



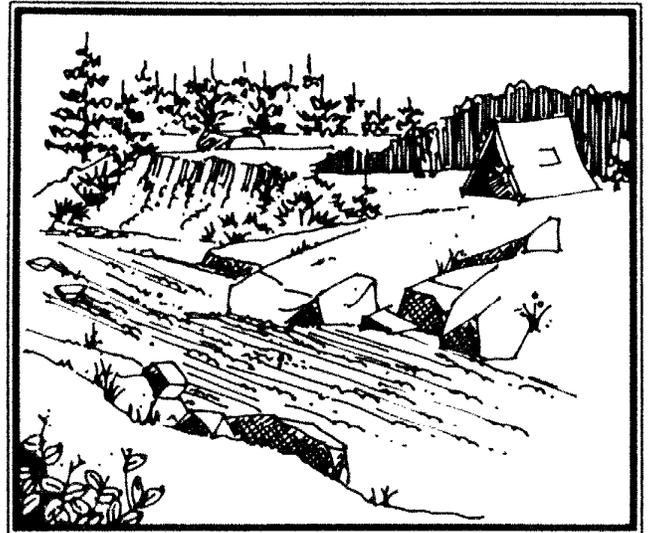
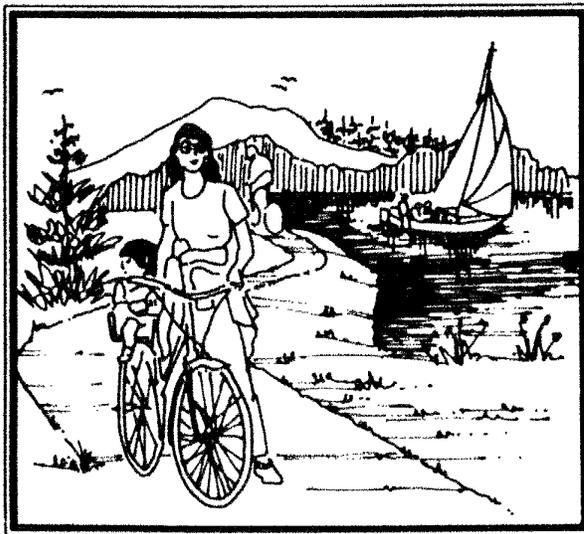
United States
Department of
Agriculture

Forest Service

Proceedings of the 1992 Northeastern Recreation Research Symposium

Northeastern Forest
Experiment Station

General Technical
Report NE-176



NORTHEASTERN RECREATION RESEARCH MEETING POLICY STATEMENT

The Northeastern Recreation Research meeting seeks to foster quality information exchange between recreation and travel resource managers and researchers throughout the Northeast. The forum provides opportunities for managers from different agencies and states, and from different governmental levels, to discuss current issues and problems in the field. Students and all those interested in continuing education in recreation and travel resource management are particularly welcome.

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PROCEEDINGS of the 1992 NORTHEASTERN RECREATION RESEARCH SYMPOSIUM

April 5-7, 1992

**State Parks Management and Research Institute
Saratoga Springs, New York**

Compiled and Edited by:

Gail A. Vander Stoep, Michigan State University

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National Forest Service - 100th Anniversary: Perspectives from the Front Lines. Rick D. Cables, White Mountain National Forest

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Panel Discussion: Managers/Researchers Round Table. Fred Kacprzynski, White Mountain National Forest

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The Impact of Resource-based Industries on Employment Stability in Northern New Hampshire. Donald G. Hodges, Mississippi State University; A. E. Luloff, The Pennsylvania State University

***WILDLIFE and FISHERIES
MANAGEMENT***

ECOLOGICAL AND SOCIAL SUPPORT FOR A CONTROLLED DEER HUNT

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This paper summarizes 7 years (1985 - 1991) of ecological and social research on a deer management program designed to reduce a controversial, over-populated white-tailed deer herd. The objectives of the controlled hunt were to eliminate starvation by increasing the body condition of deer, mitigate vegetation over-browsing, and reduce the human risk of Lyme disease. Ecological objectives were met as the herd was reduced from approximately 350 to 50 deer. Hunters supported the management program despite the number of rules and regulations. Controlled, limited hunting may be a viable management technique for deer over-population problems.

Introduction

The increasing presence of white-tail deer (*Odocoileus virginianus*) in many areas of the northeast is posing significant challenges to wildlife managers. Both ecological and social considerations compound the problem (Decker and Connelly 1990). First, fragmentation of rural land ownership is reducing the amount of land available for deer. As deer populations exceed desired levels, deer starvation rates increase and vegetation destruction caused by deer browsing becomes problematic. Second, traditional management strategies such as recreational hunting for population reduction are often unacceptable to suburban residents. Third, growing anti-hunting sentiment is putting pressure on wildlife managers to justify the role of hunting within wildlife management programs. Finally, there is a need to understand the role of deer in transmitting Lyme disease to humans.

The Richard T. Crane Memorial Reservation and The Cornelius and Mine' Crane Wildlife Refuge in Ipswich and Essex Massachusetts, illustrate the types of problems associated with deer over-population. Both properties are owned and managed by The Trustees of Reservations (TTOR), a non-profit land conservation organization. Prior to 1985, deer hunting was prohibited.

By 1983 deer mortality due to starvation and vegetation destruction caused by over-browsing became apparent to TTOR property managers. A study at Crane (Moen 1984) estimated the deer population at 350 to 400 animals, and suggested the property could support 50 deer without destruction to

vegetation. The deer tick (*Ixodes dammini*) that carries the agent responsible for Lyme disease was first observed at the reservation in 1980. By 1985 Lyme disease had reached epidemic proportions in Ipswich, Massachusetts (Lastavica et al. 1989).

TTOR and the Massachusetts Division of Fisheries and Wildlife (MDFW) proposed and received necessary state and local approval to open the property to hunting during the fall of 1983. Protests from anti-hunters, however, who threatened to place themselves in the field on opening day, forced the cancellation of the 1983 hunt. A committee composed of professional wildlife biologists, veterinarians, public health officials, anti-hunting activists, and local citizens was assembled by TTOR to explore alternative deer reduction techniques (Ellingwood and Caturano 1988).

Controlled, limited hunting was identified as an effective and potentially acceptable deer reduction strategy. The goal of the hunt was to reduce the deer herd to ecological carrying capacity and achieve the following objectives: eliminate starvation by increasing the body condition of deer, reduce the destruction of vegetation by eliminating over-browsing, and reduce the threat of human risk of Lyme disease (Deblinger 1989). This paper briefly summarizes the findings from 7 years of ecological and social research on the controlled hunt at Crane.

Study Area and Methodology

The Crane properties are composed of a 1,400 acre barrier island and 5 drumlin islands surrounded by a 700 acre salt marsh estuary. The property lies between the mouths of the Ipswich and Essex rivers bordered to the east by the Atlantic ocean. Both ecological and social research methodologies were used to evaluate the effectiveness and acceptability of the controlled hunt.

Ecological Methodology

Deer censuses were conducted by helicopter during winter (Beasom 1979, DeYoung 1985) and by spotlighting prior to hunting each fall (Progulske and Duerre 1964, McCullough 1982). To maximize accuracy and maintain standards, helicopter counts were conducted during morning hours with less than 25% cloud cover when 100% of the ground was covered by at least 6 cm of snow. Pre-season, spotlighting counts occurred one hour after sunset during 4 - 5 evenings in October over a standardized drive route covering approximately 20% of the total acreage.

Necropsies were performed on each deer harvested. Body condition was assessed by measuring whole body weight, carcass weight and kidney fat (Finger et al. 1981, Van Vuran and Coblenz 1985). Deer age was determined using microscopic sections of incisors (Lockard 1972).

Vegetation damage was assessed by measuring browsing rates of each forage species during the spring each year. Twenty, 5 m diameter plots were randomly established throughout the property. Every twig of each species below 2 m in height was examined and determined to be browsed or unbrowsed. Percent browsing was calculated for each plant species.

Deer tick abundance and, hence, the threat of Lyme disease was assessed by identifying, removing, and counting the ticks on each deer harvested. Ticks were also removed from white-footed mice (*Peromyscus leucopus*) and counted to determine the effect of deer reduction on deer tick abundance (Deblinger et al. in prep.).

Social Methodology

To be eligible to participate in the hunt, individuals were required to be a resident of one of the 10 towns surrounding Ipswich and Essex, have 5 years of deer hunting experience, possess a valid deer hunting license and hunter safety certificate, attend a TTOR sponsored pre-hunt seminar, and pass a TTOR shooting proficiency test.

Restricting hunt participants to the neighboring towns produced a population of 200 prospective hunters, and provided a mechanism for building support from the local constituency. During the pre-hunt seminar, management objectives and hunting rules and regulations were discussed. Each participant was allowed 2 days of hunting, a maximum of 2 deer, and 2 antlerless permits. Hunting occurred between sunrise and 3 p.m. on the days TTOR assigned to the individual. Hunters were required to use shotguns with slugs. Field dressing was not permitted.

The shooting proficiency test identified the best marksmen, and determined who would participate in the actual hunt. Each hunter was allowed 5 shots in the shooting test and required to hit 3 targets from distances of 30, 40, and 50 yards. Distance of the hit from the bulls eye was measured and the scores ranked. Individuals with the highest scores participated in the hunt. The cut-off for participation was based on the quota of deer to be harvested. Approximately 40% of the pre-season deer population estimate was used as a harvest quota from 1985 through 1990. During 1991, a harvest rate of 25% was used.

Over the past 7 years, 109 different individuals have participated in the controlled hunt, with between 49 and 73 hunters during a given year. Twenty-four percent of these individuals hunted only 1 year at Crane, while 16% hunted all 7 years (average = 3.79 years).

Participation and success rates for each hunter have been collected since 1985. During 1991, all hunters (n = 49) also completed a brief on-site survey at the end of their day's hunt. The questionnaire examined the individual's beliefs about the effectiveness of the deer management program at Crane, the quality of the hunt, reactions to the rules and regulations, their concerns about Lyme disease, and background information on the respondent.

Results

Deer Census and Harvest

Helicopter counts conducted during the years prior to the hunt identified between 155 and 167 deer each year. Assuming a 50% error in the census (Beasom 1979), the deer population was estimated to exceed 350 animals. This estimate is consistent with the findings reported by Moen (1984). In the years following the first hunt, the population observed from the helicopter declined from 161 deer in 1985 to 45 in 1991 (Fig. 1). Average spotlighting counts ranged from 65.3 in 1985 to 22.6 in 1991. Deer harvest declined similarly from 156 in 1985 to 49 in 1990. During 1991, when the number of hunt days was reduced by half, 28 deer were harvested. Each of these indicators suggests the deer population is now at or near carrying capacity.

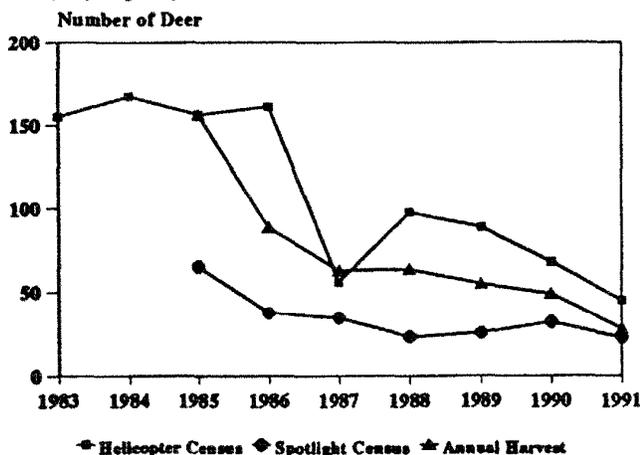


Figure 1. Deer census counts and harvest at the Crane Memorial Reservation and Crane Wildlife Refuge.

Body Condition

Deer body condition, as measured by whole body weight, improved for all deer sex/age classes. Weight increases were most pronounced among fawns, followed by yearlings and, finally, adults. Between 1985 and 1987, for example, the whole body weight of male fawns averaged 29 kg (Table 1). During the next 4 years, this average weight increased to between 34 and 37.6 kg. The weight increases were significant for male fawns ($p = 0.0043$) and female fawns ($p = 0.003$). While body weight increased for other sex/age classes, the increases were not significant.

Table 1. Whole body weight (kg) of deer harvested at the Crane Memorial Reservation and Crane Wildlife Refuge.

	Year						
	1985	1986	1987	1988	1989	1990	1991
Males							
Fawns	28.8	28.8	29.0	37.6	32.3	34.4	34.0
Yearlings	47.5	51.4	57.4	59.1	56.1	55.4	58.7
Adults	68.5	76.8	73.1	70.6	69.0	76.4	68.9
Females							
Fawns	25.5	30.0	30.0	33.6	35.6	31.2	30.5
Yearlings	49.2	45.0	47.4	51.9	50.0	52.8	54.7
Adults	55.0	55.9	55.9	56.4	55.6	57.1	55.0

Carcass weight (i.e., field dressed) increased significantly for female fawns ($p < 0.001$), male fawns ($p = 0.001$), and yearling males ($p = 0.04$). Male fawn field dressed weight, for example, increased from 20.2 kg in 1985 to 29.7 kg in 1988 (Table 2). Weight declines in male fawns were observed during the next 3 years, but were higher than the 1985 average. Female fawn dressed weight showed a somewhat similar pattern. For this age/sex class, average weights increased from 17.1 kg in 1985 to 26 kg in 1989, with small declines in 1990 and 1991. Among yearling males, weights ranged from 34.6 kg (1985) to 44.9 kg (1988). Carcass weight increased for other sex/age classes but were not significant.

Table 2. Carcass weight (kg) of deer harvested at the Crane Memorial Reservation and Crane Wildlife Refuge.

	Year						
	1985	1986	1987	1988	1989	1990	1991
Males							
Fawns	20.2	19.7	20.5	29.7	22.8	25.0	24.4
Yearlings	34.6	38.0	43.3	44.9	42.8	42.4	44.1
Adults	50.6	58.6	56.9	54.8	54.4	59.7	55.8
Females							
Fawns	17.1	21.6	20.8	24.5	26.0	22.6	22.0
Yearlings	35.6	31.5	34.4	38.4	38.4	39.4	40.7
Adults	38.5	39.5	39.9	42.0	41.2	41.5	39.6

Percent kidney fat increased significantly for female fawns ($p < 0.001$), male fawns ($p < 0.001$), yearling females ($p = 0.01$), and adult females ($p < 0.001$). For both male and female fawns, this difference was most pronounced between 1985 and 1988, when the percent kidney fat doubled (Table 3). Increases for

other sex/age classes were evident, but not significant. Taken together, these findings suggest the body condition of Crane deer population has improved over the past 7 years.

Table 3. Percent kidney (left) fat of deer harvested at the Crane Memorial Reservation and Crane Wildlife Refuge.

	1985	1986	1987	Year 1988	1989	1990	1991
Males							
Fawns	24.0	27.2	30.6	53.8	47.9	40.8	33.5
Yearlings	41.3	42.4	50.5	55.6	48.8	45.6	42.9
Adults	29.2	37.8	41.5	38.7	44.6	40.0	33.1
Females							
Fawns	26.0	29.2	35.0	51.4	50.6	43.1	45.8
Yearlings	40.7	41.4	53.3	58.0	57.0	47.1	51.2
Adults	44.9	44.9	46.6	56.2	56.8	55.0	36.6

Vegetation Condition

Vegetation condition also showed marked improvement. In 1986, every species sampled was browsed at least 59% and at most 94% (Table 4). Across the 9 plant species, an average of 84% were browsed. Such high browsing rates prohibited regeneration or seedling production. By 1990, browsing rates for each species of plant decreased significantly. Browsing on grey birch, for example, declined from 94% to 7%. The 1990 browsing rates ranged from 2% to 25%, with the exception of highbush cranberry (47%).

Table 4. Percent of different species browsed by white-tailed deer at the Crane Memorial Reservation.

Species	1986	1987	Year 1988	1989	1990
Bayberry	80	45	45	7	5
Beach Plum	--	--	62	7	7
Black Cherry	89	65	74	7	11
Blueberry	87	86	75	19	25
Highbush Cranberry	94	--	92	61	47
Buckthorn	81	65	62	6	12
Grey Birch	94	37	66	10	7
Honeysuckle	98	87	95	30	15
Privet	59	60	60	30	13
Red Maple	71	54	49	1	2

Lyme Disease

Although annual fluctuations were large, mean abundance of larval deer ticks declined from 20.8 per white-footed mouse (*Peromyscus leucopus*) prior to deer reduction to 10.3 ticks per mouse after deer reduction ($p < 0.001$) (Deblinger et al. in prep.). Similarly, nymphal deer ticks declined from 2.7 per mouse prior to deer reduction to 1.6 per mouse after intervention ($p = 0.04$). Total larval and nymphal tick populations decreased similarly. However, adult deer ticks feeding on adult, female white-tailed deer increased as deer density decreased (Deblinger et al. in prep.).

Hunter Beliefs About Controlled, Limited Hunting
Individuals surveyed during the 1991 hunt supported the deer management program. Nearly all of the respondents believed that reducing the size of the deer herd would improve the health

of the herd and reduce damage to vegetation (Table 5). Almost as many felt deer herd reductions would decrease the number of deer ticks (94%), and effectively control Lyme disease (90%). Only about a quarter (27%) worried about getting Lyme disease while hunting at Crane, and most felt the disease could be prevented with precautions (94%).

Table 5. Hunter beliefs about the Crane deer management program and Lyme disease.

Belief statement	Percent Agreeing
Reducing the size of the deer herd at Crane Beach should:	
improve the health of the herd	98
reduce the damage to vegetation	98
reduce the number of deer ticks	94
Deer hunting at Crane Beach is an effective way to control ticks which cause Lyme disease	90
I worry about getting Lyme disease when I hunt at Crane Beach	27
Contracting Lyme disease can be prevented by taking precautions	94

Almost all respondents believed the experience was worth the money they spent on it (Table 6). Compared to other public areas, hunting at Crane was viewed as more enjoyable (98%), a good substitute (86%), safer (96%), and equally as challenging (77%). Despite the number of rules and regulations, only 15% thought the hunt was too restrictive. Only about a tenth thought there were too many hunters to enjoy being in the field, and an even smaller number (6%) felt there was too much competition from other hunters. When asked to rate the overall quality of the day's hunt, 58% considered the experience excellent or perfect, 27% as good/very good, and only 15% as poor/fair.

Table 6. Hunter beliefs about deer hunting at the Crane Memorial Reservation and Crane Wildlife Refuge.

Belief statement	Percent Agreeing
Hunting at Crane Beach is well worth the money I spent on it	98
I enjoy hunting at Crane Beach more than at public hunting areas	98
Deer hunting at Crane Beach is a good substitute for deer hunting at public areas	86
It is safer to hunt at Crane Beach than at public areas	96
Deer hunting at Crane is less challenging than other areas	23
The Crane Beach hunt is too restrictive	15
There are too many hunters to enjoy being in the field	11
There is too much competition from other hunters	6

The positive ratings provided by the hunters can be partially explained by their success rates. During 1985, 94% of the hunters were successful. As would be expected with the reductions in deer herd size, these percentages declined over the next 6 years (Fig. 2). The success rates, however, were substantially higher than state-wide estimates. For example, 57% of the Crane hunters were successful in 1991; this compares to a success rate of 15% for other public hunting areas in Massachusetts.

Discussion

Deer over-population is controversial in many areas of the northeastern United States. As property owners or managers search for effective methods of deer population control, user groups, neighboring residents or anti-hunting activists create pressure against certain alternatives. In suburban locations, unsupervised, public hunting receives negative attention because residents fear that hunters cause safety problems for their families. Hunting, however, has traditionally been an effective management tool. Conversely, where Lyme disease occurs, public pressure to eliminate deer exists.

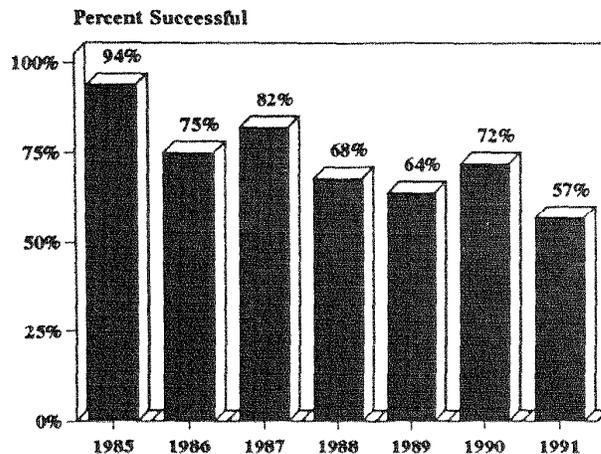


Figure 2. Hunter success rates at the Crane Memorial Reservation and Crane Wildlife Refuge.

This study was undertaken to solve a suburban deer over-population problem by using a controlled, limited hunting program. The combination of research (e.g., Moen 1984) and popular press articles which highlighted the severity of the problem, as well as the restrictive rules required of hunters, facilitated obtaining support by the local community.

Based on the 7 years of ecological research, the size of the deer herd was successfully reduced to the desired capacity tolerance of the area. The body condition of the deer has improved, winter starvation was eliminated, damage to plants mitigated, and the abundance of ticks which cause Lyme disease has decreased.

Findings from the 1991 hunter survey strongly suggest that the participants believe the hunt is an enjoyable, challenging, and safe experience. Despite the number of rules and regulations, few thought the hunt was too restrictive. Nearly all survey respondents believed the program was effective in reducing the size of the deer population, mitigating vegetation impacts, and controlling Lyme disease.

These results coupled with the lack of other viable options to control Lyme disease (Wilson and Deblinger in press), lead us to believe that controlled, limited hunting may provide the solution to other deer over-population conflicts in the northeast. Given the high success rates at Crane, however,

further research in other areas is necessary before the findings can be generalized.

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ECONOMICS

EASTERN WILDERNESS: EXTRAMARKET VALUES AND PUBLIC PREFERENCES FOR MANAGEMENT

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Eastern wilderness is a valuable resource for both wilderness users and nonusers alike, and both groups have substantial interest in its management. This study used contingent valuation techniques to examine the attitudes and values of the general public regarding eastern wilderness in Vermont. The results suggest that, while many nonusers have not formed perceptions about the activities and attributes associated with these scarce resources, they still have a considerable stake in the way such areas are managed.

A dearth of information exists on the public view of management preferences and value placed on eastern wilderness. Most socioeconomic studies of wilderness have focused on users and ignore the public as a whole, even though wilderness areas are common property resources and many people other than users have an interest in their management. Indeed, some studies have demonstrated that nonuser values can substantially outweigh user values (Glass et al. 1990, Hager et al. 1989). A broad spectrum of the public, both users and nonusers, have a range of views regarding the management of designated eastern wilderness areas.

Although much research has focused on those who actually use a resource during a given time period to determine the value of the resource, there are broader measures of value that are appropriate when dealing with common property resources (Weisbrod 1964, Krutilla 1967). Use values are appropriate when a resource is being used in the current timeframe or when individuals are willing to pay to retain the opportunity for future use (option values). However, other values reflect nonuser's concerns, including existence (willingness to pay to retain a resource even if no personal use is contemplated), bequest (concern that a resource be retained for succeeding generations), intrinsic (ethical concerns about the protection of a resource though no value to mankind is apparent), and altruistic (providing opportunities for contemporary members of society to benefit from a resource).

Aside from resource value questions, the motivations and views of the general public toward eastern wilderness area management are important considerations. Expectations and objectives for wilderness management, both by users and the interested public, are requisites for sound management. The eastern wilderness areas of northern New England in general, and Vermont in particular, encapsulate these issues.

There are six designated wilderness areas on the Green Mountain National Forest of Vermont totaling 59,598 acres; the best know is Lye Brook Wilderness Area (15,680 acres)

near Manchester, Vermont. By contrast to larger western wilderness areas, these wilderness areas are sufficiently small that day-use and short-term camping trips predominate. In this paper, we present the results of a study designed to determine the values placed upon eastern wilderness by the general public, as well as the public's attitudes about specific management issues.

Methods

Data for this study were collected by the use of a mail survey to heads of households residing within a 75-mile radius of Lye Brook Wilderness Area in southwest Vermont. The study was divided into two consecutive zones: zero to 25, and 26 to 75 miles. During January of 1990, zone-specific questionnaires were mailed to 1,000 randomly selected individuals in each zone. A second questionnaire was mailed to nonrespondents 2 weeks after the initial mailing. The usable responses from the near and distant zones were 35 and 27 percent, respectively. A field follow-up of nonrespondents was not conducted.

Individuals residing within each zone were sent similar questionnaires containing a brief statement on the purpose of the study; a brief description of the two Congressional Acts creating eastern and western wilderness designations; and a series of questions on knowledge, use attitudes, perceptions, and values of eastern wilderness. The two questionnaires were structurally identical except for the valuation questions which were wilderness specific. The inner zone questionnaire requested value information on Lye Brook Wilderness Area specifically, whereas the outer zone questionnaire focused on eastern wilderness in general. The "value" sections of the questionnaire consisted of: (1) a dichotomous choice question, (2) an open-ended contingent value question, (3) a checklist of reasons that a respondent could use to explain a zero willingness-to-pay response, and (4) a question that asked respondents to allocate their maximum willingness to pay among five use and nonuse motivational categories.

Results

Only a small percentage of the respondents (8 percent within the 25-mile radius of Lye Brook, and 4 percent in the 26- to 75-mile range) was aware of the existence of six designated wilderness areas in the Green Mountain National Forest (Table 1). Within the inner zone, Lye Brook was the best known wilderness area, whereas Breadloaf was most familiar in the outer zone of the study area. For the respondents from the inner zone, 27 percent had visited Lye Brook as compared to 10 percent from the outer zone. However, respondents from the outer zone were more likely to have visited any wilderness east of the Mississippi (55 percent) than respondents in the inner zone (39 percent).

Table 1. Percentage of public awareness of Green Mountain National Forest designated wilderness areas by respondents within 25 miles and 25 to 75 miles of Lye Brook Wilderness Area.

Green Mountain wilderness areas	Awareness of respondents living within 25-mile radius (n=285)		Awareness of respondents living within 25- 75-mile radius (n=219)	
	Number	Percent	Number	Percent
All 6 wilderness areas	24	8.4	9	4.1
Lye Brook	92	32.3	20	9.1
Bristol Cliffs	18	6.3	13	5.9
Breadloaf	40	14.0	29	13.2
George D. Aiken	61	21.4	21	9.6
Peru Peak	51	17.9	18	8.2
Big Branch	29	10.2	6	2.7

Regardless of the zonal origin, the responses for a number of questions pertaining to views and perceptions toward eastern wilderness were lumped into two categories: those who have and have not visited eastern wilderness. As might reasonably be expected, a higher percentage of respondents who had not visited any eastern wilderness areas indicated "no opinion" to a series of questions pertaining to wilderness characteristics (Table 2). Greatest agreement from both groups pertained to the statements that eastern wilderness "have great plant and animal diversity," and "are not very well known." A majority of respondents who had visited eastern wilderness agreed that eastern wilderness areas "are small," "especially valuable

because they are located close to large population centers," "are very accessible," and "need good protection because many people use them." Those respondents who had not visited eastern wilderness areas did not agree with these statements, largely due to the high number indicating no opinion. Greatest disagreement among the respondents who had visited eastern wilderness pertained to the statements that eastern wilderness areas "are not very scenic," "are not remote, wild, or large enough to be considered wilderness areas," and "offer few recreational opportunities."

Table 2. Views and perceptions about designated eastern wilderness areas, by visitors and non-visitors.

Statement pertaining to eastern wilderness areas	Visitors				Non-visitors			
	Respondents	Agree	Disagree	No opinion	Respondents	Agree	Disagree	No opinion
	Number	Percent			Number	Percent		
Are small	306	51.3	17.6	31.0	172	30.2	5.8	64.0
Are especially valuable because they are located close to large population centers	307	68.4	12.7	18.9	171	48.5	8.8	42.7
Are visited by many people	304	45.4	17.4	37.2	172	21.5	14.5	64.0
Are not very scenic	306	9.5	74.8	14.4	169	5.9	49.1	45.0
Have great plant and animal diversity	309	76.7	5.1	18.1	170	46.5	4.8	41.7
Are not remote, wild, or large enough to be considered wilderness areas	304	10.9	64.1	25.0	169	5.4	40.8	53.8
Are very accessible	304	63.5	11.2	25.3	170	30.6	8.2	61.2
Offer few recreation opportunities	300	18.4	54.4	27.3	169	8.3	26.6	65.1
Are not very well known	308	72.7	12.6	14.6	167	73.1	4.2	22.7
Are in good condition	308	42.5	12.3	45.1	167	13.2	4.2	82.6
Need good protection because many people use them	307	64.5	9.4	26.1	171	33.9	8.8	57.3
Are not real wilderness areas because people have altered them	300	14.7	49.6	35.7	169	6.5	20.1	73.4

Both visitors and non-visitors usually agreed on the kinds of activities that should be permitted on designated eastern wilderness areas (Table 3). A notable exception was the "harvest of dead or diseased trees"--65 percent of those who had visited eastern wilderness areas felt this practice was acceptable, but only 16 percent of the non-visitors agreed. It is noteworthy that only 1 of 10 from either group supported "commercial harvest of trees" on wilderness areas. Other activities considered acceptable by 60 percent or more of all respondents were "camping," "fishing," "constructing trails," and "control all forest fires." Less than one-fourth of the respondents felt that forest fires from natural causes should be allowed to burn. Besides the aforementioned "commercial

harvest of trees," other activities that received very little support were "mining/prospecting" (which not one respondent found acceptable), "all-terrain vehicle use," and "providing toilet facilities." While "fishing" received wide support as an acceptable activity, "hunting" and "trapping" were less acceptable. Overall, 45 percent of the respondents indicated that hunting was an acceptable activity, but it was favored by a higher percentage of those who had visited eastern wilderness areas than by those who had not. Likewise, trapping, which was supported by 19 percent overall, had nearly twice as much support among those who had visited eastern wilderness areas. "Mountain biking" was found acceptable by slightly less than one-quarter of each group.

Table 3. Views of respondents on activities that should be permitted on designated eastern wilderness areas.

Activity	Respondents who have visited eastern wilderness areas (n=324)		Respondents who have not visited eastern wilderness areas (n=185)		All respondents (n=518)	
	Number	Percent	Number	Percent	Number	Percent
Constructing trails	201	62.0	110	59.5	314	60.6
All-terrain vehicle use	14	4.3	13	7.0	28	5.4
Control all forest fires	194	59.9	113	61.1	312	60.2
Providing toilet facilities	13	4.0	6	3.2	19	3.7
Mining/prospecting	0	0	0	0	0	0
Mountain biking	77	23.8	44	23.8	122	23.6
Allowing forest fires from natural causes to burn	83	25.6	39	21.1	124	23.9
Hunting	160	49.4	71	38.4	235	45.4
Fishing	251	77.5	121	65.4	376	72.6
Camping	271	83.6	134	72.4	411	79.3
Building camp fires	158	48.8	65	35.1	225	43.4
Trapping	73	22.5	22	11.9	96	18.5
Commercial harvest of trees	31	11.1	17	9.2	53	10.2
Harvest of dead/diseased trees	212	65.4	30	16.2	347	67.0

A ranking of the reasons why people visit eastern wilderness areas provides some interesting insights (Table 4). Highest ranking reasons given were "see beautiful scenery," "see abundant wildlife," and "learn more about nature." Motivations often associated with wilderness experience such as "experience the danger of isolation," "test survival skills," and "visit a primitive area" ranked at the bottom. "Meet other wilderness users" also ranked low. Designated wilderness is a highly restrictive resource use in which opportunities for many commercial ventures are prohibited statutorily. Most conventional measures of economic efficiency are not designed to consider the public-oriented values associated with designated wilderness areas. In order to measure the extramarket values related to Lye Brook and eastern wilderness in general, the contingent valuation approach was implemented. The results of this analysis are reported elsewhere (Gilbert et al. [in press]), but warrant consideration here.

In total, 53 percent of the respondents were willing to make a donation to support eastern wilderness. More specifically, 51.6 percent of the respondents within a 25-mile radius indicated that they would make a donation for the management and protection of Lye Brook. For the outer zone (26 to 75 miles), 55.5 percent revealed a willingness to pay for the protection and management of eastern wilderness in general.

For all respondents, the annual median Logit values were \$9.04 for Lye Brook and \$10.12 for eastern wilderness. Respondents who had visited an eastern wilderness were willing to pay \$9.71 as compared to \$8.64 for those who had never visited an eastern wilderness area. For eastern wilderness, the differences were more marked: \$14.28 for those who had visited to \$6.40 for those who had not.

Table 4. Mean rank of reasons for visiting eastern wilderness are by all survey respondents.

Rank	Reason	Mean Rank ^a
1	See beautiful scenery	5.06
2	See abundant wildlife	6.11
3	Learn more about nature	6.67
4	Experience tranquility	7.01
5	See rare wildlife	7.11
6	Get exercise	7.44
7	Be isolated from urbanized areas	7.62
8	Share the experience with someone	8.35
9	Gain new experiences	8.56
10	Take pictures or paint	9.00
11	Be alone	9.28
12	Fish in pristine waters	9.85
13	Find excitement	11.94
14	Gain self-confidence	12.09
15	Hunt a primitive area	13.23
16	Meet other wilderness areas	13.38
17	Test survival skills	13.67
18	Experience the danger of isolation	14.62

^a/ The mean rank was derived from a Friedman Two-Way Anova. It ranks on a scale of 1 to 18 and determines if the responses are significantly different. (See Hollander and Wolfe 1973).

The Tobit mean willingness to pay was \$6.70 for Lye Brook and \$7.10 for eastern wilderness. (For more complete definitions of Logit and Tobit see Gilbert A. et al. Valuation of eastern wilderness: extramarket measures of public support. Paper presented May, 1991, Society of American Foresters meeting, Jackson, WY).

The motivations underlying the willingness to pay for the protection and management of wilderness areas indicate that nonuse values (existence, bequest, and altruistic values) outweigh use values including both current use and option values (Table 5). Nonuse values accounted for more than two-thirds of the total willingness to pay. Among the nonuse values, bequest values accounted for 29 percent of the total value followed by existence value (21 percent) and altruistic value (19 percent). For use values, option value accounted for a higher percentage than current use values.

The reasons why respondents would not commit themselves to a payment for the protection and management of eastern wilderness offer some interesting insights. While only 2 percent felt wilderness protection was a waste of resources, one-quarter indicated that they "do not use or benefit" and another 19 percent felt that "only persons who actually use eastern wilderness areas should pay." Eight percent thought eastern wilderness areas would continue to exist even if they did not pay. However, one-quarter of the respondents indicated that eastern wilderness areas are part of the U.S. wilderness system and should be financed through the regular system of taxes. One-fifth simply could not afford any contribution at the time.

Views of respondents toward paying for wilderness protection and management were in agreement between visitors and non-visitors of eastern wilderness areas (Table 6). By far, the highest number (47 percent) favored federal taxes as a source of funding. Only two other sources were favored by as many as one-fifth of the respondents: user fees (27 percent) and a federal lottery (23 percent).

Table 5. Motivations underlying the willingness to pay for the protection and management of designated eastern wilderness areas.

Wilderness Motivations	Lye Brook respondents		Eastern Wilderness respondents	
	No.	%	No.	%
So I can actually visit it this year or next (use value)	103	13.1	87	15.8
To keep the opportunity optional to visit an eastern wilderness area in the future (option value)	147	16.9	122	16.9
Just for the pleasure of knowing eastern wilderness areas exist even if you have no plans to use it personally (existence value)	149	20.1	133	21.2
To protect eastern wilderness for future generations (bequest value)	178	29.6	146	29.0
To save eastern wilderness so that others can use them (altruistic value)	162	20.3	125	17.1

Table 6. Views of respondents toward source of funding used to pay for wilderness protection and management by visitors and non-visitors.

Source of funds favored	Visitors		Non-visitors		All respondents	
	Number	Percent	Number	Percent	Number	Percent
Federal taxes	237	46.6	112	47.2	358	46.8
Voluntary contributions state/federal income tax forms	194	15.8	88	17.8	291	16.3
A federal lottery	96	22.1	39	26.7	137	23.1
User fees	204	24.7	112	30.6	322	26.5
Public donations to wilderness fund	201	16.8	107	19.6	314	18.2
Special sales tax on hiking equipment	93	10.8	41	11.3	137	10.7
Special sales tax on hunting and fishing equipment	101	11.4	47	15.7	151	12.8

Discussion

Because a follow-up of nonrespondents was not conducted, the survey results must be interpreted cautiously. Further, the valuation of eastern wilderness was based on the contingent valuation technique which is subject to measurement and interpretative limitations (Stevens et al. 1991). Nonetheless, the results provide some useful insights with respect to public preferences for the management of eastern wilderness and the value that is placed on it.

Another consideration is the spatial limitations of the study. Households at a maximum distance of 75 miles from Lye Brook were randomly selected to be mailed a questionnaire. People beyond this range are likely to be aware of designated wilderness on the Green Mountain National Forest or have an interest in it, but the relative frequency can be expected to diminish proportionately as the distance away from wilderness areas increases. For example, respondents within a 25-mile radius of Lye Brook were two times more aware of all six Green Mountain National Forest designated wilderness areas than the respondents in the 25- to 75- mile radius. Likewise, Lye Brook was much more familiar to those in the inner zone than the outer zone. Nonetheless, when the huge population outside of the study area is considered, there may be considerably more people in total that have an interest in these designated wilderness areas outside of a 75-mile radius. This could affect the measurement of extramarket values in that substantial support by measure of willingness to pay may have been omitted because of the spatial limitations of the study area.

Interpreting the views and perceptions of respondents who have and have not visited eastern wilderness is difficult because of the high percentage of respondents expressing no opinion, especially among the non-visitors. However, it is understandable that those who had not seen the areas in question may have difficulty formulating an opinion relating to specific attributes. Among those who expressed views and perceptions, there was considerable agreement between those who have and have not visited eastern wilderness. While agreeing that eastern wilderness areas were small and not well known, the respondents visualized many positive characteristics and sharply disagreed that those areas were not of sufficient size, remote, or wild enough to be considered wilderness.

With respect to the activities that should be permitted on designated wilderness areas, visitors and non-visitors generally agreed. Activities that received virtually no support were mining/prospecting, providing toilet facilities, and the use of all-terrain vehicles. While the harvesting of dead or diseased trees was deemed acceptable by about two-thirds of the respondents, the commercial harvest of trees received little support. Uses receiving the strongest support were camping and fishing. It is noteworthy that hunting and trapping each received less than 50 percent support even though neither of these activities is generally considered to be a threat to the wilderness character. This may reflect the general societal attitude about these activities rather than specific opinions about their legitimacy within wilderness.

In ranking the reasons as to why people visit eastern wilderness areas, reasons related to aesthetics were ranked highest while those associated with personal achievement tended to be ranked low. However, mean scores may be deceptive, as individuals have divergent motivations for visiting wilderness areas. A primary benefit of the wilderness environment may be its unstructured nature that provides an opportunity for people to satisfy divergent wants.

While more than one-half of the respondents were willing to make a commitment to pay to maintain and protect eastern wilderness, the remainder suggested a myriad of reasons for not paying. Only 2 percent indicated eastern wilderness areas were a waste of resources.

Even if expanded conservatively to the total number of households in the study area, the total willingness-to-pay estimates are convincing. With 53 percent of the respondents indicating a willingness to make a financial commitment for protection and management of eastern wilderness, a more conservative expansion represents a considerable number of households given the population of the study area. For Lye Brook alone (households within a 25-mile radius), the total annual willingness to pay was \$334,281 based on the Logit median. For the 26- to 75-mile zone, the estimated preservation value for eastern wilderness was \$5,718,430 with a use value of an additional \$1,073,055. These estimates were drawn from a limited range, and the potential for substantially larger values for the 19 million households in the Northeast is obvious.

The motivations underlying the willingness to pay for the maintenance and protection of eastern wilderness demonstrate the importance of bequest, existence, and altruistic values. These non-use values accounted for more than two-thirds of the total willingness to pay. Current use and option values accounted for the remainder.

It is clear that eastern wilderness areas have substantial value to people--value that extends well beyond the actual users of such areas to the population as a whole. While many non-users have not formed perceptions about the activities and attributes of these scarce resources, they still have a considerable stake in the way such areas are managed. Future research must clarify the nature and extent of such stakes so that they may be equitably incorporated into management practices.

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ECONOMICS AND DEMOGRAPHICS OF

NORTHEASTERN SPORT HUNTERS

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Over 800 hunters using the Delaware Water Gap National Recreation Area during the 1987-88 hunting seasons were interviewed to determine their demographic and expenditure profiles and related economic impact within the region. Hunters were predominantly white males, middle aged, middle income and employed in blue-collar trades. Total expenditures by this audience amounted to \$1.4 million. Input-output analysis of the \$133,000 spent within a five-county region surrounding the park showed a total sales impact of \$268,000.

Introduction and Objectives

One of the largest public hunting areas available to Pennsylvania and New Jersey residents is the Delaware Water Gap National Recreation Area (DWG-NRA). The park includes more than 70,000 acres of land along a 37 mile section of the Pennsylvania-New Jersey border. Boating, fishing and hiking are the primary summer-time activities, with hunting and other winter sports available during the remainder of the year. Total attendance among all activities for 1987 was 912,000 visitor days (USDI NPS 1988).

Hunters are a unique audience to the National Park Service (NPS) due to sport hunting being excluded from National Parks on the basis of their direct ecological impacts. The opportunity to evaluate this audience in a National Recreation Area was of particular interest to this agency. Accordingly, the National Park Service established a research grant with the Pennsylvania Cooperative Fish and Wildlife Research Unit for the general purpose of evaluating sport hunters using DWG-NRA. Our objectives were to:

- (1) determine total hunting use;
- (2) establish the demographic characteristics of hunters;
- (3) determine the expenditure patterns and economic impact of park-related hunting during the 1987-88 seasons.

Procedures

Sample Design and Survey Procedures

The 1987-1988 hunting audience was stratified into seven hunting seasons or combinations of seasons, identified as spring turkey, pheasant and rabbit, general small game (those hunting more than two species), fall turkey, bear, deer archery, and deer firearm. The division of the park into nearly equal Pennsylvania and New Jersey sections provided two sets of resident hunters and hunting seasons. In general, both states had similar types and timings for their seasons. However, since New Jersey did not offer either a fall turkey or bear season, there were 12 stratifications of the hunting public.

The sample design for survey procedures included the "opening day" of each season and the following Saturday, with random survey days selected from the remaining Saturdays and weekday periods (Sunday hunting was not permitted in either state). This provided 32 survey days in the sample design.

An interview questionnaire was developed based on previous research recommendations (Propst et al. 1985, Strauss and Lord 1988). The initial section of the instrument addressed the demographic profile of the user group. The second section of the instrument secured the current and planned costs of the individual's trip by type of expenditure and by place of purchase. Equipment costs were obtained for items purchased over the past year and used during the current hunting trip.

Over 98% of the hunters contacted were willing to participate in the interview process. Over 850 interviews were conducted, with 799 qualifying as complete data sets.

Attendance Estimates

The NPS ranger staff conducted a vehicle count on each sample day for the purpose of estimating total park attendance. Vehicle counts were made along established travel routes during early to mid-morning periods (7 to 10 AM) to secure maximum daily counts.

Vehicle counts were multiplied by the average vehicle occupancy level obtained from interviews to estimate the total attendance on survey dates. Daily attendances on sample days were subsequently used to interpolate probable attendances on non-survey dates, thereby providing a means for estimating total seasonal attendance. Interpolations were adjusted for (1) specific weather conditions, (2) weekend and weekday periods, and (3) the trend in attendance over any given season.

Data Analysis

Each of the 12 hunting audiences was analyzed in terms of hunting use, demographics, and expenditures. In general, averages were first established for each day's survey, followed by the development of seasonal averages that used daily attendances as the weighting factor. Total expenditures for any given season were based upon seasonal averages and total attendances.

Economic Model

The economic impacts of the hunting expenditures made within a five-county region surrounding DWG-NRA were modeled through the Impact Analysis for Planning (IMPLAN) System, developed by the USDA Forest Service. The IMPLAN model was originally designed to estimate the regional economic impacts of forest management plans for the National Forests (Alward et al. 1985). Version II, released in 1986, contained a number of improvements, with the model now providing more recreation-specific descriptions of trade and commerce.

Results and Discussion

Total Use

Total hunting within DWG-NRA during all 1987-88 seasons approached 47,400 activity days (Table 1). Nearly 72% was on the New Jersey side of the park, with 28% occurring on the Pennsylvania side. The most popular seasons in New Jersey were the deer firearm, involving 31% of the total, followed by deer archery (26%), and pheasant/rabbit (25%). General small game hunters represented another 15% of total use.

Table 1. Total seasonal use, average daily expenditures, and total seasonal expenditures by season for Delaware Water Gap National Recreation Area hunters, 1987-88.

State Hunting Seasons	Total Use (act. days)	Average Expenditure (\$/ad)	Total Expenditure (thousand\$)
Pennsylvania:			
Spring Turkey	802	15.95	12.8
Pheasant/rabbit	2,597	23.39	60.7
General small game	925	11.73	10.9
Fall turkey	453	15.64	7.0
Bear	622	44.35	27.6
Deer (archery)	1,276	18.70	23.9
Deer (firearm)	6,773	35.41	239.8
State total	13,448		382.7
New Jersey:			
Spring Turkey	1,124	32.90	37.0
Pheasant/rabbit	8,457	26.25	222.0
General small game	5,040	13.26	66.8
Deer (archery)	8,671	34.55	299.6
Deer (firearm)	10,642	39.51	420.4
State total	33,934		1,045.8
Park total	47,382		1,428.5

A similar division was found in Pennsylvania, where 64% of the use was tied to the big game seasons and 36% to the small game seasons. For Pennsylvania, the deer firearm season was the most popular, involving 50% of the total hunting audience. This was followed by pheasant/rabbit (19%), deer archery (9%), and general small game (7%).

For Pennsylvania, nearly half of the use was from the three counties adjacent to the park, with another 24% originating from the Philadelphia region. Of interest, with 18% of the Pennsylvania use involving non-resident hunters, 91% came from New Jersey. Average round trip travel distances for hunters on the Pennsylvania side was 116 miles.

Residents from eight counties in northeastern New Jersey, largely adjacent to Newark, provided 75% of the hunting use on the New Jersey side. Less than 7% of the New Jersey use was from non-resident hunters. However, on an absolute measure, this was about equal to the Pennsylvania non-resident use. Most of the non-resident use in New Jersey was devoted to deer hunting (98%), whereas in Pennsylvania, non-resident hunters divided their interests between small game and big

game seasons. The round trip travel distance for all hunters on the New Jersey side was 132 miles.

Demographics

Hunters on either side of the park could be characterized as young to middle-aged white males, high school educated, and having an average annual family income of \$31,000. About 70% of the hunting use in DWG-NRA was by residents from the urban and suburban counties near Newark, Philadelphia, and Allentown-Bethlehem.

Age. The age structure of hunters showed a strong entry of young hunters in the 10-19 year class, representing over 14% of the total audience (Table 2). The majority of use, about 55%, was from hunters in the 20-29 and 30-39 year classes. Declining participation was evident in the older age classes. Overall, age distributions for the DWG-NRA followed the general profile found in a recent national hunting survey (USDI FWS 1988).

Nearly 50% of the hunting use was by family groups, with much of this involving fathers and sons. Peer groups represented another 35% of total use and again represented certain traditional bonds of friendship. The hunting tradition among family and peer groups was also evident in their years of experience with DWG-NRA and overall positive attitude and allegiance toward this recreation area. Hunting experience with the park averaged 10 years among all hunters.

Hunting continues to be a male dominated activity. Overall, less than 3% of total participation was identified with female hunters. The highest proportion of female hunters was found in New Jersey's general small game (5.6%) and archery (3.6%) seasons and in Pennsylvania's deer firearm season (1.6%).

Table 2. Age class distributions of sport hunters using the Pennsylvania and New Jersey portions of Delaware Water Gap National Recreation Area, 1987-88.

Age Class (years)	Pennsylvania (% of total)	New Jersey (% of total)	All Hunters (% of total)
10-19	12.8	14.9	14.4
20-29	26.1	31.0	29.9
30-39	25.3	25.5	25.4
40-49	14.3	11.9	12.4
50-59	9.4	8.3	8.5
60-69	8.5	.3	6.0
>70	3.5	3.4	3.4
	100.00	100.0	100.0

Within the total audience of hunters, 93% were white, 3% black, and 4% from other non-white origins. Hunters in Pennsylvania had the smallest percentage of minority groups, representing just under 2% of the total. For New Jersey, minorities represented 8% of the total hunting population.

Income levels. The average annual family income for hunters in Pennsylvania was \$29,700 and in New Jersey \$33,000. The higher average for New Jersey was the result of 18% more hunters being in the \$30,000 - \$40,000 and \$50,000 - \$60,000 income ranges and 14% fewer in the under \$20,000 range.

In Pennsylvania, the lowest average annual incomes were recorded in the deer firearm (\$26,100), deer archery (\$29,000) and fall turkey (\$29,300) seasons. In New Jersey, the lowest average annual income levels were also recorded among deer firearm (\$31,000) and deer archery (\$32,000) hunters.

Employment. The general employment profile for hunters on either side of the park showed about 60% in blue-collar trades and slightly more than 20% in white-collar positions. In addition, 5% were students, 1% unemployed, and 14% retired. However, it should be noted that these distributions only relate to the persons actually interviewed during the survey. Some under-representation of students could have taken place due to a potential bias of interviewing senior members of hunting parties.

Education. Hunters from either side of the park had similar education profiles, with about 65% having either a high school or technical school education and about 25% having attended college or a professional school. Less than 8% had only a grade school education. The general proportion of hunters having high school or trade school education was nearly equal to the proportion of hunters involved in blue-collar employment. In like manner, the proportion having college or professional school education was consistent with the proportion of hunters holding white-collar positions.

Hunting Expenditures

A sizable difference in the expenditures per activity day (ad) was evident among the various hunting seasons, ranging from \$12/ad in the general small game season to \$44/ad in bear season (Table 1). Although the average expenditure per activity day showed a substantial variation among the individual seasons, the weighted average expenditures between the two states were within 10% of each other, averaging \$30.83/ad in New Jersey and \$28.42/ad in Pennsylvania. This compared well to the 1985 national average of \$30 per activity day (USDI FWS 1988).

Total expenditures from all hunting audiences using DWG-NRA during the 1987-88 seasons totaled \$1.4 million (Table 1). As might be expected, the distribution of expenditures paralleled attendance, with 73% of the total from New Jersey and 27% from Pennsylvania. For Pennsylvania, 76% of the total was from the three big game seasons and 24% from the four small game seasons. A smaller percentage of the New Jersey total (69%) was from their two big game seasons.

The distribution of expenditures among all hunters showed 43% in equipment, 16% in transportation, 14% in food costs, 13% in license fees, 12% in expendable activity costs, and 3% in lodging. Over 80% of all hunting expenditures were made near the participants' home area. Only 11% was spent near DWG-NRA, 4% in transit, and 5% elsewhere in the U.S.

Economic Impact

A five-county region surrounding the DWG-NRA was used for purposes of economic impact analysis. This included Pike, Monroe, and Northampton in Pennsylvania and Sussex and Warren in New Jersey. Only the expenditures made within this region by non-residents were considered for impact analysis. As such, the focus was on money attracted to the region by DWG-NRA sport hunting. For the 1987-88 hunting seasons, this was limited to \$133,000. Although this recreation area drew a large portion of hunters from outside the region (81%), most of their hunting expenditures were made in their home areas (81%).

The \$133,000 in direct sales to the region was entered to the IMPLAN model on the basis of the particular economic sectors receiving these expenditures. As a result of these direct sales, the IMPLAN model identified the indirect effect of the inter-industry trade generated by the direct sales and the induced effect of the added household consumption originating from the employment supported by direct and indirect sales. These secondary impacts amounted to \$135,200, for a total sales impact of \$268,200. Since the cumulation of total sales across various sectors can introduce a certain double count, value added provided a better measure of the net economic gain to the region. This totaled \$137,300, with 29% occurring in the service sector, 23% in wholesale and retail trade, 21% in

the financial sector, and 11% in manufacturing. Overall, 63% of the value added went to employee income (\$73,400) in support of 6.5 annual jobs within the region.

Conclusions

The Delaware Water Gap National Recreation Area provides a major land area and a diversity of seasons for Pennsylvania and New Jersey hunters. As might be expected, this opportunity has not gone unnoticed within this populated region. Over 47,000 days of usage were estimated for all 1987-88 hunting seasons. Although hunting is often characterized as a sport pursued by an older segment of our population, the DWG-NRA study showed a strong entry of young hunters. Furthermore, over 55% of the hunters were in their 20's and 30's.

The social attributes of hunting, often cited as a key motivating force (Kennedy 1974, More 1973), were also evident in the character and composition of the hunting groups. Over 50% of the usage was identified with family groups, with another 35% tied to close-knit peer groups. Father and son groups were particularly evident during the interview process. Hunting experience within the park averaged 10 years among all hunters, again lending support to the traditional ties among these groups and with this park.

Hunting within the DWG-NRA involved a total cash outlay of \$1.4 million by these participants. However, nearly 81% of these purchases were made outside the five-county region surrounding this park. Direct sales within the region to non-residents of the area were limited to \$113,000, with an additional \$155,000 generated as secondary impacts from the direct sales. One of the primary restraints to hunting expenditures within the region is the lack of Sunday hunting caused by state game laws. As such, most non residents to the region organized their weekend trips as one-day events, with the majority of their expenditures made outside the region.

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FUNDING SUPPORT AND RECREATION

QUALITY

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Support for increased levels of public financing of recreation opportunities was found to be low among a stratified random sample of Vermont residents. But that study implies that political support for public funding depends on mean opinion in the general population. Studies of political leadership suggest that elected officials are more likely to base their decisions on the views of a relatively tiny but influential segment of political participants than on general public opinion.

The authors of a paper published in the 1990 Proceedings of the Northeastern Recreation Research Symposium imply that representative samples of residents suggest the choices that state legislatures or the Congress will (or perhaps should) make in collecting and allocating public funds (Manning & Zwick 1990). While their data indicate a preference among resident adults for "no new taxes" of a general nature to support recreation, this does not mean that funding is not or would not be available if key political leaders supported new allocations. It is this writer's contention that while Manning and Zwick's finding represents popular democratic ideology, it misinterprets the actual political process guiding public decisions. Even conservative Republicans can be persuaded to support funding coalitions, if bureaucrats recognize their strategic importance and allocate extra benefits to their districts (Arnold, 1979, 141).

The authors based their findings on a cross section of Vermont's adult population, however, clarification is needed.

First of all, 16% of Vermont's adult population are not registered to vote and 42% of those registered did not turn out to vote in the last Vermont general election (Barone & Ujifusa 1991, 1258). Since legislators are known to be more responsive to actual voters from their own voting districts than to anyone else, the authors are not surveying the correct population. Their data are diluted by many non-voters and persons unlikely to vote, probably politically alienated and perhaps accounting for some of the low levels of significance (Dionne 1987, Gilmour & Lamb 1975).

Second, since 1952, repeated surveys have shown that from 60 to 71% of the actual voters have responded in National Election Studies surveys that government is too complicated to understand (Neuman 1986, Fig. 1.1). Indeed, effective political support has been shown by Neuman to be related more to the attitudes and behavior of a small (less than 5%) sophisticated political elite than to the views of cross sections of society.

Third, while pluralists such as Dahl (1963) hold that organized interest groups provide an effective means for individual participation in the political system, interest group membership is drawn disproportionately from middle and upper-class segments of the population. These groups are governed by small elites whose values do not always reflect the values of most members (Dye & Zeigler 1975). Dye & Zeigler also point out that most of the communication with decision makers is from other elite members rather than from the general population; also, these decision makers'

perceptions of general attitudes are likely to be affected by their own values, similar to other high status persons.

Furthermore, Neuman points out that for many issues the effective size of the politically sophisticated elite is most often less than his reported 5%. He observes that "for many political matters the effective size of this group could be...a fraction of 1% of the population..." Neuman tells us, however, that this fraction can mobilize the larger half-attentive portion of the political electorate (1986, p.186), if they can raise the issue from obscurity to prominence. Only at that time will some knowledge of the data presented by Manning and Zwick become politically useful.

The hurdle of raising the issue from obscurity to prominence takes us back to the work of Dye & Zeigler (1975) again. If support for a political issue is not easily mobilized except by a small elite which controls what Neuman calls the political alarm bells, how is this group's concern to be aroused? Dye & Zeigler note "...elites are recruited disproportionately from the well-educated, prestigiously employed, older, affluent, urban, white, Anglo-Saxon, upper and upper-middle-class population of the nation" (p. 142). They share a consensus on fundamental values and the range of disagreement among them is relatively narrow, more related to ends than means. If, therefore, one is to stimulate the tiny but politically sophisticated leadership in regard to an issue such as recreation funding, successful research might most effectively be focused first on determining who the interested leaders are.

Further, in order to elicit their concern, research should seek knowledge about the types of recreational tastes and values most likely to stimulate this group's active involvement. Given the social status of these leaders, they are not likely to be stimulated by recreation values or quality issues limited strictly to the popular cultural tastes and values of lower status groups (West, 1981; Burdge, 1969). However, the more popular tastes and values (standardized and stereotyped to appeal to as many as possible; see Gans, 1974, 22) may well benefit indirectly from the actions of higher status political leaders or may well be added on to the funding program once these leaders begin their mobilization of support.

Sociologist Herbert Gans has pointed out that the more highly educated and affluent "establishment" are advocates of what he calls "high culture" (1974, 75-84) and are really concerned about the nature of the good life, particularly outside the work role. While Gans notes that high culture standards and ideas have diffused more widely throughout society, particularly in the upper middle class, popular culture is still very different from high culture.

Gans observes that the economic vitality of high culture depends on affluent people who are its customers and patrons. These high status persons help subsidize the magazines, museums, concerts and other institutions (such as nature conservation areas and landscape parks) which disseminate high culture.

Gans goes on to suggest that high culture and popular culture represent separate taste cultures or differing sets of shared aesthetic values, and these separate taste cultures have to do with values and products about which people have some choice. He includes leisure time values among these cultural differences. Therefore, if the culture specific concerns of these leadership groups are to be surveyed in regard to recreation funding, the leisure time values and tastes which concern these higher culture groups must be ascertained.

From this meager summary of Gans' and others thoughts, we can deduce that the potential activist political leadership, which might mobilize political support for new or re-allocated expenditures for recreation quality, may well have leisure and recreation tastes which differ from those of the majority of

Manning and Zwick's representative sample. Thus if we are to motivate this leadership group to contribute time, money and energy to the task of mobilizing public support for and defense of Vermont's recreation quality budget, we not only will have to survey and identify this set of individuals, but we will need to identify the recreation values and tastes that motivate those individuals' real concerns.

This review of theory and literature suggests that potential political leaders of recreation funding increases will not strongly respond to tastes and leisure values primarily of concern to middle and lower class Vermonters. This may also be true of the values sought by the many out-of-state patrons reserving automobile campsites in Vermont State Parks. Our researchers concerned about funding increases will probably have to design a survey that, as Neuman puts it, will oversample the activist group in the elite leadership stratum. Only then will our researchers understand and be able to supply information actually useful for improving effective political support for high quality recreation opportunities.

Once the leadership group is activated and convinced that an issue is worthy of their time and interest, then that group may assure sufficient support to gain at least part of the budgetary increases required for a perceived public recreation problem.

A note of caution: research of this nature may require primarily non-governmental or private funding, as publicly funded community power studies are often the subject of criticism by partisan political leaders. Nevertheless, if citizens or researchers are really concerned about recreation quality issues, it is argued that this political science-based approach will produce more effective actual results than representative surveys of the general population.

Neuman's conclusion is worth repeating: "The essence of politics lies in the subtle interactions between the elite stratum and the mass public" (1986, 187). If funding research can be narrowed in the fashion suggested by this paper, the supportive leadership groups consequently identified might well be expected to influence both favorable legislative support and tradeoffs. These groups may also persuade a majority of registered voters to support either new taxes or a re-allocation of funds from "non-essential" uses.

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PSYCHOLOGY and LEISURE

THE RELATIONSHIP BETWEEN LEISURE ACTIVITIES AND NEED SATISFACTION: A PRELIMINARY INVESTIGATION

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Logistic regression was used to identify the best predictors of need satisfaction for males and females based on leisure activity preference, age, and social class. The development of such profiles can enable the leisure professional to design services and programs which better match the needs of their clients.

Introduction

As the amount of leisure time has increased during the later half of the twentieth century, researchers have investigated the numerous ways in which individuals have chosen to spend this time. One approach taken by these investigators has been to analyze the relationship between leisure activities and the satisfaction of various psychological, physiological, and social needs. Indeed, psychologists such as Murray (1938) and Maslow (1943) have long postulated that all behavior is a function of needs, and much of their work has provided the theoretical foundations for many of these studies. However, as many researchers have discovered, the relationship between leisure activities and human needs is extremely complex (Tinsley, Barrett & Kass, 1977; London, Crandall, & Fitzgibbons, 1977; Tinsley & Kass, 1978, 1979; Iso-Ahola & Allen, 1982; Allen, 1982). It is not sufficient for example to merely identify a set of needs and to pair them with a particular activity, for as Crandall (1980) argues it is quite conceivable that different activities can be done for different reasons by the same people at different times, and even then the same activity can be done for different reasons by different people at the same time. Moreover, even though many studies have demonstrated a close relationship exists between human needs and leisure preferences, the cause and effect question remains unsolved, as Howard (1976) asks, what comes first, liking a particular activity, or choosing it because it satisfies certain needs?

In spite of the complexity of the relationship between leisure activities and need satisfaction however, studies conducted over the last twenty years have made significant contributions to our understanding of the phenomenon; insight which Tinsley, Barrett, and Kass (1977) argue is imperative in a society where life satisfaction is increasingly dependent upon the profitable use of leisure time. Researchers have found support for the idea that needs are leisure activity specific, that is certain needs are related to certain activities (Tinsley, Barrett, & Kass, 1977; Tinsley & Kass, 1978). They have also found that needs and activities cluster in groups suggesting there is an underlying commonality among them, so that as Iso-Ahola (1980) suggests, people do not walk around with a list of 45 needs in their heads, rather leisure needs tend to cluster together in people's thinking. Regarding the clustering of leisure activities, (London, Crandall, & Fitzgibbons, 1977) this can begin to explain why different activities can satisfy the same

needs for different people; and it also has implications for the substitutability of activities (Ritchie, 1975).

Thus, a wealth of evidence suggests that a close relationship exists between leisure activities and need satisfaction. However, findings regarding gender differences, the influence of social class, and age on the leisure activity and need satisfaction relationship have been contradictory and many researchers have supported Havighurst's (1957) contention that choice of leisure activities is more closely related to needs than to demographic variables such as age, gender, and social class. In spite of this, Beard and Ragheb (1980) recognize the importance of answering such questions as:

"What is the relationship between age and satisfaction derived from leisure activities for each of the "need areas"? Do the type of needs filled by leisure activities vary for male and female participants? How does income and education level relate to leisure satisfaction?" (p31).

They suggest that it is only after we have addressed these questions that we can begin to truly understand the relationship between leisure activities and need satisfaction. Indeed, in reviewing the literature on women and leisure, research indicates that the constraints on the leisure experienced by women are quite distinct from those experienced by most men (Henderson et al 1989). Moreover, Deem (1982) found a strong relationship exists between women's educational level, employment, family, public life, and leisure. For example, women who have not had formal educational opportunities may not be aware of the wide range of leisure activities that exist, or they may lack the confidence to participate. The same may be true for men. Certainly, with regards to vacation choices Graburn (1983) found that individuals with lower education levels lacked the "cultural self confidence" to travel far from home, even when they were not constrained by finances.

Age, or stage in the life course may also be related to leisure activities and need satisfaction. Indeed, Osgood and Howe (1984) note that little is known about the changing motivations for, and the meaning of leisure across the life course. They ask, do the same activities have different meanings for different individuals, or even the same individual at different stages in the life course? Certainly, Iso-Ahola (1980;1981) supports the idea that leisure needs have both stable and dynamic characteristics, and as a result he contends that leisure activity patterns change continuously over the life course as the individual feels the need to experience novelty and change.

Purpose of the Study

Therefore, given that the literature indicates there is a relationship between leisure activities and need satisfaction, but at the same time the influence of gender, social class and age remain unclear, the purpose of this study was to investigate the nature of this relationship, specifically to develop multiple regression models which would elucidate the relationship among leisure activities, need satisfaction, gender, social class and levels of life satisfaction.

Data Collection

The data for this study were collected by a research team consisting of trained graduate students in the spring 1985. A systematic random sample of Connecticut residents was drawn from the telephone directories of different parts of the State. Every nth name was selected and a random point of entry was employed. The interviews were conducted at different times of the day in order to increase the heterogeneity of the sample in terms of occupational status. Each of the interviewers used standardized interviewing procedures which included a screening question asking the subject if he/she were aged over 18.

The resulting sample consists of 639 Connecticut residents; 294 males and 345 females aged between 18 and 66 plus years, with a mean age of 37 years. 47.8% of the sample are employed full time and 14.7% are students.

Instrument

The questionnaire used in this study was designed by Yiannakis. Subjects were first asked to indicate how many times per month they participated in a range (34 items) of leisure activities, which included walking for pleasure, going to bars, and playing racquet sports. Subjects were then asked to indicate the degree to which 19 human needs were satisfied for them, and to rate their overall life satisfaction. The demographic questions pertained to age, family's total annual income, occupational status, highest level of education completed by the interviewee, and gender.

Data Analysis

The data were analyzed in two stages. Principal components analysis with quartimax rotation was employed to identify the constructs underlying the leisure activities scale and the needs scale. The leisure activities loaded on eight factors accounting for 51.2% of the variance. The need scale resulted in a five factor solution accounting for 50.4% of the total variance. All of the items which loaded .5 or above were subsequently used to label each of the appropriate factors.

Logistic regression which is the method most suited for use with non-linear data and nominal and ordinal levels of measurement was employed to identify the variables which best predict the correct classification of individuals who expressed either satisfaction or dissatisfaction with each of the need clusters. Each need cluster was dichotomized into high and low satisfaction based on frequency distributions for the individual needs constituting each particular cluster. The leisure activity factors were recoded into high and low participation rates; income and education levels used as indicators of social class were also dichotomized into high and low. Age and life satisfaction were dummy coded so that each level was treated as a separate variable in the regression analyses. Separate analyses were run for males and females. Each need cluster was entered in the analysis as a dependent variable and the eight activity factors, age, income, education, and life satisfaction were used as independent variables.

Results

- A. Security Needs Cluster:**
Financial security
Safety and personal security
Need for home and/or family

Variables Predicting Satisfaction of the Security Needs Cluster for Males

1. They take part in Family Oriented Activities, such as playing with the dog, cat, or other pet and spending time with their families.
2. They do not participate in Young Social Recreational Activities such as going to bars, bowling or pool, playing football, basketball, or baseball, and attending sports events.
3. They are highly satisfied with life in general.

This model correctly classifies males who report satisfaction with the security needs cluster 79.64%

Variables Predicting Satisfaction of the Security Needs Cluster for Females

1. Females also participate in Family Based Activities.
2. They do not engage in Mature Social Recreational Activities such as playing cards, bingo, or similar games, or spending time with friends and relatives.
3. These women come from families where the annual income is over \$31,000.
4. Like the males, the females also report that they are highly satisfied with life in general. This model correctly classifies females who report satisfaction with the security needs cluster 91.74%

B. The Individuation Needs Cluster did not appear to be related to leisure activities for either males or females.

- C. Love and Affection Needs Cluster:**
Companionship needs
Need for love and affection
Sexual Needs

Variables Predicting Satisfaction of the Love and Affection Needs Cluster for Females

1. These females also take part in family based activities.
2. Their total family annual income is also over \$31,000.
3. They report that they highly satisfied with their lives.
4. These women are aged under 66 years old.

This model correctly classifies females who report satisfaction with the love and affection needs cluster 79.70%

No model is available for males.

- D. Physical Well Being Needs Cluster:**
Need to feel good about your body
Need for health and well being
Exercise needs

Variables Predicting Satisfaction of Physical Well Being Needs Cluster for Males

1. These men participate in Fitness Activities including running, aerobics, cycling, racquet sports, skiing, and weight training.
2. They do not take part in Entertainment Activities such as window shopping, dining out, attending movies, plays, and concerts.
3. But, they do take part in Passive Entertainment Activities such as watching television and listening to the radio.
4. These group is not aged between 26 and 33 years old.
5. They also report that they are extremely satisfied with their lives in general.

This model correctly classifies males who report satisfaction with the physical well being needs cluster 99.1%

Variables Predicting Satisfaction of Physical Well Being Needs Cluster for Females

1. These females also take part in activities associated with the Fitness Factor.
2. They also report that they are extremely satisfied with their lives in general.

This model correctly classifies females who report that their physical well being needs are satisfied 92.77%

- E. Yuppel Needs Cluster:**
Need for variety, excitement, and stimulation
Need to feel competent, accomplished, or successful.

Variables Predicting Satisfaction of the Yuppie Needs Cluster for Females

1. These women take part in Entertainment Activities such as window shopping, dining out, and attending movies, plays and concerts.
2. They also participate in Thrill (Seeking) Activities such as sky diving, hang gliding and the martial arts.
3. These women report that they are either highly satisfied with their lives in general or dissatisfied.

This model correctly classifies females who report satisfaction with the Yuppie Needs cluster 85.24%

No model is available for males.

Discussion

Contrary to the findings of previous researchers, the results of this study indicate that age, gender, and social class do in fact influence the relationship between leisure activities and need satisfaction. The existence of different regression models for males and females indicates that gender is an influential variable, thereby supporting the contention of Henderson et al (1989) that men and women experience leisure differently. For example, with regards to satisfaction of the physical well being need cluster, even though men and women both indicate that they participate in fitness activities, men also show an interest in passive entertainment activities such as watching TV and listening to the radio, whereas, women do not. This difference may be explained by the findings of Deem (1982) and Henderson et al (1989) that women experience time constraints on their leisure due to family obligations, and therefore may not regard watching TV as a need satisfying leisure activity.

With regard to age differences and the relationship between leisure activities and need satisfaction, the love and affection need cluster indicates that females under the age of 66 years are satisfied with this particular need cluster. This finding lends support to Romsa, Bondy, & Blenman's (1985) contention that the need for love and association appears to rise above all other needs as retirement progresses, and therefore, we may speculate that this need is not satisfied for women in our sample over 66 years old.

Pertaining to social class differences, educational level did not appear to be influential in the relationship between leisure activities and need satisfaction for our sample. However, total annual family income did affect the leisure activity/need satisfaction relationship for females for two of our need clusters. Females in families with incomes over \$31,000 were identified as being satisfied with their needs for love and affection and security.

Implications

First, these results have implications for leisure counseling. By identifying those characteristics which are associated with high levels of need satisfaction the counselor can recommend leisure activities to those individuals experiencing deficits regarding one or more of the need clusters.

Second, the profiles identified for each need cluster could be used by the leisure industry to more effectively target sub-populations within the leisure market. By recognizing the characteristics of individuals who report that they are satisfied with respect to particular need clusters, segments of the leisure industry can design their services, programs, etc., so as to enhance the probability that needs will be satisfied. This in turn, will increase the likelihood that individuals will become regular participants resulting in improved profitability for leisure industry and an enhanced quality of life for its clientele.

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DEFINING APPROPRIATE RECREATION USES FOR A PUBLICLY MANAGED RIVER RECREATION ENVIRONMENT *

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This paper examines the question of defining appropriate recreational use for two segments of the Delaware River managed by the USDI National Park Service. In-depth, tape-recorded dialogues were conducted with 204 recreation users of these segments to determine what forms of experience they desire. Content analysis of these dialogues resulted in the construction of user experience profiles for each study participant. Through cluster analysis of these profiles, it was concluded that four basic constituency groups existed. Differences between the groups are explored, with the goal of illuminating issues surrounding the problem of determining appropriate use.

Introduction

During the formative years of outdoor recreation research, Elwood Shafer (1969) wrote a seminal article entitled *The Average Camper -- Who Doesn't Exist*. It was an article that captured the attention of managers and researchers alike. In that era, managers were frantic in their initiatives to develop recreation facilities and services that could keep pace with the burgeoning demand for outdoor recreation. In the rush to provide new opportunities to accommodate the volumes of new recreationists coming to the outdoors, relatively little thought was given to the notion that not all people wanted the same things. In fact, there seemed to be little consideration to the possibility that all the development taking place in the backcountry was in fact destroying the very nature of the experience that many people wanted (Schreyer and Knopf 1984).

Shafer's article articulated what has come to be known as a basic truth in outdoor recreation: that the needs of outdoor recreationists are diverse, and failure to recognize that diversity results in management systems that do not serve recreation needs. The article established a tone that has been the focus of outdoor recreation research ever since. The driving force of research has been to identify and measure diversity, and the search has been on to find meaningful ways to distinguish among outdoor recreationists with different kinds of interests.

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The diversity concept has been explored using a variety of variables such as length of stay (Roggenbuck 1975), commercial versus private trips (Schreyer and Nielsen 1978), method of travel (Shelby 1980), environmental disposition (Hendee, Catton, Marlow and Brockman 1968), experience level (Williams, Schreyer and Knopf 1990) and trip motivations (Brown and Haas 1980). But perhaps the most fruitful approach to conceptualizing diversity has been to focus on the character of experience that recreationists desire while in pursuit of their outdoor activities (Driver 1976).

Much of the "experience-based" research has centered on the development of questionnaires capable of measuring the psychological and social outcomes that people extract from the outdoor experience. These questionnaires have been used to develop inventories of orientation to outcomes such as escape, social contact, exploration, achievement, spiritual fulfillment, arousal and status enhancement. Responses to these inventories have been used as a basis for partitioning people into groups with different goals, and therefore with different management requirements. For example, Bowley (1979) found that trail hikers in the Allegheny National Forest could be partitioned into five groups based on differences in desired outcome profiles -- and that these groups had clear differences in crowding perception, satisfaction level, and degree of support for specific management practices. Such experience-based segmentation research has been prolific throughout the past two decades, and has been the source of much insight for resource managers yearning to identify the distinguishing features of each constituency group they must serve (Knopf 1983).

This paper reports the results of such an experience-based segmentation project -- conducted as part of a larger effort to determine appropriate recreation uses for river corridors under the jurisdiction of the Mid-Atlantic Region of the National Park Service (Lime, Anderson, Knopf, Schomaker and Schreyer 1985).

The scope for this particular project focuses on the Delaware River resource, in the corridor that partitions Pennsylvania from New York and New Jersey. Two National Park Service jurisdictional units are included in the project -- the Upper Delaware Scenic and Recreational River and the Delaware Water Gap National Recreation Area. While the river stretches in these two areas have been serving local recreationists for years, the mix of people migrating from more distant, heavily urbanized areas has been steadily increasing in recent years. The questions facing management of these resources are similar to those facing managers of any outdoor recreation resource:

- resource?
- desired recreation experience?
- Of the different forms of recreation experience that are desired, which are most appropriate for the resource being managed?

These questions are the driving force for this paper. The first two questions are largely empirical or scientific questions. They can be answered independent of management mission or policy initiatives. Appropriately, this paper will provide answers to them in the context of the two Delaware River environments incorporated into the study.

The last question, however, is largely a question that must be answered from the context of a managerial vision or institutional mandate. Its very nature precludes an answer from any agent other than the management community itself. But while the research community cannot provide the answer, it can -- as it reveals answers to the first two questions -- identify alternatives to the status quo. In effect, the research community can help by illuminating the alternative answers that could exist for the third question. It can also help by pointing to the consequences surrounding the alternate ways of answering that question. It is in this spirit that the paper proceeds. It strives

for an empirical determination of answers to the first two questions, so that managers will be better equipped to answer the third.

Study Methodology

In 1986, the Mid-Atlantic region of the National Park Service commissioned an intensive state-of-science review on what is known about the problem of defining the nature of humans' experience. The goal was to use insight from that review to create a comprehensive, innovative methodology for defining and measuring the desired experiences of river recreationists (Lime, Anderson, Knopf, Schomaker and Schreyer 1985).

During the process, over 500 references in the fields of psychology, environmental psychology, social psychology, recreation, sociology, marketing and philosophy that pertained to the measurement of human experience were reviewed. In addition, in-depth personal interviews were conducted with seventeen nationally renowned experts throughout these fields to gain a sense of cutting-edge theoretical and methodological perspective that could have bearing on the problem of measuring the river recreation experience.

From these efforts, a new theoretical model useful for defining the character and diversity of river recreation experiences was created. This model, and the methodology for measuring recreation experience that flows from it, are described in Mid-Atlantic Region Report 26, *The Experiential Aspects of Recreation -- A Review of Relevant Literature and Suggestions for Future Research* (Berger and Schreyer 1986).

The Berger and Schreyer (1986) approach was intended for use in National Park Service settings, and it was implemented in this study. Its basic features are summarized here, but the reader is directed to the original source for detail.

The primary feature of the methodology involves use of in-depth, tape-recorded dialogues with study participants -- a technique relatively novel to outdoor recreation research but time-tested and productive in numerous other fields of inquiry. The dialogues are intended to last as long as a half-hour -- with the interviewer interactively exploring such themes as highlights of the experience, low points of the visit, motives for participating, sources of satisfaction, emotional responses to the experience, images of ideal activity, and feelings about the role of management. The technique is renowned in other disciplines for its ability to deliver rich data on the nature of desired experiences.

A second feature of the methodology is a mechanism for analyzing the tape-recorded dialogues in a way that summarizes their content in a managerially useful form. Berger and Schreyer's state-of-science review led to the identification of thirty-five dimensions that have been used throughout many disciplines to distinguish among people with different kinds of desired experience. These dimensions were incorporated into a rating form, so that a person listening to the tapes could rate the relative presence of each particular dimension in a conversation.

The tape-recorded dialogues that serve as the foundation for this particular study were conducted during the summer of 1986. The recordings were made with 80 visitors to the Upper Delaware Scenic and Recreational River and 124 visitors to the Delaware Water Gap National Recreation Area. Study participants were river recreationists just completing participation in one of three activities: canoeing, rafting or angling. Participants were purposively sampled to approximate the summer population of people engaging in these activities across the two resources, but budget restrictions precluded strict adoption of a statistically-driven sample plan. Following the tape-recorded interviews, participants completed a three-page questionnaire. That instrument gathered background information relating to such variables as state of residence, ethnicity, occupation, education, group size, group composition, past recreational

experience, perceived skill level, and trip motives. Such information was gathered so that correlates of the user experience profiles could be explored.

Five judges listened to each tape-recorded interview, and rated it on each of the thirty-five user experience measurement scales. Ratings passing the test of inter-judge reliability (Graefe, Schreyer, Williams and Knopf 1992) were used to compute an average for each measurement scale for each participant. These average ratings were added to the data base and used as a basis for quantifying desired experiences.

To identify (a) the number of user experience constituencies in the sample (question 1) and (b) the distinguishing features of these constituencies (question 2), a four-stage process was employed. Since the process is elaborate and comprehensively described elsewhere (Graefe, Schreyer, Williams and Knopf 1992), the four stages are only briefly summarized here.

The first stage called for combining the thirty-five individual experience measurement scales into a smaller, more manageable set of broader experience scales or dimensions. The goal was to create a more limited number of scales that could measure the broadest dimensions of variation in desired experience for the particular population of river recreationists at hand. Cluster analysis methodology was used to identify these broad dimensions and the particular measurement scales that could be combined to create them.

The second stage provided for the creation of experience profiles across these new scales for each study participant. The third stage called for additional cluster analyses to partition study participants into groups of individuals holding similar experience profiles. The goal was to identify the number of river constituency groups that could be characterized as holding substantially the same portfolio of desired experience.

The fourth and final stage included a process for identifying variables from the written questionnaire that were statistically linked to constituency group membership. In this way, not only the number but also the distinguishing background characteristics of constituency groups could be identified.

Study Results

Constituency Groups

Cluster analysis of responses to the thirty-five experience measurement scales showed that the underlying dimensionality of response for the study population could be captured by combining the thirty-five measures into nine scales. Details on the conceptual and empirical character of these scales are offered by Graefe, Schreyer, Williams and Knopf (1992). Scale profiles of these nine dimensions were constructed for study participants and subjected to cluster analysis. After many iterations of examining the structure of the profiles, it was determined that the variation across profiles could best be captured by the specification of four user experience groups. In effect, the data suggested that four distinct constituency groups exist among river recreationists using the Delaware River study areas. Again, details on the methodologies and decision-points that led to these conclusions are provided by Graefe, Schreyer, Williams and Knopf (1992).

Five of the nine scales were particularly useful in accounting for differences in desired experiences across groups. The five scales were:

activity commitment -- a measure of the intensity of focus on, and commitment to, the particular recreation activity at hand; the degree to which the activity carries intrinsic meaning in shaping self-definition and self-worth; the degree to which it serves as a vehicle without substitute for building feelings of mastery and competence.

arousal -- a measure of orientation toward active and intense activity as opposed to passive and tranquil activity; the degree to which risky, uncertain experiences are preferred over safe, predictable experiences; the degree to which there is orientation to thrilling, festive experiences rather than mellow and low intensity experiences.

control -- a measure of the intensity of interest in controlling the environment and other people; the degree to which the individual actively shapes the character of the recreation experience; the degree to which the recreationist wishes to emerge as a group leader or decision-maker.

escape -- a measure of disposition toward escaping everyday home and work environments; the degree to which the activity is used as a vehicle for escape as opposed to a phenomenon chosen for its own intrinsic properties.

affiliation -- a measure of the intensity of interest in social transactions; the degree to which there is focus on sharing with others as opposed to having a solitary, self-focused experience.

Figure 1 plots mean scores of the measures comprising each of these five scales for the four user experience constituency groups identified by cluster analysis. Table 1 shows the numbers of respondents comprising each constituency group.

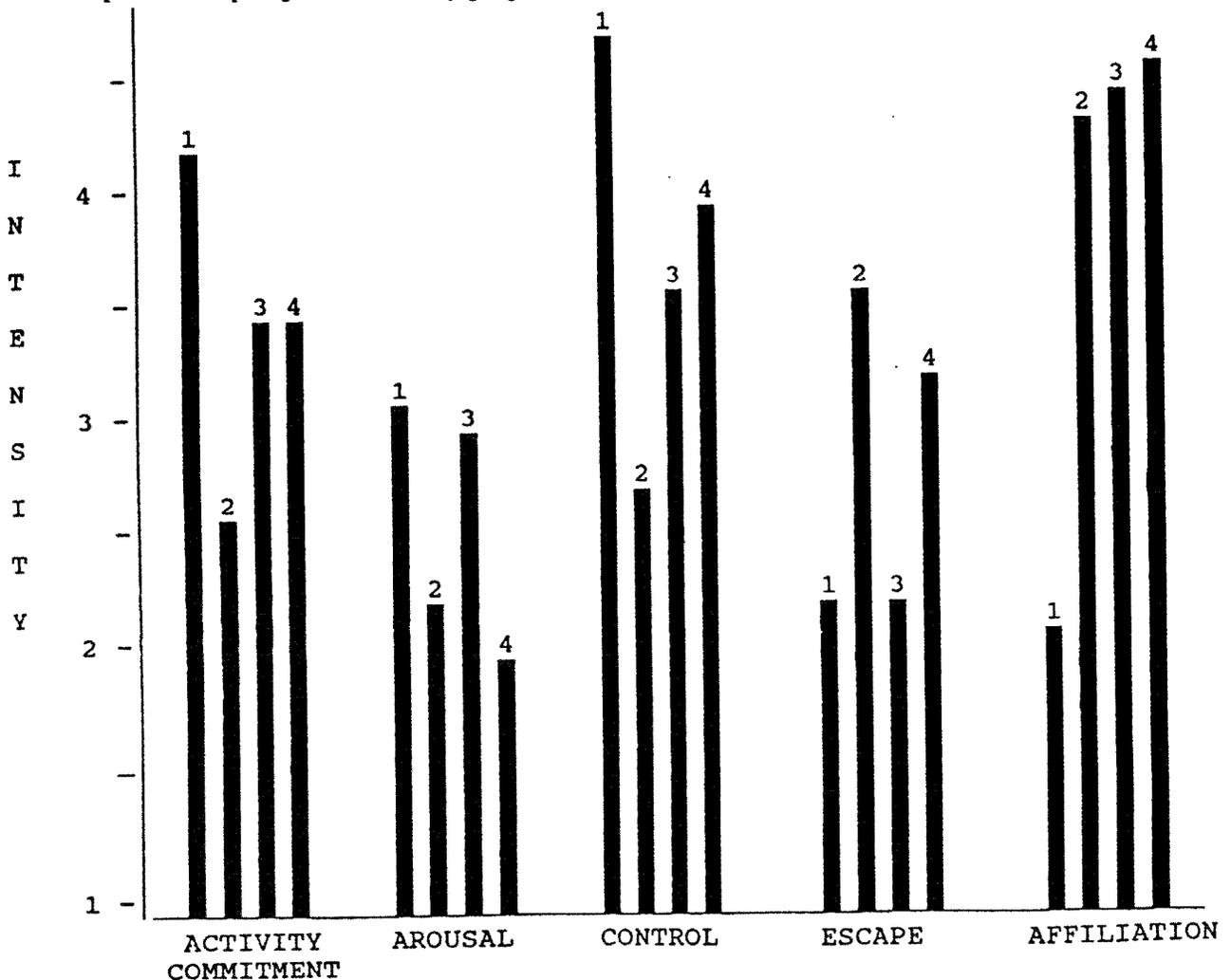


Figure 1. Desired experience profiles for Delaware River recreation constituency groups (Intensity score is positively related to orientation to the desired experience: see Graefe, Schreyer, Williams and Knopf 1992).

Two themes emerge. First, the constituency groups are not even in size. Membership ranges from a low 8.3 percent of the sample to a high 38.7 percent of the sample. Nearly seventy percent of the sample is concentrated in two groups (Groups 3 and 4). Second, there are clear and conceptually meaningful differences between the four groups in desired experience portfolios.

Table 1. Number of Respondents in Each Constituency Group.

Constituency Group*	N	Percent
Group 1	17	8.3
Group 2	45	22.1
Group 3	63	30.9
Group 4	79	38.7
TOTAL	204	100.0

*Based upon oblique principal component cluster analysis -- Ward's minimum variance method (Graefe, Schreyer, Williams and Knopf 1992).

The smallest constituency group (Group 1) appears to be the one most intensely focused on the unique character of the Delaware River recreation experience. Its members show an exceptionally strong commitment to the activity they were pursuing, an even stronger orientation toward controlling the nature of the experience, and clearly distance themselves from the very dominant social orientation of all the rest of the Delaware River recreationists. They are attracted to the river recreation experience for the arousal it inherently provides; they are less interested in using the experience simply as a means to escape the home environment.

On the other hand, members of the next largest constituency group (Group 2) are quite low in their orientation to the particular recreation activity being pursued and equally low in the need to control the nature of the experience that unfolded. Instead, their quest is more squarely placed on escaping undesired situations back home and on socializing.

In turn, members of the second largest constituency group (Group 3) are almost equally interested in a social experience, yet they are clearly less interested in escape and more committed to the activity they had chosen for their recreation experience. And, it seems that they find particular meaning in that activity because of its arousal-inducing potential.

The largest constituency group (Group 4), in contrast, can be distinguished by its orientation toward a more sedentary experience. Like the majority of the other river recreationists, its members show a strong orientation toward a social experience. Yet, they show the lowest disposition of all groups toward producing an arousing experience. Their interests seem to be more centrally focused on using the activity to quietly gain control and enhance self-confidence as they cope with a stress-filled everyday environment back home.

Distinguishing Background Variables

Table 2 reveals background variables that exhibited statistically significant differences across the four constituency groups. Of the variables examined, most emerged as significant -- yielding further testimony to the distinctiveness of the four constituency groups identified by the clustering of experience portfolios.

Group 1 (high commitment to the activity; low interest in socializing) is comprised of the most experienced river recreationists with the greatest attachment to the Delaware River resource. Their desire for input into management of the resource runs particularly high -- twenty points over the average for the entire sample. They tend to be older recreationists (almost half are over 35) and are as likely to be alone as to be with someone else. If they are with someone else, it will likely be with a friend or acquaintance -- not a family member. They are much more likely to use the river on weekdays rather than weekends. In fact, weekday use overshadows weekend use by a three-to-one margin. Relative to the rest of the sample, they are somewhat more likely to use the Upper Delaware rather than the Water Gap area, and anglers have the highest probability of being part of this group.

Group 2 (high interest in socializing and escape; low commitment to activity) includes the least experienced river recreationists in the sample. Its members are not likely to participate in the river experience alone (in sharp contrast to Group 1). In fact, nearly half participate in groups containing at least five people. Group compositions are wide ranging -- from family to friends to acquaintances to combinations of all three. They tend to be young -- over half are twenty-five years old or less. Nearly two-thirds of these group members rate themselves in the novice categories. They tend to express little or no attachment to the Delaware River environment, and they show very low interest in providing input to management.

Group 3 (high interest in socializing and arousal; high commitment to activity) also contains a disproportionate number of young people -- in this case, sixty percent are twenty-five years old or less. However, unlike Group 2

individuals, they tend to express strong attachment to the Delaware River resource. Even while they are younger than Group 2 members, they tend to be more experienced and rate themselves higher in skill levels. They tend to be part of even larger groups than Group 2 members -- with at least a third participating in groups of ten or greater.

Group 4 (high interest in socializing but interested in sedentary experience; high commitment to activity) members tend to be similar to Group 1 members in that they are older and have more experience on the Delaware River. However, they carry lower attachment to the resource and are less intense about having input into management. While carrying a strong interest in socialization, their outing emphasizes the small group experience: three-quarters are in groups of only two, three or four. As was true with Group 1, a disproportionate number of anglers are represented. However, group composition for Group 1, is more varied to include friends, family, acquaintances and every combination thereof.

Management Implications

The purpose of this study was to identify the number of constituency groups seeking different types of experiences on segments of the Delaware River managed by the National Park Service, to identify their distinguishing characteristics, and to set the stage for discussion on what constitutes appropriate use for these resources.

Four distinct constituency groups were identified empirically. Managerially important caricatures of these four groups can be constructed by synthesizing information on their experience profiles (Figure 1) with that on background characteristics of group members (Table 2).

One group of people, which might be characterized as *active veterans*, are the most experienced, most committed, and most personally attached to the Delaware River as a meaningful place. Its members have been using the Delaware River for a long time. They are oriented to the recreation activity itself rather than the social opportunities that might emerge from it. They tend to seek out the more quiet, weekday experiences when they can be in control of the nature of their experience. More than any other group, their experiences seem to be focused upon -- and facilitated by -- the particular and unique stimulation associated with the Delaware River recreation experience.

A second group, which might be characterized as *young novices*, carry a more distant relationship with the resource. Its members are predominantly young recreationists searching for escape in a socializing context. They have extremely low experience in river recreation, and rate themselves as low in river recreation skills. They tend to socialize in large groups. The recreation activity and the recreation resource appears to be little more than a backdrop for the pursuit of the fundamentally important socializing goal. They have relatively little interest in providing input to management. Their orientation toward, and commitment to, the particular recreation activity being pursued is extremely low.

A third group, which might be characterized as *social thrill seekers*, also tend to be young and interested in the social experience. And, they tend to find meaning in the large group experience. However, in contrast to the *young novices*, these individuals tend to be more experienced and tend to attach much greater meaning to the unique character of the Delaware River experience. They seem to care a great deal about the particular activity they have chosen, valuing it for its arousal inducing potential. The activity -- and the environment -- appear to be integral to the experience. But on the whole, their interest in having input into management is substantially less than that expressed by the *active veterans*.

The fourth group, which might be characterized as *casual socializers*, contains members who are oriented to a social experience but wish to accomplish it in a more passive,

Table 2. Background Variables Exhibiting Statistically Significant Differences Across Constituency Groups (values in percent) *

	Total Sample (n=204)	<u>River Experience Type</u>			
		Group 1 (n=17)	Group 2 (n=45)	Group 3 (n=63)	Group 4 (n=79)
<u>Resource Used</u>					
Delaware Water Gap	61	53	60	46	75
Upper Delaware	39	47	40	54	25
<u>Time of Visit</u>					
Weekday	52	77	49	52	48
Weekend	48	23	51	48	52
<u>Group Type</u>					
Friends	48	29	38	37	54
Family	21	0	24	19	25
Family/Friends	12	0	11	13	15
Single	4	47	0	0	1
Other	20	24	27	32	4
<u>Group Size</u>					
Alone	4	47	0	0	1
Two through Four	57	24	51	46	77
Five through Ten	19	18	27	19	15
Over Ten	19	12	22	35	6
<u>Age</u>					
Under 21	17	6	20	36	3
21-25	24	24	31	24	20
26-35	28	24	31	19	34
Over 35	31	47	18	21	43
<u>Activity</u>					
Canoeing	53	59	67	54	44
Rafting	15	6	20	25	6
Fishing	17	29	13	5	25
<u>Activity Experience</u>					
Delaware River:					
Less than three years	50	18	76	54	40
Three or more years	50	82	24	46	60
Anywhere:					
Less than five years	60	35	80	54	58
Five or more years	40	65	20	46	42
<u>Annual Participation</u>					
Delaware River:					
One day or less	54	23	78	54	48
Greater than one day	46	77	22	46	52
Anywhere:					
Two days or less	45	18	67	48	27
Greater than two days	55	82	33	52	63
<u>Perceived Skill Level</u>					
Novice/Advanced Novice	45	12	66	43	41
Intermediate/Advanced/Expert	55	88	34	57	59
In control of activity					
none or some of time	25	0	35	24	27
most or all the time	75	100	65	76	73
<u>Attachment to Delaware River</u>					
None or some	36	12	65	25	33
Fair amount/Great deal	64	88	35	75	67
<u>Desire for Management Input</u>					
None or some	54	35	70	55	47
Fair amount/Great deal	46	65	30	45	53

* Based upon Chi-square tests of significant differences (threshold p value of 0.05)

sedentary way. Its members seem to emphasize the small group experience that provides a tranquil form of escape and the re-establishment of control. They are substantially older than the norm, and have greater experience and skills. They carry a substantial commitment to their activity and the Delaware River resource which facilitates it. They are second only to the *active veterans* in their desire for management input.

Which of these constituency groups are most appropriate for the Delaware River resource? At first blush one is tempted to argue that if anything is inappropriate, it is the question itself. Since we are speaking about a public resource, we should not have the capacity to exclude any use as "inappropriate." Under this logic, each of the four constituency groups should be able to claim their right of access to the resource.

However, recreation research has made it clear that such logic is flawed. As each constituency group lays claim on a resource, the nature of the available experience changes and other groups can lose access to the kind of experience they desire (Schreyer and Knopf 1984). So the aftermath of what seems to be a laudable attempt to serve everyone is in fact a systematic discrimination against certain groups of recreationists. Research has identified the groups that face such discrimination; they are the long-standing, veteran users of resources who were initially attracted by the naturally occurring, unique attributes that the resources carried (Schreyer and Knopf 1984).

In the present study, the constituency group that appears to show the greatest requirement for the naturally occurring, unique attributes of the Delaware River is the *active veterans*. It is interesting that these long-standing, veteran users of the river are strongly overrepresented on weekdays and underrepresented on weekends. It is possible that as the character of the Delaware River experience has changed through the years by the increasing presence of large groups of socially-oriented recreationists on the weekends, the options for the *active veterans* to achieve their desired experience have been reduced. To the extent this is true, their rights to access have been discriminated against in favor of the other constituency groups. They are forced to seek meaning in the weekday environment -- but only a limited number of people have the luxury of creating that option. If this logic holds, the small numbers associated with the *active veterans* group (8.3 percent of sample) may well be an indication that the experience they seek is no longer readily available. As Shafer (1969) would put it: by attempting to serve everyone, many will not be served at all.

Given the scarcity of our recreation resources and the conflicting experience orientations of our recreation clientele, it is no longer an option to attempt to meet the needs of everyone at each resource. The onus is upon managers to create a vision that defines what is to be delivered at any given resource within a context of what is available elsewhere. In this way, the desired experiences of everyone might in fact be available somewhere. Managers of the Delaware River can define many visions for the appropriate use of the protected environment. One goal might be to favor the requirements of recreationists whose desired experiences are directly linked to the intrinsic properties of the natural resource. If this was the goal, then the most appropriate use would be that characterized by the *active veterans*. Under this management scenario, the constituency group characterized as *young novices* could be judged to hold needs that could be met in any number of alternate (and more plentiful) recreation settings. They could be directed elsewhere for their recreation experience without severely impacting upon their ability to achieve the outcomes they desire.

On the other hand, a goal of management might be to build new public constituencies and to introduce urban populations to outdoor experiences. Under this management scenario, it

would not only be important, but strategically wise, to emphasize opportunities for *young novices* on the river.

Perhaps the goal of management would be to build these new urban constituencies, but to favor recreationists that find value in the naturally occurring, unique properties of the Delaware River environment. Under this management scenario, the needs of the *social thrill seekers* should be emphasized.

Alternatively, the goal of management might be to offer a resource that meets the needs of stressed urban populations yet does it in a way that emphasizes tranquility and low environmental impact. Under this management scenario, opportunities for *casual socializers* should be emphasized. While having social needs and a strong stress response that characterizes much of mass recreation, their small group character, their disposition toward low arousal, and their commitment to the resource would evoke much lower levels of social and environmental change than the *young novices* and *social thrill seekers*.

Certainly, definitions about what constitutes appropriate use are not mutually exclusive. It may be appropriate to accommodate a mix of constituency groups, or it may be appropriate to zone the resource to favor different constituencies at different places or times.

The decision about what constitutes appropriate use is not an easy one. Not only must the needs of existing clientele be considered, but also the needs of former clientele who no longer come to the resource because the available experience has changed. Not only must the current structure of services be evaluated, but also totally different forms of services that would appeal to people who are now alienated by what is available. Not only must the specific resource in question be considered, but also the array of opportunities available elsewhere.

While this study has served its purpose in identifying the number and distinguishing features of user experience constituency groups on the Delaware River, the task of defining appropriate use has just begun. That task rests beyond the bounds of research and is legitimately housed in the management arena. Yet, empowered by research, management is in better position to discern the complexities surrounding the decision and to assess the consequences. It is in this spirit that the research community offers itself as a facilitating partner and an enabler in the complex task of defining appropriate use.

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