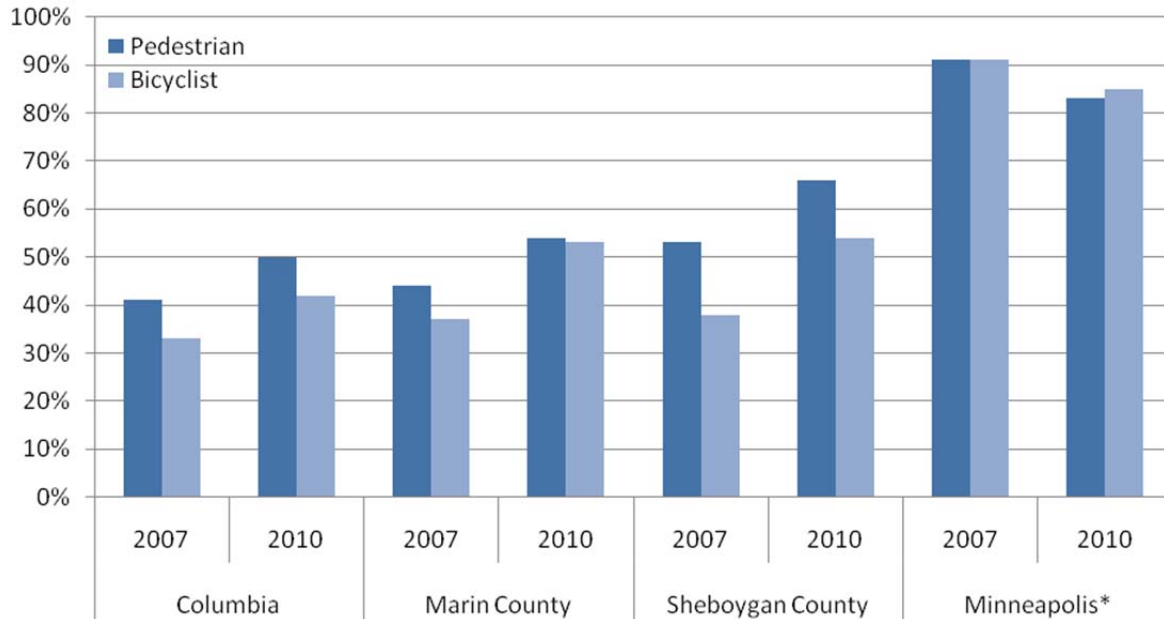
The intercept surveys administered at a representative sample of count locations in each of the pilot communities provide a snapshot of travel behavior of bicyclists and pedestrians in 2007 and 2010. Figure 46 shows the percentage of respondents who stated they were bicycling or walking for utilitarian (commute to work, school, shopping/doing errands, or personal business) reasons as opposed to for exercise/recreation reasons in 2007 and 2010. Note that while Columbia and Marin County administered their surveys on both weekdays and weekends, Minneapolis and Sheboygan County only administered surveys in conjunction with counts on a weekday during the morning or afternoon peak commute time (between 7:00 and 9:00 a.m. or between 4:00 and 6:00 p.m.). In each of the communities where surveys were administered on weekdays and weekends, as well as in Sheboygan County, a higher percentage of respondents bicycled or walked for utilitarian purposes in 2010 than respondents did in 2007. Minneapolis surveys showed a decline, but reflected a small sample of recreation and exercise users (10 percent of both walking and bicycling responses) for the 2007 baseline.<sup>17</sup>

<sup>15</sup> For more information on the survey methodology, see: <http://bikepeddocumentation.org/>.

<sup>16</sup> Columbia had six locations, Marin County seven, Minneapolis nine, and Sheboygan County eight.

<sup>17</sup> Minneapolis surveys showed 76 percent of 2007 responses indicating work or school as trip purpose (walking 64 percent; bicycling 83 percent). In 2010 the number of survey responses indicating work or school as trip purpose increased to 78 percent (walking 65 percent; bicycling 84 percent).

**Figure 46: Percent of Utilitarian Trips for the Pilot Communities**



\*Note: Minneapolis surveyed only on weekdays between 4:00 and 6:00 p.m.

Figure 47 shows the percentage of pedestrian and bicyclist trips that people in Columbia and Marin County took that included transit, meaning that the respondent was either walking or bicycling to or from a ride on a public bus, train, or ferry. In each community for each mode, a greater percentage of pedestrian and bicycling trips included transit in 2010 than in 2007.

**Figure 47: Percentage of Pedestrian and Bicyclist Trips that Included Transit for Columbia and Marin County**

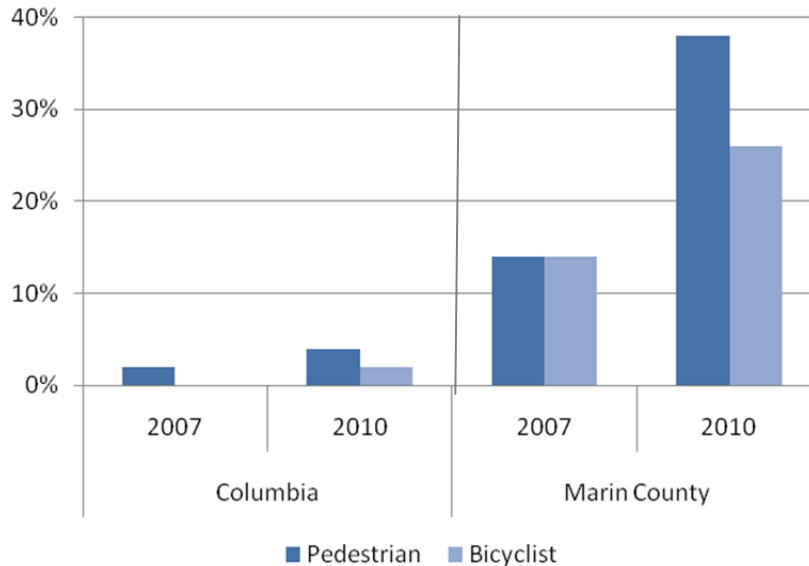


Table 13 shows the estimated average length of pedestrian and bicyclist trips in miles that people in all four communities made in 2007 and 2010. In some communities, the average distances increased; in others, they decreased. Note that these trip distances include both utilitarian and exercise/recreation trips.

**Table 13: Average One-Way Estimated Trip Distances**

	Minneapolis		Columbia		Marin County		Sheboygan County	
Year	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike
2007	1.4 miles	6.1 miles	3.0 miles	10.6 miles	2.6 miles	17.8 miles	1.7 miles	N/A
2010	1.5 miles	6.6 miles	2.3 miles	7.3 miles	3.0 miles	15.1 miles	2.8 miles	6.2 miles

***Minneapolis’ Survey Methods Analysis***

Intercept surveys administered by Minneapolis in 2007 were only conducted on weekday peak periods (4:00 to 6:00 p.m.) during the annual counts. The lack of weekend survey data likely skewed the survey results for Minneapolis, which resulted, as reported in the previous section, in a disproportionate number of school and work commute trips when compared to results from the other pilot communities that also conducted weekend surveys. In 2009, Transit for Livable Communities partnered with St. Olaf College in Northfield, Minnesota, to look at the survey results and their use as inputs for the Intercept Survey model and develop recommendations to address this issue and improve the consistency with estimates from the rest of the pilots.

This problem was used as a mathematics practicum for a group of St. Olaf students, and their analysis led to a recommendation that TLC replicate the original effort with a supplemental round of intercept surveys in the spring of 2010 on both weekdays and weekend days and use a statistical test (a chi-square test) to measure the similarity of both rounds of surveys and determine if the new surveys could be used in place of the biased sample from 2007. The TLC administered the survey in the spring of 2010 and ran the statistical test. The test did not find strong similarity for the 2010 results with the 2007 surveys, and thus it was not possible for Minneapolis to replicate the same survey parameters as used in the other communities. This difference in data survey methodology can be seen by the disproportionately high results for Minneapolis utilitarian trips compared to the other communities (see Figure 46).

***Awareness, Parking, and Trail User Community-Level Surveys and Analysis***

The pilot communities elected to administer community-level surveys and analyses that focused on issues and questions that were of particular interest to each community. Each of the approaches differed from each other since they were tailored toward unique aspects of their nonmotorized investments. Overall, the results from the community level surveys and analyses point to an increase in awareness of nonmotorized transportation, why people choose to or not to bicycle, more people use bicycle parking if more bicycle racks are provided, and the kind of trips people are taking on multiuse trails.

***Columbia’s Awareness Survey***

Columbia contracted with a professional research, evaluation, and analysis firm to assess community awareness and attitudes toward the GetAbout Columbia Program. This effort provided a baseline survey in 2008, a midpoint survey in 2009, and a final awareness and attitudes survey in 2010. The 2008 baseline survey included questions about respondents’ expectations for the program. The 2009 and 2010 surveys provided opportunities to test respondents’ experience with and overall embrace of the program. For each year, the survey was administered over the phone to over 400 random Columbia residents age 18 and over.

***Results***

The findings from Columbia’s awareness survey represent the impact a program like the NTPP can have on a community’s attitude toward bicycling and walking and its level of awareness of an active nonmotorized program. Findings from Columbia’s awareness survey point to an increased level of awareness of GetAbout Columbia and an increased sense that Columbia is a pedestrian- and bike-friendly community from 2007 to 2010. However, reasons for or against engaging in bicycling and walking

remained generally unchanged over that same period of time. Specific results regarding these findings include:

- The percentage of respondents who were aware of GetAbout Columbia increased from 66 percent in 2007 to 75 percent in 2008 and 83 percent in 2010.
- The number of respondents who agree that Columbia is a pedestrian- and bike-friendly community increased significantly from 66 percent in 2007 to 70 percent in 2008 and 80 percent in 2010.
- Perceived safety concerns remained the biggest challenge facing people who want to walk or bike in Columbia. This result was consistent for all 3 survey years. Survey respondents in 2010 continued to consider health/exercise and recreation the most important reasons for using an alternative mode of transportation. The response “takes too much time” remains the top reason people cited for not using an alternate mode of transportation.

### *Marin County's Bicycle Parking Survey*

The Marin County Department of Public Works, in partnership with Caltrans and the Golden Gate Bridge, Highway, and Transportation District conducted surveys at park and ride lots and major transit facilities in Marin County in autumn of 2008. The purpose of the surveys was to evaluate the demand for bicycle parking at these facilities by capturing general travel habits and interest in and input on bicycle parking facilities. The surveys also asked questions about the facility where each particular survey was distributed. Mail-back surveys were distributed at all 10 park and ride lots as well as the San Rafael Transit Center and the Larkspur Ferry Terminal. A total of 536 mail-back responses were returned, of which 244 came from park and ride lots, 231 from the ferry terminal, and 61 from the transit center.

The Marin County Bicycle Coalition used a different questionnaire to conduct an internet survey of its membership with similar questions about bicycling parking facilities at transit stations and park and ride lots. One hundred and nine Internet surveys were completed.

### *Results*

The findings from Marin County's bicycle parking survey point to reasons why people did not bicycle to or park their bicycles at each location. Specific results regarding these findings include the following:

- The most common reasons for not bicycling were that respondents felt they live too far away, it was not convenient for them to do so, or that their route is too hilly or dangerous. At the same time, nearly 20 percent indicated that more bike paths and lanes would enable them to consider bicycling to the facility.
- Not having shower facilities at their final destination was cited by many as an obstacle.
- Over one-third of respondents indicated a change in their personal circumstances, such as no longer needing to pick up children, would need to occur before they could consider bicycling.
- Of those who did ride a bicycle to the facility, 65 percent brought their bikes with them on the bus or ferry because they needed it to get to their final destination; 14 percent brought their bicycle with them because they were not comfortable with leaving it at the facility.

### *Minneapolis' Bicycle Parking Analysis*

In addition to manual bicycle and pedestrian counts, Minneapolis conducted an evaluation of bicycle parking in two neighborhood business districts and two schools (Washburn High School and Roosevelt/Wellstone High School) to examine the before and after impact of NTPP-funded bicycle parking installations. An inventory of existing bicycle parking facilities and multiple observations of bicycle parking were made in May and July of 2009. Additionally, to examine the perception about the quality and availability of bicycle parking postcard spoke surveys were distributed in the business district locations.



## Results

Follow up inventory of new bicycle parking and observations were made in May and July of 2011. The results of the observations show increases in the observed number of bicycles at the new parking installations. Table 14 shows the observation averages for schools and business district.

**Table 14: Observations of Bicycle Parking at High Schools and Two Neighborhood Business Districts before and after Installation of NTPP Bicycle Parking**

	Observation	Number of Bicycle Racks	Total Available Parking	Total Number of Bicycles Observed	% Using Bicycle Rack	% Using Non-Rack Parking
High Schools	2009	6	38	31	56%	44%
	2011	19	144	46	85%	15%
	% Change	<b>217%</b>	<b>279%</b>	<b>47%</b>	<b>53%</b>	<b>-66%</b>
Business Districts	2009	72	208	117	45%	55%
	2011	163	399	148	60%	38%
	% Change	<b>126%</b>	<b>92%</b>	<b>40%</b>	<b>33%</b>	<b>-27%</b>

At the two high school locations, bicycle parking installations increased bicycle parking availability 279 percent, leading to a 47 percent increase in students bicycling to school and a 66 percent decrease in the number of students securing bicycles at non-rack locations. It should be noted that much of the existing bike parking consisted of substandard or obsolete bike racks and all NTPP parking is consistent with best practices for secure bicycle parking.

At the two business districts, bicycle parking installations increased bicycle parking availability 92 percent, leading to a 40 percent increase in the number of observed bicycles, and a 27 percent decrease in the number of bicycles secured at non-rack locations. During both observation periods, it was often noted that clusters of parked bicycles would exceed available parking at popular destinations, resulting in significant numbers of bicycles secured to objects other than bike racks.

In all cases, the increase of bicycle racks resulted in increase of observed bicycles parked; however, the rate of increase was disproportionate. This observation is reasonable when considering that bicycle parking is most effective when there are ample spaces available and providing new bicycle parking expands the likelihood that a bicyclist will be successful in locating an open rack. On the other hand, if the parking use increases at a rate similar to parking expansion, it no longer creates new incentive to bicycle to a destination. Where the need for parking is identified, it is reasonable to provide facilities in excess of anticipated demand and increase the confidence that space will be available for each bicyclist who arrives.

## *Sheboygan County's Trail User Survey*

Sheboygan County administered a trail user survey between July and October in 2009 and 2010. Over 550 people completed the survey in 2009 and over 380 completed the survey in 2010, which mainly focused on economic development questions as well as attitudes and characteristics surrounding nonmotorized trips. The survey was administered along two of the county's major trails.

## Results

The findings from Sheboygan County's trail user survey provide a snapshot of the kinds of trips people in Sheboygan County are taking on shared-use trails. Over 60 percent of the users were bicyclists and over 30 percent of the users were using the trail for utilitarian purposes. Over 50 percent of respondents were daily users of the trails, around 25 percent were weekly users, about 10 percent were monthly users, and

about 10 percent were first-time users. Over 50 percent of the trips were over 5-miles long, about 15 percent were 3 to 5 miles, about 20 percent were 1 to 3 miles. Finally, over 50 percent of respondents reported spending money while using the trails.

### Household Surveys

The pilot communities contracted with the University of Minnesota’s (UMN) Center for Transportation Studies in collaboration with NuStats, a survey research firm, to administer two bookend surveys: one in 2006 and one in 2010. The UMN research team designed and implemented surveys to collect travel behavior data to establish a baseline or “before” information on travel by bicycling and walking in the four pilot communities (and in the control site of Spokane, Washington). The research team used this baseline data in comparisons to “after” data that it collected with the same surveys in fall 2010 to identify changes in travel behavior in the pilot communities. Information on the research team’s methodology can be found in the team’s reports, available here:

<http://www.cts.umn.edu/Research/ProjectDetail.html?id=2007026>.

### Results

The results of the household surveys are inconclusive. Several factors (such as having a limited sample size) contribute to the inability to detect consistent and statistically significant impacts of the NTPP’s investment in pedestrian and bicycle facilities and programs over the past 3 years. A full discussion of the factors and the outcomes of the household survey in general are discussed in sections 2.2 and 2.3 of UMN’s Nonmotorized Transportation Pilot Program Evaluation Study Phase 2 report, which is available here: <http://www.cts.umn.edu/Research/ProjectDetail.html?id=2007026>.

## Nonmotorized Trips, Averted Vehicle Miles Traveled, and Mode Share Calculations

Because there is no recognized standard approach to quantifying bicycle and pedestrian mode share, the WG used two estimation methods to examine transportation-related changes over time. The WG used these methods, which it identified as the Intercept Survey method and the NTPP method, to determine whether they converged on similar results. The methods were used to estimate changes in mode share, the number of additional nonmotorized trips by community and per person in 2010, and based on that number, VMT (Vehicle Miles Traveled) averted. The VMT averted is an important measure for calculating the impacts of the program in terms of energy, the environment, and health. Table 15 outlines differences between these models.

**Table 15: Summary of Model Inputs and Output**

Method	Major Primary Data Inputs	Secondary Data Inputs	Estimates Averted VMT?	Estimates Mode Share?	Reportable Findings?
Intercept Survey	Bookend counts and intercept surveys	ACS, NHTS	Yes	Yes (for ped and bike)	Yes
NTPP	Bookend counts	ACS, NHTS	Yes	Yes	Yes

The Intercept Survey model, developed by Alta Planning + Design, uses the bookend intercept surveys to calculate VMT averted by nonmotorized travel as well as to calculate the modal share for pedestrian and bicycle modes for the years 2007 and 2010. The Intercept Survey model uses National Household Travel Survey (NHTS) data for total home based trips and trip distances by nonmotorized mode and American Community Survey (ACS) data for commute to work mode shares. Using trip purpose data collected in the bookend intercept surveys, the Intercept Survey model uses trip purpose ratios to estimate the total

number of nonmotorized trips by trip purpose and nonmotorized mode.<sup>18</sup> The model then sums the utilitarian trips by mode and multiplies them by average trip distances by mode. These calculations result in averted VMT by nonmotorized mode for 2007 and 2010. The change in averted VMT due to bicycling and walking between these 2 years is based on the trip purpose results of the intercept survey as well as the change – in this case increase – in the community-wide nonmotorized counts in each of the communities.

Because no standard method for calculating nonmotorized mode share and VMT averted exists, the WG developed a second model, termed the NTPP model, to see if results from these new methods converge. The NTPP model uses bookend community-wide count data to calculate mode share and VMT averted due to nonmotorized travel for the years 2007 and 2010. The NTPP model uses NHTS data for baseline mode share, trips per household, vehicle occupancy, and trip distances by nonmotorized mode and ACS data for households per community. The NTPP model uses NHTS mode share data based on metropolitan statistical area size to establish an assumed baseline for the pilot communities. The model then uses the count data to estimate a percent change in nonmotorized mode share between 2007 and 2010 and calculates the total number of trips per mode for 2010.

The NTPP model controls for the number of households in the communities over time and assumes that any increases or decreases in nonmotorized mode shares would result in a corresponding decrease or increase in vehicle trips. Transit trips are held constant since there are no consistent data available on how transit ridership might have changed within each of the four pilot communities over this time period. Changes in the total number of trips per nonmotorized mode are then multiplied by trip distances by mode to estimate VMT averted. A small group of academic peer experts reviewed this model and provided suggestions for its improvement, which were evaluated and incorporated. In short, the main difference between the Intercept Survey model and NTPP model is that the former uses trip purpose ratios, generated from the intercept survey results, to estimate the total number of nonmotorized trips by trip purpose and nonmotorized mode while the latter simply uses NHTS mode share data to estimate the total number of trips by mode.

Because not all communities conducted counts and surveys annually, both the Intercept Survey and NTPP models provide results for the bookend year (2010). To estimate the results over 3 years, it was assumed that any changes between 2007 and 2010 were linear. Therefore, the results for 2009 were assumed to be one-third smaller than 2010 and the results for 2008 are two-thirds smaller than 2010.

## **Results**

Using the NTPP model, Table 16 presents the estimated number of additional nonmotorized trips by community and per person that were made in 2010. These numbers are in addition to the baseline number of nonmotorized trips that people in the communities made in 2007 and controls for population growth. On average, people in the pilot communities made 4.7 more bicycle trips and 23.1 walking trips in 2010 than they did in 2007.

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<sup>18</sup> Minneapolis estimation may significantly under represent non-utilitarian trips due to its survey methodology as described above.

**Table 16: Estimated Number of Additional Nonmotorized Trips by Community and Per Person in 2010 as Compared to 2007**

Community	Total Additional Nonmotorized Trips by Community			Additional Nonmotorized Trips Per Person > 16 Years		
	Bicycling	Walking	Total	Bicycling	Walking	Total
Columbia	178,900	362,100	541,100	2.1	4.2	6.3
Marin County	1,717,800	7,971,000	9,688,800	8.4	39.2	47.6
Minneapolis	1,139,800	6,692,900	7,832,700	3.5	20.7	24.3
Sheboygan Co.	301,900	1,241,300	1,543,300	3.3	13.7	17.1
<b>Total</b>	<b>3,338,400</b>	<b>16,267,400</b>	<b>19,605,800</b>	<b>4.7</b>	<b>23.1</b>	<b>27.9</b>

Table 17 presents the estimated results of the NTPP and Intercept Survey models for averted VMT. For the NTPP model, the number of trips in Table 17 was multiplied by the national average trip distance for nonmotorized trips according to the NHTS: 2.26 miles for a one-way bicycling trip and 0.7 miles for a one-way walking trip. The estimates for both models are similar: an estimated 16 million miles were walked or bicycled that would have otherwise been driven in 2010, and an estimated 32 million miles were averted between 2007 and 2010. The number of averted VMT is similar between the modes because though the models estimated more walking trips than bicycling trips, bicycling trips are on average three times longer than walking trips. The results for 2007-2010 are twice the results of 2010 because the model calculates totals for 2010 compared to 2007, and not for 2008 or 2009. Due to the incremental nature in which projects were completed in the pilot communities between 2007 and 2010, it was assumed that results for 2008 were one-third of the results for 2010 and results for 2009 were two-thirds of the results for 2010. Accordingly, the total results for 2007-2010 are twice the result amounts for 2010.

While the number of averted VMT is only an estimate, there are some reasons to suggest that the estimate is low. Two considerations point to averted VMT being under-reported: 1) the intercept surveys indicate longer average nonmotorized trip distances than the NHTS national average nonmotorized trip distances (see Table 13) and 2) the models assume a one-to-one mileage trade-off between vehicle trips and nonmotorized trips; it is likely that vehicle trips are often longer than walking and bicycling trips, particularly for discretionary utilitarian trips (like shopping or dining out). However, NHTS data (for all modes) include trips made for social/recreational purposes, such as exercising, going to the gym, visiting friends, and visiting a public place. The portion of nonmotorized trips that were made strictly for exercising and would have otherwise not been made by a vehicle likely balance out the other two considerations that would have otherwise undercounted averted VMT.

There will likely be further increases in nonmotorized travel in 2011 as more projects are completed and in the years that follow after the NTPP projects are more fully integrated as key components of each communities' multimodal network.

**Table 17: Estimated Averted VMT Total for 2010 and 2007-2010**

Model	Averted VMT in 2010			Total Averted VMT 2007 to 2010		
	Bicycling	Walking	Total	Bicycling	Walking	Total
NTPP	7,544,700	11,387,200	18,931,900	15,089,400	22,774,400	37,863,900
Intercept Survey	8,068,300	8,102,300	16,170,600	16,136,600	16,204,600	32,341,200

Table 18 shows estimated 2010 community-by-community totals for increases in total miles of bicycling and walking as well as per person (over the age of 16 years) averages for annual increases of bicycling and walking, based on the estimates of the NTPP model.

**Table 18: Estimated Increases in Miles of Bicycling and Walking by Community and Per Person for 2010**

Pilot Community	Total Increases in Miles			Increases in Miles Per Person > 16 Years		
	Bicycling	Walking	Total	Bicycling	Walking	Total
Columbia	404,400	253,500	657,900	4.7	2.9	7.6
Marin County	3,882,200	5,579,700	9,461,900	19.1	27.4	46.5
Minneapolis	2,575,800	4,685,100	7,260,900	8.0	14.5	22.5
Sheboygan County	682,300	868,900	1,551,300	7.5	9.6	17.1
<b>Total</b>	<b>7,544,700</b>	<b>11,387,200</b>	<b>18,931,900</b>	<b>10.7</b>	<b>16.2</b>	<b>26.9</b>

The WG also used the NTPP model to estimate mode share changes between 2007 and 2010 (Table 19). In each community, both modes increased, but walking increased more than bicycling. For the communities in sum, bicycling mode share increased overall by 0.4 percent (i.e., a 36 percent increase from 2007), walking mode share increased 1.8 percent (i.e., a 14 percent increase), and driving mode share decreased 2.2 percent (i.e., three percent decrease) between 2007 and 2010. One of the assumptions of the NTPP model was that increases or decreases in walk and bicycle mode share would be directly balanced by a corresponding decrease or increase, respectively, in driving. Accordingly, since bicycling and walking increased in each community, the model assumed a total driving decrease equal to the increase in walking plus the increase in bicycling.

**Table 19: Estimated Change in Mode Share (and Percent Change) between 2007 and 2010**

Pilot Community	Bicycling	Walking	Driving
Columbia	+ 0.2 (15.8%)	+ 0.4 (4.4%)	- 0.5 (- 0.6%)
Marin County	+ 0.6 (64.4%)	+ 3.0 (21.0%)	- 3.6 (- 4.7%)
Minneapolis	+ 0.3 (26.3%)	+ 1.5 (10.9%)	- 1.8 (- 2.3%)
Sheboygan County	+ 0.3 (26.2%)	+ 1.2 (14.8%)	- 1.5 (- 1.7%)
<b>Total</b>	<b>+ 0.4 (35.9%)</b>	<b>+ 1.8 (14.2%)</b>	<b>- 2.2 (- 2.7%)</b>

To establish a reference point for comparison of these changes in context with national trends, the pilot changes from 2007 to 2010 can be compared with the NHTS national change from 2001 to 2008 by examining the annual average increase over the time period of each. Table 20 compares the change in mode share experienced annually in the pilot communities with that of the Nation according to data from the NHTS.<sup>19</sup> These annual averages indicate that mode share increases in the pilot communities to bicycling and walking and away from driving from 2007 to 2010 generally outpaced the national annual average from 2001 to 2008.

**Table 20: Estimated Annual Change in Mode Share in the Pilot Communities Per Year between 2007 and 2010 and Nationally Per Year between 2001 and 2008**

Pilot Community	Bicycling	Walking	Driving
Columbia, 2007-10	+ 0.05	+ 0.10	- 0.13
Marin County, 2007-10	+ 0.15	+ 0.75	- 0.90
Minneapolis, 2007-10	+ 0.08	+ 0.38	- 0.45
Sheboygan County, 2007-10	+ 0.08	+ 0.30	- 0.38
<b>Total, 2007-10</b>	<b>+ 0.09</b>	<b>+ 0.45</b>	<b>- 0.55</b>
National, 2001-08	+ 0.03	+ 0.26	- 0.31

<sup>19</sup> <http://www.dot.state.fl.us/planning/trends/tc-report/bike-ped.pdf>



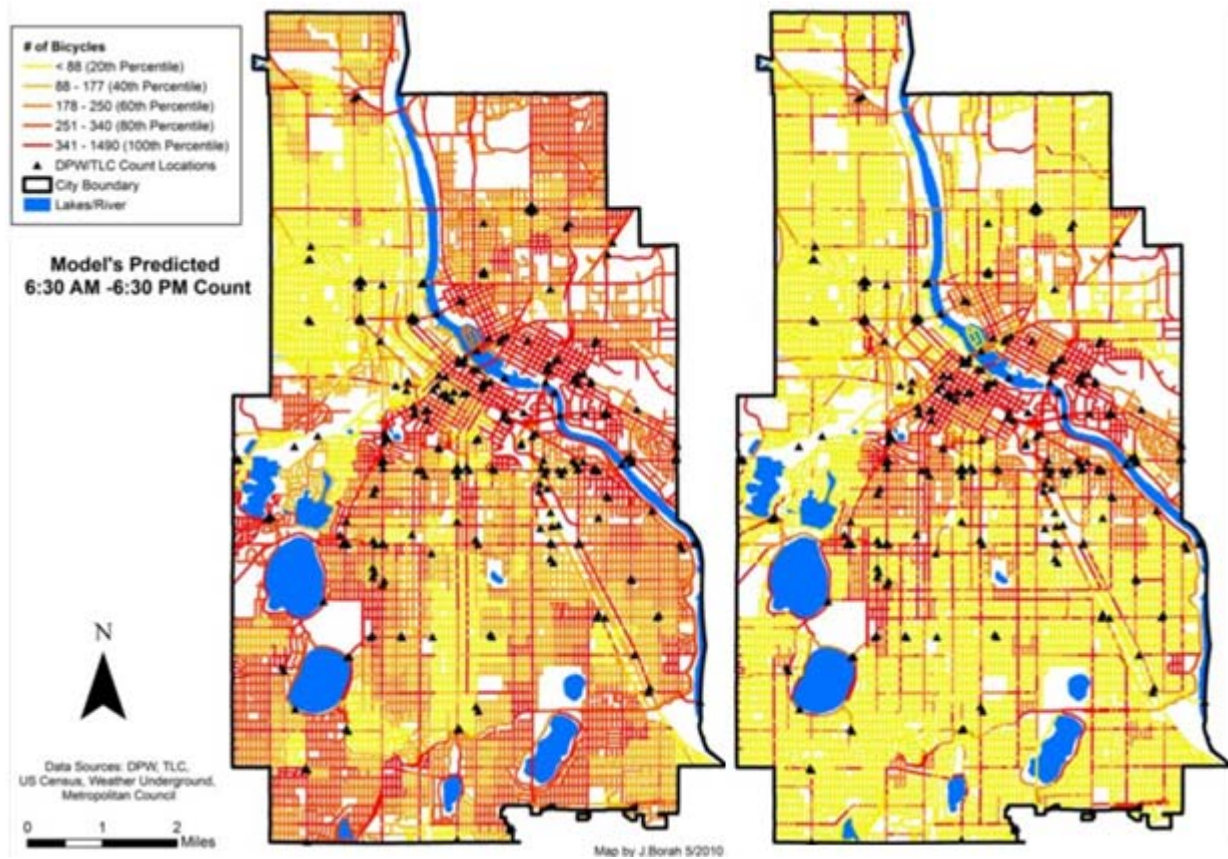
### **Bicycle and Pedestrian Demand Modeling**

In 2010, students from the UMN Humphrey Institute of Public Affairs developed a regression model to estimate bicycle and pedestrian infrastructure use in Minneapolis based on count data provided by BWTC and the city of Minneapolis. The purpose of this effort was to provide transportation managers with new information and a tool to help plan, manage, evaluate, and optimize investments in nonmotorized facilities. The process included assembling and cleaning the data, computing descriptive statistics, computing scaling factors for extrapolating the counts, estimating 12-hour daily counts from the extrapolated counts, and then modeling pedestrian and bicycling traffic accordingly.

### **Results**

The work resulted in predictive 12-hour maps (Figure 48Figure ) for bicycling and walking on Minneapolis' street system. Similar maps for the city's off-street trail maps were developed as well. Although the analysis identified some gaps in data collection needs, the outcome provides the basis for establishing normal travel behavior and conditions for Minneapolis. This type of tool can help better inform decision-makers about where to best invest in improvements based on relevant performance measures. By overlaying current bicycle and pedestrian infrastructure, decisionmakers can see if there are areas where more infrastructure is needed given the demand. The city of Minneapolis and Transit for Livable Communities now partner with the University of Minnesota Humphrey Institute for Public Policy for an ongoing Capstone Program focused on nonmotorized transportation.

**Figure 48: Predicted 12-Hour Counts (6:30 a.m. - 6:30 p.m.) for Bicycling (left) and Walking (right) in Minneapolis**



Source: J. Borah, University of Minnesota, May 2010

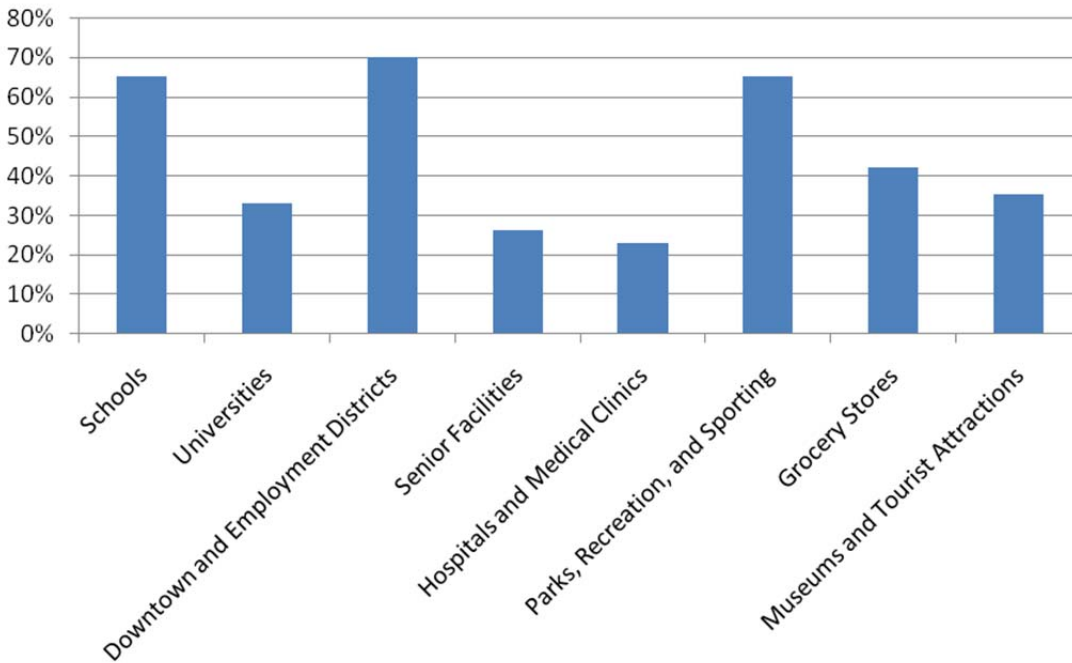
## Connectivity

One goal of the NTPP was to develop a network of infrastructure facilities for walking and biking that connect directly with transit stations and community activity centers, including education, work, and recreation sites, and other important destinations. These connections are a vital component of a complete transportation system, as they promote walking and bicycling as a viable option to access every day needs, and enhance community livability and accessibility, particularly for low-income residents with limited resources to invest in private transportation. As a way to gauge connectivity, the pilot communities estimated the number of connections that each project made to various types of activity centers. These activity centers included schools, universities, downtown and employment districts, senior facilities, hospital/medical clinics, parks and recreation, grocery stores, and museums and tourist attractions.

## Results

Figure 49 shows the percentage of projects that include at least one connection to one of a variety of activity centers. In many cases, the same project connects to multiple destinations.

**Figure 49: Percent of Projects with Connections to Activity Centers**



### Use of Local and National Data Sources for Reporting Requirements

The enabling legislation for the NTPP calls for developing “statistical information on changes in motor vehicle, nonmotorized transportation, and public transportation usage in communities participating in the program and assess how such changes decrease congestion and energy usage, increase the frequency of bicycling and walking, and promote better health and a cleaner environment.”<sup>20</sup> The previous sections presented a discussion on changes in motor vehicle, nonmotorized transportation, and the frequency of bicycling and walking. This section presents a discussion about changes in public transit usage and congestion. Chapter 5 presents a discussion about changes in energy usage, health, and the environment.

### Public Transit Usage

The legislation asked the NTPP to measure modal travel, including by public transit. Transit usage rates are particularly important for NTPP because many pilot projects are designed to improve walking and bicycling connectivity to transit, which can replace lengthy automobile trips. Because there is reliable consistent community-level data available, the NTPP obtained unlinked trip data from the Federal Transit Administration’s National Transit Database (NTD)<sup>21</sup> for years 2006 to 2009 as a proxy for public transit usage in the pilot communities.<sup>22</sup> Unlinked trips are the total numbers of passenger boardings on bus, rail, and paratransit services. A person’s journey between an origin and destination may require multiple unlinked trips if the person has to transfer between services. Note that the NTD data reflects the operations of transit systems, which do not always align with city or county borders. Specifically, the data for Minneapolis covers multiple cities within the Minneapolis-St. Paul region.

### Results

Unlinked trip data results vary year to year for the pilot communities (Table 21). Transit use increased dramatically in Columbia between 2006 and 2009 due to service expansion, and modestly over that time

<sup>20</sup> <http://www.fhwa.dot.gov/environment/bikeped/legtealu.htm#sec1807>

<sup>21</sup> <http://www.ntdprogram.gov/ntdprogram/>

<sup>22</sup> NTD data was used for each community except for Marin County; unlinked passenger trips for Marin County were supplied by Marin Transit since Marin County transit trips are not broken out separately in the NTD.

period for Marin County. From 2006 to 2009, Sheboygan County decreased its number of transit routes due to budget cuts. Accordingly, Sheboygan County witnessed a notable decrease in transit trips when comparing 2006 to 2009, but less of a decrease when comparing 2007 and 2008 to 2006. Keeping pace with the national trend, Minneapolis transit trips increased over the 4-year period with trips on the system peaking in 2008.

**Table 21: NTD Unlinked Trips for the Pilot Communities and Nationally, 2006-09**

Pilot Community	2006	2007	2008	2009	% Change 2006-09
Columbia	540,980	1,640,608	1,829,638	2,263,406	+ 318.4%
Marin County	2,523,468	3,271,908	3,345,236	3,302,258	+30.1%
Minneapolis	73,356,649	76,966,724	81,835,735	76,343,042	+ 4.1%
Sheboygan County	551,267	532,835	531,714	452,605	- 17.9%
National	9.75 billion	9.95 billion	10.28 billion	10.13 billion	+ 3.9%

### Congestion

The NTPP could not develop a suitable measure for changes in levels of congestion in each of the pilot communities over the years of the pilot project. As a proxy for community-wide vehicle congestion, the NTPP considered using U.S. Census ACS results for daily annual commute to work times, but this information is not suitable for congestion since other factors could affect travel time, such as people living further away from where they work. Congestion levels on roadways – measured annually on consistent days and times with traffic counts – would be a better measure, but standard data do not exist for this measure throughout all four communities.

### Observations

- Since NTPP is a true pilot program, there is no template for how comprehensive evaluation should be conducted. Methods developed and lessons learned will be invaluable for future national programs and community-level planning and evaluation.
- Though legislation contained statistical requirements, it did not provide funding for data collection and evaluation; the pilot communities each agreed to reserve a portion of their program funds for this purpose, which was also funded in part by FHWA.
- Improved data collection and tracking and forecasting methods for walking and bicycling trips continue to be a need for transportation agencies across the country. As agencies transition to performance-based decisionmaking, improving data for all transportation modes will be even more important for making cost-effective investments.
- Improved performance measures are needed to better indicate how transportation improves community access and participation beyond traditional emphasis on improving distance based mobility and travel time.
- To effectively evaluate the impacts of the NTPP, the WG developed a consistent approach to collect and evaluate data while taking advantage of and encouraging additional data collection and evaluation initiated by individual communities.
- Wherever possible, the NTPP used directly collected data to arrive at the statistical reporting requirements. When this direct data collection was not feasible or necessary, the NTPP supplemented its directly collected data with available local and national sources.

## Conclusions<sup>23</sup>

- Bookend counts in each of the communities show that between 2007 and 2010, bicycling and walking increased in each of the four communities.
- In most of the communities, a higher percentage of bicycling and walking trips were made for utilitarian trips than for recreation/exercise in 2010 than in 2007, meaning that the count increases over these 4 years came primarily from increased utilitarian bicycling and walking trips in each of the four communities. This finding supports one of the underpinnings of the NTPP program: that by improving nonmotorized transportation networks, more people will walk and bike.
- The NTPP and Intercept Survey models estimate that between 2007 and 2010, people walked or bicycled over 32 million miles instead of driving. This number reflects new bicycling and walking trips added to the levels assumed for 2007 and controls for population growth from 2007 to 2010.<sup>24</sup>

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<sup>23</sup> Notes:

- The NTPP and Intercept Survey models are limited since the data inputs for both models are not entirely local: the NTPP model uses NHTS MSA data and the Intercept Survey model uses national NHTS data. These national/average travel behavior data are likely more conservative than actual travel behavior data since, based on old (more than 10 years old) data and anecdotal information, the walking and bicycling mode share in each of the communities is probably greater than the national/average. The NTPP model, for example, estimates higher numbers of miles walked and bicycled if the initial/baseline mode share is higher for walking and bicycling.

<sup>24</sup> All four communities experienced population growth from 2007 to 2010.



## 5. Other Benefits

### Introduction

This chapter discusses and summarizes other important benefits of the NTPP, in addition to those considered in earlier chapters. These benefits respond to directions in the legislation for NTPP to assess how changes in nonmotorized usage affect energy usage, health, and the environment,<sup>25</sup> and other priorities the WG set for the program. This chapter is divided into sections that consider benefits related to:

- Health and Safety
- Environment and Energy
- Community Access

Each section describes the focus the WG has taken for benefits related to these complex goals; includes analysis of quantitative impacts; and highlights examples of pilot projects developed to accomplish these goals. The quantitative analysis is within the limits of the available evaluation methods and data, and is largely based on the community-wide results, including averted VMT, as presented in section 4.2.

### Public Health and Safety Benefits

#### Physical Activity and Health

The WG chose to focus on increased levels of physical activity from walking and bicycling and crash rates for pedestrians and bicyclists under the broad topic of health benefits. This is in addition to the important health benefits associated with reductions in toxic air emissions discussed above.

The 2011 National Prevention Strategy, authored by the U.S. Surgeon General in partnership with 17 agencies including DOT, identifies the creation of safe and healthy communities as a key strategy to improving the Nation's health. The construction of networks of pedestrian and bicycling infrastructure, such as those constructed through the NTPP, is identified as an evidence-based means to accomplish these prevention goals. Furthermore, the Community Guide to Preventive Health Services, which is sponsored by the CDC to comprehensively review relevant research and produce scientifically sound recommendations, recommends the construction of pedestrian and bicyclist infrastructure as a way to increase physical activity.

Regular physical activity improves health. Lack of physical activity is the Nation's third leading risk factor for death, behind tobacco, and alcohol.<sup>26</sup> The 2008 Physical Activity Guidelines for Americans recommends adults achieve at least 150 minutes per week of moderate cardiovascular exercise, such as walking or bicycling, in addition to strength training.<sup>27</sup> Periods of cardiovascular activity can be as short as 10 minutes to provide benefit. Data collected through the NTPP (Table 13 in section 4.2) suggest that walking and bicycling trips are sufficient in length to create health benefits; moreover, in at least three of the pilot communities, nonmotorized trips cover more distance than the national average, suggesting an

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<sup>25</sup> <http://www.fhwa.dot.gov/environment/bikeped/legtealu.htm#sec1807>

<sup>26</sup> Mokdad A, Marks J, Stroup D, Gerberding J. Actual Causes of Death in the United States, 2000. JAMA 2004; 291:1238 – 1245 (original study). Mokdad A, Marks J, Stroup D, Gerberding J. Correction: Actual Causes of Death in the United States, 2000 (letter). JAMA 2005; 293(3):293-294 (correction of original study)

<sup>27</sup> <http://www.health.gov/paguidelines/>

even greater benefit. According to public health researchers,<sup>28</sup> regular physical activity such as that achieved through walking and bicycling trips facilitated by NTPP investments:

- Reduces the risk and the impact of cardiovascular disease
- Reduces the risk and the impact of diabetes
- Reduces the risk of certain types of cancer
- Controls weight
- Improves mood
- Reduces the risk of premature death

The physical activity benefits of the investments made through this program will continue to provide dividends long into the future, as the new facilities become further established as part of transportation networks.

### ***Physical Activity Goals***

The NTPP model provides rough estimates of increases in physical activity in the pilot communities from the 2005 base year. The estimates are derived from the total reduced VMT replaced by walking and bicycling, as presented in section 4.2, as assumptions on average nonmotorized trip distances and times. Based on this calculation, the average person living in the NTPP communities walked 6 minutes and bicycled 1.25 minutes more per week in 2010 than in 2007. These additional minutes are helping people reach the CDC's recommendation that people undertake moderate-intensity aerobic activity for at least 150 minutes per week.<sup>29</sup> It would require additional future data collection and analysis to move beyond the limits of these broad averages to identify a distribution of activity levels among individuals necessary to more accurately measure health benefits from the net increases in community and program levels of activity.

### ***Economic Cost of Mortality***

Working with the CDC, the NTPP applied the World Health Organization's Health Economic Assessment Tool (HEAT) for Cycling to estimate the economic savings resulting from reduced mortality from increased bicycling in the pilot communities in 2010.<sup>30</sup> To run this calculation, the CDC entered the total number of new bicycling trips that were made in 2010 (as shown in Table 13), which are in addition to the expected number of bicycling trips that would have been made in 2010 given 2007 bicycling rates. Applying this model, the added nonmotorized trips in the pilot communities taken in 2010 reduce the economic cost of mortality by \$6.5 million. These results are for a single year of increased bicycling only; results for the duration of the infrastructure's life span will likely greatly increase this amount.

This estimate is likely conservative because it is based only on benefits of reduced mortality (death) and not of reduced morbidity (illness) and only calculates reduced mortality due to increased physical activity (and does not consider safety or the health benefits of improved air quality), and only includes bicycling for utilitarian purposes. As discussed in the safety section below, bicycle and pedestrian fatalities have not increased despite growth in rates of walking and bicycling in the pilot communities; consequently, health benefits would not have to be adjusted down.

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<sup>28</sup> National Prevention Council's National Prevention Strategy: America's Plan for Better Health and Wellness, 2011. <http://www.healthcare.gov/center/councils/nphpphc/strategy/report.pdf>

<sup>29</sup> <http://www.health.gov/paguidelines/>

<sup>30</sup> World Health Organization, Health Economic Assessment Tool for Cycling, adapted for use in the U.S. by Dr. Candace Rutt, CDC, 2011.

The estimated economic savings from reduced morbidity would likely greatly surpass the economic savings of reduced mortality.<sup>31</sup> Furthermore, the HEAT uses conservative inputs; the actual savings are likely higher than the estimate above. The HEAT model to estimate the benefits of increased walking has not yet been calibrated with U.S. values; in the future, it will likely provide estimates of significant additional economic savings from reduced mortality.

This discussion and the estimates of health benefits are provided to demonstrate an important future area of analysis for the pilots as they complete their networks and for communities interested in estimating or measuring the impacts of nonmotorized investments. This analysis will be increasingly possible as models and tools such as HEAT are further refined and as data collection for walking and bicycling trips becomes more common.

## Safety

The NTPP focused on improving safety for pedestrians and bicyclists, in addition to the goal of increasing the rates of walking and bicycling in the four pilot communities. Each community has invested NTPP funds in nonmotorized infrastructure and programming that improves safety for pedestrians and cyclists. Virtually all of the infrastructure projects improve safety directly or indirectly, and each community instituted programs aimed specifically at educating the public about walking and bicycling safety. Comprehensive and conclusive safety data for each of the communities is not yet available, but preliminary results suggest that bicycle and pedestrian safety has remained the same, despite increases in bicycling and walking rates in each pilot community.

### No Increase in Fatal Crashes

While each pilot community experienced increases in bicycling and walking from 2005 to 2009, **fatal bicycle and pedestrian crashes held steady or decreased** in all of the communities, according to available data.

## Safety Data

Table 3 indicates that fatal bicycle and pedestrian crashes have remained relatively steady from 2005 to 2009. This is notable because during this time period, each pilot community experienced increases in bicycling and walking (see section 4.2). Therefore, it is possible that later data will continue to indicate that injury and fatality rates (fatalities per 1,000 pedestrians, for example) will have decreased. The National Highway Traffic Safety Administration (NHTSA) compiles annual statistics on fatal crashes in its Fatality Analysis Reporting System (FARS) Encyclopedia. Table 22 shows fatal bicycle crashes by year, and Table 4 shows fatal pedestrian crashes in each of the counties where pilot communities are located. There is research literature that documents this trend in other cities.<sup>32</sup> Conclusions from FARS are limited because numbers are so small, providing the potential for major percentage changes based on a very limited number of events. Analysis of safety trends in the pilots is limited by the lack of consistent and detailed injury data for the four study areas.

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<sup>31</sup> World Health Organization, Health Economic Assessment Tool for Cycling, adapted for use in the U.S. by Dr. Candace Rutt, CDC, 2011.

<sup>32</sup> Marshall, Wesley E. and Norman W. Garrick, "Evidence on Why Bike-Friendly Cities Are Safer for All Road Users," Environmental Practice 13 (1) March 2011  
<http://files.meetup.com/1468133/Evidence%20on%20Why%20Bike-Friendly.pdf>

**Table 22: Fatal Bicycle Crashes by County, 2005-2009**

<b>County</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Sheboygan County, WI</b>					
<b>Total roadway fatalities</b>	11	9	13	11	13
Pedestrian fatalities	1	0	1	2	1
Bicyclist fatalities	0	0	0	0	0
<b>Columbia, MO</b>					
<b>Total roadway fatalities</b>	9	15	8	8	10
Pedestrian fatalities	1	2	0	0	1
Bicyclist fatalities	0	0	1	0	0
<b>Minneapolis, MN</b>					
<b>Total roadway fatalities</b>	20	15	26	23	17
Pedestrian fatalities	6	1	4	2	6
Bicyclist fatalities	0	1	2	2	1
<b>Marin County, CA</b>					
<b>Total roadway fatalities</b>	11	9	12	7	10
Pedestrian fatalities	3	2	3	2	1
Bicyclist fatalities	0	0	0	0	0

Source: NHTSA, FARS

These data have a couple limitations. First, fatalities do not tell a complete story about safety; such data excludes injuries and perceived safety, which may be better indicators of overall community-wide safety. Also, while the years of the FARS data coincide with the timeline of the NTPP up to 2009, a great many of the projects were not completed at the time of the most recent data collection, and other completed projects were not open for use long enough to be fairly assessed for their impacts.

Despite these limitations, FARS data are the only safety data that are consistent across all four pilot communities, which makes it an effective way to measure changes in safety over time. Community-level data on crash-related injuries are inconsistent among the four pilot communities and therefore were not used for this report. Future analysis of FARS data could provide a better perspective of the effects of NTPP investments on safety after all projects are built-out and established as part of community networks.

The investments that the pilot communities have made in infrastructure and programming will encourage residents to bicycle and walk while promoting safety among all road and path users. Given the currently available data and their limitations, no changes in safety can be derived. However, as the communities continue to build their bicycle and pedestrian infrastructure and implement their programming, they may see additional roadway safety improvements. Further analysis could provide a better understanding of the impacts of NTPP investments on safety in each community as data become available.

### **NTPP Project Examples**

The pilot communities assumed that all projects, whether for infrastructure or education, produce physical activity benefits to the extent that they encourage more walking and bicycling. Examples of infrastructure and outreach projects that explicitly focus on safety include:

- Columbia converted an existing street into a “bike boulevard,” diverting vehicular traffic to other roadways and prioritizing bicycle and pedestrian travel (see section 4.1.2 for more information).

- Marin County installed flashing beacons and illuminated pedestrian signs along Sir Francis Drake Boulevard at Saunders Avenue and Madrone Avenue in San Anselmo, CA.
- Minneapolis implemented more than a dozen “road diets,” where travel lanes were either narrowed or eliminated in order to add bike lanes and in some cases create a shared center two-way left turn lane to reduce conflicts and create safer streets for all users (see section 4.1.8 for more information).
- Sheboygan County is installing traffic-calming infrastructure near 13 elementary and middle schools around the county to improve safety for schoolchildren and encourage physical activity.

The pilot communities also used NTPP funds for programs that educate adults, children, and law enforcement officials about walking and bicycling safety. Examples include:

- Columbia expanded a walking school bus program to improve safety for children and their parents while walking to and from school.
- Marin County conducted bike education/street skills courses to educate adults about proper and safe bicycle riding techniques.
- Minneapolis conducted community workshops to educate local officials and interested citizens about infrastructure strategies that would improve walking and bicycling safety, provided bicycle safety education to Minneapolis school bus drivers and certified new League of American Bicyclists instructors.
- Sheboygan County trained its law enforcement officials to be more familiar with the laws, rights, and responsibilities of bicyclists, pedestrians, and motorists.

## Environment and Energy

To consider impacts on the environment, the WG focused on emissions of criteria pollutants identified under the Federal Clean Air Act Amendments<sup>33</sup> and carbon dioxide (CO<sub>2</sub>), the major transportation-related greenhouse gas and an important contributor to global climate change. To consider the impacts of program investments on energy use, the WG focused on energy savings from shifts from driving to walking and bicycling.

According to FHWA’s NHTS, most walking and bicycling trips are short: 40 percent are within 2 miles of home, and 50 percent of the working population commutes 5 miles or less.<sup>34</sup> Most air pollutants, including volatile organic compounds, hydrocarbons, and carbon monoxide (CO), which are regulated under the Clean Air Act, are emitted within a few minutes of starting a vehicle because of engine characteristics, making these trips more polluting per mile from the perspective of respiratory health.

### Environment and Energy Savings

- The pilot communities saved an estimated 22 pounds of CO<sub>2</sub> in 2010 per person or a total of 7,701 tons.
- This is equivalent to saving over one gallon of gas per person or nearly 1.7 million gallons over the duration of the program.

Each gallon of gas burned produces 19.4 pounds of CO<sub>2</sub>, nearly a pound per mile driven on average.<sup>35</sup> Automobiles, the fastest growing source of greenhouse gas emissions, are responsible for about 20 percent of the CO<sub>2</sub> emissions in the U.S.<sup>36</sup>

The WG estimated changes in air quality over the period of the program using a table of conversions (Appendix 4). Table 23 shows the impact of the NTPP on these pollutants in 2010 and between 2007 and

<sup>33</sup> <http://www.epa.gov/air/caa/>

<sup>34</sup> 2009 National Household Travel Survey, League of American Bicyclists Fact Sheet, <http://www.bikeleague.org/resources/reports/pdfs/nhts09.pdf>

<sup>35</sup> <http://www.epa.gov/oms/climate/420f05001.htm>

<sup>36</sup> <http://www.epa.gov/fueleconomy/420f04053.htm>



2010. The input for these conversions is the averted VMT figures presented in section 4.2. With a combined population of 702,986 people over the age of 16 in the pilot communities in 2010, the NTPP estimates that almost 22 pounds of CO<sub>2</sub> were saved in 2010 per person (over the age of 16) or 7,701 tons collectively between the pilot communities.<sup>37</sup> This amount is equivalent to saving more than 1 gallon of gas for every person older than 16 in the pilot communities in 2010.

**Table 23: Air Quality Benefits of the NTPP**

Pollutant	Reduction/Savings in Pounds		
	Per Day	In 2010	2007-2010
Hydrocarbons	156	56,763	113,527
Particulate Matter (PM) <sub>10</sub>	0.59	217	434
PM <sub>2.5</sub>	0.56	205	409
Nitrogen Oxides (NO <sub>x</sub> )	109	39,651	79,302
Carbon Monoxide (CO)	1,418	517,548	1,035,097
Carbon Dioxide (CO <sub>2</sub> )	42,195	15,401,235	30,802,470

Averted VMT can also be converted into energy savings, measured in gallons of gasoline or British Thermal Units (BTUs, the standard measure of energy) saved. For gasoline savings, it is assumed that the average passenger car fuel efficiency is 22.6 miles per gallon.<sup>38</sup> For BTUs, it is assumed that the average gallon of conventional gasoline contains 113,500 BTUs. Table 24 presents these conversions.

**Table 24: Energy Savings of the NTPP**

Pollutant	Reduction/Savings		
	Per Person in 2010	Total in 2010	Total from 2007-2010
Gallons of Gasoline	1.19	837,696	1,675,392
British Thermal Units (BTUs)	135,249	95 billion	190 billion

### NTPP Project Examples

The pilot communities assumed that all projects, whether for infrastructure or education, produce environmental and energy benefits to the extent that they encourage shifts from car travel to walking and bicycling. Some examples where these benefits were explicitly considered include:

- NTPP funds for the Union Pacific Rail-Trail conversion in Sheboygan were combined with a Federal Congestion Management Air Quality grant to improve air quality by reducing VMT.
- In Minneapolis, there is conceptual work underway with North Minneapolis residents on an urban greenway project for walking and bicycling.
- The Tennessee Valley Path in Marin will restore wetlands by providing a new all-weather raised pathway which will reduce use of unplanned or informal paths by walkers and bicyclists.

<sup>37</sup> The results for 2007-2010 are twice the results of 2010 because the model calculates totals for 2010 compared to 2007, and not for 2008 or 2009. Due to the incremental nature in which projects were completed in the pilot communities between 2007 and 2010, it was assumed that results for 2008 were one-third of the results for 2010 and results for 2009 were two-thirds of the results for 2010. Accordingly, the total results for 2007-2010 are twice the result amounts for 2010.

<sup>38</sup> [http://www.bts.gov/publications/national\\_transportation\\_statistics/html/table\\_04\\_23.html](http://www.bts.gov/publications/national_transportation_statistics/html/table_04_23.html)

## **Community Mobility and Access to Destinations**

The WG identified improved access through providing additional transportation options as a goal for the four pilot communities. In particular, the pilots focused on improving nonmotorized connections to public transit and access for individuals with limited mobility options – children and older residents, low-income groups, and individuals with disabilities. The intent was to improve access to opportunities, whether for work, education, or recreation, and ultimately, to improve the economic vitality and quality of life in the communities.

### **NTPP Project Examples**

Although all NTPP projects were intended to improve community access, examples of projects with this explicit focus include:

- The Marin project to improve nonmotorized access to the Health Campus, a major center for community medical care and employment.
- In Minneapolis, Nice Ride bike-sharing program involves substantial business community participation and provides access to Central Corridor businesses during light rail construction (see project profile in section 4.1.9).
- The Minneapolis Sibley Community Bike Library project, with 16 social service and other partners, provides loaned bicycles; classes, child trailers, and other resources to support low-income residents with bicycle use.
- Sheboygan’s Union Pacific Rail-Trail conversion, which is in the heart of the city, will create a major north/south nonmotorized corridor running within a mile of 26 schools, 34 places of worship, 90 manufacturing employers, and 31 percent of Sheboygan County’s population, including low-income areas where 30 percent of residents do not own a car.

## 6. Insights and Lessons Learned

Through the course of the pilot program, FHWA and the communities have celebrated many successes, and also learned many lessons about nonmotorized transportation planning, implementation, and evaluation. There have also been many lessons about the program itself, and insights into how to design and administer such programs. Based on the discussions in the previous sections of this report, this chapter offers a selection of insights and lessons learned related to the following categories:

- Pilot program design
- Program planning and implementation
- Building capacity
- Stakeholders and partnerships
- Research and evaluation

### Pilot Program Design

1. **Program Status Elevates Agency Commitment:** Each community's selection as a pilot site raised the local profile of nonmotorized transportation and brings additional organizational attention. In addition to local agencies, State departments of transportation and the FHWA Division offices have embraced the importance of the program and are committed to problem-solving and innovation.
2. **Funding Flexibility Supports Innovations to Meet Local Needs:** The flexibility of program funding allows the communities to tailor the program to meet their most important needs while capitalizing on unique opportunities to innovate. Each community is taking a different approach developing its own combination of planning, education, and facilities projects.
3. **Delivery of Small Projects Should be Streamlined:** More flexibility is needed and the approval process should be streamlined in order to develop small nonmotorized projects efficiently. Complex Federal and State requirements can create a disincentive to move forward quickly with smaller projects, even though relatively small investments could otherwise be implemented quickly and have great impact.
4. **Short-Term Results Underestimate Benefits:** The short timeline between the actual release of funds, project selection, design, and construction, and the deadline to complete the final report resulted in evaluation based on incomplete results for many projects. It takes time to identify, plan, engage the public, secure official support, implement projects, and collect data for program evaluation. Program results at this time reflect impacts of relatively newly opened infrastructure projects, as well as educational and outreach programs. At the time of data collection, not all projects had been built and placed in use; the communities still had unobligated funds. To better understand impacts of the full suite of pilot community projects and programs, evaluation could be phased, with opportunities to track results well after full build-out.
5. **Working Group Approach Adds Value:** The NTPP Working Group has been a source of cohesive and collaborative program management, resulting in stronger pilot program outcomes for a national audience. The legislative emphasis on performance measures and reporting encouraged collaboration and productive exchange of ideas; the four pilots and FHWA have invested significant resources in developing a common measurement methodology that could benefit other communities across the country.

### Program Planning and Implementation

1. **Comprehensive Bicycle/Pedestrian Plans and Street Design Policies Provide Advantages:** Comprehensive bicycle/pedestrian plans establish the vision for nonmotorized transportation and assist with project selection based on an established project priority list developed with public involvement. Project implementation moved more slowly in the communities that did not have a

comprehensive plan in place prior to the start of the NTPP, as they invested significant time and resources developing such a plan to help guide the program implementation. In addition to plans, comprehensive street design policies help to prioritize roadway investments and make most efficient use of resources.

2. **Leveraging Funds Expands Program Impact:** The ability to leverage funds from other sources – both public and private – greatly expands the impact and reach of the Federal investment. Several innovative projects, including the Cal Park Tunnel Path in Marin County, California, and the Nice Ride Bicycle Sharing in the Minneapolis area, Minnesota, would not have been possible without strong partnerships and leveraged funds from multiple sources.
3. **Nonmotorized Programs Must Include Non-Infrastructure Investments:** While NTPP focuses mainly on bicycle and pedestrian facilities, strong education, outreach, and marketing programs are needed to complement the capital facilities. All of the communities engaged in outreach and educational activities; particularly notable examples include road safety classes for adults and youth in many communities, as well as training for local law enforcement and engineers in Columbia, Missouri, and Sheboygan, Wisconsin.

## Building Capacity

1. **Projects and Outreach Efforts Must be Culturally and Generationally Appropriate:** Engaging underserved communities and serving immigrant and low-income populations is critical to long-term success and support. There are numerous challenges in reaching these populations, and efforts must be culturally and generationally appropriate. Successful examples include the Minneapolis area Bike/Walk Ambassador Program, which provided safety, skills, and learn-to-bike programs in a variety of settings, for example, training to community health workers serving the Latino community in South Minneapolis.
2. **Education and Training for Engineers and Local Staff Provide Long-Term Benefit:** Communities have invested significant resources for training and education to build local and institutional capacity among their engineers, planners, municipal staff, and community partners. This education has resulted in near- and long-term benefits, with engineers and planners also incorporating new knowledge into projects outside of the pilot program. In particular, efforts have focused on building capacity related to designing streets that better accommodate bicycling and walking as transportation.
3. **Exposure to Best Practices Leads to Breakthroughs:** Exposing local engineers, planners, elected officials, and advocates to innovative practices and experiments demonstrates the potential of nonmotorized programs. These educational opportunities, and working with other leaders, helped to engage elected officials and engineers.
4. **Local Examples Help Build Public Support:** Despite the great value of exposure to national and international best practices, having an identifiable local example is often the most effective way to gain community acceptance to implement a new type of design. Seeing an example in the local context helps residents to better understand the benefits and get ideas of how to address similar needs in their community. Planners and engineers must be strategic in selecting locations to pilot innovative designs and treatments, to find situations that may be more receptive to new designs and can also serve as a local model to continue moving the practice forward in each community.

## Stakeholders and Partnerships

1. **Broad Public Education and Outreach Creates Better Understanding of Program Goals:** Outreach efforts must be broad, and not limited to groups already known to support bicycling and walking. Reaching out to a wide range of local civic groups fosters community-wide support and a better understanding of program goals. Use of local advertising, including newspapers and radio, also

brings the message to a wide range of people. In Columbia, MO, coordinated outreach, educational, and informational programs increased public awareness of bicycling and walking in general and of the pilot program. Attitude surveys conducted from 2008 to 2010 in Columbia found steady increases in awareness of the program and perceptions of the importance of walking and bicycling.

2. **NTPP Provides Opportunities to Build Relationships with Local Employers:** Relationships with major local employers provide another avenue to support individual initiatives and projects, and also contribute to longer term behavior shifts. In addition, bicycling and walking infrastructure and programs can help attract new employers. For example, major employers in Sheboygan County have provided easements and engineering support for trail projects that extend the county-wide network and serve their campuses. Employers have also provided support and incentives for employees participating in Walk/Bike to Work Week.
3. **Early Support from Local Officials Benefits Projects through Entire Process:** Strong support from elected officials as champions of the program has been critical to current and future successes. Local policies and commitment have helped to implement specific projects and institutionalize a long-term focus on nonmotorized transportation. For example, in Marin County, the Board of Supervisors has highlighted nonmotorized transportation as one of its key initiatives. This support has allowed the program to leverage additional funding sources to undertake more substantial and complex projects to accelerate build out of the nonmotorized network.
4. **New Inter-Agency and Intra-Agency Connections Highlight Common Goals:** NTPP has established relationships between agencies with overlapping goals, some of which had no previous contact. This has been especially helpful in fostering ongoing partnerships linking transportation and public health, both at the local and Federal levels, to address common goals such as reducing single-occupant vehicle use.

## Research and Evaluation

1. **Working Group Collaboration Leads to New Evaluation Approaches:** The SAFETEA-LU legislation included goals that require data and performance measures but did not provide specific guidance on the evaluation approach; this was developed collaboratively by the pilot communities and WG partners. The FHWA as well as the pilots have committed significant resources to data collection and evaluation, both to support this program and to help advance the state of the practice nationally.
2. **Evaluation Highlights Importance of Both Community-Wide and Project-Level Approach:** While the overall program contributes to community-wide transportation, environmental, and health benefits, some impacts may be too localized to be reflected at the community level, especially in the larger communities. Evaluating changes at the project level provides the opportunity to understand the impacts of specific projects and to begin to understand the transformational potential of nonmotorized projects and programs.
3. **Institutionalized Location Counts are Significant:** All four communities committed to ongoing location-specific counts, which are used to track ongoing trends and measure the impacts of the investments. The counts, which will continue even after the program is officially complete, represent an ongoing legacy of data collection and evaluation. Ongoing data collection may include both manual and automated approaches, and is scalable depending on the size of the community and resources available. In order to compare across communities and years, counts should be consistent year to year, with thought given to geographic distribution within the community.
4. **Count Data Provide Basis to Measure Community-Wide Results:** The NTPP model represents an innovative approach to estimating averted VMT and changes in walking and bicycling mode share, using location counts and data from the NHTS. This relatively inexpensive approach offers the opportunity to make reasonable estimates of changes on a community wide basis, assuming that the



count data are of high quality. While using national survey data allows the model to make consistent assumptions across all four communities, future evaluation efforts would benefit from more localized household survey data. One goal for future evaluations may be to include travel diaries or questions about nonmotorized transportation behavior in routine regional household travel surveys.

## 7. Continuing the Progress

Moving into the future, the pilot communities will maximize the transportation benefits of the pilot investments. Activity continues to implement remaining infrastructure projects; execute awareness, outreach, education and enforcement work; and collect data to evaluate and learn from the program. Their data collection efforts will benefit the communities themselves and the wider field of transportation. The NTPP provides opportunities to refine transportation-related data collection and modeling methodology and to further develop methods that could be used more broadly across the Nation. The four communities represent a diverse cross-section of the country, with different populations, demographic profiles, urban settings, and needs for nonmotorized transportation. The results of this program provide insight into how to maximize the return on nonmotorized investments in a variety of contexts. As transportation agencies consider the importance of using performance measures to prioritize and track investments, the data and results from programs like NTPP will be even more important.

It is important to continue to build safe and convenient multimodal transportation networks. Safe and comprehensive networks provide more (and more affordable) options for transportation, housing, employment, and services, and can also be a more efficient and cost-effective way to provide government services. Increasing walking and bicycling also improves individual and community health. Continuing partnerships with organizations like the CDC and local health departments is important to continue the emphasis on the nexus between transportation choices, health, and the attendant costs and benefits to the individual and public at large. To accomplish these goals, communities will need a variety of methods and tools, including dedicated funding, leveraging and combining multiple funding sources to undertake large-scale projects, policy changes, improved data collection and performance measures, meaningful public engagement, and broad partnerships and coalitions. The NTPP communities engaged in all of these strategies, and the new partnerships formed were able to leverage the significant additional resources well beyond the scale of the original Federal investment.

The experience of the pilot communities demonstrates how Federal resources for nonmotorized transportation are used, and highlights the significance of what can be accomplished with a more concentrated focus. Access to such resources allows the opportunity to take a more strategic approach, stepping back to view community needs and allowing for a comprehensive set of investments, including infrastructure and non-infrastructure. The communities engaged in a wide range of innovative and important activities, including:

- First-time bicycle and pedestrian Master Plans;
- System network approach to facility investments, including filling gaps;
- Innovative infrastructure and non-infrastructure projects that advance the state of the practice;
- Broad outreach and education throughout the community;
- Development of data collection standards and improved performance measures;
- Specialized outreach to targeted communities to emphasize social equity in access to nonmotorized travel opportunities;
- Innovative educational and marketing campaigns;
- Signature regional projects that would not be able to be built without other funding sources;
- Evolving policies and procedures for addressing community transportation needs;
- Education for local planners, engineers, decisionmakers, law enforcement;
- Partnerships with local businesses, educational institutions, community organizations;
- Partnerships within other sectors of local/regional/State/Federal government;
- Expanded access to public transportation and key community destinations; and
- Greater understanding of the barriers that currently exist for a truly balanced transportation system.

Programs like NTPP reflect the ability of nonmotorized investments to transform communities, improving quality of life, by expanding access to safe and healthy travel options.

Despite all the work accomplished and reported by the pilot communities to date, as the full program investment is realized, important aspects can be assessed in greater depth. These include the following considerations of concentrated, strategic, nonmotorized investments:

- Economic development and community development benefits
- Ability to reach and affect multicultural populations
- Qualitative and quantitative assessment of cultural and institutional change
- Best practices of public process for proposed projects
- Long-term impact of investments on sustained travel behaviors
- Program impact on future policy and funding priorities beyond NTPP

The findings from NTPP demonstrate the importance of nonmotorized transportation and how these transportation modes can enrich communities. In March 2010, the DOT released a *Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations*, which stressed the importance of building safe and convenient multimodal transportation systems. The findings from the NTPP affirm these words of the *Policy Statement*:

Increased commitment to and investment in bicycle facilities and walking networks can help meet goals for cleaner, healthier air; less congested roadways; and more livable, safe, cost-efficient communities. Walking and bicycling provide low-cost mobility options that place fewer demands on local roads and highways. DOT recognizes that safe and convenient walking and bicycling facilities may look different depending on the context — appropriate facilities in a rural community may be different from a dense, urban area. However, regardless of regional, climate, and population density differences, it is important that pedestrian and bicycle facilities be integrated into transportation systems. While DOT leads the effort to provide safe and convenient accommodations for pedestrians and bicyclists, success will ultimately depend on transportation agencies across the country embracing and implementing this policy.

# Appendices

## **Appendix 1: Working Group Members**

**Columbia, Missouri:** Ted Curtis and Sam Budzyna

**Marin County, California:** Craig Tackabery and Dan Dawson

**Transit for Livable Communities (Minneapolis, Minnesota):** Joan Pasiuk, Steve Clark, and Tony Hull

**Sheboygan County, Wisconsin:** Aaron Brault and Emily Vetting

**Federal Highway Administration:** Gabe Rousseau

**U.S. DOT/Volpe National Transportation Systems Center:** William Lyons, Ben Rasmussen, Anna Biton, and Jared Fijalkowski

**Rails to Trails Conservancy:** Marianne Fowler, David Levinger, and Stephanie Manning

**Centers for Disease Control and Prevention:** Arthur Wendel

**Marin County Bicycle Coalition:** Deb Hubsmith



## Appendix 2: Demographic and Economic Characteristics and Travel Behavior among Communities

	City of Columbia	Marin County	City of Minneapolis	Sheboygan County	Average Among Pilots	Spokane, WA (Control)
<b>Geographic Area (sq mi)</b>	53.0	121.4 <sup>1</sup>	55.0	514.0	185.9	58.0
<b>Persons per sq mi</b>	2,047.2	2,079.2 <sup>2</sup>	6,956.0	224.7	2,826.8	3,602.0
<b>POPULATION (2010 Census)</b>						
<b>Total</b>	108,500	252,409 <sup>3</sup>	382,578	115,507	214,748.5	208,916
<b>Total population 16 and older</b>	90,168	205,904	312,884	91,204	175,040.0	167,196
<b>EDUCATION (2009 ACS 3-Year Average)</b>						
<b>Percent of population enrolled in college or grad school</b>	25.6	6.0	12.9	5.7	12.6	8.5
<b>Total population 25 and older</b>	54,023	180,467	256,267	77,019	141,944	133,233
<b>Less than high school</b>	7.1	7.8	12.3	10.3	9.4	8.7
<b>High school or equivalence</b>	20.0	13.1	19.5	38.4	22.8	25.9
<b>Some college, no degree</b>	17.6	19.0	18.4	20.9	19.0	26.8
<b>Associate or bachelors degree</b>	33.1	37.8	33.7	24.6	32.3	27.8
<b>Grad or professional degree</b>	22.3	22.3	16.1	5.9	16.7	10.8
<b>MEDIAN AGE (2010 Census)</b>	26.8	44.5	31.4	40.3	35.8	35
<b>HOUSEHOLD INCOME (2009 ACS 3-Year Average)</b>						
<b>Total # of households</b>	43,206	101,042	167,542	43,595	88,846	84,878
<b>Less than \$ 25,000</b>	31.4	12.4	28.8	20.8	23.4	30.4
<b>\$ 25,000-49,999</b>	24.2	16.0	24.8	27.3	23.1	30.7
<b>\$ 50,000-74,999</b>	19.6	14.2	17.3	22.5	18.4	17.8
<b>\$ 75,000-99,999</b>	9.9	12.4	10.9	14.9	12.0	10.6
<b>\$ 100,000 or more</b>	14.9	44.7	17.3	14.6	22.9	10.5
<b>Median household income (2009 \$)</b>	\$41,698	\$88,565	\$46,087	\$52,016	\$57,092	\$39,561
<b>RACE (includes Hispanic and non-Hispanic) (2010 Census)</b>						
<b>White (alone)</b>	79.0%	80.0%	63.8%	89.9%	78.5%	86.7%
<b>Black (alone)</b>	11.3%	2.8%	18.6%	1.5%	8.5%	2.3%
<b>American Indian and Alaska Native</b>	0.3%	0.6%	2.0%	0.4%	0.8%	2.0%
<b>Asian (alone)</b>	5.2%	5.5%	5.6%	4.6%	5.2%	2.6%
<b>Other race</b>	1.1%	6.9%	5.6%	2.0%	3.9%	1.9%
<b>Multi-racial</b>	3.1%	4.2%	4.4%	1.6%	3.3%	4.6%
<b>Hispanic (any race)</b>	3.4%	15.5%	10.5%	5.5%	8.7%	5.0%
<b>WORK COMMUTE (2009 ACS 3-Year Average)</b>						
<b>Total # of workers 16 and over</b>	54,203	122,438	207,588	59,135	110,841	91,145
<b>Car, truck, or van – drive alone</b>	74.1	67.9	61.6	81.6	71.3	74.5
<b>Car, truck, or van – carpool</b>	12.7	8.4	8.7	9.1	9.7	11.3
<b>Public (excludes taxi)</b>	0.9	8.5	13.8	0.5	5.9	4.4
<b>Walk</b>	6.0	2.9	6.4	3.5	4.7	3.2
<b>Bicycle</b>	1.7	1.3	4.1	1.0	2.0	1.2
<b>Other means</b>	1.4	1.4	0.8	1.1	1.2	1.1
<b>Worked at home</b>	3.3	9.6	4.7	3.2	5.2	4.3
<b>Mean travel time (minutes)</b>	16.3	28.5	22.0	18.3	21.3	20.0
<b>HOUSEHOLD CHARACTERISTICS (2010 Census)</b>						
<b>Total # occupied units</b>	43,065	103,210	163,540	46,390	89,051.3	87,271
<b>Owner occupied</b>	47.4%	62.6%	49.2%	71.7%	55.8%	57.6%
<b>Renter occupied</b>	52.6%	37.4%	50.8%	28.3%	44.2%	42.4%
<b>Average family size</b>	2.9	2.9	3.1	3.0	3.0	3.0

	City of Columbia	Marin County	City of Minneapolis	Sheboygan County	Average Among Pilots	Spokane, WA (Control)
<b>Percent of households with individuals under 18</b>	26.1	29.0	23.5	30.3	26.3	28.9
<b>Percent of households with zero vehicles available</b>	7.3	5.0	18.4	7.1	9.5	9.4

<b>OCTOBER CLIMATE (in Degrees Fahrenheit)</b>	Columbia	San Rafael	Minneapolis-Saint Paul	City of Sheboygan	Average Among Pilots	Spokane
Average temp (max)	67.5	75.0	58.6	59.4	65.1	58.5
Average temp (min)	45.5	50.5	38.7	43.2	44.5	36.0
Inches of rain	3.1	1.7	1.9	2.5	2.3	1.2

Source for meteorological data: University of Minnesota research team.

<sup>1</sup> The land area represents all of Marin County, not Marin’s city-centered corridor.

<sup>2</sup> Refers to the population density for all of Marin County.

<sup>3</sup> Population in all of Marin County.

## Appendix 3: Selected Project Maps

### Marin County Bicycle Route 5 – refer to section 4.1.5

**NOVATO**  
Vintage Oaks

**SAN RAFAEL**  
Northgate Shopping Center  
Marin Civic Center  
Lincoln Ave. Pathway  
Fourth Street  
San Rafael Transit Center

**SAN ANSELMO**  
San Anselmo Avenue

**LARKSPUR**  
Magnolia Avenue  
Bon Air  
Marin Country Mart  
Larkspur Ferry Terminal

**CORTE MADERA**  
The Village at Corte Madera  
Corte Madera Town Center

**DON'T DRIVE:  
TAKE ROUTE 5!**

Visit [www.marinbike.org/Routes5](http://www.marinbike.org/Routes5)  
for all activity details

**ROUTE 5 BIKE EVENTS**

**MAY**

- Thursday, 12: Bike to Work Day Party & Expo at Marin Country Mart. Rides start from Mike's Bikes, San Rafael and Sausalito
- Sunday, 15: Fun Ride/Locust Fairfax (for advanced riders)
- Sunday, 15: Ride to WITH MY OWN TWO WHEELS in San Rafael
- Friday, 20: Food Truck Crush at the Larkspur Ferry. Ride starts at Whole Foods, San Rafael
- Saturday, 28: Family Allycat (scavenger ride) Ride starts at Mike's Bikes, San Rafael

**JUNE**

- Saturday, 4: Nature Ride - Wild Care, Marin Audubon. Ride starts at Whole Foods, San Rafael
- Saturday, 11: Fairfax Festival - Ride to parade
- Sunday, 19: Father's Day ride from Northgate Mall to downtown San Rafael
- Saturday, 25: SF Mission District Bicycle Tour. Ride from Mike's Bikes, San Rafael, to Larkspur Ferry

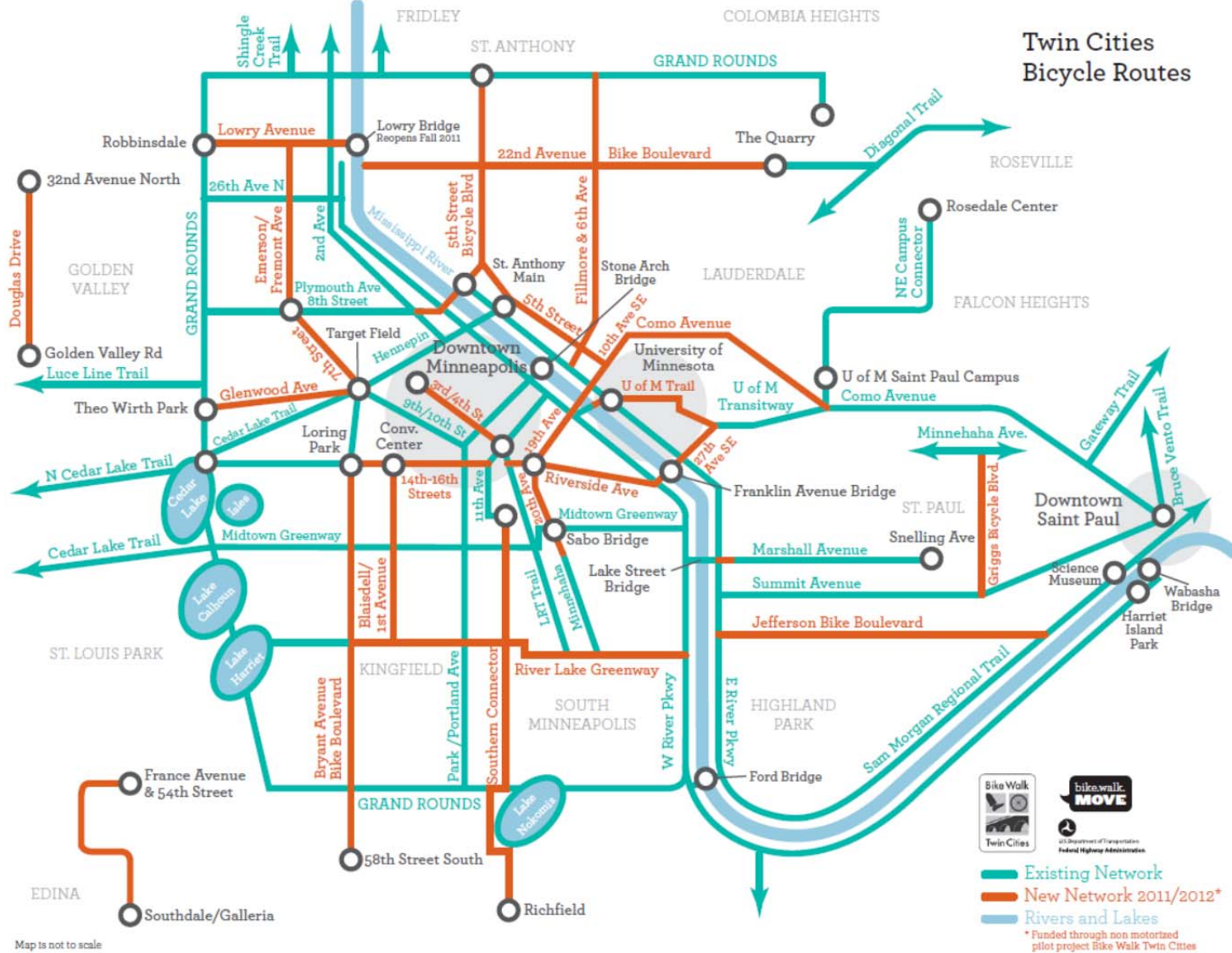
**JULY**

- Friday, 1: Outdoor movie BREAKING AWAY in San Anselmo. Ride starts at Whole Foods, San Rafael
- Saturday, 9: Ride to Giants vs. Mets. Ride starts at Mike's Bikes, San Rafael. Fee \$40
- Friday, 15: Pub Crawl. Ride starts at Iron Springs in Fairfax
- Saturday, 23: Ride from Whole Foods, Mill Valley to Marin County Mart
- Saturday, 30: Ride to matinee at Century Larkspur Landing

**MCBC**  
MARIN COUNTY BICYCLE COALITION

Figure 50: BWTC Bicycle Routes (source: Bike Walk Twin Cities)

Bike Walk Twin Cities Bicycle Routes – refer to section 4.1.7



## Appendix 4: Averted VMT Conversions

Pollutant	Conversion	Equation	Amount
Hydrocarbons	1.36	Daily mileage reduction multiplied by 1.36 grams per reduced mile	155.52 pounds/day
PM <sub>10</sub>	0.0052	Daily mileage reduction multiplied by 0.0052 grams per reduced mile	0.59 pounds/day
PM <sub>2.5</sub>	0.0049	Daily mileage reduction multiplied by 0.0049 grams per reduced mile	0.56 pounds/day
NO <sub>x</sub>	0.95	Daily mileage reduction multiplied by 0.95 grams per reduced mile	108.63 pounds/day
CO	12.4	Daily mileage reduction multiplied by 12.4 grams per reduced mile	1417.94 pounds/day
CO <sub>2</sub>	369	Daily mileage reduction multiplied by 369 grams per reduced mile	42195.16 pounds/day
Hydrocarbons	1.36	Yearly mileage reduction multiplied by 1.36 grams per reduced mile	28303.9 pounds/year
PM <sub>10</sub>	0.0052	Yearly mileage reduction multiplied by 0.0052 grams per reduced mile	108.2 pounds/year
PM <sub>2.5</sub>	0.0049	Yearly mileage reduction multiplied by 0.0049 grams per reduced mile	102.0 pounds/year
NO <sub>x</sub>	0.95	Yearly mileage reduction multiplied by 0.95 grams per reduced mile	19771.1 pounds/year
CO	12.4	Yearly mileage reduction multiplied by 12.4 grams per reduced mile	258065.2 pounds/year
CO <sub>2</sub>	369	Yearly mileage reduction multiplied by 369 grams per reduced mile	7679519.8 pounds/year

### Inputs

453.59	Grams to pounds conversion
51,868	Daily mileage reduction





## Appendix 5: NTPP Websites

### Federal Highway Administration's NTPP Web site:

- <http://www.fhwa.dot.gov/environment/bikeped/ntpp.htm>

### Columbia, Missouri

- Program Name: GetAbout Columbia
- Administered by: Columbia Department of Public Works
- Web site: <http://www.gocolumbiamo.com/PublicWorks/GetAboutColumbia/>

### Marin County, California

- Program Name: WalkBikeMarin
- Administered by: Marin County Department of Public Works
- Web site: <http://www.walkbikemarin.org/index.php>

### Minneapolis, Minnesota

- Program Name: Bike/Walk Twin Cities
- Administered by: Transit for Livable Communities
- Web site: <http://bikewalktwincities.org/>

### Sheboygan County, Wisconsin

- Program Name: NOMO
- Administered by: Sheboygan County Planning Department
- Web site: [http://www.co.sheboygan.wi.us/html/d\\_planning\\_nonmotorized\\_project.htm](http://www.co.sheboygan.wi.us/html/d_planning_nonmotorized_project.htm)