MOUNTAIN BIKES AND METROPOLITAN PARK DISTRICTS: ISSUES AND TRENDS IDENTIFIED BY STATE PARKS AND STATE PARK DISTRICTS IN OHIO

Eric L. Longsdorf, Ph.D.
Assistant Professor and Coordinator
Division of Recreation and Leisure Studies
MS 119, The University of Toledo
Toledo, Ohio 43606-3390
eric.longsdorf@utoledo.edu

Ruthie Kucharewski, Ph.D., CTRS
The University of Toledo

Abstract.—This study explored selected issues and trends related to mountain biking within Ohio State Parks and Park Districts. A convenience sample of 21 State Parks and 26 Park Districts completed a 24-item survey assessing mountain bike: (a) access, (b) activity levels, (c) planning, and (d) management. Results indicated that 86 percent of State Parks participating in the study allowed on-road or off-road mountain bike activity, compared to only 31 percent of participating Park Districts. Out of the 26 State Parks or Park Districts allowing mountain biking, 65 percent reported experiencing increased mountain bike activity, while 38 percent considered mountain biking either a resource-management or recreation-management concern. Of the 21 State Parks or Park Districts ***not*** allowing mountain biking activity, 57 percent indicated mountain bike users illegally trespassing on park grounds, and 52 percent indicated having discussed opening areas to mountain biking or including mountain biking in future management plans.

1.0 INTRODUCTION

Few outdoor activities have increased in popularity as rapidly as mountain biking over the last decade (National Sporting Goods Association [NSGA], 2004, Sporting Goods Manufacturing Association 2005). Estimates indicate that over 23 million Americans actively engage in both on-road and off-road mountain biking (NSGA 2004). Compared to traditional outdoor activities, mountain biking is a relatively new pursuit. As such, the use of mountain bikes has presented many new challenges for public land managers, including issues related to managing and monitoring activity levels, maintaining access, protecting natural resources, minimizing user conflict, and maximizing user safety. While literature has addressed the aforementioned issues related to mountain bike use on public land managed by federal land-management agencies (Chavez 1996, 1997; Chavez et al. 1993), an examination of the issues and trends related to mountain bike use and management within land-management agencies on the state or local level is extremely limited.

As our cities continue to expand and open space within our communities becomes more limited, it is likely that mountain biking enthusiasts will place greater demands on our metropolitan park resources to meet their recreational needs. Historically, particularly in the Midwest, mountain biking has not been well received within many state and local park districts primarily because many metropolitan-based park districts were established as urban wilderness areas and have traditionally managed these areas based on preservation-related management principles (S. Linnenburger, International Mountain Bicycling Association [IMBA], personal communication, October 25, 2005). As such, many state and local land-management agencies have established management policies prohibiting or limiting mountain bike activity. Currently, mountain biking enthusiasts identify the need for greater access to mountain biking opportunities in urban areas as a major challenge facing the mountain biking community and urban resource managers (IMBA 2005).

In response to what appears to be an increase in advocacy for mountain biking opportunities within urban areas, and limited research identifying issues and trends related to the management of mountain bikes on the state and local level, this study explored selected issues and trends related to mountain biking within Ohio State Parks and Park Districts. Specific objectives of the study included identifying mountain bike: (a) access, (b) activity levels, (c) planning, and (d) management within Ohio State Parks and Park Districts.

2.0 METHODS

2.1 Instrumentation

The survey used in the current study was developed based on a questionnaire used to examine mountain biking issues and actions within the U.S. Forest Service (Chavez 1996). Content items on the survey questionnaire were separated based on whether the respondent's park(s) allowed or did *not* allow mountain biking. Parks or park districts *not* allowing mountain biking were requested to respond to only five content items on the survey questionnaire that requested information pertaining to: (a) illegal mountain bike activity, (b) the consideration of future management strategies to provide mountain bike access, (c) whether their park(s) had been contacted by groups advocating for mountain bike access, (d) whether their park(s) perceived the prevention of mountain biking to be a top five resource-management concern, or (e) whether their park(s) considered the prevention of mountain biking a top five recreation-management concern.

Parks or park districts allowing mountain biking were requested to respond to 18 content items on the survey questionnaire that requested a breadth of information pertaining to: (a) mountain bike activity levels, (b) management issues and actions, and (c) park or park district demographics.

Mountain bike activity level was measured using seven content items requesting that respondents indicate: (a) the estimated number of mountain bike users visiting their park(s) annually; (b) the estimated percentage of annual riders who partake in on-road or off-road mountain biking; (c) if their park(s) had witnessed an increase in mountain bike activity over the last five years (yes/no); (d) if their park(s) experienced illegal trespassing in areas prohibiting mountain bike use (yes/no); (e) if their park(s) received any requests to permit mountain bikes on trails limited to foot traffic only (yes/no); (f) if their park(s) had encountered problems with mountain bike groups using their park(s) for sponsored tours, rallies, or races without notification or authorization (yes/no); and (g) if their park(s) had nearby concessionaires or businesses that rent mountain bikes (yes/no).

Mountain bike management issues and actions was measured using eight content items requesting that respondents indicate: (a) if their park(s) had conducted surveys to identify use patterns, impacts, or visitor feelings on mountain biking in their park(s) (yes/no); (b) if their park(s) had partnered with local, state, or national mountain biking organizations to discuss management issues (yes/no); (c) if their park(s) consider mountain biking a top five resource-management concern (yes/no), and if yes why; (d) if their park(s) consider mountain biking a top five recreation-management concern (yes/no), and if yes why; (e) if their park(s) had observed resource damage from mountain biking (yes/no), and if yes, what types of resource damage and what types of management strategies are used for prevention; (f) if their park(s) observed or received reports of mountain bike accidents resulting in injury (yes/no), and if yes, what types accidents and what types of management strategies are used for prevention; (g) if their park(s) observed or received reports of user-conflict (yes/no), and if yes, what types of conflict and what types of management strategies are used for prevention; and (h) if their park(s) observed or received reports of safety problems (yes/no), and if yes, what types of safety problems and what types of management strategies are used for prevention.

Demographic information was collected using three content items requesting that respondents indicate: (a) the estimated number of acres of recreation land within their park(s); (b) the estimated number of annual visitors to their park(s), and (c) within their park(s) the approximate number of miles of paved and unpaved roads open/closed to mountain biking, the approximate number of miles of all trails and the number of those miles open to mountain biking, and the approximate number of miles of specifically constructed bike trails.

2.2 Procedures

The researcher's Human Subjects Review Committee granted approval of the measurement instrument and permission to engage in the study. Ohio State Park Managers and Ohio Park District Supervisors were solicited to participate in the study February and March 2006. An initial mailing and follow-up reminder letter were instituted to maximize response rate. Solicitations

Table 1.—Total Number of Miles of Trails & Roads Open to Mountain Biking in Ohio State Parks

Road or Trail Type	Total Miles	Miles Open to Use	Percentage
Paved Road	315	303	96
Unpaved Road	53	49	92
Multi-Use Trails	322	89	28
Built MTB Trails	100	100	100

N=18

Table 2.—Total Number of Miles of Trails & Roads Open to Mountain Biking in Ohio State Park Districts

Road or Trail Type	Total Miles	Miles Open to Use	Percentage
Paved Road	87	86	99
Unpaved Road	41	36	88
Multi-Use Trails	210	50	24
Built MTB Trails	15	15	100

N=8

to all study participants were sent via US mail and included: a personalized cover letter indicating participant identification procedures, confidentiality procedures, and information pertaining to the study's purpose; a copy of the survey questionnaire; and a coded self-addressed, pre-stamped, envelope for survey questionnaire return.

2.3 Subjects

Thirty Ohio State Park Managers identified through the Ohio Department of Natural Resources and 40 Ohio Park District Supervisors identified through the Administrative Directory of the Ohio Parks and Recreation Association, were solicited to participate in the study. Out of the 30 Ohio State Park Managers solicited to participate in the study, 21 completed survey questionnaires were received, yielding a 70% usable response rate among Ohio State Parks. Out of the 40 Ohio Park District Supervisors identified to participate in the study, 26 completed survey questionnaires were received, yielding a 65% useable response rate among Ohio Park Districts. Overall the study produced a usable response rate of 67% following an initial mailing of the survey questionnaire to all study participants, and a mailing of a reminder post card to study participants who did not respond to the study solicitation within two weeks of the initial mailing.

2.4 Statistical Design

Measurement instruments were analyzed using the Statistical Package for Social Sciences (SPSS). All data reported in this article were analyzed and reported as grouped data. Not all participants responded to all applicable measurement items, resulting in some points of missing data. As such, the total number of respondents per item is noted within each results scenario. Data analysis was done using standard descriptive statistical methods.

3.0 RESULTS

3.1 Mountain Bike Access

Regarding mountain bike access, study results indicated that 86 percent (n=18) of the 21 Ohio State Parks participating in the study allowed on-road or off-road mountain biking and that 31 percent (n=8) of the 26 Ohio Park Districts surveyed allowed on-road or off-road mountain biking. Ohio State Parks allowing mountain biking ranged in size from 450 land-acres to 20,000 land-acres (*Mdn*=3,500) compared to Ohio Park Districts which ranged from 230 land-acres to 87,000 land-acres (*Mdn*=1,650). Overall, results indicated a total of 1,143 miles of roads and trails within the 26 Ohio State Parks and Ohio State Park Districts allowing mountain bike activity, out of which 728 miles (64%) were open to mountain bike use. The greatest available miles of roads and trails open to mountain bike use were reported by

Table 3.—Reported Trends in Mountain Biking Activity in Ohio State Parks

Activity Indicator	Yes	Percentage	No	Percentage
Experienced Increase in Mountain Biking Activity (Last 5 Years)	15	83	3	17
Experienced Illegal Trespass in Areas Prohibiting Mountain Biking	7	39	11	61
Received Requests to Mountain Bike on Foot Traffic Only Trails	15	83	3	17
Experienced Illegal Group Sponsored Mountain Bike Activity	0	0	18	100
Have Mountain Bike Rental Concessionaires Near Park	2	11	16	89

N=18

Table 4.—Reported Trends in Mountain Biking Activity in Ohio State Park Districts

Activity Indicator	Yes	Percentage	No	Percentage
Experienced Increase in Mountain Biking Activity (Last 5 Years)	2	25	6	75
Experienced Illegal Trespass in Areas Prohibiting Mountain Biking	4	50	4	50
Received Requests to Mountain Bike on Foot Traffic Only Trails	4	50	4	50
Experienced Illegal Group Sponsored Mountain Bike Activity	1	13	7	87
Have Mountain Bike Rental Concessionaires Near Park	0	0	8	100

N=8

Ohio State Parks. Table 1 and Table 2 report miles of roads and trails open to mountain biking by road type, trail type, and park classification for all study respondents reporting the allowance of mountain bike activity.

3.2 Mountain Bike Activity

Of the 18 Ohio State Parks reporting mountain biking activity, 83 percent (n=15) provided annual mountain biking visitation estimates. Annual estimated mountain bike visitation rates ranged from 50 to 6,000 riders (*Mdn*=775). Of the 16 Ohio State Parks estimating mountain bike activity by type (i.e., on-road vs. off-road), the reported median percentage of on-road mountain biking activity was estimated at 22.5 percent compared to an estimated median percentage of 77.5 percent for off-road activity.

Of the eight Ohio Park Districts reporting mountain biking activity, 63 percent (n=5) provided annual mountain biking visitation estimates. Annual estimated mountain bike visitation rates ranged from 100 to 50,000 riders (*Mdn*=250). Of the five Ohio Park Districts estimating mountain activity by type (i.e., on-road vs. off-road), the reported median percentage of on-road mountain biking activity was estimated at 40% compared to an estimated median percentage of 60 percent for off-road activity. Table 3 and Table 4 report additional mountain biking activity trends within Ohio State Parks and Ohio Park Districts.

3.3 Mountain Bike Management

Of the 26 Ohio State Parks and Park Districts allowing mountain biking, 15 percent (n=4) had completed at least one survey or project directed at identifying mountain bike use patterns, impacts, or visitor feelings within their park compared to 85 percent (n=22) who engaged in no such planning or management action. While only a small percentage of Ohio State Parks and Park Districts indicated engaging in mountain bike research, across the sample 46 percent (n=12) reported having partnered with a local, state, or national mountain biking organization to develop management strategies or engage in other mountain biking projects. When asked if their park(s) considered mountain biking a top five resource-management concern or a top five recreation-management concern, 15 percent (n=4) identified mountain biking as a high level resource-management concern and 23 percent (n=6) as a high level recreation-management concern. **Note: The identification of mountain biking as either a top five resource-management concern or top five recreation-management concern was reported by Ohio State Parks only.** Overall, reasons such as increased popularity, increased growth, increased demand, freeeriding (i.e., off-trail riding), and resource damage were cited as issues intensifying mountain bike resource-management or recreation-management concerns in Ohio State Parks. Table 5 and table 6 report additional mountain bike

Table 5.—Reported Trends in Mountain Bike Management in Ohio State Parks

Management Indicator	Yes	Percentage	No	Percentage
Observed Evidence or Resource Damage From Mountain Biking	6	33	12	67
Observed/Received Reports of Mountain Biking Accidents	7	39	11	61
Observed/Received Reports of User Conflict from Mountain Biking	7	39	11	61
Observed/Received Reports of MTB Safety Problems	4	22	14	78

N=18

Table 6.—Reported Trends in Mountain Bike Management in Ohio State Park Districts

Management Indicator	Yes	Percentage	No	Percentage
Observed Evidence or Resource Damage From Mountain Biking	3	38	5	62
Observed/Received Reports of Mountain Biking Accidents	1	13	7	87
Observed/Received Reports of User Conflict from Mountain Biking	2	25	6	75
Observed/Received Reports of MTB Safety Problems	0	0	8	100

N=8

management issues and actions reported within Ohio State Parks and Park Districts.

State Park Managers and Park District Supervisors who reported resource damage, accidents, user conflict, or safety problems related to mountain biking were also asked in open-ended questions to indicate types of resource damage, accidents, user conflict, or safety problems they had observed or had reported, as well as management strategies used to prevent each issue or action. Multiple responses could be provided. Commonly reported problems and management actions related to resource damage, accidents, user conflict, and safety are reported in Tables 7 through 12.

In addition to the management issues reported in Tables 7 through 12, respondents were asked to provide information related to mountain bike safety. Common problems related to mountain bike safety included the excessive speeds at which mountain bikes can travel (n=2), mountain bikers not wearing helmets (n=1), mountain bikers freeriding (n=1) or riding in areas posted as too dangerous for mountain bike use (n=1), and the opportunity for collisions between mountain bikers and hikers (n=3). Reported management strategies used to promote mountain bike safety included developing mountain bike safety programs (n=1), working with mountain biking organizations (n=1), separating different user groups (n=1), and clearing trail blind spots.

Selected information related to mountain biking was also collected from State Parks and Park Districts that did not permit mountain biking activity. Out of the three State Parks and 18 Park Districts indicating they did not allow mountain biking activity, 57 percent (n=12) reported experiencing illegal mountain bike activity in their parks. When asked if their park received any advocacy from national, state, or local mountain biking organizations to allow mountain biking, 43 percent (n=8) indicated advocacy for use of their park had occurred. In addition, 52 percent (n=11) of those parks currently not allowing mountain biking indicated that they had engaged in open discussions about allowing mountain biking or have already included the allowance of mountain biking in future management plans. One park indicated it was in the process of designating a trail for mountain biking to study the impacts of the activity for future management decisions.

4.0 CONCLUSIONS

Results from this study indicate that managers and supervisors of public lands in Ohio face the challenge of addressing both ecological and social issues when developing management strategies to meet the outdoor recreation needs of the public. Developing management strategies to meet the public's outdoor recreation needs while simultaneously protecting and sustaining natural resources is often difficult (Chavez 1997). Literature indicates that resource managers have primarily three

Table 7.—Evidence of Resource Damage

Resource Classification	Evidenced Damage
Trail (N=4)	General Damage
	Restructuring of Trail
Soil (N=3)	Erosion
	Digging/Mound Building
Water (N=1)	Wet Trail Riding
Vegetation (N=1)	Off-Trail Paths

Table 8.—Resource Damage Prevention

Prevention Category	Prevention Technique
	Signage
Education (N=2)	Trail Building
Hardening (N=2)	Trail Maintenance
	Meet MTB Groups
Cooperation (N=3)	Reroute Trails
Restriction (N=3)	Deny Access to MTB

Note: Responses were in an open-ended question format. Based on responses, categories of concerns were developed based on classifications used by Chavez (1996). Responses included information that would fit in more than one category.

Table 9.—Evidence of Accidents

Type of Accident	Evidenced Injury
Minor (N=1)	Cuts & Abrasions

Table 10.—Accident Prevention

Prevention Category	Prevention Technique
Education (N=4)	Signage/Brochures
	Request Helmet Use
Hardening (N=2)	Redesign Trails
	Create Switchbacks
Cooperation (N=1)	Request Injury Reports
Restrictions (N=1)	Require Helmets

Note: Responses were in an open-ended question format. Based on responses, categories of concerns were developed based on classifications used by Chavez (1996). Responses included information that would fit in more than one category.

Table 11.—Evidence of User-Conflict

Type of Conflict	Evidenced Conflict
	MTB Travel to Fast
Hikers v. MTB (N=3)	Hikers Don't Yield
MTB v. Hikers (N=3)	Startle Game
Hunters v. MTB (N=2)	Horses Ruin Trails
MTB v. Horses (N=4)	MTB Startle Horses
Horses v. MTB (N=2)	

Table 12.—User-Conflict Prevention

Prevention Category	Prevention Technique
	Signage/Brochures
Education (n=6)	Trail Announcements
	Clear Trail Blind Spots
Hardening (n=2)	User Group Meetings
	Dedicate Single-Use
Cooperation (n=1)	Enforce Regulations
Restrictions (n=1)	Close During Hunting

Note: Responses were in an open-ended question format. Based on responses, categories of concerns were developed based on classifications used by Chavez (1996). Responses included information that would fit in more than one category.

classifications of management strategies that can be used to balance ecological and social issues related to recreational impacts. These management classifications include behavior modification, resource hardening, and bridge building. Behavior modification strategies specifically attempt to change visitor behavior through direct (e.g., behavior regulation or restriction) and indirect (e.g., education) actions (Lime 1979, Peterson & Lime 1979). In contrast, resource-hardening techniques attempt to fortify natural resources so they can better withstand visitor behavior (Peterson & Lime 1979). Other management strategies such as collaborative problem-solving, resource sharing, and volunteerism, which represent cooperative actions between agencies and individuals, can be classified as bridge-building techniques (Wondolleck & Yaffee 1994).

Because mountain biking is a relatively new pursuit, literature related to the ecological impacts of mountain biking is scarce (Thurston & Reader 2001). As such, resource managers have often handled trail degradation through direct behavior modification strategies, such as closing entire areas and trails to mountain biking, or moving mountain biking activity to double-track trails such as roads (Morey et al. 2002). Results from this study suggest that Ohio State Parks and Park Districts are more actively engaged in indirect behavior modification and bridge-building management strategies.

Overall, results from this study indicted that opportunities for mountain biking, both on-road and off-road, are being demanded by mountain bike enthusiasts within Ohio, and that Ohio State Parks and Park Districts are taking an active role in providing mountain biking opportunities throughout the State.

5.0 LIMITATIONS AND FUTURE RESEARCH

There are a number of limitations to this study. One limitation is the response rate (67%) for the study. As a result, threats to external validity may exist due to nonresponse bias. A second limitation is that the questionnaire was self-administered; thus potential threats to internal validity may exist if respondents provided desirable rather than accurate data. A third limitation is that the findings of this study are specific only to the State of Ohio, and do not reflect mountain biking issues and trends or management strategies of other state or municipal parks. Finally, this study did not address mountain biking issues within Ohio State Forests because the researchers could not identify a means for collecting mountain biking data at the forest level rather than at the forest district level. Despite limitations, the results of this study have implications for all public land managers, as well as the mountain biking community. Although these data are most useful to park managers and supervisors in the State of Ohio, management information reported in this study does suggest planning directions that could be used by other public land managers supervising state, county, and local trail systems in the region, specifically as mountain bike management strategies relate to resource degradation, user conflict, and safety. Based on the low number of managers or supervisors indicating that mountain biking was a top management concern within their park, it appears that the management strategies reported in this study have proven to be effective.

Based on the findings of this research, future research could include studies that identify: (a) mountain biking issues and impacts in Ohio State Forests, (b) mountain bikers' perceptions of the management strategies used to promote or restrict mountain bike activity within the State of Ohio, (c) characteristics, preferences, and attitudes of mountain bike users in Ohio, and (d) economic impacts of mountain biking on community development within the State of Ohio.

6.0 CITATIONS

Chavez, D.J. 1996. **Mountain Biking: Issues and actions for USDA Forest Service managers.** RP-PSW-226. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

Chavez, D.J. 1997. **Mountain bike management: Resource protection and social conflicts.** Trends. 34(3): 36-40.

Chavez, D.J.; Winter, P.L.; Baas, J.M. 1993. **Recreational mountain biking: A management perspective.** Journal of Park and Recreation Administration. 11(3): 29-36.

International Mountain Bicycling Association. 2005. **Urban resources & hot spots.** Retrieved October 25, 2004 from http://www.imba.com/resources/urban/index.html

Lime, D.W. 1979. **Carrying capacity.** Trends. 16(2): 37-40.

Morey, E.R.; Buchanan, T.; Waldman, D.M. 2002. **Estimating the benefits and costs to mountain bikers of changes in trail characteristics, access fess, and site closures: Choice experiment and benefit transfer.** Journal of Environmental Management. 64: 411-422.

National Sporting Goods Association. 2004. **Ten-year history of selected sports participation.** Retrieved May 17, 2004 from http://www.nsga.org/public/pages/index.cfm?pageid=153

Peterson, G.L.; Lime, D.W. 1979. **People and their behavior.** Journal of Forestry. 77(6): 343-346.

Sporting Goods Manufacturing Association. 2005. **Sports participation topline report.** SMGA International.

Thurston, E.; Reader, R.J. 2001. **Impacts of experimentally applied mountain biking and hiking on vegetation and soil of a deciduous forest.** Environmental Management. 27(3): 397-409.

Wondolleck, J.; Yaffee, S.L. 1994. **Building bridges across agency boundaries: In search of excellence in the USDA Forest Service.** PSW-92-0215. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.