

VISITOR PERCEPTIONS OF PERSONAL SECURITY AND CRIME AT OUTDOOR RECREATION AREAS: CONTEMPORARY ISSUES AT US ARMY CORPS OF ENGINEERS LAKES AND ALONG THE APPALACHIAN TRAIL

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Abstract. This pilot study focuses on visitors' perceptions of security at outdoor recreation areas at several US Army Corps of Engineers recreation areas and along the Appalachian Trail. Of specific interest is the difference noted in the perception of security between users of the Corps lakes, which are staffed by rangers and law enforcement officers, and the perceptions of Appalachian Trail users where contact with any rangers or law enforcement officers is unlikely. Preliminary analysis of the pilot study data show that Appalachian Trail users perceive overall higher levels of crime and have less contact with any staff, yet are more satisfied with the level of assistance that they received from law enforcement officers. Differences between different visitor characteristics and socio-demographic variables are examined, demonstrating a high degree of disparity in the perceptions of security of males and females.

Background

A safe and secure environment is necessary for visitors to outdoor recreation areas and park personnel alike. Unfortunately, reports of violent crimes have been highlighted in recent news reports across the nation, with particular attention given to nine murders (including two double homicides), attempted murders and rapes committed along the Appalachian Trail since 1974. Additionally, the 1998 murder of a National Park Service ranger in the Shenandoah National Park has raised the awareness of such crimes to virtually all park-goers. This study reports the results of a pilot study conducted at three US Army Corps of Engineer-managed lakes located near Huntington, West Virginia, one Corps-managed area near Portland, Oregon, and along the Appalachian Trail.

In a study of perceived safety and security problems at Somerville Lake, Texas (US Army Corps of Engineers),

Fletcher (1983) found that perceived safety and security problems negatively affected users' enjoyment of parks. The study also noted the site specificity of perceived safety and security problems, with significantly higher levels of concern at non-fee areas in comparison with the fee areas at the same lake. This was partially explained by the degree of supervision at the fee areas, where access was restricted by a staffed entrance/exit. In several different studies, researchers found that 30-35% of visitors were *not* able to say that they felt safe in the park that they were visiting (Godbey and Blazey, 1983, Westover, 1986, Whyte, 1995).

In a recent study, Ibitayo and Virden (1996) sought to compare the perceptions of park managers with those of park visitors regarding deviant behavior in urban parks. Given a twenty-one item list (items such as theft, vandalism, noise/loud music, parking violations, drug use, and so forth) park managers consistently rated the items much higher in terms of security problems than the visitors. Essentially, visitors perceived low levels of depreciative behavior, while park managers perceived much higher levels of deviant behavior. This study also showed that frequent visitors perceived significantly higher levels of depreciative behavior than did infrequent users. Suren and Stiefvater (1997) focused on administrative strategies to combat socially depreciative behavior in parks and recreation agencies. In a survey of almost 60 park and recreation administrators, 53 percent noted vandalism as a problem, 42 percent mentioned alcohol and drug use, and 37 percent suggested hanging out as a problem.

This pilot study was conducted in 1998 with the purpose of attempting to ascertain visitors' perception of crime in two outdoor recreation environments, US Army Corps of Engineers lakes in West Virginia/Kentucky and Oregon/Washington, and the Appalachian Trail (A.T.). The A.T., a unit of the National Park Service, is a linear footpath, running over 2100 miles from Maine to Georgia. The A.T. crosses through 14 eastern states, and encompasses over 250,000 acres of mountain terrain. Trail hikers were given the opportunity to fill out a one-page survey when they stopped at the Appalachian Trail Conference's (ATC) headquarters building in Harpers Ferry, West Virginia, a popular stop-off point located at about the midway point on the A.T. The ATC is a nonprofit organization dedicated to the preservation of the trail and its resources. The US Army Corps of Engineers maintains operational control of 463 lakes, rivers, and wetlands across 40 states, and is one of the nation's largest recreation providers. The Corps of Engineers visitors were interviewed through face-to-face interviews at recreation sites along the shores of three Corps-managed lakes in West Virginia and Kentucky and in the Columbia River Gorge on the border of Oregon and Washington.

This study compares the responses of visitors to similar questions at both Appalachian Trail and Corps of Engineers recreation areas. Visitors at each of the recreation locations were asked to answer several questions about their perceptions of security and crime during the Summer 1998 recreation season (n=848). User responses to variables such as satisfaction with security at the recreation site,

ranger assistance, whether they had encountered crimes, whether they had heard of crimes at the recreation areas, and other associated variables were measured. Independent variables for the study were gender, age, employment status, education level, distance from recreation area, visibility of ranger or law enforcement patrols and location of recreation area.

Results

The first table focuses on the baseline question of an individual's perception of security while at the recreation area. Table 1 shows that users of the Appalachian Trail were more likely to indicate that they were very safe (76%) than Corps lake users (60% very safe). Over one-third (37%) of the Corps lake visitors noted that they were reasonably safe, compared to just under one-quarter (24%) of the AT users. Of interest in this table is the finding that

a small minority (4%) of Corps lake visitors felt that they were somewhat unsafe or very unsafe, while no A.T. users (0%) reported that they were less than reasonably safe. This finding was unexpected. The researchers expected Corps lakes users to feel more safe, since most of the lakes have some sort of roving security patrols, such as ranger or local law enforcement officers, in contrast with the A.T. that has few people on patrol.

The differences between males and females regarding perception of safety and security are also noted in Table 1, with more males reporting that they felt very safe than females both along the A.T. and at ACOE lake recreation areas. There was a larger disparity between the perceptions of males and females along the A.T. than was noted at the ACOE lakes. There was little difference between the males and females in the lower categories of somewhat unsafe and very unsafe at the ACOE lakes.

Table 1. Perception of safety/security

Perception of Safety/security	Appalachian Trail	ACOE Lakes	A.T. Males	A.T. Females	ACOE Lake Males	ACOE Lake Females
Very safe	76%	60%	79%	65%	62%	57%
Reasonably safe	24%	37%	21%	35%	35%	40%
Somewhat unsafe	0%	3%	0%	0%	3%	4%
Very unsafe	0%	1%	0%	0%	1%	0%

Table 2 shows the results of whether visitors encountered a security problem along the Appalachian Trail or at the ACOE lake recreation areas over the past year. Overall, A.T. visitors were more likely to have encountered some sort of security problem while recreating along the trail

(9%) than were ACOE users (2%). Similarly, there were greater differences between the females (6% encountered a problem) and males (2% encountered a problem) than at the ACOE lakes, where just 2% of both males and females encountered a problem.

Table 2. Encountered a security problem within the past year

Encountered a Security Problem	Appalachian Trail	ACOE Lakes	A.T. Males	A.T. Females	ACOE Lake Males	ACOE Lake Females
Yes	9%	2%	10%	6%	2%	2%
No	91%	98%	90%	94%	98%	98%

Related to the notion of actually encountering a security problem is the issue of hearing about a crime or crimes committed along the A.T. or at one of the ACOE recreation areas. Table 3 highlights the differences between the two distinctly different recreation environments. Clearly, the A.T. users were much more likely (69%) than ACOE recreation users (9%) to have heard of a crime that had

been committed. Distinct differences were also noted between males and females along the A.T. (80% of females had heard of a crime committed, compared to only 64% of males). There was little difference in the perceptions at the ACOE lakes, with less than 10% of males and females hearing of a crime committed within the past year.

Table 3. Heard of a security problem within the past year

Heard of a Security Problem	Appalachian Trail	ACOE Lakes	A.T. Males	A.T. Females	ACOE Lake Males	ACOE Lake Females
Yes	69%	9%	64%	80%	9%	9%
No	31%	91%	36%	20%	91%	91%

Table 4 indicates the proportion of visitors along the A.T. and at ACOE recreation areas who had some sort of contact with a law enforcement officer while they were recreating. Once again, distinct differences were noted between the two user groups. While virtually no A.T. users (1%) had any sort of contact with law enforcement officers, one-quarter (25%) of ACOE users had some sort of law

enforcement contact while at the recreation area. Females at the ACOE lakes were slightly more likely to report some sort of contact with a law enforcement officer than males. The proportion of A.T. visitors who reported any form of contact was not sufficient to be included in the gender analysis of Table 4.

Table 4. Contact with law enforcement officers

Contact with a law enforcement officer	Appalachian Trail	ACOE Lakes	A.T. Males	A.T. Females	ACOE Lake Males	ACOE Lake Females
Yes	1%	25%	---	---	22%	28%
No	99%	75%	---	---	78%	72%

Table 5 reports the degree of satisfaction with the assistance received from the law enforcement officers. Interestingly, the A.T. users reported a higher degree of satisfaction than ACOE users regarding satisfaction with assistance received from law enforcement officers. This is surprising because of the great degree of difference between the number of A.T. users who encountered some

sort of contact compared to ACOE visitors, and relates to the concept of understanding users' expectations about the visibility of law enforcement officers at recreation areas. Little difference was noted in the satisfaction levels by males and females at the ACOE lakes, and, once again, not enough A.T. users experienced a contact with a law enforcement officers to make a gender comparison.

Table 5. Satisfaction with assistance received

Satisfaction with assistance	Appalachian Trail	ACOE Lakes	A.T. Males	A.T. Females	ACOE Lake Males	ACOE Lake Females
Very satisfied	66%	58%	---	---	58%	58%
Reasonably satisfied	31%	38%	---	---	37%	38%
Somewhat dissatisfied	3%	3%	---	---	2%	3%
Very dissatisfied	3%	1%	---	---	2%	0%

Conclusions and implications

Perhaps the most important finding of this pilot study is that the A.T. visitors reported overall higher levels of safety and security, while reporting less contacts with law enforcement officers. Following this trend, A.T. users also reported higher degrees of satisfaction with the assistance provided by law enforcement officers, while reporting much less contact. Although it is important to note that these preliminary data are the results of a pilot study, the implications to managers are important. The expectations of users regarding the degree of law enforcement contact desired must be understood by managers. When recreationists desire solitude, or simply want to enjoy a recreation experience with family members or friends, they may not wish to have contact with law enforcement officers, and the lack of contact may actually result in a higher quality experience.

The Appalachian Trail recreationists present themselves as a user group that is very different than the ACOE lake recreationist when it comes to security issues. ACOE visitors consistently showed lower levels of security problem encounters, situations where they heard about security problems, and even satisfaction with the assistance received from law enforcement officers. The ACOE lake

users, conversely, reported higher levels of contacts with law enforcement officers, and this contact did not appear to increase their overall perception of security at the lake.

The differences between males and females, as well, were stronger for A.T. visitors than for ACOE visitors. While ACOE visitors reported similar results in nearly all categories in this study, A.T. users reported distinctly different responses depending on gender. Males reported higher perceptions of security overall, and were more likely to have encountered a security problem in the past year. Females, however, were more likely to have heard about a security problem on the trail in the past year. This is important to managers because the perception of criminal activity at a recreation area, whether the crime was real or not, may lead to a decreased perception of security, as noted in this pilot study.

Overall, when different user groups are queried about crime and security, quite different responses are noted. Once specific user groups' perceptions of crime and security issues are understood, managers can attempt to inform or educate users about the risks associated with a specific recreation area. ACOE recreation areas, with 462 dams, levies, wetlands and other multi-purpose water-related projects in 40 separate states, represent an enormous

amount of recreation visitation and shoreline acreage, and the perceptions and statistical accounting of crimes at these areas must be understood as well. The Appalachian Trail, traversing through 14 states and literally hundreds of counties, townships, towns, and other jurisdictions is a unique geographic feature that warrants further study. This pilot study focused on hikers who had traversed over half of the trail (through hikers), which is only one segment of A.T. users. An ongoing visitor use study of A.T. users queries all different user groups (day hikers, weekend or week hikers, through hikers, etc.) about their perceptions of security on and near the A.T., and will allow us to study the subject of security along the A.T. in much more depth.

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WEATHER RELATED LIABILITY IN OUTDOOR RECREATION

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Abstract: Weather related accidents have traditionally been considered as "Acts of God." Case law is starting to change that perception to a more situational context. A recent national survey on the laws, regulations, and operating procedures public agencies and organizations utilize to warn outdoor recreationists and sports participants of severe weather conditions revealed that only a few of the surveyed organizations have formal visitor warning procedures. While there are few statutory or regulatory requirements the courts have increasingly awarded damages to plaintiffs in weather related cases.

Introduction

The research survey utilized a mailed questionnaire to the state offices of the Division of State Parks (or equivalent outdoor recreation unit) for each state, U.S. Forest Service regional offices, National Park Service regional offices, and the national offices of the National Camping Association.

The surveyed organizations represent thousands of campgrounds operated by both agencies and concessionaires and includes most of the major providers of campgrounds in the United States. The study indicated that there is an apparent inconsistency between what agencies and organizations believe they are providing and what they are actually providing regarding weather warnings. Some categories of severe weather forecasting (i.e. hurricanes, flooding, extreme temperature) provide a much longer time

period between the damaging event and the warning forecast. While weather warnings are available for tornadoes and severe thunderstorms, the warning period is much shorter and the legal risk may increase.

Research Methodology

A nation-wide weather warning survey was conducted by Professor Bruce Hronek of the Department of Recreation and Park Administration at Indiana University. The survey was directed at the National, Regional or State offices of some of the major outdoor resource managing agency in the United States. The survey focused on obtaining information regarding the statutory requirements organizations have in providing weather warning; what organizations have self-imposed through written operational procedures; and, if they have warning procedures, what methods are employed to inform the visitor of severe weather. The survey was intended to determine if a national trend or standard exists related to severe weather warnings.

The research survey utilized a mailed questionnaire to the state offices of the Division of State Parks (or equivalent outdoor recreation managing unit) for each state, the U.S. Forest Service regional offices, the National Park Service regional offices, and the national office of the National Camping Association. A month after the initial request for information, a follow-up mailing was sent to those who did not respond. In September a final telephone inquiry was made to the six units who failed to respond to the mailings.

The surveyed organizations represent thousands of campgrounds operated by both agencies and concessionaires. and includes most of the major providers of campgrounds in the United States. Each individual respondent (state, region, or national office) represents an extensive network of camping facilities. A single respondent may represent as many as 200 or more individual campgrounds with varying numbers of camping sites in each campground.

Table 1. Response Rate Summary

Organization	# of Units Surveyed	# of Units Responding	% of Units Responding
State Parks (State Offices)	50	9	98.0
National Park Service (Regional Offices)	10	10	100
U.S. Forest Service (Regional Offices)	9	9	100
National Camping Association (Non-Public National Office)	1	1	100
Total	70	69	98.6

Response To Survey Questions:

Question 1. Do you know of any statutes requiring your organization to warn the campground visitor of severe weather.?

Results: 68 no (98.6%), 1 yes (1.4%)

All respondents except the State of Rhode Island and Michigan stated there were no laws (statutes) requiring them to provide weather warnings. While Rhode Island indicated their answer was yes, they had no written operating procedures. Their detailed notation indicated that they used the state's Emergency Management Agency to warn campground visitors.

Table 2 Questionnaire Summary (Questions 1 & 2)

Question:	Number YES	Percent YES	Number NO	Percent NO
1. Do you know of any statutes requiring your organization to warn the campground visitor or severe weather?	2	2.9	67	97.1
2. Does your organization have written operational procedures that recommend that visitors be warned of severe weather conditions?	23	33.3	46	66.7

Question 2. Does your organization have written operational procedures (internal manuals handbooks, instruction etc) that recommends or directs visitors be warned of severe weather conditions?

Results: 23 yes (33.3 %), 46 no, (66.7%)

Of the 23 responding yes, 17 (73.9 %) indicated that not all the units (parks, campgrounds, etc.) in their jurisdiction had weather related operational procedures. Only part of the areas, frequently coastal areas or those particularly subject to weather related events such as tornados, floods,

fires etc., have operational warning systems. Some respondents who marked no to question 2 indicated that while they did not have weather warning operational procedures they may warn visitors if they knew of severe weather conditions.

Question 3. If your regulations or procedures warn visitors of severe weather conditions, what type of systems do you use?

Results:: The twenty three respondents, who indicated they had operational procedures, stated they use the following methods to warn visitors of severe weather conditions:

Table 3 Visitor Weather Warning Methodology

Methods Used to Warn Visitor	Number of Respondents Using Method	Percent of Respondents Using Method
Personal Contact	23	100
Bulletin Boards	17	73.9
Public Radio (visitor responsible to monitor)	16	69.6
Audio Warnings - alarm, siren, etc	8	34.8
Signs	2	8.7

Interpreting the Data

There is an apparent inconsistency in what campground managing agencies and organizations headquarters believe they are providing and what they are actually providing regarding weather warnings. Contact with field personnel indicates that, because of a number of factors, most campground owners and managers cannot provide visitor warning of quickly developing severe weather occurrences. This is generally the result of manpower limitations, remoteness of unmanned camping facilities, number of occupied units in campground, campers engaged in activities outside their camping site (hiking trails, swimming, sight-seeing, etc.); and campground personnel management duties that limit the monitoring of telephone and radio broadcasts on a continual basis.

Weather warning related to hurricanes, extreme temperatures, broad area flooding can be forecast many hours if not days ahead, allowing adequate warning for outdoor recreation users. Exceptions to the opportunity to warn would apply to wilderness users, hikers, boaters, and others without radio or other public media contact in remote locations. Because of the lead time available, the public can be adequately warned regarding specific categories of predicted weather events such as hurricanes and broad area flooding.

The National Weather Service (Meteorologist in Charge, National Weather Service, Indianapolis Indiana) indicates that the primary means of warning the public of severe weather conditions is through weather radio, the weather wire, and the national weather warning system. Meteorologists indicate that lead time between issuing of weather warnings for tornados or high winds and the occurrence of the event is normally between 0 and 20 minutes. Frequently the first warning is given after the event occurs and is recognized on weather radar or reported by a severe weather spotter.

Some categories of severe weather forecasting provide a much longer time period between the damaging event and the warning. Hurricanes, and broad area flooding can usually be predicted many hours if not days in advance of the event. Special or severe weather statements provide additional information between the issuance of a watch and a warning.

Weather watches just relate to tornados, floods, and severe thunderstorms. Severe thunderstorms warnings are issued when damaging winds and large hail are expected; but lightning is not expected. Lightning information may be noted in special weather statements, but is not included in watches and warnings.

The National Weather Service anticipates that when weather watches are issued, people will go about their daily activities but monitor radios for further updates and possible warnings.

Radars, in many cases, have the unique characteristics of being able to distinguish tornados and straight line wind conditions a short period of time before they occur.

A common defense for weather related accidents has generally been that the occurrence was an "Acts of God". This is used when there is an obvious unforeseeable,

intervening force of nature. Severe weather can also be considered an "emergency" situation. People representing agencies and organizations under emergency conditions cannot reasonably be held to the same conduct as on who has had full opportunity to reflect, even when it appears that they made the wrong decision. Under emergency conditions, a persons choice may be mistaken and yet prudent., and thus ,without negligent intent or a perceived duty of care .

Selected Weather Related Cases:

Schieler v. United States 642 F.Supp. 1310 (E.D. Cal 1986)

Plaintiff was injured as a result of being struck with lightning in Sequoia National Park. The plaintiff was standing on top of Moro Rock when the accident occurred. The plaintiff argued that he should have been warned of the dangers of lightning in the area, that there was thunderstorms predicted, and the Park Service failed to provide safety devices (lightning rods) to ground the observation area. The court ruled in favor of the defendant stating the discretionary function of the federal agency applies to decisions of this nature met the discretionary function exception to the FTC because the decisions was "made pursuant to the activities and decisions of the Park Services in carrying out the Congressionally mandated mission of the Park."

Picardo v. North Patchoque Medford Youth Athletic Association, Inc. 172 A.D.2d 814; 569 N.Y.S.2d 186 (1991)

Supreme Court of New York, Appellate Division, Second Department. Plaintiff's decedent was struck by lightning on a baseball field while playing for the defendant's team. The plaintiff claimed that the defendant "allowed a baseball game to continue when threatening weather became apparent" The defendant asked for summary judgement claiming the decedent was 19 years old at the time of his death and he elected to play baseball in weather conditions which were readily apparent, thunder was heard, and lightning was seen.

The trial court rejected the defendant's request for summary judgement. The defendant appealed. The appeals court revered the order of the trial court and granted the defendant a motion for summary judgement based upon the fact there was no compulsion or economic interest to continue to play in obvious threatening weather.

Chimino v. Town of Hemstead 488 N.Y.S.2d 68 Supreme

Court, App. Div. 2d 1985. Plaintiff was injured as a result of being struck by a wave at a beach area managed by the Town of Hemstead in the state of New York. The plaintiff alleged that the City was negligent not to warn him of the wave conditions or they should have closed the beach. The courts ruled that the City had no duty to warn the plaintiff or close the beach because of weather and wave conditions was obvious to the users.

McAuliffe v. Town of New Windsor 577 N.Y.S.2d 942 (A.D.

1991) Plaintiff, age 16, was injured on the town's beach as a result of being struck by lightning while playing volleyball on the beach. Plaintiff claimed that the defendant was negligent in their supervision of the beach. The plaintiff had heard the warning to get out of the water but claimed he did not hear the warning to take cover. The appeals court determined that the Town of New Windsor did not have a

duty "to specifically warn McAuliffe against the danger of lightning."

Dykema v. Gus Macker Enterprises, Inc 492 N.W.2d (1992) Plaintiff was attending a basketball tournament as a spectator. He paid no entrance or admission fee. While running toward a shelter the plaintiff was struck and injured by a lightning storm blown tree limb. The plaintiff claimed that a special relationship existed and Gus Macker Enterprises had a duty to protect their patrons. The defendant claimed that not special relationship existed because the plaintiff was not there for business purposes, he did not pay a fee, he was able to see the changing weather, and the plaintiff did not entrust himself to the control and protection of the defendant. The Appeals court ruled that the "defendant was under no duty to warn plaintiff of the approaching thunderstorm.

Weather Related Cases:

Lightning

Bier v. City of New Philadelphia 11 Ohio St.3d 134, 464 N.E.2d 147 (1984) Supreme Court of Ohio; Lightning Strikes metal picnic shelter causing death and injury. Lack of lightning protection contributed to plaintiffs injuries.

McAuliffe v. Town of New Windsor 577 N.Y.S.2d 942 (1991) Supreme Court of New York, Appellate Division, Third Department; The obligation of beach recreation personnel to warn people to "take cover" during thunderstorm.

Wave (Ocean)

Stresmpkowski v. Borough of Mansquan 208 N.J. Super. 328, 506 A.2d 5 (1986) Supreme Court of New Jersey, Appellate Division; Swimmer struck by wave off public beach.

Cimino v. Town of Hempstead 488 N.Y.S.2d 68 (1985) Supreme Court, Appellate Division, 2nd Department; Town has no duty to warn bather/swimmer of wave activity.

Flash Flood

Ducy v. United States 713 F.2d 504 (1983) United States Court of Appeals, 9th Circuit; National Park Service Recreation Landowner Liability Defense for flash flood in National Recreation Area.

Other Weather Related Cases:

Fuhrer v. Gearhart By the Sea, 79 Or. App. 550, 719 P.2d 1305, 734 P.2d 1349, (1987) app'd Or App., 742 P.2d 58 (1987).

Cutler v. Jacksonville Beach, 489 S.2d 129 (Fla 1986)
Geffen v. County of Los Angeles 242 Cal. Rptr. 105 (1988)

Harmon v. U.S. 532 F.2nd 699 (1975)

Christon v. Kankakee Valley Boat Club, 152 Ill App.d 202, 504 N.E.2d 263 (1987)

MOUNTAIN BICYCLISTS' BEHAVIOR IN SOCIAL TRAIL ETIQUETTE SITUATIONS

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Abstract: Mountain bicyclist organizations and land management agencies have promoted trail etiquette guidelines in attempts to reduce social and environmental impacts on multiple-use trails. The purpose of this study was to unobtrusively examine mountain bicyclists' behavior in two social trail etiquette situations: yielding behavior and speed traveled. A secondary purpose was to create a scale for testing yielding behavior. Results indicated that significant differences existed in yielding behavior based on gender, and three equipment indicators of behavior. Significant differences were present in speed traveled for gender, estimated age categories, and six equipment indicators. The yielding scale offers a more precise measurement of yielding behavior of mountain bicyclists than methods employed previously.

Introduction

The growing popularity of mountain biking during the 1980s and 1990s throughout the United States has created one of the more recent recreation resource management issues facing managers of multiple use trail systems. Perceived social and environmental impacts have surfaced in various locales (Moore, 1994). In some areas, recreational conflicts and resource degradation have pitted recreation users against each other with battle lines drawn in board meetings, on the trails, as editorials in local newspapers, and in popular magazines (Hendricks, 1997). In other regions, conflicts have been minimal and cooperation has been extensive between mountain bikers, hikers, and equestrians.

Attempts to control the impact of mountain biking have included site closures, new regulations, and educational campaigns. Among the most accepted and widespread educational efforts are trail etiquette guidelines published, distributed, and communicated by various land management agencies and bicycle organizations. For example, the International Mountain Bicycling Association (IMBA) recommends that bicyclists (a) ride open trails

only, (b) leave no trace, (c) control the bicycle, (d) always yield, (e) never spook animals, and (f) plan ahead.

Even with the development of extensive educational efforts little is known about actual adherence to trail etiquette and the behavior of mountain bicyclists in multiple-use trail settings. The few mountain bike studies conducted specifically related to trail etiquette have also raised issues, yet to be addressed. In previous research, mountain bicyclists indicated that etiquette should be followed (e.g. Chavez, 1997a), yet an unobtrusive study of mountain bicyclists observed that behavior is often contrary to the espoused etiquette (Ramthun & Ruddell, 1992). Furthermore, actual etiquette may be conditional or situational based on resources and the behavior of others (Hendricks & Ruddell, 1995; Ruddell & Hendricks, 1997) and conflict perceptions may vary according to experience (Chavez, 1997a) or activity orientation (Watson, Asp, Walsh, & Kulla, 1997). Social conflict trail etiquette situations remain an issue for land managers (Chavez, 1996, 1997b).

The purpose of this study was to unobtrusively examine mountain bicyclists' behavior in two social trail etiquette situations: yielding behavior and speed traveled. A secondary purpose was to create a scale for testing yielding behavior. Potential equipment indicators of mountain bicyclists behavior were also examined.

Methods

Subjects in the study were 188 mountain bicyclists riding on a multiple-use protection road (dirt, fire road) on Mt. Tamalpais in Marin County California on selected days and randomly chosen times during June and August, 1998. Mt. Tamalpais is recognized, as the "birthplace" of mountain biking and 20 years following the first mountain bike riders on the mountain, recreational conflict remains a serious concern for land managers. The Marin Municipal Water District (MMWD) maintains similar trail etiquette guidelines to those suggested by IMBA. MMWD asks bicyclists to stop and wait for equestrians and hikers to pass or signal the bicyclists through, recommends announcing a presence by ringing a bell or saying hello, and to slow down and pass with care. They also enforce a 15 mph speed limit and a 5 mph speed limit when passing others and on a blind turn.

Independent variables identified by field observations were gender, estimated age categories, and potential equipment indicators of behavior (dichotomous variable, equipment observed or not observed). Estimated age categories were 18-25, 26-35, 36-45, 46-55, and 56 and above. Equipment indicators observed were gloves, riding jersey, riding shorts, sport glasses, helmet, hydration pack, riding shoes, and clipless pedals. The dependent variables were yielding behavior when approaching two hikers and speed. Measures for the dependent variables were taken unobtrusively as follows: (a) yielding was rated on a 9-point behavior anchored rating scale with three general categories no yield, marginal yield, and superior yield; (b) speed was calculated with a radar gun to determine miles per hour the bicyclist was traveling. A scale was developed

for speed with 0 being any speed at the speed limit (15 mph) or below and a point on the scale for each mile per hour over the speed limit. This procedure was developed due to a limitation of the radar gun which was unable to record speed for individuals traveling at a slow speed (11 mph and under) or who stopped and started in the area where speed was recorded. A research assistant with the radar gun was located to the side of the protection road where it was unlikely that bicyclists would see this individual. For the independent variable observations and to record the yielding behavior two researchers hiked up the protection road side by side not giving any verbal or non-verbal indication that they would yield to an on-coming bicyclist. The bicyclists could see the hikers within approximately 25 meters. Following contact with a bicyclist the researchers maintained their original position on the trail in preparation for other bicyclists. The inter-rater reliability coefficient for the yielding scale was .97.

Data analysis involved a one-way analysis of variance procedure for the estimated age categories and a t-test for gender (male/female) and equipment indicators (observed or not observed). Estimated age categories were collapsed to 18-35, 36-45, and 46 and above because few subjects were observed that were 18-25 or 56 and above. A separate analysis was conducted for the speed and yielding dependent variables.

Results

Results of the study indicated that there was a significant negative correlation (-.32) between yielding behavior and speed traveled. The overall mean score for yielding was 3.13 (slightly above no yield, exemplified by eye contact only). Females yielding mean score (3.53, between no yield with eye contact only and a marginal yield with a positive verbal response on the scale) was significantly higher than males (2.95, a no yield, indicating eye contact only). There were no differences in yielding behavior among the estimated age groups $F(2, 170) = .77, p < .465$. Equipment indicators with significant differences between those with the equipment and those without were hydration pack, clipless pedals, and riding shoes indicating that those with the equipment were less likely to yield. Subjects with equipment indicators had lower mean scores than those without for all equipment except a helmet (see Table 1).

The mean speed traveled for all subjects 12 mph and above was 17.53 (n=164). Speed traveled was not readable for 24 (12.8%) of the subjects. Nearly 60% of the subjects were traveling over the 15 mph speed limit (see Table 2). When using the mph scale the mean score was 2.65. The males mean score (3.13) was significantly greater than the females score (1.76). The 18-35 age group was traveling

significantly faster than the 36-45 age group, $F(2, 170) = 3.95, p < .021$. Significant differences in equipment indicators were gloves, jersey, sport glasses, clipless pedals, riding shoes, and riding shorts. In all cases the subjects wearing the equipment were traveling at a higher rate of speed (see Table 3).

Discussion

In this locale, etiquette violations persist in spite of long-term managerial strategies and practices that have attempted to reduce user conflicts and violations related to trail use behavior. Based on the results of this study acceptable yielding behavior is nearly non-existent and speed traveled is an additional concern. This follows more than 20 years of various management practices by the MMWD and others on Mt. Tamalpais. Practices have included informational outposts, the formation of a volunteer bicyclist organization, published etiquette guidelines and bicycle trail maps, fines of up to \$200.00 for speeding violations, speed enforcement with a radar gun, posted signs, and meetings between concerned parties and land managers (Edger, 1997). Indirect management and educational strategies have diminished in recent years; it may be time for land managers and mountain bicyclist advocates to reinvest energy in these efforts.

The results offer support for the use of a yielding scale that is a more precise measurement than previously utilized techniques relying on a dichotomous variable of observing or not observing appropriate trail etiquette (i.e. Ramthun & Ruddell, 1992). The scale provides a standardized measure for recording trail etiquette behavior in a variety of inter and intra-group scenarios. For example, the scale could be used for mountain bicyclists yielding behavior with other bicyclists and equestrians in addition to the situation examined in this study. The scale may also be appropriate for single track trail situations and would allow for a comparison between single track and protection road yielding behavior and uphill/downhill scenarios.

The results also demonstrate the need for recreation researchers to employ triangulation techniques and to examine criterion validity for traditional survey research methods. Self-reported yielding behavior in surveys has generally shown more favorable results than reported here.

In this study, the examination of equipment indicators of behavior proved fruitful in segmenting individuals who were more likely to commit etiquette violations. Bicyclists with the presence of specialized equipment were especially apparent traveling at a faster rate of speed than individuals without the equipment. Equipment has long been studied as a component of recreation

Table 1. Yielding Behavior

Variable	n	Mean	SD	F/t-value	P
Overall sample	173	3.13	1.46		
<i>Gender</i>					
Male	119	2.95	1.38		
Female	54	3.53*	1.57	.016	-2.42
<i>Age Groups</i>					
Age 18-35	98	3.18	1.54		
Age 36-45	45	3.22	1.51		
Age 46+	30	2.83	1.09	.769	.465
<i>Equipment Indicator</i>					
No gloves	77	3.37	1.56		
Gloves	96	2.94	1.36	1.92	.056
No helmet	25	3.08	1.58		
Helmet	148	3.14	1.45	-.20	.846
No hydration pack	149	3.22	1.49		
Hydration pack	24	2.60*	1.15	2.32	.026
No jersey	107	3.27	1.45		
Jersey	66	2.92	1.47	1.53	.127
No sport glasses	126	3.21	1.44		
Sport glasses	47	2.93	1.52	1.14	.256
No clipless pedals	134	3.28	1.49		
Clipless pedals	39	2.62*	1.27	2.55	.012
No riding shoes	125	3.32	1.55		
Riding shoes	48	2.66**	1.09	3.14	.002
No riding shorts	46	3.18	1.39		
Riding shorts	127	3.11	1.49	.28	.780

Note. F-test is for age groups; others are t-tests

* p < .05

** p < .01

Table 2. Speed Frequencies

MPH	n	Percent	Cumulative %
No reading	24	12.8	12.8
12	12	6.4	19.1
13	17	9.0	28.2
14	14	7.4	35.6
15	16	8.5	44.1
16	18	9.6	53.7
17	8	4.3	58.0
18	13	6.9	64.9
19	20	10.6	75.5
20	10	5.3	80.9
21	10	5.3	86.2
22	10	5.3	91.5
23	3	1.6	93.1
24	5	2.7	95.7
25	3	1.6	97.3
26	0	0.0	97.3
27	0	0.0	97.3
28	3	1.6	98.9
29	2	1.1	100.0

Note. Speed limit is 15 mph, 5 mph when passing and on a blind turn

Table 3. Speed Behavior

Variable	n	Mean	SD	F/t-value	P
Overall mph	164	17.53	3.93		
Scale mph	188	2.65	3.32		
Gender					
Male	124	3.13	3.51		
Female	58	1.76**	2.62	2.94	.004
Age Groups					
Age 18-35	98	3.25 ^a	3.71		
Age 36-45	45	1.82 ^a	2.63	3.95	.021
Age 46+	30	1.87	2.53		
Equipment Indicator					
No Gloves	84	1.98	2.74		
Gloves	96	3.27**	3.63	-2.75	.007
No helmet	29	2.14	2.25		
Helmet	154	2.78	3.47	-1.28	.207
No hydration pack	158	2.68	3.39		
Hydration pack	25	2.68	2.76	.00	.997
No jersey	114	1.86	2.29		
Jersey	69	4.03**	4.19	-3.96	.001
No sport glasses	135	2.12	2.56		
Sport glasses	48	4.25**	4.50	-3.11	.003
No clipless pedals	140	2.09	2.67		
Clipless pedals	43	4.60**	4.34	-3.60	.001
No riding shoes	133	2.15	2.68		
Riding shoes	50	4.08**	4.30	-2.96	.004
No riding shorts	49	1.86	2.54		
Riding shorts	134	2.98*	3.51	-2.37	.019

Note. F-test is for age groups; others are t-tests

* $p < .05$

** $p < .01$

^a indicates significant difference $p < .05$ between these two groups, post-hoc Tukey procedure

specialization (Bryan, 1977) and has continued as a critical element of recreation specialization conceptualization and theory (i.e. Ditton & Loomis, 1992). This preliminary analysis of equipment as an indicator of bicyclists' behavior indicates that the concept of recreation specialization and its multi-dimensional aspects such as commitment, involvement, and skill development may be useful for segmenting mountain bicyclists.

Gender and to a limited degree age estimates were also useful in determining etiquette violations. With the lapse in time since educational efforts on Mt. Tamalpais have been stressed, a new segment of riders may have matured. Younger bicyclists may not have been reached with the previous campaigns and are potentially unintentional or uninformed violators (Gramann & Vander Stoep, 1987) of trail etiquette. Women and men yielding and speed differences support the need to understand women and men in their leisure pursuits and behavior as suggested in previous literature (e.g. Henderson, 1994, 1996) and to extend the analysis within the mountain biking activity

beyond a simple variable for segmenting users. This would require an investigation within other paradigms of inquiry and with additional research methods.

By identifying groups of users who are more likely to commit etiquette violations, land managers and bicycling organizations can develop messages that appeal to the priorities of those groups. Additionally, confirmatory and further research into the phenomenon of equipment indicators within mountain biking will be an important step in understanding the motivation and preferred experiences that lead to these etiquette violations.

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DISTINCTIONS BETWEEN PERMITTED AND NON-PERMITTED REGISTERED SNOWMOBILERS

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Abstract: In a study of winter 1996-97 Michigan snowmobiling, it was estimated that nearly one third of Michigan registered snowmobiles did not possess a mandatory trail permit for public land operation. This had potentially serious funding and law enforcement implications. In response to manager concerns, a follow up mail questionnaire study of registrants was conducted to better understand why individuals would have a valid, 3-year Michigan snowmobile registration and not purchase an annual trail permit. Respondents with registered, non-permitted snowmobiles reported that many were not used during the 1996-97 winter season because they were a spare machine, non-functional or the respondent lacked time for snowmobiling. Others reported using their machines only on private property or solely in support for ice fishing, which is an exception to the public land trail permit mandate. In addition, it appears there are many expired or duplicate registrations in the state's data base, leading to an overestimate of registered snowmobiles.

Introduction

In Michigan, residents are required by the Michigan Snowmobile Law (Public Act 74 of 1968 as amended) to register their snowmobiles with the Secretary of State in order to operate them on public lands, frozen waters and the shoulders of county roads (should the county permit such operation). Registrations have a three year life. Non-residents are permitted to use their snowmobiles on Michigan's public lands, waters, and shoulders of county roads so long as they possess a current registration from Michigan or from their state or country of origin. In addition to registration, Michigan Public Act 99 of 1994 mandated that all snowmobiles operated on public lands, frozen waters and road rights of way since winter 1994-95, regardless of the owner's state or country of residency, must possess an annual Michigan snowmobile trail permit. The only exceptions are when the machine in question is used on frozen waters for the sole purpose of supporting ice fishing. This 1994 law did not effect snowmobiling on private lands, where a trail permit is not required.

In 1997, a comprehensive study of Michigan snowmobiling use and users during winter 1996-97 was conducted with those who had purchased Michigan snowmobile trail permits (Nelson et al. 1998). One key finding from this study was that a significant proportion of the Michigan registered snowmobiles did not possess a snowmobile trail permit. The Michigan Secretary of State reported approximately 219,000 snowmobiles registered during winter 1996-97. For that same winter, the Michigan Department of Natural Resources Forest Management Division (DNR - FMD) reported 212, 000 snowmobile trail permits were sold. Based upon the study results, it was estimated that 140,000 Michigan registered snowmobiles and 72,000 machines registered in other states possessed snowmobile trail permits, leaving 79,000 Michigan registered snowmobiles without trail permits.

Management Concerns

This number of Michigan registered snowmobiles lacking trail permits was of financial and enforcement concern to the DNR. First, funding for snowmobile trail management is primarily generated through snowmobile trail permit fees and state sales taxes on gasoline used in snowmobiles. DNR-FMD is the state's snowmobile trail program manager. While funding for Michigan's past snowmobile program had lagged slightly behind its management needs, recent program shifts coupled with increased snowmobiling participation had exacerbated trail funding shortfalls.

One reason for shortfalls was legislative direction to establish partnerships between DNR - FMD and non-profit clubs and associations. Partners would meet on the ground snowmobile trail development and maintenance responsibilities through a grants program administered by DNR - FMD. However, this has resulted in the need for significant new financial resources to properly equip grant sponsors, provide cash reimbursements for sponsor expenses and administer the program. The program is state wide, covering a 5,900 mile plus trail system that goes far beyond the borders of the state forest system. As a result of these increased expenses, less money has been available to conduct off season maintenance of the trail system, such as fall grading to insure a smooth trail going into the winter. In addition, expanding numbers of machines and intensifying use facilitated by technology advancements, tourism promotion and more available winter services, has necessitated greater routine maintenance and in-season grooming, thus increasing those expenses.

The intensifying use has correspondingly lead to a congested trail system (Nelson et al. 1998). As a result, development of new trails and connections to towns and other trails, has become a top priority in Michigan, especially as communities recognize the financial benefits of snowmobiling (Stynes et al. 1998). However, the expansion of the trail system also requires more funding. Michigan's designated snowmobile trail system is 25% on state forests, 25% on national forests and 50% on private lands, including some owned by forest products and utility corporations. On non-industrial private lands, annual leases

are used to secure the trail for public use. Each year, some of the leases are withdrawn, necessitating expensive trail rerouting. Costs include planning, landowner contact, preparing and executing leases, updates of maps, etc. However, these private lands, especially adjacent to towns or where a band of inholdings in a public forest might cause a break in a trail, are critical. Near towns they provide legal gateways for snowmobilers to safely access services such as lodging, gasoline and restaurants, promoting economic benefits from snowmobiling.

A final factor in the funding shortfall has been overestimation of potential trail permit sales. When the trail permit system was initiated, it was estimated that essentially all Michigan registered machines would have a trail permit plus another 80,000 non-resident machines registered elsewhere. However, the highest number of trail permits that have been sold at the time of the study was 219,300. Consequently, anticipated revenue has not been realized.

Enforcement concerns were centered on compliance with permit mandates. The DNR Law Enforcement Division (DNR – LED) had primary responsibility for snowmobile law enforcement on public lands and frozen waters. Due to increases in the number of personal injury and fatal snowmobile accidents through the 1990s, more snowmobile law enforcement was undertaken for winter 1995-96 and 1996-97 by the DNR – LED. With these additional enforcement efforts, how could there be a high level of non-compliance with trail permit mandates?

A review of citations written by DNR – LED and officer field reports revealed few citations for permit violations and relatively high levels of trail permit compliance. The most common violations were illegal operation on a roadway by permitted machines. Other potential explanations were that non-permitted, Michigan registered snowmobiles were not being used, were only used on private lands or that registration records were inaccurate. All of these factors might provide some explanation of the high number of Michigan registered snowmobiles that do not possess trail permits. However, no information was available to answer these questions.

Study Objectives

In response to DNR concerns, a follow-up study to the initial snowmobile trail permit holder study was proposed. The overall goal was to better understand situations where an individual would have a valid Michigan snowmobile registration and not purchase an annual trail permit. The specific objectives of this study were to:

1. Characterize Michigan registered snowmobiles without trail permits and compare them to machines with trail permits.
2. Characterize the use of Michigan registered snowmobiles without trail permits and compare it to the use of permitted machines.
3. Characterize the users of Michigan registered snowmobiles without trail permits and compare

them to the users of permitted machines.

4. Assess why a trail permit was not purchased for non-permitted machines.

Study Methods

A mail questionnaire was used to elicit information from Michigan snowmobile registrants. In order to make comparisons between the permitted machines from the 1996-97 study, a sample of snowmobile registrants was selected from all snowmobile registrations that were valid during some or all of winter 1996-97 (November 1, 1996 - March 31, 1997). The list was obtained from the Michigan Secretary of State. Names and addresses of those who had requested the Secretary of State not to release their information were deleted by the Secretary of State prior to providing the list to the researchers. These deleted names totaled less than 500.

The list contained 275,280 registrations with renewal dates from the year 1997 through the year 2000 that were potentially valid during winter 1996-97. From this population, 2,200 names were selected in a systematic sample with a random start after the list had been sorted to eliminate duplicate names and snowmobiles owned by public entities and private corporations.

The mail questionnaire was designed by the authors, reviewed by DNR personnel from LED and FMD and by the Michigan State University Committee on Research Involving Human Subjects. After one round of revisions based on the review, the 2 page instrument was finalized and printed. The first mailing of the questionnaire was done on May 4, 1998 by first class mail. The second, to those who had not responded to the first, was sent by certified mail on June 12, 1998. It was accompanied by a revised cover letter. The cutoff date for responses was August 31, 1998.

Study Results

Of the 2,200 registrants sampled, 90 had invalid addresses. Of the 2,110 valid addresses, 1,149 (54.4%) provided a usable response. Of those, 38 (3.3%) no longer owned any snowmobiles. Hence, 1,111 fit the definition of owning one or more Michigan registered snowmobiles. In total, these 1,111 registrants owned 2,455 snowmobiles, or 2.21 snowmobiles per registrant. Of the 1,111 registrants, 227 (20.4%) had one or more machines without a winter 1996-97 trail permit. Of those 2,455 machines, 364 (14.8%) did not have a winter 1996-97 trail permit. The rest of the paper presents the responses of those individuals who reported owning one or more Michigan registered snowmobiles without a trail permit and contrasts them to the previous study of use and users of machines with trail permits (Nelson et al. 1998).

Those with one or more non-permitted snowmobiles were likely to own slightly more machines per household than those with only permitted snowmobiles (2.42 vs. 2.21). Non-permitted machines were much different than the

permitted machines. Non-permitted machines were, on average, much older (1981 vs. 1992), less powerful (394 cc vs. 516 cc), and used less gasoline during the winter of 1996-97 (8 gallons vs. 71 gallons) as they were driven a shorter mean distance (80 miles vs. 810 miles). Only slightly more than half (52%) of the non-permitted, registered machines were used during winter 1996-97.

For those who did not use a non-permitted machine, when asked in an open-ended format why, poor snowmobiling conditions, lack of time, the machine being inoperable and that it was an extra machine were the most frequent responses (Table 1). Health reasons and not residing in Michigan during the winter were less frequently cited.

Table 1. Most important reasons Michigan registered snowmobile without trail sticker was not used during the winter of 1996-1997.^a

Reason	Percentage
Poor snow or ice conditions	20.5
Too busy to snowmobile	19.9
Machine inoperable	17.0
Extra machine that was not needed	16.5
Lost interest in snowmobiling	6.8
Older unreliable machine or antique	6.8
Machine for sale	5.1
Health and age	4.0
Do not reside in Michigan during winter months	2.8
Other	0.6
Total	100.0

a. Open ended question.

Non-permitted machines, including those with no use, averaged 7.6 days of use during winter 1996-97. Of this, 68% was where snowmobiling was the principal activity and 32% was where use supported of another activity, primarily ice fishing. This contrasts to permitted Michigan registered machines, including those with no use, during winter 1996-97. They averaged 25.1 days of use, of which 93.5% was principally snowmobiling and 6.5% was in support of another activity, primarily ice fishing (Nelson et al. 1998).

Non-permitted machines that were used during winter 1996-97 were most frequently used on land owned by the operator or a member of his/her household (Table 2). Coupled with use on frozen lakes or waterways (for ice fishing), this accounted for over 3/4 of non-permitted machine use days. Slightly more than 12% of use days were on public trails and road shoulders, which would be classified as illegal. Hence, about 88% of the reported user days of non-permitted, Michigan registered machines were legal.

Table 2. Distribution of machine days for Michigan registered snowmobiles without trail permits during winter of 1996-1997.^a

Location	Percentage
Land owned by my household	45.0
Frozen lakes or waterways	30.8
Private land of a friend or relative	9.8
Public trails (trails marked with orange diamonds)	7.2
Public road shoulders	5.9
Private club or association land	1.2
Total ^b	99.9

a. Machine day is the use of the snowmobile by one or more persons for any portion of a day for snowmobiling or support of another activity such as ice fishing.

b. Total may not add up to 100.0% due to rounding.

When respondents were asked why they did not purchase a trail permit for the registered, non-permitted machines used in winter 1996-97, use solely on private property was the most commonly cited reason (Table 3). Other

frequently cited reasons were the cost of the permit, not using the public trail system and solely using the machine as a support vehicle for ice fishing.

Table 3. Most important reason why Michigan registered snowmobiles used during the winter of 1996-1997 did not have a trail permit.

Reason	Percentage
Machine used only on private land or lakes	22.3
Cost of permit	21.2
Do not ride trails, trails too dangerous	18.4
Machines used only for ice fishing	11.1
Limited time to snowmobile	6.7
Old non dependable machine not used much	6.7
Poor winter conditions to warrant purchase	6.1
Poor trails and trail maintenance	3.9
Machine only used for racing or other special events	1.7
Other	1.6
Total	100.0

Management Implications

The survey data indicated that 1 in 5 Michigan snowmobile registrants owns one or more non-permitted machines and that about 1 in 7 Michigan registered machines does not have a trail permit. Thus, about 40,000 of the estimated 80,000 non-permitted, Michigan registered machines can be explained by this data. One explanation for the remaining 40,000 machines, is that expired registrations were not purged in a timely manner and are characterized as valid after their expiration. A brief examination of the data base found a number of such instances. In addition, the survey results revealed that 3.3% of the respondents no longer owned snowmobiles, further indicating that some of the remaining non-permitted registrations may be duplicates, kept on file after the machine has changed hands. Lastly, there were a few respondents that had never owned snowmobiles, let alone had them registered, so inaccuracies in the names and addresses of registration records may also contribute to accounting for the rest of the non-permitted snowmobiles.

Based on the survey responses, concerns about the widespread illegal use of non-permitted machines on public lands, trails and road rights of way appear unfounded. Since these registered, non-permitted snowmobiles are typically much smaller, older and less used than permitted machines, it is logical that their use is primarily confined to the legal uses of riding on private property and support for ice fishing. Further, almost half the registered machines without trail permits were not used during the 1996-97 winter season.

For the future, more cooperation is needed among snowmobile trail, law enforcement and registration managers. Accurate data, the timely sharing of information and better knowledge of use and users prior to revenue projections from new user fees would improve program functioning and budgetary accuracy.

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HISTORIC PRESERVATION IN RECREATION

MUSEUMS AND CULTURAL INSTITUTIONS IN MICHIGAN: CAN THEY BE VIABLE TOURISM ATTRACTIONS AND TOURISM INDUSTRY PARTNERS? *

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Abstract: Heritage tourism has been gaining more attention by the tourism industry. The museum industry is now wanting to partner actively with tourism professionals; however, there are a number of challenges to be addressed to facilitate effective collaboration. A census mail survey of Michigan museums and cultural institutions identifies the opportunities and challenges for developing these partnerships.

Introduction

Heritage and cultural tourism continue to receive attention nationally and internationally. It has been only in the past two years has much attention been given to heritage or cultural tourism in the NERR symposia (Roenke 1999; Vander Stoep 1999; Lacy and Roenke 1998; Leuty and Stanley 1998, Anderson, Kerstetter and Graefe 1998; Roenke and Lacy 1998.). However, others have been involved in active development throughout the 1990s. Illustrative of Europe's early interest in formalized heritage tourism, the topic was included in a publication titled *Special Interest Tourism* (Zeppel and Hall 1991). In 1992, Utah held its first Annual Governor's Conference on History and Heritage (Hunt 1992). Even traditional land management agencies are recognizing the importance of heritage, as indicated by the 1993 workshop on *Heritage Tourism and National Forests*, sponsored by the U.S. Forest Service (USDA Forest Service 1993). Also in 1993 the National Trust for Historic Preservation published a guidebook on heritage tourism development (Green 1993). Finally, in 1998, Michigan conducted a workshop on *Culture and Tourism: A Template for Action* to bring together representatives of the museum and tourism industries.

Much of this attention has been prompted by trying to identify, then meet the needs of growing travel markets having desires to learn about or otherwise have their travel experiences enriched through exploration of "new" places, cultures and resource environments. No longer is "sun and fun" sufficient for many tourists. Historic and cultural resources play a vital role in meeting this demand; museums, in the broad definition, are inherently linked to

such resources, by providing "display" areas, programs and special events to showcase historical and cultural stories.

The tourism industry, as well as communities highly dependent on tourism for their economic health, are attracted to the "heritage tourist" because, as research throughout the world indicates, the "heritage tourist" market segment spends more money while traveling than the "average" tourist -- on lodging, food and shopping. They also tend to "stay longer" at destinations, thus increasing their overall economic and "heads in beds" impacts. An additional benefit of developing museum and other heritage attractions for tourism is the provision of the services and amenities of such places and experiences for the local communities. In some cases, however, expanding or shifting the missions of cultural institutions originally created to serve local communities potentially can detract from the community service mission or create other problems if not done carefully. Such issues will be more fully discussed later.

Beginning in 1997, the museum community in Michigan, spearheaded by efforts of the Michigan Museums Association (MMA), began working on a package of efforts to focus, develop and package experiences, and train professionals to more effectively provide exciting and quality heritage tourism experiences within the state. These efforts, jump-started by production of a white paper titled "Discover the Stories and Faces of Michigan," included collaborative work with American Automobile Association of Michigan to produce "cultural tourism" inserts for *Michigan Living* (AAA's Michigan member magazine) in 1998 and 1999, a series of meetings with staff of *Travel Michigan* (Michigan's tourist bureau) to develop and promote Michigan cultural product, and a statewide conference on cultural tourism in 1998 followed by a series of regional meetings in 1999 to further develop and promote Michigan's cultural and heritage resources as tourism opportunities.

Research on the preferences and current travel patterns of tourists to Michigan and elsewhere is available from several sources. However, without a solid base of data about the current status and potential of involvement in tourism by Michigan's museums, MMA was limited in developing appropriate and efficient approaches. Thus, the MMA Board commissioned a survey of all known Michigan museums and cultural institutions to determine the potential of such sites to provide products, experiences and services for visitors to Michigan.

Methods

Only a brief summary of research methods are presented here, as details of the mail survey process can be found in the 1999 NERR proceedings (Vander Stoep, 1999). Using the American Association of Museums' (AAM) classification scheme for "museums," the following institution types were included in the mailing list for the MMA survey: museums of all types, halls of fame, nature centers, zoos, aquaria, historic homes and sites, battlefields and other military sites. The final mailing list contained 501 institutions, based on merging and culling of several

different lists by MMA. Using a modified version of Dillman's (1978) Total Design Method, with a series of follow-up mailings and phone calls, the number of deliverable surveys was 489. The total number of surveys returned was 333 (response rate of 68%). However, due to various problems with some of the returned surveys, the final working sample size was 449, with a total of 293 usable surveys returned (working response rate of 65%). Because the survey was conducted during the fall/winter season, many of the facilities were not open, thus making it impossible to contact anyone about a response. It is assumed that the majority of such facilities are small, local museums or societies. Based on responses of similar facilities, the economic contributions and ability of such organizations to actively serve the tourism industry probably are limited.

The five sections of the survey requested:

- A descriptive information about museums;
- B museum visitation and visitor tracking procedures;
- C museum staffing;
- D museum expenditures (annual budget, previous and projected capital outlay); and
- E museum links with tourism industry.

Results

Results are presented by the five survey instrument categories listed above. Presented results are based on percentages of responding institutions.

A: Descriptive information about museums. Based on the American Association of Museums (AAM) discipline list for classifying museums, more than half of the Michigan institutions (53%) are either history museums or historic houses/sites. An additional 14% describe themselves as "general" (having collections representing two or more disciplines) and 10% are nature centers. The remaining 23% of institutions are distributed among all the other disciplines. Almost 8% indicate some type of specialization, with maritime museums being the most common (n=8). Other specialized disciplines include railroad, aircraft or military, geology/natural history, hall of fame, automobile, land surveying, plant conservatory, hunting/fishing, music and living farm. (For details, see Figure 1, Vander Stoep 1999.)

The AAM places museums into one of three size categories based on their annual operating budgets. However, each museum discipline uses slightly different budget figures to determine which institutions are "small, medium or large." Because Michigan has fewer than 500 cultural institutions overall, more than half of which are historic sites, houses or history museums, it is impractical to use a variety of size classification systems in analyzing data. Therefore, for this study, size categories are defined by annual operating budgets as follows:

- Small less than or equal to \$250,000
- Medium between \$250,000 and \$1 million
- Large \$1 million or more

By far, the vast majority of Michigan museums are in the "small" category — at least 75%. Medium-sized museums make up 15% of responding institutions. Another 9% are considered "large" (Figure 1).

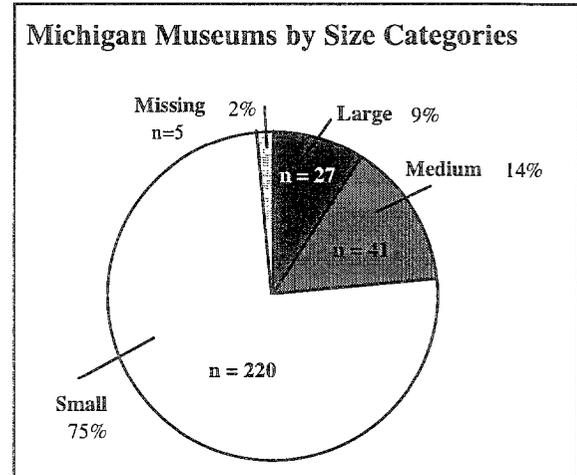


Figure 1. Percent of Michigan museums in each of three size categories.

For most museum disciplines, the majority fall within the "small" size category. The exceptions are zoos (most of which are "large"), art museums (just under 50% of which are "small"), and arboretums and aquaria (none of which are "small"). (See Figure 2.)

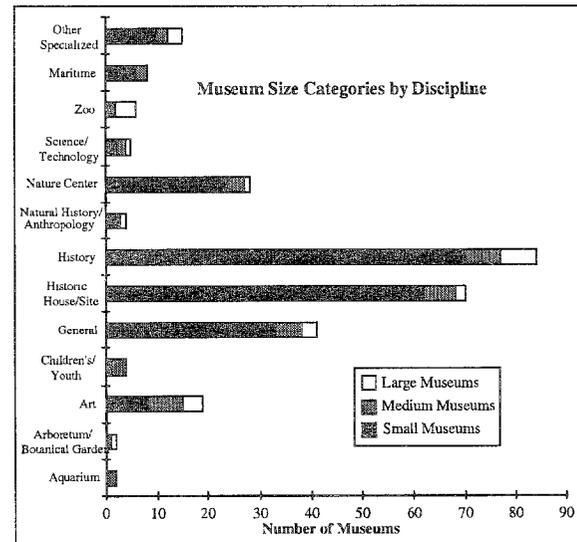


Figure 2. Number of Michigan museums within each discipline by size category.

The majority of Michigan museums are private nonprofit organizations (56%), with only three of those responding being private for-profit organizations. The rest (43%) are public institutions. Of these, the majority are associated with city or other local government entities. Thirty-three sites (26% of public institutions) are operated by a State of Michigan agency, while only five (4%) are federally operated. The rest are city/local (56%) or county (14%) operated. A total of 23 institutions are associated with universities. (See Figure 3.)

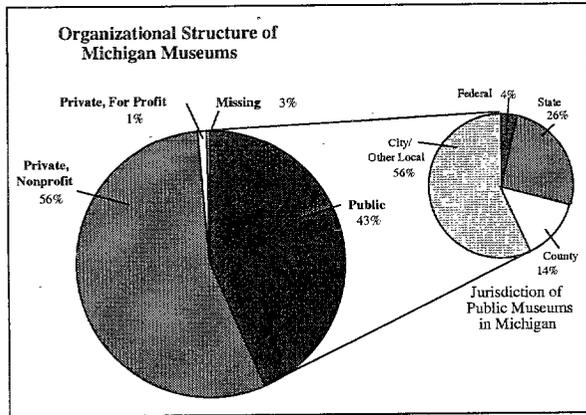


Figure 3. Organizational structure of Michigan museums by sector and government authority.

Museum distribution across the state is irregular, with stronger presence (both in total number of museums and size of museums) clustered in urban areas and three areas of the Upper Peninsula traditionally perceived as strong tourism attraction areas. Of Michigan's 83 counties, 24 have only one museum or cultural institution located within their boundaries. Another 27 indicate having two to four museums, 18 have five to nine museums, and only four (Ingham [Lansing/East Lansing], Kent [Grand Rapids], Oakland and Wayne [both in the Detroit area]) have 10 or more. The Detroit area, not surprisingly, boasts the largest number of museums, with 20 located in Oakland County and 21 in Wayne County. Only ten counties have at least one "large" museum facility. (See Figures 4 and 5.)

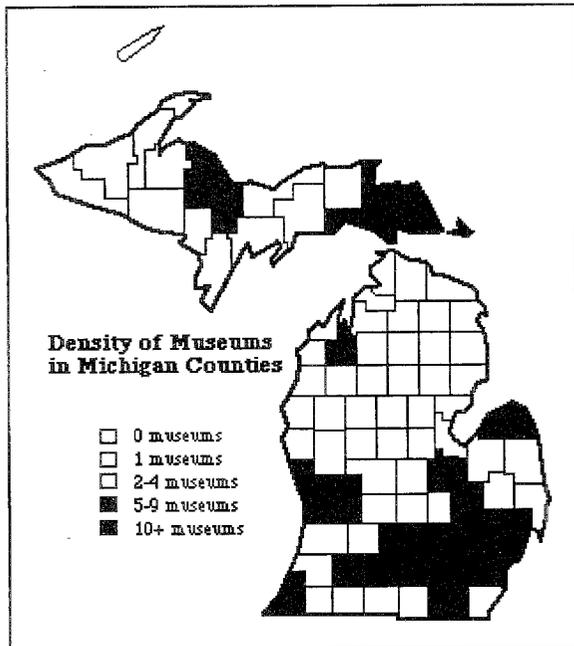


Figure 4. Density of museums in each county, regardless of museum size, and based on responding institutions.

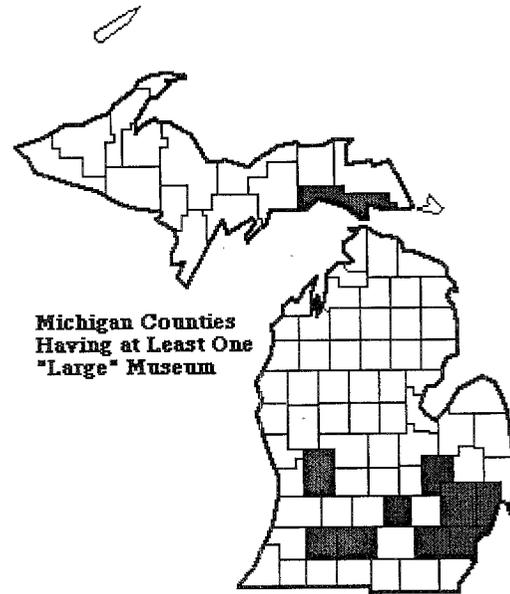


Figure 5. Michigan counties having at least one large museum, based on responding institutions.

B: Museum visitation and visitor tracking. To understand current visitation patterns and begin to project possible impacts of museums on tourism, tracking visitor and program participation numbers is critical. Of responding museums, 95% track visitation in some way. However, many techniques used to track visitation are not very accurate. Voluntary visitor sign-in is at least one of the tracking techniques used by 60% of all museums. Almost 25% use "guesstimates." Most museums use more than one strategy. Other than the few museums that track point of origin zip codes, museum attendance and participation numbers do not distinguish between tourist and local visitation. Small museums have a greater tendency to use the more inaccurate techniques, such as voluntary sign-ins and "guesstimates." (See Figure 6.)

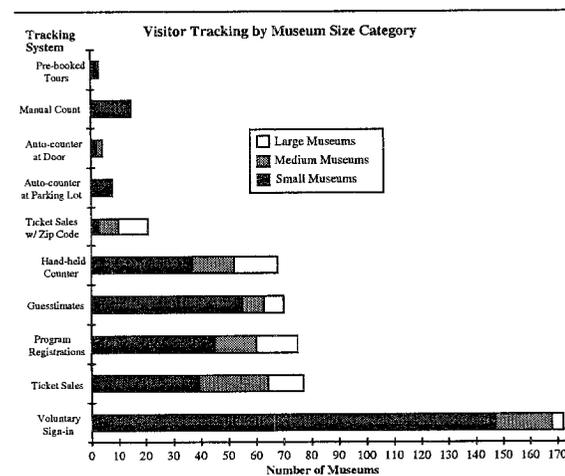


Figure 6. Techniques used by museums to count the number of visitors and program participants by museum size category.

Based on available reports of visitation (results from techniques having varied degrees of accuracy), the estimated number of people served in 1996 by responding museums ranged between 13 and 15 million. (See Vander Stoep, 1999 for details.)

C: Museum staff. The number and seasonality of staff can affect a museum's ability to serve tourists. Most museums appear to rely heavily on unpaid part time staff, both year-round and for the summer season. Nearly 30% of the museums, all of which are "small," are operated entirely by volunteers; 70% of all small museums have no year-round paid full time staff. About 3/4 of paid staff and almost 3/4 of unpaid staff are part time while the percent of full time and part time paid staff are comparable (34% and 41% respectively). (See Figures 7, 8 and 9.)

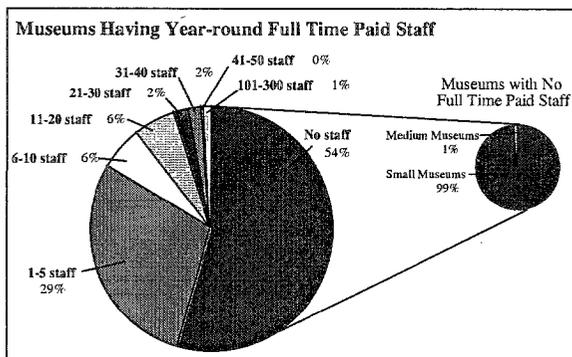


Figure 7. Staffing profile for year-round full time paid museum staff (percent of museums hiring the number of staff within each range indicated), including those with no full time staff.

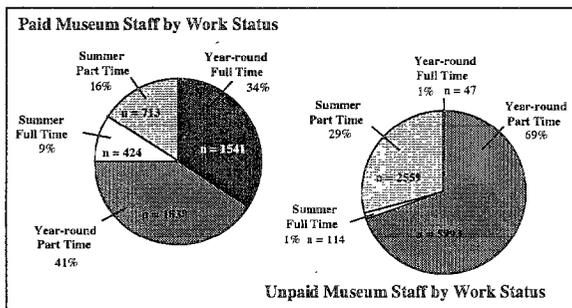


Figure 8. Percent of museums using paid and unpaid staff, full or part time, by annual or seasonal status.

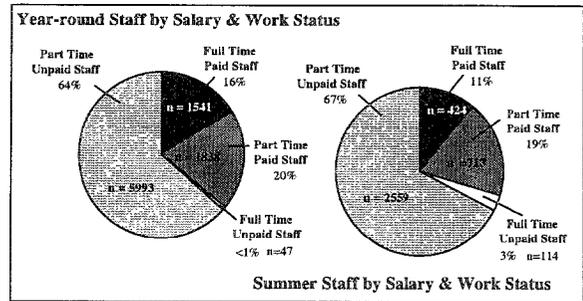


Figure 9. Percent of museums staffed year-round and during the summer season using paid and unpaid staff, full or part time.

D: Museum expenditures. Questions were asked about gross annual operating budgets for 1996, the total amount of capital outlay for the past three years, and the anticipated total capital outlay over the next three years. Estimates of total annual operating budgets and capital outlays, based on using midpoints of expenditure ranges provided on the questionnaire, indicate the following (for 289 museums responding to this question):

Total annual operating budget for 1996	\$286,720,000
Total capital outlay for the past three years	\$198,700,000
Total capital outlay for the next three years	\$201,150,000
Total spent on tourism advertising in 1996	\$2,680,527

(For details, see Vander Stoep 1999.) While the total amount spent on tourism advertising (\$2,680,527) is about 9% of the 1996 total gross annual operating budget for all responding museums, 135 museums did not spend anything on tourism advertising.

E: Museum links with tourism industry. Of the 293 museums responding, 94% (276) indicated involvement in some type of activity with the tourism industry. The most common was distribution of brochures in a variety of locations: in the local area (220), in Michigan Welcome Centers (155), are partners in developing regional brochures with other institutions. Fewer are members of Convention and Visitors Bureaus, develop packages with other museums, market to motor coaches and serve on local tourism councils. Channels other than brochures used for tourism promotion include newspaper (232), radio (150), other tourism publications (141), television (131), and magazines (112). A few institutions use the internet, newsletters, billboards, local Convention and Visitors Bureau, and posters. Tourism-link activities used by relatively few museums include working with local Convention and Visitors Bureaus (9), working with local schools (8), using Michigan Welcome Center display cases (3), and working with Travel Michigan (3). (See Figures 10 and 11.)

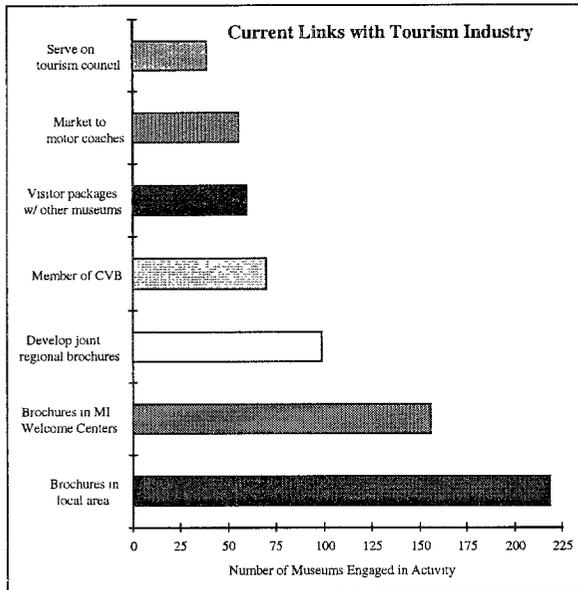


Figure 10. Number of museums engaged in tourism-related activities listed on the survey instrument.

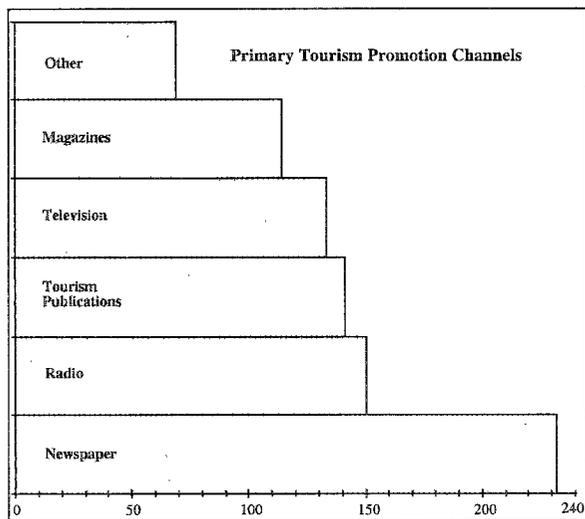


Figure 11. Number of museums promoting their sites or events to tourists through tourism promotion channels (other than brochures) listed on the survey instrument.

Of responding museums, 62% percent indicated interest in working more closely with tourism industry professionals and to promote their sites to tourists. Willingness increases as museum size increases, with all "large" museums willing to be involved.

Discussion and Management Implications

Cultural stories and sites form the base. Michigan has a wealth of historical and cultural stories to tell, ranging from the human habitation by the Paleo and Woodland Indians to the post-European-contact development of the state and Great Lakes Basin. Almost without exception, these stories

are linked to the natural resources that have constructed the better known "woods and water tourism product image" of Michigan. A seemingly endless supply of trees supported a huge lumbering industry, many of them used to rebuild Chicago after the big fire and to supply a thriving furniture business; copper and iron deposits provided the raw materials for a major mining industry; the Great Lakes supported a large commercial fishery for many years; and the Great Lakes served as a major transportation corridor long before inland travel was well developed. Other areas of the state boast numerous ethnic and cultural stories: the Native American communities throughout the state, the Finns who settled in the Upper Peninsula, the migration of Mexicans into the Detroit area, the Dutch farming communities of the lower peninsula, and the role of Michigan in the Underground Railroad; the military involvement of the state. These are just a sampling. Yet Michigan is still perceived primarily as a "woods and water" destination, a place known for its exceptional outdoor-based recreation (Vander Stoep 1998). While the state does have numerous museums and offers annual or occasional special events (e.g., Tulip Festival in Holland, Finn Fest in Marquette), and while it is developing some of its cultural sites and stories (e.g., Mexicantown in Detroit, sites related to the Underground Railroad in the Irish Hills area), many of the stories are inadequately told or unavailable to visitors.

Why some sites may not be ready. With so many stories to tell, why is Michigan perceived to be a "woods and water" destination? Partly, probably, due to extensive and long-running promotion of Michigan's traditional resource-based image combined with the history of vacation cottages, camps, and coastal "resorts." Michigan's natural resources admittedly are dominant. However, the cultural stories are integrally linked with those natural resources. The state does have some wonderful museums, and hosts about special events annually, many of them based on heritage or ethnic themes. And the "list" of museums numbers nearly 500. Nevertheless, current missions and/or operating status of many of the museums render them minimally "ready" for active tourism participation.

Several of the organizations initially appearing on lists of museum-type organizations are really local historical societies, most of them having no physical facility to serve tourists or house collections. While these organizations may periodically present a history-based lecture or sponsor a special event, most are focused on the local community and are not prepared to serve large numbers of visitors. Many actual museums are small, local enterprises, often developing out of the passionate interest of one or a few local residents who want to preserve the community's past. Houses or other buildings may have been donated to house objects and artifacts, donated by yet other residents. Often there is no accession policy to guide the collections, little or no money to properly preserve the items, little or no money to adequately display the materials and tell the stories. Likewise, often there is no formal, trained staff to enable operation of a full-service museum. While volunteers and people with passion can contribute significantly, their efforts usually are not consistent and extensive enough to support tourism business. Hours of

operation often are limited, random or "by appointment" only. This pattern does not match the typical tourist's needs for "being open when I'm there." Museum exhibits, many of them in the style of decades ago -- collections of like objects displayed on glass-enclosed shelves, sometimes with an identification label and the name of the donor, sometimes not -- cannot compete with a general touring public accustomed to the glitz and quality of a highly mediated environment. Parking lots, restroom facilities, and other infrastructure and support amenities are inadequate to handle a regular flow of tourists. Among specific reasons given as constraints to increased tourism involvement are:

- lack of financial and/or staff resources, making it unfeasible to promote to or adequately service tourists;
- sites and facilities not designed to handle increased numbers (e.g., limited parking space, inadequate space for bus access);
- sites minimally developed because the organization's emphasis may be on research, genealogy or other community interest;
- the organization's mission, which may preclude serving tourists; and
- presence of sensitive natural or cultural resources that could be negatively impacted as a result of increased visitation (by tourists or others).

Some museums simply choose to maintain their focus on serving the local community. Such missions and decisions must be respected.

Yes, Michigan does have some large and medium-sized museums currently operating successfully as tourism attractions. Many others either are not able or choose not to operate as such. This variability is seen repeatedly in the survey results: annual and capital outlay budgets vary drastically; some museums are well staffed with trained professionals while many rely extensively or entirely on volunteers; visitor tracking techniques range from "guesstimates" to zip code tracking and occasional surveying of paying customers; brochure-based promotion ranges from zero to multiple-piece, wide distribution. Many museums are satisfied with their current roles and structures. Not surprisingly, of those unwilling to work more actively with the tourism industry, 91% are from the "small" category. However, there are those that would like to take a more active role their community development and in tourism. Some of these are uncertain as to what they can do and with whom to work.

Strategies for developing the heritage tourism market and developing partnerships between museums and the tourism industry. Readily apparent in hand-written comments by survey respondents, and through insights gained by direct communication with museum and tourism industry professionals, is the lack of knowledge and understanding about the "other's" way of doing business: different missions (e.g., education and preservation vs. economic development and "heads in beds"), different professional "languages," different philosophies and bottom lines, perceived differences in target markets, and others. Thus, it is important to find ways to exchange information and open lines of communication and collaboration between museum and tourism industry professionals. Museum professionals must understand that

a museum involved in tourism *must* pay attention to service quality, accommodating tourist time schedules, and increasing the total expenditures of tourists in that community. Tourism professionals must understand that many museums have a mission and message of preservation, restoration or some other form of protection, and must recognize the potential impacts of tourists on those resources and be willing to develop strategies to minimize such impacts, even if it means compromising in the short term on total income. Museum professionals must join and actively participate in local Chambers of Commerce, Convention and Visitors Bureaus, and tourism associations. They must become knowledgeable about good business practices. Tourism professionals must learn to respect strategies such as historic preservation, aesthetics in design, the sociology of quality museum/heritage experiences, and must learn effective interpretive techniques (e.g., for tour guides). Additionally, both sectors must work within the larger community development context to assure that tourism development occurs within parameters and impacts acceptable to the community, and that the museums and heritage amenities continue to serve the local residents rather than displace them with tourists.

If museums choose to become more actively involved in tourism, the decision must be a decisive one and one that brings with it a degree of commitment to take the actions needed to be successful. It means doing a better job of tracking and understanding current visitors (local and/or tourists), conducting a market analysis of tourist preferences and expectations, conducting a feasibility study (tourism involvement must be economically viable) to include visitors' willingness to pay for the quality and type of experience offered. It means doing an environmental scan to identify existing or potential competitors and to identify potential partners for developing tourism packages, joint promotion, and integrated tourism experiences.

Various approaches have been used or are being developed to bolster Michigan's cultural and heritage tourism opportunities. An example is use of a *Passport in Time*, used to link multiple sites in the Upper Peninsula along routes developed based on themes: mining, maritime, logging. The concepts of heritage routes and cultural/heritage landscapes are gaining popularity as ways to link sites, provide joint promotion, and to protect natural, historic and cultural resources. These efforts are not easy, however, and require an enormous amount of interaction, negotiation and planning to assure that needs of multiple stakeholders are met, and to ensure that individuals do not feel their personal rights are being restricted by such plans. The Sauk Trail, which follows Route 12 across the southern part of Michigan's lower peninsula, traces a transportation route used historically, even during pre-history times by the native people of Michigan. The *Sweetwater Trail*, though not a physical route or trail, uses a theme-based map to indicate the variety of marine and coastal resources and attractions available to visitors. The purpose is to draw tourists into communities to do their own exploring of Great Lakes-related resources and stories. The Detroit River has recently been named as one of 10 American Heritage Rivers and is being used as a corridor around which to integrate a variety

of tourism amenities, attractions and experiences. These are only a few of the Michigan examples. Most are relatively new and still under development. Their success will be heavily dependent on the ability of museum, heritage, tourism and economic development professionals to collaborate, and to respect the values and needs of the other groups. If this can be achieved successfully, tourists, residents and the resources themselves will be the beneficiaries.

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* Details of this study's methods are described in the 1998 NERR proceedings article about the same survey. The author was not permitted to present details during the 1998 NERR symposium (waiting for client approval). However, client approval was received prior to publication of the proceedings. Therefore, only a brief summary of the background and methods is presented here. Focus is on additional results and discussion.

FOREST RESOURCE ISSUES IN RECREATION

ASPECTS OF NONINDUSTRIAL FOREST OWNERSHIP THAT INFLUENCE ATTAINING RECREATION AND OTHER NONTIMBER OBJECTIVES

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Abstract: Nonindustrial private forest-land owners exhibit attitudes and motivations that favor nontimber benefits and an ecosystem-based approach to forest-land management. However, market failures associated with the public or nonpriced nature of many forest benefits inhibit the markets' ability to allocate resources efficiently. Public ownership, easement purchase, taxation, subsidy, regulation, and "green certification" are explored as potential remedies to meeting goals related to recreation and other nontimber benefits.

Introduction

Because forests play a critical role in enhancing the biological, economic, and spiritual quality of our lives, there is increasing concern about their management and use. This concern is embodied within the concepts of "ecosystem management." Although some disagreement is evident among the many attempts to define ecosystem management (SAF 1993, Grumbine 1994, Salwasser 1994, More 1996, Leak et al. 1997, Lackey, 1998), several generally agreed upon concepts have emerged.

With an ecosystem-based approach to management, marketable forest products such as lumber and opportunities for recreation still are produced, but the focus shifts toward overall ecosystem health and sustainability. Management activities in a particular forest stand reflect its position and influence on the larger landscape. For example, management activities would be adjusted if a particular stand represented a unique ecological type within a landscape or was a crucial link in connecting wildlife habitats across the greater landscape. There are other subtle and not-so-subtle differences between an ecosystem-based approach and the more traditional approach to management. For our purposes, it will suffice to describe the differences between the traditional approach to management and an ecosystem-based

approach as a shift in focus from the stand, owner, and shorter time frame to the greater landscape or ecosystem, society, and longer time frame. A greater focus on ecosystem health and other nontimber objectives has important implications for tourism and many forest-related recreational activities.

Forests cover approximately two-thirds of the northeastern landscape (USDA For. Serv. 1988) and offer a broad spectrum of benefits to the region's inhabitants. Any meaningful move toward ecosystem-based management or attaining nontimber objectives in this region must occur on private land simply because the vast majority of the forest is in private ownership.

Landowners Value Nontimber Aspects

Surveys of landowner attitudes conducted by the USDA Forest Service show that many owners hold their woodland primarily for noncommercial reasons (Birch 1996). Commonly cited reasons for owning forest land include that it is part of their farm or residence, aesthetic enjoyment, wildlife viewing, and other forms of forest-related recreation. Landowner attitudes and motivations suggest that they are favorably disposed to an ecosystem-based approach to management. Rickenbach et al. (1998) found similar motives for ownership in an assessment of landowner attitudes toward ecosystem management in Franklin County, Massachusetts. Landowner attitudes toward three dimensions of ecosystem management (landscape perspective, small-scale sensitivity, and temporal vision) were measured using indices derived from Likert scale statements. Statements addressing "landscape perspective" assess landowners' understanding and sensitivity toward the notion that their land is linked with the larger landscape or ecosystem. "Small-scale sensitivity" addresses the role of smaller parts of a parcel (e.g., bogs, downed trees, unique vegetation) within their property as well as the greater ecosystem. "Temporal vision" addresses the role of time and concern for future generations. Although there is overlap among the three dimensions, together they capture the essence of ecosystem management applied to small parcels. Landowners surveyed in Massachusetts held favorable attitudes toward each of the three dimensions within an ecosystem-based approach to management.

Obstacles to Achieving Public Objectives

Although landowners seem to favor the concepts embodied within an ecosystem-based approach to management, there are several aspects associated with private ownership that represent potential obstacles to achieving ecosystem-based management on these lands. Perhaps the most obvious obstacle is that landscapes, watersheds, or other ecologically defined management units seldom follow legal boundaries and often include multiple ownerships. The huge number of owners and the associated diversity of objectives make coordination of management activities a daunting task.

Further, the presence of externalities¹, particularly those associated with the public or the nonexclusive nature of nontimber forest benefits, inhibits the markets' ability to

allocate resources efficiently. Generally, ecological or amenity benefits, such as water purification or scenic views, accrue to all. Because individuals cannot be excluded from enjoying these benefits, there is an incentive to "free ride" by refusing to pay for their production or maintenance in the hope that others will. From a social perspective, this situation will lead to an underallocation of forest land relative to land uses where benefits are more fully reflected in market prices. Similarly, nontimber values such as wilderness and other ecological benefits will be underallocated relative to wood products in a pure market system. Government intervention frequently is required to avoid these underallocations. Considerable disagreement and debate can arise concerning the appropriate type of intervention.

Potential Remedies

Government land acquisition effectively moves allocation decisions from the market system to government officials charged with managing for the public benefit. Not only is this very expensive, but because needs, wants, perceptions, and values vary widely across society, conflict and costly litigation frequently arise over the appropriate management strategy and resulting mix of benefits. Without the guiding hand of the free market system, public land managers need alternate guidelines for selecting an optimal path.

Achieving an efficient allocation of forest benefits on private lands is a greater challenge. Policy makers must not only determine the optimal mix of benefits from a social perspective but must also achieve the desired results in an efficient and equitable manner. Regulations, taxes, subsidies, and easements are among the tools available for adjusting for market failures associated with private forest ownership.

Regulation, such as the Endangered Species Act, may be used to ensure that externalities are considered. Although regulation may be the only feasible means to achieve a desired result, there are several potential problems with this method. Ill will is created if people believe that regulations are unfair or that their needs have not been duly considered. Public dissatisfaction with government regulation was strongly articulated during recent elections (see "Assignment of property rights"). As soon as a regulation is proposed, lawyers and others work diligently to uncover and/or create loopholes to circumvent it. Monitoring and enforcement also may be technically difficult or limited in times of budget constraints. Even the best intentioned regulations may have unforeseen effects. For example, harvesting restrictions designed to enhance prospects for wildlife requiring older forests may lead to reductions in the available habitat in the long run. While providing short-term habitat protection (e.g., stands over a certain age cannot be harvested), the regulation creates a strong financial incentive for landowners to harvest stands before they reach the desired age. Numerous economic studies have shown that regulations generally are inefficient even when accomplishing their goals.

The use of taxation as a remedy for the externality problem was first put forward by Pigou (1932). Pigouvian taxes may be used to discourage harmful externalities, such as pollution,

certain types of land conversion, timber harvesting, or other activities considered harmful to the long-term health of the forest ecosystem. To ensure the proper allocation of forest land with respect to other land uses, a tax could be levied on forest conversion, thereby aligning the private and social costs of forest loss. Such a tax increases the private cost of forest conversion, which the landowner would balance against the anticipated gains from the alternate use in making his or her decision. Determining the appropriate level of the tax is a formidable challenge. Theoretically, the tax should equal the marginal social cost of the externality but in practice this amount is not known. The problem is compounded by the irreversible nature of development and the long time frames that forest growth entails. If the tax is too low, or should conditions and preferences within society change, there may be no practical way to adjust and overcome past inadequacies.

Although not designed explicitly for this purpose, yield and severance taxes bring the private and social costs of timber harvesting more in line. By effectively increasing the cost of harvesting, these taxes are an incentive for landowners to provide society with the externality benefits associated with older forests. It should be noted that increasing taxes on forests or forest-related uses may make it less desirable to own forest land and reduce the overall forested acreage in the long run.

On the other hand, landowners could be compensated for the externality or ecosystem-based benefits that their woodlands provide to society. Although the method of payment varies, government-supplied technical assistance (e.g., extension activities), cost share programs (e.g., Forestry Incentives Program), or reductions in property taxes for forest land are examples of rewards or subsidies that effectively reimburse landowners for some of the externality benefits that their forests supply. Reward or subsidy programs can be targeted at specific externality values (e.g., technical assistance or subsidies for defined activities) or more generally (e.g., the current use tax programs available in many states). The effect of these programs is to increase the private cost of forest conversion by the anticipated loss of the subsidy. However, determining the appropriate amount of the reward or subsidy remains a problem. Generally, politically acceptable goals are established and funds are made available. The success of the program is then judged by its contribution toward meeting the goals, with no explicit attempt made to estimate marginal contributions to social welfare.

Another way to help close the gap between the private and social costs of timber harvesting has arisen in the marketplace without government intervention. Participation in wood certification programs or "green marketing" is gaining popularity among timber growers, wood-products manufacturers, and consumers. These programs stem from the belief that consumers will pay a premium for wood grown and harvested in an "ecologically sensitive" manner. Because "certified" products sell at a premium, landowners are in a sense compensated for some of the externality benefits arising from their improved forestry practices. Efficiency in allocation is improved by internalizing some of the externality

costs. The prices for "certified" timber products more accurately reflect the environmental costs of harvesting. The voluntary nature of this strategy is a primary advantage. However, it remains to be seen whether consumers will respond to these programs and if the potential benefits can be achieved.

Easements are another way to supply externality values. Rights to development or a particular externality, such as access for hunting or other types of recreation, may be purchased by public or nonprofit organizations, with the landowner retaining the remaining property rights. Easements may be permanent or for a limited time. There are several advantages to this approach. Conflict is minimized because easement transactions occur only between willing sellers and buyers. Determining an absolute value for the externality generally is not necessary because the upper limit for the offer price rarely exceeds the financial loss to the landowner. Because this loss is market based, it is easier to estimate than the total value of the externality to society. High purchase and negotiation fees are a potential drawback. Agencies or organizations also must monitor, enforce and, if necessary, manage for the externality. Tax issues surrounding easements are yet to be resolved. Granting an easement reduces the value of the property rights that reside with the original owner and may limit choices available to future owners. This may reduce the value of the property and if taxing authorities recognize this, the property tax burden must be shifted to other property within the community. This may be politically unpopular as easements become more widespread.

We have described several tools for coping with market failures resulting from the presence of externalities. Public ownership and easements remove allocation decisions from the influence of the free market and effectively internalize the externalities. By doing so, society assumes all costs associated with its decisions. However, public officials are saddled with the arduous task of allocating resources across a broad spectrum of competing uses, and they must do so without the guiding hand of the market. Regulation may achieve results but several potential problems were noted, including a lack of efficiency in obtaining an optimal allocation. Taxation and subsidy approaches use the market to allocate resources efficiently. However, determining the appropriate levels is difficult and long time periods often are required to make adjustments. An issue that is crucial to determining the appropriateness and acceptability of any strategy is the assignment of property rights.

Assignment of Property Rights

The right to own property is held dear in the United States and in many parts of the world. But property ownership is not an absolute conveyance. The public trust doctrine originated in Roman times, spread to England, and on to America with the colonists (Fitzgerald 1995). In the United States, the common law public trust doctrine was at first primarily concerned with the public's ownership or rights to navigable waters, but has expanded to include other natural resources. The rights to many externalities reside in the

public domain. For example, the public's right to breathe clean air and simultaneously, the state's authority to regulate pollution recently was extended to include secondhand smoke even though this infringes on the personal rights of smokers. But where are the dividing lines between landowner and public rights? And why are these important?

Considerable legal and political controversy surrounds the answer to the first question. Fitzgerald (1995) documented a long history of court cases and interpretations of the public trust doctrine. Legal controversy will continue; perhaps that is the nature of the beast. Citizen (including landowner) dissatisfaction with the status quo was strongly articulated in the debates and outcomes of many recent elections. Several current legislative proposals deal with the government's rights and responsibilities in limiting private property rights. One House proposal would make it voluntary, not mandatory, for private landowners to conserve the habitat of endangered species on their property. The proposed bill would offer financial incentives to private landowners by requiring the government to compensate them for any reduction in property values caused by efforts to protect endangered species. The Clinton administration vehemently opposes this proposal. No solution is in sight.

A definition and division of property rights between landowners and the public is an important factor in selecting a strategy for dealing with market failures that result from the presence of externalities. In a market-oriented approach, the choice between taxation and subsidy rests on the division of property rights that relate to externalities. Kohn (1994), following the work of Coase (1960) and others, shows that under certain restrictive assumptions, the same efficient allocation of resources will ensue regardless of where the externality rights are vested, but the approach for influencing behavior will be different. If externality rights are vested largely with the public, the strategy for influencing behavior should be weighted toward taxation. Conversely, subsidies are appropriate to the extent that landowners are vested with rights to the externalities. Easement purchase and regulation may be thought of as extreme cases. The purchase price of the easement effectively subsidizes landowners for the value of the externality. On the other hand, regulating or forbidding an activity effectively "taxes" away the landowner's value for that particular use.

Summary

Although landowners are inclined toward an ecosystem-based approach to forest-land management and to providing nontimber benefits, there are several potential obstacles to adoption. In a capitalistic society, market forces efficiently allocate some goods and resources but fail for others. The presence of externalities leads to failures in the market system to allocate benefits associated with forests efficiently. Forest land may be underallocated with respect to other land uses, and amenity or ecological benefits (e.g., biodiversity, wildlife habitat) may be underallocated with respect to wood products and market-priced recreational opportunities. Society must find an alternate means of choosing an optimal allocation of forest-related benefits.

Direct public ownership, regulation, taxation, subsidy, or the purchase of easements may be used to correct for market failures resulting from externalities. Formidable difficulties are associated with each course. Selecting the appropriate policy for achieving an optimal mix of benefits from private lands depends on where the property rights reside with respect to the externalities. Whether landowners or society are responsible for and effectively "own" the externality values is largely a political and legal question that should be resolved before policy development. Regulation and taxation are appropriate to the extent that property rights are vested with the general public. However, if landowners retain the rights to an externality, the purchase of easements or incentives, such as subsidies or tax relief, should be used to achieve the desired allocation of forest-related benefits.

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¹ Externalities refer to interactions among firms or individuals that are not adequately reflected in markets.

RECREATIONISTS' ATTITUDES TOWARD THE FOREST AND FOREST MANAGEMENT POLICIES

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Abstract: Two hypotheses concerning recreationists' attitudes toward the forest and forest management policies were examined using telephone survey data from samples of forest landowners and nonowners in Pennsylvania. The first hypothesis, that differences between forest landowner and general public recreationists would be obtained with respect to attitudes toward forest management policies, was not supported. The results did support the second hypothesis, which stated that differences existed between the two groups in terms of general forest attitudes. Implications of these findings are advanced.

Introduction

Although there is an extensive body of literature examining the association between participation in outdoor recreational activities and environmentalism (Dunlap and Heffernan, 1975; Geisler et al., 1977; Pinhey and Grimes, 1979; Van Liere and Noe, 1981; Jackson, 1986; Theodori et al., 1998), little research has been conducted on the association of forest recreation with environmental concern (Nord et al., 1998; Theodori and Luloff, *forthcoming*). Utilizing telephone survey data from samples of forest landowners and nonowners in Pennsylvania, Nord et al. (1998) examined the association of forest recreation with two measures of environmentalism—environmental concern and pro-environmental behavior. Their results indicated that participation in forest recreational activities was moderately associated with pro-environmental behavior but only weakly associated with environmental concern.

More recently, Theodori and Luloff (*forthcoming*) extended this research by comparing the environmental concern of nonindustrial private forest landowner recreationists with general public recreationists in Pennsylvania. They examined whether forest landowner recreationists were more likely than recreationists drawn from the general public to engage in pro-environmental behaviors. Their results indicated that, on the average, recreationists drawn from the general public did not engage in as many pro-environmental behaviors as forest landowner recreationists.

The present research extends the literature on forest recreation and environmentalism. Building upon earlier work (Theodori and Luloff, *forthcoming*), two hypotheses concerning recreationists' attitudes toward the forest and forest management policies were examined. First, it was hypothesized that there will be differences between forest landowner and general public recreationists with respect to attitudes toward forest management policies. The second hypothesis was that there will be differences between the two groups in terms of general forest attitudes.

Data

The data used in this study were collected by telephone survey. During the fall of 1991, a randomly selected sample of 601 NIPF landowners and 600 members of the general public from the Commonwealth of Pennsylvania were interviewed. In addition to gathering descriptive social and demographic information for both groups, the survey included attitudinal and behavioral questions about the environment, the forest, forest policies, and recreation.¹ While the two groups were quite similar in terms of sociodemographic characteristics, forest landowners were slightly older, more likely to be white, had slightly higher average incomes, and were more likely to live in rural areas (see Luloff et al., 1993; Bourke and Luloff, 1994).

Measurement and Analyses

Measuring Forest Recreation

Two aspects of forest recreational participation were measured. These included: (1) frequency of forest visitation; and (2) types of forest recreation activities in which respondents participated. In order to filter forest recreationists from non-participants, respondents were asked how often they or any member of their household visited forests for recreation/vacation purposes. Responses categories included: (0) never; (1) less than once a year; (2) once a year; (3) several times a year; (4) monthly; and (5) at least weekly. As shown in Table 1, the majority of the respondents in each group visited forests for recreation/vacation purposes at least several times a year. While one of every ten general public respondents visited forests more than once a week, nearly one third of the forest landowners did so. Only 12% of the general public and 6% of the forest landowners never visited forests for recreational purposes. These cases were excluded from the following analyses.

Table 1. Frequency of Forest Visitation (in percentages)

<i>Frequency of Visit</i>	<i>General Public</i>	<i>Forest Landowners</i>
More than once a week	10.3	31.1
Monthly	12.8	19.3
Several times a year	39.4	28.2
Once a year	16.5	10.6
Less than once a year	8.7	4.8
Never	12.3	6.0

Respondents who reported visiting forests for recreational purposes were asked whether they engaged in any of the following outdoor recreational behaviors: (1) camping; (2) hiking; (3) sightseeing by car; (4) picnicking; (5)

birdwatching; (6) fishing; (7) hunting; and/or (8) riding off-road vehicles. Multiple responses were allowed. Table 2 presents the distribution of forest recreational participation for the general public and forest landowners.

Table 2. Forest Recreational Participation (in percentages)

<i>Outdoor Activity</i>	<i>General Public</i>	<i>Forest Landowners</i>
Camping	42.4	40.6
Hiking	55.6	63.1*
Sightseeing	45.2	37.3*
Picnicking	55.2	38.3***
Birdwatching	12.6	20.9**
Fishing	35.7	38.5
Hunting	25.1	46.4***
Riding off-road vehicles	8.9	14.1*

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As shown in Table 2, the most popular activity for each group was hiking, while the least popular for each group was riding off-road vehicles. Picnicking was the second most popular outdoor activity for the general public, while hunting was the second most popular activity for the forest landowners. Significance tests for the difference in the proportion of forest landowner and general public recreationists who engaged in each outdoor activity was examined using a z-test for the difference between proportions (Agresti and Finlay, 1997). This z-test takes the form:

$$z = \frac{\hat{\pi}_2 - \hat{\pi}_1 - 0}{\sqrt{\frac{\hat{\pi}_2(1-\hat{\pi}_2)}{n_2} + \frac{\hat{\pi}_1(1-\hat{\pi}_1)}{n_1}}}$$

Where $\hat{\pi}_1$ and $\hat{\pi}_2$ denote the sample proportions, and n_1 and n_2 denote the independent random sample sizes.

General public recreationists were more likely than forest landowner recreationists to engage in sightseeing ($p < 0.05$) and picnicking ($p < 0.001$). Conversely, the forest landowners were more likely than members of the general public to engage in hiking, riding off-road vehicles ($p < 0.05$), birdwatching ($p < 0.01$), and hunting ($p < 0.001$). There were no significant differences with respect to camping and fishing.

It is not unreasonable to expect that outdoor recreationists would engage in several activities (Jackson, 1986; Theodori et al., 1998). In this sample, approximately 70% of the general public and about the same percentage (69%) of the forest landowner recreationists engaged in two or more outdoor activities. The respective mean scores for recreational participation were 2.8 for the general public and 3.0 for the forest landowners. The difference between these groups was not statistically significant.

Measuring Forest Attitudes

Attitudes Toward Forest Management Policies

Attitudes toward forest management policies were measured by seven questions. Respondents were asked whether they strongly agreed, agreed, disagreed, or strongly disagreed with the following forest management policies: (1) banning the general practice of clear-cutting; (2) encouraging mineral exploration and extraction; (3) establishing more nature preserves; (4) promoting economic development through expansion of the forest products industry; (5) encouraging protection of fish and wildlife habitats; (6) designating more "wild and scenic rivers;" and (7) encouraging forest landowners to harvest timber.

A principle axis factor analysis of the seven forest management policies revealed that there were two underlying themes: (1) management policies advocating the

preservation of the forest, and (2) management policies advocating the use of the forest (data not shown).² Responses to the battery of items measuring attitudes toward forest management policies were dichotomized into the categories of "agreement" (strongly agree and agree) and "disagreement" (strongly disagree and disagree). The difference in the proportion of general public and forest landowner recreationists agreeing with each forest management policy was examined using a z-test. An examination of Table 3 shows that no significant

differences existed between the two groups with respect to these items. The overwhelming majority of both groups of recreationists supported the protection of fish and wildlife habitats, the designation of more "wild and scenic rivers," and the creation of more nature preserves. Both groups expressed similar attitudes toward banning clear-cutting, promoting economic development through the expansion of forest products industries, and encouraging future mining and timber uses.

Table 3. Agreement Toward Forest Management Policies (in percentages)

<i>Policies Advocating Use of Forests</i>		
<i>Forest Management Policies</i>	<i>General Public</i>	<i>Forest Landowners</i>
Encouraging mineral exploration and extraction	50	46
Promoting economic development of forest products industries	56	61
Encouraging forest landowners to harvest timber	50	56
<i>Policies Advocating Preservation of Forests</i>		
<i>Forest Management Policies</i>	<i>General Public</i>	<i>Forest Landowners</i>
Establishing more nature preserves	93	90
Encouraging protection of fish and wildlife habitats	98	96
Designating more "wild and scenic rivers"	94	91
Banning the general practice of clear-cutting	66	61

General Forest Attitudes

General forest attitudes were measured by three types of variables: (1) attitudes toward the use of forests; (2) attitudes toward responsibility for conservation of the forest; and (3) attitudes toward education of and planning for forest use and conservation. In order to assess attitudes toward use, respondents were asked whether they thought cutting down trees in Pennsylvania's forests usually resulted in: (1) soil erosion; (2) wildlife habitat destruction; (3) permanent loss of forests; (4) muddy streams; (5) residential and commercial development; and (6) loss of recreation space. Responses were dichotomized into yes and no.

To assess attitudes toward responsibility for conservation, respondents were asked who should be responsible for deciding about the conservation of forest land. Response categories included: landowners only; both the landowners and the government; and the government only.

Lastly, to examine attitudes toward education of and planning for use and conservation of forests, respondents

were asked whether they strongly agreed, agreed, disagreed, or strongly disagreed with the following items: (1) It makes good sense for a forest land owner to have an overall plan for using and taking care of the forest; (2) People need more information on what could be done to take better care of the forests; and (3) Trying to teach people about the forests is a waste of time and money. As with the items measuring attitudes toward forest management policies, responses were dichotomized into "agreement" and "disagreement."

Attitudes toward the use of forests were assessed using a z-test for the difference between proportions. An examination of Table 4 shows that general public recreationists were significantly more likely ($p < 0.001$) than forest landowners to view each of the possible outcomes—soil erosion, wildlife habitat destruction, permanent loss of forests, muddy streams, residential and commercial development, and loss of recreation space—as problems resulting from the cutting down of trees in Pennsylvania's forests.

Table 4. Attitudes Toward the Use of Forests (in percentages)

<i>Possible Outcomes</i>	<i>General Public</i>	<i>Forest Landowners</i>
Soil erosion	81	71***
Wildlife habitat destruction	92	77***
Permanent loss of forests	74	63***
Muddy streams	85	76***
Residential and Commercial Development	88	77***
Loss of recreation space	80	67***

*** p < 0.001.

The question about who should have responsibility for deciding about the conservation of forest land was analyzed by a cross-tabulation. As shown in Table 5, the cross-tabulation of recreationist group and responsibility revealed a highly significant relationship ($p < 0.001$). While forest landowner recreationists were equally divided between landowners having the sole responsibility and both the

landowners and the government sharing the responsibility for the conservation of private forests, an overwhelming majority of the general public respondents (75%) asserted that the responsibility should be divided between the landowners and the government. Few respondents in either group stated that the government should have the sole responsibility of taking care of private forests.

Table 5. Attitudes Toward Responsibility of Conservation of the Forest (in percentages)

<i>Responsibility for the Forest</i>	<i>General Public</i>	<i>Forest Landowners</i>
Landowners only	22.5	49.4
Landowners and government	74.9	50.5
Government only	2.5	0.5

Chi square = 85.562; df = 2; $p < 0.001$.

Attitudes toward education about and planning for forest use and conservation were assessed also using a z-test for the difference between proportions. An examination of Table 6 shows that the overwhelming majority of both groups agree that it makes good sense for a forest landowner to have an overall plan for using and taking care of the forest, that people need more information on what could be done to take better care of the forests, and that

trying to teach people about the forests is not a waste of time or money. General public recreationists were significantly more likely ($p < 0.05$) than forest landowners to agree that landowners need to have a overall plan for using and taking care of the forest and significantly more likely ($p < 0.01$) to agree that people need more information about the forests.

Table 6. Attitudes Toward Education About and Planning For Conservation of Forests (in percentages)

<i>Attitudes</i>	<i>General Public</i>	<i>Forest Landowners</i>
It makes good sense for a forest landowner to have an overall plan for using and taking care of the forest	97	94*
People need more information on what could be done to take better care of the forests	98	95**
Trying to teach people about the forests is a waste of time and money	6	8

$p < 0.05$; ** $p < 0.01$.

Conclusion

The results of this study indicated that while both forest landowner and general public recreationists engaged in about an equal number of outdoor recreational activities, differences in patterns of forest recreation existed. More important, though, were the findings concerning the two hypotheses. The results did not support the first

hypothesis, which stated that differences between forest landowner and general public recreationists would be obtained with respect to attitudes toward forest management policies. The second hypothesis, that differences between the two groups existed in terms of general forest attitudes, received substantial support. General public recreationists were more likely than forest landowners to view each of the six possible outcomes

resulting from cutting down trees in Pennsylvania's forests as problematic. Furthermore, general public recreationists were more likely than forest landowners to assert that the responsibility for deciding about the conservation of forest land should be divided between the landowners and the government. Lastly, general public recreationists were more likely to agree that landowners need to have an overall plan for using and taking care of the forest and that people need more information about the forests.

Despite the statistical significance, the substantive significance of these findings should not be overlooked. For example, while the general public recreationists were significantly more likely than the forest landowners to view each of the six possible outcomes resulting from cutting down trees as precarious, nearly 7 out of every 10 forest landowners also felt that cutting had deleterious impacts (Table 4). Moreover, the overwhelming majority of both the general public and forest landowners supported efforts in education about forests and planning for conservation. Both of these areas are critical to the sustainable use of forests for recreation.

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Notes

¹ See Luloff et al. (1993), Bourke and Luloff (1994), and Nord et al. (1998) for detailed descriptions of the sample.

² Data available upon request from authors.

HUMAN DIMENSIONS OF FISHERIES

DEVELOPMENT AND VERIFICATION OF A SPECIALIZATION INDEX FOR ANGLER SEGMENTATION

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Abstract: Recreation specialization can be viewed as a continuum of behavior from the general to the particular. Along the continuum participants in a particular recreational activity can be segmented into meaningful subgroups based on specific criteria. Individuals within a subgroup or specialization level will be more similar to each other than to individuals in other subgroups. Previous studies have defined, measured and segmented specialization groups in a variety of ways. This research builds on the Ditton et al. (1992) re-conceptualization of recreation specialization from a "social worlds" perspective. A specialization index was developed to segment social world members into meaningful sub-worlds based on four main characteristics: orientation, experiences, relationships, and commitment. Survey questions were designed to measure the four characteristics on a sample population of Massachusetts freshwater anglers. A mail survey was administered and achieved a response rate of 55%. Pairwise comparisons showed significant positive bivariate relationships among all four index items. Anglers were segmented into four groups (ranging from least specialized to most specialized) based on cumulative response scores to index items. The "least specialized" angler group accounted for only 1.2% of all respondents. "Moderately specialized" anglers accounted for 31.6%, "very specialized" anglers accounted for 43.2%, and "most specialized" anglers accounted for 24.0% of respondents. Internal validation analysis supported the use of this specialization index as a tool for angler segmentation.

Introduction

Outdoor recreation participants generally display wide variation in their experiences, avidity, expertise, commitment, economic expenditures, and social interactions related to a particular activity. Connected to this variation are important sociological and psychological differences affecting motivations, expectations, desired outcomes, satisfaction levels, perceptions, and social norms. Previous recreation specialization studies have explored ways of categorizing outdoor recreation participants into meaningful subgroups. Bryan (1977) described "recreational specialization" in trout anglers as a continuum of behavior from the general to the particular, reflected by equipment and skills used and activity setting preferred. The four levels of specialization identified in this study were occasional anglers, generalists, technique specialists, and technique-setting specialists. Bryan (1977) suggested that more highly specialized anglers are part of a leisure social world with a shared sense of group identification derived from similar attitudes, beliefs and experiences. Bryan's study greatly advanced the general understanding of diversity among recreationists. However, his definition of specialization was not testable since specialization and subsequent propositions were both defined and measured in the same terms (Ditton et al. 1992).

Ditton et al. (1992) initiated development of a testable theory that links recreation specialization with elements of social worlds described by Unruh (1979). Boundaries, within Unruh's social world framework, are determined by interaction and communication, and transcend formal delineators of organization. Each social world contains four distinct sub-worlds that are ordered along a theoretical dimension measuring knowledge and understanding of the social world (Unruh 1979). Sub-worlds are designated based on the social involvement level of its actors. These levels are strangers, tourists, regulars, and insiders. Participants in a social world can be segmented into the appropriate sub-world based on four characteristics: orientation, experiences, relationships, and commitment (Table 1). Once individuals are segmented into meaningful sub-groups (i.e. sub-worlds) recreation specialization can be tested against variables such as avidity, side bets, attitude toward management, resource dependency, and mediated interactions.

Table 1. Characteristics and types of participation in social worlds (source: Unruh 1979)

	Sub-world Types			
	Strangers	Tourists	Regulars	Insiders
Orientation	naivete	curiosity	habituation	identity
Experiences	disorientation	orientation	integration	creation
Relationships	superficiality	transiency	familiarity	intimacy
Commitment	detachment	entertainment	attachment	recruitment

Ditton et al. (1992) used the variable avidity (i.e. days fished per year) to segment participants into specialization levels. Level of fishing participation has been shown to be an adequate surrogate for the concept of angler specialization as proposed by Bryan (Graefe 1980). Not surprisingly, anglers who fish more frequently generally tend to have greater involvement with equipment, higher self-reported skill levels, and use a wider variety of settings. However, a testable recreation specialization theory from a social worlds perspective requires a multi-variable approach to segmentation that incorporates orientation, experiences, relationships, and commitment. A single variable (such as avidity) cannot adequately measure these distinct dimensions of specialization. The purpose of this research was to develop and validate an index

applicable to the "re-conceptualized" social worlds view of recreation specialization.

Methods

Four survey questions were derived from the four dimensions of specialization (orientation, experiences, relationships, and commitment) and their corresponding characteristics for each level of specialization (Table 1). Question response options consisted of statements describing a participant's connection to an activity relative to that particular dimension. Responses ranged from least specialized to most specialized along a four-point scale (Table 2).

Table 2. Recreation specialization index survey questions.

-
- Q. Please indicate your general *orientation* to the sport of fishing.
- 1) I am an outsider. I am uncomfortable when I go fishing, and don't really feel like I am part of the fishing scene
 - 2) I am an observer or irregular participant. Sometimes it is fun, entertaining or rewarding to go fishing
 - 3) I am a habitual and regular participant in the sport of fishing
 - 4) I am an insider to the sport. Fishing is an important part of who I am
- Q. Please indicate how you would best describe yourself during a fishing *experience*.
- 1) I am often uncertain. I am unsure about what I can or cannot do while fishing, or how to do it.
 - 2) I have some understanding of fishing, but I am still in the process of learning more about fishing. I am becoming more familiar and comfortable with fishing
 - 3) I have become comfortable with the sport. I have regular, routine and predictable experiences. I have a good understanding of what I can do while fishing, and how to do it.
 - 4) I am a facilitator in the sport. I encourage, teach and enhance opportunities for others who are interested in fishing.
- Q. Please indicate how you would best describe your *relationships* with other anglers.
- 1) Superficial. I really don't know any other anglers.
 - 2) Very limited. I know some other anglers by sight and sometimes talk with them, but I don't know their names.
 - 3) One of familiarity. I know the names of other anglers, and often speak with them.
 - 4) Close. I have personal and close relationships with other anglers. These friendships often revolve around fishing.
- Q. Please indicate how you would best describe your *commitment* to fishing.
- 1) Almost nonexistent. I am basically indifferent about going fishing.
 - 2) Moderate commitment. I will continue to go fishing as long as it is entertaining and provides the benefits I want.
 - 3) Fairly strong commitment. I have a sense of being a member of the activity, and it is likely I will continue to fish for a long time.
 - 4) Very strong commitment. I am totally committed to fishing. I encourage others to go fishing and seek to ensure the activity continues into the future.
-

Specialization index questions were sent to a random sample of licensed Massachusetts freshwater anglers through a mail survey administered using the Salant and Dillman (1994) technique. This included sending a survey notification letter, the first survey mailing, a postcard reminder, and a second survey mailing. The four questions used for this study were a small part of the overall questionnaire which included over 100 questions. Overall response rate for returned surveys was approximately 55% (1,411 returned out of 2,930 sent). Of the 1,411 returned, 1,353 had completed, usable responses for the four specialization index questions used in this study.

Results

Frequency distributions were calculated for each of the four questions (Figure 1). On a scale of responses from "1" (least specialized) to "4" (most specialized) the modal response for all four items was "3". The proportion of responses in the least specialized category (i.e. response=1) was 2% or less for "orientation", "experience", and "commitment". This proportion was considerably greater for "relationships" (7.3%), although still small compared to the other specialization levels. Nearly 60% of respondents chose "3" for the question regarding "experience". The

other variables were more evenly distributed across responses, except for the lack of "1" responses (Figure 1).

Bi-variate relationships among the items considered for inclusion in the index were examined to determine the degree to which items were related (Babbie 1995). Correlation coefficients for the six pair-wise comparisons ranged from 0.41 to 0.60 and were all statistically significant (Table 3). This middle range suggests that no two items were so similar as to warrant exclusion from the index to avoid redundancy. This suggested that while significant positive relationships were found for all pair-wise comparisons, each item measures a somewhat different aspect of recreation specialization. The two lowest correlation coefficients involved the variable "relationships

(0.41 and 0.43) while the highest correlation was between "orientation" and "commitment" (0.60). Another way to analyze bi-variate relationships is to examine the percent of occurrences when two variables differ by more than a particular amount. For each of our four variables possible responses ranged from "1" (least specialized) to "4" (most specialized). For all pair-wise comparisons, less than 9% of respondents had responses for any two variables that differed by more than one (Table 3). This further supports the strong positive relationships between all items. Most cases where an angler's responses for two variables did differ by more than one involved the variable "relationships". Pair-wise comparisons not involving the variable "relationships" differed by more than one for only about 3% of respondents.

Table 3. Bi-variate relationships among index items.

Index Item Pair	Correlation Coefficient	Percent Of Responses Differing By More Than One
Relationships and Experience	0.41	8.2%
Relationships and Orientation	0.43	8.9%
Relationships and Commitment	0.49	7.8%
Experiences and Orientation	0.48	3.0%
Experiences and Commitment	0.50	3.0%
Orientation and Commitment	0.60	3.0%

Based on results from the bi-variate comparisons it was decided to include all four items in the recreation specialization index. A composite specialization rank was calculated by adding the responses to the four items for each respondent (Figure 2). Composite scores ranged from 4 through 16. As discussed earlier, most of the respondents fell into the mid to high end of the specialization scale with the lower end of the spectrum being under-represented. Respondents were segmented based on their cumulative item score as follows:

- If cumulative score = 4-6 Index = 1
(least specialized)
- If cumulative score = 7-10 Index = 2
(moderately specialized)
- If cumulative score = 11-13 Index = 3
(very specialized)
- If cumulative score = 14-16 Index = 4
(most specialized)

Closer examination of individual item responses showed that 13 anglers with a cumulative score of "10" (moderately specialized) indicated they did not really know any other anglers (item response for relationships="1"). In such cases, for the other three items (commitment, experience, orientation) these anglers had a total score of "9" for an average item score of "3" ("very specialized"). Anglers who indicated "least specialized" for relationships and "very specialized" for the other three items (averaged) were placed in the "very specialized" group (Index=3). Therefore the item "relationships" was down-weighted for this particular response pattern only. This was justified by

the fact that the variable "relationship" behaved differently than the other three items with more "least specialized" (item score=1) responses.

The "least specialized" angler group (Index=1) accounted for only 1.2% of all respondents. "Moderately specialized" anglers (Index=2) accounted for 31.6%, "very specialized" anglers (Index=3) accounted for 43.2%, and the "most specialized" anglers accounted for 24.0% of respondents.

Internal index validation was conducted to test how well our specialization index measured each of the four items (i.e. relationships, commitment, experience, and orientation). Item analyses using direct comparisons between index scores and items scores were possible since both were based on equivalent four-point scales ranging from least to most specialized. The index score was identical to the item score for "orientation" 72% of the time, "commitment" 75% of the time, "experiences" 67% of the time, and "relationships" 60% of the time. For all items, the absolute difference between index score and item score exceeded one for less than 3% of respondents. These results support internal validation of our specialization index.

Discussion

There are several possible explanations for the fact that the "least specialized" sub-world was under-represented in our data. Firstly, we should not rule out the possibility that this group may, in fact, be much smaller in size than the other groups. This would be the case if the learning curve from

"least specialized" to "moderately specialized" requires a relatively short time period. Since our survey was conducted on license holders from the previous year, anglers who were "least specialized" at the time of license purchase had a full fishing season to increase their specialization level prior to receiving our survey. Another possible explanation is that our sample did not include groups of anglers that make up the majority of the "least specialized" group. For example, children (under 17 years old), out-of-state anglers, and three-day license holders, were not part of our survey population. Non-response bias could also be a possible explanation if the probability that an angler returned our survey was positively correlated to the angler's specialization level. Finally, the choice of words we used for the "least specialized" response options could explain the low percent of respondents selecting those options. Anglers may have felt too embarrassed or ashamed to identify themselves with words such as "outsider", "uncomfortable", "unsure" or "uncertain", which may have strong negative connotations. Our results suggest that "least specialized" sub-worlds may be more difficult to sample for a variety of reasons. A special sample design may be needed in certain situations to adequately address this group.

Our results showed that although all four social world specialization dimensions (relationships, orientation, experience, commitment) were included in the index, the "relationship" dimension behaved somewhat differently from the other three. Specifically, some anglers scored "least specialized" for "relationships" but were in the middle to high range of specialization for the other three dimensions. This suggests that, for the activity of freshwater fishing, having personal relationships with other anglers may not be as important of a component to advancing to higher specialization levels as previously thought. Although interaction and communication determine social world boundaries (Unruh 1980), in today's world these can be readily achieved through mediated channels instead of personal contact. Some highly specialized anglers may rely on journals, magazines, cable television, and the world wide web to acquire and exchange information about fishing. If so, our question measuring "relationships", which focuses only on personal contacts, may have to be expanded to include a wider range of interactive and communicative possibilities.

The dimensions included in our index were derived directly from the social worlds literature. The question of which measures should be used to define specific dimensions of a specialization index is open to interpretation ((Kuentzel & McDonald 1992). For example, "commitment" to an activity has been measured by the number of related magazines one subscribes to (Bloch et al. 1990), the level of activity involvement (Huffman 1986) the centrality of the activity to one's lifestyle (Chipman & Helfrich 1988), the number of "side bets" invested in, and an affective attachment to the activity (Buchanan 1985). Similarly, one could come up with multiple ways to define and measure "orientation", "experience", and "relationships" related to a particular activity. Specialization dimensions can also be measured using either behavioral or cognitive measures.

One of the main features of social world involvement is voluntary identification (Unruh 1980). Therefore, one does not become part of a social world (or sub-world) by performing certain behaviors (e.g. joining a club, buying certain equipment). The necessity of voluntary identification suggests a strong cognitive component to entry into a social world and movement between sub-worlds within a social world. This cognitive component is reflected in the questions we used in this study to measure specialization dimensions. For example, rather than measure commitment through other variables as described above, anglers were asked directly to chose the statement that best describes their commitment to the sport. Approaching specialization from a social worlds perspective may add subjectivity to the index since words like "commitment", "insider", and "orientation" can mean different things to different people. However, this subjectivity does not necessarily bias the segmentation process, but rather, it re-defines specialization in a new way. The assumption that a specialization index derived from objective measures (i.e. gear used, days fished, magazines purchased) is preferable to one that uses more subjective cognitive measures should not automatically be made. The next step is to test the specialization index proposed here against other (external) variables to determine if the sub-worlds described constitute meaningful and distinguishable subgroups. It would also be interesting to compare participant segmentation using our index with previous specialization indices using the same survey population.

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TESTING RECREATION SPECIALIZATION: APPLICATION OF A SPECIALIZATION INDEX

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Abstract: A representative sample of licensed Massachusetts freshwater anglers was segmented into three levels of specialization with the use of a specialization index. The index used four indicator variables to identify and classify anglers. These indicator variables focused on: 1) Orientation to the sport of fishing, 2) Fishing experiences, 3) Relationships with other anglers, and 4) Commitment to fishing. Hypothesis tests regarding group differences in frequency of participation, importance of activity and non activity-specific elements of the angling experience, support for management regulations, and financial costs provided strong support for the conceptual framework of Recreation Specialization as developed by Ditton et al. (1992). These findings indicate a multi-dimensional index can be used to segment angling participants into discreet specialization categories where differences can be predicted. Management implications are discussed.

Introduction

Previous research has demonstrated that anglers vary considerably in their angling motivations and preferences. Fishing, as with other leisure activities, is not a static, unidimensional entity. Anglers come from different socioeconomic backgrounds, they seek different experiences and use different types of gear to achieve a desired outcome, fish for different species, vary in their commitment level, and in their frequency of participation (Bryan 1979; Graefe 1980; Knopf, Driver, and Bassett 1973). This diversity among anglers must be recognized and accommodated if fishery managers are to provide satisfactory angling experiences to a widely diverse clientele. If management agencies fail to provide quality experiences, angler participation will likely decrease, as will angler expenditures and support for fishery management programs.

The traditional approach to understanding participants has been to aggregate them into one group, and to then describe the average participant (Shafer 1969). However, this technique does little to help in understanding any one type of participant because it basically describes no one. Classifying anglers according to species sought, frequency of participation, age, gender, and socio-economic groups is

possible, but typically fails to accurately and fully describe anglers and their activity. Understanding the diversity among participants through segmentation can give greater insight into the angler population. Classification of anglers into meaningful subgroups is beneficial and necessary in explaining the diversity of preferences among anglers.

One emerging technique is to classify participants according to recreation specialization, where participants are segmented into homogeneous subgroups, with each subgroup sharing similar attitudes, beliefs, ideologies, etc. Bryan (1977) first conceptualized recreation specialization as a "continuum of behavior from the general to the particular reflected by equipment and skills used in the sport and activity setting preferences" (Bryan 1977). He contended that people are "socialized" differently into their sport, depending on their stage of development in the activity. A later study on the concept of recreation specialization defined it as a process that segments and intersects social worlds into new recreation subworlds where they are arranged on a continuum from least specialized to most specialized (Ditton, Loomis and Choi 1992). Although evidence supports the concept of recreation specialization, our understanding of the process by which the population in question is best segmented into subgroups is weak. Further work on how to effectively segment anglers into homogeneous sub-groups that reflects their level of specialization remains to be done. Drawing from the conceptual framework of Ditton et al., this study proposes to segment a population of freshwater anglers through use of a specialization index, and then test the theory of recreation specialization as developed by Ditton et al. (1992).

Literature review

Bryan (1977) conceptualized recreation specialization as a level of involvement within an activity ranging from the very general to the very specific, which would be reflected by skills obtained and used, type of equipment used, preferences for species sought, perceptions, motivations, specific environmental settings, and management preferences. Through a process of inductive reasoning, Bryan (1977) argued that anglers at different stages of specialization could be found at different fishing locations using different angling equipment and techniques. He went on to conclude that when anglers become more specialized, they change their fishing orientation away from consumptive aspects and towards a more qualitative experience.

The introduction of Bryan's conceptual framework stimulated additional research on recreation specialization as a tool for describing and understanding the diversity among anglers. Studies argued that specialized users differ from less-specialized users on a variety of issues, including motives for participation (Kauffman and Graefe 1984; Schreyer, Lime and Williams 1984), importance of non-activity specific elements (Fiedler and Ditton 1986), preferences for management strategies (Hammit and McDonald 1983; Chipman and Helfrich 1988), perceptions about crowding (Vaske, Donnelly and Heberlein 1978; Graefe, Donnelly and Vaske 1986), environmental

preferences (Kauffman and Graefe 1984; Schreyer and Lime 1984; Schreyer and Beaulieu 1986; Virden and Schreyer 1988), equipment ownership and use (Chipman and Helfrich 1988; Wellman, Roggenbuck, and Smith 1982), and centrality to lifestyle (Wellman et al. 1982; Virden and Schreyer 1988). In general, these studies provided support for recreation specialization as a concept.

These studies employed several different classification procedures to segment participants into various levels of specialization. Graefe (1980) concluded that frequency of angling participation (avidity) was a useful surrogate measure for angling specialization. He found that anglers who fished more frequently, and thus were defined as being more specialized, had higher self-reported skill levels, participated in more diverse fishing settings, and had a greater dependency on the resource. Chipman and Helfrich (1988) used frequency of participation, investment, years of fishing experience, and centrality of angling to lifestyle as a means of evaluating the concept of recreation specialization. These four dimensions were used to determine if anglers differed in their motivations, perceptions, and management preferences among six specialization levels. They concluded that investment, consumptive habits, and frequency of participation were important characteristics for determining specialization. Schreyer et al. (1984) used total number of river runs as a means of classifying river users into six groups, and found differences between the groups in the type of prior river experience, motives for participation, perceptions of conflict, and support for managerial regulations. Kauffman and Graefe (1984), used preferences for river characteristics to segment canoeists into more-specialized and less-specialized canoeists. They found that more-specialized canoeists had a higher preference for whitewater settings, and were more interested in confronting challenges, developing their skills, and testing their equipment than less-specialized canoeists. Fiedler and Ditton (1986) segmented anglers into levels of consumptive orientation based on responses to statements regarding the importance of catching fish. They found that low-consumptive anglers rated higher the importance placed on catching fish than did high-consumptive anglers. Their finding supports Bryan's (1977) suggestion that more-specialized anglers place less importance on the activity-specific elements of the angling experience than do less-specialized anglers. Wellman et al. (1982) used a specialization index based on equipment investment, past experience, and centrality to lifestyle to segment anglers into groups that reflect respondents' attitudes toward depreciative behavior. They found little evidence to suggest that specialized canoeists differed from non-specialized canoeists in their attitudes about depreciative behavior. Virden and Schreyer (1988) also used a centrality to lifestyle measure to classify participants into specialization levels, and found that level of specialization explained differences in preferences for 21 of 38 environmental attributes among backpackers.

The above studies, while supporting Bryan's framework for specialization, were based on a concept that was tautological (circular) in its reasoning. Specialization was defined in terms of behaviors and preferences, which were

then used to predict specialized behaviors and experiential preferences. As a result, recreation specialization, as a concept could never be empirically tested. Ditton, Loomis, and Choi (1992), however, noted the circularity of Bryan's definition. They re-conceptualized his framework based, in part, on Unruh's (1979) social worlds perspective. According to this perspective, members of each social world should hold similar attitudes, beliefs and motivations which creates a sense of group identification. Social worlds can be further segmented into subworlds, which are homogeneous subgroups that can be ordered along a theoretical continuum ranging from least to most specialized (Bryan 1977; Straus 1978, 1984; Devall 1973; Unruh 1980; Ditton et al. 1992; McFarlane 1996). Such distinctions develop as a result of geographical or environmental characteristics, using different technologies and skills, focusing activities on different objects and ideologies (Ditton et al. 1992). Unruh (1979) further suggested that members within a social world could be ordered along a theoretical dimension having four characteristics which include orientation, experience, relationships and commitment. Based on the above, Ditton et al. (1992) reconceptualized recreation specialization as a process that segments and intersects social worlds into new recreation subworlds where they are arranged on a continuum from least specialized to most specialized.

Ditton et al. (1992) developed eight propositions, three of which they tested. They used a single-dimensional approach, frequency of participation, as their means of classifying anglers into four specialization groups. Their results provided empirical evidence for specialization by showing that groups the four differ in their resource dependency, level of mediated interaction, and in the importance they attach to activity-specific and non activity-specific elements within a recreational activity. Highly specialized anglers were found to have a higher resource dependency than did less specialized anglers. The highly specialized groups placed more importance on catching big trophy fish while the less specialized anglers were disinterested in the "rare event" aspect of the fishing experience. They found that anglers who were more specialized had a greater involvement in various types of mediated means of communication than did less specialized anglers. Ditton et al. (1992) also found that as the level of specialization increased, the importance of the catch-related elements of the angling experience decreased relative to the non-catch related elements of the experience.

Although their use of a single dimensional approach to segmenting the population of anglers into subgroups proved successful, Ditton et al. (1992) recognized that other variables can, and should, be used as a means of classifying individuals into specialization subgroups suggest the development of a multi-dimensional approach, such as an index, to operationalize specialization.

Study objectives

This study proposes to use a multi-dimensional index to test recreation specialization theory by re-examining one of the propositions already tested by Ditton et al. (1992), in addition to examining three other propositions that have not been tested. The proposition to be re-tested maintains

that more-specialized individuals attach less importance to activity-specific elements, and more importance to non-activity specific elements of the fishing experience, than less-specialized anglers. Ditton et al. (1992) found that more-specialized anglers placed less importance on activity-specific elements, such as catching fish, and more on the non activity-specific elements of the fishing experience.

The second proposition to be tested will determine if more specialized anglers have a higher frequency of participation than their less-specialized peers. Individuals are likely to increase their participation when they feel some sort of attachment to the activity. As specialization levels increase, alternative activities will be rejected as the commitment to participating in the primary activity increases (Buchanan 1985, Unruh 1979). This generates a level of commitment to participate in the activity which varies according to level of specialization. Ditton et al. (1992) propose that as angling activities become a more centralized aspect of that individual's life, the more likely that individual is to participate in angling activities.

The third proposition to be tested concerns support and opposition to certain management tools and regulations. Participants who are more-specialized are expected to indicate greater support for management rules and regulatory procedures, as well as for social norms which identify and often dictate acceptable behavior (Ditton et al. 1992). Discontinuing the activity would have a greater impact for more-specialized individuals than for less-specialized individuals, therefore by voluntarily accepting rules and social norms associated with the activity, participants help to ensure its continuation (Ditton et al. 1992).

Individuals also generate side bets, where something of value (time, money, social relations) is invested in the activity with the condition that to discontinue the activity would generate a loss of the investment (Alluto, Hrebiniak, and Alonso 1973; Becker 1960). More-specialized individuals are proposed to have a greater financial and emotional investment in a given activity than less-specialized individuals (Ditton et al. 1992). Therefore, the fourth proposition to be tested concerns whether or not more-specialized anglers do indeed have a higher level of side-bets than do low-specialized anglers.

Hypotheses

Based on the above, the following hypotheses were generated.

Ha1(a): More-specialized anglers will place less importance on activity-specific elements of the angling experience than low-specialized anglers.

Ha1(b): More-specialized anglers will place more importance on non activity-specific elements of the angling experience than low-specialized anglers.

Ha2: More-specialized anglers will have a greater frequency of participation than low-specialized anglers.

Ha3: More-specialized anglers will have a greater support for various management tools and regulations than less-specialized anglers.

Ha4: More-specialized anglers will have generated a greater value of side-bets than less-specialized anglers.

Methods

Data Collection

Data were collected by way of a mail survey administered to a random sample of licensed Massachusetts anglers. The basic survey design and implementation followed accepted principles based on Salant and Dillman (1994). To all members of the sample, a personalized advance-notice letter was sent, announcing they had been selected to participate in the survey and that they would be receiving the questionnaire in the mail within the following week. One week later a set of survey materials was mailed to all members of the sample. These materials included the questionnaire, a cover letter describing the intent of the survey, and a self-addressed stamped envelope for returning the completed survey. Two weeks after mailing the advance notice letter, a thank you/reminder postcard was mailed to all members of the sample. This follow-up served to thank those who had already completed and returned their questionnaire, and to request a response from those who had not. Five weeks after mailing the advance notice letter, a second set of survey materials was sent to those who had not yet responded. This second survey package was identical to the first, except that the personalized cover letter was revised to further encourage the subject to complete and return their survey.

Specialization Index

Anglers were classified into subgroups through the use of a specialization index. The index was composed of four indicator variables. These variables were: 1) Orientation to the sport of fishing, 2) Fishing experiences, 3) Relationships with other anglers, and 4) Commitment to fishing. There were four possible responses to each indicator variable, with each response increasing in value. It was designed so that the higher values would be selected by more specialized individuals, and the lower values would be selected by less specialized individuals. A total specialization score was computed by summing the values of the four indicator items, and could range from 4 to 16. The total specialization score was then separated into three groups, high-specialization, moderate-specialization and low-specialization, using methods as described by Salz (2000).

Analysis

One-way ANOVA tests were used to test for mean differences between the three specialization groups. A significance level of .10 was used to test the null hypotheses. This level of confidence reflects a balance between a higher probability of committing a Type I error (rejecting a true null hypothesis) and consequently decreasing the probability of committing a Type II error (failure to reject the null when it is false). Gregorie and Driver (1979) suggest this as being a more appropriate level so other studies would not mistakenly consider some of the differences found as unimportant upon the commission of a Type II error.

Results

Survey Response Rate

Approximately fifty-five percent of the questionnaires were returned in usable form (Table 1). There were 312 questionnaires returned as undeliverable by the U.S. Postal Service, 3 were returned because addressee was deceased, and 29 were returned by the respondent as unusable. The remainder were non-responses.

Table 1. Status of sport angler questionnaire response.

Type of Response	N	Total	%
Initial sample	2930		---
Mortality	344		---
Deceased (3)			
Non-deliverable (312)			
Not-usable upon return (29)			
Effective sample	2586		100.0
Non-Response	1175		45.4
Usable returned surveys	1411		54.6

Specialization Index

Based on Salz (2000), initially, four levels of specialization were identified, with scores of 4-6 representing the lowest specialization level, 7-10 the second specialization level, 11-13 the third specialization level, and 14-16 being the highest specialization level (Table 2). However, only 16

individuals (1.2%) were found to be in specialization level 1 (Table 3). Because this is inadequate for purposes of statistical analysis, level 1 was dropped. Therefore, low-specialization anglers correspond to level 2, moderate-specialization anglers correspond to level 3, and highly-specialized anglers correspond to level 4.

Table 2. Distribution of total specialization scores.

<u>Specialization Score</u>	<u>n</u>	<u>%</u>
4	2	0.1
5	3	0.2
6	11	0.8
7	36	2.7
8	109	8.1
9	126	9.3
10	169	12.5
11	179	13.2
12	214	15.8
13	179	13.2
14	135	10.0
15	99	7.3
16	91	6.7

Table 3. Number and distribution of anglers according to specialization.

	Level of Specialization			
	1 (dropped)	2 (L)	3 (M)	4 (H)
n	16	427	585	325
%	1.2	31.6	43.2	24.0

L = low-specialization, M = moderate-specialization, H = high-specialization

Importance of Activity and Non-Activity Specific Elements (Hypothesis One)

Eight items were used to measure the importance of activity-specific elements of the fishing experience. Results show significant differences for six of these eight

measures (Table 4). Based on these results, the null hypothesis that there are no differences according to level of specialization on activity-specific measures of the fishing experience, was rejected. Because the results are as predicted by Hal(a), it is accepted as stated.

Table 4. Mean differences in importance of activity-specific items according to specialization level.

Items*	Group Mean Score			F	p
	L	M	H		
For the experience of the catch	<u>3.499**</u>	<u>3.808</u>	<u>4.128</u>	29.885	0.000
It doesn't matter what type of fish I catch	<u>3.329</u>	<u>3.074</u>	<u>2.938</u>	12.023	0.000
For the sport of fishing, not to obtain food to eat	<u>3.550</u>	<u>3.901</u>	<u>4.183</u>	26.246	0.000
I am just as happy if I don't keep the fish I catch	<u>4.052</u>	<u>4.156</u>	<u>4.329</u>	7.508	0.001
I'm just as happy if I release the fish I catch	<u>4.109</u>	<u>4.180</u>	<u>4.370</u>	7.584	0.001
A fishing trip can be successful even if no fish are caught	<u>3.800</u>	<u>3.828</u>	<u>4.031</u>	5.772	0.003
When I go fishing, I'm just as happy if I don't catch a fish	<u>3.088</u>	<u>3.040</u>	<u>3.111</u>	0.522	0.593
To obtain fish for eating, and not for sport	<u>1.496</u>	<u>1.485</u>	<u>1.547</u>	0.496	0.609

*For Items 1, 3 and 8 mean scores were based on responses to the following categories; 1 = Not at all important, 2 = Slightly important, 3 = Moderately important, 4 = Very important, 5 = Extremely important. For all other Items, mean scores were based on responses to the following categories; 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.

**Means underscored by the same line are not significantly different at the .10 level using Tukey's test.

Twelve items were used to measure the importance of non activity-specific elements of the fishing experience. Results show significant differences for all twelve items according to level of specialization and therefore, the null hypothesis is rejected (Table 5). It was predicted that

more-specialized anglers would place greater importance on non activity-specific activities than would less-specialized anglers. Because the results are as predicted, Ha1(b) is accepted as stated.

Table 5. Mean differences in importance of non activity-specific items according to specialization level.

<u>Items*</u>	<u>Group Mean Score</u>			<u>F</u>	<u>p</u>
	<u>L</u>	<u>M</u>	<u>H</u>		
To be outdoors	4.165**	4.243	4.450	10.865	0.000
To experience new and different things	2.849	2.931	3.279	12.137	0.000
For relaxation	4.203	4.353	4.559	17.644	0.000
To be close to the water	3.343	3.587	3.973	22.518	0.000
To get away from the demands of other people	3.412	3.470	3.842	10.429	0.000
To test my skills using light tackle	2.627	3.185	3.570	53.903	0.000
To develop my skills	2.652	3.161	3.688	66.645	0.000
To get away from the regular routine	3.796	3.912	4.159	9.864	0.000
To be with friends	3.115	3.199	3.559	12.973	0.000
To experience adventure and excitement	3.391	3.735	4.009	29.839	0.000
To experience natural surroundings	4.119	4.256	4.453	13.782	0.000
For family recreation	3.297 ^a	3.126 ^b	3.256 ^{ab}	2.360	0.095

*Mean scores were based on responses to the following categories; 1 = Not at all important, 2 = Slightly important, 3 = Moderately important, 4 = Very important, 5 = Extremely important.

**Means underscored on the same line or having similar superscript are not significantly different at the .10 level using Tukey's test.

Frequency of Participation (Hypothesis Two)

Results showed significant differences on angler frequency of participation according to level of specialization (Table 6). The null hypothesis is therefore rejected as stated. Highly-specialized anglers had significantly higher rates of

participation than moderate and lower-specialized anglers. Results also show that moderately-specialized anglers have significantly higher rates of participation than lower specialized anglers. Because this is consistent with Ha2, it is accepted as stated.

Table 6. Mean differences in frequency of participation according to specialization level.

	Level of specialization			<i>F</i>	<i>p</i>
	<u>L</u>	<u>M</u>	<u>H</u>		
Mean total days fished	<u>15.215*</u>	<u>36.475</u>	<u>56.609</u>	105.918	0.000

*Means underscored by the same line are not significantly different at the .10 level using Tukey's test.

Importance of Management Tools and Regulations (Hypothesis Three)

Eleven items were used to measure support or opposition to various management regulations. The null hypothesis, which states that there are no differences between anglers in their support and opposition to management rules, was rejected since significant differences were found for ten of

the eleven items (Table 7). The prediction that more-specialized anglers would indicate a greater support for management rules than would less-specialized anglers was supported on nine of the ten significant items. The mean values for the one item (restricted fishing area) was directly opposite of that predicted. Because nine of the ten significant items were ordered as predicted, Ha3 was accepted as stated.

Table 7. Mean differences in support and opposition of management regulation items according to specialization level.

<u>Items*</u>	Group Mean Score			<i>F</i>	<i>p</i>
	<u>L</u>	<u>M</u>	<u>H</u>		
Minimum size limit	<u>4.095**</u>	<u>4.218</u>	<u>4.433</u>	9.105	0.000
Maximum size	<u>3.283</u>	<u>3.542</u>	<u>3.733</u>	13.387	0.000
Creel limit	<u>4.112</u>	<u>4.287</u>	<u>4.463</u>	14.230	0.000
No stocking allowed	<u>3.558</u>	<u>3.671</u>	<u>3.935</u>	13.658	0.000
Stock non-native fish	<u>2.993</u>	<u>3.288</u>	<u>3.343</u>	12.414	0.000
Stock native fish	<u>4.216</u>	<u>4.336</u>	<u>4.403</u>	6.628	0.001
Restricted fishing area	<u>3.445</u>	<u>3.256</u>	<u>3.069</u>	7.608	0.001
Mandatory catch and release	<u>3.126</u>	<u>3.158</u>	<u>3.439</u>	6.628	0.001
Slot limit	<u>3.120</u>	<u>3.186</u>	<u>3.388</u>	5.753	0.003
Prohibit use of certain gear	<u>3.631</u>	<u>3.533</u>	<u>3.581</u>	0.913	0.402
Voluntary catch and release	3.874 ^a	4.028 ^b	4.022 ^{ab}	2.915	0.055

*Item mean scores were based respondents' answers for following categories; 1 = Strongly oppose, 2 = Oppose, 3 = Neutral, 4 = Support, 5 = Strongly support.

**Means underscored by the same line or having the same superscript are not significantly different at the .10 level using Tukey's test.

Generation of Side Bets (Hypothesis Four)

Four items were used to measure the financial costs of participation in recreational angling. Significant differences were found according to specialization level for

all four items (Table 8). It was predicted that more-specialized anglers would generate a greater value in side bets than less-specialized anglers and this prediction was supported for all four items. Ha4 is therefore supported as stated.

Table 8. Mean differences in the cost of replacing fishing equipment with similar equipment between specialization level.

Items	Group Mean Score				
	<u>L</u>	<u>M</u>	<u>H</u>	<u>F</u>	<u>p</u>
Replace reels	\$116.76*	\$228.87	\$455.80	90.369	0.000
Replace rods	133.66	284.55	555.28	38.536	0.000
Replace tackle	114.66	279.00	579.84	77.977	0.000
Replace electronic equipment	262.00	436.65	580.42	6.945	0.001

*Means underscored by the same line are not significantly different at the .10 level using Tukey's test.

Conclusions and discussion

Results of the four hypotheses tests provide strong support for the theory of recreation specialization as conceptualized by Ditton et al. (1992), and for the use of the specialization index as developed. For each hypothesis, the alternative form was supported. The study suggests that the use of a multi-dimensional index is an advance over the unidimensional index used in previous studies. Instead of using one variable to describe a group, this index uses multiple variables, which may be a more robust and overall better indicator of group distinctions.

Results indicated that more-specialized anglers were more interested in a qualitative experience while less-specialized anglers had a more simplistic view of fishing that did not consider other intrinsic elements of the experience as important. This supports specialization theory and further reconfirms the results of Ditton et al (1992).

Frequency of participation was also shown to increase as specialization levels increase. Anglers who are more-specialized participate in angling activities more often than anglers who are less-specialized. According to specialization theory, participation should increase as specialization levels increase. The results pertaining to frequency of participation among anglers are consistent with this theory.

It appears that more-specialized anglers are more receptive to management regulations than less-specialized anglers. The support for management regulations was shown to increase as specialization increases. The former group is more likely to be impacted than the latter group if fishing activities were discontinued, therefore, as predicted from specialization theory, the former would be more supportive of rules and regulations issued from fisheries management agencies. As predicted, the side bets anglers appropriated

for fishing activities was shown to increase as the level of specialization increased. Because of a greater involvement within the activity, more-specialized anglers will commit greater financial costs towards fishing than anglers who are less-specialized. This is also supportive of recreation specialization.

Regarding questions where respondents selected from a five-point scale as to the extent they agree or disagree with statements about sport fishing, almost all mean values fell within the Neutral (3) and Agree (4) categories, regardless of specialization level. Perhaps in future research, ordering the scale with the Neutral category being 1, then Strongly disagree (2), Disagree (3), Agree (4) and Strongly agree (5) might produce more varied responses between the different specialization groups.

On the initial segmentation of anglers into the four original specialization levels, there are several possibilities for finding few anglers in the lowest specialized category (that was eventually dropped). One possibility is response bias, where individuals belonging to this category were among those who did not respond to the survey. Another possibility is that many anglers are initiated into fishing activities before they reach the age of 16, when they are required to purchase a fishing license in order to legally participate in freshwater angling activities. Since survey participants only included licensed state anglers, many young individuals new to fishing activities, and thus are the least specialized, were excluded from the sample population.

There is potential here for fisheries managers to gain an understanding of group differences on a variety of issues to efficiently improve services already provided. By developing and promoting services based on some aggregation of anglers, the interests of most anglers are ignored. Managers may then be confronted with a fairness issue, where resources are allocated unfairly. Segmentation

by specialization recognizes that different groups have different attributes that require different marketing schemes. Through a better understanding of the angling constituency, managers can avoid making resource allocation decisions that may result in the loss of credibility of the fisheries agency (Loomis and Ditton 1993; Ditton 1996). The results of this study provide strong support for the use of a multi-dimensional index as a means of classifying participants into homogeneous groups, based on the recreation specialization theory developed by Ditton et al. (1992). Having this type of sophisticated insight to anglers can be used to effectively evaluate current management objectives and services.

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