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Northeastern Recreation Research Symposium Policy Statement

The Northeastern Recreation Research Symposium seeks to foster quality information exchange between recreation, tourism, and resource managers and researchers throughout the Northeast. The forum provides opportunities for recreation and tourism research managers from different agencies, states, and government levels, as well as those in the private sector to discuss current issues, problems, and research applications in the field. Students and all those interested in continuing education in recreation and tourism management are particularly welcome.

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Proceedings of the 1997 Northeastern Recreation Research Symposium

April 6 - 8, 1997



On Lake George in Bolton Landing, New York

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Hans G. Vogelsong
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**Recreation, Protected Areas
and Social Science**

Opening Session



RECREATION, PROTECTED AREAS, AND SOCIAL SCIENCE: WHERE ARE WE GOING?

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Abstract: I am new in my job as coordinator for USDA Forest Service research in recreation, social sciences, and wilderness. I predict that we will be giving greater attention and resources to this area in the near future, despite recent budget cuts and personnel reductions. Researchers should cooperate with each other nation-wide, and involve resource managers and users in the research process. They should also take time to enjoy their jobs and their personal and family life, as new Chief Mike Dombeck has suggested.

Thank you for inviting me today. I must tell you that I prepared these remarks before I knew exactly what the assigned title was to be. However, I normally add titles to papers after I see what turns out, so this one may fit. Because I am new in my job, it's easier to talk about the future than the past. I know myself better than my job, so I will talk more about where I am going and less about where we are going. Please tell me if we're headed the same way.

Greetings from Washington, our nation's capital. I remember learning from Ross Tocher in 1969 about the *escape from* versus the *attraction to* motivations for recreation. For me, both are operative today. It's good to be here on Lake George, a very attractive place.

In truth, if I wasn't happy to be here, I would not be here. After all, today is Sunday, a day not for work, but for rest, renewal, recreation, family, and listening to "Car Talk" on National Public Radio. However, my wife came with me, and we are looking forward to celebrating our 34th wedding anniversary tomorrow in this luxurious hotel. So this is fun, and my remarks are going to reflect that.

It's Sunday. We can say anything we want. So greetings again from Washington -- home of avarice, bureaucracy, back-biting, butt-kicking, mud-slinging, political posturing, bombast, pork, drugs, murder, but no baseball. I like it there, I really do. Not because of all these negatives; every place has negatives. But Washington also has cherry blossoms, two rivers, fabulous buildings, great art, wonderful music, opera, museums, other cultural attractions, winning soccer, the best collection of ethnic restaurants outside of New York City, and cheap booze. Right! I can buy French wine cheaper in Washington than you can buy California wine in the Napa Valley. Why? Because Congress controls the taxes in DC, most of the cost of alcoholic beverages is taxes, and Members of

Congress are known for their appreciation of the finer things in life, like foreign travel and foreign wines.

In addition to these attributes, Washington is full of good people who work hard. Despite stereotypes, despite what you read in the newspaper or see on TV, this is true for all three branches of government, from the very bottom to the very top of the pay scale. So it's an exciting place, and it's a great place to work with other people to get things done. It is a better place for extroverts than introverts. Even though I'm an introvert, I like working there.

Since last October 2, I have been sitting in a chair once occupied by Alan Ewart as the national coordinator for Forest Service research in recreation, wilderness, and social sciences. This is in the staff that also handles forest inventory, economics, and urban forestry research. Some of you know Al. All of you know him at least as well as I do. I think he called this area of research, "human dimensions". Apparently, that nomenclature failed to fly in the Forest Service. Nobody knew what it meant. So Ken Cordell and a cast of colleagues are convening Tuesday in Salt Lake City to figure out what to do with human dimensions.

I have spent some of my time since October counting heads and some of it counting dollars, mostly looking forward. For fiscal year 1998, which begins in only 6 months, the Forest Service is asking for about 4 1/2 million dollars for social/cultural research, including recreation, and about \$1.1 million for wilderness research, some of which is recreation. The total of \$5.6 million is up about 6 percent from actual dollars in 1997.

Is this a lot of money or a little? It's not a lot compared to a total budget of \$180 million for all areas of Forest Service research. The only areas that got less in 1997 are forest health monitoring, forest product safety and human health, rangeland ecology, and urban forestry. Wilderness research would have been last if I hadn't cheated and added it to social, cultural, and recreation.

Hey, they brought me back from Vienna to be in charge of one of the five smallest research programs in the whole organization! I guess I can look at this magnificent display of confidence in two ways: (1) there's no way even I can make things much worse, or (2) they have given me a huge challenge to make things better.

Can we make it better? I hope so. Based on some very early numbers, I would not be surprised to see an increase of about one million dollars in 1999. If we turned everyone loose to ask for as much as they think they could use productively, we would probably get a request of more than double what we're requesting this year. Doubling sounds good, but I'll be happy simply with a bit of growth. We have certainly had enough of shrinkage.

Enough about dollars. What about people? My head count is not complete, but there are about 30 Forest Service scientists identified with social, cultural, recreation, and wilderness research, at about half that many locations. My goal, naturally, is to visit all these locations and meet all these people, and their cooperators. So far, I have been to

only two of these locations, but by going to meetings such as this, and because some folks come to Washington, I have met quite a few already.

As I get around to meeting everyone, I intend to assure them of my support in getting the resources they need to do their job.

I intend also to find out how well they know each other and whether it might be possible to integrate their efforts a bit better. Communications are getting cheaper, faster, and easier, but it is surprisingly easy still for researchers to put their heads down close to their work and not notice someone else doing similar work elsewhere. For example, it is surprising that we have two meetings scheduled this week that have forced many people to choose between Lake George and Salt Lake City.

As I get around, I plan to ask our researchers how they decide what to work on. Who participates in problem identification and problem selection? Do we have a good balance between individual inspiration and customer-driven research? Are resource managers and resource users consulted by researchers in deciding what to do, where to do it, and how to do it? Are we going far enough to make sure our research is relevant to real problems, used to solve these problems, and available to all who face these problems? Are researchers rewarded for doing the right thing, either in pay and promotions, increased resources and flexibility, or opportunities for professional growth and personal satisfaction?

I'll also ask if we're having fun. We are in *recreation* for goodness sake! If we are not having fun, there is something wrong with us. Former Forest Service Chief Dale Robertson used to encourage all of us to have fun, but he also told us that if we weren't working hard enough, we were going to be bypassed by someone who was working harder. He worked hard, but it didn't help. I think he's having more fun now. I know former Chief Jack Ward Thomas pretty well, but I can't remember him ever talking much about having fun. Jack did have fun as a researcher. I think he did not have much fun while he was Chief, although he worked hard in both roles. Our new Chief, Mike Dombeck, has said something I like. He said, "Give it your best, but don't give it your all; save something for yourself and your family." I *hope* he is following his own advice. I hope that *you* are following this advice. I *know* that I am following this advice!

I've told you a couple things I've done on the job so far, counting dollars and heads. That's been fun. Also on the job, I reviewed the Forest Service draft long term strategy under the Government Performance and Results Act. It was terrible, awful, poorly written, but I *had fun* saying so.

I reviewed a couple manuscripts on social science inputs to ecosystem management that were pretty good, and I *had fun* reading them and saying so. I've traveled to Orlando, Riverside, Burlington, and Pretoria, South Africa, *on the job!* I drove to this meeting with my wife, and that was fun and continues to be. I learned about Koreans who pick ferns on forest land, saw a picnic area being modified to meet the wishes of Hispanic users, met a woman who is the executive director of the American Association of Nude Recreation. Diversity takes many directions, and diversity is fun.

On the job, I have fought with an old computer system that I could not believe still functioned, but this was fun, like using antique tools to build something. I have fought with a new computer to try to access e-mail and the Internet at the same time, and to build my own web page; here, the fun continues. I fielded inquiries from students at the Wharton School about the current definition of visits vs. visitor-days in the RPA statistics on recreation use. I consulted the experts. They didn't know! They disagreed! In the old days, when it made little difference, we knew the answer. Now, when it matters, we don't! I sent back a lot of information and explained the difference between information and knowledge. This was amusing, and it continues to be so.

What else? I shook hands with the new Chief as I came in the door on his first day at work. I shook hands with several Deputy Chiefs as they left on their last day of work. Well, some things are more fun than others.

I said I was following our new Chief's advice to save some time and energy for self, family, friends. Here's proof it can be done. Since we came home from Austria, I've been to a high school reunion in Oakland, saw ' beat Stanford at a basketball game in Berkeley, went to Pagliacci at the Metropolitan opera in New York, and the Matthew Passion at Constitution Hall in Washington. I went skiing with my older son, and baby-sat for his daughter, my granddaughter. I replenished my wine cellar and went to a winery, went out to dinner in two dozen different restaurants, hosted family and friends at our house, wrote a preface for a friend for his book of poems, raised funds for two churches, became a deacon, narrated a Christmas play, worked in the yard, walked in the woods, and spent way more than half of my time with my wife, some of it sleeping.

What is the point of this rambling walk with my inner self that I have inflicted on you this afternoon? I guess it's that I'm glad to be here, I'm glad to meet you, I'm glad to see you, I'm looking forward to working with you, and I hope you plan to have as much fun doing it as I will.

Thanks again for the invitation.



**Water Based Recreation
Management Studies**



**WATERCRAFT USER CHARACTERISTICS,
MANAGEMENT PREFERENCES, AND USER
ENCOUNTERS ON THE UPPER DELAWARE
SCENIC AND RECREATIONAL RIVER: 1979 -
1996**

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Abstract: Recreational boaters on the National Park Service managed Upper Delaware Scenic and Recreational River were surveyed about their characteristics, management preferences, and user encounters. Field interviews were conducted from Memorial Day weekend through Labor Day weekend during the summer of 1996. A total of 650 boaters were contacted at public and commercial access sites and asked to participate in a brief interview and a follow-up mail survey. During the interview process, 602 boaters gave their addresses and agreed to participate in the mail survey. Of the 585 surveys deliverable, 326 were returned for a 56% response rate. Comparisons were made with a similar boater study conducted on the Upper Delaware Scenic and Recreational River in 1979.

Introduction

In 1978, Congress designated 73.4 miles of the Upper Delaware River as part of the National Wild and Scenic River System (NWSRS). The National Park Service (NPS) began management of the river in 1980. The Upper Delaware Scenic and Recreational River (UDSRR) is located south of the Catskills along the New York - Pennsylvania border. The designated portion of the river extends from the confluence of the Upper Delaware's east and west branches in Hancock, New York, and extends downstream to Mill Rift, Pennsylvania. Unlike many of the other rivers in the NWSRS, the UDSRR is located near a major metropolitan area and receives high levels of watercraft use. The river corridor is mostly privately owned and the land is not managed by a federal agency. While the NPS has jurisdiction on the water, the agency only owns and manages 24 acres along the UDSRR.

The NPS reserves the right to monitor an area of interest within the UDSRR watershed. With the cooperation and approval of the NPS, the Upper Delaware Council, the Delaware River Basin Commission, the Citizens Advisory Council, the Commonwealth of Pennsylvania, the State of New York and the affected political subdivisions of these two States, the current river corridor area that the NPS

monitors has been set at 55,574 acres. This allows the NPS certain management rights outside of the river and the 24 acres that it owns. The corridor boundary has been drawn to define an area in which there is a national interest. The intention of this is "to protect water quality, preserve natural features, provide for recreational uses, provide for the continuation of agriculture, conserve river resources, and maintain existing land use patterns." (Conference of Upper Delaware Townships and NPS 1986). The previous rights of land owners within the 52,400 acres of this project boundary are not limited or infringed upon.

Some of the UDSRR's river access sites are owned by the New York State Department of Environmental Conservation (NYSDEC) and held in cooperative management with the NPS. The NPS works in partnership with the NYSDEC at these sites, but is directly responsible for the day to day management of them. The Pennsylvania Fish Commission manages several sites along the river in a cooperative agreement with the NPS. There are many private access sites along both sides of the UDSRR that are owned and managed by commercial outfitters or by other organizations for their customers or members.

The first watercraft user study on the UDSRR was conducted in 1979 (Dawson et al. 1981a and 1981b) as part of the National River Recreation Study (Knopf and Lime 1984). Subsequent research on recreational river use on the UDSRR has been limited (Marion 1989, Pawelko 1996). In 1995, the NPS field staff expressed interest in better understanding and documenting current river user characteristics on the UDSRR. A 1996 study (Bowes 1997) was designed and conducted that was similar in research design and methodology to the 1979 study.

The NPS annual reports (unpublished) for the UDSRR estimated that recreational use of the UDSRR included 496,397 visits in 1996 with 80% due to boaters. Other users included anglers, swimmers, NPS historic site visitors, and other tourists seeking information from NPS offices. Estimated recreational use has risen dramatically (213%) from the 158,375 visitors in 1981 which was the first year of NPS management on the UDSRR.

The goal of this paper is to report on two objectives of the 1996 study: (1) to measure the characteristics, management preferences, and user encounters experienced by watercraft users on the UDSRR in 1996; and (2) to compare the results of the 1979 and 1996 watercraft user studies.

Methodology

The field research for the 1996 study was carried out between June 1 and August 31. A total of 14 weekend days, and 6 weekdays were sampled systematically across the public and commercial access sites. Brief field interviews were conducted to measure descriptive user characteristics such as group composition, watercraft type, origination and destination points on the river, and to ask boaters for their cooperation in a follow-up mail survey. The mail survey was similar to the questionnaire used in 1979. A modified Dillman technique was used (Salant and

Dillman 1994) and up to three mail survey reminders were used to ensure a high response rate. The research and sampling methodologies for the studies in 1979 and 1996 were similar so that direct comparisons could be made between the results. Statistical tests between the two data sets were not conducted because the 1979 data set was not available for analysis.

A total of 650 boaters were contacted in 1996 at public and commercial access sites and asked to participate in a brief interview and a follow-up mail survey. During the interview process, 602 boaters gave their addresses and agreed to participate in the mail survey. Seventeen of the surveys sent out were undeliverable. Of the 585 surveys deliverable, 326 were returned for a 56% response rate in 1996. All 326 surveys from the 1996 study were used in the following analysis and compared to the 230 surveys returned (67% response rate) in the 1979 study (Dawson et al. 1981a and 1981b).

Boater Characteristics

The states of residence reported by boaters has changed noticeably in 17 years (Table 1). Of the three states that can be compared, the only one that has diminished participation is New York with a 11% decrease in the number of boaters that claim it is their state of residence. More boaters are now coming from both New Jersey and Pennsylvania than they did in 1979. Boaters from New Jersey have increased by 10%, and boaters from Pennsylvania have increased by 2%. Only 4% of the boaters were coming from outside of the tri-state area in 1996.

People who reported participating in commercial trips has decreased by 15%, and those who reported being on a private trip using their own equipment rose by 14% (Table 1). More people own their own watercraft and have the interest to plan and manage their own trips. These changing trends are highlighted by the types of watercraft boaters are using today. The percentage of boaters rafting the UDSRR has risen to 47%, while the percentage of boaters using canoes has dropped to 48%. The recreational boating experience is affected by this change in watercraft in such characteristics as length of trip, speed of travel, and group size. These characteristics can also change the need for facilities along the way, location of access sites, and the behavior of boaters.

The percentage of boaters that reported being with family members dropped 30% since 1979 and groups consisting of friends dropped by 4% (Table 1). The one group type that increased is organizations which grew by 11% over the last 17 years. This may be related to the rise in the use of rafts since they can accommodate more boaters in one watercraft and allow members of an organization to spend time together.

The percentage of boaters coming to the UDSRR for day trips versus overnight trips has remained unchanged in the last 17 years (Table 1). The number of boaters who had

floated the Upper Delaware one or more times prior to their interview has grown by 17% since the last study.

Table 1. Boater characteristics compared between the 1979 and 1996 UDSRR studies.

	1979	1996
Residence		
New York	Percent 56	Percent 46
New Jersey	27	38
Pennsylvania	10	12
Others	7	4
Trip Type		
Commercial	89	75
Private	11	25
Watercraft Type		
Canoe	90	48
Raft	1	47
Kayak	4	4
Other	5	1
Group Type		
Friends	75	45
Family	47	44
Organization	10	21
Trip Length		
Day Trip	68	65
Overnight Trip	32	35
Previous Experience		
More than one trip on The UDSRR	52	69

Boater Motivations

Seventeen of the 29 motivational statements in the 1996 study had 50% or more of the boaters reporting that they agreed or strongly agreed with the motivational statement (Table 2). The top motivation for boaters visiting the UDSRR remains 'viewing scenery' which increased by 12% since 1979. Five of the other motivational variables also increased in percentage of boaters who agreed or strongly agreed that those were important motivations for their trips to the UDSRR. 'Spending time with friends' has moved from the fourth most highly rated motivation in 1979 to the second in 1996, ahead of 'peace and calm' and 'excitement.' A seventh motivational variable 'to get away from crowds' is considered as staying the same between 1979 and 1996. Ten new variables were used in the 1996 study that could not be compared to the 1979 results; all had a majority of boaters who reported that they agreed or strongly agreed that those were also important motivations for their trip to the UDSRR.

Perceived Recreational User Problems

Nine of the 30 boater related problems in the 1996 study had 50% or more of the boaters reporting that they agreed or strongly agreed with the problem statement (Table 3). All nine variables decreased in the percent of boaters who rated them as a perceived problem. This decrease in the percent of boaters that rate certain variables as problems could be caused by many things such as: less knowledge of the issues, less concern for the issues, or improvements in those areas. One fact that supports the latter possibility is that the number of boaters who previously visited the UDSRR has risen by 17% since the 1979 study (Table 1). In 1979, the situation considered by the highest percent of

boaters to be a problem was 'low water': however, in 1996 this variable was ranked seventh in order of percent response. The problem of 'too few garbage cans' decreased by 17% since 1979 which suggests that this situation has improved. Both 'litter on the banks' and 'litter in the river' decreased by 14% from 1979 to 1996. It is important to note that six of the problems perceived by

50% or more boaters in 1996 were also considered problems by 50% or more boaters in 1979. Only two of the 1979 problems, 'low water' and 'unskilled boaters,' were no longer seen as problems by the majority of boaters in 1996. Fifty percent of the boaters perceived that insufficient information about the river was a problem in 1979 and 1996.

Table 2. The percentage of boaters who agree or strongly agree with a motive for boating on the UDSRR during the 1979 and 1996 studies.

Boater Motivations*	1979	1996
	Percent	Percent
<i>Increased</i>		
View Scenery	84	96
Spend Time with Friends	71	89
Peace And Calm	80	81
Excitement	77	80
To Exercise	63	75
Experience New Things	59	70
<i>Decreased</i>		
Get Away From Crowds	60	59
<i>No Comparison</i>		
Change Of Routine	-	91
Get Away From Life	-	88
Close to Nature	-	88
Run the Rapids	-	86
Release Anxiety	-	80
Rest	-	72
Part of Group	-	67
Spend Time with Family	-	58
Similar People	-	53
Reflect	-	51
Developing Skills	68	-

*Originally measured on a 5-point Likert scale: -2= Strongly Disagree, -1= Disagree, 0= Neutral, 1= Agree, 2= Strongly Agree.

Table 3. The percentage of boaters who report a slight to serious problem while boating on the UDSRR during the 1979 and 1996 studies.

Perceived Boater Problems*	1979	1996
	Percent	Percent
<i>Decreased</i>		
Inadequate Toilets at Stops	69	62
Litter On The Banks	74	60
Inadequate Toilets At Access Points	60	57
Litter In The River	70	56
Too Few Garbage Cans	68	51
Inadequate Brochures	51	50
Low Water	76	41
Unskilled People	50	37
<i>Stayed The Same</i>		
Insufficient Information	50	50
<i>No Comparison</i>		
Too Few Drinking Water Sources	60	-

*Measured on a 5-point scale: 1= Not a problem, 2= Slight problem, 3= Moderate problem, 4= Serious problem, 5= Very serious problem.

Preferred Management Actions

Eleven of the 20 proposed management action statements in the 1996 study had 50% or more of the boaters reporting that they agreed or strongly agreed with the proposed statement (Table 4). The variables in Table 4 are organized from highest to lowest percent with the rank order of all nine variables from both studies remaining the same over the last 17 years. Four preferred management actions had an increase in reported support while five reported some decrease in support. The largest differences in percentages between the studies were for the decreases in number of boaters supporting: (1) 'post hazard signs' which decreased 15% since 1979, and (2) 'more enforcement patrols' which decreased 13% since 1979 and has become an issue that is not supported by the majority of boaters. Out of all the variables that 50% or more boaters supported in 1979, two no longer have the majority supporting them in 1996. Comparisons could not be made between five of the management variables because they were not included in each study. Two new variables were used in the 1996 study that could not be compared to the 1979 results -- 'improve access sites' and 'new visitor center' -- and both were supported by a majority of boaters. Three of the 1979 study variables were not replicated in 1996.

Table 4. The percentage of boaters who agree or strongly agree with a preferred management action on the UDSRR during the 1979 and 1996 studies.

	1979	1996
Preferred Management Actions	Percent	Percent
<i>Increased</i>		
Carry Out Trash	84	88
Add Hiking Trails	78	79
Designate Campfire Areas	59	66
Improve Loading Areas	48	55
<i>Decreased</i>		
More Mile Markers	73	68
Post Hazard Signs	73	58
Campsites At Access Points	64	54
More River Campsites	54	49
More Enforcement Patrols	55	42
<i>No Comparison</i>		
Improve Access Sites	-	64
New Visitor Center	-	64
Provide More Information	75	-
Provide Firewood	58	-
Prohibit Off-Road Vehicles	54	-

*Originally measured on a 5-point Likert scale:
-2= Strongly Disagree, -1= Disagree, 0= Neutral, 1= Agree, 2= Strongly Agree.

User Encounters

The percentage of boaters who experienced the number of watercraft encounters they expected rose over the last 17 years in both the 'put in' and 'take out' variables (Table 5). Since the number of boaters who had been on the UDSRR previously had increased since 1979 (Table 1), this would seem to imply that boaters today have a more accurate idea

of how many encounters to expect based on previous trips to the UDSRR.

Table 5. Expectations of boaters for the number of other watercraft that would be encountered versus what they actually experienced during their trip on the UDSRR in 1979 and 1996.

<i>Number Of Watercraft Expected*</i>	<i>At Put In</i>		<i>At Take Out</i>	
	1979	1996	1979	1996
Fewer or Far Fewer than Expected	19	21	20	20
What Expected	57	65	55	63
More or Far More than Expected	24	14	25	17

*Originally measured on a 5-point scale: -2= Far Fewer, -1= Fewer, 0= What Expected, 1= More, 2= Far more.

Boaters were asked to estimate the number of other watercraft they saw at the put in and take out access points during their trip on the UDSRR in the 1979 and 1996 studies (Table 6). A majority of boaters in both studies reported seeing between 1 to 25 other watercraft at both put in and take out points. While there has been an increase in the percent of boaters seeing 1 to 25 other watercraft in 1996, the percentage of boaters reporting the higher watercraft encounter categories has decreased over the last 17 years. In both studies, only a minority of the respondents reported seeing more than 25 other watercraft at the put in and take out points and this percentage has decreased. It is difficult to determine the exact cause of this decrease in the percent of boaters seeing high numbers of other watercraft at the put in and take out, but it does not necessarily imply overall decreasing use levels on the UDSRR (e.g., users may be better distributed along the river).

Table 6. The number of watercraft encountered by boaters during their trip on the UDSRR in 1979 and 1996.

<i>Number Of Watercraft Seen</i>	<i>At Put In</i>		<i>At Take Out</i>	
	1979	1996	1979	1996
0	6	5	5	8
1-25	65	77	60	72
26-50	19	11	22	14
51-75	4	1	5	2
76-100	5	4	5	2
>100	1	2	3	2

Boaters were asked how they felt about the number of other watercraft they encountered at different times during their trip on the UDSRR during the 1979 and 1996 studies (Table 7). This information shows a substantial rise in the percentage of boaters who rated their feelings about watercraft encounters as neutral: these feelings of neutrality increased 19% at the put in, and 18% at the take out. This may indicate a more tolerant attitude or more realistic expectations. Probably the increases in the percent of boaters with previous experience on the UDSRR has created more realistic expectations about the amount of

other watercraft to expect. The percentage of boaters who would like to see more other boaters decreased 11% between 1979 and 1996 for both put in and take out points along the UDSRR. The percentage of boaters who reported seeing too many other watercraft decreased as well for both put in and take out access points on the UDSRR.

Table 7. Feelings of boaters about the number of other watercraft they encountered versus what they would like to experience during their trip on the UDSRR in 1979 and 1996.

<i>Number Of Watercraft Wanted to Experience*</i>	<i>At Put In</i>		<i>At Take Out</i>	
	1979 Percent	1996 Percent	1979 Percent	1996 Percent
Would like to see More or a Few More Watercraft	15	4	13	2
Neutral	62	81	65	83
Saw Too Many or Far Too Many Other Watercraft	23	15	22	15

*Originally measured on a 5-point scale: -2= See More, -1= See Few More, 0= Neutral, 1= Few Too Many, 2= Far Too Many.

Summary and Discussion

Some of the important comparisons between the results of the 1979 and 1996 studies that have management implications are:

- An increased use of rafts (up to 47% in 1996) as the watercraft of choice has management implications due to the larger social group involved in each watercraft, slower travel, less distance traveled, and other factors.
- An increase in the percentage of private trips and organized groups suggests shifts in user types.
- Boater motivations have remained complex and relatively constant for seven motives.
- An increase in the previous boating experience on the UDSRR and in the percent of boaters experiencing the amount of encounters they expected indicates more accurate expectations by boaters.
- The perceived problems of boaters include the need for more boater services and information; these have remained the same in rank order of percentage reporting a problem but decreasing percentage ratings indicate management success, especially in view of the dramatic increases in use.
- The preferred management actions include more boater services and signage on the river.

The increase in visits to the UDSRR from 1981 to 1996 and the declining percentage of boaters who perceive problems suggests that management on the river has been successful. The cooperative management between the NPS, the Upper Delaware Council, the Delaware River Basin Commission, the Citizens Advisory Council, the Commonwealth of Pennsylvania, the State of New York, and the counties and townships within the UDSRR corridor makes management complex but boaters were more satisfied

(i.e., reported fewer percentage of problems than in 1979) in 1996. However, continued effort to further mitigate problems and provide better boater services and information are necessary. Future research on UDSRR boaters should be conducted every two to five years rather than the 17 years since the last study as more short term trends and fluctuations can be monitored and guide the management process.

Acknowledgments

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CUSTOMER SATISFACTION AT US ARMY CORPS OF ENGINEERS-ADMINISTERED LAKES: A COMPILATION OF TWO YEARS OF PERFORMANCE DATA

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Abstract: The purpose of this paper was to demonstrate the application of a model which can be used to predict the overall customer satisfaction levels of water-based recreationists. Data were collected from two distinctly different user groups: boat ramp users and campground users. Results indicated that each user group had different satisfaction attributes that impacted their overall satisfaction level.

Introduction

Given the level of attention that customers across the nation are placing on customer service, it is not surprising that outdoor recreation resource managers are attempting to determine the most efficient methods of improving their own customer service levels. Within the marketing field, Parasuraman, Zeithaml and Berry (1985) focused on five tenets of service quality; tangibles, reliability, responsiveness, assurance, and empathy. These authors further developed their concept of service quality attributes into the well-known SERVQUAL model (Parasuraman et al., 1988). The SERVQUAL concept was introduced to the leisure services arena when Mackay and Crompton (1988) adapted the SERVQUAL model to meet the requirements of recreation-specific satisfaction issues in park environments.

The model presented in this paper relies upon four recreation-specific domains of visitor satisfaction: facilities, services, information, and experience. These four domains capture the individual satisfaction attributes important to outdoor recreation managers and visitors and are more easily understood than abstract concepts such as tangibles, reliability, responsiveness, assurance, and empathy.

Study Methods

Data for this study were collected at two US Army Corps of Engineers (Corps) lakes in South Dakota; the Lewis and

Clark Lake, and Lake Francis Case, over the 1996 summer season. A systematic sample of visitors was interviewed through a series of on-site surveys at six separate recreation areas at the two lakes. The response rate for the survey was 92% (n=629).

Results

The results of this study demonstrated the importance of park-specific research, and suggested that service quality instruments should be adapted or supplemented to fit the characteristics of a particular park site or user group. Significant differences were found between the two user groups, and different satisfaction attributes were found to impact the user groups' overall satisfaction rates. Additionally, an overall model of satisfaction (Fig. 1) was developed to determine which attribute impacted the overall group of respondents without accounting for the specific recreation activity in which they had participated.

Overall Satisfaction Model

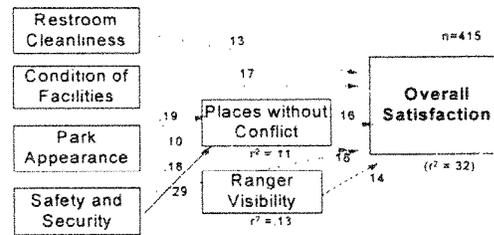


Figure 1 Overall Satisfaction Model

In the overall satisfaction model, the attributes of restroom cleanliness and condition of facilities directly impacted overall satisfaction, while park appearance and safety/security both directly and indirectly impacted overall satisfaction. Places without conflict and ranger visibility were moderating influences on overall satisfaction. The overall satisfaction model accounted for about 32% of the variance associated with visitor satisfaction levels.

When examining the satisfaction attributes that impacted the two user groups, differences were noted. For boat ramp users (Fig. 2), four of the eight satisfaction attribute impacted overall satisfaction. Restroom cleanliness, park appearance, safety/security, and the availability of places to recreate without being bothered by incompatible activities impacted overall satisfaction. Restroom cleanliness and places without conflict had a direct impact upon overall satisfaction, and safety/security had both a direct and indirect impact by virtue of its effect on the perception of places without conflict. Park appearance also impacted the places without conflict indicator, the strongest predictor of overall satisfaction. Overall this model accounted for about 32% of the variance associated with visitor satisfaction levels.

Satisfaction of Ramp Users

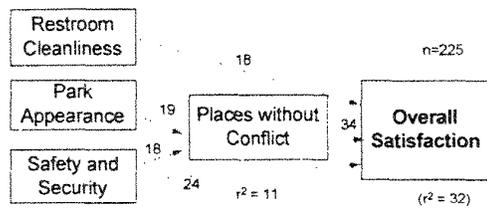


Figure 2 Ramp-user Satisfaction Model

The model which developed for understanding the customer satisfaction levels of campers (Fig. 3) was the most interesting and complex model. This model accounted for about 37% of the variance associated with overall satisfaction, which was the best overall model of customer satisfaction.

Satisfaction of Campers

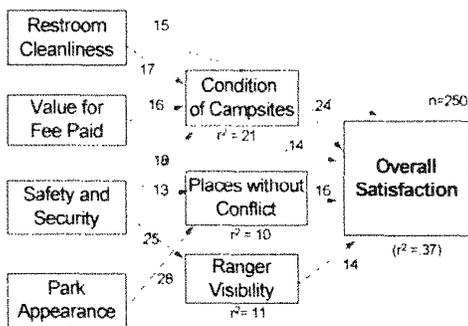


Figure 3 Campground-user Satisfaction Model

In the campground user model, restroom cleanliness and value for fee paid have both a direct and indirect effect on overall satisfaction. Safety and security impacts overall satisfaction only indirectly, but has an effect upon the condition of campsites, places without conflict, and ranger visibility. These three moderating variables, condition of campsites, places without conflict, and ranger visibility all impact overall satisfaction, with the condition of campsites being the strongest predictor.

Summary

The satisfaction models presented in this paper support the concept of maintaining separate sets of standards when attempting to determine the customer satisfaction levels of various user groups. It is possible (and probable) that each different user group will identify different attributes that impact their satisfaction levels in varying manners. Resource managers need an easily understandable means to determine the level of satisfaction of their visitors in order to allocate valuable and shrinking resources. These models, though applicable to user groups at two lakes in South Dakota, should be further developed and an attempt should be made to apply the concept to a larger base of users in a more geographically diverse setting.

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**Forest Recreation
Management Studies**



IDENTIFYING FUNCTIONAL COMMUNITIES FOR USE IN FOREST PLANNING AND DECISIONMAKING

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Abstract: Public land managers are searching for frameworks for organizing and displaying social information that will make it useful in forest management and decisionmaking. On the Chequamegon-Nicolet National Forests in Wisconsin, managers and researchers have used the concept of functional communities to develop such a framework. Functional communities define geographic areas in and around the Chequamegon-Nicolet where people's perceptions and use of the Forests are similar or compatible.

Introduction

The USDA Forest Service and other public land managers are wrestling with how to improve their analysis of the social impacts of management decisions. Two events have spurred Forest Service managers' interest in people/forest interactions. The first event was the Forest Service's adoption of ecosystem management as its new management paradigm. On June 4, 1992 the Chief of the Forest Service announced that the Agency was committed to "using an ecological approach in the future management of the National Forests and Grasslands."¹ The Agency's adoption of an ecological approach to management was a response to changing public values related to the environment and to increased understanding about how ecological systems work.

One of the foundations of ecosystem management is that people are part of and interact with ecosystems:

"People are a part of forest ecosystems; they derive material and non-material goods and services from them, they live, work, and play in forests, and their attitudes, behavior, and knowledge of the forest ecosystem affect it in both direct and indirect ways. Thus, forest management systems that alter the structure and processes of the biological component will alter the human system that interacts with it. Conversely, the way in which people are organized and the processes through which they make decisions will lead to alterations in the forest ecosystem." (FEMAT 1993, p. VII-110)

Within the Agency, issues related to people/forest interactions fall under the rubric "human dimension of ecosystem management." In focusing on the human

dimension of ecosystem management, Agency staff seek to understand human demands on, values and perceptions of, and interactions with ecosystems, and to integrate these into policies, programs, and management decisions.²

In addition to a change in management philosophy, the Forest Service is embarking on its second round of land and resource management planning under the National Forest Management Act (NFMA) of 1974 (as amended by the Resources Planning Act of 1976). The first forest plans completed in the late 1980s were criticized for their lack of social analysis (USDA Forest Service 1990a). For example, in a series of critiques of the initial NFMA planning effort conducted by the Forest Service in cooperation with The Conservation Foundation and Purdue University, critique team members noted that on forests where the planning process was successful "the attention to people's needs (emotional, symbolic, and organizational, as well as economic and community needs) were given consideration along with the resource capabilities and commodity schedules" (USDA Forest Service 1990a, p.13).

In analyzing the effectiveness of the planning effort for decisionmaking, a critique team found that decisionmakers were left in a vacuum with regards to social information on which to base planning decisions: "We concluded that the planning process was designed for an analytical approach to resource decisionmaking; it lacked any means for incorporating sociopolitical issues into the decisionmaking process. A balance of both approaches is needed..." (USDA Forest Service 1990b, p.14).

One of the problems with including information on the human dimensions in forest planning and decisionmaking is finding a useful format for displaying or organizing relevant qualitative and quantitative information. Last July, several social scientists from the North Central Forest Experiment Station and their cooperators met in Park Falls, Wisconsin at the headquarters of the Chequamegon-Nicolet National Forests.³ The Chequamegon-Nicolet is one of the first forests in the Eastern Region of the Forest Service to initiate forest plan revision, and we met to talk about social issues related to forest planning. Wisconsin National Forest staff felt that they needed a social assessment to help them place their planning effort in a social context. As part of this task, we agreed to look at the concept of functional communities, and to test the use of functional communities as a means of organizing information for social assessment and forest planning. To accomplish this, we would be drawing on work initiated by Deborah Carr, U.S. Forest Service, and Dale Blahna, Utah State University, that analyzes peoples' ties to the national forest from two perspectives—from a distance, using secondary data from sources like the Bureau of the Census; and up-close-and-personal, using key informant interviews to identify functional communities. It is the use of functional communities for collecting and organizing information for social assessment that is discussed here.

The Concept of Functional Communities

Generally when you categorize a group of people (or any set of objects) you can do so according to two different schemes—by categories or functions (Flynn 1985). With categorical groups you classify people according to

statistical or definitional characteristics. Examples of categorical groups include "teenagers" or "families with incomes below the poverty line." With categorical groups, the groups are defined by the analyst, and people are either in or out. Functional groups are made up of people with similar behaviors or interactions. Functional groups cannot be determined prior to the analysis, but are determined by the analysis. In Wisconsin, we were interested in defining areas in and around the Chequamegon-Nicolet National Forests where people's perceptions and use of the Forests are similar or compatible. We would define these functional communities using key informant interviews.

Using Key Informants to Identify Functional Communities

Key informants are "experts" who can provide information about activities or events, or can help explain events (Patton, 1980). To identify potential key informants we contacted the five district rangers on the Chequamegon-

Nicolet National Forests and asked them to provide lists of long-time area residents (Forest Service and non-Forest Service employees) who could help us understand the relationship of the area to forests, lakes and public lands. From those lists we selected 46 residents to interview, 23 Forest Service employees and 23 non-Forest Service employees. We met with people at places and times convenient for them. We met people at mills, sporting goods stores, resorts, and in district offices; we met over lunch, before work, and after supper.

The Forest Service employees we interviewed had lived in Wisconsin an average of 34 years, and in the community 39 years. Non-Forest Service key informants had lived in Wisconsin an average of 39 years and in the community 33 years. Table 1 shows the employment of non-Forest Service key informants. We were looking for balance in the employment and affiliation of our key informants, but ultimately we took whom ever had the time.

Table 1.—Distribution of key informants among occupation categories, average length of time living in Wisconsin and living in the functional community, non-Forest Service informants, Wisconsin National Forests Social Assessment

Occupation/ employment	Number of informants ¹	Years lived in Wisconsin	Years lived in the functional community
Educator/writer/extension	5	46	28
Timber industry	5	35	49 ²
Civic leader	5	50	37
Retiree	4	63	35
Small business owner/operator	4	43	32
Tourism/recreation	3	42	35
Other	3	22	10

During the interviews, we sat at a table with a large map of Wisconsin covered with a piece of mylar. We asked key informants to start drawing circles around areas where the people thought about and used the Wisconsin National Forests in similar ways. Then, we used an interview sheet to ask them a series of questions about the people and resources in their circles. These questions sometimes caused our key informants to redraw their communities, but by using this process we came up with 15 functional communities for the Chequamegon-Nicolet National Forests.

Using Functional Communities in Forest Planning and Decisionmaking

How are we using these functional communities to help forest managers understand the social context in which they are operating? First, narrative information is used as part of the Forests' public involvement process. For each community we created a community profile. Community profiles include a general description of the community, a discussion of community ties to the land, further discussion of ties to the Wisconsin National Forests, and a list of issues important to the residents of the functional community. Community profiles are an important component of the public involvement process developed by the Forests. Community profiles help diversify the input received regarding forest management and planning by providing information on the issues and concerns from people who might not otherwise become involved in formal

public involvement activities. Information presented in community profiles adds texture and depth to the discussion of programs and issues that occur during "Friends of the Forest" meetings and other outreach efforts. Information contained in community profiles helps round out the list of issues managers develop as part of the forest planning process. Finally, insights gained from interviews and displayed in the profiles help land managers anticipate the responses by different publics to potential changes in forest management.

Functional communities are useful frameworks for displaying categorical data. For example, the map in Figure 1 shows the percent change in population in northern Wisconsin by county. This is interesting, but it's a little hard to see how it applies to the Forests specifically. Figure 2 shows the same information for the 15 functional communities. These maps are useful in showing how different various communities around the forests really are.

Finally, functional communities could serve as a basis for analyzing the impacts of alternative management actions on different communities for social impact analysis. For example, after identifying impact categories of importance to a community (perhaps number of jobs, quality of life, tradition and culture, economic diversity), a focus group could be formed in each community to ascertain people's perceptions of the potential impacts of management alternatives on the community.

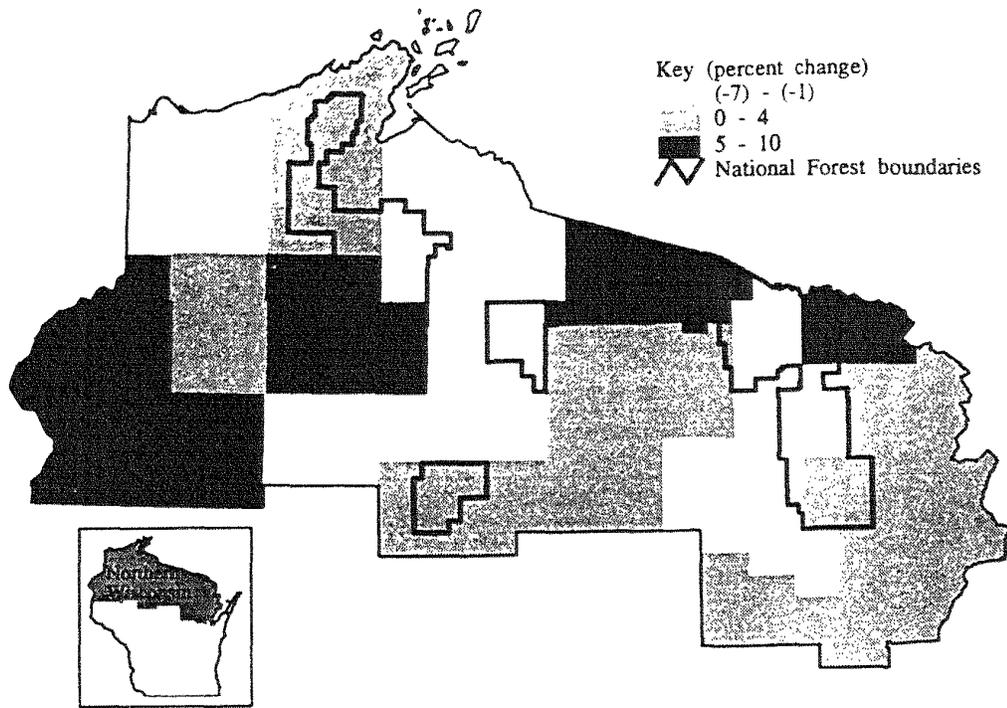


Figure 1. Percent change in population, northern Wisconsin by county, 1980-1990 (US Census Bureau)

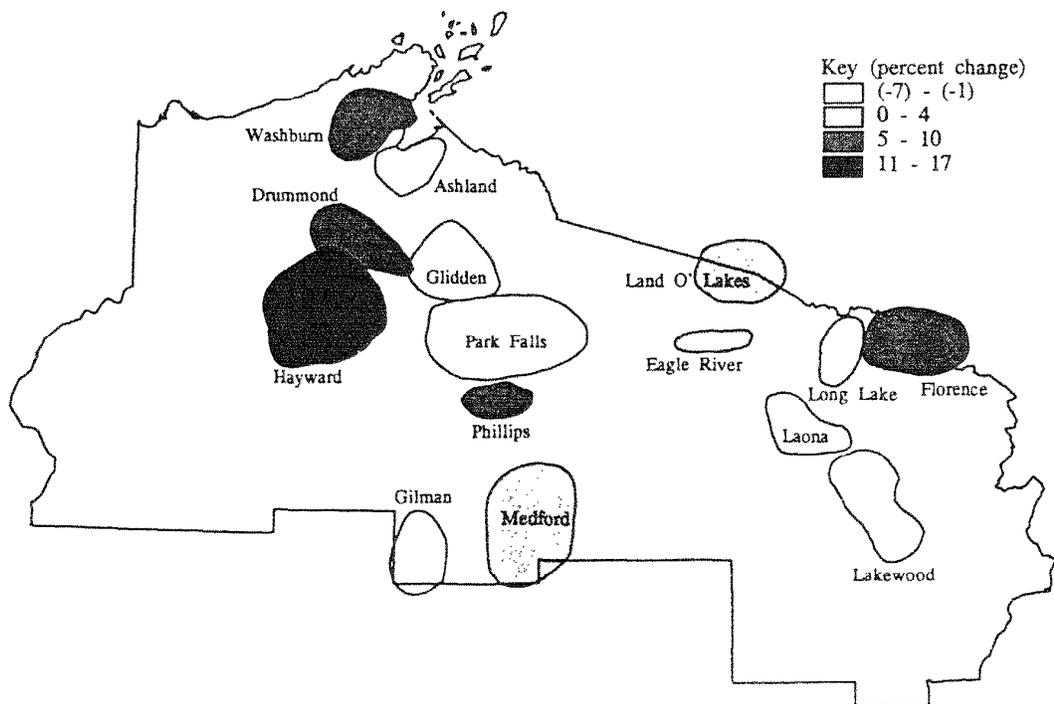


Figure 2. Percent change in population, northern Wisconsin by functional communities of the Chequamegon-Nicolet National Forests, 1980-1990

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¹ "Ecosystem Management of the National Forests and Grasslands." Memo to regional foresters and station directors from Chief F. Dale Robertson, June 4, 1992.

² USDA Forest Service, National Human Dimensions of Ecosystem Management Task Team. Human Dimensions in Ecosystem Management: A Concept Paper. September 1996.

³ The Chequamegon National Forest and Nicolet National Forest have one administrative staff and are being managed as one forest even though they technically remain two forests.

RECREATIONAL ASPECTS OF FORESTLAND EASEMENTS IN THE NORTHERN FOREST REGION OF NEW YORK STATE

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Abstract: Forestland easements are the subset of conservation easements encumbering forested properties. These less than fee interests in private land are flexible legal mechanisms that contribute to a diverse collection of land use influences. This study of forestland easements and their grantors in the northern forest region of New York State revealed that recreation rights are an important aspect in the decision by forest landowners to grant a conservation easement. These recreation rights may be legally acquired by the grantee, retained by the grantor, or divided in ways that allows both parties to share them. Financial and non-financial values placed on the use of forestland for recreation are evident in the factors affecting the decisions of landowners who granted forestland easements. Private, non-industrial landowners who donated forestland easements most often retain recreation rights to the protected property. Industrial landowners who sold forestland easements commonly granted broad public access to the protected property for recreation.

Introduction

Conservation easements are commonly associated with protecting land from development, but they have other functions as well. Often they go beyond ensuring that land remains as open space by constraining or directing how that open space is used. Conservation easements may encumber land of many different open space uses, as well as buildings, so it is helpful to divide them by land use types for the purpose of discussion. The subset of conservation easements encumbering forestland, known as *forestland easements*, are used to ensure land remains forested and to provide other forest related benefits to the grantee. The disposition of recreation rights is often dependent upon whether the landowner donated the forestland easement or

sold it. An investigation into the content of forestland easements in the northern forest region of New York State revealed that one of the benefits from forestland that is commonly addressed in the agreement is the use of the property for recreation.

In the northern forest region of New York, the highest and best use of many forested properties is joint production of timber and recreation. That is, forestland has a market value that reflects its ability to grow timber and to be used concurrently for recreation. Most this land has some development value, which may be to the exclusion of the other two uses. Private, non-industrial landowners often capture this recreation value through their own enjoyment of the property. Industrial owners, such as forest products companies, capture this value through hunting leases or year-round recreation leases. Forestland easements have been used by landowners, at least in part, to retain, sever, or divide recreation values of forestland. Examination of forestland easement deeds reveals the various ways in which recreation is addressed in these easements.

The northern forest region of New York State has a diverse group of forestland easements, providing a background for this study. This region was first defined by the Forest Service's Northern Forest Land Study (1990) and later described in greater detail by the work of the Northern Forest Land Council (1994). It is a 7,600,000 acre area of largely undeveloped forestland that includes both the Adirondack Park and the Tug Hill Plateau. Within the 6,000,000 acre Adirondack Park, there are some 2,500,000 acres under New York State ownership. This state land is classified as "forest preserve", which means, among other things, that it can never be managed for timber production.

The forestland easement study (Bick 1996) inventoried all of the conservation easements held by known grantees in the region. The deeds to these conservation easements were examined. Those deeds found to encumber a property with a significant forestland component were included in the data set. The information contained in the deeds was divided into five categories: general information, affirmative right, restrictions, reserved rights, and terms and conditions. The variables within each of these five categories were then identified and inventoried. A description of the five categories follows in the next section, along with a discussion of the recreational aspects of each.

Results and Discussion

There is a considerable amount of general information included in most deeds. This information includes, among other things, the identity of the grantor (person or organization who donates or sells), and the identity of the grantee (organization that receives the easement). There are 50 donations and 29 sales in the study area, spread among eight grantees. The 50 donations came from 47 different grantors (i.e. a few grantors made more than one donation). Of these 47 grantors, 39 were private, non-industrial landowners. The sold easements, most of which were purchased by New York State, came from 11 different

sellers. Of these 11, a group of seven, including forest products companies, a public utility, a real estate investment firm, and a college, are considered industrial landowners. Donated and sold easements are discussed as distinct groups throughout this paper and, to a certain extent, this distinction generally represents the difference between non-industrial and industrial landowners.

Affirmative rights are those things the grantee is allowed to do on or with the protected property. A total of 23 different affirmative rights occur in the study. The donated easements generally contain far fewer affirmative rights than the sold easements. Among these are a group that pertains to allowing public use of the property for recreation. These affirmative rights for recreation are shown in Table 1.

Table 1. Affirmative rights found in forestland easements in the Northern Forest Region of New York State and the percentage of deeds they occur in, by type of grant.

	Type of grant	
	Donations (%)	Sales (%)
Public Recreation Affirmative rights		
Construct and maintain trails	2	79
Public recreation use comparable to that on state land	0	79
Parking lot construction	0	72
Recreation corridor access	4	10
Fishing	0	10
Trapping	0	10
Construct and maintain campsites	0	3

The data set includes 50 forestland easements that were granted as donations and 29 forestland easements that were granted as sales.

Only two of the affirmative rights for recreation purposes occur among the donated forestland easements in the study. Two donated forestland easements allow public use of trails on the property. One forestland easement grants the right to construct a trail for this purpose. Few landowners donated recreation rights, indicating these rights are of value to them. Public recreational use of the property can detract from the landowner's privacy and may degrade the resource. A landowner who derives satisfaction from the private enjoyment of his/her property could be forgoing all or part of that satisfaction by sharing the on-site use of the property with others.

Affirmative rights for recreation are major components of the deeds from forestland easement sales. This underscores the financial value these rights have. One of the two most common is broad public access for recreation uses comparable to those allowed on public lands in the State Forest Preserve. This is the right in which the landowner most clearly surrenders privacy and opens the resource to public access. Among sales, the other common recreation rights are intended for use in managing the resource to enhance public recreation access, including the right to construct trails and the right to construct parking lots. The remaining affirmative rights for public recreation, including

fishing (10%), trapping (10%), and campsite establishment and maintenance (3%), are associated with use of the property under the affirmative right to broad public recreation access. A few of the sales deeds (10%) provide for public use of trails, rather than broad access. It is interesting to note that these forestland easements were purchased from private, non-industrial owners.

Restrictions are those things that the grantor is prohibited from doing on, to, or with the protected property. There are 37 different restrictions found among the forestland easements. These restrictions can be divided into two types. Some of the restrictions involve various aspects of development, effectively constraining the property to forested uses. With restrictions in place that assure continued forest uses, the second category includes restrictions that shape and limit how the forest is used as open space. All restrictions work with reserved rights in determining the extent of development and the way the forest will be used. The restrictions affecting recreation use of the protected property are shown in Table 2.

Table 2. Restrictions affecting recreation uses found in forestland easements in the Northern Forest Region of New York State and the percentage of deeds they occur in, by type of grant.

	Type of grant	
	Donations (%)	Sales (%)
Open space use restrictions		
Motor vehicle use	50	65
Hunting	22	0
Trapping	12	0
Fishing	8	0
Powerboats	4	0
Number of vehicles on the property at one time	0	3
Trail construction	2	0
Use of firearms	2	0
Camping	2	0

The data set includes 50 forestland easements that were granted as donations and 29 forestland easements that were granted as sales.

Among the restrictions affecting recreation use of the protected property are limits on motor vehicle use, hunting, trapping, fishing, powerboats, the number of vehicles on the property at one time, trail construction, firearms, and camping. Note that many of these restrictions pertain only to donated forestland easements, those in which the recreation rights were retained by the grantor. Though most of the restrictions occur infrequently in the study, they are worth noting because their presence demonstrates the variability of content in forestland easement agreements.

The restrictions, by themselves, provide an incomplete picture of how the use of the property is constrained. Reserved rights are those uses of the property retained by the grantor. This section is the portion of the forestland easement agreement where the grantor can truly customize

it to meet his/her needs. These reserved rights guarantee continued or future uses of the property by the grantor or subsequent owners of the protected property. In many cases, these reserved rights serve to modify the restrictions in the deeds and define the limits of acceptable development and use of the protected property. Nevertheless, the reserved rights section represents more than a list of exceptions to the rules. These reserved rights are very telling evidence about the landowner's intended uses of the property. A total of 72 separate reserved rights are found among the forestland easements. These reserved rights can be separated into four types: development, resource management, ownership administration, and on-site enjoyment. The reserved rights for on-site enjoyment are shown in Table 3.

Table 3. Reserved rights for on-site enjoyment found in forestland easements in the Northern Forest Region of New York State and the percentage of deeds they occur in, by type of grant.

<i>Reserved rights</i>	Type of grant	
	<i>Donations (%)</i>	<i>Sales (%)</i>
Use of the property for recreation	32	7
Construct and maintain lean-tos	12	41
Cut firewood for on-site use	18	0
Create and maintain scenic vistas	16	0
Recreation use the same as allowed to the public	0	4
Construct docks	6	0
Home gardening	4	0
Bury camping refuse	2	0
Establish lawns	2	0
Have electric generators	0	3
Hunting and fishing	2	0
Bring enforcement proceedings against violators	2	0
Use aircraft near the property	2	0

The data set includes 50 forestland easements that were granted as donations and 29 forestland easements that were granted as sales.

There are relatively few reserved rights for on-site enjoyment among the sold forestland easements. This is expected because most of these grantors are industrial landowners who have foregone their own on-site enjoyment of the property to convey broad public recreation access. In addition to an outright reservation of the right to use the property for recreation, some donors reserved such complementary rights as the right to construct lean-tos, to clear scenic vistas, and to cut firewood for on-site use. Other reserved rights for on-site enjoyment occur infrequently in the data set, demonstrating the unique ways in which forestland easements have been tailored to meet the needs of the landowners.

Two reserved rights that are included in the resource management category of reserved rights also pertain to use of the property for recreation. Among sold easements granting public recreation access, it is common for the

grantor to retain the right to close portions of the property to public access during and immediately after timber harvesting. A smaller number of these grantors also retain the right to close reforestation areas for a set time period after the plantation is established.

Terms, conditions, and other provisions encompass all of the interesting information falling outside the limits of the other four categories. Ten variables in this category were tracked through all of the deeds. Four of these variables are directly related to recreation (Table 4).

Table 4. Terms, conditions, and other provisions found in forestland easements in the Northern Forest Region of New York State and the percentage of deeds they occur in, by type of grant.

Terms, conditions, & other provisions	Type of grant	
	<i>Donations (%)</i>	<i>Sales (%)</i>
No public access clause	72	7
Liability clause - grantor held harmless	8	83
Liability clause -grantee held harmless	18	38
Management plan requirement (by grantee, grantor, or both)	0	69

The data set includes 50 forestland easements that were granted as donations and 29 forestland easements that were granted as sales.

The clause denying public access generally states that nothing contained in the forestland easement shall give or grant to the public a right to enter upon or use the property where no such right existed prior to the grant. This clause occurs in 72% of donations but only 7% of sales. This difference is expected because most of the sold forestland easements grant public access for recreation.

The grantor held harmless clause generally states that the grantee holds harmless and indemnifies the grantor for any and all liability from misfortunes the grantee may suffer in the course of activities on the property. This clause occurs in very few donations (8%), but is very common among sales (83%). A chi-square test indicates inclusion of this clause it is correlated with public recreation rights among sales.

Similarly, the grantee held harmless clause generally states that the grantor holds harmless and indemnifies the grantee for any and all liability from misfortunes the grantor may suffer in the course of activities on the property. This clause is occurred in 18% of donations and 38% of sales. Again, a chi-square test indicates inclusion of this clause it is correlated with public recreation rights among sales.

The management plan requirement may be on the grantee, grantor, or both. The donated forestland easements failed to include this requirement in all cases. Among donated forestland easements, the deed itself is an impressive

planning document for the property. Since most donors retained all of the recreation rights to the property, their are fewer potential conflicts in use and, thus, less need for a plan. The opposite is true of the sold forestland easements, where potential conflicts between recreationists and timber harvesting must be addressed.

Conclusions

Private forestland in the northern forest region of New York State has a market value that can be thought of as a combination of three different components - its value as a timber producing resource, its value for recreation, and its development potential value. This is a strong generality, and in some cases these values overlap or perhaps exclude one another. To the extent that we can observe all three of these uses and values occurring at once on a single ownership, we can think of them as subsets of the land's total market value. With this in mind, the ways in which these values have been divided by forestland easement grantors become more evident.

A substantial number donors in this study are private non-industrial landowners who retained recreation rights. Clarifying what these recreation rights mean to the individual landowner requires further examination. Perhaps the landowner is just retaining privacy that they would have been unable to enjoy with public recreation on the property. Privacy may be an element of their own recreation use, it may be a quality they find desirable in a homesite, or it may be an option for either of these two purposes they retained for future owners of the property.

Reserving the rights necessary to keep the recreation value of the property intact demonstrates the financial value of these recreation rights. When interviewed, most forestland easement donors stated that they would be using the land in the same manner they were at the time of the interview,

regardless of whether they had donated the forestland easement. This suggests that they did not give up anything that was personally valuable to them in the forestland easement.

Forestland easements are being used, in part, as a means of providing opportunities for public recreation on private forestland. This has been accomplished through the purchase of forestland easements from industrial landowners by the State of New York. In most cases, the forestland easements came from industrial private landowners. As long as the recreation value coexists with the value of the land as a timber producing resource, financially motivated landowners must capture this value. For example, the annual capture of recreation rent has been accomplished through hunting leases. When the State of New York began purchasing forestland easements, some industrial landowners had the opportunity to capture the recreation value or recreation rent of the land through a one time sale of these rights. This allowed them to lower their basis in the land, making the economics of holding the land as a timber producing resource more feasible. Two of the sold forestland easements granted trail corridor access across the protected property to the public. In both cases these forestland easements were granted by private, non-industrial landowners.

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PUBLIC RECREATION ON PRIVATE FORESTS: NO MORE GUARANTEES

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Abstract: Studies across the U.S. have found that non-traditional ownership of Non-Industrial Private Forest-land (NIPF) ownership, centered on residential and recreational rather than timber production objectives, is gaining prevalence. Recent NIPF conversion in the Northern Forest of Northern New England and New York came under scrutiny by the Northern Forest Lands Council. A study conducted by the University of Vermont to determine ownership factors associated with conversion of Vermont NIPF found that generational turnover in ownership drives much of the change in ownership objectives to residential and recreational use. The new generation of owners, undertaking conversion at greater rates, were dominated by middle-aged, affluent professionals having these coexistent objectives. Recreation-centered owners converted NIPF parcels at rates higher than the average for all new owners. Owners purchasing with nature preservation objectives, and engaging in wildlife management activity, exhibited a pronounced increase in conversion activity. The study concluded that this generational turnover of Vermont NIPF to owners with recreational/residential objectives is contributing to the parcelization and privatization of this land, affecting the current and future availability of public, open recreation space in Vermont.

Introduction

Recently attention has turned to the conversion of Non-Industrial Private Forest-land (NIPF) to developed uses across the Northern Forest of New York, Vermont, New Hampshire and Maine. Large-tract purchases by speculators in the Northern Forest in the late 1980s spurred the formation of the Northern Forest Lands Council (NFLC), which identified NIPF conversion among issues to be studied as potential threats to traditional uses of the Northern Forest (Harper et al 1990).

The NFLC-commissioned Northern Forest Lands Study found that decreased travel time from major urban centers, increased number and quality of roads, and the demand for scenic property among other causes have led to identification of NIPF lands by major commodities markets as undervalued and economically attractive for purchase and development (Harper et al. 1990). Similarly, recent studies across the Northeast found the majority of NIPF owners in Vermont and elsewhere do not hold land for timber management. The prevalence of non-timber ownership objectives is so widely recognized in NIPF ownership studies that it has been termed "the NIPF problem" (e.g., Bliss et al. 1994, Bourke and Luloff 1994,

Egan and Jones 1993). A recent study of Vermont NIPF owners found residence (43%) and aesthetic enjoyment (39%) the leading reasons for ownership (Widmann and Birch 1988). That study also concluded that timber production ranked low (1%) and was concentrated on parcels of 500 or more acres.

The new NIPF owner with residential/recreational objectives often has little knowledge of the benefits of timber management and little desire to manage for timber (Rosen and Kaiser 1988). These owners, typically from urban areas, often find they have no practical need for the acreage of forestland they purchase (Hubbard 1989). The more frequent newer uses of NIPF, such as residential and nontimber investment, do not require parcels of the size necessary for economic timber production. Even after the land has been subdivided, the new owner often finds more land left than he or she knows what to do with (Healy 1981).

NIPF parcels with amenity values such as water bodies and views are coveted by owners with non-timber objectives; accordingly, recreational activities have begun to attract increased numbers of vacationers and retirees from large metropolitan areas to the Northern Forest (Harper et al. 1990). They will be more unlikely to harvest forest products and more likely to develop. Recent indications point to recreation demand's positive effect on conversion. Participants at the 1989 "Conserving the North Woods" conference noted increased claims being made on forestland by recreationists and second-home buyers (Bristow 1989, Healy 1989). They said that landowners catering to the recreational development market have found it profitable to divide larger parcels into 1-40 acre tracts. These tracts sell for higher prices per acre and are most in demand by those planning to erect a second home. The Irland Group study in Harper et al. 1990 states that recreationally valuable lands in the northern reaches of New England and New York are being subdivided--privatized--so that individuals may secure their share of a diminishing amenity resource.

In connection with these findings, a study of Vermont NIPF conversion was undertaken by the UVM School of Natural Resources to determine the extent of this conversion and identify the ownership factors associated with it. The objectives of this study were:

- To identify ownership factors associated with the conversion of Vermont's Non-Industrial Private Forest Land (NIPF) to other land uses.
- To characterize NIPF ownerships that are prone to land use change.

Methods

That study's population, all 100+ acre land parcels transferred between January 1987 and June 1993, was obtained from the VT Department of Taxes transfer tax form. A total of 772 survey returns were gathered from 3072 valid addresses for a 25.5% proportion of the state's NIPF transfers during that period. Sellers and buyers

were surveyed to obtain generational data, and to elicit empirical data on differences thought to exist between recent ownerships and older ownerships. Locational, demographic, natural feature, legal, land use, and parcel sale information were collected as independent variables to establish profiles of ownerships prone to conversion. The dependent variable, conversion, was defined as that point in time when the NIPF owner engages in a land development activity on the NIPF property not primarily associated with woodland management, or subdivides, or sells for subdivision or development, all or part of the NIPF property.

Several types of conversion were distinguished for this study; two types, *woodland conversion* and *sale conversion*, are discussed in this paper. *Woodland Conversion* occurred when clear indications of development took place during ownership tenure on a parcel primarily in woodland use before purchase. Four study criteria indicate such development had taken place:

1. the parcel had developed acreage
2. the parcel had one or more structures added
3. the parcel had one or more property features added (utilities, water system, access road or driveway)
4. the parcel was used primarily as permanent residence, second home, vacation home, commercial business, or industrial enterprise.

Sale Conversion was measured in the study as a parcel undergoing a transfer involving initial or continued conversion through development or subdivision, denoted by these events:

1. The parcel was sold to a developer, a real estate agent/broker, or a buyer purchasing for development;
2. The parcel was sold to develop land for profit.
3. The parcel was subdivided into parcels of less than 100 acres, one or more of which was sold.
4. The parcel was sold to a buyer purchasing for a residential single home, residential home with multiple units, vacation home, commercial use or industrial use.

The data were analyzed in several stages of univariate, bivariate and multivariate analysis. Frequency analysis was used to find the proportion of respondents exhibiting a single ownership characteristic or group of characteristics; the Z-test of binomial proportions was used to test the hypothesis that any two proportions found in the frequency analysis were statistically different. Chi-square analysis was used to identify ownership factors corresponding with conversion activity at statistically significant levels. Chi square analysis of all nominal independent variables were run against all conversion types, including the *woodland conversion* and *sale conversion* types discussed here.

Results

The study's central finding was that roughly half--47.9% was the exact finding--of Vermont NIPF was being converted during the study period either as a function of the sale or during the resulting ownership.

Generational Turnover

Most conversion appears to be driven by a generational turnover effected in the transfer from sellers to buyers, resulting in many newer ownerships by affluent, middle-aged white-collar professionals (Table 1). Purchasing often from retiring sellers with lower incomes and more often with land-based occupations, new owners exhibited significant increases in income, education, managerial/professional occupations, and out-of-state residency. They also were dominated by buyers in baby-boomer to middle-age.

Table 1. Demographic profile of buyers and sellers of 100+ Vermont NIPF, 1987-1993

	NIPF Sellers 1987-1993	NIPF Buyers 1987-1993
Age 40-59	35.6%	67.8%
graduate education	33.3%	42.7%
Income > 50K	36.4%	53.6%
managerial/professional occupation	22.5%	44%
Vermont native	43%	31%
Recreation/aesthetic	27.2%	55.7%
Ownership objectives		

Note: Profile of the new user is a middle aged, educated, affluent, white collar professional with recreation/aesthetic ownership objectives.

Note: Total percentages add to over 100% because some respondents, contrary to instructions, listed several objectives without indicating primary objective

These new ownership's match the profile of urban, mobile, affluent professional noted in previous studies as gaining predominance in NIPF ownership across the country.

A Recreation-minded New Owner Generation

As noted in the set of demographics shown in Table 1, recreation-related ownership objectives were prevalent among NIPF buyers during the study period. Over half of all purchasers between 1987 and 1993, 55.7%, listed a recreation-related motive as their primary purchase objective. Nature preservation and recreational activity were reported by buyers at a frequency between 2 1/2 to 3 times that of the generation that sold to them. These figures, representing sharp increases from seller to buyer generation, compare to decreases to 19.7% in timber production and to 16.8% in farm/food production objectives. Additionally, a more than doubling has occurred in ownerships with hunting or fishing camp objectives. Table 2 illustrates this shift in purchase objectives the previous generation to current generation of Vermont NIPF owners.

A Development-minded New Owner Generation

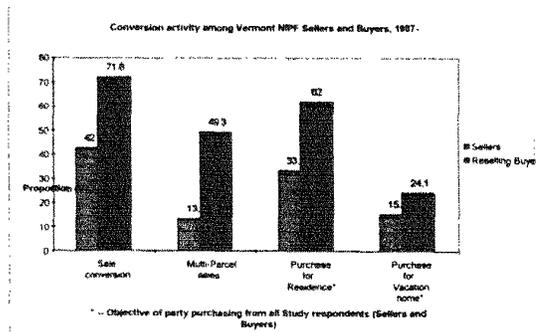
Concurrent with the sharp increase in recreation-centered NIPF ownership were sharp increases in conversion

activity among the buyer generation, and of conversion-related activity, measured as purchase for primary or vacation residence. *Woodland Conversion* activities during ownership tenure (adding structures, utilities, roads and/or other features to the property) increased by over half, from 13.9% among sellers to 21.4% among buyers; this increase produced a chi square significance level under 1%. The increase in conversion activity related to the sale of NIPF property approached or exceeded a doubling in several areas, as shown in Figure 1.

Table 2. Primary purchase objective disparities between buyers and sellers.

Purchase objective	Buyers (%)	Sellers (%)	Δ Z-score (.05 sig. \geq 1.645)
nature preservation	18.8	6.5	4.9041
recreational activity	19.2	8.0	4.3461
vacation home residence	17.7	12.7	1.8801
hunting/fishing camp	11.9	5.0	3.3096
farm/food production	16.8	22.9	2.1254
timber production	19.7	22.3	.8789

Figure 1. Sale-related conversion among Vermont NIPF buyers and sellers, 1987-1993.



The first column in Figure 1 shows the overall proportions of sellers and buyers engaging in any type of *Sale Conversion*; the remaining columns show three of the several measures used which contribute to the overall figure. Each of these increases produced chi square significance levels of under 1%.

The sale of an NIPF property for vacation home use is shown in Figure 1 to be an prominent manifestation of these sale conversions. Having already experienced a significant increase from the seller to the buyer generation (Table 1), activity in this area continues its significant rise. Figure 1 shows the sale for vacation home among both seller and buyer study generations. Reselling buyers (buyers who resold within the seven-year study period)

sold to a "third" generation exhibiting a still greater likelihood (24.1%, vs. the 12.7% and 17.7% of study buyers and sellers) to purchase for vacation home.

Decreasing parcel acreage and ownership tenure accompanied this conversion activity in a cycle in which accelerating parcelization appears to accompany accelerating turnover. Sellers reported parcelization in only 15.3% of sales. In contrast, fifty-two of the seventy-nine reselling buyers, or 66%, reported parcelization. This is more than a four-fold rate increase. The resulting parcels, moreover, were less than half the size of parcels in multi-parcel sales by the seller generation, as shown in Table 3.

Table 3. Mean acreage of parcels in multi-parcel sales.

Sold parcel(s)	Sellers' mean acreage	Reselling Buyers' mean acreage
2nd sold parcel	70.5	22.8
3rd sold parcel	32.4	13.8

Additionally, reselling buyers sold all or part of their parcel for residential development in 68 sales--almost half the 142 seller parcels sold for that purpose. Seller residential sales occurred on ownerships averaging approximately 23 years, while reselling buyers sold after a 4.9 year average tenure. At these rates, reselling buyers within ten years will sell for residential use as many parcels as did the generation that sold to them. This is a generational doubling in turnover rate if present rates are maintained.

The results presented in this section apply to the respondent population as a whole. Among new ownerships whose owners who indicated directly or indirectly that recreation activity was primary to their purchase, these indications of conversion activity showed still greater increases.

Conversion on Recreation-Centered Ownerships

The large overlap between the recreation-centered ownerships and converting ownerships suggested in the above section was more directly seen in several NIPF buyer statistics. One data indicator of this was the increased conversion rates near recreation activities. Conversion measured as addition of structures on the parcel during tenure (*woodland conversion* in the study) rose significantly on NIPF parcels within 20 minutes of some recreation activities. Table 4 shows these increases.

Table 4 Buyer *Woodland Conversion* rates in proximity to recreation activities.

Activity	< 20 min. to rec activity	> 20 min. to rec activity	Chi sq sig. level
X-C skiing	26.0%	16.9%	.018
Golf course	24.5%	15.6%	.022
Downhill skiing	24.1%	17.6%	.091

Another more direct indicator of the prevalence of conversion among recreation-oriented ownerships, and perhaps more telling as to the type of owner and activity on such ownerships, was the increased conversion activity among owners who saw their ownerships as opportunities to links to nature. A sizable 55.4% of all parcels, including parcels already in developed use, sold for development-related purposes. However two-thirds --66.67% -- who had purchased with nature preservation as primary objective sold some or all their property for development purposes.

A similar finding resulted among owners seeking connection with wildlife through NIPF ownership. Conversion among owners practicing any of several wildlife activities increased from 14.4% to 34.2%, a factor of about 2.4, with a chi-square significance level of 0%. Each category of wildlife management activity producing the overall result was practiced by owners exhibiting similar increase in conversion, as shown in Table 5.

Table 5. *Woodland Conversion* rates when wildlife management activities practiced.

Wildlife management activity	not practiced (%)	practiced (%)	chi square significance level
Wildlife habitat creation	17.7	35.1	.00026
Wildlife feeding stations	20.0	42.9	.0042
Wetland protection, restoration, or creation	20.1	35.1	.03315
Pond construction	19.5	39.5	.00226
Fish stocking	20.3	35.5	.04715
Any wildlife management activity	14.4	34.2	.0000

Summary

A generational turnover was found to be predominant in the transfer of Vermont NIPF; this generation manifested as transfer from the retiring to the baby-boomer/middle-aged; from less affluence to greater affluence; from land-based occupation to managerial/professional occupation; finally in ownership objective. The new generation of owners purchased for recreation-related objectives in over half of all purchases. Though the new generation's conversion activity as measured in this study increased significantly among all buyers, the recreation-minded buyers exhibited still greater increases in development and fragmentation.

Several particular ties between conversion and recreation/aesthetic ownership factors accompanied the general conversion increase among owners with recreation purchase objectives. Increased development and parcelization occurred on parcels within 20 minutes of commercial recreation activities. NIPF Buyers with nature preservation objectives showed added increases in sale for development and subdivision; similarly, conversion during ownership rate among buyers practicing wildlife management activities was well over twice that of those who did not.

Conclusions

Among the findings arising from this study of Vermont NIPF conversion was the finding that new owners have increased desire for recreation-related NIPF use, as well as incomes allowing purchase of 100 ac+ NIPF land for recreation. These new owners often desire a "back-to-nature" ownership of Vermont NIPF, involving both interaction with nature, recreation and residence on their "piece of Vermont." Due to the smaller parcel size and shorter tenure requirements for residential use as contrasted to traditional timber and farm use, these owners are also prone to subdivision of parcels and shorter tenure. They may also be unused to managing such large acreage or have little idea how to do so. As a result the new NIPF owner is using NIPF for private recreation on increasing numbers of smaller parcels.

One speculation arising from this study is thus that new owners, used to a standard of greater land use density and clearly-marked private boundaries, are importing a new standard of decreased accessibility on smaller parcels. The activity of the owners described above appears to be an increased pace of parcelization on parcels sprouting residences, causing a visible fragmentation of land once open-seeming and accessible. Such parcels are more clearly bounded and privatized. A new ownership ethic regarding public use of these lands may also be imported by such ownerships, and traditional recreational activities such as hunting and fishing have little choice but to move on to other land less clearly marked and in private use.

Fragmented private ownership may be creating increased difficulty for public recreation on NIPF lands. Privatized small ownerships are eating up potential public acquisition and provision of recreation land; as these areas suburbanize and urbanize, more recreation land may need to be provided by the public sector.

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**Outdoor Recreation
Management Studies**



PERMITTING PETS IN FLORIDA STATE PARK CAMPGROUNDS: SELECTED PERCEPTIONS OF CAMPERS

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Abstract: Since the 1950s pets have been excluded from Florida State Park Campgrounds. In response to public comment and pressure, the Florida State Park System recently began to reconsider this policy. The initial step in this process was to survey campers to examine camper characteristics and perception's about a variety of campground issues, particularly attitudes towards allowing pets in Florida State Park campgrounds. This paper discusses the findings. People with previous camping experience at campgrounds that permitted pets reported only slight negative impacts. Most campers expected that permitting pets in campgrounds would have negative impacts on campground noise and the observance of wildlife. If behavior is consistent with stated intention, permitting pets in the state park campgrounds would result in a slight increase in overall camping frequency.

Introduction

Florida State Parks Campgrounds are currently one of the few state parks campground systems to restrict pets from their campgrounds. The reasons for this restriction cited by the state parks managers include safety hazards, increased noise, negative impacts on the observance of wildlife and a general negative impact on the overall experience of campers. Recently, this policy has been challenged by numerous pet owners. They cite personal companionship and personal safety as positive impacts resulting from permitting pets in campgrounds. In 1996, at the request of the state legislature, the state parks system undertook a research project to survey campground visitors. The purpose of the study was to examine camper characteristics and perception's about a variety of campground issues,

particularly attitudes towards allowing pets in Florida State Park campgrounds.

This paper will discuss some of the findings from this research project - particularly what the perceived impacts might be if pets were permitted in Florida state parks campgrounds and how changing the pet policy in campgrounds might impact the frequency of camping in Florida State Parks by state residents and non-residents.

Methodology

An on-site intercept interview was conducted during January through March, 1996 at 16 campgrounds in Florida.

One state park campground was selected in each of the six administrative regions of the Florida State Parks system. Private campgrounds in the vicinity of each state park campground were also invited to participate in the study. Ten private campgrounds agreed to permit their campers to be surveyed. An interview with 47 questions was administered to campers in both the state park and private campgrounds. Questions included basic demographic and camping history questions plus additional sections to discover the respondent's familiarity with pets in campgrounds; their perceptions of the impact pets might have and their likely changes in state park camping patterns if pets were to be permitted in state park campgrounds. The survey was conducted by project personnel from the University of Florida. A total of 619 surveys was completed.

Figure 1. Survey Locations



Findings

The profile of respondents is summarized in Table 1. About 53% of the respondents were interviewed in state park campgrounds while 47% were interviewed in private campgrounds. 34% were Florida residents, 58% were non Florida, US residents and 8% were international visitors. About 43% were pet owners while 57% did not own pets. Regarding participant experiences with camping in campgrounds with pets, about 82% reported camping at some previous time in a campground that allowed pets while 18% had no experience camping in campgrounds that permitted pets.

Among all campers, 36% reported that pets enhanced their camping experience, 41% reported no effect and 23% reported a negative effect on their camping experience. When further analyzed, about 30% of non pet owners

reported a negative effect on their camping experience. About 38% of the campers who were interviewed in Florida State Park Campgrounds reported a negative effects on their camping experience.

Table 1. Profile of respondents

<i>Interview Location</i>	
53%	Interviewed in state parks
47%	Interviewed in private campgrounds
<i>Residence</i>	
34%	Florida residents
58%	Non resident - US
8%	Non resident - International
<i>Pet Ownership</i>	
43%	Pet owner
57%	Non pet owners
<i>Campers previous experience with pets</i>	
82%	Stayed in campgrounds that permitted pets
18%	Never stayed in campgrounds that permitted pets

The reported effects of pets on pets on previous camping experiences are shown in Table 2.

Table 2. Effects of pets on previous camping experience

<i>All Campers</i>	
36%	Positive effect
41%	No effect
23%	Negative effect

<i>Non pet owners - only 30% felt a negative effect</i>	
<i>State park campers - 38% felt a negative effect</i>	

Campers were asked to explain what they believed would occur if pets were permitted in state park campgrounds. These beliefs are summarized in Table 3.

Table 3. Beliefs about impacts if pets were permitted (Overall sample)

<i>Safety</i>	
18%	Positive effect
54%	No effect
28%	Negative effect
<i>Observation of wildlife</i>	
3%	Positive effect
42%	No effect
55%	Negative effect
<i>Noise in campground</i>	
2%	Positive effect
42%	No effect
56%	Negative effect
<i>Overall Experience</i>	
28%	Positive effect
37%	No effect
35%	Negative effect

A slight majority of of state park campers indicated that allowing dogs in state park campgrounds would have a negative effect on their overall camping experience. About

41% of state park campers indicated that the presence of pets would have a negative effect on safety, 72% expect a negative effect on the ability to observe wildlife and 70% anticipate a negative effect on noise levels in state park campgrounds. Only about 15% of private campground campers expect a negative effect on safety while about 40% predicted a negative effect on wildlife observation and noise.

Campers were asked to report how changes in the current pet policy might affect their future camping patterns in Florida State Park campgrounds. Anticipated changes in camping frequency due to a change in the pet policy are shown in Table 4.

Table 4. Changes in camping frequency if pets were permitted.

<i>Willingness to camp in Florida State Parks (overall sample)</i>	
No change	- 70%
Increase	- 18%
Decrease	- 12%
<i>Willingness to camp in Florida State Parks (Private campgrounds)</i>	
No change	- 74%
Increase	- 23%
Decrease	- 3%
<i>Willingness to camp in Florida State Parks (State Park Campgrounds)</i>	
No change	- 68%
Increase	- 12%
Decrease	- 20%

When asked how their camping frequency in state parks would change if pets were permitted in campgrounds, 70% of the overall sample replied it would make no difference, while 18% indicated they would increase their camping in state parks and 12% would decrease their camping in state parks. 23% of the campers interviewed in private campgrounds indicated potential increases in visits to state park campground while 20 of the campers interviewed in state park campgrounds indicated that their future visits would potentially decrease.

Conclusion

Results of this study were somewhat mixed. Less than one forth of the campers who had camped in campgrounds which permitted pets felt that their overall experience had been negatively impacted yet most campers anticipated some negative impact on the observance of wildlife and campground noise. Overall, if behavior was consistent with stated intentions, changing the policy would have a small positive impact on camping frequency in Florida State Parks. More than two-thirds said that the policy would not affect their camping frequency. Of the nearly one-third who indicated that a change in policy would affect their camping frequency, slightly more than half the group indicated that they would camp more often in state park campgrounds and slightly less than half said that they

would camp less frequently. If pets were permitted in campgrounds, there would be some small positive impact on camping frequency but also some negative impacts on wildlife and noise. Clearly the decision to change campground policies should consider other issues than campground attendance as little overall change in camper attendance is indicated by this study.

Discussion:

Increased attendance may/may not cover additional operating costs. Additionally, there are some questions as

to whether policies like this should even be subject to popular opinion. Since this study was conducted during the winter tourist season, it had a high proportion of non resident campers, perhaps seasonality may have been a research issue. Other policy issues such as length of stay and reservations methods plus the availability of full service hook-ups for motor homes may reduce the move from private campground to state park campgrounds.

Parables and Paradigms: An Introduction to Using Communication Theories in Outdoor Recreation Research

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Abstract: Studies that employ communication theories are rare in recreation resource management. One reason may be unfamiliarity with communication theories and their potential to provide useful results. A two-dimensional metatheoretical plane is proposed, selected recreation and communication theories are located in it, and functional comparisons are made among eight disparate theories. Communication theories have much to offer scientists and managers, and both are encouraged to use them.

Introduction and background

Communication theories have much to offer those who are concerned with outdoor recreation management and research. Managers' experiences with (mis)communication, whether they are considered frustrations or successes, are commonplace. Nonetheless few research approaches to systematically investigate these experiences have been reported in either the leisure studies or recreation resource management literature. Why don't outdoor recreation researchers use communication theories more often? Clearly it is, in part, due to a lack of familiarity with communication theories. Yet communication theories have much in common with familiar and more often used social psychological theories. To bridge this gap a paradigmatic perspective that gives the reader a unifying view of the research process is presented, followed by examples of theories from the recreation and communication literature.

To begin, the research process itself needs to be viewed as if it were short narrative (story). These "stories" of the initial phases of a particular study when presented in a short, summary form can be analyzed as a text (data) from which the behavior (choices) of the controlling character (scientist) can be obtained. Such research narratives serve as more than an objective statement of the work done: they are like parables, providing a paradigmatic insight about the norms and conditions that define a particular research enterprise.

For instance, a recent communication focused article reported a study of low impact messages on wilderness trailside bulletin boards (Cole, Hammond & McCool, 1997). The study was concerned with communication effectiveness. The authors chose a persuasive communication theoretic approach to an information processing problem and used a quasi-experimental design method. The paradigmatic choices made by the authors are clear: their approach is individualistic and rationalist. Similar "parables" could easily be constructed from other studies with a communication or information flow

objective. If analyzed as a set they would empirically define the approach (paradigm) currently taken by scientists working at the interface between communication and recreation resource management.

The existing body of recreation resource management studies is ample evidence that there is a recognized need to better understand the ways in which recreationists learn, and decide, about when, where and how to do various activities. This logically includes the application of mass media effects, social network, information processing, and other useful communication theories. Nonetheless, as in the example above, most of the work currently being done in this literature conforms to paradigms rooted in a few social psychological theories, especially persuasion theory or other close variants of theories of reasoned action (e.g., Manfreda, 1992).

This is not an undesirable state of affairs, but there are many other potentially useful theories, especially among the relatively untapped work of mass communication theorists. To many recreation researchers these other theories may seem strange or not applicable. Knowing more about their strengths or weaknesses, and how or when to employ them, is a logical first step. This paper will not try to promote one theory over another. Instead the goal will be to reduce the uncertainty about communication theoretic approaches in order to make some of them more immediately useful to future research.

The Paradigm Plane

Metatheoretical concerns: A comparative framework. All science makes some philosophical assumptions: this is a problem of approach, or paradigm. There are unwritten rules or exemplars that quietly, and some might say insidiously, guide recreation researchers to choose one or another approach to a management "issue." For this paper, two distinct metatheoretical aspects are presented to reveal the underlying theory choices: these are normative utility and epistemological frame.

Utility is axiological: it is self-evident that a theory must be useful in explaining or understanding actual behavior(s) at some level. Sometimes a theory may encompass a close modeling of specific behavioral characteristics, or a strong and immediate link back to the "real world." At other times, research is focused at a more abstract level, or is general in scope, or even intentionally removed from the application of results. Thus theories exist in a range of types from those whose utility is relatively abstract, general or nomothetic (law-like) to theories whose utility is quite applied or aimed at site-level contexts. Consequently the theory "at risk" in any given study can be distinguished as to its immediacy or closeness to a particular recreational setting or decision context. This immediacy or utility delimits the study's generalizability. In practical terms, theories tailored in one setting may not be appropriate in others, and nomothetic theories may require additional effort to apply them to specific settings. It is a necessary tradeoff. In choosing a theory to apply to a problem, a researcher has acceded to a normative imperative to pick an approach and, ipso facto, it will have a utility level. Of course many times this may be done uncritically; i.e.,

merely assuming the approach previously taken by others is "good enough."

Second, the epistemological frame of a theory can yield useful distinctions as well. When a researcher follows a paradigm (e.g., picks a theory) the meaningful concepts of that theory also delimit discourse. This is another metatheoretical concern. By necessity each theory makes assumptions about how people come to know things and the categories of knowledge they employ. This is the purview of epistemology. In the context of devising a study, these assumptions reside in the tacit agreement scientists make on behavioral issues through the choice of a given theory or in the type of analysis needed. They are not always explicit nor obvious, and these distinctions too are often ignored.

In short, each theory contains epistemological assumptions about the nature of a subject's action, thought, and reality. Although this area is extremely complex, the approach here is to make it manageable by crudely modeling this domain through a tripartite typification of theories that distinguishes idiosyncratic, sociological, and highly individualistic types of explanations. The differences among these categories mirror important differences in approach to recreational behavior(s) that the researcher subsumes in the theory (either because they are felt to have been established by other scientific work or because it is a pure and arguably logical assumption).

At one end is the idiosyncratic approach: few, if any, assumptions are made to group respondents and the subject is often investigated with a strong emic (roughly, from the subject's own viewpoint) stance. The uniqueness of individuals and setting dynamics, e.g., culture or power relationships, play a strong role. Typical theories of this sort in communication research are those that focus on symbolic content or latent values.

On the other hand, a theory might make substantial assumptions that allows the grouping of individuals or eases variable measurement. Some theories that focus on, say, choice behavior may wish to assume a rational thought process or that setting differences do not substantially affect the behavior in question. Finally, a third group of theories may investigate a person's actions in support of, or in relation to, a social role or status. Again some assumptions will be made about the actor's view of the world and the focus is largely on sociological behaviors. In order, constructivist theories, rational exchange theories, and symbolic interactionist theories may serve as familiar examples of these three types of epistemological assumptions.

Therefore, in this paper the epistemological dimension is grouped into three "camps," which reflect (1) strongly rationalist and individualistic theories, (2) a middle ground in which relations, roles, and group processes are the focus, and (3) a broadly open intellectual tradition that makes few assumptions about the thoughts and commonalities of the subjects and focuses on symbolic, meaning and valuation processes in various contexts.

Taken together the utilitarian and epistemological dimensions of paradigm type define a plane of choice that will co-locate the many useful and distinct communication theories (see figure 1). The next step is to place familiar or potentially useful theories in this space. For clarity, two theories commonly applied to recreation behaviors are presented. These would be placed along the left edge of the plane (rational column). Following that, selected communication theories are presented that could be, or currently are, used in studies of outdoor recreation settings.

Recreation-related theories: Persuasion theory is typical of theories that occupy the upper left portion of the paradigm plane. It is relatively abstract, and meant to apply to a broad range of settings and people, and is therefore a general theory. Moreover it is clearly rationalist in its approach to the behavior studied. People are hypothesized to have measurable responses to inputs, which are in the form of information, usually by either central or peripheral routes. The assumptions of broad scale utility and reasoned behavior make it both general and rational.

At the lower left corner of the plane one might find recreational crowding theories. The actor is usually seen as a rational processor of stimuli, and the clear level of application is meant to be activity, if not site, specific. Numerous studies have been done along this line of inquiry to the point where summary papers listing dozens of individual studies are now in print with an eye toward generalizing more broadly to the behaviors in question. These studies are not fully representative of all recreation or visitor studies and are not presented as a characterization of the entire field, but they are examples that illustrate two long standing research traditions in resource recreation research.

Communication theories: One objective of this paper is to provide an overview of communication theories with reference to the paradigmatic plane presented above. The two rational mass communication theories, one general and one specific, occupy much the same position as the two recreation theories previously presented (see figure 1). These are reviewed first.

Figure 1. Paradigm plane with selected communication theories

Gen'l	Information exchange	Uncertainty reduction	Fantasy theme
		Role emergence	Motive-embedded
Utility			
Site	Compliance gaining	Functional group decision making	Value-laden story
	Rational	Relational	Symbolic
	Epistemology		

Rational theories. Information Exchange Theory is a general theory meant to apply to most, if not all, communication settings. In this theory, messages are considered objectively describable and exist independent of the receiver. The receiver in turn is affected by these messages (persuaded, informed, etc.) in a linear process of response. Berelson and Lazarsfeld (1948) defined its essence nearly 50 years ago as "objective, systematic and quantitative description of the manifest content of communication."

A more applied or setting dependent version of this perspective is Compliance Gaining Theory, where specific behavioral outcomes are desired from the communication events that are being measured. In this theory, the actor is rational and the communication events are still largely objective facts. That is, they do not depend largely upon specific individuals or social requirements, and the specific behavior of interest, such as rule compliance, is explicitly included in the theory (Krippendorf, 1993). A recreation example might be a prohibited behavior such as having a campfire in certain areas. A researcher would measure which "rules" campers know about, where they obtained site use information, and whether they saw signs, notices, or written prohibitions.

Relational theories. The second column of figure 1 locates communication theories that differ from the first by relaxing the strongly individualistic assumptions of the rational approach. Instead the actor is set in a role-bound context where relational features interact with the communication elements to give rise to meanings, interpretations, and ultimately behaviors. All relational theories assume an epistemological need for social structure, but emphasize different aspects of the communication process. Some are more client-centered than others. Each in its own way contributes to a particular place in the paradigmatic plane.

A general relational theory is Uncertainty Reduction Theory (Berger and Calabrese, 1975). It too focuses on the relational aspects of communication as a means to define and uphold societal structures or symbols. Many of the key social facts for this theory are roles or authorities. For example URT might be useful to understand how communication can reduce uncertainty and lead to efficiency as district rangers do their job in communicating with the public.

A fairly general theory in this vein is Role Emergence Theory (Bormann, 1990). The objective is to understand decisionmaking in small groups by classifying the utterances of actors according to the role they have in a group process, such as a jury deliberation, and how these are used to signify status, provide leadership, etc. Both utility and assumptions about the actors are in the middle range of the paradigm plane. By restricting the concern for a particular task group, such as a quality assurance committee, a more specific theory such as Hirokawa's (1985) Functional Theory of Group Decision Making may be a good choice. This approach would be especially useful when the focus is on communications in groups trained to decide relatively specific issues and the goal is to

understand how better decisions might be engendered. The paradigmatic focus is still relational but the utility level is more specific and would not be generalized to other small groups that don't share decision making roles and characteristics. For the prohibited campfires example a scientist might investigate how or why a given campfire regulation achieves compliance or non-compliance within certain user groups by investigating who says what to whom, who are the group decisionmakers, etc.

Symbolic theories. Finally there are numerous communication theories that seem to have more in common with the humanities than social science. They make no claim to provide behavioral predictions and favor situated understanding and explanation as the primary goal. This sort of intellectual tradition is typical among social scientists and educators from constructivist, feminist, and post modern approaches to science. In communication there are general theories that provide a means to assess the meaning of communication events to particular groups especially on their own terms (emic) or as embedded regularities not previously recognized. A well-known one is Fantasy Theme Analysis (Bormann, 1982) wherein communication is analyzed to pull out the themes and symbols that are operative in that setting. For instance, consider the slogan "Only you can prevent forest fires." Who promotes this idea and how is it received and transmitted through society? What is the symbolic reality that Smokey Bear embodies for a given group, and how different might it be for a mountain community surrounded by National Forest lands than one in an urbanized area? According to FTA, people who share a way of communicating about an issue are termed a rhetorical community, and their symbolic use of language and media can be studied theoretically to arrive at an understanding of the entire community.

A more focused or middle level utility theory might be Motive-Embedded Analysis. It is essentially a particularized form of dramaturgical analysis where the symbols used in conversations, writings, ads, or speeches are analyzed to uncover the motives that underlie them (Bullis & Tompkins, 1989). Although this study focused on communication among forest rangers, MEA might have particular usefulness to resource managers who are faced with conflicting demands from stakeholder groups in a planning context or discussions with a particularly important customer group. The theory allows a trained analyst to attribute motives to a person or group based on a study of behaviors, anecdotes, and discourse.

Finally, figure 1 presents a theory that relies heavily on symbolic analysis but is more specific in its utility: Value-Laden Story, which is a form of Narrative Paradigm Theory. The researcher preselects a particular class of events (e.g., health care workers servicing HIV patients). The core idea is to "unpack" the values, both instrumental and terminal, found in the narratives (stories) of individuals in a particular circumstance. For instance, by evaluating closely the value-laden components of subjects' stories, a strong sense of the differences in goals and values between HIV patients and their doctors was accomplished

(Vanderford, Smith, & Harris, 1992). Similar approaches would be useful in selected recreation resource decision making contexts. For instance in the campfire issue from above a researcher might interview managers and selected user groups to uncover substantive differences in their values, needs, and preferences. Both groups are treated emicly; i.e., the researcher's task is to understand the issue from each group's own perspective and make comparisons or conclusions afterward. Their subjective values and evaluative statements are the data that emerges from interviews and drives the analysis.

SUMMARY AND CONCLUSIONS

Returning to the broader picture, thoughtful application of communication theories will assist the larger enterprise of multimethod social science (e.g., triangulation) applied to resource recreation management. No argument is made that communication theories are meant to supplant existing recreation behavior theories. Increased use of communication theories is far from antithetical to current practice in the leisure paradigm. In many instances it is complementary and occupies the same metatheoretical place as existing outdoor recreation research. This paper has only scratched the surface and planted a few selected seeds. Scientists are encouraged to attend to the concepts and models of the broad field of communication so that these theories can be applied beyond the arenas of product marketing and mass media studies and, thereby, be brought fruitfully into the outdoors.

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The Relationship Between Activity Specialization And Preferences For Setting And Route Attributes Of Selected Rock Climbers

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Abstract Many natural areas are now in the process of developing climbing management plans in order to control management factors associated with the growth of rock climbing. These factors may include limiting areas of use and limiting the type of climber utilizing the resource. The purpose of this study was to further develop and operationalize the concept of recreation specialization as it relates to rock climbing. This study also examined preferences for the physical characteristics of rock climbing routes and the general recreational setting. Management implications of this study include the development of a heuristic management tool to categorize and rate climbers into a continuum of specialization from general to specific users that in turn would display different environmental preferences for the environment in which the sport of rock climbing takes place.

Introduction

The sport of rock climbing, a form of adventure recreation, has grown considerably in the past several decades (McAvoy & Dustin, 1985). This incredible expansion and resulting upsurge of participation raises many questions for land managers and park officials. What role should they play in regulating this recreational activity? To what degree should forms of the sport be regulated? Which participants should receive special management intervention? Many natural areas are now in the process of developing climbing management plans in order to control management factors associated with the growth of the sport, such as limiting areas to use, and limiting the type of climber utilizing the resource. Managers would benefit from the development of a heuristic tool capable of matching management strategies with the variability of recreational orientations and needs.

To help management understand variability within recreational activities, Bryan (1977) introduced the idea of specialization which provided a conceptual framework with which to explore recreation behavior. He sought to explore the diversity of recreationists within a given activity. Recreation specialization "...refers to a continuum of behavior from the general to the particular" (p. 175). This

continuum is reflected by the equipment, skills, and activity setting preferences of the recreationist. At one end of the specialization continuum is someone who has very general interests in an activity and participates in several forms of the activity. At the other end of the continuum is a person who has a narrow field of interest and limits interest to a specialized branch of the sport. Bryan sought to explain variability among recreationists in terms of their behavior and attitudes regarding different forms of the activity.

Bryan's (1977) specialization typology has subsequently been used by researchers to help explain attitudes and behaviors towards management, setting and resource preferences, attitudes towards resource conservation, and motivations for participation. Specialization has also been utilized, with varying success, to help understand behavioral patterns in several activities including canoeing, backpacking, rock climbing, as well as non-outdoor recreational related activities such as contract bridge.

Hollenhorst (1987) attempted to apply recreation specialization theory to rock climbers and the sport of rock climbing. In Hollenhorst's study, expertise was used as a surrogate measure of specialization and was compared to the independent variables of experience use history (EUH); the ecological, social, and climbing difficulty character of the environment; age; gender; equipment used; and social context. Hollenhorst's study was delimited to those rock climbers who engaged in top-rope rock climbing. Other rock climbers that were excluded from this study were solo climbers, lead climbers, boulderers, and aid climbers. A limitation of this study was that it potentially excluded a wider variety of climbers on the specialization continuum.

Hollenhorst (1987) also found that two climbing sites that contrasted in ecological character (developed vs. natural) did not differ in terms of the level of specialization exhibited by users. As Hollenhorst stated, the finding would seem to contradict the specialization theory developed by Bryan (1977) who said that an increase in specialization would increase the dependency on the natural character of the environment. Hollenhorst asserted that "...rock climbers are generally insensitive to and unconcerned with the ecological character of the rock climbing site... it is more likely that these attribute preferences relate to the quality of the rock and the climbing route" (p.129). Hollenhorst's assertion, however, would seem to confirm Bryan's theory. Bryan suggests that the values attached to a level of specialization are "inextricably linked to the properties of the resource on which the sport is practiced" (p.186). The present study focused on exploring the properties of the resource and its relation to specialization.

It was the intent of this study to help gather information on the attitudes of rock climbers so that informed decisions could be made in terms of managing our natural areas with rock climbing resources. The sport of rock climbing has several different forms which may be characterized by participants of differing skill and experience levels (Hollenhorst, 1987). In the present study, rock climbers

were examined in the context of recreation specialization to help better understand the heterogeneous behavior associated with participation in the sport.

Purpose of Study

The purpose of this study was to develop and operationalize the concept of specialization as it relates to rock climbing. This study developed and tested a multi-attribute index for measuring and categorizing activity specialization of rock climbers. As an extension to previous rock climbing studies, this study also examined the preferences of rock climbers for the ecological character of the environment by measuring preferences for the physical characteristics of climbing routes and general recreational settings. This study examined the following questions:

- What specific setting and route attributes do rock climbers prefer?
- Overall, do climbers prefer the attributes related to the rock climbing route or the general recreational setting?

Use of the specialization index as a heuristic management tool would help managers identify who is participating in rock climbing and help understand users' attitudes and preferences towards specific environmental attributes. Findings would also suggest to land managers how to increase user satisfaction across the entire specialization spectrum and in turn help to avoid "recreation triage" (Ewert, 1986; Hollenhorst, 1987), a condition in which managers inadvertently cater to one specific user group.

Data Collection Procedures

Seneca Rocks Recreation Area, located in Pendleton County, West Virginia in a remote area of the Appalachian Mountains, was selected as the study site. The recreation area lies on US Forest Service land and offers a variety of recreational opportunities including over 400 rock climbing routes. The study site was selected because it draws a representative sample of rock climbing enthusiasts according to a study conducted by Botkin (1985).

The subjects were delimited to people participating in rock climbing and explicitly excluded people engaging in other related activities such as rappelling and hiking. Climbers were asked to fill out the survey as they exited the rock climbing area. The participants were also asked whether they had completed the survey on a previous occasion to help control for duplication. A total of 263 surveys were collected over the administration period between June 23 and August 12, 1996. Ten individuals refused to complete the survey, creating a response rate of 97 percent.

Instrumentation

A multi-attribute specialization index was developed to help measure the heterogeneous behavior associated with participation in the sport of rock climbing. Seven indicators were utilized to measure three behavioral aspects of specialization including skill level, prior experience, and commitment. These indicators were standardized through a Z-score transformation and additively combined to create a

specialization index that ranged in score from -10.7 to 15.96. A Cronbach's Alpha was utilized in order to test the internal consistency of the 7 items. One of the items was eliminated from the scale when reliability analysis revealed that it did not contribute to the overall specialization index. The remaining six items of the specialization scale obtained a reliability coefficient of .81. The Alpha coefficient for the testing of the relative homogeneity of the specialization index exhibited a strong degree of internal consistency among the indicators employed to construct the index and thus the specialization index was judged to be sufficiently reliable.

To measure climbers preference for environmental attributes related to the general recreational setting (the rock climbing area) and the rock climbing route, participants were asked to rate the importance of statements relating to the physical attributes of both the rock climbing route and the general activity area. This was done on a seven-point rating scale with responses ranging from "not important" (1) to "very important" (7). Subsequently, each set of questions relating to either the general setting or rock climbing route were combined to create a general setting score and a route attribute score, respectively.

Analysis

Pearson Correlation coefficients were used to analyze the relationship between the specialization index and preferences for both general setting attributes and rock climbing route attributes. The specialization index was further divided into high specialists and low specialists consistent with other specialization studies (Wellman, Roggenbuck, & Smith, 1982). High specialists were defined as the upper quartile (upper 25%) and low specialists as the lowest quartile (lowest 25%). Subsequently, Paired T-Tests were utilized to compare preferences for route and setting attributes between high and low specialists.

Table 1: Pearson Correlation Coefficients Between the Specialization Index and the Importance of Physical Setting Attributes (n = 257)

Attributes	Mean	Pearson r	Two-Tailed Probability
High Mountain	4.05	.001	.987
No Evidence Of Man Made Features	4.39	-.076	.226
Natural Lakes and Streams	4.93	-.075	.233
Availability of Potable Drinking Water	3.72	-.231	.000
Seeing Wildlife	4.21	.079	.204
Rugged Terrain	4.23	.042	.500
Scenery of Area	5.54	-.015	.805
Condition of Access Trails	3.16	-.164	.008
Cleanliness of Area	5.54	.001	.981
Short Length of Approach	4.55	-.226	.000

Table 2: Pearson Correlation Coefficients Between The Specialization Index And Physical Route Attributes (n = 257)

Attributes	Mean	Pearson r	Two-Tailed Probability
Scenery Viewed From Climb	5.23	.141	.023
Natural Condition Of Climbing Route	5.69	.079	.208
Not Seeing Manmade Features On The Climb	4.5	-.050	.424
Cleanliness Of The Climb	5.54	.076	.225
High Degree Of Naturalness On The Climb	5.42	.006	.923
Presence Of Bolts	5.02	-.042	.505
Length Of Climb	4.71	.023	.708
Presence Of Permanent Top Rope Anchors	4.36	-.226	.000
No Loose Rock	2.83	-.015	.811
Difficulty Level Of The Climb	4.95	-.039	.532
History Of Climb	3.37	.107	.087
Quality Of Route	5.81	.295	.000
Type Of Climb	4.61	-.078	.212
Amount Of Exposure	4.53	.051	.415
Natural Features Of Climb	4.5	.092	.139

Table 3: Paired T-Tests for High Specialists and Low Specialists on Route Attribute Score and Setting Attribute Score.

Variable	N	Mean	St. Dev	St. Error	T Value	2 Tail Prob.
<i>High Specialists</i>						
Route Attributes	56	4.89	.67	.09	3.17	.002
Setting Attributes		4.58	.92	.12		
<i>Low Specialists</i>						
Route Attributes	55	4.69	.68	.09	3.51	.001
Setting Attributes		4.34	.63	.08		

The results of the Pearson Correlations between the specialization index and general setting attributes would seem to confirm that, as specialization increases, the preference for specific physical setting attributes becomes more extreme. There were three specific setting attributes that were significant at the .05 level. "Availability of potable drinking water", "condition of access trail", and "short length of approach" all showed a significant negative correlation. As specialization increases these variables would seem to be less important to rock climbers' preferences for a rock climbing area. (Table 1)

Secondly, the results of the Pearson Correlations would seem to confirm that, as specialization increases, the

preference for specific physical route attributes becomes more extreme. There were three specific route attributes that showed a significant correlation at the .05 level. "Scenery viewed from the climb", and "quality of the route" showed a significant positive correlation while "presence of permanent top-rope anchors" showed a significant negative correlation. It would seem that as specialization increases, "Scenery viewed from the climb" and "quality of the route" become more important to climbers' preference of a climbing route. It would also seem that as specialization increases the "presence of permanent top-rope anchors" becomes less important to a climber's choice of a rock climbing route. (Table 2)

The results of the Paired T-tests would seem to confirm that high specialists show a stronger preference for physical route attributes than for physical setting attributes. High specialists ($p = .002$) overall showed a stronger preference for the route attributes than the setting attributes. It was found that low specialists ($p = .001$) also demonstrated a significantly higher preference for route attributes than setting attributes, although not as strong as high specialists. (Table 3)

Discussion and Implications

The findings would suggest that rock climbers are more concerned with the attributes of the rock climbing route than the general recreational setting. Therefore, managers could channel rock climbers into areas that are not in pristine condition, closer to the trail head, and in areas that are generally unappealing to other recreational users. To cater to low specialists, these sites could be equipped with permanent top-rope anchors since it was found that this attribute became more important as specialization decreased. Since high specialists are less concerned with the length of approach than low specialists it would make sense to channel high specialists into a more pristine and backcountry setting. Channeling rock climbers into appropriate areas could be accomplished through distribution of informational brochures or the establishment of appropriate trail signage.

Land managers and park officials are currently developing climbing management plans to be able to manage the recent influx of rock climbers into their areas. Many land managers and agencies are struggling with whether or not fixed and permanent anchors (i.e. bolts, pitons, and rappel anchors) should be allowed in their management areas. Specialization does not seem to have any relationship to "presence of bolts", "degree of naturalness", "not seeing manmade features on the climb", and "natural condition of climbing route". However, as mentioned earlier, this may be due to current acceptable practices in the sport. Climbers, regardless of what route they are on, may actually expect to find bolts, anchors, and other manmade features. This acceptance of current practice may render these attributes moot in terms of route selection preferences.

In the future, it would benefit land managers to conduct research on the issue of fixed protection (i.e. bolts, rappel

anchors, belay/rappel stations). Is this an acceptable practice in rock climbing and how would the elimination/addition of these devices be perceived by climbers? Findings would help provide managers with a basis to make informed resource oriented management decisions that would help protect the environment as well as increase user satisfaction along the entire continuum of climbing activities.

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STATISTICAL TESTS AND MEASURES FOR THE PRESENCE AND INFLUENCE OF DIGIT PREFERENCE

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Abstract: Digit preference which is really showing preference for certain numbers has often described as the heaping or rounding of responses to numbers ending in zero or five. Number preference, NP, has been a topic in the social science literature for some years. However, until recently concepts were not adequately rigorously specified to allow, for example, the estimation of number of responses for a given stated value that are a consequence of NP. This paper reviews developments, identifies current research directions and then builds on methods of estimating numbers exhibiting NP to provide measures and statistical tests. A chi-square test of significance of NP; a test for the significance of particular heaps and confidence intervals for the estimated proportion of a population exhibiting NP are presented. The interpretation of the tests and measure is illustrated. Of particular practical value is a measure of the potential for NP to bias the value of the mean and total of a stated response variable.

Note: In this article certain standard symbols are used. These are: \approx or \cong is approximately; \equiv is equivalent; \therefore is therefore; \exists is there exists; \forall is for all; \subset is "is a subset of"; \in is "is a member of"; \ni is such that.

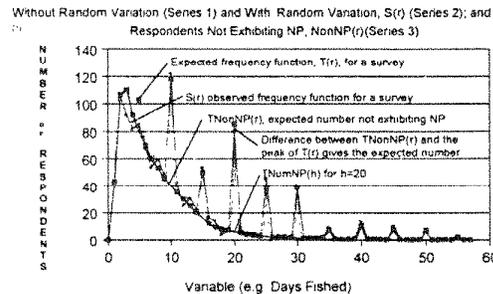
Keywords: digit preference, bias, statistical test, heaping, rounding, stated participation

Perspective

Digit preference, really number preference (NP), is a phenomenon that is recognized by the heaping on or rounding of responses to certain numbers such as numbers ending in zero or five. It has been a topic in the scientific literature for some years (Burton & Blair, 1991; Baker 1992; Hultsman, Hultsman, Black 1989; Huttenlocher, Hedges, & Bradburn 1990; Pickering, 1992; Rodgers, Brown, & Duncan 1993; Rowe & Gribble 1993; Tarrant & Manfredo 1993; Wen, Kramer & Hoey 1993). Recent publications have operationalised the concept of exhibiting number/digit preference, NP. This has been done with adequate rigor to allow the estimation of the number of responses for a given stated value of a variable r for which NP was exhibited (Vaske, Beaman, Manfredo, Covey and Knox 1996; Beaman, Vaske, Donnelly and Manfredo

1997). A key idea is that heaping/rounding such as exhibited in response to questions about the frequency of doing something or the amount spent should be viewed as a generic phenomenon. The implication of this approach is that results can be derived that relate to a variety of practical problems of making estimates using stated responses.

Figure 1. Hypothetical Example of A Frequency Function Showing The Consequence of 0-5 Number Preference



This article presents results that are part of a larger research thrust that began in 1994 when the magnitude of heaping in Colorado fishing data was recognized (see Vaske et al. 1996). Figure 1 closely resembles an actual frequency function for the Colorado fishing data. In the figure the horizontal axis is used to indicate the stated number of days fished, r . One sees that for $r=15$, there are 50 responses. However, from the figure one also sees that there is a function marked as $S(r)$ that is 50 for $r=15$ but that is relatively smooth for values that do not end in 0 or 5. In fact, the smooth function $NonNP(r)$ is formed by ignoring heaps on numbers ending in zero or five. An important concept is elaborated on by Beaman et al. (1997). It is that the value of $NonNP(r)$ for values of r at which heaps occur is an estimate of the number of people giving that responses who are not exhibiting NP. For example, one sees that for $r=15$ it is estimated that there are 10 people not exhibiting NP. Having estimated the number of people not exhibiting NP, one can conclude that 40 ($=50-10$) were respondents exhibiting NP.

The section below titled "Derivation of Statistical Tests and Measures" formalizes the idea just introduced and proceeds to derive measures and statistical tests with some degree of rigor. In that section, the result just introduced for estimating numbers of respondents exhibiting NP is expressed by Equation 1. This result is important since Hultsman, Hultsman and Black (1989) recognized that simply taking the proportion of responses ending in zero or five as an estimate of the proportion of the population exhibiting NP is biased. This is because even if nobody exhibited NP about 20% of responses would still be expected to end in zero or five. Having identified the $NonNP(r)$ function and noting that if one can estimate the number of people exhibiting NP for each heap, Beaman et al. (1997) deduced that the proportion of the population exhibiting NP can be estimated. It is just the sum of the estimates of numbers exhibiting NP for all heaps divided by the number of respondents (Equation 2). Their analysis shows that for a given variable r , unless some special

conditions occur, this approach gives essentially unbiased estimates of the number of respondents exhibiting NP. They also identified the fact that if a NonNP(r) function can be defined, the same unbiased approach to estimating the proportion exhibiting NP can be applied regardless of whether heaping is on a set of numbers ending 0 and 5 or on another set of preferred numbers.

Huttenlocher, Hedges and Bradburn (1990) were specific in identifying prototypes, groups of numbers on which heaping occurs. Prototypes include sets of numbers other than numbers ending in zero and five. The work of Huttenlocher et al. (1990) also plays an important role in ongoing research in that they propose a psychological theory of heaping. They propose that though there may be special cases where people intentionally give a response that is too large or too small, generally **heaping is a consequence of recall being imprecise**. In other words, the heaps that one sees in Figure 1 can be viewed as a consequence of respondents giving a "best estimate" of what they believe to be the true value with which they should respond. If asked about hours in western cultures responses will, for many respondents, be rounded to a prototype of 4, 8, 10 and 12. In other contexts, for some individuals, the mind as part of retrieving a response will "produce" responses heaped on 7; 14 or 15; 30; etc. reflecting weeks and months. Unfortunately, while based on a given question some respondents are disposed to respond by one prototype, others may use another. So, digit preference or more precisely number preference, NP, can be **generically** viewed as certain respondents minds using certain prototypes rather than giving exact responses (Huttenlocher et al. 1990).

The next section accepts the prototype model of NP. Based on accepting it, set theory, statistical theory and mathematical equations are used to deduce consequences. After deriving the proportion of the respondents exhibiting NP (Equations 1 and 2), attention turns to statistical tests for heaping. Firstly, the **null hypothesis** that there is no NP exhibited is examined. In this case, variation around NonNP(r) is random. The expected value of NonNP(r), $T_{nonNP(r)}$, gives the means of a multinomial distribution. So one has the information about the distribution of responses so that a chi-square distribution can be defined (Equation 4) to test whether any apparent exhibition of NP (any heaping) is statistically significant. Given that the chi-squared distribution is related to the sum of squared deviations from a normal distribution, a formula for the significance of a particular heap is derived (Equation 5). Equations 6 and 7 recast the consideration of deviations in term of the difference between an expected number of responses and the number actually observed by introducing the binomial distribution and a Poisson approximation for frequency functions with heaps. When one acknowledges that there are heaps, expected values and variances do not have the values that are expected under the null hypothesis. Equations 8, 9 and 10 formalize variance estimates, distributions and statistical tests when the null hypothesis obviously does not apply.

Though most of this article focuses on statistical tests and measures for stated response frequency functions, it also

addresses the matter of the influence of heaps on the mean and totals. In applied research, one is not typically interested in what proportion of respondents may be exhibiting NP but rather in the influence their response heaping has on important parameters for managerial and operational decisions. In many cases the value of the stated responses to management or operations is in estimating such statistics as total participation, average catch or total kill. Knowing if such statistics are biased is the crucial matter to clarify in considering NP. The ability to estimate the numbers exhibiting NP is used to compute a ratio showing the potential of NP to influence the estimates of means and totals (see Equations 11 and 12).

Part of the problem of examining the distribution of stated responses is that some respondents may live near streams and fish hundreds of days a year. The statistical concern is that a very small heap can be concluded to be significant based on the fact that responses around it have a frequency of zero. Equation 13 addresses this matter. However, what this article does not do is examine the general estimation problem of redistributing heaped values back to the actual or "accurate" values. These are "accurate", not rounded, values. One may think of the mind as determining that, for example, determining by some information retrieval process determining that 27 is a best estimate. However, in a second step the mind, using a particular prototype, maps 27 into 30. This second step would be invoked when there was a certain level of uncertainty about a response such as 27. Still, "accurate" responses retrieved in a first step could be off because of recall error. On its own recall error should not cause heaping. Such matters are being pursued in other research where it is argued that not recalling all events or recalling some that should not be recalled simply does not result in heaping.

Specifically, promising research on unbiased estimation is proceeding based on a Huttenlocher, Hedges and Bradburn (1990) observation. This was that **typically a respondent is not trying to bias results**. A respondent's heaped response can be taken to give **what that individual considered to be** the most accurate report of their actual behavior that would be given in the particular context. If appropriately coached they might recall more accurately but that alters the context. Given that respondents are not attempting to introduce bias by exaggerating or understating what they do, algorithms to distribute heaps back to "where they came from" are being developed. Furthermore accepting that respondents are not trying to bias survey results allows for principles of **multiple imputation** (Rubin 1996) to be invoked. Multiple imputation has been used since the 70's to produce data sets in which accurate responses for individuals become part of a data set that can be processed to produce unbiased estimates of all statistics that may be biased by heaping. Papers reporting on such developments are being prepared for publication in 1997 and 1998.

In summary, a step toward dealing with the influence of NP on a variety of estimates is taken by providing a variety of measures and statistical tests. The following section derives these. These derivations may be of limited interest. However, it is suggested that until estimation methods

under development are available (current references, manuscripts and programs can be requested from the authors), researchers should compute the "influence on the mean" measure (Equation 12). This suggestion is based on managerial or operational decisions depend on means computed from data in which NP is significant. Significance can be clear either because statistical tests show it or because it is obvious that the potential for bias from NP should not be ignored.

Derivation of Statistical Tests and Measures

Assume that there is a frequency function, $S(r)$ (see Figure 1) that is defined on a set of response values, R . Also consider that there is a preferred set $P \subset R$. The observation by Beaman et al. (1997) facilitating new findings is that: All frequencies that are not for values in P are for members of $R-P$. Frequencies for members of $R-P$ are \therefore responses of people who do not exhibit NP. Based on having many replications of a study, one can visualize the observed frequencies, $S(r)$, from each survey as distributed around a function $T(r)$ (see Figure 1). For $r \in R - P$, one has $T(r) \equiv T_{\text{NonNP}}(r)$ where $T_{\text{NonNP}}(r)$ gives the expected number of individuals not exhibiting NP. One does not observe $T_{\text{NonNP}}(r)$ but rather for $r \in R - P$ one observes $\text{NonNP}(r) \equiv S(r)$ which is subject to statistical variation from survey to survey. So for a value, $h \in P$, at which there is a heap $E_{\text{NonNP}}(h)$, the estimated value of $T_{\text{NonNP}}(h)$, should be estimable using a "smooth" curve. Such a curve would joining together values of $\text{NonNP}(h)$ for neighboring non-heaped values (e.g. a linear or quadratic function fit to surrounding values e.g. for $r \geq 5$ values of $\text{NonNP}(r) \ni r \in \{h-2, h-1, h+1, h+2\}$ see Beaman et al. 1997).

Now, by hypothesis heaps only occur at $h \in P$. In Figure 1 this is for integers ending in 0 or 5. This means that observed values of $S(r)$ for other r -values ($r \notin P \equiv r \in R - P$) are observed frequencies of not exhibiting NP, $S(r) \equiv \text{NonNP}(r)$. This is the case as long as there is no reason for actual behavior to favor five, 10, etc. thus causing *real* peaks on such values (see Beaman et al. 1997). So, assume that there are no "real" heaps. Then, it is reasonable to conclude, as shown in the figure, that for integers $h \in P$ for which $S(r) \neq \text{NonNP}(r)$, an estimate of the value of $T_{\text{NonNP}}(h)$, $E_{\text{NonNP}}(h)$, can be obtained by extrapolating to it from non-heaped values above and below h . Furthermore, if $E_{\text{NonNP}}(h)$ is an estimate of the number of responses for h for which there is no NP the other responses at h are a consequence of exhibiting NP so:

Equation 1:

$$S(h) - E_{\text{NonNP}}(h) = E_{\text{NumNP}}(h)$$

The number of responses in which NP is exhibited, $E_{\text{NumNP}}(h)$, can be estimated. As indicated in Figure 1 this is an estimate of $T(h) - T_{\text{NonNP}}(h) = T_{\text{NumNP}}(h)$.

The two recent articles identified above as clarifying generic NP concepts (Vaske et al. 1996 and Beaman et al. 1997) have suggested that the sum of $E_{\text{NumNP}}(h)$ values divided by N , the total number of responses on the stated response variable r , is an estimate of the proportion of a

population (or of a subpopulation) exhibiting NP on the variable r . Here this measure is defined by:

Equation 2:

$$\text{PropXingNP} = \sum_{h \in P} E_{\text{NumNP}}(h) / \sum_{r \in R} S(r)$$

The value of PropXingNP is .26 for the $S(k)$ function shown. The notation $\text{PropXingNP}_{(\text{var})}$ could be used to make it clear for which variable on a survey the measure was calculated. We do not further complicate description and notation by explicitly dealing with several variables and with nonresponse on different variables as producing subpopulations of different sizes from which estimates for a population would be made. Still, unless two variables had the same distribution for actual behavior $\text{PropXingNP}_{(\text{var})}$ would be expected to have a different value for each. For example, if $S(r)$ is for days fished and the other variable is total catch, c , then based on Vaske et al. (1996), PropXingNP_c would be predicted to be greater than .26. Based on the preceding, one can legitimately say that $\text{PropXingNP} = .26$ means that 26% of the respondents actually gave a response ending in 0 or 5 when their response should not have ended in 0 or 5; they exhibited NP. A proportion of .26 is a relative large percentage. Its large value is consistent with it being obvious by viewing Figure 1 that the heaps are too large and too regular in where they occur to reflect random variation. In Vaske et al. (1996 Figure 1) one sees that the only clear exceptions to 0-5 NP are heaping on 12 and 14. Though these might be thought to relate to avoiding 13, they also correspond to "once a month" and to "every day for two weeks." Clearly, one might ask for statistical proof of significance or more reasonably want a general significance criterion that would apply to smaller PropXingNP values such as .1 or .05 that might not be significant. What is needed is a test that allows one to reject the hypothesis that *NP is not being exhibited*.

To develop a test for the "not being exhibited" hypothesis, assume that for a given variable, r , and for N respondents no NP is being exhibited. Then for r the observed frequencies, $S(r)$, are *all for people who are not exhibiting NP* thus they are just a set of observations, $\text{NonNP}(r)$ that relate to the expected distribution, $T_{\text{NonNP}}(r)$. Based on the multinomial distribution $T_{\text{NonNP}}(r)$ gives expected frequencies, for a population of size N with an observation vector $S(r) \equiv \text{NonNP}(r)$. For 0-5 NP the research cited in the introduction has defined estimates of $\text{NonNP}(h)$, $E_{\text{NonNP}}(h)$, for numbers >0 ending in 0 or 5 ($h \in P$). For each $h \in P$, $E_{\text{NonNP}}(h)$ was estimated by the average of $S(r)$ for 2 values above and two values below h :

Equation 3:

$$\begin{aligned} E_{\text{NonNP}}(h) &= \text{mean}(S(h-2), S(h-1), S(h+1), S(h+2)) \\ &= \text{Mean}(\text{NonNP}(h-2), \text{NonDp}(h-1), \text{NonDp}(h+1), \\ &\quad \text{NonNP}(h+2)). \end{aligned}$$

It may appear "obvious" that the estimates defined by Equation 3 should be obtained by curve fitting. However, since one does not know what curve to use, results of curve fitting can produce poorer estimates than those obtained by

using Equation 3. More importantly, because Equation 3 estimates each ENonNP(h) using different observations, the estimates for the different values of h are, for practical purposes, uncorrelated. This is since correlation only results from the constraint that *the total number of respondents = the sum of all the S(r)*. Virtual independence of the estimates is important since given the definition of a chi-square with degrees of freedom, d, as the sum of squared deviates of d independent Normal(0,1) variates, based on and means, variances and asymptotic normality of the distribution of multinomial responses(e.g. see Kendal 1943, Ch. 12):

Equation 4:

$$\chi^2_d \equiv \sum_{\forall h \in H} ((S(h)-ENonNP(h))^2/ENonNP(h))$$

where d=Size(H) and ENonNP(h)>0 and (S(h)-ENonNP(h))/ENonNP(h)^{1/2} ≅ Normal(0,1).

As defined in Equation 3, chi-square (Equation 4) must be computed for ENonNP(h)>0 while an estimated ENonNP(h) ≤ 0 can occur. This presents problems. As one sees in Figures 1 and 2, for h=30 or greater, for some values of h, surrounding values are zero(as occurs in real data examined e.g. see Vaske et al. 1996). For h where adjacent values(re adjacent see Equation 3) are zero:

Equation 3 Alternative Conditions: If the mean of surrounding values is 0 then:
 (a) if S(h)>0 then, based on the assumption that all the responses in the interval of interest have actually occurred at h by chance(testing the plausibility of this assumption is introduced below), an estimate of ENonNP(h)= S(h)/5;
 (b) if adjacent S(r)=0 and S(h)=0 then the potential heap should be ignored and d reduced by 1 since, effectively, an h has been removed from P.

In the case where ENonNP(h) is estimated by prorating its value to an interval, chi-square (Equation 4) is biased if there is actually a heap. The bias results since the allocation of S(r)/5 is based on there being no heap and thus mass is assigned to adjacent values that should not be assigned to them. If there is a heap of expected size TNumNP(h), then the mass allocated to each surrounding cell(should be) has an expected value of T(h)-TNumNP(h). Regardless, the effect on chi-square of the bias is conservative in that it results in a reduced probability of NP being found to be significant.

Equation 4 is important for more reasons than that it defines chi-square (Equation 4). Firstly, note that it is defined h ∈ P for which ENonNP(h) is estimated. The definition does not depend on 0-5 NP being studied but applies to any set of preferred values P. It is only the way that ENonNP(h) is estimated(Equation 3) that is specific to 0-5 NP. If the variable being considered was average hours spent fishing and heaps were expected at 4, 8, 10 and 12 then an "alternative" Equation 3 could be formulated allowing a chi-square to be calculated.

The second matter to note about chi-square (Equation 4) is that it can be significant simply because NumNP(h) is very large for one or two values of h.. In fact, if NP is obviously significant, there may be good reason to focus on particular residuals, NumNP(h) rather than deriving a statistical test that just confirms the obvious. Based on the way that chi-square is defined in Equation 4 and derived from the multinomial(Kendal 1943 ch 12) each term in the sum can be treated as the square of an observation from a Normal(0,1). This means that confidence intervals can be based on the distribution:

Equation 5:
 Distribution((S(r)-ENonNP(r))/(ENonNP(r))^{1/2})
 ≅ Normal(0,1)

Each S(r) being an observation from a multinomial the probability of a response, h, is:

Equation 6
 Eprob(h| NP is not exhibited and h is not favoured in actual behavior)= p(h|NP)=ENonNP(h)/N

So, under the null hypothesis the difference between S(h) and ENonNP(h), NumNP(h), has a binomial distribution. Such a distribution is defined by a p and N. Thus, the following defines alternative distributions to use for making statistical tests

Equation 7: Distribution(S(h)|NP) ≅
 (a) Binomial(N, p(h|NP)); or
 (b) Distribution((S(h)-N*p(h|NP))/(N*p(h|NP)(1-p(h|NP))^{1/2}) ≅ Normal(0,1); or
 (c) Poisson(N*p(h|NP) for N*p(h|NP) << N.

Here, again, the methods apply to any heaping not just 0-5NP. The important matters are that:

1. there be an hypothesis about where the heaps occur(a set of preferred values, P, must be pre-specified); and
2. there be a way of computing ENonNP(h) that is appropriate for the set P.

The arguments just made for p(h|NP) can actually apply for any S(r) where p(r)=S(r)/N. One can simply substitute p(r) for p(h|NP) into the expressions given in Equation 7 to obtain distributions. However, for p(h|NP) where the probability is estimated as p(h|NP)= ENumNP(h)/N the same approach may seem appropriate but there is a complication. It arises because ENumNP(h)=S(r)-ENonNP(h). As indicated above, given 0-5 NP and the estimates specified in Equation 3, S(r) and ENonNP(h) are for practical purposes independent, so:

Equation 8:
 Var(NumNP(h))=Var(.S(h)-ENonNP(h))
 =Var(S(h))+Var(ENonNP(h)) and based on the Poisson
 =S(h)+Var(ENonNP(h)) and based on Equation 3
 =S(h)+Var((1/4)(S(h-2)+S(h-1)+S(h+1)+S(h+2)))
 ≅ S(h)+(1/16)ENonNP(h)
 and since for no heap E(S(h))=ENonNP(h) and otherwise
 E(S(h))>ENonNP(h)
 ≤ S(h)+(1/16)S(h)=1.06S(h)

The preceding, in fact, provides proof that Equation 7 does not apply to NumNP. The variance derived is not

$Np(h|NP)(1-p(h|NP))$ which it would be if the distribution were binomial nor is $E(\text{NumNP}(h))=\text{Var}(\text{NumNP}(h))$ which must be the case for a Poisson distribution. Of the options identified in Equation 7 one is left with approximating the distribution of $\text{NumNP}(h)$ by a normal distribution or using weak distributional assumptions, such as expressed in Tchebycheff's inequality to define statistical tests and confidence intervals. Equation 9 shows these options:

Equation 9:

- (a) the distribution of $\text{NumNP}(h)$

$$\approx \text{Normal}(\text{NumDP}(h), (1.06S(h))^{1/2})$$
; or
- (b) regardless of distribution using Tchebycheff's inequality (Kendal 1943, p. 203)

$$\text{Probability}(|\text{NumNP}(h)-T\text{NumNP}(h)| > \alpha) \leq 1/\alpha^2$$
 where α can be arbitrarily chosen e.g. as 10 to give a 1% level.

Another matter that might concern a person who is examining data in which NP occurs is whether for different data (e.g. for different segments) differences in estimates of the proportions of the populations exhibiting NP are significant. To develop a statistical test one must note that though by definition PropXingNP is an estimate of what appears to be the p of a binomial since it is based on $\text{NumNP}(h)$, as described above, its variance is defined by Equation 8 meaning that

Equation 10:

- The distribution of PropXingNP is

$$(a) \approx \text{Normal}(\text{PropXingNP}, ((1.06/N) (\sum_{h \in R} S(h))^2)^{1/2})$$
; or
- (b) based on Tchebycheff's inequality and given "that a variance of a sampling distribution of proportions of an attribute" in samples of N

$$is \leq 1/(4N) \text{ (Kendal 1943, p. 203)}$$

$$\text{Probability}(|\text{PropXingNP}-T\text{PropXingNP}| > k) \leq 1/(4N*k^2)$$
 where $k \ni 0 < k < 1$ and is e.g. chosen for a 1% level.

The preceding provides tests for significance and confidence intervals, however a small part of a population may exhibit NP with high variability. Knowing $\text{NumNP}(h)$ allows one to assess the degree to which NP is contributing to the mean or total of the response variable as follows:

Equation 11:

$$\begin{aligned} \text{Sum}(r|S(r)) &= \sum_{\forall r \in R} rS(r) \\ &= \text{Sum}(rS(r) \forall r \in R-P) + \text{Sum}(hS(h) \forall h \in P) \\ &= \text{Sum}(rS(r) \forall r \in R-P) + \\ &\quad \text{Sum}(h(\text{ENonNP}(h)+\text{ENumNP}(h)) \forall h \in P) \\ &= (\text{Sum}(rS(r) \forall r \in R-P) + \text{Sum}(h\text{ENonNP}(h) \forall h \in P)) + \\ &\quad \text{Sum}(h\text{ENumNP}(h) \forall h \in P) \\ &= \text{Total related to not exhibiting NP} + \text{Total related to exhibiting NP} \end{aligned}$$

So, the contribution to the total and thus to the mean of r can be partitioned based on exhibiting and not exhibiting

NP. This suggests that a measure of the potential for exhibiting NP to influence the mean of r be defined by:

Equation 12:

$$\text{PropMeanNP} = \sum_{\forall h \in H} h * \text{ENumDP}(h) / \sum_{\forall r \in R} rS(r)$$

Figure 2: Hypothetical Frequency Functions For Computing NP Measures And Tests

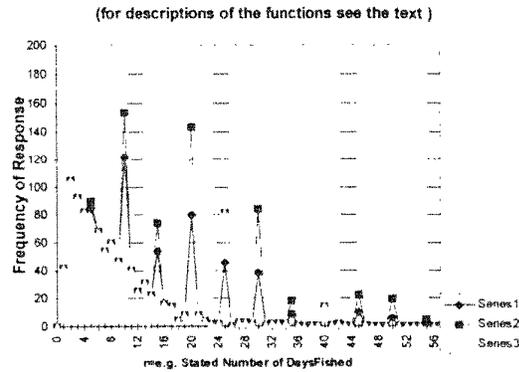
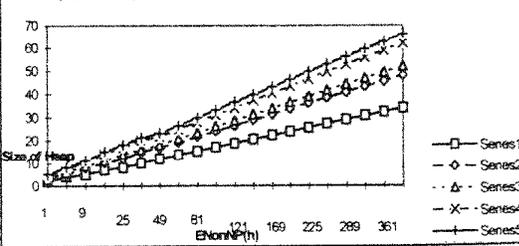


Figure 3: Deviations That Are Significant for a Given ENonNP(h) at the Levels Defined for the Different



Results of Computations for Examples

Some measures and statistical tests have been calculated for the hypothetical $S(r)$ data shown graphically in Figure 2. Series 1 in Figure 2 is Series 1 in Figure 1. The other two series in Figure 2 are variations on Series 1. Series 2 has about the same level of NP for small numbers as Series 1 but by $r=25$ about twice as many people exhibit NP in Series 2. Series 3 has more people exhibiting NP than Series 2 except for $r=26$. Because the three series share the same $\text{NonDp}(r)$ function one knows that NumXingNP will increase in value from Series 1 to 2 to 3. Also chi-square (Equation 4) and PropMeanNP values are expected to satisfy the same relation. The PropXingNP values are .26, .38 and .45. Because the NP peaks are large and obvious chi-square is expected to be so large as to have an infinitesimal probability of occurring by chance. For chi-square with $d=11$ the .001 level for it is 28 while values calculated for it start at 3313 for Series 1 and are larger for Series 2 and 3 (11,962 and 19,301). One way to see this is by examining the probability that a heap like the one at 30 occurred by chance. For Series 1, based on a normal approximation, the difference between the heap frequency

and the expected frequency is 7.3 times the expected standard deviation. Given that deviations of more than 4.1 standard deviations occur about 1 time in 10,000, the heap is clearly significant.

Given that there is significant NP being exhibited, if management is interested in a mean or total then one still has no idea whether there is potential for such values to be biased. The measures of the potential influence of NP on the mean (PropMeanNP, Equation 12) are .47, .63 and .71. There is obvious reason to be concerned that treating the heaps as valid observations could cause a significant bias in estimates of means and totals.

When chi-square (Equation 4) will obviously be significant, as is the case in the examples presented here, simply showing that one or more heaps is highly significant using distributions defined in Equation 7 is an easy alternative to computing chi-square (Equation 4). Figure 3 was prepared based on Equation 7. It facilitates testing for the significance of heaps since one need only determine the value of $S(r)$, estimate $\text{NonNP}(h)$, to use the figure to determine the value of $\text{NumNP}(h)$ that is significant at one of the levels given. The only issue then is if the estimate $\text{NumNP}(h)$ is large enough to be significant. The .001 and .0005 levels are provided in Figure 3 so that if, for example, the significance of 7 heaps is being considered, one can use the Bonferonni principal that if 7 heaps, say 10, are significant at the λ (e.g. $\lambda = .001$) level, then all considered together are, at least, significant at a level $\lambda \times 7$ (e.g. $= 10(.001) = .01$). Ongoing research suggests that understanding the structuring of significant heaps is necessary to produce estimates of NP bias.

The Poisson distributional approximation introduced allows statistical significance to be examined in another way. Assumption 3- Alternative Conditions (a) specified that an estimate of $\text{NonNP}(h)$ be based on $T(h) = S(h)/5$ given that $S(r) = 0 \forall r \in A = \{h - 2, h - 1, h + 1, h + 2\}$. One can examine the likelihood of heaps surrounded by zeros by considering:

Equation 13:

$$\text{Prob}(S(h) \text{ and } S(r)=0 \forall r \in A) \leq \Theta$$

where it is assumed that there is no NP and no real heaps; and where Θ is the desired level of significance (e.g. .01).

In figure 2, one can see a potential heap of 2 at 55 surrounded by 4 zeros. Accepting the Poisson distribution approximation as specified in Equation 7, based on $T(r) \cong S(h)/5$, the probability of 0 for a given $S(r)$ is $e^{-S(h)/5}$. There is only one way for all 4 adjacent observations to be 0 so the probability of this is $(e^{-S(h)/5})^4 = e^{-4 \cdot 2/5} = .2$. For the heap of 6 at 50 the probability is $(e^{-S(h)/5})^4 = e^{-4 \cdot 6/5} = .008$ so, conservatively, the heap is significant at the 1% level. Actually this shows that any heap of 5 or greater, considered on its own, is significant at the 1% level.

Conclusion

This research has immediate consequences and implications for future research. Its immediate practical importance is providing statistical tests for the significance of NP in data and a measure of the potential of NP to cause bias in the mean or total of a response variable (e.g. in average days fished or total catch). By taking a generic approach, attention is not on 0-5 NP or a preferred set of 4, 8, 10 and 12 (because a question is about hours). Continuing research is showing that as the "NP processes" are better understood criteria for rational decisions about ignoring, attenuating or correcting NP are being developed.

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PERSONAL BENEFITS OF PUBLIC OPEN SPACE: A CASE STUDY IN BOSTON'S ARNOLD ARBORETUM^{1/}

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Abstract: Managers of urban parks need to document the benefits that their parks produce. Use level is a typical measure of such benefits, but simple use statistics can mask the rich diversity of people and activities that the parks serve. This study examined the uses and users of Boston's Arnold Arboretum during late summer in 1992. On 25 sample days, we recorded observations on 3,983 individuals engaged in 98 different activities. The highest use levels were recorded on sunny afternoons, particularly on weekends; the most common activities were strolling, conversing, looking at something, and cycling. The incidence of problem behavior was slight. These activities represent the personal benefits produced by the Arboretum in that they accrue directly to the individuals involved. Additional research is needed on the social benefits of urban parks that accrue to institutions throughout the community.

Introduction

Urban parks are among the nation's foremost recreation resources, providing services to millions of Americans each day. Regrettably, many once great city parks have deteriorated; in times of fiscal austerity, parks tend to be bypassed in favor of other city services. Nationwide, the result is a huge backlog of deferred maintenance, vandalized facilities, and ineffective service--circumstances that can lead to even further declines (Whyte 1980). To counter this situation, park managers must be able to document the benefits that urban parks produce. Such documentation could help parks departments achieve parity with other city departments in the competitive world of municipal finance.

The general topic of recreation benefits has received much attention during the past two decades and numerous

studies have examined the effects of activity participation on benefit measures ranging from the physiological to the psychological to the economic (see review by Driver et al. 1991). This paradigm works well for many forms of recreation, particularly in more remote settings where there is uniformity in both the activities undertaken and the population served. In the city, though, things are different. Cities provide space, and a highly diverse population makes what use of it they will. For example, More (1985) examined two central city parks during July and August and found users engaged in 156 different activities. The amount and nature of use varied with the time of day and the characteristics of the landscape. In a study of trail use in Chicago's Warren Park, Gobster (1991) found that 51.2% of the users engaged in strolling as their primary activity, while the remainder were engaged in a variety of activities ranging from sitting (13.9%) to bicycling (9.2%) to free play (2.3%). In addition, 73.3% of all users engaged in a secondary activity such as walking a dog (8%), conversing (6.5%), or listening to the radio (1.7%). In a study of four parks in the Los Angeles area, each frequented by a different ethnic group, Loukaiton-Sideris (1995) found that stationary activities (watching children play, watching sports, picnicking, sitting/relaxing) were the most common in all parks, followed by mobile activities (walking, jogging, bicycling) and sports activities. These studies indicate how difficult it is to document the benefits of urban parks at a highly detailed level. For example, a jogger receives an entirely different set of benefits than a mother who is watching her child play, yet both sets of benefits may be attributable to the same park. Moreover, parks provide a variety of other benefits that can be biological or social in nature--they modify microclimates, reduce air pollution, absorb runoff of surface water, stimulate economic development, and provide settings for community and civic events. All of these benefits must be included in any comprehensive assessment of urban parks. Yet the most obvious starting point continues to be documenting the multitude of ways in which people use urban parks. In this study we examined the late summer use of the Arnold Arboretum, a 265-acre reserve that is a key component of Boston's "emerald necklace."

Methods

Designed by Frederick Law Olmstead in the 1870's, the Arnold Arboretum is a natural area located in the Jamaica Plain section of Boston. It is administered jointly by Harvard University and Boston's Department of Parks and Recreation. As such, the area is both a major scientific resource--maintaining a vast collection of trees, shrubs, and vegetation from throughout the world--and a major recreational resource for the people of Boston. It contains a variety of landscapes ranging from intensely cultivated areas with lawns and beautifully arranged flowering shrubs to marshes, streams, and hills covered with naturally occurring oak and hemlock. A small section of the Arboretum houses a unique collection of Bonsai trees and Japanese gardens.

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The Arboretum is readily accessible to most city residents by car or mass transit. Although it is entirely fenced, access is available from multiple points. At the main entrance, a visitor center provides information and includes educational exhibits and a small gift shop.

Visitors move through the Arboretum on a series of paved roads and paths. General access to these roads is restricted, so most people walk or ride bicycles, though it is possible to make special arrangements to drive. The Arboretum also operates a series of tours via a small bus.

To systematically inventory the late summer recreational use of the Arboretum, we followed procedures outlined in More (1985). This entailed having two trained observers follow a fixed route throughout the area on selected sample days between August 1 and September 15, 1992. To establish the sample days, the week was divided into weekdays and weekend days, with holidays treated as weekend days. The total sample consisted of 17 randomly selected weekdays and 8 weekend days, 55 and 53% of their respective categories. On each sample date, observations were made in the morning (beginning at 9 a.m.) and in the afternoon (beginning at 1 p.m.).

In making the observations, the Arboretum was divided into 21 sectors following roads and paths. The entire area was covered and a fixed walking route was established to allow the observers to cover all parts of each sector. On each sample date, an observer chose a starting point (a major access point) at random and flipped a coin to determine the travel direction (forward or backward). The observer then followed the fixed route until an entire circuit was completed. On average, it took 2-1/2 hours to walk the route; observations were made on all sample dates, regardless of weather.

As the observer encountered Arboretum users, he or she recorded their ages, genders, the number in their group, their location (on road or path, or off road or path), and as many as five behaviors per individual. Multiple behaviors were recorded because some activities are compatible; for example, a couple strolling hand in hand and talking would have been recorded as strolling, talking, and engaging in affectionate behavior--a total of three activities. When an inventory of all users within a sector was completed, the observer moved to the next sector until a complete circuit of the Arboretum was completed. When data collection was completed, observations had been obtained on 3,983 individuals. Since the study was considered exploratory, the data were simply tabulated rather than being subjected to a comprehensive statistical analysis.

Results

The Arnold Arboretum tends to attract heavy recreation use. We observed an average of 122 visitors on weekdays and 319 on weekend days. Moreover, late summer is a time of year when park use generally declines (cf. More 1989; Gobster 1991). Highest use generally tends to be in the spring and early summer. Use was heaviest on Sundays and most visitors (67%) arrived in the afternoon or on sunny days (Table 1).

Table 1--Visitation by time of day and weather

Time and weather	Frequency	Percent
Morning	1,301	32.7
Afternoon	<u>2,682</u>	<u>67.3</u>
Total	3,983	100.0
Sunny	3,137	78.8
Cloudy	740	18.6
Rainy	<u>106</u>	<u>2.7</u>
Total	3,983	100.0

Park use was distributed unevenly across the sectors; the visitor center and adjacent areas attracting the greatest use. Most visitors (69%) remained on the roads and paths. Socially, users tended to be alone (48%) or in couples (33%); the largest group observed was 65. Nearly 95% of all users were in groups of four or fewer. Approximately 61% were adults between the ages of 20 and 40, while 19% were preteens (Table 2). Both genders were nearly equally represented (51% male vs. 49% female), so even a gender distribution is unusual (More 1985; Westover 1988) in American parks. These percentages are a testament to how comfortable women feel visiting the Arboretum. With respect to race, 83% of the Arboretum users were Caucasian, 10% were African-American, and 8% were other non-Caucasian (Table 3).

Table 2--Ages of visitors

Age category	Frequency	Percent
Infant	123	3.1
Child	735	18.7
Teen	143	3.6
Younger adult (20-39)	2,406	61.3
Older adult (40-60)	306	7.7
Senior	<u>216</u>	<u>5.5</u>
Total	3,925	99.9

Behaviorally, we observed users engaging in 98 different activities. We grouped individual activities into 12 major categories plus a miscellaneous category (Table 4).

Table 3--Race of visitors

Race	Frequency	Percent
Caucasian	3,188	82.6
African-American	375	9.7
Hispanic	142	3.7
Asiatic	138	3.6
Eastern Indian	<u>15</u>	<u>0.4</u>
Total	3,858	100.0

The most common activities were walking (40.5% of the total), particularly strolling, and conversing (17.5%). Other common activities included looking at something (9.5%), cycling (6.9%), sitting (6.0%), and playing (5.5%) (Table 5).

Table 4--Behavior categories as a percentage of total behavior

Behavior category	Number	Percent
Walking behavior	2,659	40.5
Conversing	1,157	17.6
Looking behavior	622	9.5
Cycling	452	6.9
Sitting	397	6.0
Play behavior	364	5.5
Eating/drinking	188	2.9
Affectionate behavior	143	2.2
Exercise	138	2.1
Reading/writing	105	1.6
Resting/sunning	77	1.2
Photography	40	0.6
Miscellaneous	<u>221</u>	<u>3.4</u>
Total	6,563	100.0

Particularly noteworthy is the relative absence of what might be termed "problem behavior." Table 5 includes several activities that might be considered questionable, for example, walking dogs off leash (n=393), climbing trees (n=46), picking flowers and vegetation (n=15), drinking alcohol (n=4), and arguing (n=4). Together, these accounted for 7.0% of all observed behavior, most of which is attributable to unleashed dogs. However, it may be that our data underestimate such activity somewhat; for example, littering takes only an instant and may be underrecorded with observational techniques, and other problem activities may be more furtive in nature and not easily observed. Nevertheless, the large numbers of women and children who visit the Arboretum, along with our own data and observations, suggests that neither safety nor problem behavior (with the possible exception of unleashed dogs) is a concern.

Discussion and Conclusion

These data need to be interpreted cautiously. Our goal was to specify what a particular person was doing in the Arboretum at the time when we observed him or her, but there are inherent problems with behavioral observation. We have noted the problem of multiple activities, and measurement reliability--the extent to which two observers agree--is somewhat less for behavior than for variables like gender or age (More 1985). The larger categories of Table 5 also are somewhat arbitrary, for example, should singing be placed in the category of "conversing" or under "miscellaneous?"

Perhaps even more serious are what the data fail to reveal. For example, we have no indication of visit duration--some people spend only a few minutes in the Arboretum, while others stay all day and engage in multiple activities. Similarly, the behavioral data give us no indication of the intensity with which some people use the Arboretum. While many are infrequent visitors, others visit daily, frequently occupying the same bench at the same time and displaying a level of commitment to the area that is not apparent from our data. Finally, the behavioral data give us

no idea about people's mental state--what they are thinking. For example, some users might value the Arboretum for its tranquility and solitude. However, we do not know this from our data; all we can record is someone sitting on a bench or strolling alone through the woods.

These problems notwithstanding, our behavioral data provide a rich source of information about the Arboretum and the purposes it serves for its users. Strolling and talking, getting exercise, enjoying the beauty of the area, or simply sitting in the grass are common among the 98 activities we observed. People came to eat lunch, hold hands, or watch their children make discoveries under rocks or in the eddy of a quiet brook. They birdwatched, posed for photographs, and read books, newspapers, and magazines. Their purposes were as rich and varied as the complex city that surrounded them. However, we need to turn to the question we raised in the introduction: how can we go from these rich data to a deeper understanding of the benefits that the Arboretum and other urban parks like it provide city residents?

Clearly, quantity of use is one major criterion for benefit; it has been the typical measure of the success of most parks and plazas (cf. Gold 1972; Hatry and Dunn 1971; More 1990; Whyte 1980). However, the diversity of use and users may be another important criterion. For example, city parks departments often attempt to achieve high use by providing structured facilities and programming around them. Yet, while ball diamonds, soccer fields, and the like may help fulfill this goal, they also may serve a limited clientele. When coupled with high use levels, the diversity of users and uses that we observed in the Arboretum suggests a park that offers a broad spectrum of benefits for community residents. Such service diversity deserves greater attention as a criterion for success.

We also need to be doing more conceptual work on the benefits of urban parks in general. Typically, recreation activities like camping, hiking, and hunting can be analyzed for the various benefits they offer participants (cf. Driver et al. 1991). But this is impractical when dealing with 98 different activities. Instead, we suggest a tripartite classification of the benefits of urban parks. First, urban parks offer their users personal benefits in that they accrue directly to individuals who use the area. This is the kind of benefit with which we have been primarily concerned in this study. Second, urban parks produce a variety of biophysical benefits. As noted, parks contribute to the functions of city ecosystems: they modify temperatures and microclimates, reduce air and noise pollution, and absorb water. Such benefits ultimately accrue to people, but they do so indirectly through the improvement of ecosystem functioning rather than through direct use. Third, urban parks produce an important set of social benefits. These are benefits that accrue to community institutions rather than to individuals. For example, the Arboretum is booked well in advance for Easter sunrise services. While the

Table 5. Behavior of Arboretum Users

Behavior	Number	Percent	Behavior	Number	Percent	Behavior	Number	Percent
Walking Behavior			Play Behavior			Reading/Writing		
strolling	1733	65.2	children's games	131	34.5	reading book	43	41.0
walking dog off leash	393	14.8	roller-skating/blading	50	13.2	reading sign	33	31.4
walking with child	138	5.2	climbing trees	46	12.1	reading newspaper	17	16.2
in stroller	109	4.1	playing with ball	38	10.0	reading map	6	5.7
walking dog on leash	84	3.2	Frisbee	19	5.0	writing	4	3.8
walking with something ^{a/}	83	3.1	with dogs	19	5.0	reading magazine	2	1.9
walking purposively	61	2.3	tricycling	16	4.2	Total	105	100.0
being carried	35	1.3	baseball	15	3.9			
running	10	0.4	with toddler	13	3.4	Resting/Sunning		
wheelchair	7	0.3	with sticks	9	2.4	resting	38	49.4
running purposively	6	0.2	in water	7	1.8	sunbathing	23	29.9
Total	2659	100.0	with plants	6	1.6	sleeping	16	20.8
			on rocks	3	0.8	Total	77	100.1
Conversing			catch	3	0.8			
talk to others	1057	91.4	with sprinkler	1	0.3	Photography		
listen to others	67	5.6	with wagon	1	0.3	wedding pictures	19	47.5
talk to wildlife	25	2.2	with fountain	1	0.3	being photographed	7	17.5
arguing	5	0.4	skateboarding	1	0.3	photographing something	4	10.0
yelling	2	0.2	digging	1	0.3	photographing flowers	4	10.0
talk to self	1	0.1	Total	380	100.2	photographing people	4	10.0
Total	1157	99.9				photographing view	1	2.5
			Eating/Drinking Behavior			videotaping	1	2.5
Looking Behavior			snack	86	45.7	Total	40	100.0
looking at trees	282	45.3	picnic	72	38.3			
looking at view	198	31.8	drinking from fountain	24	12.8	Sitting		
looking at animals	43	6.9	drinking alcohol	4	2.1	on bench	192	48.4
looking at pond	39	6.3	carrying food	2	1.1	on ground	188	47.4
looking at plants	23	3.7	Total	188	100.0	on lawn chair	17	4.3
looking at other people	21	3.4				Total	397	100.1
looking at child	9	1.4	Affectionate Behavior					
looking at flower	7	1.1	hand-in-hand	124	86.7	Miscellaneous		
Total	622	99.9	embracing	19	13.3	organized group	94	42.5
			Total	143	100.0	listening to radio	56	25.3
Cycling Behavior						driving in car	21	9.5
Cycling	416	95.4	Exercise			pick flowers/vegetation	15	6.8
teach child to ride bike	8	1.8	jogging	110	79.7	singing	10	4.5
learning to ride bike	6	1.4	speed walking	16	11.6	crying	7	3.2
child in bike seat	5	1.1	roller skating	6	4.3	painting	5	2.3
repairing bike	1	0.2	exercising	5	3.6	changing diaper	5	2.3
Total	436	99.9	gymnastics	1	0.7	picking up	3	1.4
			Total	138	99.9	lost	2	0.9
						planting trees	2	0.9
						using metal detector	1	0.4
						Total	221	100.0

^{a/} Includes objects such as binoculars, cameras, books, food, etc.

individual participants undoubtedly benefit from participation. there also is a "corporate" benefit that accrues to the church that offers the service. Thus, we need to understand how urban parks benefit various community social systems including business/commerce, government, health, religion, education, and community service organizations. Bluestone (1991) made it clear that the founders of Chicago were anxious to develop parks (in addition to other forms of civic ornamentation) as a means to attract investment. Such social benefits accrue when parks contribute to the functioning of civic systems and community institutions.

In sum, this study revealed both high use levels and great diversity of use in Boston's Arnold Arboretum during late summer of 1992. Although the typical user was a strolling/talking Caucasian adult aged 20 to 39, it would be misleading to place any emphasis on the "typical user" because of the Arboretum's many different uses. Future studies need to focus on documenting the variety of benefits produced by urban parks; the "personal" benefits examined in this study represent only one category of such benefits.

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**AN EXPLORATORY COMPARISON OF
MOTIVATIONS AND CROWDING NORMS
BETWEEN ETHNIC GROUPS IN DOWNHILL
SKI AREAS OF NEW YORK STATE AND
KOREA**

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Abstract: This study explores the concept that ethnic groups have different motivations and crowding norms when downhill skiing and that visiting and immigrant ethnic groups would respond more like their original ethnic group than they would be like their host ethnic group. The four ethnic groups or sampling strata that were surveyed in this study were: White Anglo skiers at Hunter Mountain Ski Area; Korean skiers at Hunter Mountain Ski Area; White Anglo skiers at Yong Pyeong Ski Resort; and Korean skiers at Yong Pyeong Ski Resort. The total sample was 1,157 skiers for the four sampling strata. Eight hypotheses were tested to explore what affect the ethnic differences of skiers had on motivations for skiing and crowding norms for White and Korean skiers in New York State and Korea. Discriminant analysis was used to predict group classification in the four sampling strata based on the eight variables used in the hypotheses testing.

Introduction

Managers have expressed concern about not having adequate information to plan for and serve various ethnic groups. Information on recreational differences between ethnic groups is limited. Several studies have reported on different participation rates between different ethnic groups and other studies have reported that ethnic differences in participation rates remain even when socio-economic factors are controlled (Carr and Williams 1993, Floyd et al. 1994, Klobus-Edward 1981, Washburne 1978). Ethnic groups are the subject of this study and are defined as a group that is distinct on the basis of country of origin, language, religion, or cultural tradition (Hutchinson 1987). The term race is not used herein since it is based more on socially constructed definitions of physical appearance and differences in physical appearance between groups (Banton 1987).

This study was designed to investigate the relationships between ethnicity and motivations for a recreational activity and crowding norms. The approach in this study was to select a recreational activity and setting that would be relatively consistent in the United States and Korea, as these were the two ethnic comparisons of interest to the authors. Downhill skiing was determined to be a recreational activity that was similar in individual equipment, commercial services, and skiing experience in the two countries to warrant an exploratory study of them (Kim 1992, Rowan 1993, Sandberg 1989). After investigating many ski areas in the Northeastern United States and Korea, two ski areas were found to be reasonably comparable and each had a strong ethnic population of White Anglo and Korean skiers from which a sample could be collected (Park 1996). These two areas were Hunter Mountain Ski Area in New York and at Yong Pyeong Ski Resort in Korea. The characteristics of these two areas are summarized in Table 1. The largest differences were in the greater vertical drop and more ski slopes at Hunter Mountain.

Table 1. Comparison of the ski area characteristics at Hunter Mountain Ski Area in New York and at Yong Pyeong Ski Resort in Korea during the 1997 ski season.

Description Summary	Hunter Mountain Ski Area, NY	Yong Pyeong Ski Resort, Korea
Peak elevation (feet)	3,200	3,720
Vertical drop (feet)	1,600	750
Number of ski slopes	49	13
Number of ski lifts	15	16
Ski slope distribution		
Beginner	35%	25%
Intermediate	35%	50%
Advanced	30%	25%
Average annual snowfall (inches)	125	35
Season	Nov. 1 to May 7	Nov. 25 to April 7
Night ski slopes	0	2
On-site lodging	Condo, hotel, Inn	Condo, hotel
Adult lift ticket price (weekend)	\$40	\$35
Classification	Large medium size	Medium size

The approach in this study was to explore the concepts that ethnic groups will have different motivations and crowding norms and that visiting and immigrant ethnic groups would

respond more like their original ethnic group than they would be like their host ethnic group. The two objectives of this paper are: (1) to explore what affect the ethnic

differences of skiers had on motivations for skiing and crowding norms for White and Korean skiers in New York State and Korea; and (2) to predict group classification in the four sampling strata based on the eight variables used in the hypotheses tested.

Methods

Skiers were systematically sampled going into the main ski lodge and were asked to complete an on-site self-administered survey (Park 1996). The ethnic background of the skiers was asked to determine if they would be included in the study sample and to categorize them into the White Anglo or Korean groups. The survey was available in both English and Korean languages and the survey staff were bi-lingual to help in the interview and survey process. Survey sampling was conducted in 1996 on 2 3-day weekends in February at Yong Pyeong Ski Resort in Korea and on 3 2-day weekends in February-March at Hunter Mountain Ski Area in New York.

Eight hypotheses were tested in this paper using the Kruskal-Wallis *H* statistic, Duncan's Multiple Range Test, or the Chi-square statistic: (1) the natural environment motivational scale has equal mean scores for all four groups; (2) the escapism motivational scale has equal mean scores for all four groups; (3) the social interaction motivational scale has equal mean scores for all four groups; (4) the physical exercise motivational scale has equal mean scores for all four groups; (5) the level of skiing experience is the same between the four groups; (6) the preferences for downhill skiing crowding are the same for all four groups; (7) the expectations for downhill crowding are the same for the four groups; and (8) the acceptable waiting time (mean) for a ski lift is the same for all four groups. These eight variables were used in a

discriminant analysis to classify survey participant membership in the four ethnic groups.

Results

The field interviews and surveys resulted in the following sample sizes for each of the four ethnic groups (i.e., sampling strata) that were analyzed in this study: (1) 415 White Anglo skiers at Hunter Mountain Ski Area; (2) 124 Korean skiers at Hunter Mountain Ski Area; (3) 116 White Anglo skiers at Yong Pyeong Ski Resort; and (4) 502 Korean skiers at Yong Pyeong Ski Resort. The total sample was 1,157 skiers in the four sampling strata.

Ten motivational questions (survey items) were combined into four scales using factor analysis to reduce the number of variables for the following analysis. The four scales were made of motivational questions as follows: (1) the natural environment scale was based on 'to be close to nature', 'to feel calm and tranquility', and 'to enjoy the absence of man-made features'; (2) the escapism scale was based on 'to be away from job stress', 'to change from the daily routine', and 'to be away from others'; (3) the social interaction scale was based on 'to develop a friendship with others' and 'to meet new and different people'; and (4) the physical exercise scale was based on 'to improve skiing skills' and 'to get physical exercise'. Korean skiers in Korea reported the highest mean rating for all four motivational scales (Table 2) and two of these mean scale scores were significantly higher than the other three ethnic groups: natural environment scale and social interaction scale. White Anglo skiers in Korea reported a significantly higher mean scale score for escapism than the other three ethnic groups. White Anglo skiers in New York State reported a significantly higher mean scale score for physical exercise than the other three ethnic groups.

Table 2. Mean motivational scales scores for the four ethnic groups.

Motivational Scales ^{abc}	Korean _k	Korean _{nys}	White Anglo _k	White Anglo _{nys}
Natural environment scale (3 survey items)	3.4	2.9	2.9	2.9
Escapism scale (3 survey items)	3.3	2.9	3.6	3.1
Social interaction scale (2 survey items)	3.0	2.5	2.8	2.9
Physical exercise scale (2 survey items)	3.6	3.8	3.7	4.0

^aItem responses: 1=never true, 2=slightly true, 3=somewhat true, 4=quite true, 5=always true.

^bScale score = (total of all item responses/ # of items in scale).

^cStatistical test: bold type indicates that mean is significantly different using Kruskal-Wallis *H* Statistic with $p < 0.05$.

Comparison of the skiing experience levels between the four ethnic groups required the construction of a new variable to accommodate the magnitude of difference between new beginning skiers and experts. A skiing experience composite variable was created based on four reported variables from the study so that skiing experience level = ((years skiing x times skiing per year) + number visits + ski ability). The results of the composite variable on skiing experience was then categorized into three

experience levels: low, moderate, and high. The Chi-Square statistical test results indicated that there were significant differences between the experience levels of the four ethnic groups (Table 3). Korean skiers in Korea and New York State tended to be in the low to moderate skier experience levels, White Anglo skiers in Korea tended to be moderate to high experience levels, and White Anglo skiers in New York were evenly distributed between all three skier experience levels.

Table 3. Skiing experience level percentages for the four ethnic groups.

Skiing Experience Level ^{ab}	Korean _k	Korean _{nys}	White Anglo _k	White Anglo _{nys}
Low	51%	41%	15%	31%
Moderate	35%	40%	42%	34%
High	14%	19%	43%	35%

^aSkiing experience level = ((years skiing x times skiing per year) + number visits + ski ability).

^bStatistical test: Chi-Square Statistic with 6 df. and $p < 0.05$.

Comparison of the downhill crowding preferences between the four ethnic groups required the construction of a new composite variable to reduce the number of variables for the following analysis. The downhill crowding preference scale was based on the acceptable average number of times that a skier had to stop, change direction, and reduce speed will skiing. The Korean skiers in Korea had a significantly lower scale score compared to the other three ethnic groups

(Table 4). The lower acceptability of these downhill skiing interruptions or maneuvers is probably related to the higher number of Korean skiers in Korea who are beginners learning to ski. The expectations for downhill crowding were significantly lower for the Korean skiers in Korea than for the other three ethnic groups (Table 4); although the mean scores, from a management perspective, were relatively similar for all four groups.

Table 4. Expectations and preferences for downhill crowding for the four ethnic groups.

Expectations and Preferences for Crowding	Korean _k	Korean _{nys}	White Anglo _k	White Anglo _{nys}
Downhill crowding preference scale (3 items) ^{ab}	3.8	5.9	5.4	5.0
Downhill crowding expectation ^{cd}	2.3	2.6	2.6	2.5

^aScale score = (total of all item responses/ # of items in scale).

^bStatistical test: bold type indicates that mean is significantly different using Kruskal-Wallis *H* Statistic with $p < 0.05$.

^cItem responses: 1=much less than expected, 2=less than expected, 3=about same, 4=more than expected, 5=much more than expected.

^dStatistical test: bold type indicates that mean is significantly different using Duncan's Multiple Range Test with $p < 0.05$.

The mean waiting time for riding a chair lift or other transport uphill was significantly lower for Korean skiers in Korea than the other three ethnic groups (Table 5). The mean waiting time for both Koreans and White Anglo skiers in Korea was less than New York groups probably

because of the shorter ski slopes and higher number of lifts per slope in Korea (i.e., skiers expected more rapid accommodation on a lift because the downhill experience was shorter in time in Korea than in New York).

Table 5. Acceptable mean waiting time for riding the chair lift for the four ethnic groups.

Acceptable waiting time ^a	Korean _k	Korean _{nys}	White Anglo _k	White Anglo _{nys}
Mean (minutes)	6.4	8.8	7.1	8.1

^aStatistical test: bold type indicates that mean is significantly different using Kruskal-Wallis *H* Statistic with $p < 0.05$.

The attempt to predict group classification in the four sampling strata was based on the eight variables used in the hypotheses tests previously described herein. The statistical procedure used was discriminant analysis with a stepwise method of including the eight discriminating variables. All eight variables had high Wilk's lambda values and each were significant ($p < 0.05$) in comparing between the groups and were included in the analysis (Table 6). The results of the Box's *M* test indicated that the

group co-variance matrices were not too dissimilar. Three discriminant functions were used to combine the eight variables. The attempt to correctly classify the skiers in their respective ethnic group using the discriminant functions was significantly ($p < 0.05$) better than what would be predicted by chance. The overall correct classification was 52% with the highest percent correct classification (70%) for Korean skiers in Korea (Table 7).

Table 6. Stepwise analysis with 8 discriminant variables.

Step	Variable Entered	Wilks' Lambda	Significance
1	Downhill crowding preference scale	0.89	0.000
2	Skiing Experience Level	0.81	0.000
3	Natural environment scale	0.74	0.000
4	Physical exercise scale	0.67	0.000
5	Escapism scale	0.63	0.000
6	Downhill crowding expectation	0.62	0.000
7	Social interaction scale	0.61	0.000
8	Acceptable waiting time	0.60	0.000

Table 7. Correct classification using discriminant analysis for the four ethnic groups.

	Korean _k	Korean _{nys}	White Anglo _k	White Anglo _{nys}
Percent correct classification	70.1%	46.4%	55.9%	31.1%

Discussion

The approach in this study was to explore the concepts that ethnic groups will have different motivations and crowding norms and that visiting and immigrant ethnic groups would respond more like their original ethnic group than they

would be like their host ethnic group. Based on the analysis of the eight variables in this paper, White Anglo skiers in Korea were more similar to White Anglo skiers in New York than to the host ethnic group of Korean skiers. Korean skiers in New York were more similar to the host

ethnic group of White Anglo skiers than they were to Korean skiers in Korea. Acculturation may have played a major role as an intervening variable since Korean skiers in New York tended to be residents (e.g., first or second generation immigrants) whereas White Anglo skiers in Korea tended to be businessmen and women or military staff in Korea on assignment or tourists in Korea for an extended vacation. Thus, White Anglo skiers in Korea did not tend to assimilate Korean culture and behavior. Further analysis by Park (1996) concluded that the three ethnic groups of Korean skiers in New York and White Anglo skiers in New York and Korea were more similar to each other than any of them were to Korean skiers in Korea.

Two cautionary notes are necessary when reviewing this paper: (1) larger samples are needed to control for the affect of skiing experience levels on this type of comparative analysis; and (2) the ability to generalize these findings is of some concern since only one ski area was used from each country. Future research needs to take these two research design issues into consideration when testing for differences between ethnic groups and host versus visiting and immigrant groups.

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MOVIES AND MOOD: AN EXPLORATION OF THE CRITICAL VARIABLES RELATED TO MOOD STATES

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Abstract: The purpose of this study was to examine the relationship between movie viewing and mood, and to test the Pleasure Arousal Dominance (PAD) mood theory in a theater setting. The results of this exploratory study are presented here, challenging the PAD model, and providing suggestions for future research regarding the leisure and mood relationship.

Introduction

Mood is defined by Hull (1990) as a specific set of subjective feelings which occur as a consequence of everyday leisure experiences. Kamins, Marks, and Skinner (1991) asserted that moods are sub-categories of feeling states that are subjectively perceived by individuals and are more transient than feelings.

Among leisure researchers, mood is a relatively new area to be studied. As Hull (1990) pointed out, researching specific moods rather than the general phenomena of "feeling good" or "having fun" may lead to a better understanding of leisure. Furthermore, it has been suggested that one's mood may impact an individual's behavior, cognitive skills, and even health (Hull, 1990; Forgas & Moylan, 1987).

Several researchers have used film as a stimulus to test the effects of mood on attitudes and behavior (Hubert & Dejong-Meyer, 1990; Cools, Schotte, & McNally, 1992; Forgas & Moylan, 1987). Hubert and Dejong-Meyer conducted a study in which they exposed two matched groups of participants to films with contrasting themes: *Raiders of the Lost Ark* (an action/adventure) and *The Peanuts* (a comedy). Self-assessment mood scales, perception of bodily sensations, salivary cortisol tests, respiration, and facial electromyogram (EMG) were used to collect data. Analysis revealed viewing film stimuli influenced the moods of the participants. In a similar study, Cools, Schotte, and McNally (1992) exposed three groups of women to film segments with contrasting themes: a

travelogue (neutral affect), a comedy (positive affect), and a horror film (negative affect). Results indicated that food intake for subjects who viewed the horror film decreased, whereas food intake for subjects exposed to either the neutral film or positive film increased following viewing these films. Although these studies took place in a controlled setting, it suggests that mood may be manipulated in certain environments and that mood is a powerful force that influences behavior.

Forgas and Moylan (1987) also used film stimuli to test the effects of mood on attitudes and behaviors. However, their data collection was completed in a more natural environment: a movie theater. Over 900 movie-goers were interviewed immediately following happy, sad, and aggressive films. The interview schedule contained 13 questions which were designed to assess political judgments (satisfaction with aspects of government, etc.), the likelihood of future events (e.g., future performance of economy or likelihood of a nuclear war, etc.), an examination of attitudes toward punishment and responsibility (e.g., appropriateness of punishment for crimes), and questions about satisfaction with their private, social, and working lives. The last question asked respondents to rate their mood on a 7-point scale from bad to good. In order to determine pre-movie attitudes, 120 individuals were interviewed before the movie. Analysis revealed significant changes in attitudes and mood after viewing the movies. Those who viewed the happy movie reported being in a significantly better mood than those who viewed the sad or aggressive movies. Further analysis suggested that all of the films significantly influenced political, social, and quality of life judgments among respondents. Although it was found that attitudes were influenced through this study, the researchers didn't examine the long term effect (if any) of mood on behavior. For instance, do post movie attitudes and judgments carry over into everyday life and behaviors such as voting in an election? In addition, those interviewed before the film were not matched with those interviewed after the movie. Therefore, the results don't reveal individual changes in mood before and after viewing the films.

Although the link between film and mood seems to be well established, some leisure researchers have also examined mood in relation to its effect on the leisure experience. For example, Godbey and Blazey (1983) explored the leisure behavior of older adults in urban parks. They used a questionnaire to examine several social psychological constructs including mood. Results indicated that about 47% of respondents reported that park use had a positive effect on mood. In other words, using parks contributed to improving people's moods. In a similar study, Mannell, Zuzanek, and Larson (1988) used the experience sampling method with 92 retired adults to investigate the antecedents and consequences of leisure (e.g., perceived freedom, intrinsic motivation, mood states, flow, etc.). Results indicated that perceived freedom was significantly related to mood. Participants who indicated higher levels of perceived freedom in leisure reported being in better moods than those with lower levels of perceived freedom. These results demonstrate how mood might influence the leisure

experience or perhaps how the leisure experience might impact mood.

Hull (1990) asserted that mood reflects attributes of the leisure experience and that mood is a product of leisure. In a review of literature on mood, Hull (1990) posited that mood is a "predictable, measurable and a theoretically grounded product of leisure activities" (p. 99). Furthermore, he asserted that managers may be able to control factors which influence mood. Hull and Michael (1995) tested Hull's assertions of mood by conducting an empirical examination of mood in which approximately 100 people completed a series of questionnaires before, during, and after engaging in activity at a park. Results indicated that anxiety and tiredness decreased significantly as a result of park use. Moreover, Hull and Michael asserted that results suggested that measures of mood reflect attributes of the leisure experience.

These studies demonstrate that mood is a powerful psychological force which may affect attitudes, cognitions, and behaviors among recreationists. Hull's notion that mood is a characteristic of the leisure experience seems logical and relevant to the study of the antecedents and consequences of leisure. Further examination of mood may help managers learn how to produce positive moods or reduce negative moods during leisure. For instance, a leisure produced mood may influence levels of enjoyment and satisfaction. Therefore, learning more about the determinants and consequences of mood could help managers to positively impact enjoyment and satisfaction in an outdoor recreation setting. In future studies we might ask if there are common attributes of an activity or setting that are essential to improving mood.

The Pleasure Arousal Dominance Theory of Mood

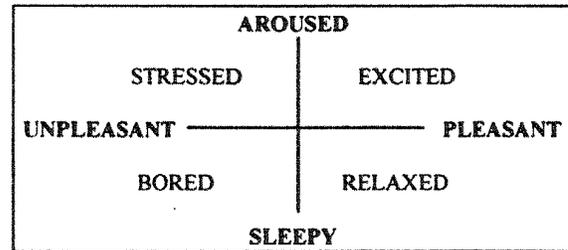
Although the importance of studying mood has been demonstrated, it is more difficult to identify a theory from which to base an investigation on mood. Hull (1990) suggests using a multi-dimensional model to examine the effects of mood on attitudes and behavior. One such theory is the Pleasure Arousal Dominance (PAD) theory of mood which was developed by Berlyne (1960) and further refined by Russell and Snodgrass (1987). PAD consists of three bi-polar dimensions which range from very aroused to very sleepy, very pleasant to very unpleasant, and very dominant to very submissive (see Figure 1). Mood is then described according to where an individual falls in the three dimensional space. For instance, someone who is unpleasant, but aroused, may be in a stressed mood, whereas pleasant and aroused feelings may lead to an excited mood. Dominance and submission refer to the amount of control the individual has in a situation. This dimension differentiates between anger and fear. For instance, someone experiencing arousal, unpleasant, and submissive feeling states would result in anger.

Although this model was suggested to investigate the impact of leisure on mood, it has not been thoroughly tested in a leisure setting. The primary purpose of this paper was to examine the validity of the PAD mood theory. A secondary purpose of this paper was to determine the effects of a movie induced mood on behavior.

Therefore the research questions for this study were as follows:

1. Is the PAD mood theory supported in a movie setting?
2. Does a mood induced by movie viewing affect the intention to perform specific behaviors?

Figure 1: Two of three dimensions of the PAD mood theory are shown here. The third dimension, dominance/submission is not pictured and runs orthogonal to the other two dimensions. It runs straight out from where the two dimensions intercept.



Methods

A comprehensive list of current movies was compiled by the research team. They were then viewed and categorized into themes on the basis of media film reviews and personal reports. From that list, two movies were chosen for the study: Celtic Pride and Fargo. These movies were chosen because they elicited distinctly different responses in mood among the research team. Celtic Pride was labeled as a comedy, and Fargo was labeled as a psycho-drama. A self-administered questionnaire was used, representing five categories including (1) gender, (2) group size, (3) how quickly time passed, (4) intention to perform activities post movie viewing, and (5) mood. Non-identifying demographic characteristics were also obtained. Perceived time duration was measured by a 5-point response scale with 1 being slowly, and 5 being quickly. Plans for after the movie were measured by a nominally scaled list of activities and included such items as dining out, shopping, studying, and going home. Two questions were asked to assess specific changes in plans caused by the movie induced mood.

The dependent variable of mood was measured with eight mood states: aroused, relaxed, unpleasant, sleepy, excited, bored, pleasant, and stressed. This was done with a 5-point Likert type scale where 1= definitely do not feel, and 5= definitely do feel. While the PAD Mood Theory is a three dimensional model, this study was limited to the two dimensions pictured in the model in Figure 1: pleasure and arousal.

Members of the research team convened in the theater lobby on two different evenings. Data were collected on individuals immediately following the viewing of either film. All subjects were approached yielding a response rate of 86%. Willingness to participate and refusal rates were equal between the two films, and the overall refusal rate for this sampling was 14%.

Description of Sample

The sample (n=96) included 36% (n=35) females and 64% (n=61) males; 40 viewed the comedy (Celtic Pride) and 56 viewed the psycho-drama (Fargo). Of the total sample, 37.9% (n=36) were between the ages of 18-22, 17.9% (n=18) were between 23-27, 6.3% (n=6) were between 28-32, 7.4% (n=7) were between 33-39 years, 20% (n=19) were between 40-49, and 10.5% (n=10) were 50-59. Minors were not selected for this sample, and there was an under representation of senior citizens in the population surveyed. Group sizes were as follows: 10 individuals saw the movie alone, while the remaining were with the following number of people; 56 were among pairs, 16 were with 2 other people, 3 were with 3 others, 6 were with 4 other individuals, 3 were among a group of 6, and there were 2 people who were in a group size of 7-8.

Analysis

Single item variables were used to test the constructs of interest in this study and bivariate parametric tests of significance were used. A significance level of .05 was used to determine the significance of the relationships tested during the analysis. The following represents the description of the analysis and results of the testing as related to each research question.

In order to examine the validity of the PAD mood theory, the researchers first had to establish that the movies produced significantly different moods. A series of t-tests revealed that the two films produced significantly different moods for five mood variables: unpleasant (t=3.63; p<.05), relaxed (t=2.60; p<.05); sleepy (t=2.97; p<.01); pleasant (t=3.65; p<.001); and stressed (t=2.17; p<.05). Table 1 provides a summary of these results.

Table 1. Relationship Between Movie Type and Mood

Mood	Celtic Pride mean (n) Std. Dev.	Fargo Mean (n) Std. Dev.	t-value
Aroused	2.19 (37) 1.29	1.71 (56) 1.20	1.79
Unpleasant	1.53(38) .86	2.38 (55) 1.41	3.63**
Relaxed	3.28 (39) 1.45	2.52 (56) 1.34	2.60*
Sleepy	2.54 (39) 1.41	1.70 (55) 1.21	2.97**
Excited	2.85 (40) 1.21	2.50 (54) 1.49	1.26
Bored	1.87 (38) 1.16	1.49 (55) 1.09	1.58
Pleasant	3.38 (39) 1.23	2.40 (55) 1.37	3.65**
Stressed	1.36 (39) .81	1.80 (56) 1.18	2.17*

Since it was determined that the two movies produced significantly different moods, the researchers performed a series of two-way ANOVAS to examine the interactive effect of gender and movie type on mood for the five mood variables that produced significantly different moods

during the two movies. Because men and women differ in terms of the meaning of leisure (e.g., Henderson & Rannels, 1988), this analysis accounted for gender. Results indicated that there was one gender by movie interaction of note. Among females, Fargo produced a much less pleasant mood than Celtic Pride. However, Fargo produced only a slightly less pleasant mood among males than Celtic Pride (F=5.09; p<.05). Results also indicated that there was a significant main effect of movie type for the following mood variables: Fargo produced a more unpleasant, more stressed, less relaxed and less sleepy mood than Celtic Pride.

A correlation matrix was produced for each gender by movie type combination in order to examine the validity of the PAD mood theory. For females who viewed Fargo, it was found that bored and unpleasant (r=.43; p<.05), relaxed and pleasant (r=.46; p<.05), bored and sleepy (r=.52; p<.01, and stressed and unpleasant (r=.41; p<.05) were positively and significantly related. It was also found that relaxed and unpleasant (r=-.61; p<.01) and pleasant and unpleasant (r=-.53;p<.01) were negatively and significantly related. For females who viewed Celtic Pride, results suggested that sleepy and relaxed moods (r=.75; p<.01) were positively and significantly related. For males who viewed Celtic Pride, results indicated that relaxed and aroused (r=.471; p<.05), excited and relaxed (r=.35; p<.05), and stressed and unpleasant moods (.57; p<.05) were positively and significantly related. Males who viewed Fargo were found to be relaxed and aroused (r=.52; p<.01), aroused and stressed (r=.40; p<.015), unpleasant and stressed (r=.63; p<.001), relaxed and excited (r=.72; p<.001), sleepy and bored (r=.68; p<.001), and excited and pleasant (r=.53; p<.01).

It is interesting to note, that for males the intercorrelations of aroused and excited, relaxed and excited, and aroused and relaxed were statistically significant and moderate. However, according to the PAD mood theory, these moods are not supposed to occur simultaneously. These mood variables appear in different quadrants of the model suggesting that they are independent of each other. However, results of this study suggests that for males, two theoretically opposed moods may co-exist. The PAD mood theory does not account for simultaneous moods. Therefore, researchers should consider further testing this model and perhaps it should be refined to represent true mood states that occur during leisure experiences.

A secondary purpose of this paper was to examine the effects of a movie induced mood on behavior. The relationship was examined with a series of chi-squares. Results indicated that a movie induced mood does not affect movie-goers' intentions to perform behaviors following viewing the movie. In other words, a movie induced mood has no statistically significant effect on changing plans for after viewing the movie.

Conclusion

According to the Pleasure Arousal Dominance (PAD) mood theory, excited, relaxed, and aroused moods are theoretically opposed and cannot occur at the same time.

However, according to the results of this study, two opposing moods can exist simultaneously. The leisure-mood connection needs further attention before this conclusion can be made and the investigators of this study propose testing the PAD mood theory in other leisure settings such as outdoor recreation. Outdoor recreation activities may produce significantly different and perhaps heightened mood states than other types of recreation providing for unique research. We suggest modifying the PAD model if future studies also support simultaneous moods. These modifications may make the model more flexible and representative of true mood states that exist during a leisure experience. It is important to conduct more research in this area. Theories of mood and methods of studying mood may provide fruitful research approaches to traditional leisure problems. In addition, the effects of mood have implications for improved health and wellness, as well as marketing and commercial recreation (Hull, 1990).

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Minority Group Participation in Recreational Fishing: The Role of Demographics and Constraints

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Abstract: Minority populations are increasing in numbers and will influence participation and expenditures in fishing activities. This, in turn, will affect fisheries management. Between 1995 and 2025, 78% of the net change in the U.S. population will be attributed to minority group members. This increase in minority populations will be related to a potential increase in the number and proportion of minorities involved in fishing activities. However, it has been shown that minority groups presently comprise a much lower proportion of those who participate in fishing activities when compared to Anglos. This low participation rate implies that minority groups are subject to a variety of constraints or factors that inhibit their participation in fishing activities. Unfortunately, there is little information to explain which constraints are perceived as most serious by minority populations. This paper attempts to identify and discuss possible explanations for low participation rates or non-participation among minority populations, and to discuss the importance of recognizing population trends so agencies can successfully recruit new participants and respond to different types of desired angling experiences. This, in turn, should help fisheries agencies become more efficient in delivering opportunities and services to what will be a growing number of minority constituents.

Introduction

Population dynamics within the United States will be one of the most important factors influencing fisheries management within the next few decades (Robey 1985; Fosler, Alonso, Meyer and Klein 1990; Murdock 1995). Projections predict that the U.S. population will increase by 72 million between 1995 and 2025, with immigrants and their descendants playing the major role in this increase (U.S. Census Bureau 1996). This growth in minority populations is largely due to the high projected birth rate of immigrant groups, many of which came to the U.S. during the 1980's when immigration levels were high and are already in residence. It is this change in population structure that will impact the social and political contexts of fishery management. The purpose of this paper is to suggest to resource managers that in order to secure future angler support, they must understand the implications associated with demographic change, identify and remove constraints, and develop strategies to recruit groups that presently have low participation rates.

Management agencies need to address demographic changes, especially within minority populations, if they are to increase participation rates, recruit additional participants, and succeed in providing services that will meet the demand for a more diverse constituent base. In order to accomplish this, managers must develop programs and services that overcome constraints that have prevented certain groups from participating. This is of primary importance since studies based on current trends suggest that more people are less likely to participate, and participate less frequently, as the population becomes more ethnically varied (Loomis and Ditton 1988; Murdock, Backman, Colberg, Hoque and Hamm 1990; Murdock, Loomis, Ditton and Hoque 1996).

The types and effects of constraints can vary among subpopulations defined by social and economic factors, with those most likely to be affected including minority racial and ethnic groups (Ritter, Ditton and Ricchers 1992). It has been suggested that personal and situational characteristics can create variability in perceptions of constraints (Searle and Jackson, 1985). By identifying minority subgroups that distinguish women and ethnic/racial minorities, agencies can focus on specific strategies that extend services to include groups, that have traditionally been underrepresented.

Demographic Background

The Anglo subgroup (whites of non-Hispanic origin) is the largest of the racial/ethnic groups (Table 1, Figure 1). However, Anglos are projected to be the slowest-growing group between 1995 and 2025 (U.S. Census Bureau 1996) (Figure 2). This group is projected to account for approximately one-fifth of the total population increase in the United States. Growth in the angling population will occur in all regions, except the Northeast (Maine, Vermont, New Hampshire, Massachusetts, Pennsylvania, Connecticut, Rhode Island, New Jersey and New York) where this group will decline in size. Census Bureau information predicts that 67% of the 16 million Anglos added to the population will be located in the South (Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas).

The Black subgroup (Blacks of non-Hispanic origin) is also projected to show slow growth in all regions, except in the South where 64% of the 12 million Blacks added to the population will occur (U.S. Census Bureau 1996). It currently ranks as the second most populous racial/ethnic group in all regions, except in the West (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California), where it ranks fourth. However, it is projected that by the year 2025, the Hispanic population will surpass the Black population numerically throughout the Nation (Table 1). Projections show a rapid increase of 32 million people in the Hispanic population between 1995 to 2025, accounting for 44% of the total growth of the U.S. population during that time period (U.S. Census Bureau 1996) (Table 1). This is the second fastest-growing population in every region.

The Asian and Pacific Islander population (not of Hispanic origin) is the fastest-growing subgroup in every region and will account for the largest percent increase in the total population between 1995 and 2025 (Table 1, Figure 1). This subgroup is currently the fourth-largest in all regions except in the West where they are ranked third. Fifty-six percent (7 million people) of the total increase in the Asian and Pacific Island population is projected to occur in the West, while the Northeast will see an increase of 2 million (U.S. Census Bureau 1996).

The American Indian population (including Eskimos and Aleuts) is the least populous group and is projected to be the third slowest-growing population in all regions except in the south, where it will be ranked second (U.S. Census Bureau 1996). Almost half of the 812,000 American Indians added to the population between 1995 and 2025 will be located in the West.

Role of Immigration

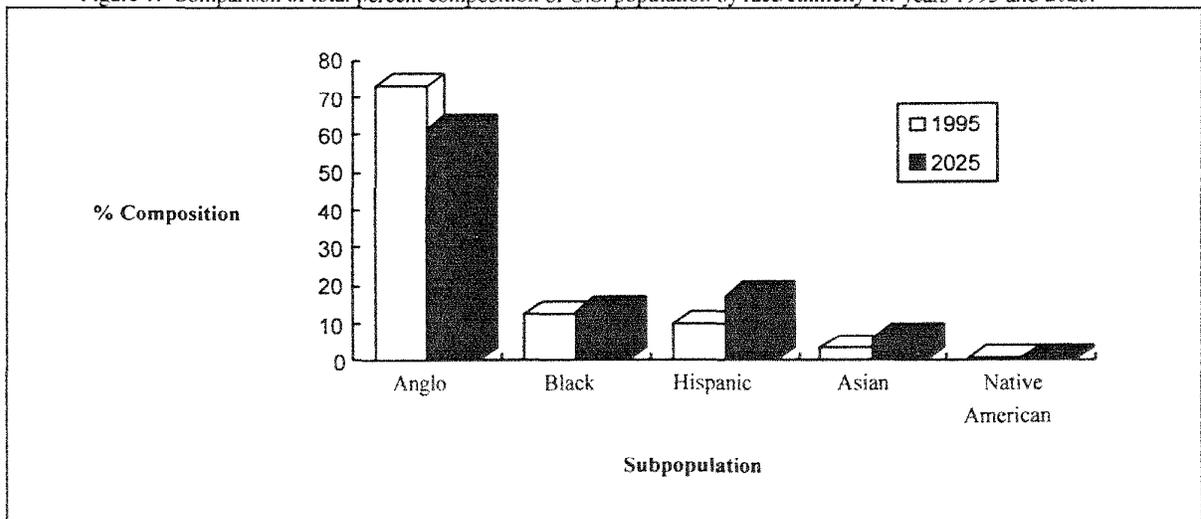
The population of the United States has grown significantly compared to other developed nations, with the exception of the Depression and World War II eras when growth rates decreased. The years between 1946 and 1964 were characterized by rapid growth, and are commonly known as the "baby boom" era. The cohorts produced in this period currently comprise one-third of the total population

(Murdock et al. 1996). However, the 1960's began a period of moderate to slow growth which is projected to continue into the next century. Current trends suggest that the average annual growth rate will decrease by one-third between 1995 and 2025 (Day 1996) (Table 2). However, the proportion of the total U.S. population composed of minority group members will increase to 38.2% by 2025, compared to 24.4% in 1990. Much of the increase in minority group populations can be attributed to Hispanic and Asian immigrants (many arriving in the 1980's) and their descendants. The percent composition of Anglos in the population by 2025 will have decreased by 11% from 1995, whereas the minority groups will see an increase in total percent composition in the population (Table 1, Figure 1). In addition, 78% of the net change in the population between 1995 and 2025 is projected to be accounted for by members of minority groups, with Hispanics and Asians showing the largest percent increase by 2025 (Figure 2). Immigration will continue to have a substantial effect on demographic changes in the United States over the next 30 years. The majority of immigrants will continue to come from Latin America and Asia (Murdock 1995), bringing with them their own traditional ideologies and customs. They will exert different demands on products and services than will the traditional recreationist.

Table 1. Total population and percent changes between 1995 and 2025 according to race/ethnicity. Population numbers in millions.

Race/Ethnicity	Population in 1995	Percent Composition in 1995	Population in 2025	Percent Composition in 2025	Numerical Increase 1995-2025	Percent Increase 1995-2025
Anglo	193.6	73.1%	209.1	61.8%	15.6	8.1%
Black	31.6	12.5	43.5	13.4	11.9	37.7
Hispanic	26.9	10.1	58.9	17.4	32	119
Asian/Pacific Island	8.8	3.5	20.7	6.5	11.9	135.2
Native American	1.9	0.8	2.7	0.9	0.8	42.1
Total	262.8	100	334.9	100	72.2	27.5

Figure 1. Comparison of total percent composition of U.S. population by race/ethnicity for years 1995 and 2025.



Angler Demographics

It is estimated that 88% of all adult anglers nationwide are Anglos (Harrington Market Research 1992). But noted earlier, Anglos will represent a decreasing percentage of the general population by the year 2025, and therefore are likely to make up a smaller proportion of the angling public. Blacks over the age of 16 accounted for only 5% of the total fishing population in 1993 (U.S. Department of the Interior, Fish and Wildlife Service 1993), and Hispanics, the second fastest-growing population, make up only 2% of all anglers (Harrington Market Research, 1992). The fastest-growing group, the Asian and Pacific Islander population, is reported as comprising only 0.5% of the total U.S. angling population (Harrington Market Research 1992). Only 10% of all women (inclusive of all racial and ethnic groups) participate in angling activities.

Little information exists on the level of recreational angling participation by the Native American subgroup. Many Native American and Alaskan people have continued to fish as a part of their cultural heritage, and many treaties (signed by the U.S. Government in the mid-1800s) have recently been upheld in Federal courts which recognize their traditional right to harvest fish. In addition, these rights have been upheld despite harvesting regulations placed on commercial industries, and the rest of the angling public. While fishery management

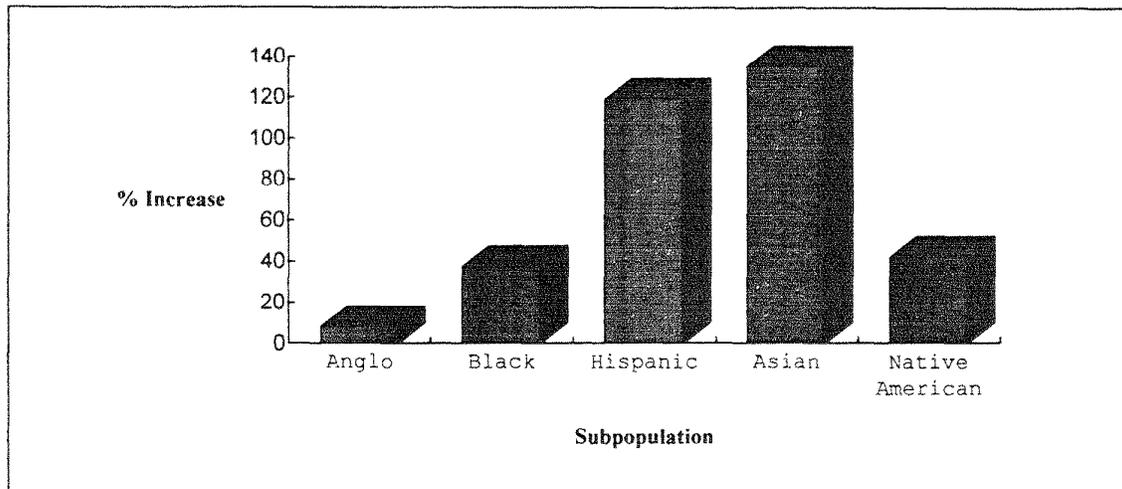
agencies may not focus on the Native American populations, their interests are of no less importance. In fact, states in the west region might especially take note on their demographic characteristics when making recreational fishing or water allocation policies that could possibly conflict with Native American fishing rights.

Immigration will continue to be an important factor on the future growth of angling participants. Murdock et al. (1996) projects that most of the net increase in total numbers of anglers will be due to minority populations. Black, Hispanic and Asian immigration further increases the net number of participants. Furthermore, if it were not for the projected immigration rates of Anglos, the total number of Anglo participants would actually decline (Murdock et al. 1996).

Table 2. Average annual percent change for years between 1995 and 2030.

Years	Projected Growth Rates
1990-1995	1.05
1995-2000	0.88
2000-2005	0.81
2005-2010	0.80
2010-2020	0.81
2020-2030	0.72

Figure 2. Percent increase in sub group populations from 1995 to 2025



Review

A constraint can be viewed as a restriction towards participation in a certain activity, and could inhibit an individual's desire to participate in leisure activities (Jackson 1988), including angling. Scott (1991) suggests that leisure constraints are forces within people's lives that must be successfully negotiated if they are to be involved in leisure activities. Nonparticipation is just one possible outcome as a result of constraints, but people may, instead, modify their behavior to maintain some pattern of sustained involvement (Scott 1991). It may be said that participation is dependent not on the absence of constraints, but on negotiation through them. Such negotiation may modify rather than foreclose participation (Jackson, Crawford and

Godbey 1993). This negotiation process is dependent on the relative strength of, and interactions between, constraints on participating in an activity and the motivations for such participation (Jackson et al. 1993). Identifying and understanding the extent to which constraints prevent participation in an activity will help managers distribute programs and services to produce opportunities for those interested in participating in that activity. While there is research into the constraints that prevent angling participation, there is little research into which constraints are most often perceived by or affect minority groups. Constraints that have a greater effect on minority group participation may include insufficient sources of information (no knowledge of how to get

involved), social-economic (low income) considerations which may also lead to a lack of time, inadequate facilities or lack of access, and social isolation.

Affects on Minority Groups

Poor availability or use of information is often an important constraint to participation in recreational constraints. Insufficient knowledge of information sources can prevent an individual from participating in an activity, even though they might otherwise want to. Since fishing is more popular among rural residents for all racial/ethnic groups, including Anglos (Waddington 1995; Duda 1993; Radonski 1983), anglers tend to be over-represented in rural areas and under-represented in urban areas as a percent of the population (U.S. Department of the Interior Fish and Wildlife Service 1980). This under-representation may reduce opportunities for urban dwellers from obtaining information about fishing, such as learning how, where, and when to fish. It is possible for information on fishing activities to be more readily exchanged between family and community members in rural areas than in urban areas, since rural members are more likely to fish (and fish more often) than those who reside in the cities. In rural communities it may be possible that this information is passed along through verbal communication, whereas in urban communities, anglers may be more likely to gain information through fishing organizations.

Socialization into fishing activities, often by a family or close community member, can be an important element in the recruitment of angling participants, especially for children (Dargitz 1988). Children who have anglers in their households are more likely to engage in fishing activities than are children who do not have anglers in their households, with females being less likely to have the opportunity to be introduced to angling than males (Dargitz 1988).

Dargitz (1988) states also that residence plays a minor role in socialization, and that ethnicity is a much larger factor towards the introduction of recreational fishing to children. However, since demographic information reveals that ethnic subpopulations are greater in urban areas, they would, therefore, be less likely to be socialized into angling activities than those who reside in rural areas. These groups may wish to participate in fishing activities, but lack the information on how to get involved. Management agencies putting more effort into distributing information in urban areas, specifically targeting minority groups, will likely see an increase in angling-related interests from these groups. With most immigrants moving to urban areas, this will result in a large increase in potential urban anglers.

Minorities may find that they lack general access to fishing areas, especially in urban centers. Fishing areas may be far from residences and there may be few opportunities to participate near home. Participation by minority groups and single-parents may be limited because they may lack certain socio-economic means to access these areas. It will be increasingly important for management agencies to understand who is not using their facilities in order to improve services in these areas. Developing recreational fishing opportunities adjacent to urban areas, such as "put

and take" systems (i.e. fishing in swimming pools and public water ways), along with distributing information on their locations may work to recruit new anglers and get current anglers to fish more often. Public agencies can also provide public shore and pier access for anglers who lack boat access.

Socioeconomic groups differed widely in their per capita fishing expenditures in 1991 (U.S. Fish and Wildlife Service 1993). Anglos had greater per capita fishing expenditures than any other subgroup. If this trend continues, total expenditures will decline since the number of Anglo participants are projected to decrease. Also, socioeconomic factors can quite often dictate the amount of disposable income, minority anglers will have less time and money to devote to angling activities. The use of a sliding-scale fee structure may be an option for managers to provide access services for those with lower incomes.

It may be possible that some minorities and women feel threatened or uncomfortable participating in an activity dominated by white males, even though they may be otherwise interested. This social isolation may be difficult to imagine for some, but it can often be an uncomfortable situation for a woman, or a member of a racial/ethnic minority group to walk into a room (perhaps for a class offering techniques in angling) that is comprised of white men. Perhaps providing an atmosphere where people of different ethnic backgrounds are encouraged to participate, such as through advertisements portraying a family or group of people of Asian or Hispanic descent, for example, enjoying the angling experience. Agencies involved in the recruitment of urban dwellers, women, and ethnic/racial subgroups may well benefit by focusing on outreach programs to overcome their historically low participation rates.

Discussion

Managers must realize that they can not focus solely on the interests of the traditional angling clientele. Instead, they will have to overcome constraints that inhibit a group's desire to participate in order to continue to satisfy its constituents and financial support base. According to Boothby et al. (1981), it is a variety of constraints, not just one, that often influences reasons for non-participation in a recreational activity. Many surveys conducted by fishery management agencies mask much of the angling diversity through the use of means and measures of central tendency when publishing results (Ditton 1996). Ditton suggests that such results can often be misleading because they do not promote an understanding of female or black anglers. Furthermore, many surveys distinguish only between whites, females and blacks, and then lump all other racial/ethnic groups into the "other" category. This does little to encourage the understanding of the constraints, experiences and preferences of Hispanics and Asians, the two fastest-growing populations.

Agencies should consider the growing political influence among minority groups as a result of their increasing numbers, and that they may be less supportive of existing or proposed management rules and regulations than is the existing population of anglers (Murdock et al. 1996).

Acknowledging the ethnicity-specific demographic changes that are projected to occur in the United States over the next 30 years will facilitate an understanding of the implications these changes will have on recreational fishing and its management agencies. As indicated, the traditional angler constituent base, consisting of mostly white males, is a decreasing percentage of the total U.S. population. This decrease will coincide with a decrease in financial support for fisheries conservation and management through the loss of state license revenues and Federal Aid moneys that traditionally support these services. Furthermore, a decrease in participants means fewer expenditures that would otherwise benefit local economies. Fisheries managers will need to develop programs and services that target other members of the population that have had historically low angling participation rates. By considering the present levels of minority group participation and expenditures, agencies can extrapolate information as to why these subpopulations feel constrained to participate in recreational fishing. Because present research into the leisure constraints of minorities is scarce, additional studies need to be performed to discover why minorities have historically remained non-participants in fishing activities. Classification of constraints by race and gender would greatly enhance the quality of future research and increase the understanding in the diversity of perceived physical and behavioral constraints. Once constraints are identified, managers can focus on the development of outreach programs in order to recruit those who wish to participate. Therefore, by understanding the importance of demographic changes and the increasing diversity among possible recruits, management agencies will be able to provide better services to a larger, more diverse constituent base.

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