

**Measuring and Monitoring Trail Use:
A Nationwide Survey of State and Federal Trail Managers**

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By Dr. Joel Lynch, Dr. Christine Vogt, Stan Cindrity, and Dr. Charles Nelson
Department of Park, Recreation and Tourism Resources, Michigan State University

EXECUTIVE SUMMARY

The Department of Park, Recreation and Tourism Resources at Michigan State University, cooperating with the Michigan Department of Transportation and others, launched a multi-year case study on the benefits of the Pere Marquette Rail-Trail located in mid-Michigan. A component of the research project was to examine the relevancy of mechanical and electronic counting devices in estimating and monitoring trail use. To assist with that effort a mail survey was conducted with state and federal trail managers across the United States. The goal of this study was to better understand the extent of trail use monitoring and to assess the application of mechanical and electronic counting devices in trail planning and management.

Surveys were mailed to 169 state trail administrators or bicyclist coordinators and 175 federal trail managers from the USDA Forest Service and USBI Bureau of Land Management. Seventy-two state-level trail administrators/coordinators (42% response rate) and 104 federal-level trail managers (59% response rate) returned a completed survey. Data collection occurred in late spring and early summer of 2001.

The following highlights emerged from this research:

- Forty percent of state trail managers and 73% of federal trail managers reported that visitor use data were collected in the past five years on one or more of the trails they managed. Those who were not able to implement such studies, overwhelmingly cited inadequate funds or staff as the main barrier.
- For over 70% of both state and federal trail managers, the most commonly cited reason for collecting these data was to aid in future planning and capital development. Budget development or grant justification, marketing and visitor satisfaction, and agency policy were also important reasons, but at slightly different levels between state and federal trail managers.
- Observations at parking lots or on trails and mechanical/electronic counting devices were most often the methods used to monitor visitors use in the past five years by both state and federal trail managers. Of those agencies that use mechanical/electronic counting devices, infrared sensors were the most frequently used. However, many trail managers considered them to be somewhat ineffective.
- Both state and federal trail managers nearly unanimously agreed that gathering trail use data will be increasingly important in the future. They also noted that GIS is a valuable tool in trail planning and management.

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*Department of Park, Recreation and Tourism Resources
Michigan State University*

INTRODUCTION

It is widely recognized that accurate information regarding the amount, type, and distribution of trail use is critical in making informed planning and management decisions, and in understanding the full range of benefits trails provide to individuals and communities (Loomis, 2000; Mowen, 2000). Of the different methods used to collect trail use data, mechanical and electronic counting devices are widely regarded as being relatively flexible and inexpensive (Dawson et al., 2000; Gasvoda, 1999; Hollenhorst et al., 1992; Watson et al., 2000; Yuan et al., 1995). These tools have been used to provide estimates of trail usage since the late 1960's (Leonard et al., 1980). While much of their application has been in wilderness and backcountry areas, a greater awareness and use of these devices is occurring among a wider audience of trail managers and researchers (O'Rourke, 1994). Recently, Neff et al. (2000) used an infrared sensor to measure trail use and assess activity patterns and Arnberger and Brandenburg (2001) used video cameras at a national park in Vienna Austria to assess the level and type of use, and visitor characteristics. Today, there are a number of manufacturers (see Appendix A for selected list) who market mechanical and electronic devices that measure and monitor trail use (Gasvoda, 1999; Watson et al., 2000).

In 2000, the Department of Park, Recreation and Tourism Resources at Michigan State University, cooperating with the Michigan Department of Transportation and others, launched a multi-year case study on the benefits of the Pere Marquette Rail-Trail located in mid-Michigan. A component of the research project was to examine the relevancy of mechanical and electronic counting devices in estimating and monitoring trail use. To assist with that effort a mail survey was conducted with state and federal trail managers across the United States. The goal of this study was to better understand the extent of trail use monitoring and to assess the application of mechanical and electronic counting devices in trail planning and management.

STUDY METHODS

Sample and Questionnaire

The data in this study were gathered using a mail questionnaire sent to both state and federal managers responsible for trails throughout the United States. Names and contact information for both groups was generated through a number of methods and sources.

Initially a list of *state trail administrators and bicycling/pedestrian coordinators* was obtained from the Federal Highway Administration (FHA). Both trail administrators and bicycling/pedestrian coordinators were chosen to account for the range of scenarios where trail use monitoring may occur. To validate this FHA list, everyone was sent an e-mail describing the study and asking whether they were the appropriate contact for their state or agency. As a result of this effort, 19 names were added to the list for a total of 169 state trail managers representing all 50 states and the District of Columbia (DC). In the case of West Virginia the FHA list only provided a bicycling/pedestrian coordinator. Over three-quarters of the states had more than one trail administrator or bicycling/pedestrian coordinator representing their state. This may mean that there may be more than one trail program per state, such as non-motorized and motorized, or there may be multiple administrators for one trail program, such as a manager and a specialist.

Federal managers responsible for trails consist of a representative sample from the USDA Forest Service (FS) and a census of Field Station Managers from the USDI Bureau of Land Management (BLM). Trail managers from USDI National Park Service, USDI Fish and Wildlife Service, and Army Corp of Engineers were not included in the sample due to the difficulty of defining and selecting a sample. Procedures for selecting and compiling FS and BLM trail managers were determined following discussions with Jim Miller, Dispersed Recreation and Trail Coordinator and others of the Forest Service (FS), and Rodger Schmitt, Recreation Group Manager and Deb Salt, National Trails Coordinator and others of the Bureau of Land Management. To obtain a sample of FS trail managers, each of the Regional Trail Coordinators were contacted and asked to identify trail managers from six representative National Forests in their region. In total, 10 Regional Trail Coordinators and 35 trail managers were surveyed. For the BLM, all 130 District or Field Station managers were surveyed. Responses could have been from both regional and field-level trail managers. As such, there may be cases where a regional and field level manager are responding about the same trail or trail system.

The questionnaire was designed by the researchers of this report and revised based upon reviews from selected trail managers and researchers. The final four-page questionnaire contains questions about trail systems, visitor use estimation techniques, data collection initiatives, use of electronic and mechanical collection devices, opinions about trail use data, and the use of geographic information systems in trail planning and management. Some questions were framed about the entire statewide or forest trail system, where other questions were about specific trails they individually managed. No attempt was made to assess the extent of overlapping agency or unit responses and thus consideration of such must be taken into account when interpreting these data. Lastly, there were slight modifications between the state trail managers questionnaire and cover letter (see Appendix B) and federal trail questionnaire and cover letter (see Appendix C) to deal with unique circumstances between these management situations.

The initial mailing for *state trail managers* included a questionnaire, a personalized cover letter and business reply envelope. This was mailed on March 12, 2001. A few weeks later on April 2, 2001 non-respondents were sent a reminder postcard. Finally, non-respondents were sent another copy of the questionnaire, a personalized cover letter and business reply envelope on April 19, 2001. The initial mailing for *federal trail managers* was sent on May 17, 2001, the reminder postcard was mailed on June 15, 2001, and a second questionnaire mailing to non-respondents occurred on July 6, 2001. Completed questionnaires were keyed and analyzed using Statistical Package for the Social Sciences (SPSS).

State Administrators and Coordinators Sampling Frame and Response Rates

Of the 169 state trail managers, 104 (61.5%) were categorized as trail administrators and 65 (38.5%) were bicycling/pedestrian coordinators. The bicycling/pedestrian coordinators are all part of their states' Department of Transportation and almost all had responsibilities concerning bicycle and/or pedestrian facilities as they relate to state roadway systems. By contrast, state trail administrators were located in a number of different governmental administrative departments and thus had a wide range of duties. For instance, responsibilities ranged from directors of state agencies/departments to program managers, planners, and resource specialists. Moreover, while many dealt exclusively with trails, others were responsible for a myriad of related recreation facilities/programs including parks, motorized and non-motorized trail programs, grants, and natural resource programs.

Seventy-two (42.6%) state-level trail managers completed questionnaires. Of these respondents, 56 (77.7%) were trail administrators and 16 (22.3%) were bicycling/ pedestrian coordinators. Nationwide, slightly more than 80 percent of respondents managed trails at either regional or agency-wide levels. The respondents represent 44 states with nearly half of the states represented by more than one trail administrator and/or bicycling/pedestrian coordinator for their state.

US Forest Service and Bureau of Land Management Trail Manager Sampling Frame and Response Rates

The 45 FS trail managers consisted of 10 Regional Trail Coordinators and 35 managers from 34 National Forests and Grasslands nationwide. Of the 35 Forest Service trail managers, the majority were trail coordinators on their forest. However, a few employees had other responsibilities. Of the 130 BLM trail managers included in the sample, 23 (17.7%) managers were from state/district offices and 107 (82.3%) were field station managers.

In terms of response, 104 (59.4%) federal-level trail managers returned a completed questionnaire. Of these respondents, 69 (66.3%) were from the BLM and 35 (33.7%) were from the FS. Over 90 percent of respondents were from states west of the Mississippi River. Eighty percent of the federal trail manager respondents managed trails on a unit-wide basis, while the remaining trail managers had regional responsibilities across various units or states.

SURVEY RESULTS

Trailway Program and System

Both state and federal trail managers characterized the majority of the non-motorized trail use as walking/hiking/backpacking and biking. Federal trail managers also reported significant horseback riding occurring on their trails. Across state agencies, the total miles of non-motorized trails vary considerably, ranging from less than 100 miles to 6,000 miles, with a median of 300 miles per state. Non-motorized trail mileage on National Forests/Grasslands and BLM units vary from none to 3,000 miles, with a median of 339 miles per unit.

Based on the results of the questionnaire, off-road vehicle and snowmobile trails were more common on federal lands than state lands with over 80 percent of the National Forest and BLM units managing such trails compared to half of the states. Total miles of motorized trails for the different state agencies ranged from less than 100 miles to over 10,000 miles with a median of 300 miles per state. Total miles of motorized trails on National Forest/Grasslands and BLM units ranged from less than 10 miles to just over 4,700 miles with a median of 343 miles per unit.

About two-thirds of the states and nearly 40 percent of the federal land management units responding to the survey indicated their state or unit had a trail plan (Table 1). On average, statewide trail plans were last updated in the mid 1990's, while federal land management units last updated their trail plans in the early part of 1990's. For those states that indicated they did not have a state or unit wide trail plan, only about half reported they were likely to develop one within the next five years; whereas nearly 60 percent of federal land management units without plans were likely to develop one within five years.

Table 1. State and unit wide trail plans in place in 2001 and future planning intentions.

	State Trail Managers	Federal Trail Managers
State/unit with current trail plan	65.9%	39.4%
Average year state/unit trail plan last updated	1995	1992
States/units without plan likely to develop one within five years	46.7%	59.3%

Visitor Use Data Collection Efforts and Estimation Methods

Of those responding to the survey, 29 (40.3%) of state trail managers and 76 (73.1%) of federal trail managers reported visitor use data were collected in the past five years on one or more of the trails they managed. The most commonly cited reason for collecting these data was to aid in future planning and capital development, followed by budget development or grant justification for state trail managers and agency policy for federal managers (Table 2). The key differences between state and federal agencies are related to marketing and visitor satisfaction, and policy requirements. State trail managers were more likely (48.1%) to cite the need to better understand customers and their satisfaction with trails than federal trail managers (36.0%). Federal trail managers on the other hand were more likely (45.3%) to cite agency policy as a reason for collecting information than state trail managers (25.9%). Those state or federal agencies that have not implemented use data collection efforts in the past five years overwhelmingly cited the lack of funds or staffing as the reason for not collecting such data.

Table 2. Selected reasons for collecting trail visitor use data (a)(b).

	State Trail Managers	Federal Trail Managers
Future planning and capital projects	77.8%	73.3%
Budget development or grant justification	51.9	44.0
Marketing and visitor satisfaction	48.1	36.0
Agency policy	25.9	45.3
State or federal requirement	18.2	26.7

(a) Respondents could choose more than one reason.

(b) Multiple state or agency responses possible.

Of those collecting trail use data, state trail managers were most focused on studying certain trails and providing system-wide data, while federal trail managers most commonly study high use trails and certain trails (Table 3). Almost half of the federal trail managers indicated collecting use data one-time only for a trail and/or trail use data on an on-going basis compared to 39% of state trail managers.

Table 3. Context and timing of most recent trail data collection effort (a)(b).

	State Trail Managers	Federal Trail Managers
<u>Context</u>		
Certain trails	42.9%	44.0%
High use trails	35.7	45.3
System-wide	42.9	29.3
Crisis situations	10.7	8.0
<u>Timing</u>		
On-going data collection	39.3%	48.0%
Irregular or one time only	39.3	49.3

(a) Respondents could choose more than one selection for context and timing.

(b) Multiple state or agency responses possible.

Trail data can be collected in a number of ways. Observations at parking lots or on trails and mechanical and electronic counting devices were most often used by state trail managers and federal trail managers in the past five years (Table 4). Federal trail managers especially relied on these techniques and registrations at trails heads to collect use information. Few agencies indicated relying on photography or video recording to collect use data. Of the different types of strategies used only half of the state trail managers and a little more than a quarter of the federal trail managers collecting such data relied on a single technique.

Table 4. Use of selected data collection techniques in the past 5 year (a)(b).

Data Collection Techniques	State Trail Managers	Federal Trail Managers
Observation at parking lots or on trails	55.2%	78.7%
Mechanical/electronic counting devices	55.2	73.3
Registrations at trailheads	37.9	68.0
On-site interview or questionnaire	41.4	30.7
Permit	31.0	30.7
Entrance or other use fees	31.0	17.3
Mail survey	20.7	8.0
Ground photography/video	10.3	5.3
Aerial photography	3.4	4.0
Other	14.3	9.5

(a) Respondents could choose more than one reason.

(b) Multiple state or agency response possible.

Quantifying the number of visitors using a trail was the most common type of information gathered (Table 5). The number of visits over a given time period, satisfaction or other attitudes, and the residency of trail users were other meaningful measures collected by state and federal trail managers. Federal trail managers also indicated they collect information about types of trail activities, group sizes, and the propensity of overnight stays or length of stays related to trail visits.

Table 5. Type of trail information collected (a)(b).

	State Trail Managers	Federal Trail Managers
Number of users	82.1%	83.6%
Number of visits over a time period	50.0	50.7
Satisfaction or other attitudes	46.4	32.9
Residency (zip codes, licenses plates)	39.3	43.8
Demographic information	35.7	15.1
Types of activities	28.6	67.1
Hours of use	28.6	21.9
Overnight stays/length of stay	28.6	50.7
Distance of trail used	28.6	12.3
Trail user conflict	28.6	30.1
Group size	25.0	61.6
Section of trails used	25.0	23.3
Economic or spending profiles	25.0	6.8
Use of local business services	7.1	2.7

(a) Respondents could choose more than one reason.

(b) Multiple state or agency response possible.

Use of Mechanical and Electronic Counting Devices

Thirteen state trail programs and 53 federal trail managers reported either testing or using one or more mechanical or electronic counting device to estimate trail usage. Infrared sensors were most common, however many trail managers considered them to be somewhat ineffective (Tables 6 for state results and Table 7 for federal results). Most of the comments about the infrared sensors revolved around the challenge of proper installation and calibrating the devices. Even though few used still photography, both state and federal trail managers rated it as a relatively effective means of collecting use data. State and federal trail managers disagreed on the efficacy of pneumatic counters, with federal agencies rating them much more effective than states. Appendix A includes a list of vendors provided by trail managers.

Table 6. State trail managers use and rating of mechanical and electronic counting devices to estimate trail usage (a).

Device	Frequency (%)		Mean
	Piloted/Tested	Implemented	Rating (b)
Inductive – magnetic counting	0 (0.0)	1 (100.0)	2.0
Still photography	1 (33.3)	2 (66.7)	3.0
Seismic – compression sensitive	1 (33.3)	2 (66.7)	3.0
Infrared – motion sensitive	5 (35.7)	9 (64.3)	3.3
Pneumatic – air pressure	0 (0.0)	2 (100.0)	4.0
Video photography	0 (0.0)	0 (0.0)	--
Digital photography	0 (0.0)	0 (0.0)	--

(a) Multiple state administrator/coordinator response possible.

(b) Rating 1=very effective to 5=very ineffective.

Table 7. Federal trail managers use and rating of mechanical and electronic counting devices to estimate trail usage (a).

Device	Frequency (%)		Mean
	Piloted/Tested	Implemented	Rating (b)
Pneumatic – air pressure	2 (20.0)	8 (80.0)	2.7
Still photography	1 (16.7)	5 (83.3)	3.0
Infrared – motion sensitive	7 (15.9)	37 (84.1)	3.2
Inductive – magnetic counting	1 (7.7)	12 (92.3)	3.3
Seismic – compression sensitive	3 (17.6)	14 (82.5)	3.4
Video photography	1 (50.0)	1 (50.0)	3.5
Digital photography	0 (0.0)	0 (0.0)	--

(a) Multiple agency response possible.

(b) Rating 1=very effective to 5=very ineffective.

Attitudes Toward Collecting Trail Use Data

State and federal trail managers strongly agree that gathering trail use data will be increasingly important in the future and will be beneficial for trail planning (Table 8). Likewise, they also consider collecting data on trail use as beneficial managing trails day to day, although they found less use for these data to establish maintenance schedules and determine staff needs.

Table 8. Attitudes toward collecting trail use data (a).

	Mean Rating	
	State Trail Managers	Federal Trail Managers
Trail use data will be increasingly needed in the future	4.4	4.3
Collecting data on trail use is beneficial for trail planning	4.3	4.4
Collecting data on trail use is beneficial to managing trails on an operational basis	4.2	4.2
Trail use data used to consider the building of new trails	3.9	3.6
Trail use data are used to enhance existing trails with new recreation activities, facilities or services	3.8	3.6
Trail use data are currently needed to justify funding	3.7	3.7
Trail use data are used to establish maintenance schedules	3.6	3.5
Trail use data are used to determine staff needs	3.4	3.1

(a) Responses include 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5= strongly agree.

Use of Geographic Information Systems for Trail Management and Planning

Geographic information systems (GIS) is widely used by state and federal land management agencies (Table 9). Three-quarters of the state agencies and 87% of federal agencies rely on internal personnel to manage their GIS programs. In the majority of cases, GIS is used to establish an accurate inventory of existing trailway facilities to aid in mapping. The other main GIS emphasis is on planning and management, where GIS is used in siting new trails and their relationship with other key features such as archeological sites, ownership boundaries and in documenting conditions or concerns such as hydric soils. etc. Some federal trail managers indicated using GIS to solve trail related issues such as assessing impacts related to other resources. Of the 20% of state and 4% of federal trail managers who did not use GIS, a little more than half of the state trail managers and over three-quarters of the federal trail managers intended to use GIS for trail planning and/or management in the future.

Table 9. Use and function of GIS.

	State Trail Managers	Federal Trail Managers
Agency use of GIS	80.0%	96.1%
Who does the GIS work?		
Only in-agency	76.4%	86.7%
Only consultant	0.0	0.0
Both in-agency & consultant	23.6	13.3

CONCLUSIONS

State and federal trail managers recognize the need to collect trail use data. For those agencies that collect data, counting the number of users was the most common practice. For federal agencies, recording the type of trail use activity and group size was also common. The most common rationale for state and federal trail respondents to collect trail use data is for planning and future capital development projects. Following this reason, state agencies need data for budget development, grant justification, marketing or visitor satisfaction, and federal agencies need data to meet agency policy mandates, for budget development or grant justification.

Approximately three-quarters of the federal agencies who collect trail use data do so using observation techniques at trail heads or parking lots or mechanical/electronic counting devices. State agencies also used these techniques, but at lower levels (with approximately 55% using these methods). The least used technique for collecting trail data was aerial photography. For both state and federal agencies, implementing mechanical or electronic devices was more common than piloting or testing devices. For state and federal trail managers the use of infrared or motion sensors was more common than other mechanical devices. For those managers who used these devices, the effectiveness of these devices, in general, was rated as being mediocre due to installation and calibration challenges.

Trail managers were also asked to express their opinions about collecting trail use data. State and federal trail managers expressed high levels of agreement that trail use data will be increasingly needed in the future, beneficial for trail planning and managing trails on an operational basis. State trail managers were currently more likely than federal trail managers to have state or unit-wide trail plans; federal managers were more likely than state managers to be developing new

trail plans developed within the next five years. GIS appears to be a tool that both state and federal trail managers will use for planning and tracking trail use levels. Federal agencies are very reliant on in-house GIS capabilities; state agencies are slightly more likely to use in-house and consulting GIS services.

MANAGEMENT IMPLICATIONS

Among state and federal agencies there is no uniform standard for non-motorized trail use data collection. This is in contrast to many other areas of natural resource management, such as forest inventory (USDA Forest Service), breeding bird inventory (USDI Fish and Wildlife Service) and implementation of the Renewable Resource Planning Act of 1974 as amended by the US Forest Service and other federal agencies.

One option to rectify this dilemma would be to require recipients of federal trail grants (both state and federal) to provide use level estimates for a representative proportion (e.g. 10%) of their non-motorized and motorized trail systems. This could be done using standardized methodologies employing mechanical and electronic monitoring devices or a combination of these and other techniques. However, given some of the challenges of obtaining reliable data with such devices, a rigorous set of installation and calibration procedures must be developed that accounts for all the types of devices currently employed by trail managers.

Cooperation among the different parties is also critical. One way to strengthen cooperation, coordination, and sharing of knowledge would be to hold regular regional workshops/conferences concerning use estimation methodologies and technologies. The US Department of Transportation, and the National Park Service could provide valuable leadership in this area as both have substantial technical and financial assistance responsibilities regarding trails. In such workshops vendors could demonstrate and educate trail managers about the proper installation and calibration techniques necessary to obtain reliable use estimate data. Such workshops could also facilitate a greater level of future cooperation and interchange of information among trail managers.

Finally, given its widespread use in the exchange of information, developing a website created and maintained by one of the key federal trail oriented agencies to up-date all interested parties on advances and application of these technology as well as be a information repository for trail use related data would be a valuable tool. The Forest Service has made strides in this developing comprehensive publications about methodologies to estimating use (see Yuan et al., 1995 and Watson et al., 2000), but more needs to be done, especially on a wider range of trails types.

This initial step of regularly estimating trail use can provide the basis to look at the benefits of trail use on a national basis such as the economic impact of tourism, use of trails for cardiovascular fitness, and non-motorized transportation among others.

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APPENDIX A

Trail User Monitor Vendors

Carson Electronics
Box 535
Valemount, BC V0E 2Z0 Canada
(250) 566-4694
acarson@vis.bc.ca
<http://www.valemount.com/acarson/>

Chambers Electronics
A & P Chambers Ltd. Kaluna House
Nairnside, Inverness, Scotland, IV2 5BU
44 (0)1463 790400
sales@chambers-electronics.com
<http://www.chambers-electronics.com/>

Cuesta Systems
3440 Roberto Court
San Luis Obispo, CA 93401
800-332-3440 or 805-541-4160
<http://www.cuestasystems.com/>

Diamond Traffic Products
P.O. Box 1455
76433 Alder Street
Oakridge, OR 9746
541-782-3903
diamondtrf@aol.com
<http://www.diamondtraffic.com/>

K-Hill Inc.
Ken Hill
817-831-3011
khill@ont.com
<http://www.khill.com/new-page-1.htm>

Optical Sensor Systems
Mr. William (Bill) Walls; Sales Manager
(321) 726-5933
sales@fiberoptic-sensors.com
<http://www.sensors-usa.com/>

Scott Technical Instruments Limited
14 Bandon Street, Hamilton
New Zealand
(64) 7 847 0646
info@scottech.net
<http://www.scottech.net/>

Trail Master
Goodson & Associates, Inc.
10614 Widmer
Lenexa, KS 66215
800-544 5415
sales@trailmaster.com
<http://www.trailmaster.com/>

APPENDIX B

State Trail Manager Cover Letter and Questionnaire

February , 2001

Dear: State Trail Manager

Michigan State University and the Michigan Department of Transportation are cooperating to study the benefits of Rail-Trails. In particular, our study focuses on the Pere Marquette Rail Trail in Midland County as a case study and model for the state.

In the past year we have completed studies of users, county residents, tourists, special event participants, and adjacent and nearby residents and businesses. In the next year we will be completing a series of manuals featuring Rail-Trail research that address benefits, life cycle, business potential, trail use and community integration, and planning and technology. To better understand technology we are asking for your assistance.

This letter and survey is a follow-up to an e-mail that you might have received and replied. We have designed a four-page survey that asks about your thoughts and efforts of monitoring trail usage. We are surveying all the state trail managers and pedestrian and bicycle coordinators across the 50 states and Puerto Rico, and contacts within several land management agencies. In the early 1990's a similar study was done by Roger Moore and received participation by 48 states. Our goal is to include all 50 states and Puerto Rico.

You indicate your voluntary agreement to participate by completing and returning this questionnaire. However, if you choose not to participate, you will not suffer any penalty. We have included a question at the end of the survey that asks whether the information you have provided could be shared with others in a report that identifies results by state. We anticipate e-mailing the results by May 31, 2001.

When you have completed the questionnaire, please mail it back to us in the postage paid envelope provided. Your responses will be kept confidential and your name will not be associated with any results. If you have any questions or concerns regarding your rights as a research participant, please contact David Wright, UCRIHS Chair, at 517-355-2180.

Thanks for your help.

Sincerely,

Joel Lynch, Ph.D.
lynchjoe@msu

Stan Cindrity
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Enclosures

P.S. The U.S. Forest Service has just issued a report titled "Wilderness Recreation Use Estimation: A Handbook of Methods and System—referenced as RMRS-GTR-56." The free report can be ordered from rschneider@fs.fed.us or by calling 970-498-1392

Dear Trail Manager,

This questionnaire asks you to provide information about the trails and visitor use estimation techniques that you or your staff oversee. If there is a more appropriate individual than yourself to complete this questionnaire, please pass it along. We hope to compile the results of this study in the spring, so a prompt response is important to the success of our study.

Please consider all types of trails when answering these questions. A trail is defined as any designated off-highway, land-based route open for public use. An additional criteria is to consider those facilities that are designated as a trail. Trails include Rail-Trails, long distance trails, and trails within parks.

Please read each question carefully before responding. Your responses may vary from section to section: fill in, check or circle the appropriate answer in the designated space. Please answer to the best of your ability and save any additional comments for the end. Thank you for your participation.

Section 1. Description of Trails

We would like to begin by asking you some general questions about the trails that you or your agency oversee. These trails you consider in your responses may extend outside your agency.

1. Does your state currently have a statewide trail plan? *(please check one)*
 - YES, in what year was it last updated? _____ *(fill in a date)*
 - NO, are there future plans to develop a plan in the next 5 years? YES NO

2. At what level do you oversee or manage trails? *(please check one)*
 - PROGRAM OR REGIONAL LEVEL AGENCY-WIDE MULTI-AGENCY

3. What types of trail uses characterize the trails you or your agency oversee? *(please all that apply)*
 - NON-MOTORIZED MOTORIZED
 - Specifically? Specifically?
 - WALKING/HIKING/BACKPACKING ORV (ATV, MOTORCYCLE, FULL-SIZE 4W)
 - EQUESTRIAN SNOWMOBILING
 - ROAD BIKING OTHER (DESCRIBE) _____
 - MOUNTAIN BIKING _____
 - CROSS-COUNTY SKIING _____
 - IN-LINE SKATING _____
 - OTHER (DESCRIBE) _____

4. Approximately how many miles of trails do you or your agency oversee by trail types?
(fill in a number for each)
 - _____ MILES OF ONLY NONMOTORIZED TRAILS
 - _____ MILES OF ONLY MOTORIZED TRAILS
 - _____ MILES OF COMBINED NONMOTORIZED AND MOTORIZED TRAILS

Section 2. Visitor Use Estimation

This next set of questions ask whether you or your agency periodically collect or require the collection of visitor use data on one or more of the trails overseen for your response in question 2.

5. For some or all of the trails that you or your agency oversee, has visitor use/visitation data been collected in the past 5 years? *(please check one)*
 - YES, CONTINUE TO QUESTION 6
 - NO, SKIP TO QUESTION 12
 - If no, why? *(please provide reasons)* _____

6. What reasons describe why visitor use data are collected on one or more of the trails that you or your agency oversee? *(please check all that apply)*
- STATE OR FEDERAL REQUIREMENT
 - AGENCY POLICY (STATE OR FEDERAL)
 - BUDGET DEVELOPMENT OR GRANT JUSTIFICATION
 - FUTURE PLANNING AND CAPITAL PROJECTS
 - MARKETING OR VISITOR SATISFACTION
 - OTHER (DESCRIBE) _____
7. What functions describe how trail visitor use data are used? *(please check all that apply)*
- NUMBERS (UNADJ. OR ADJUSTED) ARE REGULARLY COMPILED
 - NUMBERS ARE SHARED WITH AGENCY OR DEPARTMENT HEADS
 - TREND DATA ARE COMPILED
 - DATA ARE AVAILABLE FOR PUBLIC REVIEW OR USED BY OTHER AGENCIES
 - OTHER (DESCRIBE) _____
8. How would you describe the nature of the most recent trail use data collection effort?
- | | |
|---|--|
| <p><u>Context</u> <i>(please check all that apply)</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> SYSTEM-WIDE <input type="checkbox"/> HIGH USE TRAILS <input type="checkbox"/> CERTAIN TRAILS (WHICH TYPES?) _____ <input type="checkbox"/> CRISIS SITUATIONS | <p><u>Timing</u>
<i>(please check all that apply)</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> ON-GOING <input type="checkbox"/> IRREGULAR OR ONE-TIME ONLY |
|---|--|
- 9a. What trail use estimation techniques have been used in the past 5 years on one or more of the trails that you or your agency oversee? *(please check all that apply)*
- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A. REGISTRATION AT TRAIL HEADS <input type="checkbox"/> B. PERMITS <input type="checkbox"/> C. ENTRANCE OR OTHER USE FEES <input type="checkbox"/> D. ON-SITE VISITOR INTERVIEW OR QUESTIONNAIRE <input type="checkbox"/> E. SURVEY MAILED TO USER AT HOME | <ul style="list-style-type: none"> <input type="checkbox"/> F. OBSERVATIONS/VISUAL COUNTING AT PARKING LOTS OR ON TRAILS <input type="checkbox"/> G. GROUND PHOTOGRAPHY/ VIDEO <input type="checkbox"/> H. MECHANICAL OR ELECTRONIC COUNTING DEVICES (E.G., TRAFFIC, PEDESTRIAN, PARKING LOTS) <input type="checkbox"/> I. AERIAL PHOTOGRAPHY <input type="checkbox"/> J. OTHER (PLEASELIST) _____ |
|---|---|
- 9b. Are there any combinations of techniques used?
 NO YES, please list using letters "A" to "J" _____ & _____ & _____ & _____.
10. What type of data are typically collected? *(please check all that apply)*
- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> NUMBER OF VISITOR USES <input type="checkbox"/> NUMBER OF VISITS OVER A TIME FRAME <input type="checkbox"/> TYPES OF DIFFERENT ACTIVITIES <input type="checkbox"/> HOURS OF USE <input type="checkbox"/> OVERNIGHT STAY(S) - LENGTH OF STAY <input type="checkbox"/> GROUP SIZE <input type="checkbox"/> SATISFACTION OR OTHER ATTITUDES | <ul style="list-style-type: none"> <input type="checkbox"/> DISTANCE OF TRAIL USED <input type="checkbox"/> SECTIONS OF TRAIL USED <input type="checkbox"/> RESIDENCY (ZIP CODES, LICENSE PLATES) <input type="checkbox"/> DEMOGRAPHIC <input type="checkbox"/> ECONOMIC OR SPENDING PROFILES <input type="checkbox"/> USE OF LOCAL BUSINESSES OR COMMERCIAL SERVICES <input type="checkbox"/> TRAIL USER CONFLICT |
|---|---|

11. Has a report been recently written that incorporates use data? *(please check one)*
 NO YES, what is the title of the report (and website if available) _____

Section 3. Use of Mechanical and Photographic Equipment in Trail Use Estimation
The next set of questions ask about specialized counting equipment that you may use to assist in trail use estimation.

12. In question 9a, we asked about the use of photography (G) or mechanical counting (H) equipment, did you check either one? *(please check one)*
 YES, CONTINUE TO QUESTION 13 NO, SKIP TO QUESTION 15

13. Which devices have you piloted/tested or implemented to estimate trail usage? How would you rate these devices *(please check all that apply)*

Devices	Piloted/Tested	Implemented	Rating (1=very effective to 5=very ineffective)
INFRARED - MOTION SENSITIVE	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
SEISMIC - COMPRESSION SENSITIVE	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
INDUCTIVE - MAGNETIC COUNTING	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
PNEUMATIC - AIR PRESSURE	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
STILL PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
VIDEO PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
DIGITAL PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5

If any devices were piloted/tested but not implemented, please describe why? _____

14. Are there trail/use monitoring vendors or products that you would recommend? *(please check one)*

- NO YES, could you provide us names, phone numbers, websites or business cards

Also, could you comment how well these monitoring product(s) work or have provided data about trail usage. _____

Section 4. Your Attitude Regarding Trail Use Data
This section asks about your opinions of collecting trail use data.

15. Please rate your level of agreement or disagreement with the following questions about trail use data. Please answer this question even if you are not currently collecting trail use data. (circle a response for each)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
TRAIL USE DATA ARE CURRENTLY NEEDED TO JUSTIFY FUNDING.	1	2	3	4	5
COLLECTING DATA ON TRAIL USE IS BENEFICIAL TO MANAGING TRAILS ON AN OPERATIONAL BASIS.	1	2	3	4	5
COLLECTING DATA ON TRAIL USE IS BENEFICIAL FOR TRAIL PLANNING.	1	2	3	4	5
TRAIL USE DATA ARE USED TO DETERMINE STAFF NEEDS.	1	2	3	4	5
TRAIL USE DATA ARE USED TO ESTABLISH MAINTENANCE SCHEDULES.	1	2	3	4	5
TRAIL USE DATA ARE USED TO ENHANCE EXISTING TRAILS WITH NEW RECREATION ACTIVITIES, FACILITIES, OR SERVICES.	1	2	3	4	5
TRAIL USE DATA ARE USED TO CONSIDER THE BUILDING OF NEW TRAILS.	1	2	3	4	5
TRAIL USE DATA WILL BE INCREASINGLY NEEDED IN THE FUTURE.	1	2	3	4	5

Section 5. Use of Geographic Information Systems (GIS)
The final set of questions ask about the use of GIS in your agency.

16. Are you currently using GIS in your agency? (please check one)
 NO, SKIP TO QUESTION 19
 YES, Are there any trail applications? NO YES
17. Is the GIS function provided in-agency or by a consultant or both? (please check one)
 IN-AGENCY CONSULTANT BOTH
18. How is GIS being used for trail planning or management at your agency? (please describe) _____

19. If your agency or its trails section is currently not using GIS, is there an intent to use GIS for trail planning or management in the future? (please check one) NO YES
20. We are interested in compiling these results by state, are you willing to have your responses shared with other trail managers and public? (please check one) NO YES
21. Would you like a copy of the final report?(please check one) NO YES

Thank you for completing this survey. Please return to: Dr. Joel Lynch, Dept. of Park, Recreation and Tourism Resources, Michigan State University 131 Natural Resources Building, East Lansing, MI 48824-1222 517-353-5190 x139 Lynchjoe@msu.edu

APPENDIX C

Federal Trail Manager Cover Letters and Questionnaire

May 17, 2001

Dear BLM Trail Manager:

Michigan State University and Michigan Department of Transportation are cooperating to study the benefits of Rail-Trails. In particular, our study focuses on the Pere Marquette Rail-Trail in Midland County as a case study and model for the state.

In the past year we have completed trail studies of users, county residents, tourists, special event participants, and adjacent and nearby residents and businesses. In the next year we will be completing a series of manuals featuring Rail-Trail research that address benefits, life cycle, business potential, trail use and community integration, and planning and technology. To better understand technology we are asking for your assistance.

We would like to encourage you to pass the survey along if you feel there's a more appropriate person to complete the information. Please e-mail us to let us know whom you passed it on to.

This letter and survey is a follow-up to an e-mail or phone call that we sent to the regional or state recreation manager. We asked them to provide five names of individuals who manage trails. Your name was provided to us. We have designed a four-page survey that asks about your thoughts and efforts of monitoring trail usage. We are surveying all the state trail managers and pedestrian and bicycle coordinators across the 50 states and Puerto Rico and selected individuals with federal land management agencies.

You indicate your voluntary agreement to participate by completing and returning this questionnaire. However, if you choose not to participate, you will not suffer any penalty. We have included a question at the end of the survey that asks whether the information you have provided could be shared with others in a report that identifies results by state or federal agency. We anticipate e-mailing the results by July 30, 2001.

When you have completed the questionnaire, please mail it back to us in the postage paid envelope provided. Your responses will be kept confidential and your name will not be associated with any results. If you have any questions or concerns regarding your rights as a research participant, please contact the MSU representative at 517-355-2180.

Thanks for your help.

Sincerely,

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lynchjoe@msu

Stan Cindrity
cindrity@msu.edu

Christine Vogt, Ph.D.
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2. At what level do you oversee or manage trails? *(please check one)*
 PROGRAM OR REGIONAL LEVEL AGENCY-WIDE MULTI-AGENCY

3. What types of trail uses characterize the trails you or your agency oversee? *(please check all that apply)*
 NON-MOTORIZED MOTORIZED

<u>Specifically?</u> <input type="checkbox"/> WALKING/HIKING/BACKPACKING <input type="checkbox"/> EQUESTRIAN <input type="checkbox"/> ROAD BIKING <input type="checkbox"/> MOUNTAIN BIKING <input type="checkbox"/> CROSS-COUNTY SKIING <input type="checkbox"/> IN-LINE SKATING <input type="checkbox"/> OTHER (DESCRIBE) _____	<u>Specifically?</u> <input type="checkbox"/> ORV (ATV, MOTORCYCLE, FULL-SIZE 4W) <input type="checkbox"/> SNOWMOBILING <input type="checkbox"/> OTHER (DESCRIBE) _____ _____ _____
---	--

4. Approximately how many miles of trails do you or your agency oversee by trail types?
(fill in a number for each)
_____ MILES OF ONLY NONMOTORIZED TRAILS
_____ MILES OF ONLY MOTORIZED TRAILS
_____ MILES OF COMBINED NONMOTORIZED AND MOTORIZED TRAILS

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5. For some or all of the trails that you or your agency oversee, has visitor use/visitation data been collected in the past 5 years? *(please check one)*
 YES, CONTINUE TO QUESTION 6
 NO, SKIP TO QUESTION 15
If no, why? *(please provide reasons)* _____

6. What reasons describe why visitor use data are collected on one or more of the trails that you or your agency oversee? *(please check all that apply)*

- STATE OR FEDERAL REQUIREMENT
- AGENCY POLICY (STATE OR FEDERAL)
- BUDGET DEVELOPMENT OR GRANT JUSTIFICATION
- FUTURE PLANNING AND CAPITAL PROJECTS
- MARKETING OR VISITOR SATISFACTION
- OTHER (DESCRIBE) _____

7. What functions describe how trail visitor use data are used? *(please check all that apply)*

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- NUMBERS ARE SHARED WITH AGENCY OR DEPARTMENT HEADS
- TREND DATA ARE COMPILED
- DATA ARE AVAILABLE FOR PUBLIC REVIEW OR USED BY OTHER AGENCIES
- OTHER (DESCRIBE) _____

8. How would you describe the nature of the most recent trail use data collection effort?

Context *(please check all that apply)*

- SYSTEM-WIDE
- HIGH USE TRAILS
- CERTAIN TRAILS (WHICH TYPES?) _____
- CRISIS SITUATIONS

Timing *(please check all that apply)*

- ON-GOING
- IRREGULAR OR ONE-TIME ONLY

9a. What trail use estimation techniques have been used in the past 5 years on one or more of the trails that you or your agency oversee? *(please check all that apply)*

- | | |
|--|---|
| <input type="checkbox"/> A. REGISTRATION AT TRAIL HEADS | <input type="checkbox"/> F. OBSERVATIONS/VISUAL COUNTING AT PARKING LOTS OR ON TRAILS |
| <input type="checkbox"/> B. PERMITS | <input type="checkbox"/> G. GROUND PHOTOGRAPHY/ VIDEO |
| <input type="checkbox"/> C. ENTRANCE OR OTHER USE FEES | <input type="checkbox"/> H. MECHANICAL OR ELECTRONIC COUNTING DEVICES (E.G., TRAFFIC, PEDESTRIAN, PARKING LOTS) |
| <input type="checkbox"/> D. ON-SITE VISITOR INTERVIEW OR QUESTIONNAIRE | <input type="checkbox"/> I. AERIAL PHOTOGRAPHY |
| <input type="checkbox"/> E. SURVEY MAILED TO USER AT HOME | <input type="checkbox"/> J. OTHER (PLEASE LIST) _____ |

9b. Are there any combinations of techniques used?

- NO YES, please list using letters "A" to "J" _____ & _____ & _____ & _____.

10. What type of data are typically collected? *(please check all that apply)*

- | | |
|---|---|
| <input type="checkbox"/> NUMBER OF VISITOR USES | <input type="checkbox"/> DISTANCE OF TRAIL USED |
| <input type="checkbox"/> NUMBER OF VISITS OVER A TIME FRAME | <input type="checkbox"/> SECTIONS OF TRAIL USED |
| <input type="checkbox"/> TYPES OF DIFFERENT ACTIVITIES | <input type="checkbox"/> RESIDENCY (ZIP CODES, LICENSE PLATES) |
| <input type="checkbox"/> HOURS OF USE | <input type="checkbox"/> DEMOGRAPHIC |
| <input type="checkbox"/> OVERNIGHT STAY(S) - LENGTH OF STAY | <input type="checkbox"/> ECONOMIC OR SPENDING PROFILES |
| <input type="checkbox"/> GROUP SIZE | <input type="checkbox"/> USE OF LOCAL BUSINESSES OR COMMERCIAL SERVICES |
| <input type="checkbox"/> SATISFACTION OR OTHER ATTITUDES | <input type="checkbox"/> TRAIL USER CONFLICT |

11. Has a report been recently written that incorporates use data? *(please check one)*
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INDUCTIVE - MAGNETIC COUNTING	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
PNEUMATIC - AIR PRESSURE	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
STILL PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
VIDEO PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5
DIGITAL PHOTOGRAPHY	<input type="checkbox"/>	<input type="checkbox"/>	1 2 3 4 5

If any devices were piloted/tested but not implemented, please describe why? _____

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 NO, SKIP TO QUESTION 19
 YES, Are there any trail applications? NO YES
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18. How is GIS being used for trail planning or management at your agency? (please describe) _____
19. If your agency or its trails section is currently not using GIS, is there an intent to use GIS for trail planning or management in the future? (please check one) NO YES
20. We are interested in compiling these results by state, are you willing to have your responses shared with other trail managers and public? (please check one) NO YES
21. Would you like a copy of the final report?(please check one) NO YES

Thank you for completing this survey. Please return to: Dr. Joel Lynch, Dept. of Park, Recreation and Tourism Resources, Michigan State University 131 Natural Resources Building, East Lansing, MI 48824-1222 517-353-5190 x139 Lynchjoe@msu.edu