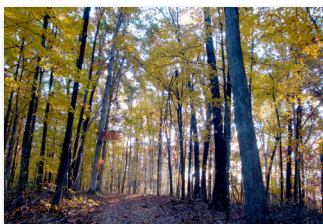


Best Practices Study

# Good Practices to Encourage Bicycling & Pedestrians on Federal Lands

December 2011



*This document was prepared for the Federal Transit Administration  
by the Paul S. Sarbanes Transit in Parks Technical Assistance Center.*

Integrating bicycle and pedestrian systems into existing transportation networks can help Federal land managers promote resource protection, reduce greenhouse gas emissions, further ecological balance, achieve financial sustainability, and improve visitor enjoyment and health. In recent years, a number of public land managers have initiated or partnered with other agencies to implement facilities and programs that promote bicycle and pedestrian travel in and around Federal lands. Other managers are interested in creating or expanding bicycle and pedestrian options in their units but need information about successful models and practices.

The purpose of this document is to share effective bicycle and pedestrian planning and implementation practices that may be applicable to Federal land settings. This report is not an exhaustive study of bicycle and pedestrian plans and programs on Federal lands. Rather, it is a sampling of instructive examples or models from a wide variety of Federal land units. In addition, selected cities and counties with successful bicycle or pedestrian programs that may be adaptable to a Federal land setting are used as examples.

This report highlights examples of plans and programs from a series of geographically diverse locations (*Figure 1*). However, the overarching goal was to select examples that illustrate components of an effective bicycle and pedestrian plan.



*Figure 1: Locations of Highlighted Projects*

Eleven components of an effective bicycle and pedestrian plan were identified:

1. Needs Assessment,
2. Partnerships,
3. Goals, Objectives, and Performance Measures,
4. Bicycle and Pedestrian Network Plan,
5. Design Guidelines,
6. Maintenance Policy and Procedures,
7. Pedestrian and Bicycle Support Elements,
8. Cost and Funding Analysis,
9. Encouragement, Education, and Enforcement Programs,
10. Evaluation and Monitoring, and
11. Updates.

**Needs Assessment:** An accurate needs assessment will help guide the development of a plan. Public participation, which can be solicited through workshops or surveys, is critical to identifying site specific needs.

Partners who developed the 2010 Lake Tahoe Region Bicycle and Pedestrian Plan (1) classified their needs through three overarching categories:

1. Environmental Benefits – improve air and water quality and reduce negative impacts on wildlife and native species,
2. Economic Benefits – increase business revenues, job creation, property values and energy savings, and
3. Health Impacts – combat obesity and reduce negative health impacts of pollution.

Surveys can help document bicycle and pedestrian needs. The North Moab Recreation Area Partnership Case Study (2) highlighted a survey that documented the support for implementing bicycle facilities. Almost 40% of the surveyed visitors indicated that they would bicycle to Arches National Park if facilities were available.

**Partnerships:** Partnerships are invaluable – and often essential to developing a strong bicycle and pedestrian plan. Federal land management agencies can realize many benefits by partnering with agencies with similar goals, including accomplishing more with less, generating fresh ideas, opportunities and solutions, and obtaining guidance or assistance with grant applications. Having a well-defined working relationship with partners through formalized agreements like memorandums of understand can ensure successful collaborations.

A major benefit of partnerships is to draw from a wider pool of resources. In Moab, Utah, the Moab Trails Alliance assists in implementing the Grand County Non-Motorized Trails Master Plan (3) by writing proposals and raising money to match grants for the North Moab Recreation Area's trail system (2).

Partnerships evolve over time, thus, Federal land managers must remain engaged within the partnerships to achieve success (4). Clearly defining the initial and ongoing responsibilities of each partner can help to aid in the success of the collaboration. A common document used to formalize partner responsibilities is the memorandum of understanding. As an example, the Red Hill Council “created a Memorandum of Understanding with the Bureau of Land Management to plan, manage, care for and maintain the Red Hill Special Recreation Management Area in Carbondale, Colorado” (5).

**Goals, Objectives, and Performance Measures:** Goals, objectives, and performance measures help to conceptualize, define and measure the success of bicycle and pedestrian actions implemented as a result of the plan. They also provide direction, establish benchmarks, and measure progress.

- Goals are characterized by generality and brevity.
- Objectives should be quantifiable, time-specific, and measurable.
- Performance measures should be specific and designed to quantify objectives.

As an example, the City of Davis, California (6) included the following goal, objective, and performance measure:

Goal: “Improve and maintain the safety, convenience, attractiveness, and inclusiveness of bicycle transportation in Davis.”

Objective: “Increase the amount of bicycle trips as a percentage of all trips to 25% by 2012.”

Performance Measure: Percent of trips made by bicycle.

**Bicycle and Pedestrian Network Plan:** A bicycle and pedestrian network plan addresses connections between popular sites within Federal land units, to gateway communities, and to the regional transportation network.

The bicycle and pedestrian network plans highlighted in this report have many common elements. From them, four steps that a Federal land manager can use to prioritize projects were identified. Even though not all of the steps will be applicable to every Federal land unit, they represent an effective starting point for discussion and planning purposes.

### *Step One: Identify Projects*

The first step is to identify bicycle and pedestrian projects. Projects under consideration should either expand the bicycle and pedestrian network or fill in missing links of the existing network. This information is often generated during the Needs Assessment planning phase.

### *Step Two: Identify Rating Criteria and Assign Criteria Weights*

Once projects are identified, the criteria with which the projects will be ranked need to be identified. The number of criterion and their focus reflects the goals and objectives for the plan and the values of the plan’s authors and stakeholders.

## EXECUTIVE SUMMARY

In Acadia National Park's Hiking Trails Management Plan (7), the following were the criteria used to evaluate the projects:

- Cultural Resource Values,
- Effects on Natural Resources,
- Effects on Communities and Neighbors, and
- Visitor Experience Values.

Assigning weights to the identified criteria will provide a tool to guide the prioritization process. The assigned weights reflect the importance of the criterion, based on input from the planners and stakeholders and the public.

### *Step Three: Choose a Rating Scale and Assign a Score to Each Project*

The next step is to choose the rating scale and subsequently score and rank the projects. Ranking projects incorporates all of the decisions made in the previous steps, including the projects identified, chosen criteria, weights assigned to each criterion, and rating scale used to rate each criterion.

### *Step Four: Summarize Results and Develop Network Map(s)*

A table that summarizes and displays the results can be an effective tool for comparing project scores and discussing priorities. The table can show the project name, the resulting score broken down by criterion, the total project score, and the rank. *Table 1* presents a portion of a table from Acadia National Park's Hiking Trails Management Plan.

*Table 1: Excerpt from Table 3 of Acadia National Park's Hiking Trails Management Plan (7)*

Trail Name	Cultural Resource Score	Natural Resource Score	Communities and Neighbors Score	Visitor Experience Score	Total Score
Beech Mountain South Ridge Trail	35	35	12	32	114
Champlain East Face Trail	50	20	10	32	112
Beech Cliff Ladder Trail	40	30	10	32	112
Jordan Cliffs Trail	45	15	10	40	110
Jordan Pond Loop Trail	45	5	10	36	96
Jesup Path	35	10	18	32	95
Tarn Trail/Kane Path	45	20	10	20	95

Maps are another effective tool for summarizing network plans. These maps can be useful for numerous planning, communication, public outreach, funding development, and educational purposes.

Table 2: Typical Bicycle and Pedestrian Design Elements

Bicycle and Pedestrian	Bicycle-Specific	Pedestrian-Specific
<ul style="list-style-type: none"> <li>• Multi-use trail widths</li> <li>• Multi-use trail pavement markings</li> <li>• Curb ramps</li> <li>• Pathway crossing treatments</li> <li>• Lighting</li> <li>• Bollards</li> <li>• Yield policies</li> <li>• Construction detours</li> <li>• Push buttons</li> <li>• Regulatory, wayfinding, and interpretive signage</li> <li>• Traffic control signals</li> <li>• Water fountains</li> <li>• Restrooms</li> <li>• Foliage offsets</li> </ul>	<ul style="list-style-type: none"> <li>• Bicycle parking               <ul style="list-style-type: none"> <li>• Design and quantity of bicycle lockers</li> <li>• Design and quantity of bicycle racks</li> </ul> </li> <li>• Manhole and drainage grate placement/design</li> <li>• Bicycle loop detectors (to allow signal change when bikes are present)</li> <li>• Bicycle lane pavement markings</li> </ul>	<ul style="list-style-type: none"> <li>• Grades (slope)</li> <li>• Benches</li> </ul>

**Design Guidelines:** Federal land managers will need to identify design guidelines that apply to the proposed bicycle and pedestrian facility projects. Table 2 presents common design elements associated with bicycle and pedestrian facilities.

Managers can utilize or adapt design guidelines available from a variety of existing federal and state sources. Three examples include:

- 2009 Federal Highway Administration’s Manual on Uniform Traffic Control Devices,
- State specific *Highway Design Manuals*, and
- The Institute of Transportation Engineer’s (ITE) *Design and Safety of Pedestrian Facilities*.

**Maintenance Policy and Procedures:** Establishing a maintenance plan is imperative for the long-term success of a pedestrian and bicycle network. In fact, the 2008 Grand County Non-Motorized Trails Master Plan (3) asserts, “A non-maintained trail system is worse than no trail system at all.” A comprehensive maintenance plan should address short-term and long-term maintenance activities, funding, equipment needs, and the agencies responsible for each task.

Some examples of short-term maintenance activities include tree and shrub trimming and mowing/snow removal. Some examples of long-term maintenance activities include striping, bike rack repairs, and rehabilitation of benches. These are typically performed every 5 to 10 years.

### *Funding*

Maintenance funding is often challenging because bicycle and pedestrian facilities are frequently implemented through grants. Grants are typically awarded for planning and construction costs but do not cover ongoing maintenance costs. However, many public agencies and Federal land units have developed creative solutions to fund or conduct maintenance activities, like maintenance of trails by volunteers, maintenance partnerships with non-profit agencies, and targeted bond or tax funding. The Red Hill Council, a partner of the Bureau of Land Management, hosts volunteer trail maintenance work parties on a weekday evening followed by a social gathering with pizza and beverages (*Figure 2*).



*Figure 2: Volunteer Trail Maintenance Work Parties (Photo courtesy of Davis Farrar, Red Hill Council)*

### *Equipment*

Some equipment for maintaining pedestrian and bicycle facilities differs from that required to maintain roadways. Equipment for snow removal, trail rehabilitation and trail maintenance are a few examples of trail-specific equipment. Careful identification of specialized equipment needs will facilitate planning and accurate budgeting of ongoing maintenance activities.

In some cases, purchasing specialized maintenance equipment is a worthwhile investment. Acadia National Park made use of a trail-specific wheel barrow that runs on tracks instead of wheels and uses a hydraulic dump instead of requiring manual operation.

### *Who is Responsible for Maintenance?*

Pedestrian and bicycle networks can cross boundaries of multiple cities, counties, and states, which can create challenges for determining who is responsible for maintenance. Before any facility is built, stakeholders should identify and formally agree on who will be responsible for maintenance. Multi-jurisdictional maintenance also represents an opportunity to share resources and coordinate tasks. Agencies should consider collaborating through maintenance agreements to reduce expenses. For example, Teton County and the Town of Jackson, Wyoming developed a memorandum of understanding for the maintenance of the pathway network. Through it, the two agencies agreed to split the cost of maintenance on a 50/50 basis.

**Pedestrian and Bicycle Support Elements:** Roadway network plans include provisions for support facilities and infrastructure, such as signage and parking lots. Similarly, bicycle and pedestrian plans should identify support facilities and services that promote and facilitate use. Some elements supporting pedestrians and bicyclists include:



- Wayfinding signs,
- Bicycle parking,
- Transit accommodations, and
- Bike rental, bike sharing, and employee bike fleets.

Federal land managers should also consider facilities such as:

- Benches
- Mile markers,
- Drinking fountains and restrooms,
- Dedicated spaces for bicyclists to congregate without blocking trails, and
- Bicycle repair stations, including bike pumps and simple tools.

### *Wayfinding Signs*

Bicycle and pedestrian paths that are clearly marked with wayfinding signs promote use and a positive visitor experience.

### *Bicycle Parking*

Providing sufficient and easily accessible bicycle parking promotes bicycle use. It also helps to prevent visitors from parking their bicycles in unsafe locations or in a manner that is detrimental to natural or historically sensitive surroundings (i.e. chained to a tree).

### *Transit Accommodations*

Integration between pedestrians, bicycles, and transit expands transportation choices for a significant number of people who cannot or choose not to drive, including children and the elderly. Facilities or services that make it easier for visitors to move seamlessly from one mode to another can expand the use of alternative transportation. Bicycle racks on transit vehicles, bicycle lockers at transit stations or provisions to allow bicycles inside vehicles are all good practices; partnerships with transit agencies can expand development of these options.



As an example, Cuyahoga Valley National Park partnered with the Cuyahoga Valley Scenic Railroad to offer “Bike Aboard” (8). Through the Bike Aboard program, bicyclists can ride the Towpath Trail and pick up the railroad to return to their starting location. This program offers visitors the flexibility to pedal as far as they want with an option to return by train. It also provides a wonderful opportunity to view the park from two different perspectives.

### *Bike Rentals, Bike Sharing and Employee Bike Fleets*

Visitors to public lands may not have a bicycle with them when they arrive. In places where good bicycling facilities exist, Federal land managers can encourage visitors to use the facilities by making bicycles available on site.

### *Bike Rentals*

Offering bicycle rentals in or near Federal lands is a good practice. In recent years, a growing number of Federal land units have partnered with concessionaires to offer bicycle rentals within public lands. A Federal land unit should partner with concessionaires that can offer bicycles that can accommodate a variety of users.



*Figure 3: Cuyahoga Valley National Park: Bicycle Racks on Trains (Photo courtesy of Arrye Rosser, NPS)*

### *Public Bike Sharing Programs*

Bike sharing is a mode of public transportation in which a fleet of bicycles is made available for short-term use, typically in urban settings. Riders generally check out and return bicycles to a network of stations. Bike sharing programs, such as Capital Bikeshare (Washington D.C.) (*Figure 4*) and Nice Ride (Minneapolis, MN), are becoming a key component of multi-modal transportation networks in cities around the world.

### *Employee Bike Fleets*

Employee bicycle fleets typically consist of standard, commercially available bikes that employees ride for various purposes. At Glacier National Park, a remote rural park in Montana, bikes are available to employees for short work trips within campgrounds or work campus areas. Providing bicycles for employee use is relatively inexpensive and simple to start.

**Cost and Funding Analysis:** Estimating costs and identifying funding sources for bicycle and pedestrian facilities are an important part of the planning process. While securing funds can be challenging, there is increasing interest and support for investing in sustainable and cost-effective transportation options like bicycle and pedestrian transportation. Therefore, an effective bicycle and pedestrian plan should contain thorough project cost estimates in order to make use of the funding opportunities available from federal, state, local, private, and non-profit sources.

A Federal land manager can review other plans to obtain estimates of cost for the different types of bicycle and pedestrian facilities. However, a Federal land manager should use them as estimates because location and the state of the economy may cause differences between the estimates and actual cost. Typically, bicycle routes are a low cost option that requires signs and pavement markings. Widening a roadway to create bicycle lanes requires a larger investment, particularly if curb-and-gutter is already present. Constructing multi-use paths may require an even greater level of investment. However, a significant benefit of investing in multi-use paths is their appeal to a wide range of people including families and first-time users. The need to purchase right-of-way, the existence of curb-and-gutter and other factors can make one facility type more or less expensive than the next.

Since there are many competing programs for funding, being prepared with an estimate for proposed projects can enable quick action when funding becomes available.



*Figure 4: Bike Sharing:  
Capital Bikeshare*

**Encouragement, Education, and Enforcement Programs:** Encouragement activities remind people about the benefits of travel without a motorized vehicle. Examples of activities that encourage bicycling and walking include tours to points of interests, developing and distributing bicycle and pedestrian network maps, and organizing special events, like car-free days. Education programs for motorists, pedestrians, and bicyclists alike promote safety for all modes; these programs can be offered in traditional, in-person forums, or through new media tools. Enforcement of rules also promotes safety; Federal land units are developing innovative enforcement programs led by law enforcement officials and park rangers and supported through volunteer trail ambassadors.

### *Encouragement – Tours, Maps, and Events*

With the growing interest in sustainable transportation and health promotion, the number of programs in public land settings to encourage people to walk or bicycle is growing. Visitors often see and experience a federal land unit in a completely different way by using an alternative form of transportation. Examples of ranger led tours, bicycle and pedestrian maps, and special events are provided.

#### *Tours*

Bicycle and pedestrian tours can introduce visitors to the non-motorized facilities available in the unit and showcase the benefits of biking and walking. Tours are particularly effective if they offer a unique experience not available to visitors in cars, such as close-up views of wildlife or access to trails that do not accommodate motor-vehicles. At Mississippi National River and Recreation Area, for example, tours are offered from July through September. Park rangers use the bicycle tours to educate visitors about the presence of the park and the resources it works to protect (9).

#### *Bicycle and Pedestrian Network Maps*

Maps of bicycle and pedestrian networks are effective tools to encourage more people to walk and bike. Maps can illustrate various features to attract and orient users, such as:

- On-street routes, separated multi-use paths, or trail networks,
- Links to public transportation such as transit stops, and
- Popular visitor destinations (hiking areas, landmarks) and services (shopping areas).

In order to make full use of maps, developing a dissemination plan can help to engage a broader audience. For example, the Lake Tahoe Bike Trail Map is distributed annually by the Lake Tahoe Bicycle Coalition.

#### *Events*

Special events are an effective way to encourage people to walk or bicycle. Events are often held to bring attention to pedestrian and bicycle issues, using fun activities or special incentives. Other events offer special limited-time access to roads, trails or attractions for visitors using non-motorized transportation.

The City of Portland holds an event called “Sunday Parkways,” which began as a single event in 2008 and has since expanded (10). Roads that connect select parks within the city are closed to motor-vehicles for this event. It gives participants the “opportunity to experience the unique benefits of walking, rolling or bicycling through neighborhoods where miles of streets are temporarily car-free and carefree.”

### *Education*

Education programs teach pedestrians, bicyclists and motorists how to safely interact, and in some cases they can teach people how to properly ride a bicycle. Educational components are particularly important for bicycle and pedestrian initiatives that target children with limited bicycling experience. For example, the Ridge to River Partnership in Boise, Idaho, created a short video on trail etiquette about how different types of trail system users should interact.

### *Enforcement*

Enforcing laws pertaining to speed limits, appropriate behavior at stop signs, crosswalks, traffic signals, and driving under the influence can improve safety for all roadway users. Enforcement activities are particularly important on or near new paths, in areas that attract users that are unfamiliar with the transportation network (i.e. tourists), and on trails that attract many young or inexperienced bicyclists who may be unfamiliar with laws and regulations.

Volunteer pathway or trail ambassadors assist some Federal land units by helping visitors with directions or informing bicyclists, pedestrians and motorists about rules and their basis. Grand Teton National Park is just one park that has created a trail ambassador program (*Figure 5*).

**Evaluation and Monitoring:** Evaluation and monitoring activities help to assess the effectiveness of plans, projects and programs. Evaluation is the “on-going monitoring of facility use, condition and problems” (11). Examples of evaluation activities include collecting data on bicycle and pedestrian use, performing safety evaluations, and conducting surveys for evaluation purposes. Collected data should help assess progress towards the objectives of the projects and programs. The findings from evaluation and monitoring activities benefit plan updates and future projects.



*Figure 5: Grand Teton National Park: Pathway Ambassadors*

### *Facility and Program Use*

One measure for evaluating the effectiveness of a bicycle and pedestrian plan is to document the number of people using the facilities and programs. Facility use can be documented in several ways, such as counting individuals at a specific location, recording the use of bicycle racks, and tallying requests for bicycle racks, benches, and wayfinding signs. Participation in programs can be documented through several methods as well, such as counting individuals or reviewing registration records. All of this information can support the evaluation of performance measures.

For example, the George Washington Memorial Parkway installed nine active infrared trail counters along the Mount Vernon Trail to track pedestrian and bicycle use. The counts indicate that the trail is likely used by bicycle commuter traffic because peaking, similar to vehicular traffic, is observed in both the morning and evening.

### *Safety*

The safety of pedestrians and bicyclists, both between the users groups and in relationship to motor-vehicles, should be monitored and evaluated. Tracking crash locations and injury severity will help identify locations in the network that need improvements. Both engineering and educational initiatives should be used to improve any location of concern.

A safety evaluation of the occurrence of accidents along Mount Vernon Trail was conducted by George Washington Memorial Parkway. From the evaluation, managers determined that approximately one ambulatory transport occurs each week (12). Bicyclists were overrepresented in the crash reports. The majority of crashes occurred between bicyclists and pedestrians, bicyclists and bicyclists, or were due to a single bicyclist that crashed. Surprisingly, few if any crashes were between motor-vehicles and bicyclists or pedestrians. In order to address these findings, George Washington Memorial Parkway managers began distributing educational materials.

### *Surveys*

Surveys help to obtain information about how bicycle and pedestrian facilities are used, user attitudes, user needs, and impacts of these facilities on surrounding communities. This information can improve programs and support future initiatives. Surveys provide information on why and how people use the bicycle and pedestrian network and their potential economic impact.

The Red Hill Project Final Report presented a survey that showed more than 71% of users traveled between 0-5 miles to access the Red Hill Area (13). Additionally, survey results indicated that more than 94% of respondents wanted to restrict motorized use in the Red Hill Area.

**Updates:** An effective bicycle and pedestrian plan is one that is continually refined. There are three primary reasons why plan updates are necessary. First, the needs of pedestrians and bicyclists will evolve as portions of any plan are implemented. Second, design standards for bicycle and pedestrian facilities are rapidly progressing as more information is gathered. Finally, plan updates document successes and areas where improvements can be made. It is for these reasons that a bicycle and pedestrian plan should be updated every three to five years.

The 2003 Lake Tahoe Region Bicycle and Pedestrian Plan (1) set forth “ambitious benchmarks,” including completing 60 miles of additional bicycle and pedestrian facilities by 2008. By 2010 (there was also a 2006 edition), only 13 miles were added. In the process of developing the 2010 Lake Tahoe Region Bicycle and Pedestrian Plan, the Tahoe Region Planning Agency found that projects listed in the plan were often overlooked by developers and plan reviewers. In response the Tahoe Region Planning Agency took four actions:

1. They incorporated a bicycle and pedestrian checklist into the planning process,
2. They created an interactive, online map of existing and proposed bicycle and pedestrian projects,
3. They conducted numerous meetings with Caltrans and Nevada Department of Transportation planners, designers, and engineers to identify the need for bicycle and pedestrian accommodation, and
4. They developed policy language to be included in their Code of Ordinances.

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## WHAT IS THE PAUL S. SARBANES “TRANSIT IN PARKS” PROGRAM?

The Paul S. Sarbanes Transit in Parks (Transit in Parks) Program is a federal financial assistance program that annually awards grants to carry out projects that provide alternative transportation (bus, rail, or other conveyance including facilities for pedestrians, bicycles, and watercraft) in national parks and public lands.

## WHAT IS THE PAUL S. SARBANES “TRANSIT IN PARKS” TECHNICAL ASSISTANCE CENTER (TAC)?

The Paul S. Sarbanes Transit in Parks Technical Assistance Center (TAC) provides information, training, and technical support on alternative transportation systems (ATS) for federal land managers. Specific services include person-to-person technical liaisons, a Help Desk ([helpdesk@triptac.org](mailto:helpdesk@triptac.org) or 877-704-5292) and website ([www.triptac.org](http://www.triptac.org)), training workshops, a peer mentoring program, and an online system to help public land managers find documents, technical manuals and other resources.

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## THE FULL BICYCLE PEDESTRIAN STUDY CAN BE FOUND AT

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