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Issues of Ethnicity Among State Park Visitors in the New York Metropolitan Area *Kieran Quinn* (Palisades Interstate Park Commission)

Managing Recreation Resources to Enhance Regional Cultures *Francisco Valenzuela* (U.S. Forest Service-Milwaukee)

Barriers to Implementation of Sustainable Tourism Initiatives *Andrew Holdnak* (University of Florida)

The Tourism Life Cycle and Net Migration in a Vermont Community *Varna M. Ramaswamy and Walter F. Kuentzel* (University of Vermont)

Outdoor Recreation Activity Preferences: A Geographical Perspective Based on Population Density *A. Williams and Robert A. Robertson* (University of New Hampshire)

The Problems of Movie Induced Tourism *Roger Riley* (Illinois State University), *C. Van Doren*, and *D. Baker* (Texas A&M University)

Involvement With New Hampshire Snowmobile Association's Trailmaster Program: A Profile of Volunteer Activities and Motivations *Michael Provost and Robert A. Robertson* (University of New Hampshire)

Salmon Falls River Greenbelt Plan: A Study in Coordination Between Non-Profits, Municipalities, and States *P. Schumacher* (Town of South Berwick, ME) and *J. Demetracopolous* (Great Works Regional Land Trust)

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Locus of Control as a Factor in Hunting and Fishing Participation Among Northeast Kingdom Residents *Rodney Zwick* (Lyndon State College), *Ron Glass* (USDA Forest Service, Northeastern Forest Experiment Station), *David Solan* (Mansfield University), and *David Tucker* (Northeast Kingdom Community Action)

Sustainable Tourism and Cultural Attractions: A Comparative Study in Ethnic Interpretative Centers in China and Canada *Y. Li* (University of Western Ontario)

Ethnicity and Recreation: A Case of Korean Immigrants *W. Jeong and H. Kim* (Pennsylvania State University)

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Computer Simulation for Recreation Management on the Carriage Roads of Acadia National Park. *Ben Wang and Robert Manning* (University of Vermont)

Hands on or Hands Off? Disgust Sensitivity and Preferences for Environmental Education Activities. *Rob Bixler* (Cleveland Metroparks) and *Myron Floyd* (Texas A&M University)

Professional Preparations for the Management of Festival Events. *J. Zanhar* (City College, Ottawa, Canada) and *J. Kurtzman* (Sports Tourism International Council, Ottawa, Canada)

Historical Perspectives of Festival Events. *J. Zanhar* (City College, Ottawa, Canada) and *J. Kurtzman* (Sports Tourism International Council, Ottawa, Canada)

The Concept of Value in Outdoor Recreation. *Tom More* (USDA Forest Service, Northeastern Forest Experiment Station)

Influence of Intrinsic and Extrinsic Factors on Environmental Concern and Behavior. *Victor Caro* (West Virginia University)

Economic Impacts of Snowmobiling in New Hampshire. *Dan Gardoqui and Robert A. Robertson* (University of New Hampshire)

The Influences of Demographic Factors on Incentive Reward Preferences. *Kimberly J. Shinew, Margie Arnold, and D. Tucker* (University of Illinois)

The Coalition for Unified Recreation in the Eastern Sierra (CURES): A Profile of a Cooperative Recreation and Tourism Planning Initiative. *Nancy Myers* (U.S. Forest Service) and *Steve Selin* (West Virginia University)

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**Water Based
Recreation**

**A COMPARATIVE ANALYSIS OF VALUE
BETWEEN USERS AND NON-USERS OF THE
WHITE RIVER**

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Abstract: There has been on-going debate determining whether Vermont rivers should be protected for in-stream uses, or whether they should be diverted for uses such as snowmaking and the generation of hydroelectricity. The economic benefits associated with protecting natural river flows are more difficult to quantify than the benefits associated with withdrawing the river water for out-of-stream uses, and, therefore, are often overlooked. This study used a contingent valuation mail survey of 3,000 Vermont households to quantify the total economic value of maintaining natural river flows in the White River. Survey results indicate that White River users spend a significant amount of money on expenditures associated with their use of the River. Users and non-users are willing to pay to maintain the current natural river flow, which they allocated to both use and non-use values, such as the ability to bequeath the river in its natural state to future generations. These results should encourage policies which protect in-stream uses of Vermont rivers in order to ensure the long-term health of river recreation in Vermont.

Introduction

Recently, there has been substantial controversy surrounding water withdrawal and diversion from Vermont rivers. The benefits associated with consumptive river uses are easily quantified through the market. There are also values associated with maintaining rivers in their natural state. For example, values derived from using the river for recreation, and/or values derived from just knowing the river exists, regardless of being able to see or experience it. However, these values are not traded in the market and are therefore more difficult to quantify monetarily than are the benefits associated with withdrawing the river water for other uses, such as snowmaking and hydroelectric generation. It is important to value non-market benefits because it demonstrates the importance of non-consumptive river uses (uses which do not divert water out of the river). In addition, identifying these benefits can help to ensure that these values are accounted for by policy-makers deciding how to best allocate our water resources among competing uses.

The objective of this research was to measure the total economic value associated with protecting the natural river flow levels in the White River in order to guide public decisions on how to best manage water resources in Vermont. The White River was selected for this study because it is one of the only free-flowing

rivers remaining in the state and is a popular recreational destination for canoeing, fishing, tubing and swimming, and nature and wildlife observation.

Methods

Survey Development and Administration

The White River Study used the contingent valuation method to measure the changes in value associated with hypothetical river flow reductions. Contingent valuation is a method commonly used to by resource economists to impute economic value for natural resources. Respondents are asked their willingness to pay (WTP) for an increase in, or to prevent a decrease in, the quantity or quality of an environmental good. The survey was sent to a stratified sample of 3,000 Vermont households -- those in towns bordering the river (regional stratum) and those in all other Vermont towns (state stratum). A modified version of Dillman's Total Design Method was used, which included two survey mailings and a post card reminder. In addition, a follow up phone survey of 10% of the non-respondents was performed to verify that the results could be extrapolated to the target population.

The first section of the survey included questions regarding the frequency of river use (# trips/year), the quality rating of the river in its current state to users, the importance of the river flow level to users, and the amount of money spent by users on non-durable and durable goods. Non-durable expenditures elicited from respondents included money spent by users during their last trip to the White River. Durable expenditures included money spent by users on goods attributed to recreation on the White River within the last year.

The second section of the survey described a reduction in river flow level to two different water levels (water level I and water level II, where water level II is lower than water level I). The hypothetical reductions in river flow level would occur due to two different development proposals, a hydroelectric facility, and a ski/golf resort (Table 1).

Table 1. Hypothetical resource scenarios.

Type of Development	Hypothetical Reduction
Hydroelectric Facility	Water Level I
Hydroelectric Facility	Water Level II
Ski and Golf Resort	Water Level I ^a
Ski and Golf Resort	Water Level II ^b

^a/ Water level one is identical to the reduction under the hydroelectric facility proposal.

^b/ Water level two is identical to the reduction under the hydroelectric facility proposal.

In the elicitation section of the survey, respondents were asked in an open-ended format for their maximum willingness to pay (WTP) to prevent a reduction in water level under both the hydroelectric facility and the ski and golf resort. A dichotomous choice question immediately preceded the open-ended question to more closely simulate a market situation. Finally, the fourth section of the survey inquired about respondents' socio-demographic characteristics and their general attitudes toward the environment.

Estimation Procedures

The estimated totals were calculated using the following equations:

Equation 1: Non-durable expenditures

Total = mean \$/trip * mean # trips/year * (% users in stratum * # households in stratum population).

Equation 2: Durable expenditures

Total = mean \$/year * % attributed to White River use * (% users in stratum * # households in stratum population).

Equation 3: WTP

Total WTP/year = mean WTP/year * (# households in stratum population).

Results

Fifty-four percent of the regional respondents and 14% of the state respondents indicated that they had used the river in the past five years. Of these users, regional and state respondents used the river an average of 34 and 7 days per year, respectively. Over 70% of all users rated the current river quality as "good", "very good", or "perfect". In addition, approximately 80% of all users responded that the river flow level was "important" or "very important" to their recreational enjoyment on the White River.

The mean and estimated total expenditures on non-durable and durable goods by river users are presented in Table 2. In general, state respondents spent more, on average, than regional respondents. Overall, users spent an estimated total \$33 million on non-durable goods per trip to the White River. In the year preceding the survey, users spent an estimated \$2.5 million on durable goods attributed to recreation on the White River.

Table 2. User non-durable and durable expenditures.

	Non-durable		Durable	
	Mean \$/trip	Total \$/year	Mean \$/trip	Total \$/year
State	\$106	\$19.9M	\$76	\$2.1M
Region	\$46	\$13M	\$28	\$237,000

The mean and estimated total WTP values for users and non-users to prevent a reduction in river flow level and maintain natural river flow levels in the White River are presented in Table 3. Overall, respondents were willing to pay more to prevent a reduction to flow level II (the lower flow level) than they were to prevent a reduction to flow level I and regional respondents were willing to pay more than state respondents. Together, users and non-users were willing to pay an estimated \$5.7 million per year to prevent a reduction from the current natural flow level to water level I and an estimated \$6.7 million per year to prevent a reduction to water level II.

Two sample t-tests revealed that users were willing to pay significantly more than non-users to prevent a reduction in flow to both water levels, under both developments. The only exception was that there was not a significant difference in the amount state users and non-users were willing to pay to prevent a reduction to water level II (Table 4)

Table 3. Willingness to pay to prevent a reduction in river flow level.

	Water Level I		Water Level II	
	Mean	Total	Mean	Total
State				
User	\$45	\$1.3M	\$49	\$1.4M
Non-user	\$22	\$3.7M	\$27	\$4.5M
Region				
User	\$62	\$531,000	\$70	\$595,000
Non-user	\$25	\$183,000	\$26	\$194,000
Total	N/A	\$5.7M	N/A	\$6.7M

Table 4. Two sample t-tests for significant difference in WTP values between users and non-users.

	Mean WTP Water Level I	Mean WTP Water Level II
	State Stratum	
Users	\$46.39	\$49.72
Non-users	\$22.21	\$26.67
p-value	.003*	.051
Regional Stratum		
Users	\$62.91	\$70.90
Non-users	\$24.00	\$26.00
p-value	.004*	.001*

a/ * p < .05.

Regardless of whether they used the river or not, respondents allocated only a portion of their total value (WTP to prevent a reduction in White River flow levels) to the ability to use the river now for recreational purposes (Table 5). Instead, they allocated the majority of their WTP to non-use values, including option, existence, bequest, and altruistic values. Option value is the value of knowing that one has the ability to use the river at some future time. Existence value is the value of simply knowing the river exists in its natural state. Bequest value is the ability to leave the river in its natural state for future generations. Altruistic value is the value associated with the knowledge that the river is protected for others to use. Respondents allocated the majority of their WTP to bequest value.

Table 5. Breakdown of WTP by regional and state users and non-users.

Region	Users	Non-users	State	Users	Non-users
Use	20%	8%	Use	17%	8%
Option	20%	13%	Option	14%	11%
Existence	16%	21%	Existence	16%	19%
Bequest	30%	35%	Bequest	31%	38%
Altruistic	12%	14%	Altruistic	14%	15%

Discussion and Implications

Although a larger percentage of regional respondents used the White River for recreation, state users spent more on durable and non-durable goods than regional users. This is probably due to the fact that state users travel further distances to recreate on the White River and rely more on, for example, local hotels and restaurants than do regional users. It is also important to note that in general, users were willing to pay significantly more than non-users. This is not surprising because a reduction in river flow level would inhibit users' ability to enjoy the river for

recreation. In addition, regional respondents were willing to pay more than state respondents. Again, this was expected because a larger percentage of regional respondents use the river for recreation, they live closer to the river, and as a result, may be more directly affected by allocation decisions concerning the White River.

The results of this study emphasize that the White River in its natural state is valuable to Vermont residents and the state and local economies. Through the purchase of durable and non-durable goods and services, White River users contribute a significant amount of money to the Vermont economy, and are

willing to pay to ensure that natural river flows are protected. However, non-users also derive value from the river in its natural state, and are also willing to pay to prevent flow level reductions. Both users and non-users attributed the majority of their value to the ability to bequest the unaltered river onto future generations.

It is important that managers consider all of the benefits associated with river flow protection when deciding how to best allocate our water resources among competing uses. Policies which take into account the economic benefits of non-consumptive river uses will help ensure the long-term health of water-based recreation in Vermont.

**MICHIGAN RECREATIONAL BOATER
COMPLIANCE WITH THE CLEAN VESSEL
ACT IN USE OF PUMPOUT AND DUMP
STATIONS: RELATIONSHIPS BETWEEN
ATTITUDES, KNOWLEDGE, SOCIO-
DEMOGRAPHIC FACTORS AND BEHAVIOR**

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Abstract: Attitudes have been debated as a contributing factor to behavior for decades. If this is the case, people's behavior in recreational settings should be partially influenced by their attitudes. Because many recreation activities occur in natural or other outdoor settings, environmental attitudes should be at least partially influential. A scale to measure a "new environmental paradigm" (NEP) has been developed to assess people's environmental attitudes. Using the NEP scale, this study assesses the influence of environmental attitudes as well as water pollution-related knowledge and two sociodemographic factors on Michigan recreational boaters' use of pumpout and dump facilities. Based on the Clean Vessel Act and state regulations, boaters are not allowed to dump sewage, treated or untreated, directly into inland or Great Lakes waters.

Introduction

For decades social psychologists and other researchers have been interested in the concept of attitudes: what are attitudes, how they are developed, how attitudes are changed, and what the relationships are between attitudes and other variables such as knowledge and behavior. A plethora of attitude work was conducted in the 1920s and 1930s, but by the 1950s the concept of group dynamics had overshadowed attitude research. However, attitudes received renewed attention beginning in the 1960s. Some research looked at differences and relationships between attitudes and other variables, such as values, opinions and knowledge. Much of the research focused on identifying factors that contribute to the development of attitudes and how attitudes could be changed by manipulating a variety of factors, including genetic factors, physiological factors, and interaction or communication factors. (McGuire, 1969) More recently, many of the factors identified as contributing to attitude development and change (e.g., information source factors such as characteristics, similarities between the source and information receiver, credibility of the source, familiarity with and degree of "liking" of the source, power relationships or positions, message channel type [e.g., personal, print, mass media], message characteristics such as type of appeal [e.g., fear vs. explanatory request], style of presentation, order of presentation of message elements [including primacy and recency effects], and time at which

information is received, especially relative to the time in which the behavior is engaged; and message receiver factors such as degree of active participation; and use of other strategies such as incentives or threatened sanctions) have been incorporated into studies about persuasion and the effectiveness of communication and other factors in guiding recreation behavior (Manfredo, 1992; McGuire, 1969; Vander Stoep and Roggenbuck, in press; Wang, Theresa L., Anderson, Dorothy H., and Lime, David W., 1996 draft).

For many years there has been considerable debate about if and how much influence attitudes have on behavior. Conceptually it seems to make sense that a person would tend to behave in concert with personal attitudes about specific objects, people, events and behaviors rather than behaving in ways inconsistent with those attitudes. As theories have developed, however, researchers have proposed that other factors contribute to, interact with, or overshadow the direct impact of attitudes on behavior. A variety of situational factors can screen, alter or otherwise affect the influence of attitudes on behavior. Additionally, several attitudes about different elements of a situation may be invoked at any given time. For example, a person may believe that protecting the environment is a good thing in general and, in many situations, would behave in a manner protective of environmental resources. However, in a given situation that person may not know that a certain behavior is damaging to the environment (e.g., hanging a lantern from a nail pounded into a tree) or may feel he/she has no alternative to a destructive behavior in a given circumstance (e.g., being caught above tree line on a mountain when a lightning storm begins, then racing straight down the mountain, disrupting fragile tundra vegetation on steep slopes and encouraging rapid erosion rather than staying on the longer trail route composed of many switchbacks).

In the first of the two scenarios presented above, the camper did not have the knowledge that heat from a lantern can damage the cambium layer of a tree or that a nail pounded into a tree, particularly if removed, could provide entry for destructive insects. Therefore, that person would not feel he/she had done anything in discord with personal pro-environmental beliefs. In the second scenario, even if the hiker knew that trail cutting across switchbacks would contribute to vegetation damage and erosion, and even if the hiker held resource-protective attitudes, attitudes about personal safety were more salient at that time. Thus, the hiker trail cut to get to more protected lower elevations to minimize the chances of being struck by lightning.

In his norm activation model, Schwartz (1977) states that a person's general cognitive structure (which includes their beliefs) influences behavior. He posits that socially developed behavioral norms create moral obligations to behave in ways consistent with those beliefs. Beliefs, he states, are influenced by 1) a person's awareness of the consequences of specific behaviors, and 2) placement of responsibility (themselves vs. other people or circumstances) for the behaviors. It is possible that, while a person may accept personal responsibility for behavior in many situations, external conditions or constraints may "force" them to behave in non-normative ways in other situations. In such cases, they deny personal responsibility and project it elsewhere, either to some other person or a situational factor. Heberlein (1972)

supports the notion that certain intervening factors such as perceived low choice in selecting behaviors or situational constraints can affect the ultimate behavior. Therefore, attitude influence could be circumvented or blocked by these other factors or conditions.

Ajzen and Fishbein, in their theory of reasoned action (1980), proposed a model that indicates that some behaviors are "reasoned," or the result of conscious thought. Antecedent variables, which influence a person's intentions to behave in certain ways, include the person's 1) attitude toward a specific behavior (composed of two factors, including their beliefs that certain behaviors lead to specific results, and the person's evaluation of the outcomes) and 2) a subjective norm, which is composed of two additional factors: beliefs about what is normative behavior, particularly about what others who are important to them think about them for behaving in certain ways, and their motivation to comply with those perceived expectations of others. The person's behavioral intentions, then, should be highly correlated with the actual behavior. In this model, attitudes are based at least partially on the person's beliefs. Ajzen (1985) later expanded the Theory of Reasoned Action to a new model called the Theory of Planned Behavior. The new model includes behaviors not totally under volitional control, acknowledging that a person's actions sometimes are influenced by a variety of internal and external factors which may inhibit or change the intended behavior. Again, attitudes could be blocked, and thus have little correlation with the actual behavior.

Others (Vande Kamp et al., 1994) have suggested that not all behaviors result from conscious, rationale decision-making processes. They contend that behaviors may be the result of cognitive "scripts" or simple decision rules that simplify decision-making. These scripts may be based on repetitive reaction to similar situations over time, or may simply be in response to broad personal rules for behaving. While not specifically stated, attitudes very well could be a part of the early development of such cognitive scripts.

Based on historical philosophical perspectives, supported by subsequent research, McGuire (1969) states that the human condition is comprised of three primary constructs: the cognitive component (knowledge, information, and perception); the affective component (feelings and emotions, likes and dislikes); and the conative component (action and behaviors). These three elements are woven into a variety of attitude/behavior models even though they may not be labeled as such. This suggests that both knowledge (cognitive element) and attitudes, to which feelings, emotions, and beliefs may contribute (affective element), be assessed for their relationships with behavior (conative element).

The above represent only some of the theories and models developed to describe variables influencing behavior. While early models proposed fairly direct links between attitudes and behavior, more recent models indicate much more complexity in the decision making process. Ajzen and Fishbein (1973), in their research to develop their models, noted that much of the research assessing the relationship between attitudes and behavior was conflicting and often inconclusive. Some studies indicate that attitudes are comprised of several factors or constructs; others

indicate that attitudes are only one of the factors that influence behavior.

In the recreation literature, results also have been varied, thereby indicating the importance of other variables in influencing behavior in specific situations. In various situations, the following have been shown to have some influence on behavior: characteristics of the message sender (particularly if the message is delivered in person); characteristics of the message itself; characteristics of the message channel (personal, print, electronic, audio); timing of the message; visitor characteristics and motivations; characteristics of the social context, and use of incentives or threatened sanctions (Vander Stoep and Roggenbuck, in press). While few of these specifically assess attitudes, it is likely that attitudes (e.g., about authority, about other people, about recreation motivations and experience expectations, about the recreation environment) have some degree of influence. However, the importance or role of the attitudes in predicting behavior or developing targeted messages to guide recreation behavior has not been determined.

In this study, the relationships of environmental attitudes, specific environmental knowledge (in this case, related to knowledge about water resources and pollution), and sociodemographic variables with a specific behavior (use of dumps and pumpout stations for disposal of recreational boating sewage) is assessed.

Study Context

Michigan's extensive water resources, both inland lakes and rivers as well as 3,200 miles of Great Lakes shoreline, annually attract thousands of recreational visits by residents and visitors from across the country. Among them are thousands of boaters. For years, Michigan has been identified as one of the top two or three states for boating activity. In 1994 Michigan had 555,000 active registered boaters (of 770,000 total unexpired registrations) who reported 4.8 million boat days on the Great Lakes and 8.6 million boat days on inland lakes (Stynes, Wu and Mahoney, 1995). With this much boating use, the potential exists for extensive water quality degradation resulting from improper disposal of boat sewage. Unlike recreational boaters operating in ocean or gulf waters, Great Lakes boaters are not allowed to dump sewage, treated or untreated, anywhere in inland lakes or the Great Lakes, even beyond three miles from shore.

In 1992 the federal government passed the Clean Vessel Act (PL 102-587) as part of an effort to reduce boat sewage pollution in United States coastal and Great Lakes waters. The Act provides federal money to increase the availability of sewage pumpout and dump stations for boats having Type III marine sanitation devices (either installed holding tanks or portable toilets). To access this money, states are required to submit a plan for providing sufficient numbers of pumpout and dump stations to meet boaters' needs, to increase access to and ease of use of these stations, and to otherwise facilitate their use by boaters.

Before federal legislation and/or state legislation of many coastal and Great Lakes states was passed, Michigan designated its coastal waters in 1987 as "no discharge areas" in response to the US Environmental Protection Agency's (EPA) Clean Water Act (under Sections 312(f)(3) and 312(f)(4)A & B). Michigan

required all marinas with a capacity of 15 boats or more either to provide a pumpout facility or to have an agreement with a nearby marina to provide those services. Currently, that program and the Clean Vessel Act (CVA) Pumpout Grant Program are administered in Michigan by the Michigan Department of Natural Resources' Land and Water Management Division. Through these programs, Michigan is attempting to provide additional pumpout facilities where needed and better facilitate boaters' use of those facilities. However, even with increased availability of dump and pumpout facilities, boaters' still assume personal responsibility for appropriate disposal of their sewage.

Factors critical to a successful CVA program of facility provision, boater education, and increased use of the facilities include 1) boaters' awareness of relevant regulations, location of pumpout and dump stations, and how to use them; 2) boaters' current use of and need for pumpout and dump stations; and 3) boaters' use and preferred sources for boating information, including information about pumpouts and dump stations. In developing a plan for increased use of dumps and pumpout stations, hopefully resulting in decreased boat sewage pollution of Michigan waters, it may be helpful to understand boaters' attitudes toward the environment in general and their role in contributing to clean or polluted water. Specific knowledge and sociodemographic factors may also influence or help predict sewage dumping behavior.

Purpose of the Study

This study is part of a much larger Michigan recreational boater study, which included boat use patterns, boating-related expenditure patterns and economic impacts, a marina inventory, a transient boater survey, and a boater information/education/environmental attitude study. The purpose of this paper is to assess the relationships between Michigan recreational boaters' environmental attitudes, their knowledge of water-related environmental issues, sociodemographic variables and their use of sewage pumpout and dump stations.

Related hypotheses are:

As respondents' environmental attitudes become more positive toward the environment (higher NEP scale scores), they will more often dump boat sewage appropriately.

As respondents' knowledge of water and water pollution issues increases (higher knowledge scale scores), they will more often dump boat sewage appropriately.

Age will have no effect on respondents' boat sewage dumping behavior.

As respondents' income increases, they will more often dump boat sewage appropriately. (This is based on previous studies that indicate income and education level are usually highly correlated.)

Methods

The environmental attitude and knowledge assessments were incorporated into the information/education portion of the larger Michigan recreational boater study. The

information/education/environmental attitude study used both a mail survey and a series of three focus groups to solicit boater responses. Results presented here will be restricted to those of the mail survey.

Mail Survey

The information/education/environmental attitude mail survey, which used a sub-sample of respondents from the general Michigan boater survey, was conducted in November and December of 1994 after responses from the general Michigan boater survey (boat use patterns and boating-related expenditures) were received. (The general boater survey used a stratified random sample of 6,000 from the total Michigan boater registration list of 901,000. This sample was stratified by geographic region (10 regions) and boat size class (four size classes), with coastal boaters and owners of large boats being more heavily sampled.) The target sample size for the information/education/environmental attitude survey was 2,000. Because this sample was stratified only by boat size class and not by county or region, the smaller sample size was sufficient. The actual sample of 1,949 boaters was drawn from respondents to the general boater survey who indicated willingness to participate in a second survey.

The information/education/environmental attitude survey was not included with the general boater survey because the combined length, which would have been extensive, probably would have reduced the response rate on both parts of the survey. The sub-sample strategy rather than a separate sample was used so that some responses from the general boater survey (such as those dealing with sociodemographic variables) could be linked with those of the information/education/environmental attitude survey so they did not have to be repeated.

The mail survey was administered using a modified Dillman procedure (Dillman, 1978). Reminder postcards were sent to all respondents within 10 days of the original mailing. No second survey was sent unless the respondent requested one after the postcard prompt.

The sample was stratified by boat size class, with more heavy sampling of boaters owning large boats (those in the two boat size classes of 21-28 feet and \geq 29 feet) because they are more likely to have installed and/or portable toilets than small boats, for whose owners the questions might have seemed irrelevant. The final sample size of 1,949 was less than the target sample size of 2,000 because not enough general boater survey respondents owning boats in Class Size C (21 to 28-foot boats) indicated willingness to complete a second survey. Of the 1,949 surveys mailed, thirteen were undeliverable, three were returned and noted as "irrelevant" by the respondents, and two were marked with "respondent deceased," resulting in a final sample size of 1,931 (see Table 1).

The overall response rate, based on the original boat size classification scheme upon which the sample was drawn, was 62%. Within class sizes, the response rates ranged from 58% to 66% (see Table 2).

Table 1. Sample sizes by boat size class

Boat Size	Original Sample Size	Sample Size Adjusted For Undel/Irrel
< 16'	400	400
16-20'	400	395
21-28'	549	541
29'	600	595
TOTAL	1,949	1,931

Table 2. Response rates by boat size class.

Boat Size	Response Rate ^a
< 16'	63.0
16-20'	63.0
21-28'	58.0
29'	66.0
OVERALL	62.0%

a/ Prior to removal of 56 unusable surveys

Before analysis, 56 questionnaires were removed from the database either because the respondent indicated owning multiple boats (rather than the single boat corresponding with the registered boat upon which the sample selection was based) or because some other factor rendered the data unusable. Thus, the final number of usable questionnaires was 1,210. Of this total, the number and percent of the total respondents within each boat class size (before weighting) was as indicated in Table 3.

Table 3. Percent of sample for each boat size class.

Boat Size	Sample Size	Percent ^a
< 16'	254	21.0
16-20'	248	20.5
21-28'	312	25.8
29'	396	32.7
TOTAL	1,210	100.0

a/ After 56 unusable surveys were removed.

Because there are many more small boats than large boats registered in Michigan, and because the original sampling scheme over-sampled large boats, responses were weighted to more accurately reflect the profile of boats of different sizes in Michigan. Based on the boat size profile weights, the percent of respondents with boats in each class size is listed in column A below. However, because some respondents own more than one boat and completed the information/education/ environmental attitude survey based on a different boat from the one for which they were sampled, an adjustment to the weighted percent had to be made, in Table 4 below. Column B shows the revised weighting for each boat size class which was used for the analysis of survey data.

In this paper, some results will be presented for weighted as well as unweighted data for two reasons: 1) weighted data creates the equivalent of a huge sample size, thus rendering many results apparently significant when they really may not be; and 2) weighting greatly reduces the influence of the larger boat owners during analysis, which may create an erroneous understanding of large boat owners, who comprise the primary sample target group. Responses from large boat owners are important because

they are more likely to represent sewage dump and pumpout station use patterns because larger boats are more likely to have portable toilets or installed heads

Table 4. Weighted sample size for each revised boat size class (used for weighted analysis, though some analysis is conducted with unweighted data).

Boat Size	A	B
	Original Boat Size %	Revised Boat Size %
< 16'	58.5	54.5
17-20'	21.4	25.9
21-28'	15.4	15.8
29'	4.7	3.8
TOTAL	100.0	100.0

To check for response bias, several variables for the respondents to the information/education/ environmental attitude survey were compared with those of respondents who did not receive this survey (e.g., by boat type, boat class, region of residence, place where boat is kept, and whether or not the boat has any type of toilet on board). Minimal differences exist, and all of them can be explained by the over-sampling of large boat owners for the environmental attitude/information survey. Therefore we can be reasonably confident that no major non-response bias exists across those who responded to the general boater survey.

Scales Used in the Survey Instrument

Environmental Attitude Score. A scale, used previously (Cottrell and Graefe, 1993, 1995; Dunlap and Van Liere, 1978; Noc and Hammitt, 1992) to describe respondents' attitudes with regard to the "new environmental paradigm" (NEP), was modified for use in this study. Due to constraints of survey instrument length, the scale was reduced from 12 to nine items, which has been shown previously to adequately measure environmental attitudes of park users (Noc and Hammitt, 1992; Noc and Snow, 1990). The scale is a five-response Likert scale, with responses ranging from "strongly agree" to "strongly disagree." This scale is the same as that used by Cottrell and Graefe with Chesapeake Bay boaters (1993) and Noc and Hammitt (1992), but is a slight modification of the original scale used by Dunlap and Van Liere (1978), which was a four-response Likert scale not having an "undecided" or "don't know" response option.

Three items in the scale ("plants and animals exist primarily to be used by humans," "mankind was created to rule over the rest of nature," and "humans have the right to modify the natural environment to suit their needs") were reverse coded prior to analysis so the pro-environmental responses would reflect the same end of the scale as for the other items.

Reliability coefficients for entire scale and for three subscales were calculated prior to additional analysis using the environmental attitude score based on the NEP scale items. The overall reliability for the nine-item scale used in this study was $\alpha = .79$ (for unweighted data), which is comparable to the .82 alpha level obtained by Cottrell and Graefe (1993) using the full 12-point scale with Chesapeake Bay boaters. Reliability

coefficients for each of the subscales also were similar to those reported by Cottrell and Graefe (1993), as shown in Table 5.

The greatest discrepancy exists for the "limits to growth" subscale, but this is expected when only two items are in a subscale. (Reliability coefficients for the subscales, based on weighted data, are comparable to those for unweighted data, except for the "limits to growth" subscale, which is .48 for weighted data as compared with .51 for unweighted data.)

An overall NEP score was calculated for each respondent by summing responses to all nine items (using reverse coding for the three items in the "humans over nature" subscale). The range of NEP scores is from 9 - 45, with the median being 27. The higher the overall NEP score, the more pro-environmental the attitudes expressed by the respondent.

Table 5. Results of scale reliability analysis, comparing those of this study's 9-item scale with those of Cottrell and Graefe's (C & G) 12-item scale.

Subscale	Reliability Coefficient* (this study)	Reliability Coefficient (C & G)
Balance of Nature	.76 (4 items)	.72 (4 items)
Humans over Nature	.67 (3 items)	.65 (4 items)
Limits to Growth	.51 (2 items)	.62 (4 items)

a/ * for unweighted data

Knowledge Score. A series of seven questions regarding Great Lakes water quality, laws related to recreation boat sewage disposal, and effects of sewage contamination on water plants, fish and other animals, and humans was used to develop a knowledge score for each respondent. While the specific questions are different, the scale is patterned after a 15-item knowledge score on more general environmental issues developed by Maloney et al. (1975). In this study, for six items respondents could select "true," "false," or "don't know." Correct responses were recoded as correct, incorrect and "don't know" responses were recoded as incorrect. For the seventh item, respondents were asked to indicate their belief about changes in Great Lakes water quality in the past 10 years. "Improved a lot" and "improved a little" were considered accurate responses; all others were considered inaccurate. The knowledge score was obtained by summing the correct responses. (Analyses were conducted using only the first six items, but there were no obvious differences between analyses using six or seven items.)

Sociodemographic Variables. Two sociodemographic variables were used in this study: income and age. Because previous studies repeatedly have indicated high correlations between income and education, it was decided that both variables would not be included in the survey. The five income categories were "under \$20,000," "\$20,000 - \$39,999," "\$40,000 - \$59,999," "\$60,000 - \$99,999," and "\$100,000 and over."

Respondents were divided into seven age categories, the same as those used by Dunlap and Van Liere (1978): 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 and more years of age.

Dumping Behavior. Dumping behavior by boaters was used as the dependent variable. Respondents were asked to indicate the number of times during the 1994 boating season they dumped their boat sewage in one of seven places, including at pumpout stations, dumps, in public restrooms, at home or cottage, directly into the water, or at some other place. Based on the assumption that the primary degradation to water quality would be dumping directly into the water, that response originally was intended for use as the "inappropriate or polluting" dumping behavior. However, only a small number of boaters admitted dumping directly in the water (less than 1% of all boaters). With this small a group in the "inappropriate dumping behavior" category, it would be impossible to run any meaningful analyses.

Therefore, an alternative definition was used to classify boaters as "appropriate" or "inappropriate" dumpers of sewage. For this definition, only use of pumpout stations and dumps designed for that purpose are included as "appropriate" behavior. All other dumping actions (whether directly in the water, in public restrooms, at home/cottage, or other places) were considered "inappropriate." This definition focuses the behavior on use of facilities designed specifically for sewage disposal rather than on whether the sewage dumping behavior immediately threatened water quality. However, other negative impacts could result from non-dump/pumpout station dumping. Dumping at places other than directly in the water or at provided facilities could pose the threat of unsanitary conditions for boaters doing the actual dumping or for others using facilities afterward for other purposes (such as using public restrooms), or potential soil and groundwater contamination for sewage spilled during the dumping process. However, caution must be used in interpreting results using this definition.

The percentage of total sewage dumps done appropriately and inappropriately for each boater was calculated. Boaters then were classified in one of three categories: "dumping appropriately 100% of the times they dumped boat sewage," "dumping inappropriately 100% of the times they dumped boat sewage," or "any mix of appropriate and inappropriate sewage dumping." Because 51% of the respondents (unweighted) indicated that they did not dump boat sewage at all (either because they did not have portable or installed heads or because they simply did not use them), the number of responses available for further analysis is restricted. (When data is weighted for actual percent of boats in each size class in the total Michigan recreation boat fleet, the percentage of non-dumpers rises to 85%. This jump probably is due to the much higher percentage of small boats in the fleet, which are less likely to have either installed or portable heads, and which are more likely to take relatively short excursions on the water. Consequently, unweighted data will be used for many of the reported results since they more adequately represent the larger boats, those more likely to be involved with sewage dumping.)

Results

Demographics

As indicated in the general Michigan recreation boating survey, trends show that Michigan boat owners are aging (Stynes, Wu and Mahoney, 1995). In this study, nearly one third of responding boat owners are of retirement age, 65 years and older. Another approximately 60% are of mid-career age (35-64 years). Table 6 shows the respondents by age category. The first column shows ages for the actual sample (unweighted data), the second column shows the expected age category breakdown for all owners of Michigan recreational boats (weighted data). The weighted data places a slightly higher percentage of boat owners in the retirement age categories (> 65 years) and the young boater categories (18-34 years).

Table 6. Michigan recreation boat owners by age category.

Age Category	Valid Percent of Sample (unweighted)	Valid Percent MI Boat Owners (weighted)
18 - 24 years	1.2	.6
25 - 34 years	6.4	9.0
35 - 44 years	16.7	19.3
45 - 54 years	26.1	19.5
55 - 64 years	21.6	19.3
65 - 74 years	19.7	21.3
> 75 years	8.3	11.0
Young (28 - 34)	7.6	9.6
Mid-career (35 - 64)	64.4	58.1
Retirement Age (> 65)	28.0	32.3

a/ Only .4% of responses missing

b/ Total N = 1210

When boat owners in the actual sample are categorized by income, nearly two thirds have an annual household income of at least \$40,000 (62.1%). However, when the data is weighted for the actual boat owner profile, that percentage drops to 49.6%. Thus, of all Michigan boat owners, about half earn more than \$40,000 per year and about half earn less than \$40,000. This shift is due to the much greater number of small boats in the Michigan recreation boat fleet. (Recall that this sample was heavily weighted for owners of large boats, those most likely to be in the higher salary categories.) See Table 7 for complete results.

Table 7 Michigan recreation boat owners by annual household income.

Annual Household Income	Valid Percent of Sample (unweighted)	Valid Percent MI Boat Owners (weighted)
< \$20,000	10.3	18.3
\$20,000 - \$39,999	27.6	32.1
\$40,000 - \$59,999	24.7	25.6
\$60,000 - \$99,999	24.3	17.9
> \$100,000	13.1	6.1
< \$40,000	37.9	50.4
> \$40,000	62.1	49.6

a/ 6.0% of responses missing

b/ Total N = 1210

Environmental Attitude Score

A single environmental attitude score was calculated by summing the responses to nine items in a Likert scale (New Environmental Paradigm), ranging from "strongly agree" to "strongly disagree." Three items were reverse coded so all items reflected a pro-environmental attitude at the same end of the scale. All responses then were recoded to reflect the same scale as used by other researchers (Cottrell and Graefe, 1993; Dunlap and Van Liere, 1978; Noc and Hammitt, 1992), with the higher scores representing a more pro-environmental attitude. The range of possible scores was from nine to 45. On all but one item, a fairly small percent of respondents answered "don't know" (ranging from 2.7% to 12.8%). The one exception was for the item "we are approaching the limit on the number of people the earth can support." Nearly one fourth (23.7%) of the respondents said they did not know. Overall, a large majority of respondents indicated a pro-environmental attitude as assessed by the modified NEP scale. For the actual sample (unweighted data), 83.3% have a total NEP score greater than the median score of 27. For the weighted data, 86.2% of boaters have a NEP score greater than 27. Calculated for both weighted and unweighted data, approximately one third of respondents exhibit strong pro-environmental attitudes (NEP score greater than 36). See Table 8.

Table 8. Overall NEP scores of Michigan recreational boaters, indicating environmental concern.

Total NEP Score * (Σ of 9 items)	Valid Percent of Sample (unweighted)	Valid Percent MI Boat Owners (weighted)
9 - 17	1.3	1.3
18 - 26	12.5	10.9
27 (median)	3.0	1.7
28 - 36	46.0	53.8
37 - 45	37.3	32.4
Anti-environmental (score < 27)	13.8	12.2
Pro-environmental (score > 27)	83.3	86.2

a/ NEP scores can range from 9 to 45; three items were reverse-coded.

b/ Total N = 1210; 6.8% (unweighted) and 5.9% (weighted) of responses were missing.

For responses to each of the nine items of the NEP scale, see Table 9. Results are presented only for the actual survey sample (unweighted data) because differences between weighted and unweighted data were minimal. Items are grouped by the same subscales identified by Cottrell and Graefe (1993).

Knowledge Score

The knowledge score used for analysis was the sum of seven items related to respondents' knowledge about water organisms and the effects of sewage pollution on those organisms as well as humans. Additional items addressed respondents' knowledge of boat sewage dumping laws and the change in Great Lakes water quality over the past 10 years. Responses were coded as "incorrect" if the answers were wrong or the respondents indicated they did not know the answer. Using the seven items,

Table 9. Frequency of responses to individual items of environmental concern based on actual sample (values in valid percent).

NEP Scale Individual Items	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree	Mean ^b
Balance of Nature						
The balance of nature is very delicate and easily upset.	1.2	12.5	4.4	44.9	37.0	4.04
Mankind is severely abusing the environment.	3.1	17.5	9.2	42.6	27.5	3.74
When humans interfere with nature, it often produces disastrous consequences.	1.9	16.9	5.8	49.2	26.1	3.81
Humans must live in harmony with nature in order to survive.	1.1	3.4	2.7	48.4	44.4	4.32
Humans Over Nature						
Plants and animals exist primarily to be used by humans. ^a	19.8	47.4	8.4	18.8	5.6	3.57
Mankind was created to rule over the rest of nature. ^a	26.9	38.8	12.8	15.7	5.8	3.65
Humans have the right to modify the natural environment to suit their needs. ^a	16.9	41.9	11.3	27.2	2.7	3.43
Limits to Growth						
To maintain a healthy economy, we will have to develop a steady-state economy where industrial growth is controlled.	7.1	23.6	12.8	41.1	15.4	3.34
We are approaching the limit of the number of people the earth can support.	6.6	24.5	23.7	29.9	15.3	3.23

a/ These three items were reverse coded prior to further analysis so that the high end of the scale (scores of 4 and 5) would indicate the pro-environmental attitude.

b/ The mean scores indicated here represent means after the data have been recoded, so the higher the mean the more pro-environmental the attitude.

c/ For each item, the missing data is less than 3%.

d/ N = 1210, unweighted data

the majority (62%) of respondents answered five, six or seven of the items correctly (54% for weighted responses), while less than 4% answered none, one or two correctly (5.5% for weighted responses). See Table 10.

Table 10 Overall knowledge scores of Michigan recreational boaters.

Number of Correct Responses	Valid Percent of Sample (unweighted)	Valid Percent MI Boat Owners (weighted)
0	.1	.2
1	.9	1.4
2	2.7	3.9
3	12.9	16.5
4	21.6	24.4
5	33.4	29.7
6	27.7	23.4
7	.7	.6

a/ Total N = 1210

b/ 3.7% (unweighted) and 5.4% (weighted) of responses missing

The numbers of correct responses for each knowledge item are indicated in Table 11 (see below).

The statement about sewage contamination making fish sick was the item with which respondents had the most difficulty. This

may be due to confusion caused by the modifier "very," which is subjective. Also, it is unclear whether "sewage" is treated or raw sewage, which may further confound this item. The item for which respondents were most correct was that "bacteria from sewage can cause humans to become ill." This issue has been well covered in the press in Michigan and was particularly salient in 1994 when several beaches and water bodies (including Lake St. Claire near Detroit) were closed to swimming due to fecal coliform contamination. While a high percentage of Michigan boaters (92% unweighted / 87% weighted) were aware that it is illegal to dump sewage from portable or installed heads into the Great Lakes, many fewer respondents (54% unweighted / 44% weighted) were aware of federal regulations restricting dumping of boat sewage (i.e., Clean Vessel Act).

Dumping Behavior

The number of times Michigan boaters dumped during the 1994 season ranged from zero to 45 times. The majority, however, did not dump at all. For the actual sample, 51% of respondents did not dump at all. When weighted for owners of boats of varying size categories as represented by the actual Michigan recreational boat fleet (increasing the number of small boats included), the percentage of non-dumpers increased to 85%. Because the unweighted data more accurately reflect dumping behavior of boats more likely to have heads (larger boats), unweighted data will be used for most of the dumping behavior analyses.

Table 11 Overall knowledge scores of Michigan recreational boaters.

Knowledge Item	Valid Percent Correct (unweighted)	Valid Percent Correct (weighted)
Fish are very susceptible to contamination from sewage.	5.7	5.3
Phosphorous and nitrogen from sewage in the water trigger algae blooms which decrease available oxygen for plants and animals.	75.4	74.0
It is illegal for boaters to dump waste from portable toilets or holding tanks into the Great Lakes	91.5	86.8
Bacteria from sewage can cause humans to become ill	97.6	97.4
Bacteria from sewage can cause fish and other animals to become ill and, if eaten by humans, can make humans ill.	72.7	74.5
Currently there are no federal laws restricting boaters from dumping sewage into the water.	56.4	44.3
Over the past 10 years, how has the quality of water in the Great Lakes and its tributaries changed (improved, stayed the same, gotten worse, don't know)?	70.2	67.0

a/ Total N = 1210

b/ For all items, both weighted and unweighted, 3% or less of responses are missing.

Only about 4% of respondents did not answer the question. The mean number of times that portable or installed heads were dumped, for those boaters who dumped at least once, was 6.3 (unweighted data). Just over half (52.6%) of boaters who dumped did so four or fewer times. As seen in Table 12, the vast majority of dumping is done by pumping out holding tanks for installed heads at pumpout stations. About one fifth of boaters dump at their homes or cottages.

Table 12. Locations where Michigan recreational boaters dump sewage from portable toilets or installed holding tanks.

Location of Dumping	Valid Percent *
Pumping out holding tank at pumpout facility	69.9
Dumping portable toilet at pumpout facility	3.4
Dumping portable toilet at dump station	5.1
Dumping in a public restroom facility	6.5
Dumping at home or cottage	20.4
Dumping at some other place	1.2
Dumping directly into the water	1.4

a/ Unweighted data, N = 565

Because so few boaters dumped directly into the water (1.4% of those who dumped at least once), inappropriate behavior was redefined as dumping of sewage at any place other than a dump or pumpout station provided for that purpose. Based on this definition, boaters were classified by those who dumped appropriately 100% of the time, those who dumped inappropriately 100% of the time, and those whose dumping behavior was mixed, with at least one dump being at a provided facility and at least one dump being at some type of alternative location. Of those boaters who dumped at least once during the 1994 season, about three quarters (74%) dumped appropriately (see Table 13). Using weighted data, of those who dumped at least once in 1994, about half dumped 100% appropriately and slightly less than half dumped 100% inappropriately, with about 4% reporting mixed dumping behavior.

Table 13. Sewage dumping behavior of Michigan recreational boaters

Dumping Behavior	Valid Percent
100% of 1994 boating season dumps occurred at dumps and pumpout stations designed for that purpose	74.0
100% of 1994 boating season dumps occurred at places <u>other than</u> at dumps and pumpout stations designed for that purpose	22.7
Mixed dumping behavior, with some at dumps and pumpout stations and some at other places	3.4

a/ N = 565; unweighted data

Hypothesis Testing

Regression analysis was used to determine the influence of each of the independent variables (environmental attitude, knowledge, age and income) on the dependent variable (dumping behavior).

When "dumping directly in the water" was used as the dependent variable (for all cases, using weighted data), it was negatively correlated with all independent variables except income, which was positively correlated. However, all correlations were extremely weak, as was the R's and beta weights for each of the variables. Therefore, this analysis provides no insight. Much of this probably is due to the extremely small number of boaters who "dump directly in the water."

When the alternative definition for inappropriate dumping behavior (anywhere other than dumps and pumpout stations provided for that purpose) was used, dumping behavior was negatively correlated with all independent variables except age category. However, again all the correlations were extremely weak, even though significance levels were indicated at .000. This probably is due to the high theoretical sample size obtained by weighting the data, so relationships probably are not as significant as they appear. The R's and beta weights were extremely small. Again, results are not meaningful: there is no explanatory or predictive ability shown for any of the independent variables in the model or for the entire model.

When unweighted data were used and the cases filtered to exclude all those who did not dump at all during 1994, results were slightly different. Dumping behavior (inappropriate) was positively correlated with environmental attitude and age, and is negatively correlated with knowledge score and income. Only the two negatively correlated variables were significant at $p < .05$. Inappropriate dumping was associated with lower knowledge scores ($p = .016$) and lower incomes ($p = .000$).

When the independent variables were entered stepwise into a regression analysis, income and knowledge variables were the only two included, with income accounting for most of the variance. The R^2 for income was .043 and $\beta = -.207$ (significant at $p = .000$). For the knowledge variable, $R^2 = .051$ and $\beta = -.091$, significant at $p = .037$.

Based on these results:

Hypothesis 1 (more positive environmental attitudes will be associated with more appropriate sewage dumping behavior) was rejected.

Hypothesis 2 (higher knowledge scores will be associated with more appropriate sewage dumping behavior) was supported, but weakly.

Hypothesis 3 (age will have no effect on respondents' boat sewage dumping behavior) was supported.

Hypothesis 4 (higher income will be associated with more appropriate dumping behavior) was supported.

Discussion and Recommendations

While three of the four hypotheses were supported (resulting in only income and knowledge being associated with sewage dumping behavior), the primary hypothesis of interest (H_1) regarding the association between environmental attitudes and dumping behavior was not supported. This result is consistent with much previous research that fails to show a strong or consistent direct relationship between attitudes and behavior. Attitudes certainly do not seem to predict behaviors. This may be particularly true when the measured attitudes are rather general (in this case, general attitudes about the environment and human relationships with it) and the behavior variable is highly specific (in this case, appropriate or inappropriate dumping of boat sewage). Other studies (such as reported by Cottrell and Graefe, 1993, who conducted a similar study with Chesapeake Bay boaters) have indicated that behavioral intentions are much more closely associated with actual behavior than attitudes or other antecedent variables. Their research supports the Ajzen and Fishbein (1973, 1980) theory of reasoned action, showing a relationship between behavioral intention and actual behavior even though all components of this theory was not specifically assessed. This study (Michigan recreational boaters), due to its broader scope, different focus, and length, was unable to include behavioral intention variables or some of the other scales, such as measures of general responsible environmental behavior, verbal commitment to environmental actions, and education level, that were included in the Cottrell and Graefe study. Perhaps these variables would have contributed to a better predictive model.

The knowledge score used in this study was developed from a series of actual knowledge items related to the specific behavior variable. This is different from the single-item, self-reported, self-perception score of environmental knowledge used by Cottrell and Graefe (1993). Perhaps the topic-specific consistency between the knowledge variable and behavior variable permitted the level of correlation shown in the analysis.

Despite the association between dumping behavior and two of the independent variables, much of the variance in dumping behavior is not explained by any of the independent variables used in analysis. That would indicate that other factors possibly are having more influence on boaters' dumping behavior. Consistent with the idea presented in Ajzen's theory of planned behavior (1985), boaters' dumping behavior may be influenced by a variety of internal and external factors which may inhibit or change boaters' intended behavior, intentions that might have been more consistent with their general environmental attitudes and knowledge. In this case, factors such as availability of dumps and pumpout stations, convenience of access and use, cost of sewage disposal, location where boats are used and/or kept (on inland or Great Lakes waters), and whether the boats are kept at personal homes/cottages or marinas may have more impact on the actual dumping behavior of boaters. Some of these variables will be analyzed in a future study.

Another confounding factor may be the dependent variable itself. It is possible that boaters may perceive that dumping in public restrooms, at their homes/cottages, or places other than dumps/pumpout stations may be "appropriate." If they are not dumping directly in the water, they may believe they are properly disposing of their sewage, regardless of potential spilling that might leach into ground or surface water, or contamination of non-designated disposal sites. This perception would render the alternate definition, as used in this study, unacceptable. Because too few boaters reported dumping directly into the water, this original definition was rendered impractical as a dependent variable for analysis.

In comparing dumping behavior of Great Lakes boaters with that of boaters in the Chesapeake Bay (or other ocean/gulf waters of the United States), boaters have fewer options for sewage handling, they may not dump any sewage, treated or untreated, anywhere in the Great Lakes. Ocean/gulf water boaters are allowed to have Y-valves on their installed heads and are permitted to dump when offshore at least three miles. Thus, their illegal behavior might include dumping within the three-mile limit, dumping untreated sewage, and dumping in bays, thereby providing a wider range of possibilities for analysis.

It may also be the case that most Michigan boaters simply are not dumping inappropriately or illegally, at least in the Great Lakes. The knowledge scale indicated that nearly 100% of respondents knew that it is illegal to dump in Great Lakes waters. Also, Michigan waters have been designated as no-dump zones since 1987, five years prior to passage of the federal Clean Vessel Act restricting boat sewage dumping across the country. Therefore, it is possible that a higher percentage of Michigan boaters are aware of the legislation. Additionally, since 1987, all Michigan marinas supporting 15 boats or more have been required to provide a pumpout station on-site or to have an agreement for

sewage disposal at a nearby facility. While gaps in availability of sewage disposal sites, especially dump stations, still exist along the 3,200 miles of Great Lakes shoreline (Talhelm and Vander Stoep, 1996), pumpout facilities are readily available in most areas.

The greater problem seems to exist for inland boaters, where marinas are much more scarce and boaters are much more likely to keep their boats at their homes or cottages or trailer to boating sites than on the Great Lakes. Fewer pumpout and dump facilities are located at these sites. Additionally, smaller boats (those less likely to have portable toilets or installed heads) are more likely to be boating on inland waters. As expressed in open-ended questions on the survey and in three focus groups, most boaters (inland and Great Lakes) would prefer to use land-based toilet facilities whenever possible. Boaters keeping boats in marinas or on the water at private homes are likely to have such access. Many other boaters, however, may have limited access to land-based toilet facilities. Yet even this group did not report dumping directly into the water to more than a minimal extent. It is impossible to know whether this is due to lack of or under-reporting, response bias, or reality. Additionally, it would seem that, for these boaters, situational factors such as availability of pumpout facilities would be more influential than attitudes and knowledge in affecting dumping behavior.

In summary, there appears to be no relationship between boaters' environmental attitudes and their sewage disposal behavior, although there is some relationship between their knowledge of sewage impacts on water quality and income with sewage disposal behavior. Further analysis is needed to determine if other identifiable factors are more likely to influence dumping behavior in any regular or predictable manner.

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OYSTER RIVER WATERSHED STUDY: A

SUMMARY REPORT

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Abstract. This paper reports the results from a study to collect baseline information necessary to plan and develop programs to abate and prevent nonpoint pollution within the Oyster River Watershed in Coastal New Hampshire. The information will assist in planning, implementing and evaluating nonpoint pollution control, remediation initiatives and education policies necessary to protect environmental quality, recreation and other amenity values.

Introduction

The Oyster River and adjacent lands are important resources for New Hampshire. Most of the challenges facing the Oyster River Watershed originate directly or indirectly from human activity. Some of these activities adversely affect water quality (i.e., residential and commercial development, road maintenance, lawn care), while other activities (i.e., recreation, tourism, sport fishing) are adversely affected by water quality. Technical solutions to many land use and water quality problems affecting the NH coastal waters are available, but obstacles exist to their implementation. These obstacles include the public's lack of understanding or appreciation of the complexity of water quality problems/land use issues, and local governments lack the fiscal and administrative resources to implement corrective or remedial actions. This is particularly true for nonpoint pollution, where numerous unrelated actions and management decisions have significant impacts on the watershed system. Increased awareness and positive public attitudes will be necessary to control or minimize the impacts of nonpoint pollution. In response to this need, a preliminary assessment of the "human dimensions" of the Oyster River Watershed was completed by the University of New Hampshire's Department of Resource Economics and Development. This assessment was completed in

cooperation with Strafford Regional Planning Commission, local government officials and concerned citizens from watershed communities (Durham, Madbury, Lee, Barrington and Dover). The assessment was completed with support from the UNH College of Life Sciences and Agriculture and the NH Coastal Program.

Study Objectives

The objectives of this research were to collect information on the attitudes, behaviors, knowledge and perceptions of Oyster River Watershed residents in regard to nonpoint pollution. More specifically, the data collected from the project (1) identified perceptions of the magnitude of nonpoint pollution in the watershed; (2) measured awareness and knowledge of the various causes and potential consequences of nonpoint pollution; (3) determined current behaviors with relevance to nonpoint pollution and the use of coastal resources, and (4) determined preferences for various nonpoint pollution management practices.

Description of Study Area

The Oyster River Watershed is located in Southeastern New Hampshire and encompasses the land surrounding the Oyster River, an offshoot of the Great Bay. The entire University of New Hampshire campus and agricultural lands are included in the watershed. Approximately seventy-five percent of the town of Durham is located within the watershed, including the town's water plant which provides its primary source of drinking water. Approximately seventy percent of Lee is within the watershed, including the Lee Traffic Circle and surrounding businesses. The watershed extends to Barrington, including those portions roughly adjacent to Hall Road. Seventy-five percent of Madbury and a small sliver of Dover near Route 108 are also included in the watershed.

Survey Methods

The survey questionnaire was distributed to a stratified random sample of households within the Oyster River Watershed. The sample was stratified in order to adequately represent the residents of the Watershed. The number distributed to each community was based upon the total number of households within the watershed (3262) and their distribution. For example, eighteen percent of the households within the watershed are in the town of Lee so 18% of the completed surveys should be from Lee in order to be representative. The survey was developed with input and suggestions from members of a steering committee composed of local officials and concerned citizens. Surveys were distributed and collected door to door within the watershed. A total of 385 completed surveys were collected for a response rate of 63%.

Profile Of Survey Respondents

Table 1 represents a demographic profile of those individuals who completed the survey. This information provides important estimates of the watershed community makeup. Citizens of the Oyster River Watershed are well educated, informed individuals, who have lived in the community for a relatively long time, with a predominance of single family homes.

Table 1. Summary of demographic information of respondents.

Age	47.9 years(mean)
Gender	56.3% male 43.7% female
Years in residence	14.6 years (mean)
Type of home	67.1% single family home 10.1% condominium 8.7% apartment 8.1% trailer/mobile home 6.1% duplex/townhouse
Own/rent	79.6% own their home
Run business from home	9.8%
Registered to vote	88.6%
Employment	70.2% employed 20.8% retired
Education	24% high school 37% college 20% masters 18% Ph.D. / professional

Table 2 provides summary information on residents behaviors, activities, and household characteristics. The average respondent recycles, uses low phosphate detergents and composts. The primary source of drinking water is from a well on their property with a septic system as the method of waste water disposal. The average respondent has 2.2 bathrooms, 1.7 showers, a dishwasher and a washing machine in their home. Overall membership in specific organizations was only moderate but the majority of respondents participate in both community and volunteer activities.

Results

Community Issues Within the Oyster River Watershed

This section addresses the communities' general concerns with local issues. Table 3 presents the results from a question that asked respondents to indicate the severity of potential community problems (not, small, medium, or serious). Residents were provided a list of 23 community issues. The results to this question are interpreted through an examination of the community issues which received the greatest proportion of responses within each of the categories.

Nonpoint Pollution Issues within the Oyster River Watershed

This section addresses the perceptions of residents and what sources of information are utilized.

Size of nonpoint pollution problem. Figure 1 indicates the percentage of respondents who feel there is a nonpoint pollution problem in the country, state, and town, along with their own drinking water. Residents' perceptions of the size of the nonpoint pollution problem varied based on proximity to their homes (i.e., the closer the issue was to their own drinking water, the less serious they perceived the problem)

In a related question, 50% of respondents disagreed with the statement "the severity of the nonpoint pollution problem in the New Hampshire coastal zone is exaggerated." This suggests that many residents consider there to be a problem in the region

Table 2. Information on behaviors, activities and household characteristics of Oyster River Watershed residents

<u>Behaviors</u>	
Participate in volunteer activities	84.3%
Participate in community activities	86.0%
Recycle	99.7%
Compost	62.1%
Use low phosphate detergents	90.6%
Test home water quality	49.6%
<u>Household Characteristics</u>	
Primary source of drinking water:	
well on property	45.8%
municipal water	34.6%
bottled water	9.4%
filtered tap water	6.7%
do not know	1.3%
<u>Method of Water Disposal</u>	
public sewer system	40.1%
septic system	51.7%
do not know	8.2%
Number of bathrooms in home	2.2 (mean)
Number of showers in home	1.7 (mean)
Dishwasher in home	74.8%
Average times run per week	3.2 (mean)
Washing machine in home	89.7%
Average times run per week	4.5 (mean)
<u>Activities</u>	
Membership in environmental groups	
Nature Conservancy	12.0%
Society for Protection of NH Forests	8.3%
NH Audubon	5.4%
Sierra Club	3.1%
Friends of Seacoast Science Center	3.1%
NH Lakes Association	1.4%
Stafford Rivers Conservancy	1.1%
Great Bay Conservation Trust	6.0%
NHDES Volunteer River Program	0.3%

Levels of knowledge. Figure 2 illustrates the breakdown of responses in regard to their levels of knowledge. When asked how knowledgeable they are about nonpoint pollution, the majority responded that they were "somewhat knowledgeable" about nonpoint pollution

Sources of knowledge. The results show that there are several primary sources of nonpoint pollution information. The data indicates 32.2% of respondents receive information on nonpoint pollution from newspaper articles, 13.6% have gained their knowledge from work or other professional experience, and 8.9% gather information from television. Conversations with other individuals and books are also important sources of information for Oyster River Watershed residents. Professional journals and Public Radio are ranked the highest in level of trust of information sources. State and federal government officials prompted the lowest level of trust from the respondents.

Table 3. Challenges Facing Oyster River Watershed Communities

<u>"Serious" problem</u>	
Safe paths for bike riders	27.7%
Lack of support for schools	14.3%
Quality of drinking water	11.1%
<u>"Medium-sized" problem</u>	
Lack of citizen participation in community decision making	35.3%
Safe paths for bike riders	34.0%
Lack of long range community planning	28.0%
<u>"Small-sized" problem</u>	
Litter in streets and parks	58.0%
Repair of local roads	47.9%
Radon	44.8%
<u>"Not" a problem</u>	
Unightly/smelly garbage dumps	67.8%
Winter snow removal	58.9%
Lack of parks and green space	58.5%

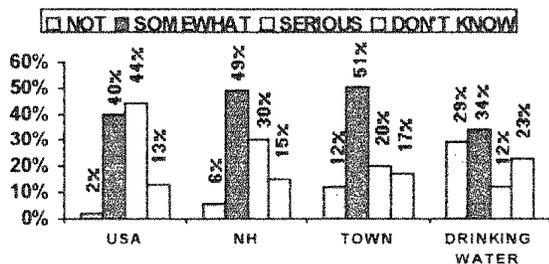


Figure 1: Residents' perception of nonpoint pollution problems

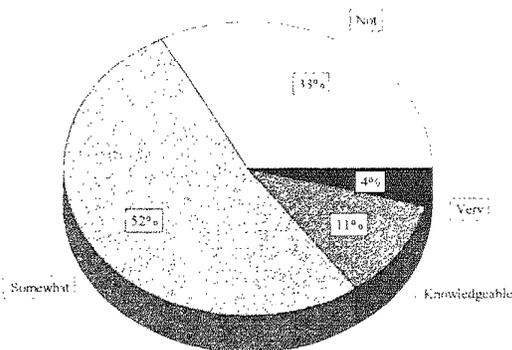


Figure 2: Residents level of knowledge about nonpoint pollution

The survey itself was an important public education tool. For example, the survey required that 385 residents think about the nonpoint pollution issues in their watershed in answering the questions. In addition, of the persons completing the survey, twenty five percent expressed a need for more information about the nonpoint pollution and related topics.

Residents' perceptions and attitudes are shaped to some extent by these various sources. Town officials need to examine the possible sources for the best avenue for public education. When asked in related attitudinal questions, 59% of respondents feel if there is continual pollution of our lakes, streams and air, nature's processes will purify the system and 82.3% feel they do not need to be concerned about reducing nonpoint pollution because other people are doing so.

Nonpoint Pollution Impacts in the Oyster River Watershed.

This section presents the perceived negative impacts nonpoint pollution can have on a watershed. The sample of residents were asked to indicate their level of concern for potential impacts from nonpoint pollution (not, slightly, concerned, or very). The sample of residents were provided a list of 13 negative impacts of nonpoint pollution. The results to this question are interpreted through an examination of the negative impacts which received the greatest proportion of responses within each of the categories (Table 4). Concerns voiced by residents centered on personal health and safety. This is evident by the top three responses in both the "very concerned" and "concerned" categories. The residents were not as concerned with loss of tourism revenue, diminished property values, and closed shellfish areas.

Table 4: Perceived impacts of nonpoint pollution and residents' level of concern - top three from each response category.

<u>"Very Concerned"</u>	
• Health threats	48.4%
• Chemicals in water	38.3%
• Contaminated drinking water	36.4%
<u>"Concerned"</u>	
• Excess nutrient supplies(algae blooms)	43.7%
• Bacteria in water(swimming warnings)	41.6%
• Contaminated fish and game	39.3%
<u>"Slightly Concerned"</u>	
• Loss of tourism revenues	37.8%
• Diminished property value	33.7%
• Loss of recreational opportunities	31.0%
<u>"Not Concerned"</u>	
• Loss of tourism revenues	31.0%
• Diminished property value	20.9%
• Closed shellfish areas	12.8%

Potential Nonpoint Pollution Sources and Potential Local Contributors.

This section addresses residents' perceptions of local nonpoint pollution contributors and potential sources. The potential local contributors of nonpoint pollution the Oyster River Watershed are numerous. Residents perceived the UNH campus, home septic systems, and automobiles as top contributors in the area.

Residents indicated several which they feel do not contribute to nonpoint pollution within the Oyster River Watershed. The Lee Traffic Circle created the least concern with 14% of respondents feeling it "does not contribute". Industrial parks and commercial agriculture were not considered serious contributors to nonpoint pollution within the Oyster River Watershed.

In a related question, residents were given a list of 32 possible sources of nonpoint pollution and asked to rank the level they think each affects the Oyster River Watershed. Acid rain, oil spills and home septic systems were identified as contributing to nonpoint pollution within the Oyster River Watershed. Logging and timber harvesting, medical waste and mining were not considered contributors by residents of the Oyster River Watershed. Medical waste and mining also had the highest percentage of individuals who responded that they do not know the degree to which the Oyster River Watershed is affected by these potential sources.

Septic Systems

This section addresses the issue of septic system maintenance and responsibility. Septic system users. Fifty percent of survey respondents have septic systems. Of the respondents who have septic systems, 93.1% know the location of the septic system. The average year of installation for the septic systems in the Oyster River Watershed was 1980.

The use and maintenance of these systems was identified as a potential nonpoint source by survey respondents, therefore the actual maintenance practices of those with systems are of interest. Septic system owners, for the most part, are willing to take responsibility for maintenance. When asked for an acceptable cost sharing scheme between homeowner, town, county, state and federal, to finance the upgrade or replacement of the system, on the average homeowners felt a cost sharing scheme of 63.3% for homeowners, with the remaining distributed between various levels of government. Seventy-seven percent of respondents felt homeowners should carry all of the cost associated with upgrading and/or replacing septic systems.

When asked what would motivate them to regularly maintain their septic system, 51.7% of respondents stated they already maintain their system. Figure 3 demonstrates how often residents check the level of sludge and scum in their septic system. Other motivations favored by respondents include: to avoid having to replace the system (52%), a property tax discount (35%), and more information (31%). Regulations were thought to be the least effective method of motivation (13%), as were cash coupons (20%).

Impact Behaviors and Conservation Behaviors.

This section addresses resident behaviors which lead to potential nonpoint pollution, as well as conservation behaviors.

Watershed resident behaviors. Many individual behaviors will impact the extent that nonpoint pollution impacts water quality in an area. There are a number of behaviors that need to be monitored or controlled to prevent misuse and subsequent pollution. For example, twenty-seven percent of respondents use salt on their driveways "sometimes", "often" or "very often". When it comes to outdoor maintenance, 35% apply lawn

chemicals or fertilizer, 22% apply garden pesticides or chemicals, 50% water their lawn and 61% water their gardens. A vast majority (93%) of the respondents felt that every person is responsible for protecting the quality of the natural environment.

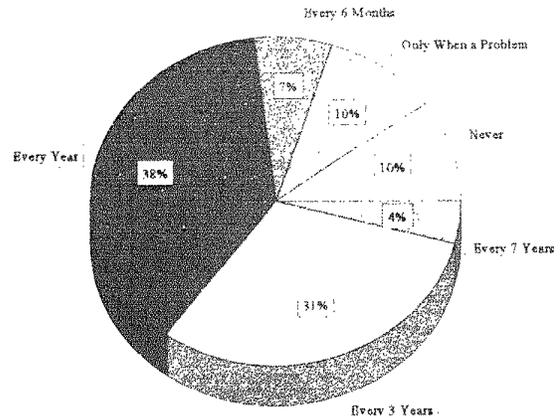


Figure 3. How often residents check the sludge and scum in their septic systems

Conservation behaviors. Only 12% of residents feel voluntary measures are adequate in controlling nonpoint pollution. This is reflected in the voluntary conservation behaviors of residents. The conservation measures currently being utilized in the Oyster River Watershed include the installation of low flow showerheads (55.6%), watering lawns less often (51.8%), stopping running water while shaving (48.2%), and washing cars less often (44.2%). The conservation measures least practiced in the Oyster River Watershed include recycling grey water onto gardens (6.4%), installing low flow taps (12.3%), and turning off the shower while soaping (16.1%). When asked about possible conservation solutions, 75% feel effective long range solutions to environmental problems depend upon changing lifestyles to fit nature.

Conclusions

This research provides insights into the characteristics, behaviors and knowledge of watershed residents. Oyster River Watershed residents are, for the most part, highly educated and are open to gaining more information on what they can do to contribute to local issues. Any state or local policies mandating abatement of nonpoint pollution should include mechanisms to insure compliance and to promote teamwork between the units of government and the respective communities. The approach should foster cooperation and cohesion between communities within the watershed. More specifically this research suggests:

- Eighty percent of residents feel lack of participation in community decision making is a problem in their community. It is important to involve the residents of the Oyster River Watershed as much as possible in the process.

of creating and enforcing a nonpoint pollution program. Residents realize that some changes in lifestyle are necessary. Therefore, the solution to protecting the Oyster River Watershed rests on the responsible and active participation of the people living within the watershed.

- A faucet aerator is a simple device which costs less than \$4 and can be installed on kitchen and bathroom faucets to save on water use. Aerators cut use by as much as 280 gallons a month for a typical family of 4. Although the flow is reduced, it seems stronger because air is mixed with the water as it leaves the tap. Only 12% of responding households have installed any type of low flow taps; if 50% of respondents, 193 households, installed them it would result in roughly 635,250 gallons of water saved every year.
- Homeowners use up to ten times more toxic chemicals per acre than farmers. Sixty percent of responding households in the Oyster River Watershed have used lawn chemicals at least one time. If even 10% of lawn-owners used organic pesticides, it would remove 2.5 to 5 millions pounds of toxic chemicals from the environment every year.
- Each time a toilet flushes it uses 5-7 gallons of water. This amount can be reduced by 15%-40% by installing a plastic bottle, displacement bag or toilet dam in the toilet tank. In the Oyster River Watershed 23% of respondents have installed some type of low flow toilets. If the average toilet is flushed about 8 times a day, that means a saving of 8-16 gallons every day... 2,900-5,800 gallons a year per household. for 50% of respondents, 193 households, that means a savings of 559,700-1,119,400 gallons a year.

Septic systems are perceived as a primary contributor to nonpoint pollution. Based on this research, 87% of system owners feel

more regulations would not motivate them to maintain their system, while avoiding replacing the system (53%) and more information(32%) would provide motivation

Acknowledgments

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Forest Planning

COLLABORATIVE PLANNING AND THE USDA

FOREST SERVICE: LAND MANAGER

PERSPECTIVES

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Abstract: The natural resource profession is at a watershed moment regarding how it will handle citizen participation and resolving conflicts in land management policy and decision making. The purpose of this paper is to describe a survey of Forest Service employees examining how participatory or collaborative methods are being implemented at the forest level and to explore those managers' perceptions regarding the future application of collaborative methods. This study presents results from nearly every national forest in the country. It overwhelmingly shows strong support for collaborative planning with forest staff personnel, particularly those most likely to work with the public. Collaborative planning appears to be well integrated into day-to-day management and decision making. It is used for a variety of purposes, the most frequent being to resolve conflicts and develop a shared vision of future resource conditions. Collaborative planning appears to be an investment in the Forest Services' future. By building partnerships, networks, and trust with the public it serves, the Forest Service has found a powerful key to accomplishing its mission of caring for the land and serving people.

Introduction

The natural resource profession is at a watershed moment regarding how it will handle citizen participation and resolving conflicts in land management policy and decision making. A number of external and internal forces have driven the profession to this moment (Selin and Chavez, 1995). Increasingly, resource managers face a crisis of control as natural resource disputes are resolved by Congress or in the courts. The authority of resource management agencies is challenged by the emerging county supremacy movement. Government downsizing creates a climate of fiscal stress for all public resource management agencies. And, perhaps most importantly, the American people--owners of the vast federal estate--are debating the role of these lands and the appropriate balance between commodity production and preservation of ecological values.

These forces have combined to create a turbulent social and political landscape where, either voluntarily or induced by public pressure, public land management agencies are experimenting with a number of new approaches to involving the public in natural resource policy and allocation decisions. While citizen participation in national forest management is mandated by the National Environmental Policy Act of 1970, the Forest and Rangeland Renewable Resources Planning Act of 1974, and the National Forest Management Act of 1976, traditionalists believe that forest managers replete with specialized training and agency mandates should assume primary control over natural resource decisions (Wellman and Tipple, 1990). However, this traditional view is being assaulted on many fronts. Increasingly, citizen groups are exercising their legal right to participate fully in natural resource policy-making and management decisions. And, resource managers are realizing that participatory approaches to involving the public may be their best and only chance to influence the direction of natural resource policy and management plans.

Much of the work on how participatory or collaborative methods have been incorporated into natural resource management has been anecdotal. Reports from the field have described "bridging activities" (Wondollock and Yaffee, 1994) or innovative cases such as the Yellowstone Coalition (Lichtman and Clark, 1994) or the Montezuma County Federal Lands Program (Preston, 1995), often touting how these approaches might be applied in other resource settings. What has been lacking is a systematic examination of how these methods are being implemented across the national forest system. Therefore, the purpose of this paper is to describe a survey of Forest Service employees examining how participatory or collaborative methods are being implemented at the forest level and to explore those managers' perceptions regarding the future application of collaborative methods.

Defining Collaborative Planning

Collaborative planning was the umbrella term used in the study to describe these participatory approaches to public involvement. More specifically, collaborative planning was explained to study participants as a, "collective process for resolving conflicts and advancing shared visions involving a set of diverse stakeholders" (Gray, 1989). Respondents were told that collaborative planning was characterized by face-to-face dialogue, mutual learning, and voluntary participation. Examples provided included task forces, coalitions, advisory groups, and partnerships. Collaborative planning, so defined, pulls together related work on transactive planning (Ashor, McCool, and Stokes, 1986), open decision making (Simon, Shands, and Liggett, 1993), and comanagement models (Rao and Geisler, 1990). By linking these participatory approaches under the umbrella of collaborative planning, a more integrated approach can be taken to the redesign of traditional public involvement methods.

Study Methods

The population for this study on collaborative planning in national forest planning and management were the 155 national forests of the national forest system managed by the USDA Forest Service. In total, 115 Forest Service employees, representing all 155 national forests, were contacted by telephone and asked to participate in the study (Some managers contacted

represented more than one national forest such as the National Forests in Alabama). The names of the Forest Service personnel contacted were obtained by an initial telephone call to the Public Affairs Officer (PAO) responsible for each national forest. The PAOs were asked for the name of one person with the "most knowledge or experience" with collaborative planning on their forest. The purpose and scope of the study was explained to the potential respondents in order to verify their experience and proceed with the interview. In cases where the potential respondent was not interviewed (e.g., unavailable), an alternate was contacted. Of the 115 managers asked to participate in the study, 113 consented to being interviewed for a response rate of 98 percent. The five page questionnaire included a number of items that varied from Likert scales to open-ended questions. The questionnaire included items pertaining to the following issues: Respondent's job title; extent of participation in collaborative planning; benefits; constraints; level of support; suggested policy and organizational changes; and the future role of collaborative planning.

Profile of Respondents

The 113 Forest Service employees participating in the study represented all 10 Forest Service regions and 153 national forests. Table 1 shows the breakdown of job titles represented in the study.

Table 1. Profile of respondents.

Job title	n	%
Forest Planner	66	58.4
PAO's	22	19.5
Resource Staff Officer	5	4.4
Ecosystem Team Leader	4	3.5
NEPA Coordinator	3	2.7
Other	13	11.5

A majority of respondents (58.4%) identified themselves as planners and another 19.5 percent were Public Affairs Officers for various national forests. It is notable that when referred to the most knowledgeable or experienced in collaborative planning on the forest, the final sample was dominated by staff rather than line officers. In fact, only three line officers participated in the study, two District Rangers and a Forest Supervisor.

Participation in Collaborative Planning

Overall, respondents indicated that collaborative planning was being integrated into national forest planning and management. When asked whether their national forest had engaged in collaborative planning, almost all (91.2%) indicated that their National Forest had or is presently engaged in collaborative planning activities. Common reasons given for lack of participation included the expressed need for training, lack of supervisor support, lack of resources or incentives, and concerns over violating the Federal Advisory Committee Act (FACA).

Respondents were also asked what issues had been addressed through collaborative planning approaches. Findings presented in Table 2 reveal several key points.

They suggest that collaborative planning has already been well integrated into national forest management's day-to-day activities

at the forest level. Collaborative planning approaches are being used most widely to resolve conflicts and advance a shared vision of future resource conditions. General comments from this section also indicate that collaborative planning is regularly employed in project level planning and management. According to one manager, collaborative planning is used, "in coordinating day-to-day resource management activities with adjacent landowners." Finally, these findings suggest that collaborative planning has not yet been fully integrated into the formal forest planning process.

Table 2. Application of collaborative planning within National Forest System

Item	%
Resolving conflicts	76.1
Goal setting	74.3
Allocating forest resources	69.0
Scoping procedures	67.3
Formal forest planning process	61.9
Monitoring forest uses	48.7

Managers were also asked through a series of questions to indicate the level of support within the Forest Service for collaborative planning. These results are shown in Table 3 and confirm the high level of support found for collaborative planning in study respondents, primarily staff officers at the forest level.

Table 3. Perceived level of support for collaborative planning.

Item	\bar{X}
Personally support	6.75
Forest supervisor support	5.77
Regional support	5.19
Washington Office support	4.54

a/ Item measured on a seven point Likert scale from 1: don't support at all to 7: strongly support.

However, perceived support was seen as dropping off through the Agency ranks from the Forest Supervisor, to the Regional, and Washington Office levels. While the survey questions do not suggest the reason for this drop off in the perceived level of support, several comments provide insight into this underlying sentiment. One manager commented, "I see a lot of collaborative planning material on the Data General and publications, but little support for implementation and training offered at the Regional and Washington level."

Benefits of Collaborative Planning

Another focus of the study was to determine the range of benefits managers attribute to collaborative forms of planning. Table 4 presents these findings.

Many of the expressed benefits focused upon communication issues or constituency building. Others emphasized practical outcomes such as reducing appeals and lawsuits. One common thread to emerge from respondent comments was the assertion that the actual process of collaborative planning and the intangible benefits resulting from it may outweigh the more tangible benefits associated with it. As one planner aptly put it, "The indirect benefits--the partnerships, networks, trust, and

information sharing--is more beneficial than the actual collaborative planning effort itself."

Table 4. Perceived benefits of collaborative planning.

Item	\bar{x}
Better understanding of alternative forest values	4.54
Improved communications	4.51
Establishes informal networks	4.48
Builds sense of forest ownership	4.16
Improved cooperation	4.12
More political support for agency	3.89
Decreased polarization	3.45

a/ Items measured on five point Likert scale from 1; strongly disagree to 5; strongly agree.

Barriers to Collaborative Planning

The study also examined managers' expressed concerns about collaborative planning and perceived barriers to its full integration into national forest planning and management. These findings are presented in Table 5.

Table 5. Perceived barriers to collaborative planning.

Item	\bar{x}
CP initiatives constrained by personal agendas	4.00
FACA constrains application of CP	3.76
CP lacks full support of line officers	3.39
CP initiatives become too politicized	3.25
CP is an inefficient method	2.82
Little incentive for USFS managers	2.40
CP requires too much time and effort	2.30
Lead to decreased federal authority	2.10
Little public support for CP	2.00

a/ Items measured on five point Likert scale from 1; strongly disagree to 5; strongly agree.

Not surprising from earlier results, the constraints of FACA and lack of line officer support were seen as barriers to fully integrating collaborative planning. Also, the danger of collaborative forums being sidetracked by personal agendas and becoming politicized was raised. Beyond these concerns, managers tended to disagree with statements that there was little incentive for Forest Service managers, that collaborative planning required too much time and effort, that collaborative planning would lead to decreased federal authority, and that there was little public support for collaborative forms of planning. One theme to emerge from the comments was the sentiment that the biggest barrier to integrating collaborative planning was the Forest Service organization itself--the institutionalized funding, rewards, and policy structures that constrain the adoption of collaborative methods.

Suggested Policy and Organizational Changes

A key question in the study asked respondents to identify changes needed to more fully integrate collaborative planning into National Forest planning and management. A summary of these suggestions is presented in Table 6.

Managers were clearly frustrated with constraints on collaborative initiatives imposed by the Federal Advisory Committee Act (FACA). In fact, if the change FACA and eliminate FACA items are combined, over 53 percent of those managers interviewed had grave reservations about FACA. Many of the related comments stressed building more flexibility into the act, allowing the Forest Service to convene advisory meetings without requiring the meeting to be open to "everyone." A common concern voiced by several managers was that FACA limits collaborative forums to information gathering and mutual learning activities, where the real potential lies in forums for consensus building and developing alternatives.

Table 6. Suggested policy and organizational changes.

Suggested Changes	n	%
Change FACA	53	46.9
More flexibility	27	23.9
Integrate into all existing rules and regs	14	12.4
More training	8	7.1
Allow Forest Service to convene groups	12	10.6
Eliminate FACA	5	4.4
No change	5	4.4
Forest Service retains final decision	4	3.6

There was also general sentiment among respondents that provisions for collaborative planning be more completely integrated into policy and procedure guidelines for NEPA, NFMA, and the RPA. A number of managers voiced a concern that many advocacy organizations lack an incentive to participate in collaborative forums, preferring to achieve their objectives through litigation and appeals. According to one planner, "Presently, there is no political mechanism to force people to sit down; we have to create a process sanctioned by the legislature that when an agreement is reached there can be no end runs." Another controversial subject among managers interviewed was the degree of control that should be retained by the Forest Service over final decisions. Most managers were skeptical of collaborative forums where decision-making is shared and power is equally distributed among the participating stakeholders. Most preferred viewing collaborative planning as an advisory function where the Forest Service retains primary control over final decisions.

Finally, a question was asked regarding the future role of collaborative planning in national forest planning and management. Seventy-seven percent of respondents felt collaborative planning will play a larger role in the future, 10.6 percent felt the role would stay about the same, and only 2.7 percent indicated the role of collaborative planning would decrease. General comments reveal that while most managers realize collaborative planning approaches are not a panacea and must be selectively applied, most agree with the planner who relates, "It's not a matter of whether collaborative planning will be used, but only how." Clarke and Stankey (1994) expressed these same concerns in analyzing the FEMAT's social assessment, "We must fashion responsive decisionmaking structures built around a core of participative management. Failure to do so will lead to a loss of professional influence" (p. 35).

Conclusions

This study presents results from nearly every national forest in the country. It overwhelmingly shows strong support for collaborative planning with forest staff personnel, particularly those most likely to work with the public. Using their experience and perceptions, one can draw several conclusions about collaborative planning in the Forest Service. Two of the major conclusions are discussed here.

Collaborative planning appears to be well integrated into day-to-day management and decision making. It is used for a variety of purposes, the most frequent being to resolve conflicts and develop a shared vision of future resource conditions. These purposes lend themselves equally well to the long-term strategic forest planning process. The majority of national forests are in some stage of revising their forest plan. It is, therefore, critical that the lessons learned about collaborative planning be transferred into this realm.

If collaborative planning is to reach its full potential as a citizen participation and conflict resolution tool, several barriers need to be addressed. While it is difficult to imagine the Agency effecting the external changes identified by respondents (e.g., changing FACA), it is within the Forest Services' control to evaluate the internal barriers identified. First, the perception that collaborative planning is not supported by line officers at all levels of the organization, with support decreasing the further one gets from on-the-ground management, bears further examination. If this is a misperception on the part of survey respondents, then simple clarification of support is all that is necessary. However, if ambiguous messages are being sent to those attempting collaborative planning, or if there is outright resistance to it, this must be dealt with in a more thorough manner.

Second, if collaborative planning is to be done at all, it must be done well. Those involved in it must approach it in the same professional manner that the Forest Service approaches all its responsibilities. This requires training. Methods for providing training in a cost effective manner and recognition of the importance of this training (by line officers in particular) is critical to successfully implementing collaborative planning. Related to the first two barriers, the Forest Service must look critically at any institutional barriers that inhibit or prevent the use of collaborative planning. Are employees not rewarded for innovations? Or worse, do they risk being penalized for innovations that do not go smoothly? Do budget practices or agency culture constrain interactions with citizens? Finally, all Forest Service employees, including those currently engaged in collaborative planning, must ask themselves what they hope to accomplish by using this process. If managers wish to retain

primary control over final decisions and use outcomes from collaborative planning activities in an advisory capacity, is this truly collaborative planning?

In summary, it is apparent from the results of our study that collaborative planning is here to stay in the Forest Service. Nearly all personnel surveyed felt that it was likely to play an ever increasing role in Agency policy and management activities. Collaborative planning appears to be an investment in the Forest Services' future. By building partnerships, networks, and trust with the publics it serves, the Forest Service has found a powerful key to accomplishing its mission of caring for the land and serving people.

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**NATIONAL FOREST PLANNING: ASSESSING
PUBLIC PREFERENCES FOR
RECREATION STRATEGIES**

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Abstract: Conjoint techniques were used to assess and analyze public preferences associated with multiple-objective decisions involving timber harvesting, wildlife habitats, and three recreational opportunities: hiking, snowmobile use, and all-terrain-vehicle access on the Green Mountain National Forest in Vermont. The empirical results obtained from focus groups composed mostly of USDA Forest Service personnel illustrate the survey design and analytical capabilities.

Introduction

Increasing demand for outdoor recreation on national forests coincides with a growing appetite for wood products as well as an increased ecological awareness that recognizes the need to preserve biodiversity, fish and wildlife habitats, scenic beauty, and other ecological values. The role of forests in enhancing the biological, economic, and spiritual quality of our lives makes their management and use of great social concern.

In making decisions that allocate resources to meet recreation, commodity, and ecological objectives, national forest managers and planners must consider public values and preferences. Because such desires vary widely and cannot be met simultaneously, a means of assessing relative values and acceptable tradeoffs is needed. This research explores the use of conjoint analysis to solicit and analyze public preferences associated with multiple-objective decisions on the use of our national forests.

The empirical portion of this study addresses the solicitation and assessment of public preferences for various levels of timber harvesting, wildlife habitats, and three recreational opportunities: hiking, snowmobile use, and all-terrain-vehicle (ATV) access, on the Green Mountain National Forest (GMNF) in Vermont. Although the public involvement phase of the study is underway, focus groups composed mostly of research and support staff at the Northeastern Forest Experiment Station and GMNF were assembled to test survey techniques. The empirical results of these focus groups illustrate the survey design and analytical capabilities. However, they should not be construed as representing public preferences.

Analytical Technique

Marketing researchers use conjoint techniques, which are designed to measure psychological judgments, to measure consumer preferences (Green et al. 1988). In conjoint studies, respondents choose between alternate products or scenarios that display varying levels of selected attributes. These comparative evaluations, which outline a respondent's preferences or the

tradeoffs he or she is willing to make, can be used to solve for the partial utilities for each attribute that are imputed from the overall tradeoffs. These partial utilities can be combined to estimate relative preference for any combination of attribute levels. Thus, the analyst obtains high leverage between the options actually evaluated by respondents and those that can be evaluated after the analyses.

Conjoint techniques are well suited for soliciting and analyzing the preferences of stakeholders in environmental decisions that frequently involve tradeoffs between costs and benefits that are not efficiently represented in market transactions. Asking respondents to make choices between alternatives mimics the real choices that managers must make and, can provide feedback to stakeholders with respect to the consequences of their choices. For example, Opaluch et al. (1993) described an approach that used paired comparisons to rank potential noxious facility sites in terms of social impacts.

Choice experiments can be designed and analyzed in many ways. Respondents may be asked to reveal their preferences by choosing one of two or more options, ranking several options, or assigning numerical ratings to each option. Numerical ratings provide the most information but also place the greatest cognitive demands on respondents. Green (1974), Green and Srinivasan (1978), Louviere and Woodworth (1983), and Louviere (1988) provide information on experimental design within the context of conjoint analysis.

The Green Mountain National Forest

The 360,000-acre GMNF comprises approximately 5% of the total land area and half of all public forest land in Vermont (USDA, For. Serv. 1992). Because of its remoteness and relatively large size, the GMNF provides unique opportunities for backcountry recreation and wildlife habitats in a region characterized by nonindustrial private forests and high population density. Public desires for forest related benefits are intense and cannot always be met simultaneously, so a means of assessing preferences and values must be incorporated into the planning process.

National forest planning occurs on three broad levels: national, regional, and forest. The Forest Plan for the GMNF (USDA, For. Serv. 1992) sets goals, objectives, standards, and guidelines that fit within broader direction specified at the national and regional levels. Forest goals are accomplished through management actions that occur on Ranger Districts and subunits of these districts. Although public input and assessment of human values are important throughout the planning process, this study addresses public preferences for actions that occur below the district level. Techniques and experience developed during this study will be useful in developing broader goals for the next Forest Plan.

The 18,600-acre study area located on the Manchester Ranger District includes two adjacent units known as Greendale and Utey. The area contains one developed campground (14 sites) and land classified in the Forest Plan as Management Area's (MA) 2.1, 3.1, 4.1, 6.2, and 8.1. The first three listed MA's include opportunities for roaded natural recreation and emphasize uneven-age silviculture (2.1), even-age silviculture (3.1), and

winter deer habitat (4.1). MA 6.2 emphasizes opportunities for semiprimitive recreation while producing high-quality sawtimber by growing trees to an old age. MA 8.1 is the White Rocks National Recreation Area where the emphasis is on protecting wild values. Timber harvesting and roaded recreation are permitted, but restricted. Broad management prescriptions, standards, and guidelines are contained in the Forest Plan. Specific management actions need to be developed for the Greendale and Utley units. The goal of this research is to develop a procedure for assessment and analysis of public preferences and acceptable tradeoffs for various levels of timber harvesting, wildlife habitats, and three recreational opportunities: hiking trails, snowmobile use, and ATV access.

Timber harvesting on the GMNF is controversial. Some publics argue against the environmental disturbance that accompanies the harvesting of wood products. However, proponents argue that harvesting timber generates revenue for local and regional economies through the creation of jobs and cash payments for wood products exported from the area. It also is used to meet objectives related to wildlife habitat, silviculture, and recreation.

The Greendale/Utley area supports a high species richness with a diverse late successional community of northern hardwoods, hemlock, and spruce. There are opportunities to enhance habitats for a variety of wildlife species through harvesting practices, and the creation and maintenance of permanent openings, but it is not clear which species the public would like to see favored. If the public prefers species associated with early succession habitats, then management can be tailored to meet these needs. Similarly, management can be structured to favor species associated with mature, contiguous habitats.

Recreational concerns center around opportunities for and potential conflicts between motorized and nonmotorized trail uses. There are opportunities to feature cultural resources (e.g., old roads, bridges, and farm sites) and to view wildlife (sightings of bear, moose, beaver, and birds are common). There are several opportunities to expand the system of hiking trails. Currently, 16 miles of travelway are available for snowmobile use, and there is public interest in expanding the available travelway. However, some users are concerned that increased snowmobile access will disrupt other recreational activities and disturb wildlife. ATVs are not permitted on travelways, but there is public interest in obtaining ATV access to the area and several potential opportunities have been identified. Those in opposition cite ecological damage and disturbances to wildlife or other recreationists as reasons to deny ATV access.

Survey Design

A conjoint ranking survey was designed to solicit preferences for five forest-related attributes: timber, wildlife habitat, hiking trails, snowmobile use, and ATV access. Three levels covering the range of reasonable alternatives for the Greendale and Utley units were selected for each attribute (Table 1). Eighteen alternatives, each depicting a unique bundle of attribute levels, were chosen using an orthogonal design that allows estimation of all linear and quadratic main-effect components as well as the interactive effect of the timber and wildlife attributes, over the

entire range of possible attribute combinations, with the least number of trials (Addelman 1962a, b).

Table 1. Choice attributes and levels.

TIMBER
1 Do not harvest timber
2 Harvest timber on 5-10% of the planning area
3 Harvest timber on 20-25% of the planning area
WILDLIFE
1 Favor wildlife preferring contiguous unbroken forests
2 Favor wildlife preferring a mix of young forests and contiguous unbroken forests
3 Favor wildlife preferring open lands and young forests
HIKING TRAILS
1 Maintain existing hiking opportunities
2 Extend the hiking trail system to include 2 additional miles
3 Extend the hiking trail system to include 6 additional miles
WINTER MOTORIZED
1 Do not permit snowmobile use
2 Maintain existing 16 miles of travelway for snowmobile use
3 Extend the travelway available for snowmobile use to 23 miles
SUMMER MOTORIZED (e.g. ATV's, motorized trail bikes)
1 Do not permit ATV's on travelways
2 Provide approximately 5 miles of travelway for ATV use
3 Provide approximately 8 miles of travelway for ATV use

The survey was designed to be presented during public meetings conducted by USDA Forest Service personnel. The initial focus groups were gathered to determine the suitability of the survey instrument. They were given an explanation describing concerns and alternatives for the Greendale/Utley area and an overview of the nature and purpose of the conjoint study. To familiarize respondents with the ranking task, a practice survey was presented. Respondents were asked to imagine that they were considering the purchase of a new vehicle and to rank in overall preference nine hypothetical vehicles possessing varying levels of five attributes: gas mileage, horsepower, cargo space, length of warranty, and country where the vehicle was manufactured. After this task was completed, respondents were provided with a brief verbal explanation of the attributes and levels depicted in Table 1 and given the opportunity to ask questions. Additional information, such as expected volume of timber harvests for each level of the timber attribute and lists of species favored for each level of the wildlife attribute, was provided. Forest Service personnel were available to respond to questions concerning any of the attributes or levels. Respondents then ranked 18 sample cards, each depicting a unique bundle of forest-related attributes for the Greendale/Utley area. Two of the 18 sample cards are shown in Table 2. Respondents also completed a series of attitudinal and demographic questions.

Empirical Analysis

An ordered probit model was used to analyze data obtained from 30 respondents participating in focus groups assembled to test survey techniques. See Dennis (in press) for a detailed discussion of the underlying theoretical and statistical models. Each

Table 2. Two illustrative sample cards.

<i>Alternative #8</i>	<i>Alternative #14</i>
Harvest timber on 20-25% of the planning area	Harvest timber on 5-10% of the planning area
Favor wildlife preferring a mix of young forests and contiguous unbroken forests	Favor wildlife preferring a mix of young forests and contiguous unbroken forests
Extend the hiking trail system to include 6 additional miles of trails	Extend the hiking trail system to include 6 additional miles of trails
Maintain the existing 16 miles of travelway available for snowmobile use	Do not permit snowmobile use
Do not permit ATV's on travelways	Provide approximately 5 miles of travelway for ATV use
RANK ____	RANK ____

respondent ranked 18 alternatives, providing 540 observed preferences. Selected results of this empirical test are shown in Table 3. The dependent variable is the ordinal ranking of the alternatives, coded from 0 to 17; higher scores being associated with greater utility. Following the orthogonal survey design, attribute levels (1, 2, 3 in Table 1) for the independent variables were coded, respectively, -1, 0, 1 for the linear form, and 1, -2, 1 for the quadratic form. Because these data are used only for illustrative purposes, detailed analyses and validation of the model are not undertaken.

Table 3. Ordered probit results (N=540).

Variable	Linear effect	Quadratic effect
Constant	+	**
Timber	+	**
Wildlife	+	**
Hiking trails	+	-
Snowmobile	-*	.*
ATV access	-**	-

** Significant at 1% level.

* Significant at 5% level.

General inferences about the preferences of the focus-group respondents can be made from the results in Table 3. Only the signs of the estimated coefficients and significance levels are provided due to the illustrative nature of the data. The positive sign estimated for the timber attribute indicates that increased levels of timber harvesting will result in a higher estimated probability of a response score falling within the ranges associated with higher utility. Therefore, higher preference and greater utility were associated with increased levels of timber harvesting. However, the significance of the quadratic timber variable indicates nonlinearity in the relationship. The nature of the overall relationship will depend on the signs and relative magnitudes of the estimated coefficients. The estimated negative sign for the quadratic timber variable indicates that there are decreasing marginal benefits associated with increased harvesting. Additional information on the nature of this relationship is provided by examining the relative magnitudes of the estimated linear and quadratic effects, as discussed below.

The estimated negative signs for the variables representing snowmobile and ATV access indicate that respondent's preferred lower levels of these activities. The coefficients for the linear form of the wildlife variable and both the linear and quadratic

forms of the hiking trail variable were not significantly different from zero. However, the significance (1% level) of the quadratic form of the wildlife variable indicates nonlinearity. It appears that respondents favored a mix of young and contiguous unbroken forests over either extreme. Discussions with members of the focus groups revealed that wildlife habitat was important, and many respondents addressed their preferences for habitat manipulation by weighting timber harvesting heavily in their ranking of the alternatives. The estimated coefficient for a variable expressing the interaction of the timber and wildlife attributes was not significantly different from zero and dropped from the model.

Interpretation of the coefficients for the polychotomous probit model is complicated. The estimated probability that a response will fall within each of the ranges is determined by the estimated coefficients and levels of the associated variables. Because the probabilities across the ranges must sum to 1, the effect of a unit change in an independent variable is to increase the estimated probability that an alternative will fall within some ranges while decreasing the probability of falling within others. The magnitude of the estimated changes in probabilities depends on the values for all the coefficients as well as the values of the other independent variables at which the change is evaluated. The expected change in the probability of an alternative falling within any of the ranges resulting from a discrete change in an independent variable can be calculated. For example, varying the timber attribute over levels 1, 2, and 3 while holding the other attribute levels constant at the mean values yields increases in the estimated probability that this alternative will be ranked highest of 0.007, 0.034, and 0.041, respectively. The probability of it being ranked lowest was 0.114, 0.032, and 0.027, respectively, for the three levels of timber harvesting. The greatest magnitude of change occurs between levels 1 and 2, illustrating the decreasing marginal benefits of timber harvesting discussed previously. Similar calculations can be performed for any change in individual attributes or combinations of attributes that is of interest to the analyst. For example, one could calculate the estimated probability that a given alternative would be ranked within the highest or lowest quintile.

Summary

Resource managers need a means to solicit and analyze human preferences and values. Conjoint techniques are well suited for coping with this task. A conjoint ranking survey was designed

for use in soliciting public preferences for various levels of timber harvesting, wildlife habitats, hiking trails, snowmobile use, and ATV access on the GMNF. The survey was tested on focus groups composed mostly of research and support staff at the Northeastern Forest Experiment Station and GMNF. No significant problems were identified by the focus groups.

An ordered probit model was used to estimate linear and quadratic main effect components from the empirical information collected during the focus group meetings. Although the results do not represent public preferences, they illustrate the analytical capabilities. The results indicate a preference for higher levels of timber harvesting and that there are decreasing marginal benefits associated with additional harvest. Lower levels of snowmobile and ATV access were preferred, while respondents appeared to be indifferent toward varying levels of hiking trails. The quadratic effect was particularly useful in explaining preferences toward wildlife habitats. Respondents appeared to prefer a mixture of young and contiguous unbroken forests over either extreme for wildlife habitat. Several respondents indicated that wildlife habitat was an important attribute but also recognized that the diversity they desired would be achieved by higher levels of timber harvesting. Public preferences will be solicited during upcoming public involvement meetings. Additional work will include estimation of the effects of socioeconomic variables on preferences.

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**CONCEPTUAL RELATIONSHIPS BETWEEN
IMPACT PARAMETERS OF SOCIAL
CARRYING CAPACITY AND THE RECREATION
OPPORTUNITY SPECTRUM**

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Abstract: The purpose of this study is to establish conceptual relationships between impact parameters of social carrying capacity and the ROS. Findings suggest social carrying capacity has low acceptable social norms for primitive recreational settings, while the social norms increase as you move to more urban recreational settings. There is a negative relationship between density and encounter norms for primitive recreational settings, while there is a positive relationship for more urban recreational settings.

Introduction

Tastes in outdoor recreation among the public are diverse (Manning 1985). The tastes can be changed depending on physical characteristics, social attributes, and management goals. The need for diversity has led to classification systems for recreation areas such as the Recreation Opportunity Spectrum (ROS). The ROS is based on the idea that there is a continuum of opportunity (Driver and Brown 1978), which is defined by six factors: access; other non-recreational resource uses; on site management; social interaction; acceptability of visitor impacts; and acceptable level of regimentation (Clark and Stankey 1979). These factors are combined in alternative arrangements to describe diverse recreation experiences. The distinguishing characteristic of the ROS is the degree to which it has been formalized and translated into management guidelines (Manning 1985).

Driver, Brown, and Stankey (1987) identified further research needed to explain the relationships among activities, settings, and experiences in the ROS framework. Natural variations such as topography, vegetation patterns, and management actions can greatly influence the actual level of contact among people. The number of people, the perceived crowding, visitor satisfaction, and how they are distributed in space and time are important elements in determining the appropriate social carrying capacities along the opportunity spectrum. Appropriate levels of interaction can vary along the ROS.

Many studies have focused on density, perceived crowding, and visitor satisfaction in recreation settings. Few studies about the relationships between perceived crowding/visitor satisfaction and use level have been researched in light of the ROS. The purpose of this study is to review the relationships between important impact parameters related to social carrying capacity, and to establish conceptual relationships between impact parameters and the ROS.

Relationship Between Social Setting and Physical Setting

As one moves from primitive to modern settings, the physical environment becomes progressively less natural and smaller, whereas user concentrations become progressively higher. This implies that there is a direct relationship between the physical environment's naturalness and the social environment's user density. Such a direct relationship can be described as being linear (Brown, Driver, and McConnell 1978; and Driver and Brown 1978). To test the direct relationship, Heywood, Christensen, and Stankey (1991) collected data from campers in seven developed campgrounds during the late summer 1989 camping season. They found that there are multiple linear and non-linear relationships between biophysical and social setting conditions

Heywood (1991) studied the subjective user responses to the objective ROS setting categories for easy-access car campers during the summer 1989 and 1990 camping seasons. He used three similar formats to measure the biophysical, social, and managerial setting preferences. He considered the relations between subjective perceptions of ideal natural conditions (five categories: primitive, nature dominant, nature modified, nature highly modified, and modern), and ideal social density (five categories: continually meet others, frequently meet others, occasionally meet others, meet few others, and meet no one). Analysis of the data showed that multiple linear and non-linear relationships are present in the campers ratings of ideal naturalness and social density

In conclusion, there seem to be some conceptual relationships between the physical setting and social setting, though the relationships are not based on the results of empirical studies, nor are they simple.

Relationship Between Use/Encounter Level and Physical Setting

The efforts to define social norms suggest that there are many ways normative factors enter into crowding problems. In Jackson's returned potential model, personal norms refer to individual standards, while social norms refer to collective standards. The range of tolerable contacts defines the scope of acceptable encounter levels, intensity shows how strongly norms are held, and crystallization is a measure of group agreement.

The relationship between encounter level and physical setting can be found in the studies of three rivers: Grand Canyon (Colorado River), Rogue River, and Brule River (Shelby 1981). River encounters per day in Grand Canyon averaged 0.9 at wilderness setting, 2.4 at semi-wilderness setting, and 4.0 at undeveloped recreation setting. River encounter norm the crystallization, was

2.4 at wilderness setting, 3.0 at semi-wilderness setting, and 5.1 at undeveloped recreation setting. As one moved from the primitive to the undeveloped setting, the river encounters per day and crystallization increased. This trend emerged with the same pattern for the Rogue River and Illinois River except for crystallization in the Illinois River study. In the study of the Rogue River, river encounters per day were 1.5 at wilderness setting, 2.9 at semi-wilderness setting, and 4.4 at undeveloped recreation setting; crystallization was 3.3 at wilderness setting, 4.5 at semi-wilderness setting, and 7.5 at undeveloped recreation setting. In the Illinois River study, encounters per day were 0.7 at wilderness setting, 2.0 at semi-wilderness setting, and 2.7 at undeveloped recreation setting; crystallization was 2.3 at wilderness setting, 2.9 at semi-wilderness setting, and 2.8 at undeveloped recreation setting.

In Whittaker and Shelby's research (1988) about the Deschutes River in Oregon, the relationship between encounter level and physical setting was found. In their research, river encounters (observed to median) were 1.8 at the lower use and development level setting, and 2.2 at the highest use and development level setting. Crystallization of river encounters was 0.85 at the lower use and development level setting, and 1.08 at the highest use and development setting. Camp encounters were 1.4 at the lower use and development level setting, and 1.9 at the highest use and development setting. Crystallization of camp encounters was 1.13 at the lower use and development level setting, and 1.26 at the highest use and development level setting.

In Roggenbuck, Williams, Bange, and Dean's research (1991) for the presence of norms for encounters with other groups at New River Gorge National River in West Virginia, the acceptable number of boats was estimated. In their research, a wilderness whitewater trip was defined as "a trip through a scenic gorge with little evidence of man, many opportunities for solitude, and chance for challenge and for you to battle the waves." A scenic whitewater trip was "a trip through a scenic gorge with some evidence of man, fewer opportunities for solitude, and guidance when running wild rapids." A social recreation trip was "a trip on a scenic river with much evidence of man, exciting rapids, and seeing other people on the river makes the trip more fun." Fifty percent of respondents would accept 5 boats for a wilderness whitewater trip, 15 for a scenic whitewater trip, and 25 for a social recreation trip. Seventy-five percent of respondents would accept the followings: acceptable number of boats was 2 for a wilderness whitewater trip, 8 for a scenic whitewater trip, and 10 for a social recreation trip. Crystallization was 12.3 for the wilderness whitewater trip, 21.6 for the scenic whitewater trip, and 34.5 for the social recreation trip.

The relationship between use level and recreation places also appeared in Manning and Ciali's study (1981). Manning and Ciali's study also focused on rivers, and closely defined the resource base of which rivers are comprised. They examined if there were differences in the nature and intensity of recreation use by six river types. The first variable examined was the number of recreation users found on each river type. The number of users on each river type was divided by the number of miles of stream in each river type to determine use intensity. This factor is similar to the density concept. Results showed that there was great diversity in the intensity of recreation use by river type. Use

intensity is least on the primitive torrent river type (0.5) and greatest on the urban meander river type (32.1). These results can be used to induce the relationship between use level/encounter level and the ROS. Use level and the ROS have a positive relationship. This implies that use levels are low in primitive recreation settings, while moving into more urban recreation settings, the use level increases. Visitors' perception of each recreation setting was considered in terms of relationship between use level and the ROS. Encounter norms reflect the visitor perception of the recreation settings. Visitors seem to prefer little evidence of people and many opportunities for solitude at primitive recreation settings, while they seem to accept much more evidence of people, and sociable activities in more modern settings. Visitors' perceptions of each recreation setting were not considered in Manning and Ciali's study, because recreation intensity just included the concept of density. With these results, it is impossible to find whether use level and the ROS show a linear or non-linear relationship. Only simple relationships between use level and the ROS can be induced from these results.

Relationship Between Crowding/Satisfaction and Use Level, and Physical Settings

Crowding refers specifically to numbers of people, so it is at least potentially a better evaluative standard than satisfaction (Shelby and Heberlein 1986). Though crowding and satisfaction have a negative and statistically significant relationship, the correlations are generally quite small. Crowding plays a demonstrable but small role in satisfaction with recreation experiences. As one of the purposes of this paper is to find the relationships between impact parameters and recreation settings, satisfaction was considered despite little correlation with crowding.

In Manning and Ciali's study (1981), one of the clearest differences found between river types concerned *desired use density* levels, that is, social carrying capacity. Manning and Ciali included in the survey questionnaire a series of questions that asked each respondent to rate on a scale of 0 (least satisfied) to 10 (most satisfied) how satisfied they would be in encountering various numbers of other recreation users. In their research results, users of the primitive torrent river type were highly sensitive to density with satisfaction falling from 8.3 to 1.2 as the number of users increases from 0 to 5. Users of the village meander river type showed considerable tolerance for crowding as satisfaction remained constant through 10 other users, and remains above 1 on the satisfaction scale even at a use level of 150. The urban meander river type showed a convex curve. This results can be used to induce the relationship between visitor satisfaction and use level in light of the ROS. Satisfaction and use level have a negative/positive relationship at a recreation setting. This implies that visitor satisfaction is great when use level is low in primitive settings. As use level is increasing, satisfaction is decreasing. This negative relationship is more sensitive in primitive recreation settings. Moving into more urban recreation settings, the relationship seems to change to a positive one, because those who visit the urban recreation setting are more tolerant of use levels.

As to moving into urban recreation settings, there seems to be a threshold for social norms (i. e., satisfaction, perceived crowding). In Manning and Cialli's study, the urban meander river type seems to have a threshold – as use levels increase, visitor satisfaction increases to a point; then as user level increases more, visitor satisfaction decreases. This view corresponds to previous research. In previous studies, it was suggested that the relationship between amount of use and user satisfaction is a curvilinear relationship (Nielsen, Shelby, and Haas 1977). Though the results of Manning and Cialli's study did not show the threshold for any river type except the urban meander river type, it is possible to make the supposition that each recreation setting has a threshold to tolerate visitor satisfaction and use level to a point. As recreation settings become more urban, tolerance is greater. Similar results also can be derived from the Jackson's return potential model to describe the hypothetical encounter preference curves for wilderness hiking, a cocktail party in a small room, and walking on a city sidewalk (Heberlein and Shelby 1986). The range of tolerable contacts was zero to five contact for the wilderness hiking experience; five to twenty-five for the cocktail party; fifty-four to two hundred and fifty for the sidewalk. Tolerance may be regarded as the range of tolerable contacts and threshold may be regarded as the neutral line in Jackson's model. From the some studies, it may be possible to explain theoretically that there is a negative relationship between social norms and use level in primitive recreation settings because visitors' tolerance is very low. The relationships become positive for urban recreation settings to a point because visitors' tolerance is high.

Conceptual Relationship between Impact Parameters of Social Carrying Capacity and the ROS

There seems to be some relationships between impact parameters of social carrying capacity and various recreation settings. In previous research, it was found that the relationships are not simple ones, but multiple ones or non-linear ones in relation to the ROS. As to reviewing previous studies, some findings were explored to establish the relationships between impact parameters and the ROS. The following are some relationships between impact parameters:

- 1) Crowding and density have a positive relationship, but density is not very powerful to predict crowding responses.
- 2) Most of the pertinent articles found no relationship between actual density and satisfaction. But there is at least some relationship between visitors satisfaction and crowding, based on the traditional crowding model, though some investigations in backcountry and wilderness found no relationship between satisfaction and crowding.
- 3) Use level and preferences for contacts (crowding) have a negative relationship in backcountry and wilderness.
- 4) There seem to be some conceptual relationships between physical setting and social setting. These seem not to be simple relationships but to be multiple relationships or non-linear relationships in terms of the recreation opportunity spectrum.

5) Use/encounter level and recreation settings of the ROS can take a linear or non-linear relationship.

6) Satisfaction and use level have a negative relationship at a recreation setting. This negative relationship is more sensitive in a primitive recreation setting; while moving into more urban recreation settings, the tolerance of this relationship becomes greater.

Based on previous findings, conceptual relationships between impact parameters of social carrying capacity and the ROS were established. The following are the basic concepts of these relationships.

1) Use level and the recreation settings of the ROS have a positive linear or non-linear relationship (Figure 1).

2) Use level (number of encounter) and social norms (e.g., perceived crowding) have a positive/negative linear/curvilinear relationship in light of recreation settings of the ROS (Figure 2). These have negative relationships close to primitive recreation settings and positive relationships close to urban recreation settings. Social norms have low tolerance in a primitive setting, and higher tolerance when moving toward an urban setting. These relationships have thresholds—the social norm increases to a point, then as use level increases more, the social norm decreases. The thresholds may or may not exist for primitive settings, while these appear more clearly close to urban settings. The relationships imply that those who visit primitive recreation settings are sensitive to increasing use levels, while those who visit urban recreation settings have much more tolerance to increasing use level. This means social carrying capacity has a low acceptable social norm close to primitive recreation settings, while it has a high acceptable social norm close to urban recreation settings.

Implications/Limitations

Social carrying capacity requires a value judgment. When defining a carrying capacity, sometimes two aspects must be considered: visitor satisfaction and environment impact. Social norms such as crowding, number of encounters, and satisfaction (though sometimes inappropriate) are used to measure visitor satisfaction. Environmental impact includes natural resource deterioration such as visible erosion, loss of ground cover, and area of bare ground. The ROS has been employed as an efficient management framework in outdoor recreation management. The ROS is a conceptual framework for encouraging diversity in outdoor recreation opportunities (Manning 1985). In wilderness recreation it is important to consider what classes of recreation opportunities are being provided in an area, whether several classes can be provided, and how these classes should be distributed on the ground (Hammit and Cole 1987). Conceptually, toward the primitive end of the ROS, recreation impacts are less acceptable, and management objectives are more likely to stress low-impact conditions.

Regarding the relationships between impact parameters of social carrying capacity and the ROS, it is possible for park managers to establish reasonable standards or social norms as a tool of park management. The relationships are different depending on

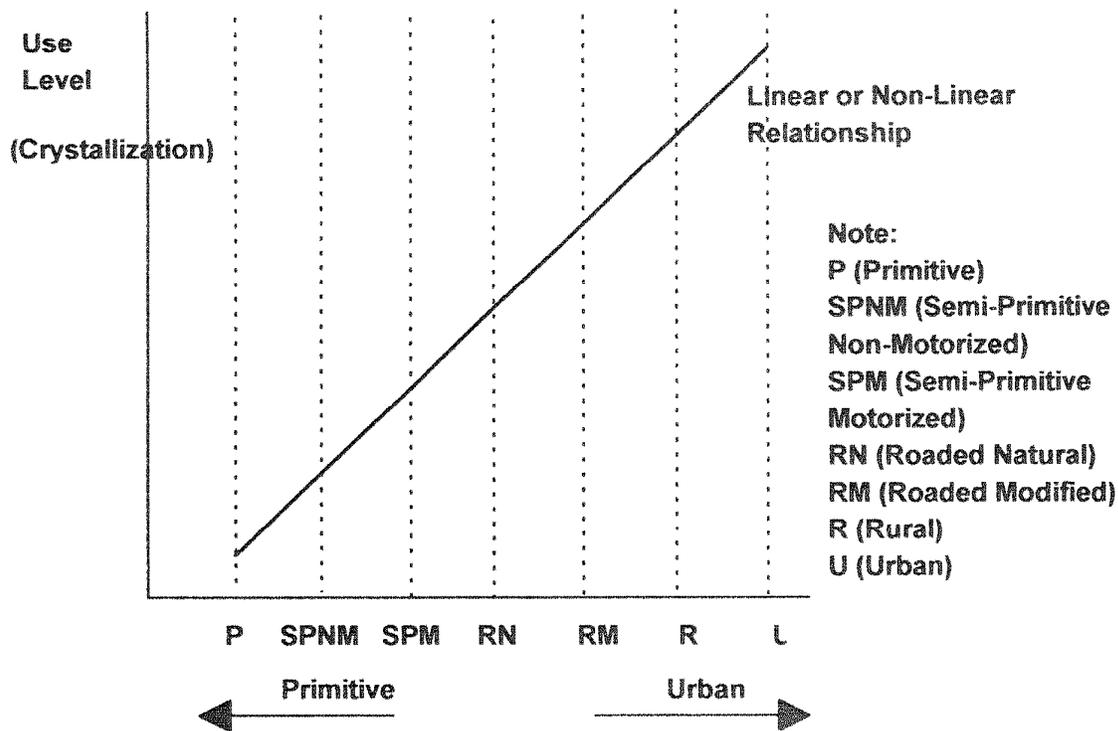


Figure 1. Conceptual relationships between use level and recreation settings

classes of the ROS; for example, the relationships between social norms and the primitive settings are negative, while the relationships between social norms and urban settings are positive to a point. Additionally, the social-psychological behavior of the recreationist is considered in deriving these relationships; that is, those who visit primitive settings have low tolerance while those who visit urban settings have high tolerance.

Few studies have been done about relationships between impact parameters and the ROS. To make matters worse, there is no study about urban/rural recreation settings of ROS; most studies have focused on wilderness recreation settings. Further research in more diverse settings is needed to verify the relationships suggested in this paper.

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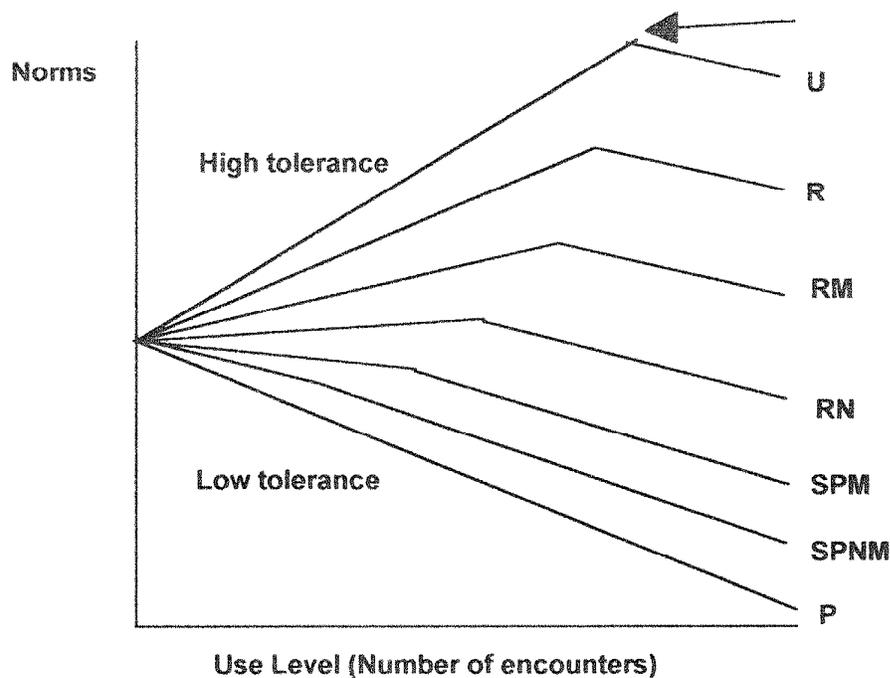


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Featured Speech
By
Jay Beaman

Recreation Research Past, Future and Critical Relationships with Management That Influence the Direction and Success of Research: Views From "Outside" After More Than 2 Decades in A Federal Agency

Jay Beaman, Ph.D.

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Introduction

What follows is not the exact text of the "featured speech" but an adaptation of the speech for the NERR Proceedings. There was an introductory statement to the presentation in which NERR was thanked for inviting the presentation and in which Jerry Vaske, Maureen Donnelly, Alan Graefe, Tom More and Orin Layman were thanked for having fostered NERR thus providing the opportunities that it has for research to be presented and for researchers and managers to meet. The presenter used overheads and had numerous props to add life to the presentation. This paper incorporates much of the overhead material into the text.

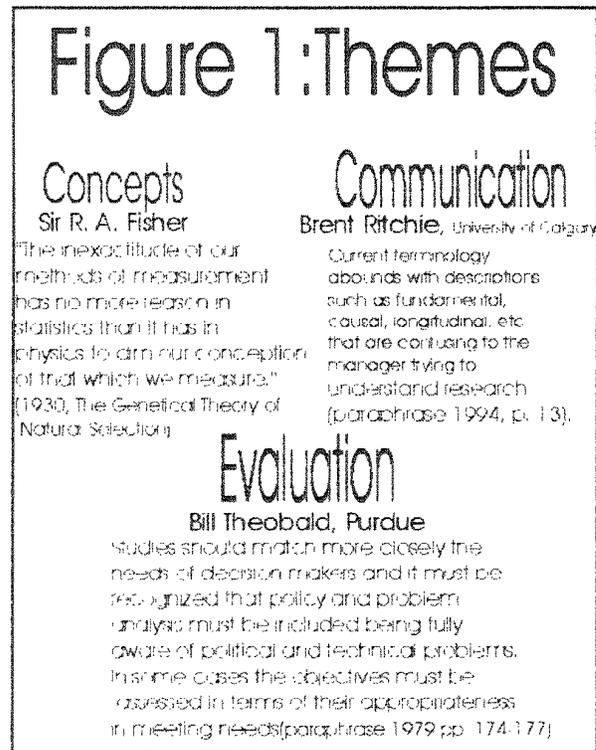
This text uses the first person in places because it, in my view, preserves some of the flavor of being a presentation. What is included in it is based on my speech notes but does not generally follow the same order. Points have been consolidated and reorganized. Some material omitted in the presentation has been included. However, I believe that this text and the presentation cover the same ground and present the same message. I provide very few references since as one can see by the Stanley, Perron and Beaman 1996 discussion of "Parks Canada's Economic and Business Models" hundreds of references could be provided. Beaman and Meis (1987) is a discussion that complements this one. There one finds references to a variety of literature.

A Perspective on Research and Its Application to Planning and Management

Having been trained in physics (BA & started Ph.D.), mathematics (MA), statistics (MA Thesis & courses) and Sociology (Ph.D.), I bring a particular approach to leisure research. Figure 1 identifies areas of concern to me. I have no use for the claim that something is justified by its benefits (re benefits see Driver, Brown and Peterson 1991) unless those benefits are measurable in a meaningful way. Qualitative research certainly has value. However, *justification* should mean something. α is justified because it has one benefit and β has none is a quantitative statement. α is justified because of its benefits exceed those of β is meaningless if benefits can't be measured. α is justified because of its benefits is a statement that raises questions. Is everything that offers the benefits that α does justified? Why not? Unfortunately, much that now passes for justification is not. Bureaucrats and politicians are following marketers in describing programs as optimal and themselves as encouraging efficiency when the benefits of services are neither

compared nor measured. The words are meaningless without measurement

The quotation from R. A. Fisher in Figure 1 actually recognizes two points. Even with a growing emphasis on the distinction between concept and observable variables (Hayduk 1987), importance, performance, substitutability, benefit, remain poorly conceptualized (Beaman 1976; Vaske, Beaman, Stanley and Grenier 1996; Mannell and Stynes 1991). If one does not have a really clear idea of what something is, it is no surprise that one does not measure it accurately or use it (e.g., attendance) in a consistent way. Still, not measuring, not being able to measure, is a good excuse to keep planning and management in the verbal and advocacy arena. In that milieu status, prestige, aggressiveness and power are key to getting things done. Research, on the other hand, sometimes requires people to recognize reality. Yes, numbers are misused but the alternative is decisions based on personal preferences, power, personality, eloquence, etc.



I guess that my abhorrence of bureaucratic game playing, lying and verbal gymnastics is why evaluation in a very traditional and rigorous version (Theobald 1979) has been an important part of how I addressed problems. I don't mean formal evaluation, I mean building evaluation into planning and management so that costly problems are recognized and corrected. However, I'm led to believe that evaluation isn't too popular. Bill Theobald assures me that his book sold as many copies as his family bought. We do not like having our pretentious claims for use of facilities, education of the public, etc. examined rigorously. Making claims to get resources is fine. Too often the next exercise is seeing that the discrepancy between plan and achievement does not become a public or bureaucratic issue. Of course, we avoid such problems

most easily by not defining measurable objectives. We deal with values and intangibles. Furthermore our managers "don't understand" so professional judgment is "key." Sometimes it is convenient not to understand. Sometimes we can manipulate managers by seeing that they do not understand. I accept Brent Ritchie's view provided in Figure 1. Addressing a problem in the detail and with the rigor that its theoretical or practical importance justifies, does cause communication and other problems. So does addressing problems simplistically or incorrectly.

I used to cringe when, as part of my job, I had to listen to planners, managers, and researchers talk about knowing their users (or their potential market, market or public) and then have them give average age and other demographic parameters. Is most of the use of a park by visitors from Canada if 60% of the *person visits* are from Canada? Or, if 60% of the *person visit days* are from the USA, is most of the use from the USA (see Beaman and Redekop, 1990)? Regardless, if planners and managers who know their clients and who require data $\pm 5\%$ do not know, some don't care, if they get visits or person visit days, there is a problem. Still, for planning and management I have long seen a more serious problem in that users and potential users were not broken down to segments with different needs and wants as part of analysis for planning and management.

I have a long standing concern with segmentation (Leicester and Beaman 1964 and 1976; Beaman 1976; Beaman and Lindsay 1975; Vaske, Beaman, Stanley and Grenier 1996). People who do not recognize the significance of identifying segments look at average figures on satisfaction, performance and other survey variables. But, these averages are not appropriate information for decisions. Why wouldn't averages be appropriate? Well, look at Figure 2 (Beaman and Vaske 1995) which depicts the attitudes of several user groups. Most of us know that many recreational areas are used by groups that seek different benefits, that have conflicting values, that favor different development options and that displace each other based on how what they want is influenced by planning and management. An average across such groups, failing to consider that they exist, can show that planning and management options should be pursued that are contrary to the interest of all groups. ROS and other systems offer one way to recognize the needs of different groups. The ultimate way is to recognize the groups, their values and to plan knowing how the groups are going to be impacted on. Public participation and other processes can then seek plans in which optimizing benefits really means something.

Aspects of the Link Between Research, Planning and Management

The last paragraph may sound impractical. Many people are only aware of my methodological work. However, I spent most of more than two decades with Parks Canada being very practical. In the early 1970's I started pushing planners, managers and researchers to recognize segments and the implications of their existence for what they said they wanted to achieve: optimal experiences, satisfaction, effectiveness (i.e., see Beaman and Lindsay 1975). These people were preparing or reviewing plans and projects. Some of us controlled approval of the dollar resources for work so review was taken seriously. I measure part

of my success while with Parks Canada in improvements that I saw in using research. I also measure it in the tens of millions of dollars of projects that never saw the light of day because when people tried to show their merits they couldn't. I am also proud that there were hundreds of projects that were improved by constructive dialogue, often outside the review process as colleagues.

I (me and my staff) prepared formal directives on research in support of planning and management. There were also less formal criteria that I circulated in the early 1980's for socioeconomic review of Parks Canada's plans and capital projects. I believe that these show a concern with knowing the "business" of Parks and doing research/analysis to see that this is properly reflected in what is done. The points covered below are paraphrased from a 1980 note from Beaman to relevant Parks Canada staff that included 20+ professional socioeconomic researchers and 40+ planners, a 100 or so managers and 30+ research support staff. The criteria are as relevant now as then. What applied researchers are being asked to do/check provides a partial definition of their needs and a template for theoretical research needed to support them. I just asked that in reviewing people use substantiation or in preparing submissions for review, the submission be examined in relation to the following:

- There should not be an appeal to standards as the basis for writing off capital and/or for creating new high-priced alternatives.

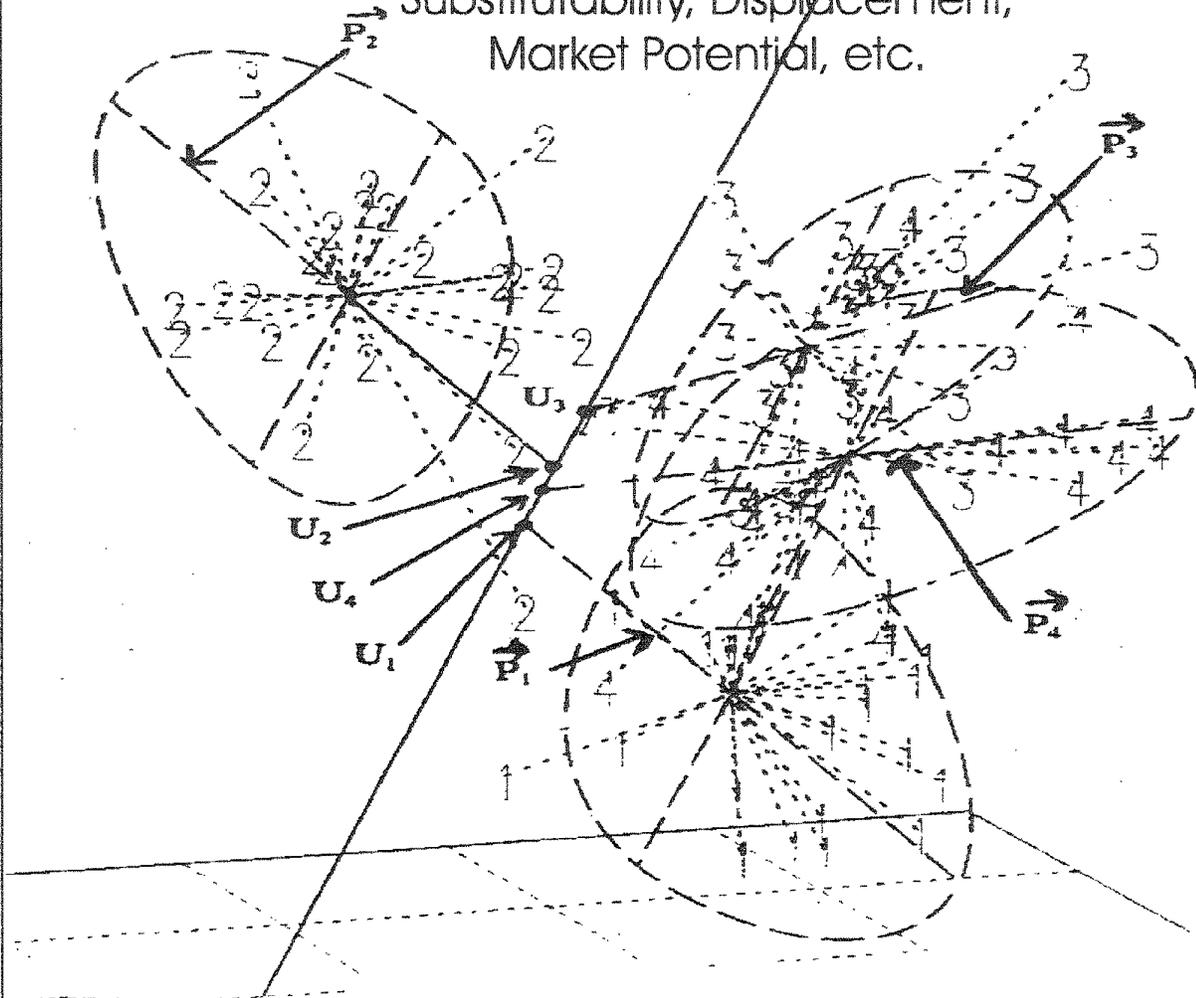
It is my position that standards are not the justification for something but, as implied in Figure 3, they are a point of reference. The more that they are specific to a segment with homogeneous behavior the more readily one can use them in planning and evaluation. ROS gives a way of describing a resource. It provides a useful starting point for research. The problem comes when there isn't *research* but rather "ROS experiences" are attributed to users of an area with a given classification and the "hypothetical experiences" of "hypothetical users" become the basis for a real plan. The *bottom line* that researchers must address for planners and managers is what is being achieved for whom at what total and unit costs. In some sense, in most societies, the rightness of the "price" and of who is served is resolved politically.

- There must be a clear indication of people objectives (who will be served, a segment definition, why and some clear indication that success can be measured)

Unless a project proponent can say who is to be served and how there is a problem! *The project has not been adequately supported by research!* Again, when I know that a park serves repeat local visitors on the weekends and also for some family holidays; and that it serves a variety of non local special interest and general tourist markets, I expect *research-based* quantitative statements about the existence of these and how they are being served to be part of a plan. Figure 4 presents a situation that I saw all too often. It's great to say we listen, we care and we serve. I too often saw that we also do what we want and spend money trying to convince publics that it is what they or most publics want! This is not to say that managers should do what some

Figure 2: Segment Structure:

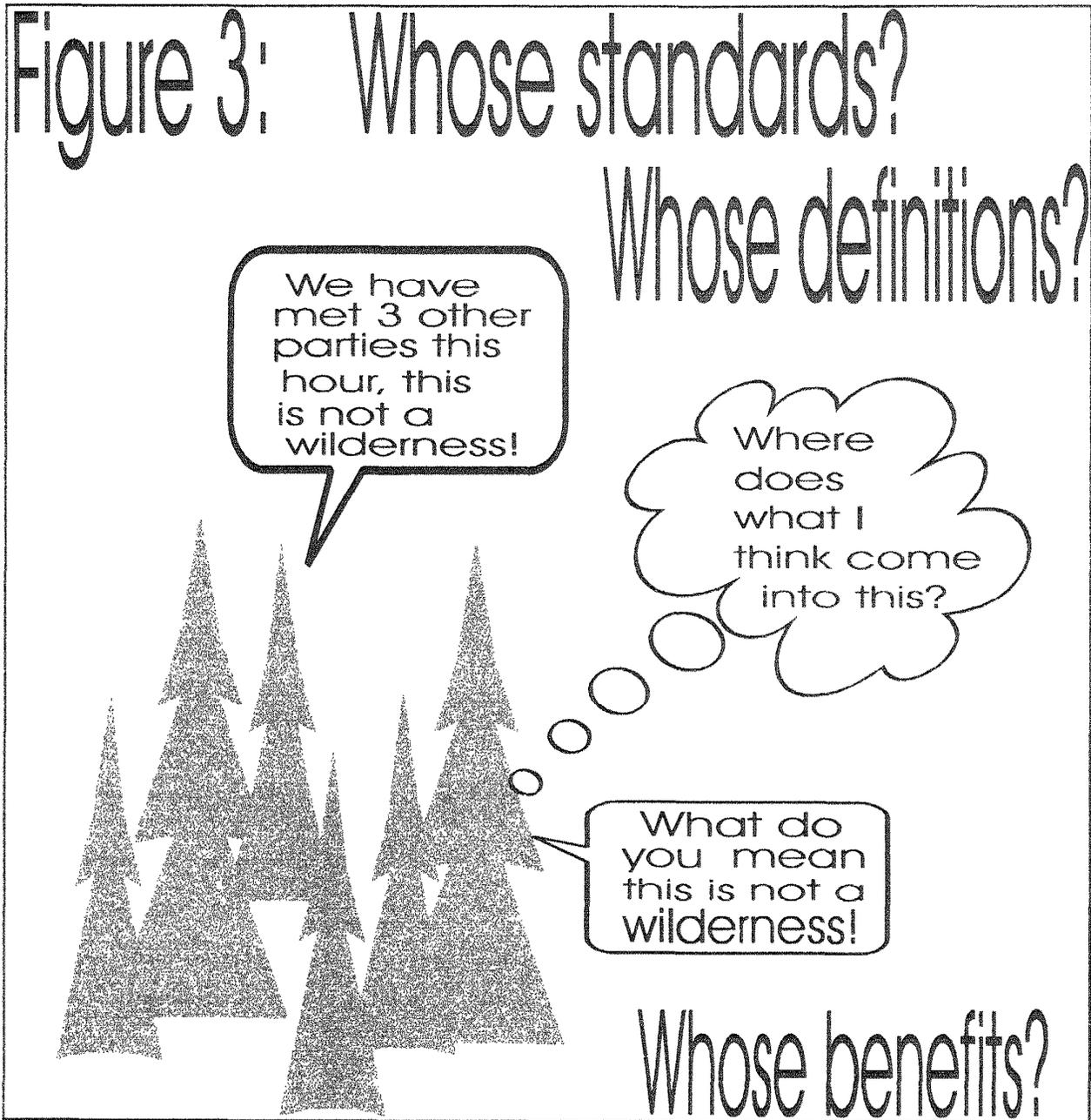
the Key to Understanding Equity,
Substitutability, Displacement,
Market Potential, etc.



The axes above show the simulated distribution of 4 segments with different values and needs. These are segments that "substitute" differently and in an importance-performance study show conflicting values resulting in decisions that displace one segment in favour of another (for segment estimation see Beaman and Vaske 1995 and for this structures behavioral implications see Vaske, Beaman, Stanley and Grenier 1996). The figure is an adaptation of a figure that appears in the articles cited.

publics want. Managers have responsibilities for resources and other mandates. It is where there is real discretion that *research* should be done to really understand what will be achieved by what we propose to do and by alternatives.

- There should not be statements of visitor preferences when there is no clear indication that real/valid segment specific information has been obtained.

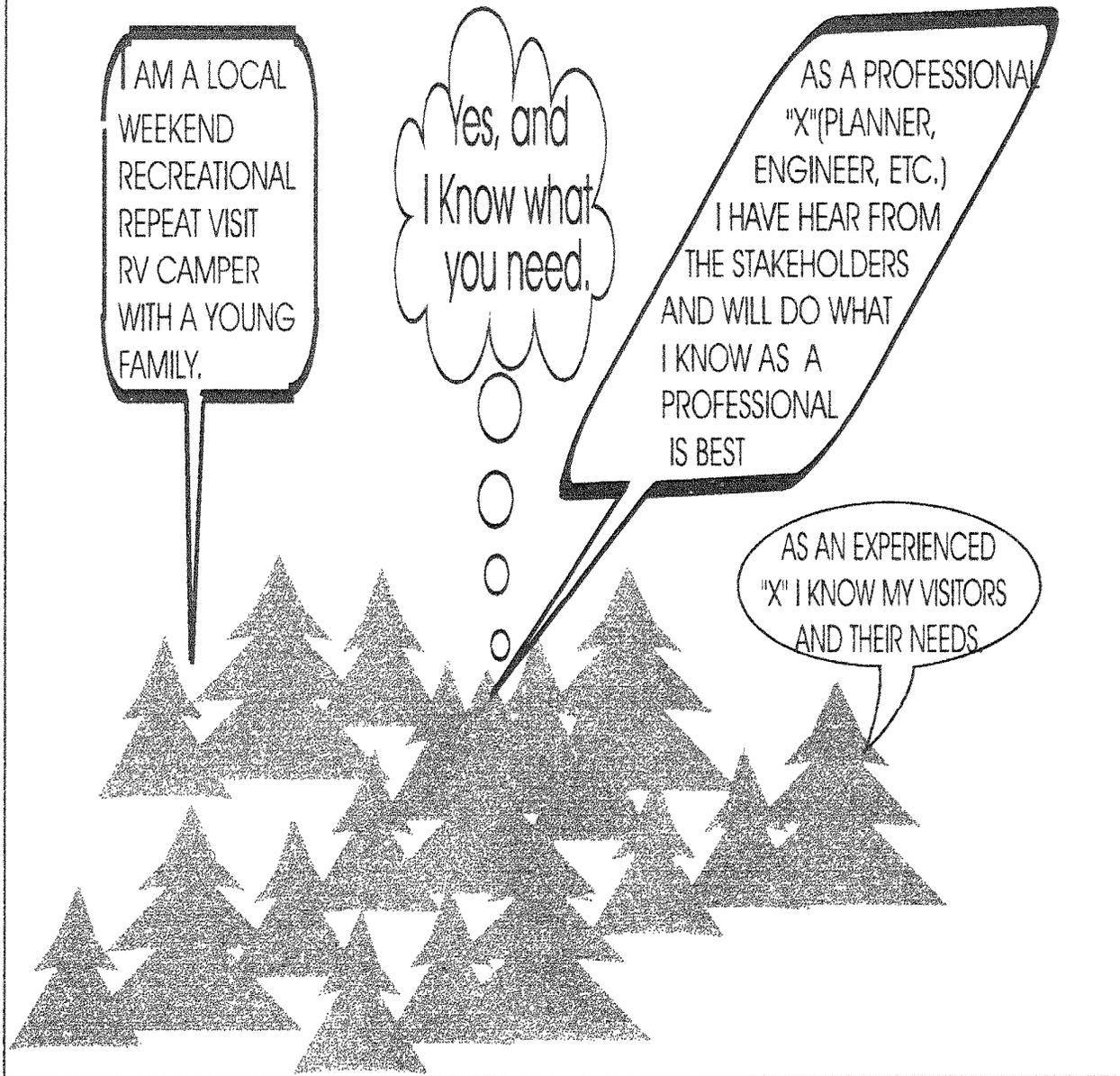


Even with clear statements of who is to be served and how, I often found by my own research (re fees, alternatives and behavior see Beaman, Hegmann and DuWors 1991) that the people to be served were not there to be served in the numbers planned for or were there but not interested in the service given alternatives. Now, in some cases project proponents simply assumed that people would come if a service was offered (as they assume that more will come if fees are lowered), in some cases their estimates of use were invalid but, most often, said/wrote what it was considered important to say, namely that something was needed. Claims were that research would take too long,

wasn't needed, couldn't be done, was too costly, etc. Statements of justification of needs too often rested on the likes of: professional judgment, status in the organization and organizational politics. I lost in opposing many "bogus justifications" but I then saw that proceeding on poor or invalid justification does not pay.

- Justifying an option should not be based on appeals to results of "public participation" when it is not clear that (a) such results exist or (b) that the results that exist are valid/reasonable in the context used.

Figure 4: NEEDS, CLIENTS AND PLANNING



There was a continuing problem with public opinion records and focus group results being used as survey data. There was also a reluctance "because of cost and time pressure" to consult the real market (to do valid research) as opposed to focus groups and the publics that *participated in meetings*. It is fascinating how

people can talk about benefits and claim to use public participation and focus group results to determine expenditures on services. Publics and focus groups only raise valid issues about why something should or should not be done. However, where something is to be built that is to be used, public opinion

or focus group views about use level are as valid for setting scale and scope as Ford's research was in support of the Edsel! Unfortunately, government requirements to involve the public is encouraging invalid use of information obtained. When will we learn that what some special people say is not what most will do!

- All alternatives to the "best" one are straw men; the analysis is an advocacy presentation with good substantiation for one alternative and negatives for the rest

One of the reasons that I am really glad that I have left the government is that what I considered to be dishonesty was getting me down. Obviously, managers and planners win, in a way, by getting what they want. Consultants do *research* to tell you what you want to hear don't they? Set up a system to encourage valid understanding of optimization, social processes and effectiveness. Then you can spend your time finding out how people are trying to manipulate the rules to get what they want. The use of "straw men" is obvious to a researcher but it can allow a project proponent to plead to management that alternatives are not really understood. Then managers can argue with managers about who has what authority; and for the wrong reason we can have yet another "pink elephant."

I could comment on the following as I have commented above, however, why I might be concerned and that research is needed is quite obvious.

- 1) Benefit statements must not refer to vague or general classes of visitors, too general for benefits to be assessed and compared
- 2) There should be a statement of number of units of different types of service to be delivered to each of the client groups that benefits and places demands on the services (i.e., repeat weekend visitors, short term 1-time visitors)
- 3) Unit costs for service should be estimated and compared to those of other similar services, benefits or alternative delivery
- 4) Estimates of use that are optimistic or sensitive to large error should be identified, probabilities of over or under development and high unit cost because of "high risk" should be estimated and considered among other factors as a negative factor for project approval
- 5) If what is proposed is part of a bigger plan with outcomes dependent on the success of the "other" elements which may or may not "go," probabilities associated with this "risk" should be estimated and considered a negative factor for the project's approval

By the way, I believe that the review process worked reasonably well. There were case studies, guidebooks, training courses, etc. (most not cited in Stanley, Perron and Beaman 1996 or other readily available sources) that facilitated good work. I am reviewing that material along with other material Parks Canada created to encourage good planning and management of park use to determine what I may wish to make available. My boss for much of my career was from GE and knew what business is. We did not necessarily agree on what should be done but he knew that when I (me and my staff) gave a case against something being

viable (business wise) the case was solid. In the 90's I was optimistic that the "new rhetoric" of more with less, of reduced staff, leaner and meaner, would foster good research. I now see it as encouraging people to say the right words. There is now a focus in Parks Canada on it making more money (the focus is on its balance sheet). A good analysis of options to Parks making more money should consider the net economic benefits of tourism to Canada, Parks Canada's education and enjoyment mandate, its role in meeting Canada's regional development goals and other government priorities. For many years I have advocated viewing the balance sheet of Parks Canada from Canada rather than an agency perspective. This is not simple even in terms of measuring net tourism benefits that should be considered as due to Parks Canada but is necessary to optimize agency benefits to Canada! You might consider how that applies to your agency and if there is any chance of getting your government to accept *the right accounting level*.

Has Research Really Progressed: How Should It Contribute to Planning and Management in the 21st Century?

The preceding section has had little specific to say about research and research capabilities. The following is very general since I want to cover more than 30 years in half a page. For references, people, etc. I refer you to *Journal of Leisure Research* starting with Vol. 1, Num. 1. The proliferation of other journals tells part of the story of research growth. When I look back, I see research that in the 40's to mid-50's was of a different nature than it is today. The emphasis was on concept and philosophy. There was excellent and, in some cases provocative, thinking. However, with the ORRRC Reports of the 50's, one saw quantitative research take on a new role. By the late 60's and 70's, supply inventories, travel flow regression models, input-output etc. economic models (see Archer 1994), system models (even with alternative factors), econometric models, linear programming models, demand functions and consumer surplus, cluster and factor models were common (e.g. see chapters, sections and over 200 references in the Ontario Research Council on Leisure's 1977 publication [Analysis Methods and Techniques for Recreation Research and Leisure Studies](#)).

The 1980's saw the coming of age of the microcomputer. It also was the time that conjoint analysis and other market research models became established. Big Surveys and extensive scaling were facilitated by the availability of computing power. Econometric models and path/causal modeling became a part of an integrated body of theory and programs. LISREL caused a flood of "causal" analyses. This was also the decade when time series analysis, geographic information systems, large survey analysis and database systems became key research tools (e.g. see references in Ritchie and Goeldner 1994-first published in 1987). Unfortunately, research tools often became black boxes, a crank for turning out research. What to optimize for and how, too often, was not conceptualized. Frequently, problems were defined so that data could be collected to meet the requirements of new analysis tools. Poorly conceptualized models, pretentious claims and late delivery of results dulled the impact on clients of new research capabilities. As commented on below credibility problems were created.

The 1990's and toward 2000 will hopefully be known for a move from data collection; and from using, improving and developing methods and uses of technology to a focus on good models of choices and decisions (e.g. see Louvier and Timmermans 1990). With improved models comes the capability to build decision support systems, DSS, that allow effective use of distributed/networked databases, use of incredible computing power, use of AI and creation of "context sensitive" analysis in support of decisions. Certainly the challenge of the 90's is interpreting policy principles so that benefits, access, or other criteria can be validly considered and optimized. Given my concern that good evaluation is rarely done and that much of the work on benefits is going into advocacy "planning and management", there is a *very serious research related problem* to be addressed between 96 and 2000! That is creating good models of behavior and validly operationalizing optimization criteria so that good DSS's are implemented.

Where Research Should Be Going And What Its Contribution Should Be

My point about research in the 90's is that it has not done particularly well at making the move from large and technically sophisticated analyses to providing the basis for DSS that acknowledges societal principles of access to recreation. One sees an evolution in ROS that allows me to explain my view. Originally ROS was a great idea to identify supply and allow discussion of allocation policies. Computer capabilities available in the 80's have brought GIS and thus sophisticated resource classification to the desk top. Large surveys have brought participation data to the desk top. Models have related these (see Beaman and Do, 1983) but so what? Most people are not where most of the supply is. Many people do not want a wilderness experience as provided by certain ROS zones. Other people presumably want more experiences than they are entitled to. But, what is anybody entitled to? How should demand be regulated by price? What subsidies are appropriate to meet tourism, education, or other objectives? Equity is a fine term but how is it to be applied in allocation problems?

Research does not tell one what values should be. In some political systems the system actually dictates most values. However, in the typical "democratic" societies, research has a major role to play in planning and management. The "myths" cited in Westfall and Hoffman (1983) give comfort to some managers and planners. I, however, believe that they need to be recognized as giving false impressions of what can and should be happening. Certainly, in 1983 US agency people had good reason to be concerned with models and surveys as the basis for comprehensive long-range planning. In the 90's quantitative planning should be (Myth 1-it shouldn't be) the ideal. Much work remains to be done for models to be valid and reasonably accurate but the alternatives of intuition, personal preference, etc. are worse. The fact is that in democracies political considerations should come into play after technical considerations. The issue in the 90's is not that politics invariably decrease the quality of decisions (Myth 2). The goal of the 90's should be getting politicians, planners and managers to take their technical support and DSS as credible. Having such tools means that they take decisions with reasonable confidence of the consequences. In the 90's we must realize that optimization models are the most

effective tool for agencies to use in policy and planning (Myth 3-aren't) If you give lip service to efficiency, effectiveness, equity, etc. and do not know how to operationalize these and test options, planning and management is a hollow shell built on meaningless words! Myth 4 of Westfall and Hoffman was that managers can/will conceptualize and will communicate about decisions. In the 80's much research lacked credibility, was too late for decisions or presented other problems. AI, artificial intelligence, systems and DSS offer the capability for managers to have "context sensitive" help in support of decisions. Of course, if government hires people who won't learn or ask and citizens will tolerate this, communication problems will continue. Informed citizens, access to information and public participation are all working against poor communication. Myth 5 implied that researchers wanted to do basic research when more data collection was needed. Well, the 80's provided tools to bury us in data but didn't do too much to improve basic understanding for planning and management. Too much of total research resources was spent on data collection, cleaning and ad hoc tabulations. More resources needed to go to research design and purposeful analysis. Each year of the 80's more and more useless cross tabulations and volumes of graphs that have no point but to impress by quantity were produced. The 80's was truly an era of too much data gathering and too little well thought out analysis. There is still time in the 90's to improve.

There are other myths that could be commented on. However, my point should be clear. I believe in models, optimization and secondary analysis as critical to good decisions. I really do not see the merits of bureaucrats taking decisions which they describe as optimizing, increasing efficiency, etc. when they can't tell you what is being optimized or how. Much of BBM, benefits based management, has degenerated into advocacy planning. "Researchers" look up benefits in books and count and list them to justify budgets. My project has 17 benefits so it is better than yours with 13! We'll cut this because it has fewer benefits listed than that! Whose benefits are being traded off? Based on what? Yes, I can feel powerful if I say which project is better, but is my decision any more than expression of my place in a political process? Decisions can be more rational if the right research is done and packaged in AI and DSS systems for use by planners, managers, politicians and interested publics.

Conclusion

It may appear that there is not much in the way of coherent threads in this presentation. Well, as I see it the are. A key area for research is knowing our clients. If planners and managers are serving the clients they must, at least, be able to predict behavior and reactions that influence determining what action should be taken. Optimization and evaluation are key areas for research. If we select action based on optimization, is optimization actually being achieved? Well, evaluation tells you that if measurable and meaningful goals were set. However, goals are often poorly set and evaluation tools "blunt", one could say of questionable relevance, yet frequently costly. Improvement is needed. That improvement will only come with an effective interface with management. Research is too easily seen as irrelevant or a threat to management.

So, what does the preceding suggest for research. Better, conceptually more sound, segmentation (Beaman and Vaske 1995) and better understanding of benefits and decisions (of substitution within and between segments-e.g. recreation decisions see Crompton and Ankamah 1993 and Um and Crompton 1992) is needed. This relates to choice models, contingent valuation and an understanding of economic and other impacts of actions on groups. The goal must be valid tradeoff/optimization considering value and behavioral differences as part of planning and managing. Developing better concepts and tools for estimating who benefits and who tradeoffs, getting benefit measures that are comparable between segments and considering the effects of "constraints" and supply availability all require research.

I see real value in the use of an evolution of ROS such as BBM to provide a communication framework. BBM can facilitate managers and researchers agreeing on measurable objectives. This is critical to establishing DSS systems using AI and databases so that a manager can keep informed with information tailored to objectives. These ideas are not new they largely address the practical application of BBM (address solving problems noted by Mannell and Stynes 1991).

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**Outdoor
Recreation
Motivations and
Norms**

ANGLER SEGMENTATION BASED ON

MOTIVATIONAL SCALE SCORES

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Abstract. This study tested the concept that distinct angler subpopulations could be further segmented into groups based on their response patterns to motivational questions. Three previously published salmon and trout angler studies were selected to explore the relationship between angler motives: Lake Ontario anglers using private boats; Lake Ontario anglers hiring charter boats; and Salmon river anglers. The intent for this exploratory study was to hold the target species and geographic area as constant as possible to compare the differences in motivational profiles for different angler subpopulations. Ten motivational variables were used to cluster similar cases together via a hierarchical agglomerative clustering technique. Four types of angler cluster groups were segmented within these three studies according to their motivational response patterns.

Introduction

Research on the attitudinal dimensions of the angling experience suggests that motivational variables and angler segments need to be considered in fishery management so that managers provide the experiences and conditions sought by anglers or so that managers can anticipate angler reactions to changes in fishery abundance (Siemer and Brown, 1994). Five categories of angler motivations have been identified by Fedler and Ditton (1994) in their review of 17 angler motivation studies: general psychological and physiological, natural environment, social, fishery resource, and fishing skill and equipment. Fedler and Ditton (1994) report that their comparisons of published angler studies on motivations found two types of noticeable differences: (1) between general statewide angler populations and subpopulations based on mode of fishing or target species; and (2) between subpopulations based on mode of fishing or target species. Fedler and Ditton recommend that fishery researchers and managers need to look at subpopulations of anglers based on mode of fishing and target species to avoid the incorrect inference that all anglers are homogeneous or similar to statewide mean statistics reported on motivational variables.

The purpose of this study is to extend the conclusions of Fedler and Ditton and explore the hypothesis that further subgroups or market segments can be identified within an angler subpopulation that is using the same mode of fishing and targeting the same fish species. The angler subgroups identified need to have significantly different motivational characteristics with management or research implications to make such classifications valuable and worthwhile to pursue.

Methods

Three existing angler studies were selected for analysis in this exploratory study based on the criteria that all three were conducted on: (1) angler subpopulations seeking similar target

species (salmon, steelhead, and trout); (2) angler subpopulations fishing in a similar geographic area (Lake Ontario and the Salmon River, a major tributary of Lake Ontario); and (3) angler studies using similar research methodologies and data collection techniques (mail surveys), response rates (56% to 62%), and conducted within a one or two year period (1991-92). The studies selected were: (1) an unpublished 1992 study of Salmon River salmon and trout anglers (n= 220); (2) a 1992 study (Dawson, 1995) of Lake Ontario boat anglers seeking salmon and trout (n= 193); and (3) a 1991 study (Dawson and Bucyrer, 1993) of Lake Ontario charter boat anglers seeking salmon and trout (n= 111).

The 10 motivational variables were the same in each of the three mail surveys with anglers asked to use a 5-point scale of importance (5= extremely important; 4= very important; 3= important; 2= somewhat important; and 1= not important) to respond to each of the items. These unstandardized variables were used to cluster similar cases together with a hierarchical agglomerative clustering technique and the average linkage between groups method for combining clusters (UPGMA) in the SPSS for Windows (6.1) PC program (Norusis, 1994). The clustering analysis used euclidean distance measures with the UPGMA method (Everitt, 1993). The cluster results were evaluated using a complete linkage dendrogram analysis of cases and case clusters. A minimum cluster size of 12 or more cases was specified.

Results and Discussion

The rank order of the mean importance of the 10 angler motives was similar for the three studies with the exception of charter boat anglers rating family togetherness higher than the challenge and excitement of fishing (Table 1). Psychological and natural resource related motives were generally ranked higher than social motives. Fishery resource and fishing skill related motives were generally ranked as less important than other motives when compared by mean scores between the angler subpopulations.

Table 1. Rank order of motivational variables for 3 angler studies of salmon and trout fishing.

Motives	Salmon River Bank Anglers	Lake Ontario Private Boat	Lake Ontario Charter Boat
Psychological			
For challenge/excitement	1	4	7
For relaxation	2	1	1
To get away	4	2	4
Natural environment			
To enjoy nature/river/lake	3	3	2
Social			
For companionship	6	5	5
Family togetherness	9	7	3
Fishery resource			
To catch a trophy fish	5	6	6
To catch many fish	7	8	8
To catch fish to eat	10	10	9
Fishing skills			
To improve fishing skills	8	9	10

Four angler motivational clusters were identified using the euclidean distance measures and the 196 cases that had responded to all 10 motive items for the study on salmon and trout fishing on the Salmon River. These four clusters included 180 of those 196 cases (92%) with cluster size ranging from 16 to 73 cases (Table 2). The difference between overall mean scores for each motivational item and the cluster analysis group mean scores were calculated (group mean - overall mean score) to descriptively represent each cluster group (SR1 to SR4) that was identified in the analysis as a distinct cluster of similar angler motive scores (Table 2). While Group SR3 mean scores tended to be less than the overall mean scores, Group SR2 mean scores tended to be greater than the overall mean scores. The three motive categories of psychological, natural environment, and social were more important to Groups SR2 and SR4 than it was to Groups SR1 and SR3. The two motive categories of fishery

resource and fishing skills were more important to Group SR2 than it was to Groups SR3 and SR4; Group SR1 had a mixed response for those two categories.

Three angler motivational clusters were identified using the euclidean distance measures and the 147 cases that had responded to all 10 motive items for the study on salmon and trout fishing from a private boat on Lake Ontario. These three clusters included 114 of those 147 cases (78%) with cluster size ranging from 35 to 44 cases (Table 3). The difference between overall mean scores for each motivational item and the cluster analysis group mean scores were calculated (group mean - overall mean score) to descriptively represent each cluster group (LPB1 to LPB3) that was identified in the analysis as a distinct cluster of similar angler motive scores (Table 3)

Table 2. Mean scores^a for 10 angler motives for salmon and trout fishing on the Salmon River and the differences between the group and overall mean scores (group mean - overall mean score) for four cluster analysis groups.

Motives	Mean Score (N=196)	Group SR1 (n=29)	Group SR2 (n=62)	Group SR3 (n=73)	Group SR4 (n=16)
Psychological					
For challenge/excitement	4.4	0.2	0.3	-0.5	0.3
For relaxation	4.1	-1.0	0.4	-0.1	0.6
To get away	3.8	-1.8	0.4	0.1	1.0
Natural environment					
To enjoy nature/river	4.1	-0.8	0.5	-0.1	0.5
Social					
For companionship	3.2	-1.1	0.5	-0.4	1.2
Family togetherness	2.4	-1.1	0.5	-0.7	2.0
Fishery resource					
To catch a trophy fish	3.4	1.3	1.0	-0.9	-1.3
To catch many fish	2.9	0.5	0.2	-0.3	-0.5
To catch fish to eat	2.1	-0.2	0.4	-0.5	-0.2
Fishing skills					
To improve fishing skills	2.9	-0.3	0.7	-0.4	-1.4

^a/ Response scores: 5 = extremely important; 4 = very important; 3 = important; 2 = somewhat important; and 1 = not important.

Table 3. Mean scores^a for 10 angler motives for salmon and trout fishing from a private boat on Lake Ontario and the differences between the group and overall mean scores (group mean - overall mean score) for three cluster analysis groups.

Motives	Mean Score (n=147)	Group LPB1 (n=35)	Group LPB2 (n=44)	Group LPB3 (n=35)
Psychological				
For relaxation	4.2	-0.3	0.4	-0.2
To get away	3.9	-0.1	0.8	-0.2
For challenge/excitement	3.6	-0.1	0.4	-0.9
Natural environment				
To enjoy nature/lake	3.8	-0.9	0.6	0.1
Social				
For companionship	3.5	-0.4	0.7	-0.3
Family togetherness	2.8	-0.5	0.8	0.0
Fishery resource				
To catch a trophy fish	2.9	1.0	0.0	-1.4
To catch many fish	2.6	0.9	0.1	-1.0
To catch fish to eat	2.1	-0.2	0.0	-0.4
Fishing skills				
To improve fishing skills	2.5	-0.3	0.9	-0.8

^a/ Response scores: 5 = extremely important; 4 = very important; 3 = important; 2 = somewhat important; and 1 = not important.

While Group LPB3 mean scores tended to be less than the overall mean scores, Group LPB2 mean scores tended to be greater than the overall mean scores. The three motive categories of psychological, natural environment, and social were more important to Group LPB2 than it was to Groups LPB1 and LPB3. The two motive categories of fishery resource and fishing skills were more important to Group LPB2 than it was to Group LPB3: Group LPB1 had a mixed response for those two categories

Three angler motivational clusters were identified using the euclidean distance measures and the 98 cases that had responded to all 10 motive items for the study on salmon and trout fishing from a charter boat on Lake Ontario. These three clusters included 67 of those 98 cases (68%) with cluster size ranging from 14 to 35 cases (Table 4). The difference between overall mean scores for each motivational item and the cluster analysis group mean scores were calculated (group mean - overall mean score) to descriptively represent each cluster group (LCB1 to LCB3) that was identified in the analysis as a distinct cluster of similar angler motive scores (Table 4). While Group LCB2 mean scores tended to be less than the overall mean scores, Group LCB1 mean scores tended to be greater than the overall mean scores. The three motive categories of psychological, natural

environment, and social were more important to Groups LCB1 and LCB3 than it was to Group LCB2. The two motive categories of fishery resource and fishing skills were more important to Group LCB1 than it was to Groups LCB2 and LCB3.

While these cluster analyses identified three or four angler motivational cluster groups within each of the three studies, this was not forced since the only specification for accepting a delineated cluster of similar cases was that it contain a minimum of 12 cases. There was no limit on the number of clusters that could be identified. The similarity between the cluster groups found within each study was evaluated by compiling a summary table of the differences between group and overall mean scores for five categories of angler motives (Table 5). The conclusion was that four different types of angler motivational groups (Type A to Type D) were evident in the 10 cluster analysis groups identified in the three angler studies. The characterization presented in Table 5 is meant to summarize the differences and similarities between the four types of angler motivation groups and show that these motivational response patterns can be identified within what was previously considered homogeneous angler subpopulations.

Table 4. Mean scores^a for 10 angler motives for salmon and trout fishing from a charter boat on Lake Ontario and the differences between the group and overall mean scores (group mean - overall mean score) for three cluster analysis groups.

Motives	Mean Score (n=98)	Group LCB1 (n=18)	Group LCB2 (n=35)	Group LCB3 (n=14)
Psychological				
For relaxation	4.2	0.6	0.0	0.4
To get away	3.7	0.2	-0.4	0.9
For challenge/excitement	2.9	0.3	-1.5	1.5
Natural environment				
To enjoy nature/lake	4.0	0.2	0.2	0.3
Social				
Family togetherness	3.9	0.8	0.1	-0.3
For companionship	3.5	0.6	0.0	0.4
Fishery resource				
To catch a trophy fish	3.0	1.6	-0.3	-1.4
To catch many fish	2.4	0.7	-0.7	-1.0
To catch fish to eat	2.4	0.3	-0.4	-0.6
Fishing skills				
To improve fishing skills	2.3	1.1	-0.5	0.1

^a/ Response scores: 5= extremely important; 4= very important; 3= important; 2= somewhat important; and 1= not important.

Table 5. Characterization of the differences^a between group and overall mean scores for five categories of angler motives for the 10 cluster analysis groups identified in the three angler studies.

Motive Categories	Type A (SR1, LPB1)	Type B (SR2, LPB2, LCB1)	Type C (SR3, LPB3, LCB2)	Type D (SR4, LCB3)
Psychological	-	+	-	+
Natural environment	-	+	=	+
Social	-	+	- or =	+ or =
Fishery resource	+	+	-	-
Fishing skills	-	+	-	- or =

^a/ Differences: "-" means that the cluster group score for each motive category is less than overall mean score, "=" means that the cluster group score for each motive category is equal to the overall mean score; and "+" means that the cluster group score for each motive category is greater than overall mean score.

Conclusions

This exploratory study tested the concept that distinct angler subpopulations could be further segmented into groups based on their response patterns to motivational questions. The three studies used in this analysis were selected to keep the target species and geographic area as constant as possible and then to compare the differences in motivational profiles for cluster groups identified in the three different angler subpopulations. This study extends the conclusions of Fedler and Ditton (1994) and suggests that further subgroups or market segments can be identified within an angler subpopulation (i.e., anglers using the same mode of fishing and targeting the same fish species). Four types of angler cluster groups were identified within these three studies with significantly different motivational response patterns. Further research is needed to explore the research and management implications of such angler motivational classifications. A suggested improvement to the cluster analysis approach in this study (i.e., clustering analysis using euclidean distance measures with the UPGMA method) would be to use case standardized variables and cosine resemblance measures with the UPGMA method as suggested by Beaman and Vaske (1995).

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**WHERE DID YOU LEARN THAT? AN
EXAMINATION OF VISITORS' HISTORICAL
FRAME OF REFERENCE AND THE
RELATIONSHIP TO ATTITUDES ABOUT
AUTHENTICITY AND SATISFACTION**

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Abstract: Various authors have argued that tourists are on a search for unique, traditional, authentic experiences. Historically, heritage attractions have offered tourists these features. However, there is growing concern that individuals' perception of the authenticity of an experience as well as its relevance to them may impact their level of satisfaction with their experience. Thus, the primary purpose of this study was to examine the role that visitors' educational background, knowledge, motivations for visiting, and general travel behavior played in their perceived authenticity and how these interactions influenced level of satisfaction. The results indicated that there were significant relationships between level of education and perceived authenticity, and level of satisfaction and perceived authenticity.

Introduction

A primary motivational force for travel is curiosity. Tourists want to see other people, other places, and other cultures; they want to experience a destination's history and traditions. According to Kinnaird, Kothari and Hall (1994), tourists are on a search for the unique, the traditional, the authentic---something "which is perceived to reflect or give access to the true and unadulterated nature of everyday living in the destination" (Valec, 1987, p. 27). Despite tourists' insatiable curiosity and the considerable tourism potential this has generated for some destinations, Boorstin (1975) has argued that modern tourists

seldom experience a living culture because the continuous development of tourism has led to a loss of "authenticity" in the travel experience. Despite Boorstin's pessimistic view of tourism, Goffman (1959) believes that tourists have come to accept degrees of "inauthentic" experiences but ultimately are motivated to travel in the hopes that they will achieve a truly authentic experience.

Pearce and Moscardo (1986) have argued that individuals' perception of the authenticity of an experience as well as its relevance to the tourists are two important mediating variables affecting their level of satisfaction. While their argument appears sound there is little supportive empirical evidence, especially with respect to industrial heritage destinations. Therefore, the primary purpose of this study was to examine visitors' attitudes and perceptions about historic tourist destinations. A secondary purpose was to examine the role that visitors' educational background, site knowledge, source of knowledge, motivations for visiting, and general travel behavior played in their perceived authenticity and how these interactions influenced level of satisfaction.

The Study Area

The study was conducted throughout a nine-county region in Southwestern Pennsylvania. The agency that oversees the nine-county region, The Southwestern Pennsylvania Heritage Preservation Commission (SPHPC), was established in 1987. Its charge was initially to: a) develop, enhance, and interpret iron and steel making, coal and historical transportation themes within the nine-county region; b) incorporate these and other industrial heritage themes into "cooperative regional tourism promotion efforts"; and, c) retain and enhance the region's quality of life.

Methodology

The individuals sampled for this study were visiting industrial heritage sites located along the *Path of Progress* (POP), a heritage route managed by the SPHPC. A systematic sample of visitors was interviewed on-site from June through October, 1995. Upon completion of the on-site interview respondents were asked if they would complete a more comprehensive follow-up survey. If they agreed, they were given a questionnaire packet comprised of a cover letter, a questionnaire, and a pre-addressed postage paid return envelope. They were also asked to provide their name and address for follow-up mailings. The on-site response rate was 99% (n=1776). A post-card reminder/thank-you was sent to all study participants the week following the initial contact. If a survey was not received two weeks after the initial contact, a replacement survey was sent to the respondent. The overall response rate was 59% (n=1047).

Results

Nearly one-half of the individuals who visited POP sites during the 1995 season traveled more than 100 miles to visit a historic destination. They reported an average of 5.8 pleasure trips and an average of 3.9 trips to historic sites in the last 12 months. In addition, when asked about their motivations for travel, 21% indicated an interest in culture/heritage/ethnicity and 85% suggested it was "somewhat" or "very" important to learn something new. Nearly all respondents (91%) documented that it was "somewhat" or "very" important to experience "authentic"

elements in a historic destination, and 81% indicated the site's historic character was "somewhat" or "very" important.

Level Of Education And Perceived Knowledge

Respondents were highly educated. Nearly thirty percent of the respondents had completed some post-graduate work or a graduate degree. An additional 22% were college graduates (Table 1). While highly educated, more than one-half (53%) indicated that they had "limited" knowledge of the sites they were visiting. Only seven percent thought their knowledge to be "extensive." (See Table 2). Those who reported having some level of site knowledge were also asked to note their sources of site knowledge. More than one-half (54%) suggested that they had obtained some knowledge about a site along the POP from books or magazines. Previous visits and discussions with friends/relatives were also important sources of site knowledge for 36 to 37% of the sample (Table 2).

Table 1. Educational level of respondents.

Level of education	
Less than high school	3%
High school	21%
Business/technical school	10%
Some college	16%
College graduate	22%
Some post graduate work	9%
Post graduate degree	20%

Table 2. Site knowledge

Perceived level of site knowledge	
None	4%
Limited	53%
Fairly extensive	36%
Extensive	7%

Sources of site knowledge	
Books/magazines	54%
Previous visit	37%
Discussions with friends/relatives	36%
School	25%
Promotional literature/pamphlet	23%
Other sources	17%
Television	3%

Authenticity

Individuals were also asked to indicate how accurate or authentic items were at the site they visited. Most items were perceived to be authentic; however, the items receiving the lowest marks were souvenirs, re-enactments, and architecture. (See Table 3). In order to measure the relationship between perceived authenticity and miscellaneous independent variables, an authenticity index was created. The 10 items measuring authenticity (refer to items listed in Table 3) were combined to create an overall perceived authenticity index. The scale mean was 1.74 and had an alpha reliability coefficient of .95. All items were highly correlated (0.4 to 0.8) and were significant at the .001 level.

Level Of Satisfaction

Respondents were very satisfied with their experience. On a 10-point Likert scale, visitors had an 8.2 mean satisfaction rating.

Approximately one-fourth (24%) were completely satisfied (10 on a 10-point scale). Nearly one-half (52%) were very satisfied (8-9 on a 10-point scale). And, only four percent rated their level of satisfaction four or below on the ten-point scale.

Table 3. Perceived historical accuracy/authenticity.

Item	Level of Authenticity
Photographs	1.49*
Historic objects	1.55
Displays	1.57
Museum	1.64
Video	1.68
Historic restorations	1.75
Interpretive signs	1.78
Architecture	1.85
Re-enactment	1.91
Souvenirs	2.49

*Mean response as measured on a Likert scale ranging from 1 "Very accurate/authentic" to 5 "Very inaccurate/inauthentic."

Relationship Between Level Of Education And The Authenticity Index

Using Analysis of Variance (ANOVA) a significant relationship was observed (p=.02). Individuals with lower levels of education and those with a college degree or some post graduate experience were more likely to perceive historical accuracy/authenticity in the site they visited (Fig. 1)

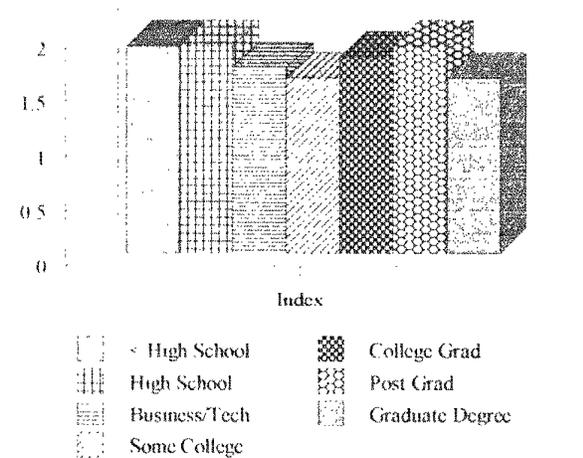


Figure 1. Authenticity index by level of education.

Relationship Between Level Of Satisfaction And The Authenticity Index

A significant relationship (p=.00) was noted via ANOVA between level of satisfaction and authenticity. Individuals reporting the highest level of satisfaction were also the most likely to perceive that their experience was "authentic" (See Fig 2)

Discussion And Implications

Overall visitors appear to be very satisfied with their experience at a POP site. They believe the sites they've visited are authentic and accurate and these features appear to be very important to

them. Of interest is the fact that visitors are willing to indicate that the sites they've visited are authentic and accurate while at the same time suggesting that they have limited knowledge about them. Perhaps MacCannell (1976) was correct when he argued that it has become very difficult for tourists to know if their experience is authentic and, in fact, it may be necessary for them to discount the existence of authenticity or inauthenticity in normal touristic experiences in order to be satisfied. Like MacCannell, Boorstin (1985) would have us believe that during the last decade tourists have become much more accepting of pseudo events-- the inauthentic-- as reality. What does this suggest for managers of heritage destinations? Managers must decide how much effort they want to put in to the preservation of truly authentic artifacts. If tourists don't know what is authentic or inauthentic, is there a point at which the investment of time, money and effort doesn't pay off? Or, will heritage attraction managers simply have to live with the role in which they've been cast-- "...balancing visitors' demands to provide entertaining authentic interpretation and the more stringent requirements of their role as guardians of the nations heritage"? (Stevens, 1995, p. 207).

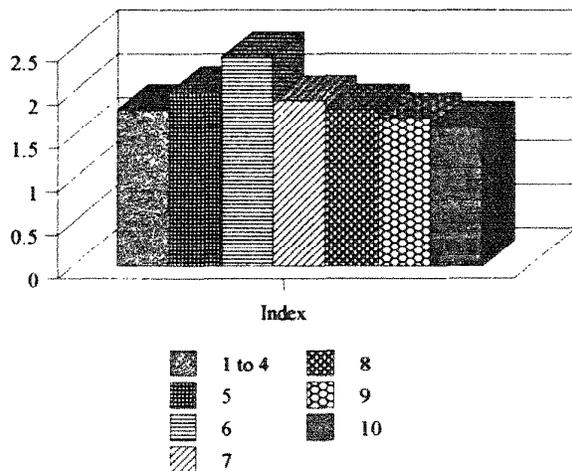


Figure 2. Authenticity index by level of satisfaction.

Satisfaction and education appear to be significantly related to visitors' perceptions of historical accuracy and perceived authenticity. People expect to see a true, authentic depiction of an historic event or facility. According to these results, if they perceive it to be authentic they will be satisfied. The POP did not let these tourists down. Again, however, are these results

depicting the reality of the POP or are they profiling a trend among heritage tourists? Are people simply accepting of a "fake reality" or inauthentic experience because it is what they have come to expect?

While the majority of respondents indicated little to no knowledge about the POP site(s) they were visiting, 43% suggested they had "fairly extensive" or "extensive" knowledge. This select group documented that their primary source of information about heritage attractions is books and magazines. This is important data for managers who want to capture the attention of an interested, knowledgeable market.

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SPECIALIZED PARTICIPANTS AND THEIR ENVIRONMENTAL ATTITUDES: RE-EXAMINING THE ROLE OF "TRADITIONAL" AND PSYCHOLOGICAL SPECIALIZATION DIMENSIONS

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Abstract. Two key issues continue to be debated in the recreation specialization literature. The first of these issues involves the measurement of specialization. The second issue is the relationship between specialization and conservation attitudes. The present study sought to concurrently examine these issues. Results indicated that a psychological measure of specialization was more predictive of environmental attitudes than the more traditional cognitive measure. Specialization was also more predictive of a site specific environmental attitude than a broader "world view" ecological concern. Findings suggest that managers measure specialization across a variety of domains and that they consider not only level of specialization, but how activity types could be grouped according to site specific setting relationships.

Introduction

A common proposition in outdoor recreation research is that recreation participants are becoming an increasingly diverse clientele. They are not only diverse in terms of demographic profiles, but also their preferences for natural resource management (Dwyer, 1994). Market segmentation has emerged as a potential framework to manage for such diversity by classifying diverse participants according to homogenous characteristics. Such a framework not only offers the opportunity to provide more satisfying opportunities for distinct and important sub-groups, but also may re-allocate incompatible groups and reduce conflicts (Wellman, Roggenbuck, and Smith, 1982; Jacob and Schreyer, 1980). Initial applications of segmentation have focused on generic categories such as activities, geographic site choice, and demographics. More recently, however, managers have suggested that an effort to assess the public's expectations for settings, facilities, programs,

and habitats be expanded (Dwyer, 1994; Carr and Williams, 1993). Such an effort may require an understanding of not only cognitive evaluations and preferences, but also more deeply held psychological and sociological attitudes about recreation activities and environmental settings where those activities occur.

The concept of recreation specialization provides a useful vehicle that may segment diverse clientele according to homogenous behaviors, setting preferences, and conservation attitudes. This concept was first introduced by Bryan (1977) and was defined as, "a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences". Under such a framework, participants would begin an activity as "occasionals" with a minimal of experience, expertise and involvement. Over time, these recreationists would progress through that activity and become socialized into technique-setting specialists with the highest level of experience, expertise, and involvement. Recreation specialization has proven to be an intuitively attractive management framework and many studies have examined its role toward a variety of managerial characteristics (Virden, 1986; Graefe, Donnelly, and Vaske, 1986; and Williams and Huffman, 1986).

While recreation specialization has been well studied and integrated into management frameworks, several issues remain problematic for managers and researchers. First, when Bryan developed his specialization typology, he noted the important role of an affective response toward activities and settings. As its conceptualization was further developed, however, Bryan and others placed a much heavier emphasis on observable characteristics such as self-described skill levels, equipment owned, and estimates of prior experience. As a result, a psychological or affective attachment toward activities has been an under-emphasized measure. Some researchers have argued that affective measures provide a useful means to understand the nature of specialization (McIntyre and Pigram, 1992; Buchanan, 1985).

Second, while specialized participants have been purported to exhibit a more conservation-oriented stance (Katz, 1981), the focus of this orientation has been limited to settings/environments associated with the activity in question. Thus, assuming that specialized participants are environmentally sensitive may depend on the nature of the activity with its norms and required setting attributes. Furthermore, Bryan's classification suggests that, at the highest level of the specialization continuum, participants place a high value on manipulating the environment themselves than having management do it for them (Williams, 1988). Such values may indicate that specialized participants hold an increased sensitivity to the environment when those attitudes are directed at settings where they conduct their activities. Whether highly specialized users place an increased orientation to a large scale ecological concern remains unresolved. Previous empirical research implies that specialized participants would be more concerned with activity specific environment attributes rather than a general concern for the environment.

If specialization is to continue its role as a useful framework to address user diversity, it should be expanded to include deeper psychological meanings and affective responses. Managers may

however be unfamiliar with how to measure such traits and may not be convinced that they are as useful as the other, more traditional measures (expertise levels, participation history, equipment owned). Past research on specialization and conservation attitudes may also lead managers to believe that a highly specialized clientele automatically will hold higher attitudes toward the environment. Such attitudes, however, may be limited to activity types dependent on pristine and natural areas. Comparing how well specialized users relate to site specific vs. broad environmental attitudes may begin to resolve this issue by defining the extent and nature of environmental concern among specialized recreationists.

Purpose of the Study

The purpose of this study will be to explore two problematic areas associated with recreation specialization. First, an attempt to validate the utility of psychological specialization measures will be pursued. This will be accomplished by examining the relative predictability of a psychological measure and a more "traditional measure" toward explaining environmental attitudes. Second, the nature of environmental concern among specialized participants will be further explored by comparing whether specialization is more strongly related to a site specific or a general world view environmental concern.

- 1). Based on McIntyre's (1992) study demonstrating the importance of a psychological component and Buchanan's (1985) contention that a psychological commitment is more basic than behavioral manifestations, a psychological measure of specialization should be as or more predictive than "traditional" measures in relation to key management variables.
- 2). Based on Bryan's (1979) and Katz's (1981) contention that specialized participants are more likely to emphasize the character of environmental settings as they facilitate activities, site-specific environmental concerns should be more strongly related to specialization than a general ecological concern for the world's entire ecosystem.

Findings should implicate the importance of measuring specialization across all domains (cognitive, behavioral, and psychological). Results may also suggest whether specialized participants are more concerned with the environment for its intrinsic value or for its functional value. The latter implication may, in turn, provoke managers to consider contextual factors other than level of specialization such as the nature and norms of the activity (appreciative vs. consumptive). Considering a specialization vis a vis a host of other interacting variables may provide managers with more realistic and effective segmentation strategies.

Methods

The data for this study was obtained from a comprehensive research project conducted at the Mount Rogers National Recreation Area from May through October 1993. Funding was provided by the USDA Forest Service. Research objectives for the larger project included gathering information pertaining to current users, use patterns, economic expenditures, and preferences for management. The sampling frame was constructed to include the diversity of activity types and settings

found within the National Recreation Area. The Mount Rogers National Recreation Area, named for Virginia's highest peak, includes over 115,000 acres of National Forest Land available for public use and enjoyment. Its location in the mountainous regions of Southwest Virginia make it an excellent setting which to enjoy a variety of outdoor experiences. These activities range from various levels and types of hiking, nature study, auto touring, and camping.

Data Collection Procedures

The study utilized both a brief on-site interview and a mail survey. Visitors who were contacted within a randomized time block were asked to participate in the study. Those who agreed to participate provided answers to a few brief questions. These questions dealt with trip variables and requested the respondent's address for the purpose of mail-back follow-ups. A mail survey was then given to respondents to be completed and returned after the completion of the visit. Postcard reminders were sent out 10 to 15 days after the initial on-site contact. Participants who did not respond within one to two weeks of the postcard mailings were then sent a second copy of the questionnaire with a cover letter explaining the importance of their participation. As a final request, a postcard reminder was sent in order to encourage participation among previous non-respondents. The response rate for Mount Rogers trail users was 67% for a sample size of 528. Data collection started in mid May, 1993 and ended in mid October, 1993. Specific sampling times and locations were chosen in a systematic way to obtain, as representative as possible, a sample of users. Total sampling time was 790 hours.

Instrumentation

While a variety of demographic and behavioral variables were assessed in the larger survey, the present study emphasized two measures: specialization and environmental attitudes. Psychological or "affective" specialization was assessed through a three item involvement instrument. This instrument was adapted according to the work of McIntyre (1990) and included Attraction, Centrality to Lifestyle, and Self-Expression sub-components. Respondents were asked to respond on a 5 pt. semantic differential scale (strongly disagree to strongly agree) how they felt about a variety of activity related statements. These statements were positioned toward the participant's most important activity and including items such as, "This activity has a central role in my life" and "This activity says a lot about who I am." The reliability of this scale was acceptable with Cronbach's Alpha at .74. Traditional measures of specialization have usually been directed toward the cognitive and behavioral domain (McIntyre and Pigram, 1992). The present study utilized a cognitive measure which asked participants to rate their skill level in their most important activity. Respondents rated themselves from 1 (Beginner) to 7 (Expert).

Environmental attitudes were also assessed in two manners. The first of these is a site-specific concern for the setting. A four item instrument was utilized to assess the site specific environmental concern. It asked respondents to rate the importance of environmental quality indicators at Mount Rogers from 1 (Not at all important) to 5 (Extremely Important). Items such as "Little evidence of land management activities" and "High degree of naturalness" were examples used in this instrument. Reliability was marginal at .69. A broad or "world view" environmental

concern was measured through a modified New Environmental Paradigm Scale developed by Dunlap and Van Liere (1978). This instrument assesses attitudes toward the earth's entire eco-system and is positioned around the appropriateness of human interactions upon the environment. The eight item scale used in this study had a high internal consistency with a Cronbach's Alpha of .90.

Analysis

Two analyses serve as the focal point for this study. The first analysis was conducted in order to assess the relative predictability of a traditional vs. a psychological (affective) specialization measure. Since specialization has often been compared with attitudes regarding conservation, environmental attitudes served as the dependent variable to which specialization was compared against. Multiple regression analyses were conducted in order to examine significant correlations between the variables and to compare the relative strengths between traditional and psychological predictor variables. A comparison of adjusted partial r square values was utilized for this purpose.

The second analysis was conducted in order to assess whether specialization was more predictive of a site specific environmental concern or a broader world view ecological concern. This analysis was conducted in the same manner of the first analysis except that adjusted r square values of similar specialization predictors were compared against the two levels of environmental attitude. The framework for both analyses is presented in Table 1

Table 1. Analysis framework two multiple regression equations.

Dependent Variables	Independent Variables
Site Specific Environmental Attitudes	Traditional Specialization
	Psychological Specialization
Broad "World View" Ecological Concern	Traditional Specialization
	Psychological Specialization

Results

Both regression equations were statistically significant at the .00 level. Thus some variance in environmental attitudes (both site-specific and broad world view) could be contributed to specialization. When the predictability of a traditional specialization was compared to psychological specialization, it was found that psychological measures had higher adjusted r square values and thus were stronger and more significant predictors of either dependent variable. While r square values were much higher for psychological specialization predictors, their magnitudes were still small with adjusted r square values ranging from .023 to .071 (Table 2). The strength of specialization predictors in both equations was suspect, suggesting that a variety of other factors impact the variance in environmental attitudes. The purpose of this paper, however, was to assess the relative performance of a psychological specialization vs. a traditional measure. Results do indicate that the psychological specialization measure was more predictive toward environmental attitudes than a traditional measure

Table 2. Results of multiple regression analysis.

Dependent	Independent	Summary
Broad "World View" Ecological Concern	Traditional Measure	adj r ² = .003 sig F = .098
	Psychological Measure	adj r ² = .023 sig F = .000
Site Specific Environmental Attitude	Traditional Measure	adj. r ² = .008 sig. F = .022
	Psychological Measure	adj. r ² = .071 sig. F = .000

The second analyses compared whether specialization was more strongly predictive of a site specific environmental attitude or a broader world view concern. Since, in the first analysis, traditional specialization measures were found to be non-significant, this variable was dropped as a predictor of environmental attitudes. While the significance of specialization in relation to environmental attitudes was established in the first analysis, it appears as though specialization was a stronger predictor of site specific attitudes vs. the broader ecological concern. Again, adjusted r square values were low (.023 vs. .071).

The exploratory nature of this study is subject to a few limitations which serve as caveats for a broad acceptance. The first of these limitations is that environmental attitudes are difficult to define and measure. The comparability of environmental attitudes was limited since site specific items asked respondents to rate the importance of attributes while broader items asked respondents the appropriateness of human dominance over nature. Secondly, the study only compared specialization with visitor attitudes and not their actual behavior. Behaviors may have been better predicted by traditional specialization, especially if those measures were in the behavioral domain. Finally, the sample for this study included a variety of front country users engaging in wide array of activities. Some mediation between activity types could have occurred since specialized backpackers and specialized RV campers may intuitively have different attitudes about the environment. Perhaps further segmenting specialized users into consumptive and appreciative activity groups may provide a more meaningful scheme for addressing user diversity (Jackson, 1987).

Discussion and Implications

The results of this study provide continuing evidence that psychological measures of specialization can be as useful as traditional measures in understanding attitudes of a diverse clientele. They deserve inclusion as a component of an individual's specialization profile. While past researchers and managers have eschewed the use of psychological measures due to complexities of measurement, this study has demonstrated that operationalizing psychological specialization need not be difficult. Secondly, results suggest that highly specialized participants may be more concerned with the environment of their activity setting rather than larger eco-systems. Managers should, therefore, be careful in assuming that attracting specialized participants will also yield a more environmentally friendly user. As previously discussed, the nature of the activity may also

influence attitudes about the environment. If area is concerned with attracting a new activity clientele, it should consider social norms particular activity forms. For example, specialization in some activities may mean using less equipment or lower impact equipment. Other activities such as motor boating or RV camping could involve an increased emphasis on a higher number of high impact equipment and accessories. If an activity and its social norms calls for a behavior that is not in the best ecological interest, its participants may not concern themselves with environmental quality and sustainability. Clearly, further inquiries into defining activity type, specialization norms, and relationships to environments may assist in managing a diverse clientele.

The results do offer tentative evidence that recreation specialization can be significantly related to variables of interest to natural resource managers. Moreover, internal psychological meanings attached to outdoor activities are just as relevant for understanding attitudes toward the environment. Our recommendations for managers are that they continue to assess the specialization of their visitors. We would suggest they use a multi-dimensional, multi-system measurement which evaluates not only their behavioral patterns and cognitions, but also their psychological involvement with outdoor activities. This study has also demonstrated a greater linkage between site specific environmental attitudes than broader ecological concerns. These site specific attitudes seemed closely related to the appreciative goals of most Mount Rogers visitors. Specialized users at other recreation areas may, however, be of a more consumptive or mechanized nature. Since specialized users position value on settings for their functional or "means to an end" utility, their user behavior may not always be environmentally friendly. Given this concern, we recommend that managers go beyond assessing levels of specialization within an activity. Perhaps it would be more wise to consider specialization across a set of activities with similar norms regarding environmental attitudes (Williams, 1988). Such a framework may better address user diversity while also considering the potential impact on the natural environment.

The present study has uncovered as many questions as it resolved. Replicating this study across a variety of settings using more congruent and expansive measures may help resolve such questions. For example, it would be interesting to see how specialized participants acted with respect to environmental attitudes. In other words, what would their actual use behavior be? Examining the role of place relationships may also provide insights into environmental behaviors as well. As with any theory or concept, recreation specialization cannot stand alone in explaining and managing for recreation behavior. Many other concepts are being developed, scrutinized, and integrated into management frameworks. To address the increasingly diverse outdoor recreation user, management strategies should assess a fuller definition of specialization while jointly considering other salient segmentation variables. The perspicacious manager will consider fashionable theoretical advances while not forsaking those proven concepts which have provided satisfactory recreation experiences.

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CROWDING NORMS FOR THE CARRIAGE ROADS OF ACADIA NATIONAL PARK: ALTERNATIVE MEASUREMENT APPROACHES

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Abstract: Research on standards of quality has increasingly focused on personal and social norms of visitors. However, alternative norm measurement approaches may yield different findings. This study developed, applied, and compared alternative measurement approaches for crowding norms on the carriage roads of Acadia National Park.

Introduction

Crowding constitutes a long-standing issue in the field of outdoor recreation. This issue is often addressed within the context of carrying capacity. In its most generic form, carrying capacity refers to the amount and type of visitor use that can be appropriately accommodated within a park or recreation area.

Recent experience with the concept of carrying capacity suggests that it can be applied most effectively through formulation of indicators and standards of quality (National Park Service 1992; Shelby et al. 1992; Stankey et al. 1985; Graefe et al. 1990; Stankey and Manning 1986). This approach to carrying capacity focuses principal emphasis on defining the type of visitor experience to be provided and maintained. Indicators of quality are specific, measurable variables which serve as quantifiable proxies for management objectives. Standards of quality define the desired condition of indicator variables.

By defining indicators and standards of quality, crowding and carrying capacity can be determined and managed through a monitoring program. Indicator variables can be monitored over time, and if standards of quality have been violated, management action is required. This approach to crowding and carrying capacity is central to contemporary park and outdoor recreation management frameworks, including Limits of Acceptable Change (LAC) (Stankey et al. 1985), Visitor Impact Management (VIM) (Graefe et al. 1990), Carrying Capacity Assessment Process (C-CAP) (Shelby and Heberlein 1986), Quality Upgrading and Learning (QUAL) (Chilman et al. 1992), Recreation Management Planning Process (Manning 1986), and Visitor Experience and Resource Protection (VERP) (National Park Service 1993).

Not surprisingly, one of the most problematic issues in this contemporary approach to carrying capacity has been setting standards of quality. Such standards may be based on a variety of sources, including legal and administrative mandates, agency policy, historic precedent, expert judgement, interest group politics, and public opinion, especially that derived from outdoor recreation visitors. This latter source has special appeal as it involves those most directly interested in and affected by carrying capacity decisions and related management actions.

Research on visitor-based standards of quality has increasingly focused on personal and social norms. Developed in the fields of sociology and social psychology, norms have attracted considerable attention as an organizing concept in outdoor recreation research and management. In particular, normative theory has special application to setting standards of quality for the recreation experience. Norms are generally defined as standards that individuals and groups use for evaluating behavior and social and environmental conditions (Vaske et al. 1986; Donnelly et al. 1992; Shelby and Vaske 1991). If visitors have normative standards concerning relevant aspects of recreation experiences, then such norms can be studied and used as a basis for formulating standards of quality. In this way, carrying capacity can be determined and managed more effectively.

Application of norms to standards of quality in outdoor recreation is most fully described by Shelby and Heberlein (1986) and Vaske et al. (1986). These applications have relied heavily upon the work of Jackson (1965), who developed a methodology--return potential curves--to measure norms. Using these methods, the personal norms of individuals can be aggregated to test for the existence of social norms or the degree to which norms are shared across groups. Normative research in recreation has focused largely on the issue of crowding (e.g., Vaske et al. 1996; Shelby 1981; Heberlein et al. 1986; Patterson and Hammitt 1990; Williams et al. 1991; Whittaker and Shelby 1988), but also has been expanded to include other potential indicators of quality, including ecological impacts at wilderness campsites (Shelby et al. 1988), wildlife management practices (Vaske and Donnelly 1988), and minimum stream flows (Shelby and Whittaker 1990).

As research on normative standards has proceeded, several approaches to measuring norms have developed. Moreover, several issues surrounding norm measurement and application have likewise arisen. The purposes of this study were to apply and compare alternative approaches to measuring crowding norms and to identify and explore several issues surrounding measurement and application of crowding norms.

Issues in Measuring Crowding Norms

Traditionally, crowding norms have been measured through a numerical approach. That is, respondents are asked to evaluate the acceptability of alternative use densities, such as 0, 5, or 10 encounters with other groups per day along trails. Resulting data are aggregated and graphed to produce a norm curve from which social norms can be derived. This numerical approach is often shortened to reduce respondent burden by simply asking respondents to state the maximum acceptable number of encounters per day. These two approaches might be called the "long" and "short" versions of this measurement technique.

More recently, visual approaches to measuring crowding norms have been developed (Hof et al. 1994; Manning et al. 1995; 1996a; 1996b). In this technique, computer software is used to manipulate photographs to depict alternative use densities. As with the numerical approach described above, long and short versions of this measurement technique can be used. The long version asks respondents to evaluate and rate the acceptability of each in a series of photographs. The short version asks respondents to select the photograph that illustrates the highest use density acceptable.

A third set of norm measurement and application issues concerns how survey questions are formulated and worded. For example, questions often use the word "acceptability" to probe for respondents' personal norms. But how is this word interpreted by respondents and how should such study findings be applied? Do such questions reveal the preferences of respondents or their true tolerance or something in between? Secondly, are personal norms of respondents influenced by knowledge of the management implications of such norms? In other words, if respondents understood more explicitly that their expressed norms would lead to management actions to exclude or otherwise regulate visitors, would they express more tolerance for greater use levels? Third, how do personal norms, as conventionally measured in recreation research, relate to norms as externally imposed by others? The sociological literature suggests that norms involve constraints on individual behavior as imposed by the views of a larger group. Therefore, do respondents feel that their personal norms are similar or dissimilar to the norms of "others"? Finally, the literature on crowding in outdoor recreation suggests that norms can be influenced by characteristics of both the respondent and those who are encountered (Manning 1985; 1986). From an empirical standpoint, how do such variables influence crowding norms?

Study Methods

The issues identified above were incorporated in a study of crowding norms on the carriage roads of Acadia National Park, Maine. Fifty-six miles of carriage roads were constructed on Mount Desert Island between 1913 and 1940 at the direction of John D. Rockefeller, Jr. Most of the roads and associated lands were donated to Acadia National Park. Visitor use of the carriage roads has increased dramatically and changed character over the past decade. For most of their history, the carriage roads accommodated pedestrians, equestrians, and bicyclists in relatively low numbers. Since development of the mountain bike in the early 1980s, and recent reconstruction of the carriage roads, all uses of the carriage roads have increased with bicycling emerging as the dominant use. These changing use patterns have given rise to concern over the levels and types of use that should ultimately be accommodated on the carriage roads.

To deal with this concern, the park adopted the Visitor Experience and Resource Protection (VERP) process under development by the U.S. National Park Service (National Park Service 1993; Hof et al. 1994; Manning et al. 1995; 1996a; 1996b). A central component of VERP is the formulation of indicators and standards of quality. An initial phase of research identified perceived crowding as an important indicator of quality (Jacobi et al. 1996). A second phase of research was designed to measure crowding norms to help formulate standards of quality.

This phase of research was conducted as a survey of a representative sample of 500 carriage road visitors during the summer of 1995. A questionnaire incorporating the norm measurement issues described earlier was developed and administered by means of personal interviews. Since visitor use of the carriage roads is relatively heavy, the number of visitors at one time along a generic 100 meter section of the carriage roads was used as the measure of use density. The carriage roads were designed so that approximately 100 meters is the average viewscape along the road system. Several alternative approaches were used to measure crowding norms as follows:

1. A visual approach was used by developing a series of photographs of a generic 100-meter section of carriage roads showing varying levels and types of use. Types of use were restricted to hikers and bikers since these are the predominant uses. Nineteen photographs were developed using the study design shown in Table 1. This study design allowed development of crowding norms for many different mixes of uses and for exploring the effects on crowding norms of both the type of respondents and type of visitor encountered. Sample photographs are shown in Figure 1. A "long" version of the visual approach to measuring crowding norms was used by asking respondents to rate the acceptability of each of the 19 photographs using a scale from -4 ("very unacceptable") to 4 ("very acceptable"). A "short" version of the visual approach was used by asking respondents "Which photograph shows the highest pattern of visitor use you think would be acceptable to see on this section of carriage roads?" Respondents were given the option of indicating that all of the photographs were acceptable.

Table 1. Study Design (Bicyclists/Hikers)

Number of Visitors					
0	5	10	15	20	30
All photographs					
0/0	0/5	0/10	5/10	0/20	10/20
	2/3	3/7	8/7	10/10	15/15
	3/2	5/5	10/5	20/0	20/10
	5/0	7/3			
		10/0			
Even distribution					
0/0	2/3	5/5	8/7	10/10	15/15
	3/2				
Bicyclists only					
0/0	5/0	10/0		20/0	
Hikers only					
0/0	0/5	0/10		0/20	
2:1 distribution (bicyclists: hikers)					
0/0	3/2	7/3	10/5		20/10
1:2 distribution (bicyclists:hikers)					
0/0	2/3	3/7	5/10		10/20

2. A "short" version of the numerical approach to measuring crowding norms was used by asking respondents, "What do you think is the maximum number of visitors that would be acceptable to see at any one time on the section of the carriage roads shown in the photograph?" Respondents were asked to answer this question for three mixes of use: 1) all visitors are



Figure 1a. Sample photograph - 0 bikers and 0 hikers.

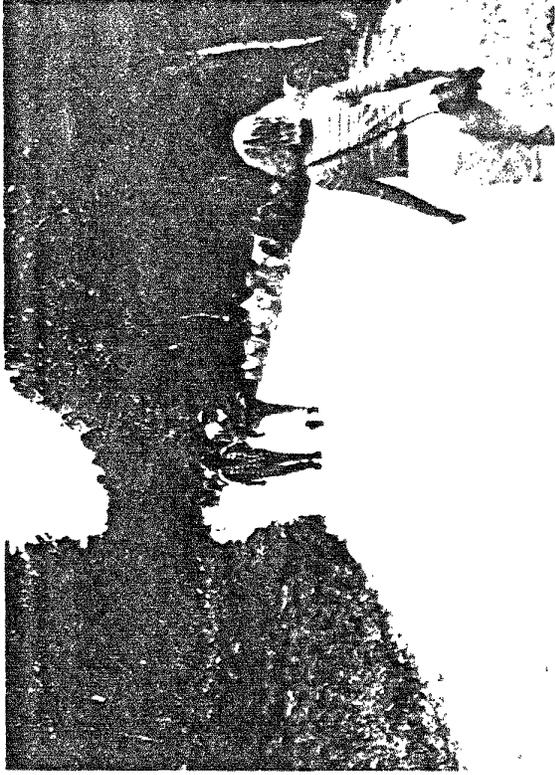


Figure 1b. Sample photograph - 0 bikers and 10 hikers.

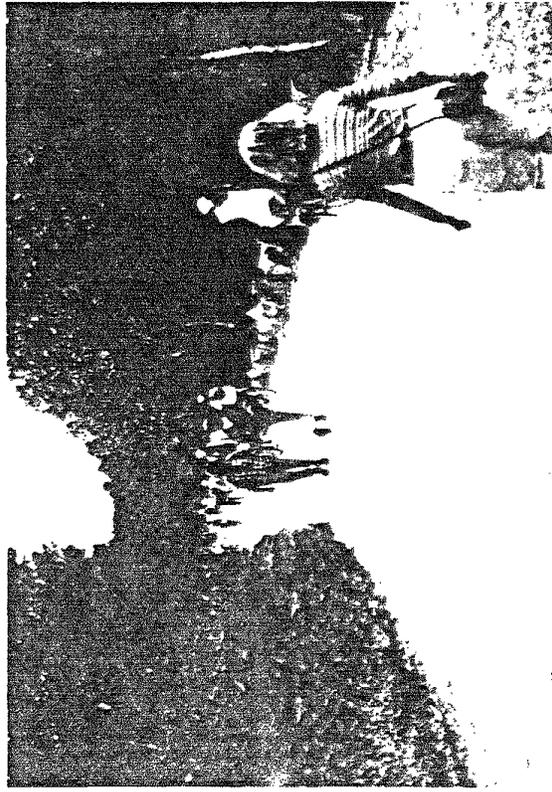


Figure 1c. Sample photograph - 10 bikers and 10 hikers.

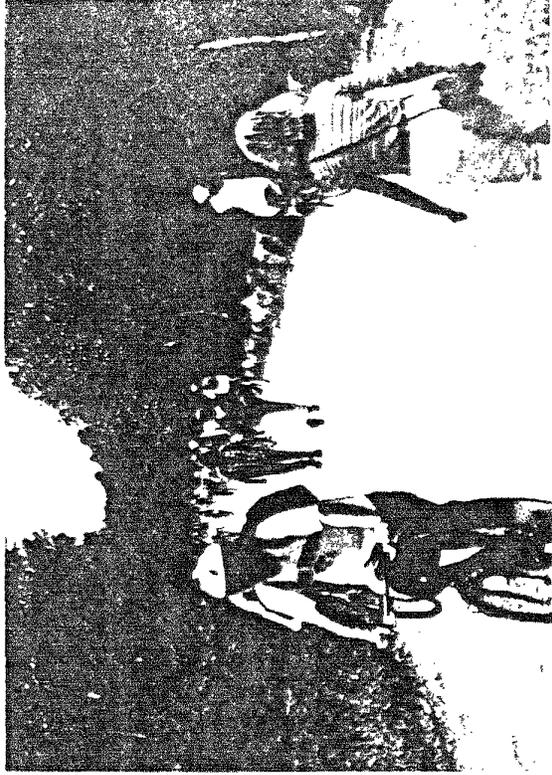


Figure 1d. Sample photograph - 15 bikers and 15 hikers.

hikers, 2) all visitors are bikers, and 3) half of visitors are hikers and half are bikers. Respondents were given the option of indicating that the number of visitors seen did not matter or that the number of visitors seen mattered, but that they could not report a maximum acceptable number.

3. Using the photographs, respondents were asked, "Which photograph shows the highest pattern of visitor use that is so unacceptable that you would no longer use the carriage roads or would shift your use of the carriage roads to a different location or time?" Respondents were given the option of indicating that none of the photographs represented this condition. This question was designed to explore the relationship between "acceptability" and "true tolerance"

4. Using the photographs, respondents were asked, "Which photograph shows the highest pattern of visitor use that the National Park Service should allow on this section of the carriage roads? In other words, at what point should visitors be restricted from using the carriage roads?" Respondents were given the option of indicating that visitor use should not be restricted at any point represented in the photographs. This question was designed to explore the influence of management implications on crowding norms.

5. Using the photographs, respondents were asked, "Which photograph shows the highest pattern of visitor use that you think most other visitors would find acceptable to see on this section of the carriage roads?" Respondents were given the option of indicating that most visitors would find all of the photographs acceptable. This question was designed to explore the relationship between personal norms and externally applied social norms.

Study Findings

Study findings are illustrated and summarized in Table 2 and Figure 2. Table 2 summarizes crowding norms for all of the measurement approaches used in this study. All of the crowding norms included in Table 2 are calculated using the sample as whole, not just a single type of respondent. Crowding norms for the long version of the visual approach are the points at which the respective regression lines cross the threshold from acceptable to unacceptable (the neutral point). All other crowding norms are mean values.

The first three norms shown in Table 2 are derived using the long version of the visual approach. The first norm, 14, is calculated using the seven photographs that show equal distribution of hikers and bikers. The second and third norms, 17 and 12, are calculated using two series of four photographs that show hikers only and bikers only, respectively. Since personal norms cannot be calculated from these data, it is not possible to test for statistically significant differences among these three norms.

However, the apparent differences among these norms are in the expected direction. That is, carriage road visitors have the highest tolerance or norm for hikers only, and the lowest tolerance or norm for bikers only, with the tolerance or norm for an even distribution of hikers and bikers midway between these norms.

Table 2. Alternative Crowding Norms.

Measurement Approach	Norm
Visual Approach (Long Version)	
Even distribution of hikers and bikers	14
Hikers only	17
Bikers only	12
Numerical Approach (Short Version)	
Even distribution of hikers and bikers	18
Hikers only	16
Bikers only	13
Visual Approach (Short Version)	
a. Acceptability	11 ^{1bcd}
b. True Tolerance	25 ^{2abcd}
c. Acceptability for most visitors	15 ^{3abcd}
d. Management implications	18 ^{4bcd}

1/ "All of the photographs would be acceptable" = 40

2/ "None of the photographs represent this condition" = 29

3/ "All of the photographs would be acceptable to most visitors" = 34

4/ "Visitor use should not be restricted" = 184

a, b, c, d = statistically significant difference

The second three norms in Table 2 are derived from the short version of the numerical approach. These norms are quite similar to the comparable norms derived from the long version of the visual approach. The numerically-based norms for encountering hikers only is 16 compared to 17 for the visually-based approach. The numerically-based norm for encountering bikers is 13 compared to 12 for the visually-based approach. However, the numerically-based norm for an even distribution of hikers and bikers is 18 compared to 15 for the visually-based approach.

The final four norms in Table 2 are derived using the short version of the visual approach. However, these norms are measured using different normative concepts and related wording. The concepts addressed include "acceptability," "true tolerance," "acceptability for most visitors," and norms as explicitly informed by "management implications" as described earlier. Since personal norms can be calculated from these data, t-tests were calculated to determine if there were any statistically significant differences among these norms. As indicated, all four norms differed from one another to a statistically significant degree. The concept of "acceptability" resulted in the lowest norm, while the concept of "true tolerance" resulted in the highest norm. "Acceptability for most visitors" and "management implications" were located within this range.

Figure 2 shows a series of norm curves developed from the long version of the visual approach. These are regression lines relating the number of people in each photograph to acceptability ratings. These norm curves take the shape expected, as acceptability declines with increasing numbers of visitors shown in each photograph. However, the curves shown vary somewhat depending upon both the type of respondent (hiker or biker) and the type of visitor shown in the photographs (hikers or bikers). It is clear, for example, that hikers are less tolerant of bikers than other hikers. Bikers show the same pattern.

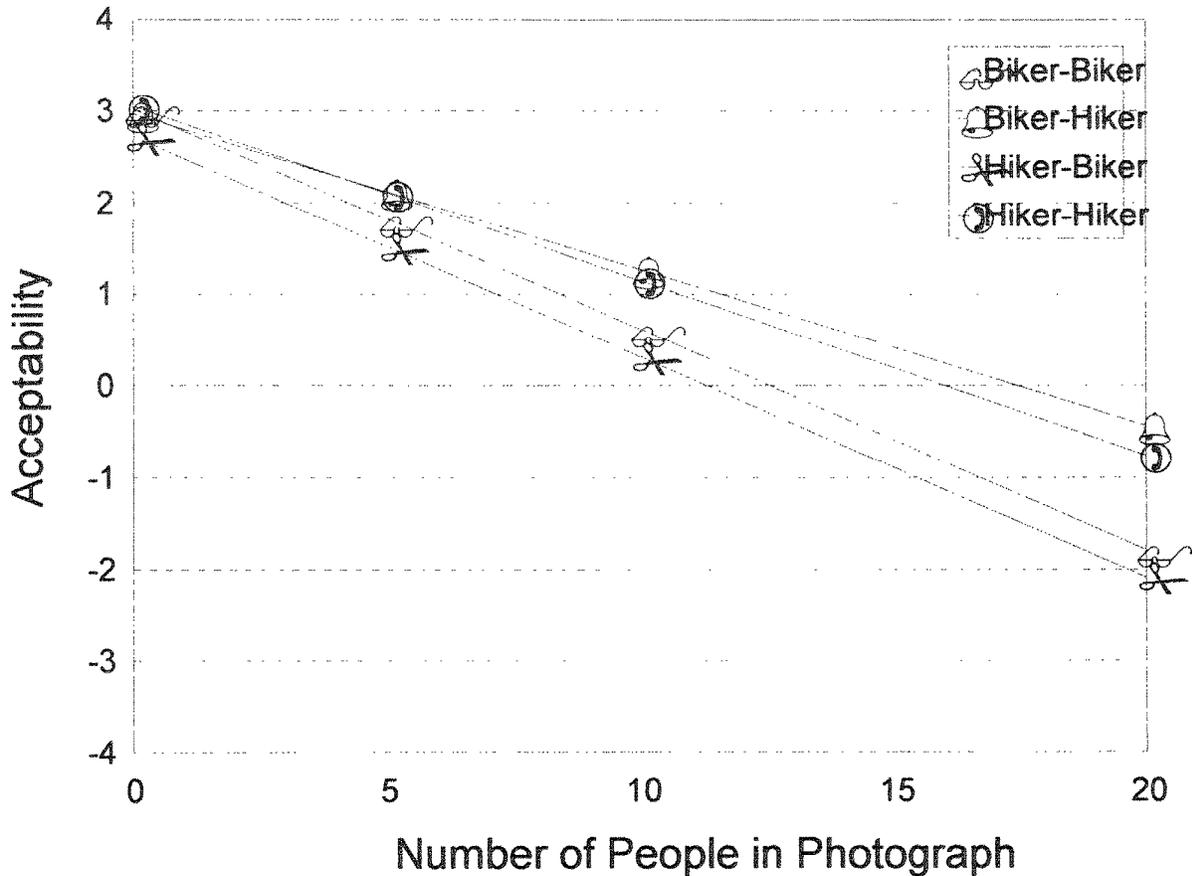


Figure 2. Norm Curves Based on Long Version of the Visual Approach

Conclusions

Research on visitor norms for crowding and other recreation-related impacts have become an important focus for formulating standards of quality. However, a number of issues have arisen regarding alternative norm measurement approaches. This study explored several alternative approaches to measuring crowding norms and found that different approaches can lead to different study findings. Specific conclusions which can be drawn from this study are as follows:

1. "Short" and "long" versions of norm measurement questions may lead to somewhat different findings. In this study, the short and long versions of the visual approach led to norms of 11 and 15 people per viewscape, respectively. Because personal norms cannot be calculated from the long version of the question, a statistical test of the difference between these norms is not possible. However, the norm of 15 is 36% higher than the norm of 11, and this difference appears substantive.
2. Visual and numerical approaches to norm measurement led to nearly identical findings in this study. However, this should be qualified in two ways. First, an earlier study (Manning et al. 1996) found relatively large differences between these two

measurement approaches. These differences were attributed to the relatively high use levels that were studied which ranged up to 108 people at one time at attraction sites. It may be that the visual and numerical approaches yield similar results only when use levels are relatively low. Second, findings from the visual approach yielded results which appear more consistent than those from the numerical approach. That is, visually-based norms reflected increasing tolerance as use conditions changed from bikers only to equal distribution of bikers and hikers to hikers only. Numerically based norms were less consistent.

3. The underlying concept and related wording of norm measurement questions can substantially influence the norms derived. The questions addressing "acceptability" and "true tolerance" yielded very different norms of 11 and 25 persons per viewscape, respectively.
4. Visitor norms may be affected through more explicit understanding of the management implications of such judgements. That is, if visitors understand that the norms they express will be used to formulate standards of quality, and that these standards of quality may in turn limit or otherwise regulate visitor access to park attractions and facilities, then they may

express more tolerance in their normative judgements. This study found the norm for persons per viewcape to be 18 using the question including management implications. This number was statistically and substantially higher than the norm (11) derived from the question which addressed acceptability only. Moreover, the norm of 18 is artificially low because an additional 184 visitors (over one-third of the sample) responded that visitor use should not be restricted at any point represented by the photographs.

5. There may be a difference between the personal norms of visitors and social norms as derived from "other visitors." These two approaches to norm measurement resulted in statistically significant differences. Most visitors apparently feel that their personal norms are more sensitive (or less tolerant) than those of other visitors.

6. Crowding norms can be influenced by both the type of respondent and the type of visitor encountered. In this study, hikers and bikers expressed different crowding norms, and these norms were influenced by the type of visitor encountered (hikers only, bikers only, or equal distribution of both). These findings are consistent with the literature on crowding.

It is likely that visitor norms will play an increasingly important role in helping to formulate standards of quality by which park and outdoor recreation areas will be managed. However, the ways in which norms are measured and applied have important implications. Based on findings from this study, this issue warrants more research and management attention.

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RELATIONSHIPS BETWEEN MOTIVATIONS AND RECREATION ACTIVITY PREFERENCES AMONG DELAWARE STATE PARK VISITORS: AN EXPLORATORY ANALYSIS

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Abstract: This paper examines the relationship between visitors' motives or benefits sought and activity choices among visitors to Delaware state parks. Respondents were asked to rank the importance of 22 reasons for visiting a state park. Factor analysis was then used to reduce these 22 possibilities to five general motivation factors. Additionally, subjects were asked to report their preferences for 18 activities available at Delaware state parks. Cluster analysis was used to place respondents into activity preference groups. Significant differences between these clusters were found in relation to how they ranked the importance of the five motivation factors. This study demonstrates that activity preferences at state parks related to motives for visiting the park. Managers should attempt to offer a diverse array of programs and activities that are appropriate for and appeal to a variety of different users.

Introduction

Management of natural resources for outdoor recreation involves decisions regarding the allocation, regulation and utilization of these resources in society. The overriding reason for resources committed to outdoor recreation purposes is that outdoor recreation experiences provide some value or benefit to the public. An important management goal, therefore, is to maximize the provision of the public good while maintaining the integrity of

the resource base for future generations (Driver and Tocher 1970; Brown 1977; McCool et al. 1984).

The "public good" assumption for committing resources for outdoor recreation purposes remains at the level of plausibility until proven empirically. Important research and management questions relate to the study of: the individual and societal benefits of outdoor recreation; the specific relationships among activities, experiences and setting attributes in relation to outcomes and benefits; and management techniques that provide for the different types of experiences demanded by the public. One management model consistent with the system-wide recreation resources development perspective and able to provide a conceptual framework to deal with some of the research concerns noted here is the Recreation Opportunity Spectrum (ROS) (Driver et al. 1987). The ROS model suggests that managed recreation resources provide opportunities for recreationists with varied preferences/motives to choose recreation activities and activity-based experiences that satisfy needs/wants for the individual/public good.

The components and interrelationships established in the ROS model have singly and in combination generated much research interest. The concept of "activity" has been studied extensively with regard to classifications systems for activities. Initial attempts at "typing" the domain of leisure activities relied on intuitive/implicit differences among activities (Kaplan 1960; Burch 1969; Hendee et al. 1981). Further taxonomic attempts typed activities based on frequencies of participation data and importance ratings of selected activities (Ditton et al. 1975; Gudykunst et al. 1981).

With the conceptualization of outdoor recreation as human experience, motivational dimensions were combined with participation rates and importance ratings to produce taxonomies of activities based on "reasons" or "why" people participated in selected activities (Crandall 1980; Tinsley and Johnson 1984). Another line of research, the "outcomes" track, focused on classifying the benefits or satisfactions achieved while participating in outdoor recreation. Initially, lists of satisfactions/outcomes of participation in selected activities were developed (Driver 1977). Later, taxonomies of leisure activities based on psychological "benefits" of participation were developed by Pierce (1980), Graefe et al. (1981), and others. Some researchers found variation in outcome "types" within activities (Brown and Haas 1980); others found similarities in psychological outcomes across settings (Graefe et al. 1981; Knopf et al. 1983).

A third line of research focused on the human use of parks as leisure "places" or "settings". Field and Check (1974) note that recreation places are not activity-specific: recreation activities pursued by people in such settings are more defined by the participation unit (human group) than by setting attributes or the specific activities for which the parks were designed. Williams et al. (1992) suggest that the recreation place, not the activity, is the repository of human meaning/value for outdoor recreation behavior.

Past research efforts tend to suggest the existence of some relationships among user groups, activity choices, and leisure

settings as postulated by the ROS management model. However, the relationships are complex and ambiguous: anomalies and inconsistencies have been found within and across conceptualization and classification schemes (Williams and Knopf, 1985; Virden and Knopf, 1989; Yuan and McEwan, 1989). Moreover, few researchers have examined an important assumption of the ROS model—that of the variably motivated recreationist choosing activities in a motive consistent fashion. If motives are efficacious in their ability to direct and channel behavior, then variably motivated recreationists should choose different recreation activity packages as suggested by the model.

Some of the studies discussed above are site-specific descriptive studies relating motives of participants to chosen recreation activities at specific sites. This study takes an alternative approach by examining the motive-activity choice link across all users of a common resource classification: state parks. This type of analysis controls for any site-specific self-selection bias in motive and activity structures at specific sites.

Given the myriad of approaches, conceptualizations and findings in relation to the ROS model, further research is needed to test the postulated relationships. The purpose of this study is to further examine the motive-behavior link as delineated in the ROS model. The objectives are three-fold:

- (1) Identify the motive structure of users of a common resource class-state parks.
- (2) Identify segments of state park visitors based on their activity participation and preferences.
- (3) Ascertain any relationships between varied motive structures and choices of recreation activities at the state park sites.

Methods

This study examined visitors to the Delaware State Park system and included all of the State Parks that charged entrance fees (11 of the 13 parks). Data were collected through a combination of on-site interviews and follow-up mail questionnaires sent to a sample of those interviewed at the parks. The follow-up questionnaire was designed to collect more in depth information regarding park visitors' attitudes and characteristics.

Sampling for the survey was designed to obtain a data base that would accurately describe visitors to each park individually as well as the overall system of State Parks (Table 1). To avoid problems of low response rates, mailing addresses were obtained from those completing onsite interviews and several reminder mailings were pursued, as per Dillman (1978). The follow-up questionnaires were sent within two weeks of their park visit. A reminder/thank you post card was sent seven to ten days later. Those not returning the questionnaires within another two weeks were sent a full follow-up questionnaire packet, and a final full follow-up was sent to those who had not responded after two more weeks.

Sampling was conducted from May through October, 1993, according to a detailed sampling schedule. Sampling was limited to weekends for the months of May, September and October.

Table 1: Survey response rates by site for Delaware State Park visitors

State Park	Onsite Interviews	Mail Questionnaires		Response Rate
		Mailed	Returned	
Cape Henlopen	256	11	76	68%
Fort Delaware	213	115	77	67%
Bellevue	284	168	105	63%
Trap Pond	227	87	52	60%
Brandywine Creek	196	123	73	59%
Holts Landing	96	66	38	58%
Delaware Seashore	320	206	115	56%
Walter S. Carpenter	181	114	63	55%
Lums Pond	267	117	64	55%
Fenwick Island	236	172	91	53%
Killens Pond	301	248	116	47%
Total	2577	1528	870	57%

During June, July and August, each park was sampled once each weekend and one week day per week. Interviewers were instructed to conduct about ten interviews on any given sampling day. Sampling times were rotated between the morning and afternoon to ensure a representative sample of users to each park. The interviews were generally conducted at the entrance stations, where visitors who entered during the sampling periods were asked to participate in the survey after they had paid their entrance fee.

Questionnaires were sent to 1,528 of 2,577 visitors interviewed in all of Delaware's State Parks (59%). Use of the mailing procedures described above resulted in 870 completed questionnaires, representing an overall response rate of 57% to the mail survey portion of the study.

Data analysis procedures included factor analysis, cluster analysis, and one-way analysis of variance. Factor analysis was used to examine the underlying dimensions within both the motivations and activity participation data. Cluster analysis identified distinct segments of park visitors based on the activity preference scores. Analysis of variance tests were conducted to analyze the relationship between motive factors and activity preference clusters.

Results

Motivations

Respondents were asked to rank the importance of 22 possible reasons for visiting a Delaware State Park. Overall, the respondents indicated that fun and escape related motivations such as "to have fun", "to have a good time", and "to escape pressure" and "get away from their daily routine" played a prominent role in their decision to visit a State Park. On the other hand, very few respondents indicated that they were motivated through educational or learning reasons (Figure 1).

Factor Analysis with varimax rotation was used to reduce these 22 items to the five general motivation factors of Escape/Solitude, Nature/Harmony, Nature/Learning, Fun/Recreate, and Social/Interaction. The Escape/Solitude factor included the largest number of variables (eight) with a reliability alpha of 0.88. The fun factor consisted of only two variables

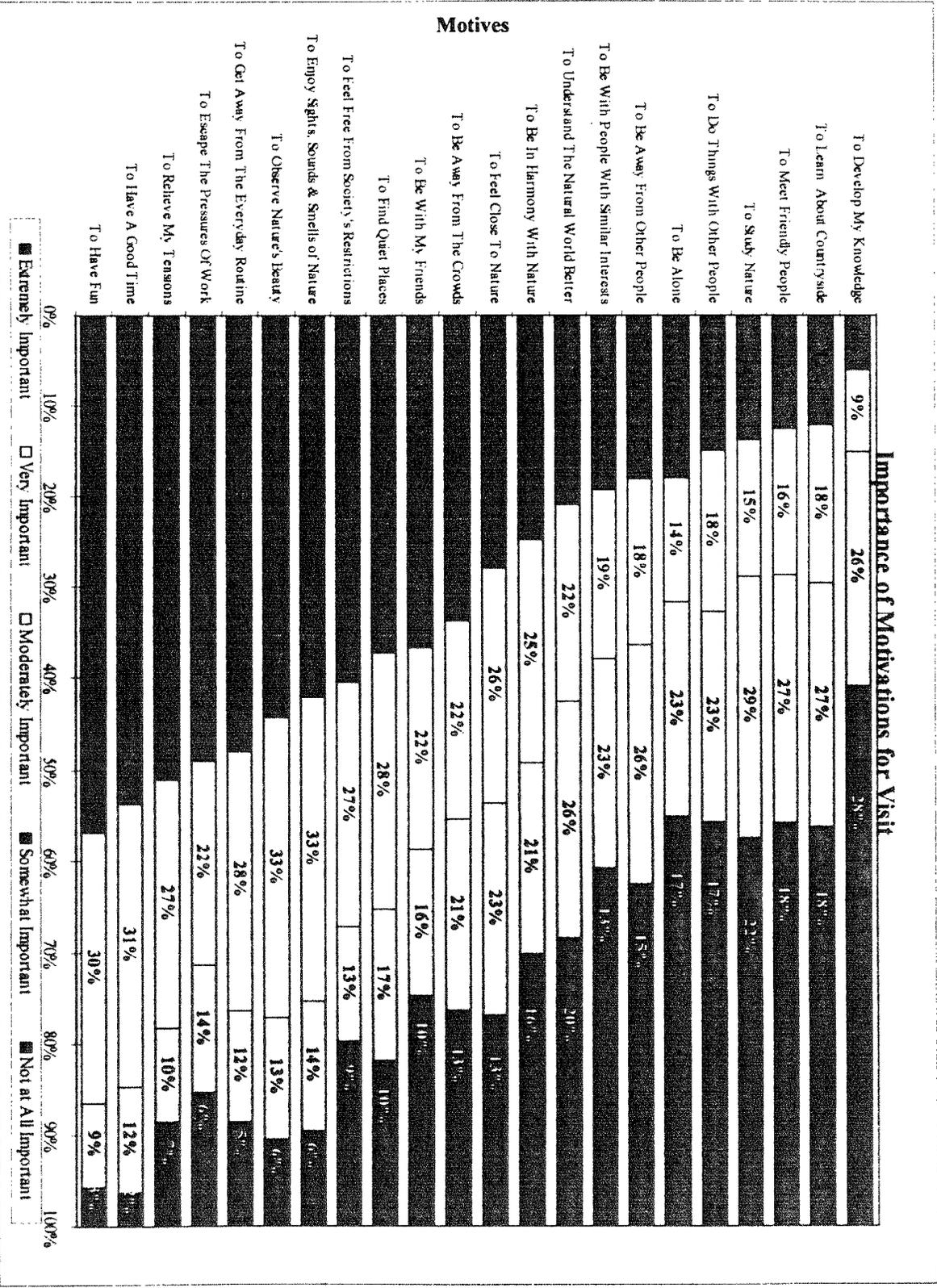


Figure 1. Motivations for visit summary chart.

with an alpha of 0.80. The remaining three factors, Nature/Harmony, Nature/Learning, and Social, consisted of four variables each, with alphas ranging from 0.85 to 0.88. The factor analysis explained just under 70% of the variance in the importance ratings (Table 2).

Activity Preferences

In addition to answering questions on what motivated them to visit Delaware State Parks, subjects were also asked about their activity preferences. Respondents were shown a list of 18 activities available for participation at Delaware State Parks, and asked to indicate which activities they participated in (or planned to participate in) during their visit. They were also asked to rank in order of importance the three activities that represented the most important reasons why their group had come to the state park (Figure 2). Swimming (45%), and Sunbathing (41%) were the two activities reported most often by the subjects, reflecting the large number of beach park respondents. The third most popular activity was walking for exercise, participated in by a third (33%) of the respondents, followed by picnicking (28%) and fishing (27%).

We attempted to factor analyze the activity importance ratings to determine if there were "Activity Dimensions". This analysis

identified five activity factors; however, the low factor loadings, inter-item correlations and weak reliabilities lead us to discard these factors in favor of a clustering approach. Cluster analysis was then used to group subjects into activity preference clusters based on how they ranked the available activity choices. Activity scores were recoded such that 0 = no participation, 1 = participated but not ranked in top three preferences, 2 = third most important activity, 3 = second most important activity, and 4 = top ranked activity. Table 3 provides the mean activity preference scores of the eight variables which best defined the clusters for four separate analyses, representing three, four, five, and six cluster solutions

The two primary clusters classified as the Passives and the Superactives remained throughout all 4 cluster solutions. Accounting for over half of the respondents, the Passive group did not rank any activities highly, but preferred picnicking over more active pursuits, with the exception of the six cluster solution where picnickers formed a separate cluster. While this group remains large throughout all solutions, nearly a third of its members shift to other groups when going from a three to a six cluster solution. On the other hand, while small, the Superactive group ranked all activities high, and contains the same number of subjects through each cluster solution.

Table 2. Factor scores for Delaware State Park visitors' motivations/reasons for visiting the park.

Questionnaire Statement	Variable Name	Factor 1 Escape/ Solitude	Factor 2 Nature/ Harmony	Factor 3 Nature/ Learning	Factor 4 Fun/ Recreate	Factor 5 Social/ Interaction
To get away from other people	AWAY	0.806				
To be away from the crowds	NOCROWDS	0.774				
To be alone	ALONE	0.758				
To find quiet places	QUIET	0.660				
To get away from the everyday routine of life	ROUTINE	0.598				
To relieve my tensions	TENSIONS	0.588				
To escape the pressures of work	PRESSURE	0.562				
To feel free from society's restrictions	FREE	0.515				
To observe the beauty of nature	OBSERVE		0.810			
To enjoy the sights, sounds and smells of nature	SIGHTS		0.802			
To feel close to nature	FEELCLOS		0.765			
To obtain the feeling of harmony with nature	HARMONY		0.678			
To develop my knowledge	KNOWLEDG			0.847		
To learn about the country side	LEARN			0.792		
To understand the natural world better	NATWORLD			0.638		
To study nature	STUDY			0.599		
To have fun	FUN				0.822	
To have a good time	GOODTIME				0.803	
To do things with other people	DO THINGS					0.855
To be with people with similar interests	SIMILAR					0.813
To be with my friends	FRIENDS					0.766
To meet friendly people	FRIENDLY					0.608
	# of Items	8	4	4	2	4
	Alpha	0.88	0.88	0.85	0.86	0.80
	Eigenvalue	7.52	2.68	2.5	1.49	1.03
	% Variance Explained	34.2%	12.2%	11.3%	6.8%	4.7%
	Total % Variance Explained	69.2%				

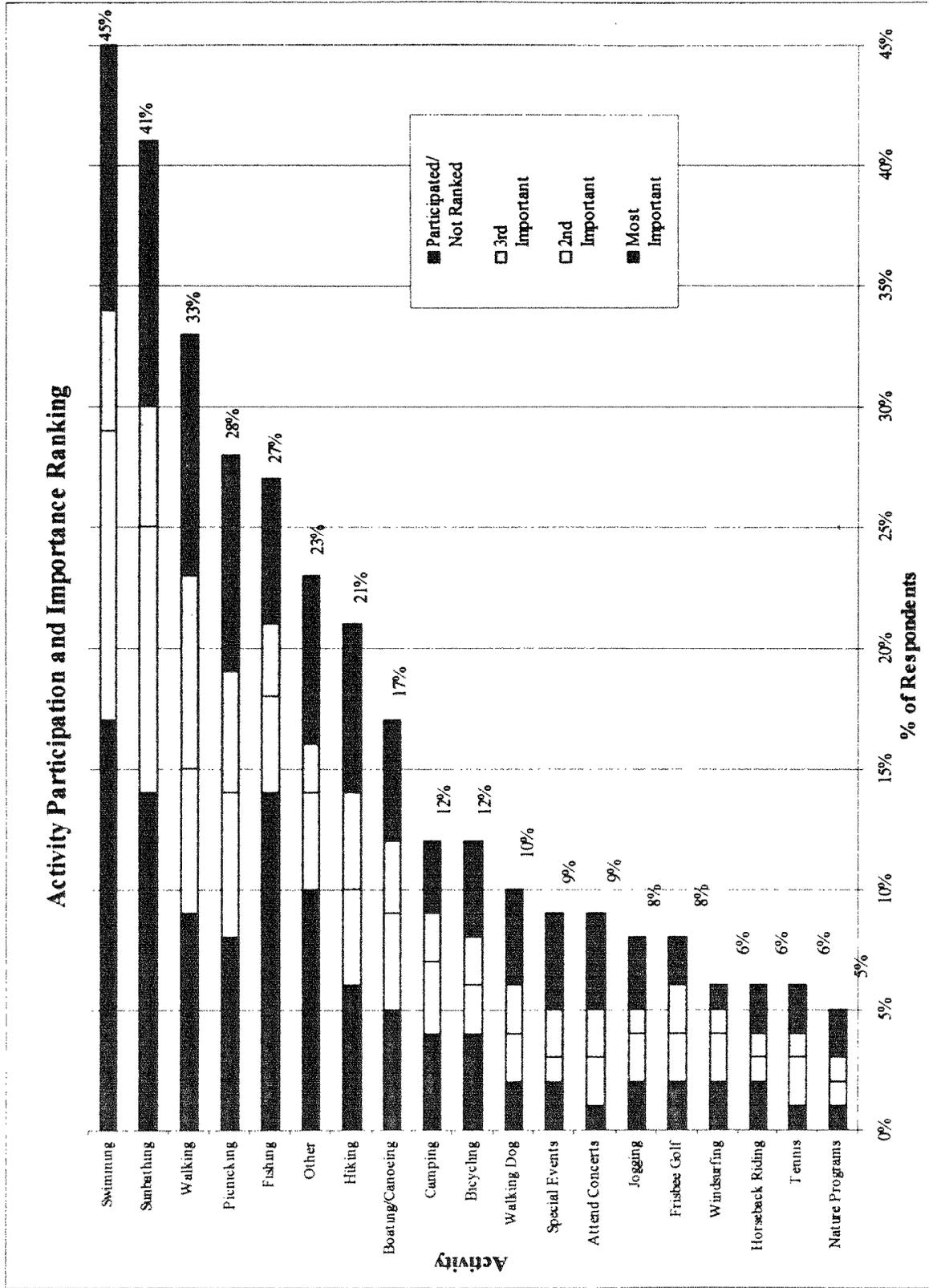


Figure 2: Activity participation and ranking summary chart.

Table 3: Visitor activity rankings by cluster.

Activity Cluster Analysis										
3 Cluster Solution										
Cluster #	n	Boating	Fishing	Hiking	Sunning	Swimming	Walking	Camping	Picnicking	Name
1	1914	0.4	0.6	0.7	0.3	0.2	0.7	0.2	0.8	Passive
2	20	3.3	3.9	3.7	3.9	4.0	3.6	3.4	3.8	Superactive
3	640	0.4	0.5	0.4	1.9	3.3	0.6	0.0	0.8	Beachgoers
4 Cluster Solution										
Cluster #	n	Boating	Fishing	Hiking	Sunning	Swimming	Walking	Camping	Picnicking	Name
1	606	0.2	0.1	2.1	0.1	0.2	2.0	0.1	1.0	Walkers/Picnic
2	1564	0.3	0.1	0.2	1.0	1.3	0.3	0.1	0.8	Passive
3	20	3.3	3.9	3.7	3.9	4.0	3.6	3.4	3.8	Superactive
4	384	1.2	3.3	0.4	0.6	0.8	0.4	0.9	0.5	Anglers
5 Cluster Solution										
Cluster #	n	Boating	Fishing	Hiking	Sunning	Swimming	Walking	Camping	Picnicking	Name
1	629	0.2	0.4	0.3	2.1	3.2	0.5	0.2	0.8	Beachgoers
2	365	0.1	0.3	1.1	0.3	0.2	3.3	0.1	0.8	Walkers
3	1255	0.1	0.4	0.7	0.2	0.2	0.1	0.1	0.9	Passive
4	305	2.6	1.9	0.6	0.4	0.7	0.3	1.3	0.6	Boaters/Anglers
5	20	3.3	3.9	3.6	3.9	4.0	3.6	3.4	3.8	Superactive
6 Cluster Solution										
Cluster #	n	Boating	Fishing	Hiking	Sunning	Swimming	Walking	Camping	Picnicking	Name
1	426	0.3	0.1	1.0	0.4	0.5	0.8	0.0	3.4	Picnic Walkers
2	295	1.0	3.7	0.4	0.6	0.7	0.4	0.3	0.4	Anglers/Boaters
3	1207	0.2	0.1	0.7	0.3	0.1	0.8	0.0	0.1	Passive
4	504	0.3	0.2	0.4	2.1	3.5	0.6	0.1	0.5	Beachgoers
5	20	3.3	3.9	3.6	3.9	4.0	3.6	3.4	3.8	Superactive
6	122	1.1	1.2	0.8	0.5	1.1	0.5	3.7	0.5	Camper/Boaters

The third cluster in the three cluster solution was the Beachgoers. This group, which ranked sunning and swimming as preferred activities, disappeared in the four cluster solution and reappeared in the five and six cluster solutions. Another noteworthy group was the Walkers/Picnickers who first emerged in the four cluster solution. This group ranked walking and hiking highly, and picnicking moderately. This cluster ranged in size from 365 to 606 and was most closely related to the Passive cluster.

The four cluster solution also included the first of the Angler groups. The anglers, consisting of 384 respondents in the four cluster solution, ranked fishing as their favorite activity. This group decreased to 305 respondents and changed into the Boater/Angler group in the five cluster solution, and further decreased to 295 due to the emergence of a Camper/Boater cluster in the six cluster solution. Note that the Anglers also rated boating relatively high in the five and six cluster solutions. The final group was the Camper/Boaters who emerged in the six

cluster solution. This group of 122 respondents were similar to the various Angler groups because of their interest in fishing and boating. However, they also reported a high preference for camping which set them apart from the previous Angler/Boater group.

Motivation/Activity Preference Relationship

Analysis of variance was used to determine whether or not there was a relationship between what motivates people to attend a Delaware State Park and their activity preferences while at the setting. Differences were identified between the various clusters in relationship to their mean scores for each motivation factor (Table 4). Significant differences between mean scores were found for at least three of the five motive factors for all four cluster solutions. While no clear motive pattern emerged, the Fun/Recreate factor contained significant differences in all cluster

Table 4. Comparison of Motive Factor Means across Activity Clusters

Motive Factor Means for Each Activity Cluster Solution							
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	
		<i>Escape/Solitude</i>	<i>Nature/Harmony</i>	<i>Nature/Learning</i>	<i>Fun/Recreate</i>	<i>Social/Interaction</i>	
Overall sample mean values		3.56	3.70	2.94	4.33	2.98	
3 Cluster							
Cluster #	n	Cluster Name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
			<i>Escape/Solitude</i>	<i>Nature/Harmony</i>	<i>Nature/Learning</i>	<i>Fun/Recreate</i>	<i>Social/Interaction</i>
1	565	<i>Passive Picnickers</i>	3.49	3.74	3.01	4.26	2.95
2	10	<i>Superactive</i>	3.68	3.63	2.84	4.75	3.44
3	194	<i>Beachgoers</i>	3.75	3.61	2.74	4.50	3.04
Sig.		0.009	ns	0.011	0.001	ns	
4 Cluster							
Cluster #	n	Cluster Name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
			<i>Escape/Solitude</i>	<i>Nature/Harmony</i>	<i>Nature/Learning</i>	<i>Fun/Recreate</i>	<i>Social/Interaction</i>
1	219	<i>Walkers</i>	3.46	3.90	3.08	4.10	2.77
2	424	<i>Passive Picnickers</i>	3.60	3.62	2.88	4.42	3.03
3	10	<i>Superactive</i>	3.68	3.63	2.84	4.75	3.44
4	114	<i>Anglers</i>	3.58	3.67	2.90	4.38	3.14
Sig.		ns	0.016	0.144	0.000	0.007	
5 Cluster							
Cluster #	n	Cluster Name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
			<i>Escape/Solitude</i>	<i>Nature/Harmony</i>	<i>Nature/Learning</i>	<i>Fun/Recreate</i>	<i>Social/Interaction</i>
1	187	<i>Beachgoers</i>	3.72	3.62	2.72	4.50	2.00
2	146	<i>Walkers</i>	3.52	3.80	3.06	4.04	2.70
3	341	<i>Passive Picnickers</i>	3.47	3.67	2.95	4.34	3.02
4	83	<i>Boaters anglers</i>	3.61	3.88	3.18	4.35	3.20
5	10	<i>Superactive</i>	3.68	3.63	2.84	4.75	3.44
Sig.		ns	ns	0.006	0.000	0.006	
6 Cluster							
Cluster #	n	Cluster Name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
			<i>Escape/Solitude</i>	<i>Nature/Harmony</i>	<i>Nature/Learning</i>	<i>Fun/Recreate</i>	<i>Social/Interaction</i>
1	128	<i>Picnic walkers</i>	3.58	3.87	3.01	4.45	3.23
2	90	<i>Boaters anglers</i>	3.59	3.58	2.84	4.43	3.05
3	347	<i>Passive Picnickers</i>	3.44	3.70	3.01	4.18	2.81
4	158	<i>Beachgoers</i>	3.78	3.64	2.77	4.49	2.99
5	10	<i>Superactive</i>	3.68	3.63	2.84	4.75	3.44
6	34	<i>Camping boaters</i>	3.59	3.74	3.04	4.28	3.36
Sig.		0.020	ns	ns	0.001	0.001	

solutions, followed by the Social/Interaction factor which contained significant differences in the four, five, and six cluster solutions. The Nature/Harmony factor revealed the least amount of variance by showing significant differences only for the four cluster solution. Both the Escape/Solitude and Nature/Learning factors held significant differences between clusters in two separate solutions.

This analysis demonstrates that people who have different activity preferences also have different motivations for visiting a Delaware State Park. For example the Escape/Solitude motivations were much more important to the Beachgoers than the Social/Interaction and Nature/Learning motivations were. Similarly, resource based groups such as anglers and walkers reported high means for the Nature/Harmony and Nature/Learning motivations. While all groups sought "fun", the Passives and Walkers groups tended to attach less importance to

this motive dimension. These results suggest that not all sites are well suited for all visitors and that what motivates people to visit a site may also determine what activities they participate in during their visit.

Conclusions

It was possible to place state park visitors into groups based on what general type of activities they prefer. However, the structure of the resulting groups is dependent on the number of clusters specified in the solution. Two main groups emerged and were stable across all the different cluster solutions - Superactives and Passives - with other tertiary groups emerging that are more dependent on the number of activity clusters derived. There was no clear "correct" solution to the segmenting of park visitors. Each of the four solutions examined provided a few more insights into the types of visitors that use Delaware State Parks.

Addressing the question "Are motivations for visiting a State Park related to activity preferences of visitors?", we found that there were significant differences between activity preference groups in relation to their motivations to visit a Delaware State Park. Put more simply people who visit recreation areas for different reasons (motivations) prefer to participate in different types of activities.

Managers must recognize that people visit parks and recreation areas for different reasons and therefore they need to offer a wide variety of activity opportunities. Furthermore, it should be noted that specific recreational settings may dictate who will visit and what they will do there. The extent of these relationships suggests managers have a direct and pivotal role in meeting visitor needs and desires in ways that can lead to higher levels of visitor satisfaction.

More research is needed to examine various visitor attribute and behavior variables such as: distance visitors traveled, first time visitors vs. repeat visitors, type of park (e.g. resource/setting variables), overnight versus day uses, as well as other visitor characteristics and setting opportunities.

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