

CHAPTER 5 – BICYCLING ISSUES ON FEDERAL LANDS

In promoting bicycling on Federal lands, it is important to be aware of the challenges that may be encountered, the resources available to help in addressing them, and how challenges have been successfully overcome in the past. Bicycling issues on Federal lands were identified through a literature review, online survey, and personal communications with land managers and others. A total of 85 surveys were completed by managers from the NPS, USFS, FWS and the BLM. Appendix G describes the survey methodology and results. This chapter describes a number of cultural and institutional barriers identified in the surveys that may hinder the promotion of bicycling on Federal lands, followed by some useful resources to help managers find solutions to common issues.

BROAD CHALLENGES

The following broad challenges were identified to promoting bicycling on Federal lands.

Mainstreaming bicycling and walking is not a high priority. Managers have more immediate responsibilities that take precedence over improving bicycling facilities and programs. Bicycling is promoted on some Federal lands, but it is typically initiated by individual champions rather than by Federal land management policy.

There is a lack of a dedicated funding source to support non-motorized travel on Federal lands. The Alternative Transportation on Parks and Public Lands (ATPPL) program has potential to fund non-motorized facilities, but to date has dedicated most of its funding to transit programs. The ATPPL program is described under the "funding issues" section below.

Non-motorized networks are often not considered important infrastructure solutions. Despite significant public interest in bicycling in the United States and successful models of bicycling infrastructure throughout Europe, transportation planners on public lands are increasingly turning to transit systems rather than seriously assessing non-motorized networks. Non-motorized alternatives need to be considered as a matter of course in many levels of planning.

Maintaining the existing infrastructure is difficult. The National Parks have suffered from limited budgets and deferred maintenance backlogs for many years. The constant need for funding to fix existing infrastructure has made it very difficult to develop new systems—even if those new systems would help solve the problems the Parks are facing. Even in cases where funding is made available from outside of the Parks' budgets, there isn't support for creating new kinds of infrastructure solutions (Olson, 2007).

The connection between transportation and sustainability is not always made. The broad concept of sustainability is often thought of by resource managers in terms of reducing energy in ways that don't require change at the personal level. Solar collectors, wind energy and compact fluorescent light bulbs tend to get more attention than transportation. When transportation is discussed, sustainability is more likely to be linked to hybrid cars or alternative fuels. Like so many issues, the idea of a new technology solving the problem seems easier to consider than the possibility that, given a choice, individuals can make change happen through their personal actions. Walking and bicycling are the most sustainable forms of transportation, but they are rarely talked about as top priorities for sustainability. Creating a new infrastructure of greenways

and trails would provide a sustainable transportation system that is known to work and costs much less to build and maintain than motorized systems (Olson, 2007).

The previous two challenges were identified in "On the Right Path: Greenways and America's National Parks" (Olson, 2007). Prepared by Jeff Olson for the Grand Canyon Foundation in 2007, this document assesses greenway projects in six national parks including the Grand Canyon, Acadia, Yosemite, Grand Teton, Golden Gate, and Zion. Olson identifies a number of cultural, institutional and physical barriers that have prevented the development of greenways in national parks. It can be viewed online at www.pedbikeinfo.org.

This section presented some of the broad challenges managers face in the promotion of bicycling on public lands. The following sections present more specific issues identified by managers, and suggested resources and examples to help managers solve these issues.

TRACKING BICYCLE USE

As pedantic as it may sound, tracking bicycle use is an issue because it is difficult to manage an activity if no data for that activity exists. It is important to understand how changes to bicycling facilities and programs affect bicycle use. Increases in bicycle use may justify changes in funding priorities. Records of motor vehicle, bicycle and pedestrian use reflect on how seriously each mode of travel is considered. It is largely unknown how many bicyclists use public lands. Bicycle use is admittedly difficult to track due, in part, to the dispersed nature of roads and trails as well the complexity of measuring mixed use corridors (motor vehicles, bicycles, pedestrians and others). A few managers reported tracking bicycle use by noting the number of bike tour participants, bike patroller's observations, trail counters, commercial bike group permits, manual counts, or surveys. Tracking methods are inconsistent and sporadic.

Some Federal land units record bicycle use on trails using mechanized counters or sign-in sheets. Others record bike rental program numbers, or estimate based on permits or staff observations. Nonetheless, non-motorized travel is not consistently tracked if it is tracked at all.

Data for nationwide bicycle use on NPS and USFS land units is not readily available. The FWS reported bicycle data at 160 of its 545 refuges in 2004. This was the last year bicycle use was reported. The BLM's Recreation Management Information System (RMS) database records numbers of backpackers, bicyclists, campers, canoe/kayakers, among other activities. These data were collected in a variety of ways including sign-in sheets at trailheads, observations by BLM personnel, visitor surveys, automated counters and, in some cases, ballpark estimates. Table 5 shows an estimate of bicycling participants on BLM lands between Oct. 1, 2005, and Sept. 30, 2006, from the RMS database. It demonstrates the degree to which BLM lands are popular with mountain bikers.

Table 5: Bicycle Use Estimates on BLM Lands.

Activity	Participants
Mountain Bicycling	2,975,393
Road Bicycling	498,084
Bicycle Racing	4,912

Table 6 shows data from National Wildlife Refuges that reported at least 1,000 bicyclists per year and refuges where bicyclists represent a high percentage of total visits.

Table 6: Annual Bicycle Use at National Wildlife Refuges in 2004.

	Refuge	States	Total Visits	Bicycle Visits	Percent Bicyclists
1	Chincoteague NWR	VA, MD	6,776,361	77,044	1.1%
2	J.N. Ding Darling NWR	FL	2,143,987	61,945	2.9%
3	Don Edwards San Francisco Bay NWR	CA	1,693,269	59,600	3.5%
4	Pinckney Island NWR	SC	808,112	36,591	4.5%
5	Minnesota Valley NWR	MN	271,641	30,000	11.0%
6	Upper Mississippi River National Wildlife & Fish Refuge	IL, IA,WI,MN	3,891,388	29,162	0.7%
7	Wichita Mountains Wildlife Refuge	OK	2,055,328	25,770	1.3%
8	Great Swamp NWR	NJ	550,302	15,000	2.7%
9	Trempealeau NWR	WI	113,876	14,849	13.0%
10	Horicon NWR	WI	1,149,144	12,370	1.1%
11	Shiawassee NWR	MI	117,233	10,050	8.6%
12	Chesapeake Marshlands NWR Complex	MD	241,937	8,900	3.7%
13	DeSoto NWR	IA,NE	964,443	8,409	0.9%
14	San Diego NWR	CA	15,260	6,100	40.0%
15	National Elk Refuge	WY	1,463,740	5,000	0.3%
16	Santa Ana NWR	TX	182,043	3,500	1.9%
17	Arthur R. Marshall Loxahatchee NWR	FL	439,755	3,366	0.8%
18	Bosque del Apache NWR	NM	470,263	2,909	0.6%
19	Merritt Island NWR	FL	660,322	2,602	0.4%
20	John Heinz NWR at Tinicum	PA	204,209	2,500	1.2%
21	Turnbull NWR	WA	89,680	2,351	2.6%
22	St. Marks NWR	FL	748,047	2,211	0.3%
23	Patuxent Research Refuge	MD	313,413	2,129	0.7%
24	Tennessee NWR	TN	453,915	2,000	0.4%
25	Wheeler NWR	AL	598,063	2,000	0.3%
26	Tijuana Slough NWR	CA	250,386	1,500	0.6%
27	Crab Orchard NWR	IL	972,752	1,500	0.2%
28	Cedar Island NWR	NC	22,840	1,500	6.6%
29	Savannah NWR	GA,SC	214,651	1,370	0.6%
30	Deer Flat NWR	ID,OR	93,488	1,000	1.1%
31	Big Stone NWR	MN	27,650	1,000	3.6%
32	Mattamuskeet NWR	NC	118,221	1,000	0.8%
33	Kenai NWR	AK	788,042	1,000	0.1%
34	Steigerwald Lake NWR	WA	3,510	600	17.1%
35	Laguna Cartagena NWR	PR	862	224	26.0%

Data provided by USFWS in July 2007.

Includes refuges reporting at least 1,000 bicycle visits per year and those with high percentages of bicycle visits.

Resources to help monitor and record bicycle use are listed below. See Appendix D for annotated bibliographies and research on common monitoring methods such as pneumatic tube counters, passive and active infrared, video cameras and others.

Action: Systematic tracking of bicycle use

Resources: The following references provide ideas for tracking bicycle use in a variety of situations.

National Bicycle and Pedestrian Documentation Project. Alta Planning and Design, August 2005. This paper describes the methodology for a nationally consistent model of data collection.

Bicycle and Pedestrian Data: Sources, Need, & Gaps, 2000. BTS00-02 Washington, D.C. http://www.bts.gov/publications/bicycle_and_pedestrian_data/entire.pdf.

Estimating Bicycle and Pedestrian Demand in San Diego. Alta Planning and Design, August 2007. Transportation Research Board 2008 paper. This paper describes a two-year study measuring bicyclist and pedestrian demand in San Diego County. The project will evaluate the effects that socio-demographic factors and physical factors have on walking and biking rates.

Pedestrian and Bicycle Data Collection in United States Communities: Quantifying Use, Surveying Users, and Documenting Facility Extent, 2005. Pedestrian and Bicycle Information Center. University of North Carolina, Chapel Hill. This document contains eight detailed case studies on automated counting methods and a case study on manual counting methods from communities around the United States. Available online at [http://www.pedbikeinfo.org/pdf/casestudies/PBIC Data Collection Case Studies.pdf](http://www.pedbikeinfo.org/pdf/casestudies/PBIC_Data_Collection_Case_Studies.pdf)

ROADWAY ISSUES

Many roadways lack shoulders and have poor sight distances, a dangerous combination for fast-moving motor vehicles and slower-moving cyclists. This section discusses three roadway issues identified by land managers.

1. Bicyclist safety on roadways with limited width
2. Bicyclist/motorist conflicts on roadways
3. Inadequate shoulders on connecting roads (outside of manager jurisdiction)

The following comment taken from the bicycling survey (see Appendix G) describes a common concern on NPS lands.

"Roads within the majority of National Park areas were designed to park standards. This means they have minimal road width and little or no shoulders. Creating additional bike facilities and roads would require widening road prisms or constructing separate trails. Widening roads often requires an environmental assessment because of the culturally or natural significant area they are crossing. Creating new bike trails is currently financially difficult, and creates a future maintenance burden on a currently overloaded system. Financial assistance would be the major factor that would provide the incentive to promote more bicycling facilities."

Roadway Issue 1: Bicyclist safety on roadways with limited width. Widening roads may not be an option due to environmental, natural/cultural resource, right-of-way, cost, or terrain constraints. If wider roadways are not feasible, managers can get ideas about other engineering, enforcement, or education safety improvements from many sources. A few of these ideas are listed below, followed by resources and examples. When wide shoulders are not an option, other options to improve safety on narrow roads include:

- traffic calming
- roadway surface improvements (install bike-friendly drainage grates, limit rumble strips to centerline)
- maintenance practices (e.g., use roadway seal coats that cover the entire shoulder, avoid chip seal; use micro-surface or thin overlay, which are safer for bikes)
- improve sight distances
- intelligent transportation systems (informing visitors of potential conflicts)
- enforcement and education (e.g., “share the road” signs)
- management options (e.g., reduce speed limits, limit motor vehicle use to certain times)
- “sharrows”—painted symbols on the roadway indicating the lane is to be shared by vehicles and bikes.

Action: Investigate alternatives to improve safety on roadways with limited width

Resources: The following two online toolkits provide a wealth of useful information.

BIKESAFE is an interactive online tool to help select engineering, educational, or enforcement treatments. It is an extremely useful tool to quickly get ideas, learn about successful programs and gain access to many resources (<http://www.bicyclinginfo.org/bikesafe/index.cfm>).

The Federal Transportation Planning Resources and Toolkit offers solutions to vehicle conflicts with bicycles and pedestrians, including building or modifying infrastructure to reduce the likelihood of conflict, using intelligent transportation systems (ITS) to inform visitors of potential conflicts, or using policies or transit to reduce the number of vehicles on the roadways (<http://www.cflhd.gov/ttoolkit/ft/SolutionsMatrix/Safety%20Issues/MotoristBicyclePedestrianSafety.htm>).

Example: Green Bay, WI, implemented a pilot project to improve roadway maintenance, making roads safer for bicyclists. This is one of many case studies available on the BIKESAFE website. This case study contains a background section that describes the types of road conditions hazardous to bicyclist such as potholes, debris, drain grates, cracked or uneven pavement, railroad tracks, and overhanging vegetation. It then presents countermeasures to consider—in this case, a pilot project where Road Hazard Identification postcards were distributed to the public through bicycle shops, bicycle clubs, recreation departments, and county, city, and village offices. This is followed by an Evaluation and Results section, Conclusions and Recommendations and finally, Costs and Funding section.

Example: Colorado National Monument is implementing various education and enforcement tools to improve safety for the many bicyclists who come to enjoy the scenery and challenge their skill on the steep, curvy and narrow roads. See Chapter 3 for details.

Example: Denali, Great Smokey Mountain and Zion National Parks and the Gateway National Recreation Area manage some roadways by limiting motor vehicles at certain times. This allows bicyclists and pedestrians safe access. See Chapter 3 for more details.

Roadway Issue 2: Bicyclist/Motorist conflicts on roadways. Many cyclists touring through public lands are at risk due to roadways designed for motor-vehicle use only.

Action: Use existing design resources to determine potential solutions

Resources: Numerous planning and design resources exist that specifically address bicycle facilities. For more references and annotated bibliographies, see Appendix D.

Bicycle and Pedestrian Toolbox Implementation Report, Minnesota DOT, January 2006, www.lrrb.org/pdf/200602.pdf. Wide shoulders not only improve safety for cyclists, they improve safety for motor vehicles, allow additional space for a vehicle to recover, provide space for emergency vehicles and snow removal, and extend pavement life. Table 7 is an example of useful information provided by this resource. It provides guidance that relates average daily traffic and posted speed limit to bicycle facility widths.

AASHTO's Guide for Development of Bicycle Facilities,
http://safety.fhwa.dot.gov/ped_bike/docs/b_aashtobik.pdf.

FHWA's Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition,.
<http://mutcd.fhwa.dot.gov/pdfs/2003r1/pdf-index.htm>.

Oregon bicycle/pedestrian facility design standards,
http://www.oregon.gov/ODOT/HWY/BIKEPED/docs/bp_plan_2_ii.pdf.

Table 7: Bicycle Lane Width Guidance, Minnesota DOT.

ROADWAY DESIGN OPTIONS FOR URBAN AND RURAL ROADWAYS

Urban Roadway		Average Daily Traffic (ADT)/Lane					
Two Lane		Less than 500	500-1,000	1,000-2,000	2,000-5,000	5,000-10,000	1,000 and above
Four Lane		N/A	N/A	2,000-4,000	4,000-10,000	10,000-20,000	20,000 and above
Posted Speed	0-30 MPH	Shared Lane 12'	Wide Curb Lane or Outside Lane 12'	Wide Curb Lane or Outside Lane 12'	Bike Lane 5'	Bike Lane 5'	Bike Lane 5'
	30 MPH	Shared Lane with Sign 12'	Wide Curb Lane or Outside Lane 12'	Bike Lane 5'	Bike Lane 5'	Bike Lane 5'	Bike Lane 6'
	35-40 MPH	Wide Curb Lane or Outside Lane 12'	Bike Lane 5'	Bike Lane 5'	Bike Lane 5'	Bike Lane 6'	Bike Lane 6'
	over 40 MPH	Bike Lane 5'	Bike Lane 5'	Bike Lane 5'	Bike Lane 6'	Bike Lane 6'	Bike Lane or Shared Use Path 6'
Rural Roadways		Average Daily Traffic (ADT)/Lane					
		Less than 1,000*	1,000-2,500	2,500-5,000	5,000-10,000	10,000 and above	
Posted Speed	0-30 MPH	Paved Shoulder 4'	Paved Shoulder 4'	Paved Shoulder 4'	Paved Shoulder 4'	Paved Shoulder 6'	
	30-35 MPH	Paved Shoulder 4'	Paved Shoulder 6'	Paved Shoulder 6'	Paved Shoulder 6'	Paved Shoulder 8'	
	35-45 MPH	Paved Shoulder 6'	Paved Shoulder 6'	Paved Shoulder 6'	Paved Shoulder 8'	Paved Shoulder 10' and/or Shared Use Path	
	over 45 MPH	Paved Shoulder 6'	Paved Shoulder 6'	Paved Shoulder 8'	Paved Shoulder 10'	Paved Shoulder 10' and/or Shared Use Path	

Note: * When average daily traffic (ADT) less than 500, shoulders are not a necessity unless the roadway is heavily used by truck or heavy commercial vehicles. In these situations bikes should be accommodated with a wide curb or shared lane.

RECOMMENDED BICYCLE PATH WIDTHS

Traffic Composition and Flow	Minimum Paved Width of Two-Way Paths		
	Good	Satisfactory	Minimum if Restrictive Conditions
Light pedestrian & 2-Way Bicycle	12'	10'	8'
Heavy Pedestrian & 2-Way Bicycle	14'	12'	10'
Pedestrian Section	6.5'	5'-6.5'	5'
Two-Way Bicycle Section	10'	8'	8'
Path Geometrics	Minimum Paved Width of One-Way Path		
Located Adjacent Curb-No Parking Allowed	8'	6.5'	5'
Separated from Roadway According to Recommended Clearances	6.5'	5'	5'

These diagrams were taken from *Minnesota Bicycle Transportation Planning and Design Guidelines*.



Roadway Issue 3: Inadequate shoulders on connecting roads (outside manager jurisdiction). State highways or county roads often connect Federal lands with gateway communities. The safety of bicyclists on these roads may be outside of a manager's control. Resources listed below help managers affect decisions about projects beyond their boundaries. Participating in the transportation planning process beyond the boundaries of Federal lands can be critical to addressing this issue and can create lasting connections between multiple jurisdictions.

Action: Get involved with state, regional, and local transportation planning

Resources: Understand and participate in FHWA and FTA surface transportation programs. Learn how to integrate Federal land management objectives with State, regional, and local objectives. Agencies must participate in the State's and/or region's transportation planning process to qualify for Federal transportation funds (many of which can be used for bicycle facilities). The following two resources are written specifically for Federal land managers.

Federal Surface Transportation Programs and Transportation Planning for Federal Land Management Agencies: A Guidebook. October 2007.

<http://www.fs.fed.us/eng/pubs/pdf/07771814.pdf>.

National Park Service, Sept. 1999. The National Park Service Transportation Planning Guidebook. <http://www.nps.gov/transportation/tmp/planning.htm>.

Example: Monthly meetings between public land managers, Utah DOT, local trails groups, and other stakeholders resulted in an \$11.7 million alternative transportation project in Moab, UT. State Highway 191 and State Route 128 connecting the Town of Moab to nearby public lands are being improved for bicycle, pedestrian and transit travel. See Appendix B for details.

Action: Create a bicycle and pedestrian master plan

Resources: View online bicycling master plans created for Federal lands at:

<http://www.grandcountyutah.net/planning.htm> and

http://www.trpa.org/documents/docdownlds/BIKE_PLAN.pdf.

Example: Moab, UT, and Lake Tahoe, CA, have trails or bicycle and pedestrian master plans that have been instrumental in making safe non-motorized connections between multiple jurisdictions.

Action: Implement a "Complete Streets" Policy

Resource: Complete streets enable safe access for pedestrians, bicyclists, motorists and bus riders of all ages and abilities. For detailed information about this program see <http://www.completestreets.org/>. A related resource, called Thunderhead Alliance, provides information to create a complete streets campaign including planning, creating partnerships and staying apprised on recent news (<http://www.thunderheadalliance.org/>).

Action: Implement a "Road Diet"

Resource: Road Diet Handbook: Setting Trends for Livable Streets. Rosales, Jennifer, July 2007. The idea of a road diet is similar to "Complete Streets" in that it considers how the roadway can be used not only for automobiles, but for bicycles, pedestrians,

transit or even landscaping for beautification. A road diet does not consider widening the roadway, but instead uses the existing right-of-way. Road diets may reduce the number of lanes for automobiles, or narrow the lane widths and use the remaining space for bicycle lanes, landscaping, parking, or wider sidewalks. Road diets may be one low-cost option to consider for increasing bicycle friendliness on some Federal lands.

Example: In Idaho Springs, CO, pedestrians and bicyclists are now able to safely cross the Clear Creek Greenway at the Stanley Road interchange with Interstate 70 (shown in photo). The Colorado DOT agreed to a "road diet," reducing the travel lane size, allowing for three and a half miles of bicycle lanes on both sides of the road. The NPS Rivers, Trails and Conservation Assistance program provided technical and planning assistance

(<http://www.nps.gov/ncrc/successes/cons0507.htm>).



Figure 33: Clear Creek Greenway, CO.

(Photo courtesy Hugh Osborne.)

Example: Table 8 summarizes case study results from road diet projects presented in the road Diet Handbook (Rosales, 2007).

Table 8: Road Diet Case Study Characteristics (Rosales, 2007).

Case Study	Location	Street Class	Average Daily Traffic	Posted Speed	Primary Adjacent Land Use	Date of Conversion /Time Since Conversion	Project Length	Road Diet Project Elements	Estimated Project Cost
Grand Boulevard 4 lane undivided roadway	Vancouver, Washington	Principal Arterial	12,000	30 mph/ 25mph	Commercial, residential, industrial	Not converted- waiting for funding	1.5 miles	To be re-stripped to two lanes, two-way center turn lane, bike lanes	\$50,000 (2003 US)
Fourth Plain Boulevard	Vancouver, Washington	Principal Arterial	17,000	30 mph	Residential with commercial	2002 / 2 years	1 mile	Conversion to two lanes, two-way center turn lane, bike lanes, ADA ramps, underground utility work	\$1.26 million (2002 US)
Baxter Street	Athens-Clarke County, Georgia	Arterial	20,000	35 mph	Commercial with residential & university	1999 / 5 years	1.9 miles	Conversion to two lanes, two-way center turn lane, bike lanes, signal modifications	\$190,000 (2000 US)
U.S. 18	Clear Lake, Iowa	State Highway	12,000	45 mph	Commercial with residential	2003 / 1 year	1.1 miles	Interim project - re-striping to two lanes, two-way center turn lane, shoulders, temporary signal	\$105,000 (2003 US)
St. George Street	Toronto, Ontario, Canada	Minor Arterial	7,400	25 mph	University	1993 & 1996 / 11 & 8 years	0.65 mile	1993- lanes reduced to two lanes and bike lanes added with median; 1996 - lanes narrowed, new curbs, added landscaping, widened sidewalks	\$4 million (1996 Canadian)
Kalkoral Valley Road	Dunedin, New Zealand	Arterial	10,000	30 mph/ 40 mph	Commercial with residential	2003/ 1 year	1.5 miles	Conversion to two lanes with on-street parking, added cycle lanes, and improved median landscaping, turn lanes, pedestrian crossings	\$180,000 (2003 New Zealand)

TRAIL ISSUES

Trails are broadly defined and may include single-track, double-track, paved or unpaved, and multi-use facilities. The following five trail issues were identified by Federal land managers in the bicycling survey (Appendix G).

- Unauthorized trails
- Inadequate staff to patrol trail systems
- Inadequate budget to maintain trails
- Trail conflicts between bicyclists and other users (pedestrians, equestrians)

- Impacts to wildlife and the environment

Trails Issue 1: Unauthorized trails. Bicyclists creating their own trails that are poorly designed and cause inappropriate impacts to resources are a major issue in some areas, especially with respect to mountain bikers.

Action: Designate specific trails that meet user demands

Resource: IMBA's *Managing Mountain Biking* 2007, pages 43-45, has many useful tips. Tip no.1—provide a reasonable substitute when you close a user-created trail. For example, construct a trail with more technical challenge, or one that provides a necessary link between routes. If user needs aren't met, unauthorized trails will continue to be a problem.

Example: “Free Lunch,” a part of BLM's Grand Junction Lunch Loop Trail system, was completed in 2007 as a one-way, downhill trail, known as a “freeride” trail, for bikers only. BLM managers in Grand Junction anticipate that creating more trails with specific design features observed on user-created trails will minimize illegal trails. In addition, keeping fast traveling downhill/freeride bicyclists separate from pedestrians and uphill bikers promotes safety for everyone. These BLM managers are making efforts to involve downhill/freeride bikers in design and construction of new legal trails.

Example: Colonnade Mountain Bike Park in Seattle, WA. This is a "special use" bike park, also known as a skill park, freeride park, or challenge park. It provides a new riding experience in a central, easily managed location. This park is being constructed under a freeway near downtown. The Backcountry Bicycle Trails Club partnered with the city to convert the vacant space into a unique two-acre mountain bike skills park. Park features are geared toward beginners through expert riders, focusing on skills progression. The unused land under the I-5 freeway was full of trash, weeds and attracted illegal activity. In addition to giving kids a fun and challenging activity, the bike club and park has gained support of local residents and homeowners by improving, and maintaining the area (IMBA, 2007).

Trails Issue 2: Inadequate staff to patrol trail systems. Managers need help to patrol existing trail systems. Volunteer patrols are one good option to consider.

Action: Empower volunteers to patrol trails

Resource: See "Mountain Bike Patrols", Chapter 8 in IMBA's *Managing Mountain Biking* 2007: Patrollers assist, educate and inform trail users. Volunteer mountain bike patrols are often referred to as the "eyes and ears" of land managers. There are more than 75 active bike patrol units in IMBA's Bike Patrol Program. Volunteer bike patrollers do not have the authority to enforce rules, but should be empowered to mobilize professional law enforcement if the need arises. This reference provides 10 traits of highly successful patrols, discusses liability issues and has many success stories. See www.imba.com/nmbp for a manual, training guidelines and other useful information.

Example: The Diamond Peaks Patrol in Fort Collins, CO, was formed in 1997 and attracts a large and diverse membership by making volunteering convenient and affordable. The patrol pays for members to take CPR/First Aid classes and covers half the cost of uniforms. Volunteers can apply for scholarships for more advanced training

such as Wilderness First Responder. Instead of requiring a set number of days per patroller per year, patrollers are required to collect 25 points each year, translating to about four workdays annually. Points are earned from a variety of activities such as patrolling local trails, volunteering for special events such as a trail work day, or collecting visitor data on remote USFS trails. Eleven local bike shops offer patrollers discounted service and merchandise. A local brewery has made the patrol the primary beneficiary of its annual biking festival and fundraiser, the Tour de Fat. Innovation, organization and close to 50 committed patrollers make this patrol an incredible asset to land managers in this region (IMBA, 2007).

Trails Issue 3: Inadequate budget to maintain trails. Limited budgets mean maintaining existing trail systems and constructing new ones is a fiscal challenge. One solution is to collaborate with other stakeholders to accomplish these tasks.

Action: Authorize volunteers to maintain trails

Resource: See "Partnerships and Managing Volunteers", Chapters 3 and 4 in IMBA's *Managing Mountain Biking*, 2007, for ideas. Chapter 3 explains the importance of partnerships, good principles and agreements. Public land managers should check with local bike shops, bike groups, conservation organizations and other stakeholders to find support for trail maintenance. See examples of successful Memoranda of Understanding (MOU) at <http://www.imba.com/resources/managers/partnerships.html>.

Chapter 4, Managing Volunteers, demonstrates how biking groups have stepped up to help managers with outdoor stewardship and trail maintenance. Learn more about how to build and sustain volunteer groups and organize and manage successful volunteer events.

Example: Blue Knob State Park located along the Allegheny Front in southern Pennsylvania was full of overgrown trails. The Park did not have enough staff to keep up with trail maintenance. The local Laurel Highlands Off and On Road Biking Association formed with the mission of improving access to the Blue Knob trails. Members effectively boosted the park's available manpower, and performed work such as clearing vegetation and removing deadfall. Since 2000, the group has cleaned up over 30 miles of single-track trails in the park (IMBA 2007).

Trails Issue 4: Conflict between bicyclists and other users (pedestrians, all-terrain vehicles, equestrians). Bikes traveling at excessive speeds and unfriendly social interactions between bicyclists and other trail users are a concern. Conflicts can be an issue especially in high use areas where trails or pathways are multi-use.

Action: Learn from others how to manage conflict

Resources: The National Recreational Trails Advisory Committee identified trail-user conflicts on multiple-use trails as a major concern. The committee asked the FHWA to produce a synthesis of existing research to help identify ways to avoid and minimize multiple-use trail conflicts (<http://www.fhwa.dot.gov/environment/conflicts/>).

As previously described, BIKESAFE is an interactive online tool to help select engineering, education, or enforcement treatments (<http://www.bicyclinginfo.org/bikesafe/>).

Chapter 6, "Managing User Conflict", in IMBA's *Managing Mountain Biking* book 2007 offers a range of solutions to user conflict such as information and education, user involvement and partnerships, trail system design and regulations. Well designed trails and trail systems can reduce conflict significantly. Trail design strategies to help reduce conflict include offering diverse trail opportunities for all types of users, designing trails to control speed and using one-way loops, preferred-use, and single-use trails to allow for a variety of visitors (IMBA, 2007). A few examples of methods to educate people to reduce conflict follow:

- Clear, well-placed signs
- Consistent rules regarding biking
- Staff and volunteer trail patrols
- Peer education and mountain bike skills clinics
- Brochures, maps and other handouts that spread the message of shared use

Example: The following excerpt is an example of information from the BIKESAFE Case study #36. "The report, *Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice* (Moore, 1994), provides guidelines for developing programs to manage trails. Although this report is primarily concerned with recreational, off-road trails, the guidelines are generally appropriate for managing any non-motorized facilities, including sidewalks and bicycle paths. The report is available at no cost from FHWA. It identifies the following 12 principles for minimizing conflicts on multiple-use trails:

- Recognize Conflict as Goal Interference
- Provide Adequate Trail Opportunities
- Minimize Number of Contacts in Problem Areas
- Involve Users as Early as Possible
- Understand User Needs
- Identify the Actual Sources of Conflict
- Work with Affected Users
- Promote Trail Etiquette
- Encourage Positive Interaction Among Different Users
- Favor "Light-Handed" Management
- Plan and Act Locally
- Monitor Progress

Example: The Tsali Recreation Area in North Carolina's Nantahala National Forest has been a popular mountain bike destination since the late 1980s. Conflicts between bikes and equestrians on the trails became a problem as bike use increased. Mixing bikers and equestrians had diminished the enjoyment for both groups. Instead of banning bikes,

managers decided to implement a rotation plan to keep the two groups separate. Bikers, the more populous user group, can ride the long loops on Monday, Wednesday, Friday, and Sunday and the shorter loops on Thursday and Saturday; equestrians follow the opposite schedule. Rules are displayed prominently at trailheads, and long-time trail users do a good job politely directing any errant users to the right trail. Both user groups have expressed satisfaction with the compromise (IMBA, 2007).

Trail Issue 5. Impacts to wildlife and the environment. Environmental impacts from trails and trail users are a concern on many public lands. There is a growing body of research related to how trails and trail users affect wildlife and the environment.

Action: Review research on how trails affect wildlife and the environment

Resource: The Leave No Trace website at <http://www.lnt.org> is a good resource on low impact practices. As the name implies, Leave No Trace principles are formulated to minimize visitor impacts. Another resource specifically for bikes is the "Mountain Biking Leave No Trace Skills and Ethics" Booklet, available at <http://www.nols.edu/store>.

"Environmental Impacts of Mountain Biking: Science Review and Best Practices" (Marion and Wimpey, 2007) describes the general impacts associated with recreational uses of natural surface trails, with a focused study that examined mountain biking impacts. Dr. Marion is a scientist with the U.S. Geological Survey who studies visitor impacts and management in protected natural areas. Jeremy Wimpey is a doctoral candidate in the Park and Recreation Resource Management program at Virginia Tech. This article provides a literature review related to trail impacts on vegetation, soil, water, and wildlife and can be found at http://www.imba.com/resources/science/marion_wimpey_2007.html. The article was originally published in "Mountain Biking and the Environment" (IMBA, 2007). The following paragraphs were adapted from this article.

Research indicates most wildlife species readily adapt or become habituated to consistent and non-threatening recreational activities. For example, animals may notice but not move away from humans on a frequently used trail or pathway. This presents great opportunities to view wildlife while minimizing possible impacts. Other forms of habituation are less desirable. Visitors who feed wildlife, intentionally or from dropped food, can contribute to food-related attraction behavior. In places where visitors stop to eat, wildlife quickly learn to associate people with food, losing their innate fear of humans. The wildlife may beg, search for food scraps or raid packs containing food. This behavior endangers their health and well being. Avoidance behavior in wildlife is also problematic. Avoidance behavior is generally an innate response that is magnified by visitor behaviors perceived as threatening, such as loud sounds, off-trail travel, travel in the direction of wildlife, and sudden movements. When animals flee from disturbance by trail users, they often expend precious energy, which is particularly dangerous for them in winter months when food is scarce. When animals move away from a disturbance, they leave preferred or prime habitat and move, either permanently or temporarily, to habitat that may not meet their needs for food, water, or cover. Visitors and land managers are often unaware of such impacts because animals often flee before humans are aware of their presence (Marion and Wimpey, 2007).

FUNDING ISSUES

The section provides funding resources for bicycling programs and tips on how managers can leverage Federal and other funds. Based on the 2005 SAFETEA-LU Federal transportation bill, bicycle and pedestrian projects are broadly eligible for funding from almost all the major Federal-aid highway, transit, safety, and other programs as shown in Table 9. This table omits one important funding program that was created in 2006 as a result of the "Federal Lands Alternative Transportation Systems Study" (Cambridge Systematics, 2001 and 2004). Congress authorized the Alternative Transportation on Parks and Public Lands (ATPPL) program in 2005 as part of SAFETEA-LU. The ATPPL program was developed specifically to encourage alternatives to the private automobile on public lands. More information about the ATPPL funding program is provided below, followed by a discussion on qualifying for Federal funds and a list of actions that land managers can take to learn more about bicycle facility funding.

Alternative Transportation in Parks and Public Lands (ATPPL) Funding—Congress established the ATPPL program to enhance the protection of national parks and federal lands and increase the enjoyment of those visiting them. Administered by the Federal Transit Administration in partnership with the Department of the Interior and the USFS, the program funds capital and planning expenses for alternative transportation systems such as shuttle buses and bicycle trails in public lands. The goals of the program are to conserve natural, historical, and cultural resources; reduce congestion and pollution; improve visitor mobility and accessibility; enhance visitor experience; and ensure access to all, including persons with disabilities (http://www.fta.dot.gov/funding/grants/grants_financing_6106.html). The program does not fund operations or maintenance of alternative transportation systems. Projects in or near a national park, national wildlife refuge, BLM area, Bureau of Reclamation area, or national forest are eligible for funding. Up to ten percent of funding can be used for program planning, research, technical assistance, and technology development.

Although the definition of alternative transportation includes bicycling, to date the ATPPL program has predominantly funded transit projects. This funding source has the potential to support more bicycle friendly facilities in the future. Forty-two projects were funded with ATPPL in 2006; only one of them was a bicycle project, and it was a planning project. James Oberstar, Chairman for the U.S. House of Representatives Committee on Transportation and Infrastructure wrote a June 27, 2007 letter to DOI Secretary Dirk Kempthorne urging him to consider funding bicycle projects in 2007 from ATPPL. In 2007, one million dollars of ATPPL funds were awarded to Teton County, Wyoming to partially fund construction of a 4.2 mile trail system connecting the National Elk Refuge Visitor Center to the end of the National Elk Refuge. In addition, \$774,000 was awarded to Grand County, Utah to construct a transit hub on the north end of Moab as part of a bicycle, pedestrian, and transit system. This multi-modal transportation system will provide connections between Moab and surrounding public lands through a combination of bicycle, pedestrian and transit facilities.

Table 9: SAFETEALU Funding for Bicycles Projects.

	NHS	STP	HEP	RHC	TEA	CMAQ	RTP	FTA	TE	BRI	402	PLA	TCSP	JOBS	FLH	BYW
Bicycle and pedestrian plan	*					*						*				
Bicycle lanes on roadway	*	*	*	*	*	*		*	*	*					*	*
Paved Shoulders	*	*	*	*	*	*				*					*	*
Signed bike route	*	*			*	*									*	*
Shared-use path/trail	*	*			*	*	*			*					*	*
Single track hike/bike trail							*									
Spot improvement program		*	*		*	*										
Maps		*				*					*					
Bike racks on buses		*			*	*		*	*							
Bicycle parking facilities		*			*	*		*	*							*
Trail/highway intersection	*	*	*		*	*	*								*	*
Bicycle storage/service center		*			*	*		*	*				*	*		*
Sidewalks, new or retrofit	*	*	*	*	*	*		*	*	*					*	*
Crosswalks, new or retrofit	*	*	*	*	*	*		*	*	*					*	*
Signal improvements	*	*	*	*	*	*										
Curb cuts and ramps	*	*	*	*	*	*										
Traffic calming		*	*	*		*							*			
Coordinator position		*				*							*			
Safety/education position		*				*					*					
Police Patrol		*									*					
Helmet Promotion		*			*						*					
Safety brochure/book		*			*	*	*				*					
Training		*			*	*	*				*					

NHS National Highway System
 STP Surface Transportation Program
 HEP Hazard Elimination Program
 RHC Railway-Highway Crossing Program
 TEA Transportation Enhancement Activities
 CMAQ Congestion Mitigation/Air Quality Program
 FLH Federal Lands Highways Program
 BYW Scenic Byways
 BRI Bridge
 402 State and Community Traffic Safety Program
 PLA State/Metropolitan Planning Funds
 TCSP Transportation and Community and System Preservation Pilot Program
 JOBS Access to Jobs/Reverse Commute Program
 RTP Recreational Trails Program
 FTA Federal Transit Capital, Urban & Rural Funds
 TE Transit Enhancements

In order to qualify for ATPPL funding, it is important for grant applicants to demonstrate bicycling projects will:

- Reduce motorized vehicle use by providing an alternative,
- Provide a high degree of connectivity in the transportation system and
- Improve safety for both motorized and non-motorized transportation system users.

Table 10 shows ATPPL funding between 2006 and 2009.

Table 10: Alternative Transportation on Parks and Public Lands Funding—2006 to 2009.

Year	2006	2007	2008	2009
ATPPL funding	\$22 million	\$23 million	\$25 million	\$27 million

Further information on ATPPL can be accessed online at http://www.fta.dot.gov/funding/grants/grants_financing_6106.html. For general information about the ATPPL program, contact Scott Faulk, Office of Program Management, Federal Transit Administration, scott.faulk@fdot.gov, 202-366-1660.

Transportation versus recreation —To qualify for Federal transportation funds, projects that are to be used exclusively by bicycles must be "principally for transportation rather than recreation purposes," with the exception of the Recreational Trails Program. FHWA has determined that in order to meet the "transportation purpose" requirement, a bicycle facility must be more than a closed loop trail that can only be used for recreational purposes—users must be able to get somewhere other than back to their starting point. Eligible trails must be open to commuters 24 hours a day, 7 days a week; even if lands that the trail goes through are traditionally closed dusk to dawn or has set hours for visitation. Beyond these requirements, any bicycle facility providing access from one point to another can be used for transportation and is therefore eligible for funding under SAFETEA-LU <http://www.fhwa.dot.gov/environment/bikeped/BP-Guid.htm>. In other words, the USDOT calls anything but a closed loop a transportation trip. Bicycling from one place to any other place, basically for any purpose, is transportation and eligible for funding from many sources.

The following actions, resources and examples provide more information on bicycle facility funding.

Action: Review Federal funding resources for bicycle facilities and programs

Resource: The Bicycle and Pedestrian Provisions of the Federal-aid Program provides online funding guidance (<http://www.fhwa.dot.gov/environment/bikeped/bp-broch.htm>). See Appendix F for funding details, organized in three sections.

- Federal funding available for bicycle and pedestrian facilities.
- Matching requirements, tips to improve funding success and resources.
- Statewide and metropolitan transportation planning processes (required to receive Federal funds).

Example: An abandoned rail line running through Bozeman, MT, is well used by bicyclists and pedestrians for recreation. It also serves a transportation function, connecting neighborhoods to downtown businesses, restaurants and parks. This type of facility meets the USDOT definition of transportation purpose and would be eligible for funding under SAFETEA-LU. Similar trails in many cities including Denver and Washington D.C., serve a recreation and transportation function as well.

Action: Develop partnerships to help leverage funds

Resource: Non-profit organizations can play a vital role in forming collaborative partnerships to help leverage funds. Federal land managers who may be constrained by daily work demands may not be able to devote the time necessary to develop long-term solutions to transportation issues. Non-profit organizations that share a concern for those issues can offer valuable assistance. The following list names a few of the organizations that can offer various types of support.

- Adventure Cycling Association (ACA) (<http://www.adv-cycling.org>).
- Bikes Belong (<http://bikesbelong.org>).
- International Mountain Bike Association (<http://www.imba.com>).
- League of American Bicyclists (<http://www.bikeleague.org>).
- Rails to Trails Conservancy (<http://www.railtrails.org>).

Example: Bikes Belong is a national coalition of bicycle suppliers and retailers whose purpose is to promote bicycling across the country. Since 1999 it has awarded 166 grants, totaling nearly \$1.3 million and leveraging more than \$476 million in Federal, State, and private funding.

Example: The Moab Trails Alliance (MTA) is a 501(c)3 non-profit that is funded by local businesses and private donors. MTA has written numerous grant proposals and raised money used to match grants for trail development. This non-profit has been a key player bringing stakeholders together to implement the North Moab Recreation Area Alternative Transportation Plan. See Appendix B for details on partnerships for the Moab project as well as Lake Tahoe Basin. These areas have been effective at developing partnerships and leveraging funding.

Example: IMBA is advocating for two important NPS programs in 2007. Hundreds of mountain bicyclists recently attended public listening sessions to support the Centennial Initiative, a campaign to boost NPS funding for the agency's 100th anniversary in 2016. Advocates asked for programs to get visitors out of their cars and onto appropriate narrow dirt trails and roads on bicycles. Mountain bicyclists are also asking for more programs to introduce children to their national parks through mountain biking. In March 2007, mountain bicycling leaders held nearly 200 meetings on Capitol Hill to urge Congress to restore funding to the NPS Rivers, Trails and Conservation Assistance (RTCA) program. Each year, RTCA helps local communities with nearly 300 projects, including many for mountain bicycling. A decade of flat funding has reduced RTCA's capacity and IMBA asked that its budget be increased to \$12 million for fiscal year 2008. IMBA is also part of the Outdoor Alliance (OA) coalition that represents millions of people who hike, mountain bike, climb, paddle and cross-country ski. OA works to ensure the conservation and stewardship of our nation's land and waters through the

promotion of sustainable, human-powered recreation. IMBA and OA have been actively supporting increased NPS funding and meeting with congressional officials to support increased appropriations

(http://www.imba.com/news/news_releases/04_07/04_26_nps_imba.html).

In closing, Chapter 5 identified common barriers to promoting bicycling and discussed four categories or types of issues commonly faced by Federal land managers related to bicycling:

- Tracking bicycle use,
- Roadway issues,
- Trails issues and
- Funding issues.

Chapter 5 also suggested actions that can be taken and resources that can be used in addressing each of these issues. Chapter 6, Findings and Recommended Actions, will conclude this bicycling guide with a list of findings from the literature review, online survey and conversations with land managers and recommended actions that managers can take to promote bicycling.

