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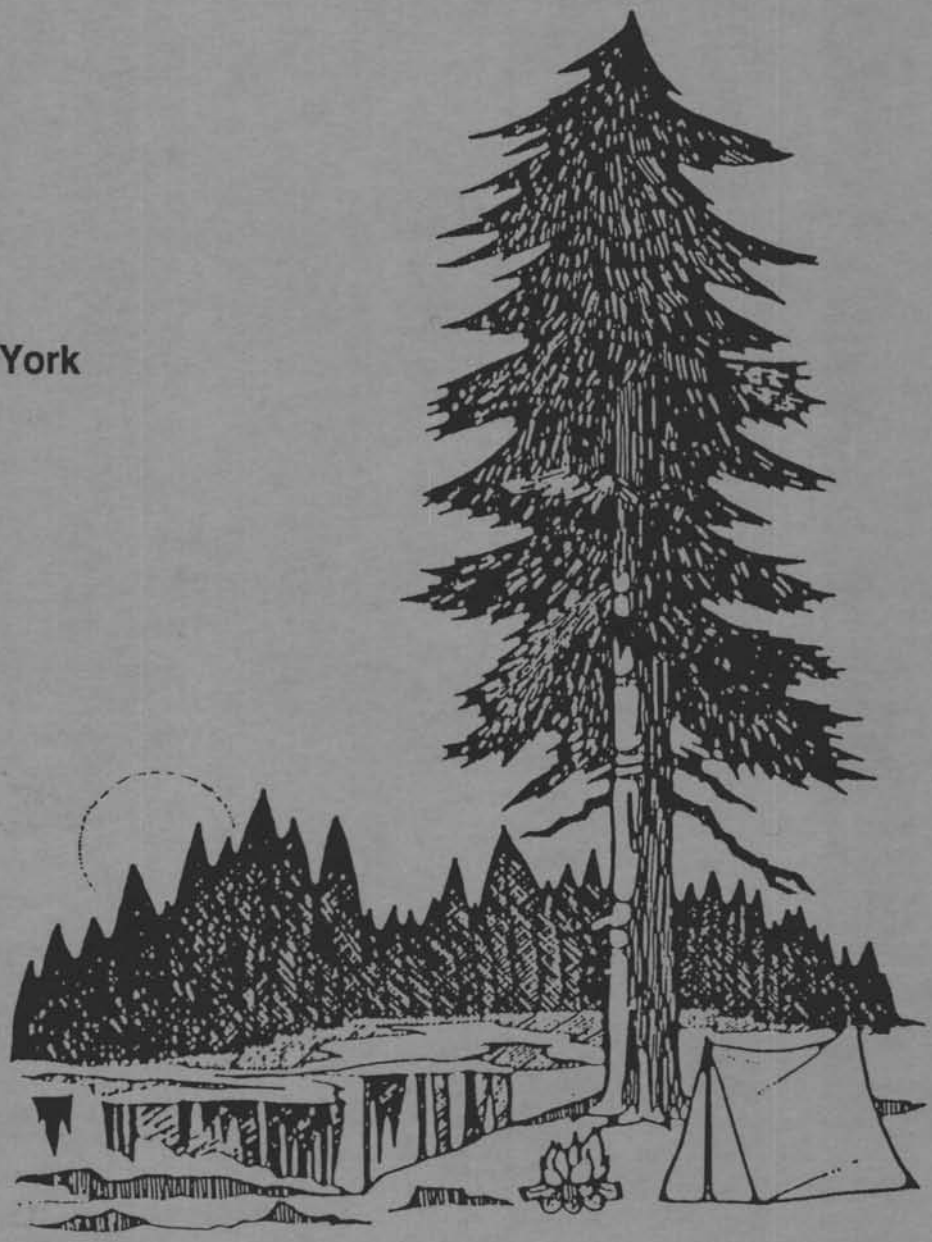

NORTHEASTERN RECREATION RESEARCH MEETING POLICY STATEMENT

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

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PROCEEDINGS of the 1991 NORTHEASTERN RECREATION RESEARCH SYMPOSIUM

April 7-9, 1991
State Parks Management and Research Institute
Saratoga Springs, New York

Compiled and Edited by:

Gail A. Vander Stoep, University of Massachusetts

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SOCIAL SCIENCE IN THE NATIONAL PARK SERVICE: AN EVOLVING MISSION AND PROGRAM

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In 1988 the director of the National Park Service requested that a social science program be established. Since that time a number of new research initiatives have been developed to address this need. This paper describes seven major steps taken thus far to meet social science needs of park superintendents, program managers, and park planners. Specific examples are presented.

Introduction

Three years ago, the director of the National Park Service (NPS) asked me to establish a social science program for the service. At that time there were a total of four sociologists and no economists in the NPS. Let me read for you what I wrote in early 1988 characterizing our social science activities. And remember as you listen to this characterization that the NPS is an organization about to celebrate its 75th anniversary, that has 356 park units, and that provides services to over 260 million recreational visits each year. This is what I wrote three years ago:

> At the present time, the service has little scientifically derived socio-economic information useful for supporting people-management decision processes. Fewer than five percent of the parks have collected statistical data to establish visitor demographic profiles and to determine where visitors go and how they actually utilize their time in parks. There is no routine and systematic collection of visitor baseline data throughout the system, or even a determination of what information should be included in such a baseline database. There is very little meaningful scientific information currently available concerning what visitors like to do in parks, what problems they encounter, or what factors contribute or detract from a quality visitor experience. Similarly, there is very little information concerning the unique needs of special visitor populations such as the elderly or single parent families. Absent these kinds of data, we do not now have bases for identifying and quantifying changing visitor use patterns, for detecting emerging trends in visitor interests and expectations, or for determining future requirements for visitor services. Neither do we have quantitative bases for assessing the adequacy of park facilities and services, for evaluating the effectiveness of park interpretive and educational programs, or for determining visitor use and enjoyment of parks."

To put this into perspective, let me describe a situation that occurred shortly thereafter.

A major consumer products company came to the NPS with a proposal for spending $1.2 - 1.5 million on a major marketing campaign. They proposed to develop an 8-page, high quality insert to Readers Digest magazine: four pages would be given to NPS to discuss matters such as park etiquette, respect for park resources. how to use park reservation systems, park safety, et.c The remaining four pages would be devoted to a highly professional, low-key marketing initiative, and would be subject to NPS approval for quality and content. This consumer products company asked that we provide them with three kinds of information about park visitors:

1) information about visitor demographics;
2) information about visitor leisure time interests and recreational preferences; and
3) information about visitor values.

We told them we were unable to provide such data, that it simply didn't exist. Their initial reaction was one of disbelief, citing their own very detailed customer database about those who buy their products. They were absolutely amazed that we would attempt to provide quality services to over a quarter of a billion visitors each year without knowing at least basic information about our client population.

Step 1 - Socio-economic Information Users

In the intervening three-year period, we have made considerable progress. I want to summarize for you where we are at the present time, and describe the nature of the social science program that we have developed to support visitor management activities in the NPS. The *first* thing we did was to define precisely who are the potential NPS users of socio-economic data. They fall into three primary categories: 1) park superintendents, 2) program managers, and 3) park planners.

Step 2 - Types of Socio-economic Information Needed by User Group

Second, we have identified the kinds of socio-economic information that these three user groups will need:

Park Superintendents

Park superintendents require general socio-economic information about visitors in order to measure the quality of the visitor experience, to set priorities, to deal with conflict situations, and to make policy decisions such as whether to impose visitor carrying capacity limits in order to deal with perceived crowding problems. Park superintendents also need comprehensive economic data in order to deal with local governments and with local business and community interests. A case in point is the recent Yellowstone fire. It was charged by some local and regional business groups and by some public officials that prompt failure to extinguish the fires caused economic devastation to the area as a result of loss of tourism revenues. In reality, a follow-up economic analysis indicated that considerably more money was spent on fire suppression activities than was lost as a result of reduced tourism expenditures. True, the fires caused economic dislocationsk but the overall result clearly was a net economic gain, certainly no an economic catastrophe.

Park superintendents also are very concerned about the ability of the park to meet future visitor needs, and so park superintendents are interested in changes occurring over time on visitor recreation preferences, visitor behavior, visitor values, visitor travel patterns, etc. and they require good socio-economic baseline data in order to identify and respond to these visitor and visitor-use trends.

Program Managers
Program managers represent a second group who need socio-economic data, in this case for carrying out operational programs. For example, the National Park Service each year spends tens of millions of dollars on visitor centers and on interpretive and educational programs. Park staff need visitor survey data in order to know if these interpretive and educational programs are effective. Similarly, park rangers who are responsible for resource protection and visitor safety functions need visitor survey data in order to measure the effetiveness of alternative ways of dealing with problems. For example, if the park has an ecologically fragile area, should the staff rely on *direct methods* suchs as law enforcement or fenced exclusion to protect the resource, or would it be more appropriate to use *indirect methods* such as education, or signs, or hand-out brochures to accomplish resource protection objectives.

NPS Planners
NPS Planners make up the thrid major group who require socio-economic data. This includes three types of planners: 1) operational planners, 2) facility planners, and 3) strategis planners. Operational planners need socio-economic information for preparing EISs, for developing visitor-use plans, for meeting the unique needs of special visitor populations such as senior visitors, for assessing the values of campgrounds reservation systems, etc.

Facility planners need socio-economic data for designing and siting visitor centers, for sizing visitor support facilities such as drinking water supplies and waste disposal systems, and for developing highway and transportation system plans.

Strategic planners need comprehensive socio-economic data for developing long-range park general management plans, for evaluating the pros and cons of capital intensive and often controversial new visitor support facilities such as new marinas, runway extensions, and overnight stay accommodations, and for develping long-range recreational use plans and visitor marketing strategies.

Step 3 - Environment for Social Science
The third thing we have done is to try to characterize the environment in which we expect our social science program to function. We acknowledge that we are in a period of recreaitonal transition, and that important changes are taking place that likely will affect our delivery of services to park visitors in the future. For example:

1) We expect to see increasing regionalization of park visits, with smaller visitor catchment areas.
2) We expect to see substantially more older adult park visitors in the years immediately ahead' and we anticipate that these senior visitors will command an ever-growing proportion of the discretionary income available for leisure time purposes.
3) We expect tthe trend toward deferred child-bearing to continue, with a high percentage of young two-wage earner familites who frequently have difficulty in matching vacation times, who place a high dollar value on their discretionary time, who place growing emphasis on high-intensity recreation activities, and who often seek instant gratification in their use of limited leisure time.
4) We expect to see increased park visitation during the shoulder season periods and during traditional off-peak seasons. For example, over the last 10 years, the National Park System experienced a 57% increase in visitation during the winter season. We believe this trend will continue.
5) We expect to see much greater use of parks by minority/ethnic groups, and we can anticipate that these visitors wil have recreational preferences and interests that may be substantially different from those of "traditional" park visitors.
6) We expect to have to deal with increased crowding, increased traffic congestion, increased competition amoung different user groups for the same recreational resources and recreational opportunities. We have experienced many visitor conflict situations among visitors who have different goals, priorities, expectations and recreational interests. For example, conflicts between ORV users and beach hikers, showmobilers versus cross-country skiers, water skiers vs river rafters, motor boaters vs canoers, horsebackers vs hikers, and RVers vs ten campers. We expect to wee more such conflicts in the future.

Let's also look at what is happening to numbers of park visitors. During the decade of the 70s, we experienced roughly a 30% increase in recreational visits, during the 80s, roughly another 35% increase. If these trends continue, we might anticipate recreation visit levels of perhaps 325-350 million by the year 2000, and perhaps 425-475 million by the year 2010. No matter what the exact number, we know that we will be called on to provide substantially more visitor recreational opportunities, and more visitor services, and do so in an environment in which visitor needs, interests, use patterns, demographics, values and expectations all may be undergoing significant change. Dealing with this level of visitation represents a truly awesome challenge, particularly in a period of limited dollar and staffing resources.

Step 4 - Role of Social Science
The fourth thing we have done in developing our program is to articulate the specific role that we want the social science program to play in the NPS. The NPS social science initiative is essentially a research effort. The program is designed to provide credible, accurate and reliable socio-economic data. It functions in a decision support role, not in a decision-making role.

Furthermore, it is critical to recognize that the NPS social science program is concerned with a set of very complex socio-economic issues that are endemic to social systems that exist in and around parks. We are dealing not only with park visitors, but rather with a park-centered social system comprised of the following sub-populations, all of whom interact with and among each other: 1) park visitors; 2) park employees; 3) concessioners; 4) inholders; 5) gateway communities; 6) park neighbors; and 7) the travel and tourism industry.

Step 5 - Park-specific Socio-economic Issues
The fifth step in formulating our social science program was to acknowledge that most of the socio-economic issues of interest to the NPS deal with problems that are of special importance to a particular park. For example:

1) At Grand Canyon NP: Evaluate visitor reaction to different levels of aircraft noise intrusion for planes flying over and in the canyon;
2) At Yosemite NP: Assess the socio-economic impacts on adjacent communities of relocating NPS facilities and resettling NPS employees outside the park boundaries;
3) At Mt. Ranier NP: Assess visitor reaction to a proposed tour bus transportation system that might replace private autos in the park.
4) At Carlsbad Caverns NP: Determine visitor reaction to the proposed removal of a profitable, but resource-depreciating, concessioner-operated deep underground lunchroom facility.

5) At the Blue Ridge Parkway: Assess visitor reactions to the degradation of scenic views resulting from clearcutting of adjacent forests.
6) At Yellowstone NP: Collect socio-economic data required for developing a winter-use recreation plan for the park; identify and characterize the nature and the severity of potential conflicts between snowmobilers, cross-country skiers and other visitors.

Step 6 - Generic NPS Socio-economic Issues

The sixth step in developing our program was to recognize that some of the socio-economic issues of interest to the NPS are generic in nature and occur throughout the system. Although typically few in number, these issues can be very important when considered for the National Park System as a whole. For example:

1) We need to develop techniques for determining social carrying capacity limits or threshhold levels at which indicidual visitor satisfaction begins to decline due to the presence of others.
2) We need to measure systemic or structural changes in park visitor demographics and basic visitor use patterns.
3) We need to develop inexpensive techniques for determining how parks impact local, regional and statewide economies.
4) We need to develop standardized methodologies for determining the values of parks, including the intrinsic or amenity values of their natural and historic resources, their community values, their scenic values, and their values as places of unique importance to our national culture and heritage.
5) We need to understnad the characteristics and the needs of special visitor sub-populations such as senios, minority groups, and single parent families.
6) We need to assess the importance of visitor reservation systems in parks that experience heavy visitor use.
7) We need to develop standard techniques for collecting baseline data required to characterize visitor attitudes, expectations, values, interests, needs, recreational preferences and satisfaction achieved.
8) We need to determine who comes to parks, and why; and who does not visit parks, and why not.
9) We need to identify potential visitor populations, and assess actions that might be taken to stimulate or to channel their future interest in parks.

Step 7 - University-based Research

The seventh and final step we took in formulating our social science program was to establish the concept of a university-based institutional framework within which socio-economic issues are unique to a particular park are addressed through work sponsored by the park itself. Similarly, those socio-economic matters of servicewide interest are addressed by research sponsored by the Washington social science program office. In both cases, nearly all of this research is conducted by unitersity personnel. We believe this enables us to draw upon the talents of experienced professionals from throughout the country, and results in high-quality and cost-effective research. At the present time, for example, the Washington social science office has research projects of general interest underway at a number of universities, dealing with matters such as the following:

1) We have a comprehensive study of social carrying capacity issues at the University of Vermont.
2) At VPI we are developing an economic model designed to assess the impacts of parks on a statewide basis. At VPI we also are developing a methodology that can be used to determine the economic consequences associated with alternative actions to preserve, develop and utilize currently unprotected Civil War battlefied sites.
3) At the City University of New York we are developing a standardized general user survey questionnaire that will be used to collect comprehensive baseline data in a consistent and systematic fashion at key indicator parks throughout the system. We will repeat these same visitor surveys at each indicator park at five- or ten-year intervals to detect changes and identify trends.
4) At Yale University and CUNY, we are developing comprehensive human resource management plans for a large urban park and a large natural are park, considering the social interactions among visitors, employees, concessioners, and the other publics with whom the park interfaces.
5) We currently are starting a new research project designed to study minority access to, and use of, parks. This likely will involve collaborative efforts at a number of historically black colleges and universities.
6) We currently are developing a social science training short course for park managers, to be put on in May. Social scientists from eight different universities are participating in this new initiative.
7) Finally, we recently completed development of a standardized catalog of questions, a set of socio-economic questions and responses that have been conditionally pre-approved by OMB. These standardized questions can be used to construct park visitor survey questionnaires quickly and inexpensively.

Summary

In summary, I have outlined for you the general scope and thrust of our social science initiative. These represent new research efforts put in place over the last 30 months. Obviously, we have much left to do. But this does represent a significant beginning in our efforts to develop and implement a professional and credible social science program for the National Park Service.

GARDENING AS A SUBVERSIVE ACTIVITY

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The following text was given as the opening address to the Northeastern Recreation Research Symposium in Saratoga Springs, New York on April 7, 1991. It characterizes a mismatch between the environmental problems confronting the planet and our human capacity to perceive them and do something about them. Based on that characterization, ways in which we might begin to behave in the light of our limitations as a species as well as our potentials are discussed. The text concludes by considering the metaphorical power of gardening as a practical means for curing what ails us.

We live in a crazy world. Or so it seems. Weather reports in Los Angeles admonish millions of us not to go outside because of the poor air quality and we do not even flinch. At the same time, the plight of two -- count them -- two grey whales trapped in an Alaskan ice floe captures national attention, tugs at our hearts, and prompts calls for immediate action. Meanwhile, half way around the globe, we are gripped by the news of one American's abduction by Middle Eastern terrorists while in our own back yard the deaths of thousands of Americans every day from preventable automobile accidents, heart disease, smoking, and the consumption of drugs and alcohol go unnoticed.

What's going on here? Why is it that we are oblivious to the real environmental hazards threatening our existence on this planet while preoccupying ourselves with transient matters that are, in the course of things, likely to be of little consequence? Why do we behave the way we do? And what can we do about it?

I have come to believe that we human beings are biologically ill-equipped to deal effectively with the environmental problems confronting the world today, that there is a fundamental mismatch between the nature of those problems and our ability to perceive them and do something about them, and that if we are to have any hope of turning things around, we must better understand the causes of the mismatch so that we might begin to act in the light of our limitations as a species as well as our potentials.

To foster that understanding, it is first necessary to appreciate the context out of which we present day humans evolved. Such appreciation is difficult to effect because of the immensity of the time involved, but it can be made easier by condensing that time into the equivalent of one calendar year. If midnite January 1 represents the "Big Bang," the origin of the universe, then every day thereafter represents approximately 41 million years. At this rate, the formation of the earth does not even take place until September 14. Dinosaurs emerge on Christmas Eve only to disappear by December 28, the same day flowers bloom for the first time. And we human beings do not make our entrance until 10:30 p.m. on New Year's Eve. Finally, all of recorded human history takes place in the last 10 seconds of the year (Sagan 1977).

This cosmic calendar illustrates vividly two essential points about human evolution. First, the climb up from our watery origins was a long and laborious one, consuming over three months of the year. Second, our ability to change the face of the earth in cataclysmic ways has happened only in the last one second.

Embedded in these numbers is the source of our human predicament. They reveal that our mental machinery, the way we take in the world and make sense out of it, was forged eons ago. Indeed scientists tell us there has been no appreciable change in either the size of our brain or the way the brain functions for thousands of years. What this means is that almost all of our biological evolution took place long before the times in which we live, and long before we fashioned tools powerful enough to destroy the earth.

Biologically, then, we are wired for a world that no longer exists. Our nervous system was formed in a relatively stable environment where only recognition of dramatic changes in our immediate surroundings -- a sudden movement, a breaking branch, an unfamiliar noise -- spelled the difference between life and death. In that world it paid to filter out the familiar, the common place, the slow to change. We learned over a long period of time to take note of certain things and to ignore the rest. It is a way of processing the world that characterizes us still.

What we have inherited is a mental mismatch of gigantic proportions. On the one hand, we are biologically predisposed to concentrate on the transitory, the fleeting, the passing moment; hence our concern for the precarious position of two grey whales trapped in the ice and our interest in the sudden kidnapping of an American overseas. On the other hand, that same biological predisposition discourages us from noticing changes marked by a slower cadence, changes that take years or even decades to be felt; hence our obliviousness to the gradually eroding quality of the air we breathe and our disinterest in the common place deaths resulting from familiar hazards of contemporary life.

The problem is that most environmental crises jeopardizing the earth have not announced themselves. They have proceeded at a snail's pace, too slow to signal our alarm, and too fast to adapt to biologically. This is true of deteriorating air and water quality, the greenhouse effect, ozone depletion in the atmosphere, acid rain, vanishing species, the destruction of tropical rain forests, the leeching of nutrients from farmland, urban sprawl, overpopulation, toxification of nuclear wastes, and the decline and fall of quality recreation opportunities and environments. One has to wonder, given the large gap between the pace of our biological and cultural evolution, just what will become of us? We are not unlike television's "The Simpsons," Neanderthal-like creatures struggling to survive in a world of our own making that nonetheless seems out of control.

Exacerbating the situation is our age-old habit of simplifying the world in which we live to facilitate its understanding. Since we can't possibly process all incoming stimuli, we have evolved mental sorting mechanisms to filter them. These default positions of the human mind automatically channel our thinking in certain ways (Ornstein and Ehrlich 1989). They encourage us to "look for discrepancies in the world, to ignore what is going on constantly, and to respond quickly to sudden shifts, to emergencies, to scarcity, to the immediate and personal, to 'news.'" (Ornstein and Ehrlich, p. 91) What they result in are mere caricatures of reality, caricatures that may have worked well enough in bygone times, but that obscure rather than clarify the reality of our present world.

The Exxon Valdez incident is a case in point. When the tanker ran aground in March of 1989 discharging millions of gallons of oil into Prince William Sound, the suddenness of it all, the sense of urgency, the emergency, triggered our primeval "fight or flight" response. It was tailor-made for the default systems of the human mind. It was news. It was an environmental crisis that had announced itself. If only Captain Hazelwood had not been drinking, we reassured ourselves, everything would have been just fine. Or would it?

What was obscured by the commotion over the Exxon Valdez disaster was the reality of a disaster of larger proportions, a disaster that would have been fueled by the Exxon Valdez if only it had delivered its cargo to port intact. For if the 10,000,000 gallons of oil that despoiled the Gulf of Alaska would have reached the gasoline tanks of America's automobiles, they would have fed into the much larger environmental crisis caused by the increased spewing of carbon dioxide into the atmosphere. That crisis, however, is not one our default systems are designed to register. Indeed the global warming crisis is all too reminiscent of the "boiled frog" syndrome. Put a frog in a pan of slowly heating water and the frog will not detect the gradual rise in temperature. It will sit there until it boils to death. Is it possible that we human beings are not that much different?

Our caricatures of the world not only misrepresent its complexity, they also lead us to adopt solutions to problems that are themselves caricatures or simplifications of what needs to be done. We are attracted to the promise of a quick fix or magic bullet to cure what ails us when in reality what is needed is the discipline of a long term commitment, a long term program of care, a long term change in behavior. Health fads come quickly to mind, as do pie-in-the-sky promises of aspiring politicians, as does the naive notion that if Exxon is forced to shell out enough money everything will be just fine. The prescriptions for our maladies are touted as fast and painless and, to make them palatable, are advertised as being of no significant cost to anyone. Is it any wonder they are seldom of significant value to anyone?

We are, in sum, living in a world of accelerated change where our cultural evolution -- our creativity, our inventiveness, our technological know-how -- far outpaces our biological evolution, our ability to perceive the consequences of our actions and then to do something about them. We are increasingly out of step with our own nature.

For most of human history this has not been a significant problem. That's because, "humanity, until very recently, lived almost entirely on its 'income' -- solar energy captured by green plants in fields, on farms and in forests by the process of photosynthesis. Now, thanks to cultural evolution, humanity is living largely on its 'capital' -- nonrenewable resources." (Ornstein and Ehrlich, p. 45) We are living on our savings. One of the principal questions of our time, both for the individual family and for the human family as a whole, is how long can this go on?

As Robert Ornstein and Paul Ehrlich argue persuasively in their book *New World New Mind*, our triumph has not been in adapting to or understanding the natural world, but in transforming that world to make it a more hospitable place for our species. The irony results from the Pogo-like realization that in this triumph we have become our own worst enemy and that, barring a fundamental change in the way we live our lives, we may do ourselves in from within.

If we are to extricate ourselves from this predicament, we must recognize our shortcomings and mend the error of our ways. We human beings are fortunate in this sense because we have the capacity to step outside ourselves, to observe and reflect upon our own circumstances. Self-awareness distinguishes us from other life forms and offers us the possibility of recovery from ill-conceived acts. So it is that the same process of cultural evolution, the same process that is responsible for our major environmental crises, offers us the hope of turning things around. For if this same creativity, this same inventiveness, this same technological know-how, can be recast in ways that consciously allow us to change our thinking, then there is still hope for a healthier and happier future for us all. The burning question, of course, is how do we go about doing it?

I have little hope for political solutions to our environmental problems. I say this for two reasons. First, politicians are ill-suited to offer leadership in dealing with environmental crises. Crises that evolve over long periods of time, or that demand long periods of commitment to resolve, or that demand long and costly programs of care to mitigate, or that demand significant changes in individual behavior to be done away with, simply do not play well to the voting public. What politician in his or her right mind is going to take a stand on an issue that will principally benefit generations of voters yet unborn? Politicians understand this. They know they must promise immediate results if they are to get elected. They also know that to have any chance of getting re-elected they must give the appearance, however false, that everything is progressing on schedule. Successful politicians are masters of the caricature, of presenting the illusion that everything is hunky-dory. It is a skill akin to acting. If recent history teaches us anything about politics, it is how well such acting works on the American public. If it teaches us anything else, it is that, however entertaining, masters of this craft are not likely to get the job done.

Second, and more importantly, I do not see the major environmental crises confronting the world as public problems. Indeed the ease with which most of us are inclined to elevate such problems to a global level puzzles me. What we seem to be saying, in effect, is that if only this business or that business would behave responsibly, if only this public agency or that public agency would behave responsibly, if only this country or that country would behave responsibly, if only they...they... they.... Why is it that we always blame someone else?

We are the ones who demand increasing amounts of gasoline for our cars. We are the ones who eat beef raised in Central and South America. We are the ones who spray chlorofluorocarbons into the atmosphere. We are the ones who insist on a bigger house in the suburbs. We are the ones who dream of visiting exotic and faraway places. We are the ones who are never satisfied with what we have. We are the ones who don't know the meaning of enough. We. . .we. . .we are the guilty ones. We need look no farther than into the nearest mirror to see who is really responsible for the state of the world.

We also need look no farther than into the nearest mirror to see who really is in a position to do something about the state of the world, to see who really is in a position to make a difference. Garrett Hardin (1985), in his book *Filters Against Folly*, admonishes us to "never globalize a problem if it can possibly be dealt with locally." By globalizing problems we shove them away to some distant authority so we can evade culpability. It's a way of turning our problems into their problems. It's a way of getting out from under the burden of responsibility. In the long run it is failure's way.

What, then, can one individual do to make a difference in this world? There are several things. But first let me be clear about expectations. If my reasoning has been persuasive, if the environmental crises facing us are as monumental as they appear to be, if as much of our evolutionary biology works against the effective resolution of these crises as I think it does, then obviously I can prescribe no simple remedies. On the contrary, all I can prescribe are ways in which an individual can proceed in the context of his or her own life. In doing so, I recognize the cumulative possibilities, the potential synergistic effects of individual actions considered collectively, but I do not dwell on them. For to do so would be to obscure the significance of that one individual who, against all odds, seizes the initiative. That individual, whoever she or he may be, is destined to be the real savior of this planet.

As a first step, I recommend the conscious slowing down of our lives. This recommendation may seem illogical in an age when everything else is speeding up, when we feel heightened pressure to keep up with the Joneses, but that is precisely why downshifting is called for. Recall that our "old" minds are programmed to respond quickly to visceral issues, to the rapid unfolding of events. We are designed to be quick on the draw. Yet sudden reactions to surface appearances result in short-lived, poorly chosen courses of action. "New-mindedness" demands removing ourselves from the immediacy of things, pondering the long-term implications, thinking before we leap. New-mindedness means developing the habit of stepping back from the fray.

The recent Yellowstone fires are illustrative. Remember the hullabaloo over the crackling events of the summer of 1988? Remember the clamor, the uproar over what ought to be done? Remember the concern for the immediate economic consequences for tourism? Remember the politicians demanding William Penn Mott's resignation as National Park Service Director because his fire policy did not bring a quick solution to that "horrible ecological disaster"?

Fortunately, calmer heads prevailed. Director Mott was not removed from office. The fires gradually were subdued with the assistance of God-given snow, and within a year of the fires' extinction the scientific community had concluded that the fires were not the disaster they were made out to be, that they were likely part of an age-old pattern of periodic burnoff. But what if we had allowed the heat of our emotional or political response to dictate our course of action? Where would those policies have led us in the long run?

Do you remember as well that all the while our national attention was fixed on Yellowstone, all the while our senses were glued to the smoldering imagery, all the while our caricature of the nation's first national park going up in smoke was calling us to action, thousands of miles away to the southeast a national park was really dying, and continues to die, a slow and insidious death? While the Yellowstone fires may have captured our flair for the dramatic, for the theatrical, for "news," the death of Everglades National Park for the lack of a drink of water goes virtually unnoticed. Old minds can be excused for that oversight. New minds cannot.

Perhaps by slowing down we will be better able to see such unannounced crises and do something about them. Perhaps by slowing down we will begin to appreciate more deeply the backdrop against which our human drama unfolds. Perhaps by slowing down we will be more inclined to give that backdrop its proper care. I know such a slowing down will not come easily. I know it will demand a conscious effort, a disciplining of the mind. I know as well that we have it within ourselves to effect such a slowdown if we so desire.

Second, I recommend scaling down our list of "necessities," of consciously living below our means. This, too, is a tall order. There is an old saying among backpackers that what one doesn't carry in one's head one must carry on one's back. I think the saying can be applied to the general conduct of our lives also. If indeed we are living increasingly on our savings, on the earth's limited nonrenewable natural resources, then it behooves each and every one of us to draw as little as possible on that savings, to carry proportionately more of what is necessary to live a full and satisfying life in our heads. We need to measure the fullness of our lives not by the number of our possessions, but by the quality of our relationships with others and by the degree to which we continue to learn and grow intellectually, spiritually, and emotionally. We need to get the weight off our backs, to lighten our physical loads.

I wonder why this is such a difficult thing to do? Philip Slater (1970), in his book *The Pursuit of Loneliness*, questioned the custom of sacrificing our lives for the accumulation of dead things. Where is the wisdom in expending our life's energy for the sake of things that in and of themselves are lifeless, for things that do not have the capacity to receive or tender affection and care? Where is the meaning in that kind of existence? Wouldn't it be better to recognize such things for what they are, mere fillers for an otherwise hollow life, and turn our attention to issues that really matter?

Third, I recommend stepping down from our anthropocentric pedestals to assume a more humble position among the creations of the earth. I encourage us to cultivate a lifestyle characterized by reverence and restraint. Just as we are awed by our own accomplishments, by our own ingenuity, we must exercise the humility that allows us to be awed by all that is beyond our making and our ken.

We must never forget that history is written by the "winners." There are histories untold and future histories waiting to be written. Who will write our history? Do we ever consider the possibility that it will be written by somebody or something other than ourselves? Will our history be written by the wind swirling over America's Great Plains, made parched and lifeless by shortsighted agricultural practices? Will our history be written by the silence of a planet made barren by the greenhouse effect? Will our history be written by the cold and emptiness of an earth no longer fit for life because of a nuclear holocaust? Or will our history be written by our children in celebration of their parents' good sense in mending the error of their ways and in developing new patterns of behaving and relating to the world around them?

If I were asked to propose a tangible first step, an individual initiative that would lead us in the right direction, a revolutionary change in human conduct that would shake the very foundation of contemporary life, something our children could take great pride in writing about someday, I would propose that each and every one of us plant and tend a garden. Gardening, it seems to me, is the quintessential metaphor for all that I have been trying to say.

It is difficult to rush a garden. Planning is called for. Preparation of the soil is necessary. Decisions about what to plant, where to plant, and when to plant must be made. This all takes time. The weather matters. Precipitation is important. Temperature is a concern. One needs to think about the long term, about the relationship between this year's planting and

future plantings, about the ability of the soil to rejuvenate itself, about the recycling of wastes.

At the outset, then, "a person who undertakes to grow a garden at home, by practices that will preserve rather than exploit the economy of the soil, has set his [or her] mind decisively against what is wrong with us." (Berry 1970) Gardening demands slowing down and stepping back from the fray. It is an antidote to the accelerated pace of contemporary life. It is calm and calculating. It is marked by a slower cadence, a beat in step with the seasons. But gardening is more than that.

Gardening is also taking responsibility for the condition of one's own plot of ground. Gardening, if done organically, is a way of improving a piece of the earth. (Berry, p. 82) Unlike public officials or bureaucrats who talk in generalities from afar about the proper stewardship of the land, gardeners are down on all fours, with rolled up sleeves, actually doing something about it. They are "serving the world's future more directly and surely than any political leader, though they never utter a public word." (Berry, p. 80) They are illustrating that responsible husbandry of the earth's natural resources is carried out by individual citizens in everyday life.

Gardeners are also scaling down their dependency on middlemen for life's sustenance. As Wendell Berry points out, "most of the vegetables necessary for a family of four can be grown on a plot of forty by sixty feet." (Berry, p. 82) By reducing the need for the grocer, and the need for a car to get to the grocer, and the need to seek pleasure beyond the bounds of one's own back yard, the gardener is involved directly in reducing the drain on the earth's bank of limited natural resources, on the earth's savings. The gardener is relearning the ability to live on the earth's income, on the solar energy captured by green plants by the process of photosynthesis. The gardener is acquiring knowledge that leads toward greater self-sufficiency, toward a way of living that is based on the wisdom of carrying more in one's head than on one's back. Gardeners are choosing to live below their means.

Finally, gardening is a way of living the connectedness that defines our relationship with the earth. Gardeners are in step with their own nature, a nature forged in close proximity to things natural, a nature inextricably intertwined with the larger community of life. While delighting in the day-to-day progress of their work and the gradual appearance of the fruits of their labor, gardeners recognize their vulnerability to larger forces -- to unexpected droughts, to sudden storms, to drastic changes in temperature. Gardeners are both proud of and humbled by what they have accomplished. They are happy with their lot and are aware that things could have turned out otherwise. Gardeners know there are thanks to be given.

Perhaps you are bewildered by my comments? Here we are, after all, confronted by environmental problems of devastating proportions and all I have to offer is the planting of a garden. Where are my slogans, my petitions, my protest songs? Where are my references to civil disobedience? The world is falling apart before our very eyes and I can't even muster a drum roll, a clanging of cymbals, a rally to arms. I should be stirring everyone up, but instead I try to calm us down. I should be inciting us to immediate action, but instead I suggest tending a garden over time. Gardening. Some subversive activity that is. I should be shouting at the top of my lungs for all the world to hear, but instead I lower my voice and speak to you personally about what it is you can do to make a difference in the context of your own life. What's going on here? Why do I behave the way I do?

The future is open-ended. It is history waiting to be written. Whether we human beings will be treated kindly by future historians depends, I think, on the degree to which we begin to act with increasing recognition of our obligations to others, with an increasing sense of humility about our place in the order of things. On an evolutionary scale we are not so far removed from the animal kingdom. We have strong genetic ties to the past. But we also have the ability to rise above our bonds and dream of worlds unknown. That ability, and our capacity to make such dreams come true, give us cause for hope and fear. The challenge facing our human family is unparalleled. How we will respond to it is a question that is up in the air.

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THE GRASSROOTS REACH FOR THE SKY

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In a light-hearted departure from typical conference proceedings, this paper identifies the need for research related to greenways and attempts to entice the conference scholars into undertaking such studies. Greenways are long, skinny connecting corridors for nature, recreation and transportation which need the attention of academicians and researchers to move into mainstream America.

Introduction

The Conference organizers called up and asked me to speak about greenways at the 1991 Northeastern Recreation Research Symposium in Saratoga Springs. I said, "Fine (remembering Saratoga's pretty)...just tell me what you want me to say." I was told to describe my local experience with greenways and take it all the way up to the international level where I'm now working. I said, "Sure."

Then I was sent the 1990 Conference proceedings. I was so intimidated by the report. It includes tables, statistics, charts. I looked at it and said, "I can do that."

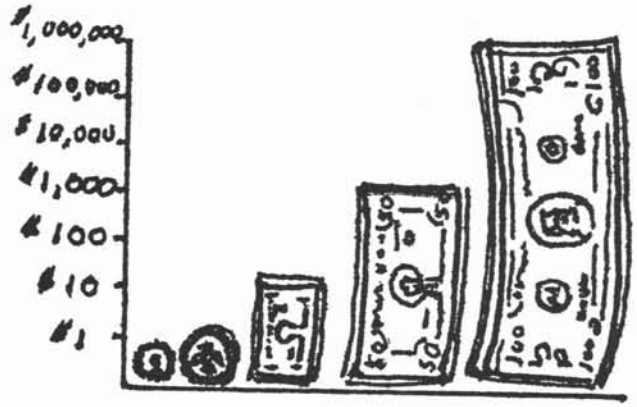

Figure 1. INCOME SCALE: Greenways benefit everyone from the broke to the really rich.

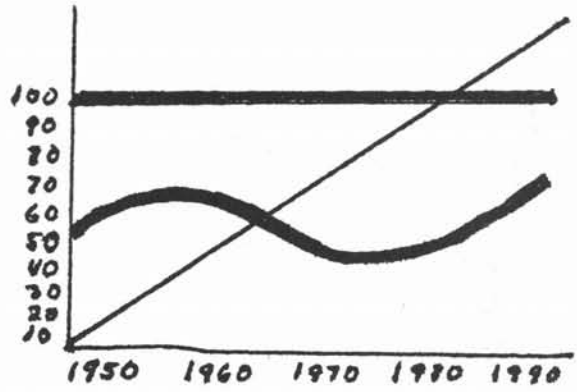

Figure 2. TREND CURVE: The data show that the number of greenways being created is going up. These include greenways that are straight, like Rails-to-Trails, and greenways that curve, like those along a river.

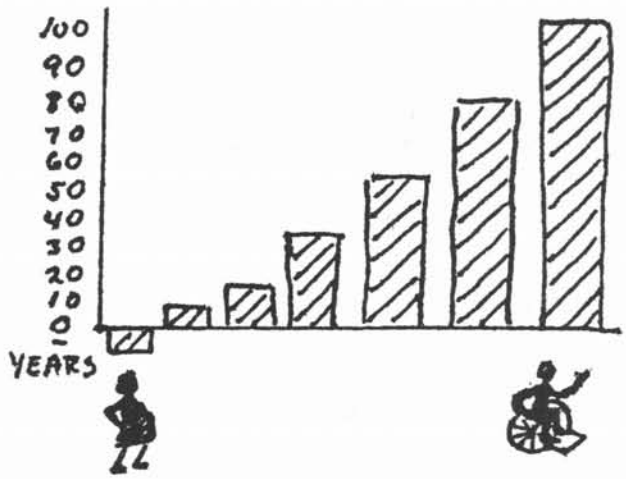

Figure 3. AGE PROFILE: The greenway users include everyone from minus a few months old to more than 100 years old.

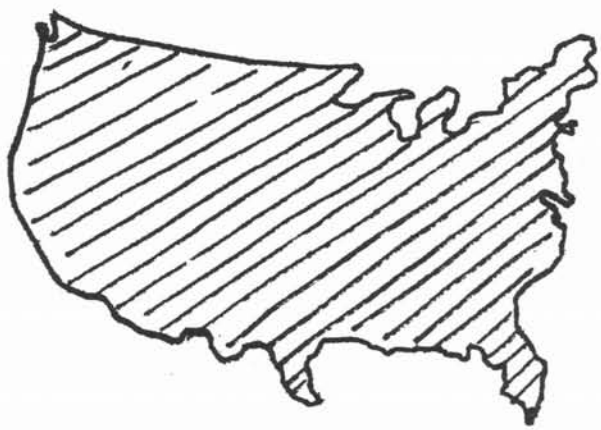

Figure 4. DEMOGRAPHICS: In the United States, every state should have a greenway.

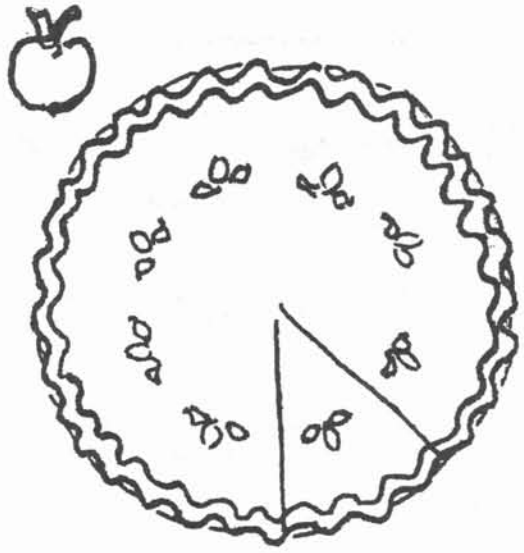

Figure 5. PIE CHART: Greenways are as American as baseball and apple pie.

Okay, so I've been found out. I don't do research. But *you* do research...and greenways should be built nationwide and even worldwide. So my goal here today is to get *you* sufficiently excited about greenways so that you'll do research. Then we'll have more studies, more people talking about greenways, more solutions proposed and benefits identified and, in the end, because of your work, we'll have more greenways.

So here is a story titled The Grassroots Reach for the Sky, as told by Anne Lusk.

Method

This all started in a little town called Stowe, Vermont, population 3,000. In 1981, I was hired by the Town of Stowe, for the princessly sum of $10,000 for two years, to see if it was feasible to build a bikeway along the Mountain Road which connects the Village to the Mountain. Working with the locals, second home owners and tourists, committees were formed and we started work. The work was broken into Phase I, which was 2.7 miles, and Phase II, which was 2.6 miles. Each phase took about three years and the same system was employed.

The first year was spent doing publicity. I'd write about anything related to the path, seeking suggestions more than handing out advice. What was created had the familiarity of an Ann Landers column. People I didn't know would approach me in the grocery store aisles and suggest, "Anne, have you thought about going over the river after the Mayo farm to get to the land by Percy's gravel yard?" Also in that first year, the landowners knew they had full control over where the path went on their land. They would draw in pencil on the map exactly where they wanted the path to go.

The second year was spent raising the money. We did a Greenways Gala Black Tie Dinner Dance with truffles, champagne, Peter Duchin, perfume party favors and a silent auction. We raised $40,000 in one night with no overhead and one hundred percent of the proceeds going to the path. On the cross country ski race derby, a course which is a race from the top of the Mountain to the Village, I did Burma Shave signs with appropriate rhymes and a plug for fund raising. We sold pieces of the path at $2 per inch, $14 per foot, $45 per rod, and on up through chains, links and furlongs. Combined with Land and Water Conservation Funds, revenue sharing and some town tax dollars, we raised $300,000 for Phase I and $380,000 for Phase II.

During the second year we also acquired the land. Phase I included deeds of easement 18 feet wide from 27 different property owners. Phase II was 5 deeds of easement. Plans and specs were written and we went out to bid.

The third year was the construction phase. During this phase, I had been told to just tell the subcontractors what to do and not have lengthy conversations with them. But it also is a small town and, in a small town, you happen to know the backhoe and bulldozer operators. So I'd describe in detail how we wanted the path to meander, hug the river in the trees, then come out to the blinding sun in the farm field. These guys would get so into the project that on several occasions when I couldn't be there to tell them exactly which way to go, I'd arrive at the site after the work was done. They'd explain, "Well, we had to cut over here so you'd go back into the woods and then you'd get a surprise view of the river." The backhoe and bulldozer operators would get so involved in the job that the story was that they had been ruined. They never wanted to go back to digging sewer lines or cellar holes.

The 5.3-mile Stowe Recreation Path was completed in 1989 and the awards include:

1. Land and Water Conservation Fund Award;
2. Take Pride in America Finalist Award;
3. Rudy Bruner Finalist Award for Urban Excellence;
4. Selection as the 786th National Recreation Trail;
5. Designation by President Bush as the 119th Point of Light.

In 1987 the Report of the President's Commission on Americans Outdoors came along, which suggested that...communities establish greenways, corridors of private and public recreation lands and waters, to provide people with access to open spaces close to where they live, and link together the rural and urban spaces in the American landscape.

The Report was so exciting that we decided Vermont needed a television public service announcement about greenways. With $75 from the Vermont Department of Forests, Parks and Recreation, a 30-second spot was written, cast, choreographed and taped in just two takes. The greenway public service announcement ran on four channels for two summers.

Then the Vermont Trails and Greenways Council came along and the National Park Service chose two states, Washington and Vermont, to receive as a cooperative agreement $50,000 to develop a model trails plan for the states. We decided to track a model town so we offered $2,500 to a community in a competition. For a meager $2,500, we had 60 applications. Instead of funding only one community, we funded three, but that was still 57 inquirerers we had to disappoint. The Vermont Trails and Greenways Council decided to turn over every rock to find some money for the communities wanting greenways. A representative from the Vermont Agency of Transportation found out we could receive $4.5 million per year 100% funding for independent bikeways and walkways. These funds could be used for highways and bridges, but greenways can compete since they are non-polluting and non-gas-consumptive transportation alternatives. Bikeways and walkways had also recently received

the support of the Federal Highway Administration in Washington.

In Vermont, we did a quick poll and found $2.5 million in projects ready to go. We went to the Agency of transportation and they gave us $500,000 because they felt we couldn't get sufficiently organized to collect projects in one month's time and have them ready for plans, specifications, permits and land acquisition in four months. Twenty-four communities have come to us with over $5 million in projects and we are hoping the Legislature will appropriate more than the $500,000 this year so we can have more ribbon cuttings. And, of course, all of this is setting the stage for not only continued greenways funding in Vermont, but also aggressive use of these funds in every state in America.

Which brings us to the Nation. There is a movement afoot to see greenways created all across the country. Greenways should become as household a word as wetlands. That familiarity is spreading as more and more communities either create their own greenway or covet their neighbor's greenway.

Now to the world. In June 1990, National Geographic featured an article on greenways which also included the address for American Greenways. Letters came in asking for information from Poland, Israel, Czechoslovakia, South Africa, Saudi Arabia, Hungary, New Zealand, England, Jordan, Argentina, Italy, Germany, the Philippines, Spain, Pakistan, Yugoslavia. In response to this worldwide demand, Greenways International is now being formed. That's how the grassroots has reached to the sky.

Conclusion

And now, we come back to you. *You* have the ability to do research, write articles, talk to colleagues and even create a greenway in your hometown. We need more studies so that people like me can use your information to lend credibility to what we say. We need hard documentation to prove to the naysayers that greenways are beneficial. We need your voices to reinforce the greenway movement. We need your firsthand knowledge to help a community, perhaps even your own community, create a greenway.

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OUTDOOR RECREATION

OUTDOOR RECREATION I

AN EXPLORATORY STUDY OF THE CHANGES IN BENEFITS SOUGHT DURING AN OUTWARD BOUND EXPERIENCE

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Participants in an eight-day Outward Bound program were asked about their motivations for participation before the experience began and at the mid-point of the actual experience. Although more anticipated differences were expected, based on motivational theory, only one of the twelve motivational domains was significantly different at the .001 level.

Introduction

As Clawson and Knetsch (1969) pointed out over two decades ago, the actual outdoor recreation activity on the site is not the total recreation experience. Instead, Clawson and Knetsch identified five distinctly different, major phases associated with an outdoor recreation experience. An outdoor recreation experience begins with *anticipation*, including planning. Thinking and planning may be very brief and spontaneous, or may range over several days, weeks or months. "Anticipation may far outrun the later reality. Pleasurable anticipation is almost a necessity . . . . But excessive optimism in the anticipatory stage may lead to later disappointment and frustration" (Clawson and Knetsch, 1969:33). Clawson and Knetsch stress that the outdoor recreationist's advance planning needs to be based upon realistic factors. When anticipation and planning lead to a positive decision, the outdoor recreation experience progresses further. The second major phase is *travel to* the actual site. *On-site* experiences and activities are the third major phase of the total recreation experience. These are activities and experiences engaged in on-site and the satisfactions derived from those activities and experiences. *Travel back* is the fourth phase. The fifth major phase of the total recreation experience is *recollection*. Clawson and Knetsch describe the recollection phase occurring after the experience is over, when the person (or persons) concerned recalls to memory one or more aspects of the total experience, and may share these recollections with friends, relatives, and associates. "When the total recreation experience makes a major impression the recollection will be strong and lasting. If the experience is a brief and common one quickly followed by a similar one, then each experience will make only a dim impression (Clawson and Knetsch, 1969:35). Recollection of an outdoor recreation experience can provide a starting point for anticipation of another. Over time, recollection of many experiences builds into knowledge, or assumed knowledge, thus providing a foundation for choosing among different outdoor recreation sites and activities. Clawson and Knetsch state, "In many ways, the whole outdoor recreation experience is a package deal; all parts are necessary, and the sum of satisfactions and dissatisfactions from the whole must be balanced against total costs. Pleasurable parts of the experience must more than balance the unpleasant parts, if any, if the same experience is to be repeated" (Clawson and Knetsch, 1969:35).

Manning points out that early empirical research in outdoor recreation was primarily descriptive, "focusing on the activities and socio-economic and cultural characteristics of users, and their attitudes and preferences about management" (Manning, 1986:79). Our understanding of outdoor recreation has evolved from this early "activity approach" to a "behavioral approach" which examines why people participate in recreation activities and the experiences gained from such participation. Experiences derived from participation in recreation activities have been prone to a variety of terms such as motivations, satisfactions, benefits sought, psychological outcomes, and experience expectations. The term "motivations" will be used throughout this paper for the sake of consistency. A behavioral approach defines recreation as "an experience that results from recreational engagements" (Driver and Tocher, 1970). Research in recreation activity choice has been dominated by this behavioral approach which theorizes most human behavior as goal-directed, or aimed at some need satisfaction (Driver and Tocher, 1970; Manning, 1986). Grounded in social-psychological expectancy value theory, a behavioral approach suggests that people engage in activities in specific settings to realize a group of psychological outcomes, motivations, satisfactions (Atkinson and Birch, 1972; Lawler, 1973; Fishbein and Azjen, 1974), or multiple satisfactions (Hendee, 1974). Manning states, "Thus, people select and participate in recreation activities to meet certain goals or satisfy certain needs, and recreation activities are more a means to an end than an end in themselves" (Manning, 1986:80). Motivations for outdoor recreation are diverse and are related to the attitudes, preferences, and expectations of users.

An expanded view of the behavioral approach acknowledges four levels of demand for outdoor recreation: Level 1 represents demands for activities themselves; Level 2 demands represent the various settings in which activities take place; Level 3 demands represent people's participation in activities in different settings to realize multiple experiences—satisfactions, motivations, or desired psychological outcomes; Level 4 demands represent the ultimate benefits which emanate from satisfying experiences derived from recreational participation (Manning, 1986:80-81). Such benefits may be either personal or societal, and are individually defined. As such, these benefits are rather abstract and difficult to measure (Manning, 1986). Consequently, empirical study of the behavioral approach to outdoor recreation has focused on Level 3 demands—people's motivations for recreation participation. Empirical tests of the behavioral approach to outdoor recreation indicate there are a variety of motivations for participating in outdoor recreation, and these motivations can be empirically identified (Manning, 1986). Potential recreation motivations are often measured empirically by a series of scale items which represent reasons for deciding to participate in a designated recreation activity (Driver, 1977). These scale items are usually then reduced through cluster analysis to dimensions which can be combined, because of a common underlying theme, to represent domains of more generalized categories of motivations. The goal-directed nature of behavior is the central concept defining the recreation research understanding of motivation.

Kuentzel (1990) points out some of the drawbacks of a goal-oriented approach to outdoor recreation participation by citing

past empirical research. Kuentzel states that response to motive scales may be socialized expressions of popular ideology, rather than a purposeful and articulated calculation of preferences and option (Kuentzel, 1990:2). Kuentzel identifies the following potential problems in the empirical use motive scales: motive scales are insensitive to the measurement of relative motive intensity, the levels of specificity and the semantic interpretation of motives between different people; motive measurement tools cannot reflect the complex nature of a decision-making process; and motive scales cannot predict differences among participants in the same activity at distinctly different settings. Additionally, Kuentzel suggests the expectancy value approach may be deficient in explaining the complexities of motivated behavior in outdoor recreation settings. Kuentzel's analysis suggests that "scaled measurements of motives using a goal-directed approach yield a rather generic description of behavioral phenomena in recreation participation. While these outcome measures can show differences in value and preference, they are not exclusive differences, and do not extricate substantial differences between experiences at different settings and among different activities" (Kuentzel, 1990:12-13).

According to Kuentzel, this motive uniformity conclusion calls for a more detailed refinement of motivation research, with a more careful distinction between experience and outcome. Kuentzel calls for a "process-oriented" approach to recreation behavior, an approach which treats the expressive doing of an activity rather than "the cognitive calculations of benefits versus cost as the motivator for participation" (Kuentzel, 1990:13). While expectancy value theory provides an understanding of attitudes, a phenomenological, process-oriented approach provides an understanding of the expressive action characteristic of recreation participation. Phenomenology recognizes that people may have different perceptions of the same event and essentially draws upon the experiences of individuals as they perceive them, the meaning of these experiences to them and their resultant feelings (Hamilton-Smith, 1990). Utilizing such an approach, people dynamically recreate the meaning of a motive in doing the actual recreational activity. "The motive takes on meaning only as it unfolds within the context of the interaction with the recreation experience, not through retrospective evaluation and objectification" (Kuentzel, 1990:16). Motives exist as entities tied to phenomena external to the individual. An individual draws on an external reality to explain or justify their behavior. A recreationist interactively recreates the meaning of a motive or alters it according to the progressive path of interaction with the recreation experience.

Purpose of Study

Taking this phenomenological, process-oriented approach into consideration, one might expect motivations to change, to be altered through participant interaction, over the course of a recreational experience, especially one that occurs over an extended period of time. The notion of time along with location at which motivations are measured are additional methodological issues as identified by Manning (1986). Thus, the purpose of this exploratory study was to measure motivational changes over the course of a recreational experience lasting over an extended period of time.

Methodology and Research Design

As part of a larger study, 35 college students, participating in an 8-day Rio Grande Outward Bound program involving a variety of outdoor activities such as whitewater canoeing, hiking, rock climbing, camping and outdoor living skills, were asked to rate the relative importance of 40 potential reasons or motivations for participation. The students were asked to complete the motivation questionnaire twice; the first time approximately two and a half weeks prior to the actual on-site experience, and the second time, four days into the actual 8-day experience.

Survey Design

Driver and associates (1977 and 1983) developed a highly comprehensive list of potential recreation motivations, or reasons for deciding to participate in a designated activity, measured empirically by a series of scale items. This item pool for Recreation Experience Preference (REP) scales is designed to quantify the psychological outcomes desired and expected from recreation participation. Respondents are asked to rate the relative importance of each scale item representing a potential motivation for participating in a designated activity. As previously discussed, these scale items are usually then reduced through cluster analysis to dimensions which can be combined, because of a common underlying theme, to represent domains of more generalized categories of motivations. For the purpose of this study, 11 of Driver's REP domains were included which seemed most appropriate for this particular outdoor recreation experience, along with a twelfth domain which we entitled Fun. Altogether, 40 statements, or scale items, were included in the questionnaires to measure the 12 REP domains.

There are two approaches to utilizing these REP dimensions: 1) each dimension in a preference domain can be used separately to examine specific aspects of the central theme of the preference domain. Driver calls this a molecular approach to domain inquiry, i.e. within the Achievement-Stimulation Domain we could look at the specific dimension of Reinforcing Self-Image, Social Recognition, Skill Development, Competence Testing, or Seeking Stimulation; 2) one could take representative items from each component dimension, i.e. Reinforcing Self-Image, Social Recognition, Skill Development, Competence Testing, and Seeking Stimulation, and combine them to define a single dimension representing the entire central domain theme—i.e., in this case, Achievement-Stimulation. Driver calls this a molar approach to domain inquiry and this second approach is utilized here in this study. Table 1 (see next page) shows the 40 statements, or scale items, representing certain underlying motivational dimensions, which are then combined to reflect domains of more generalized categories of motivations.

Data Collection

During the Anticipation Phase of the Outward Bound course experience, each student completed a questionnaire which asked them to rate the relative importance of the 40 statements related to potential reasons for participation by completing the following sentence, "I'm participating in this Outward Bound program because I want to . . . ." The relative importance of each statement was indicated by each student utilizing a 5-point Likert Scale where 1=Not At All Important to 5=Extremely Important. During the Experience Phase, a second questionnaire was administered which asked each student to indicate how important each of the potential reasons for participation was for the rest of the experience by completing the following sentence, "For the rest of my Outward Bound program I want to..." Once again, the relative importance of each statement was indicated by each student utilizing the same 5-point Likert Scale.

Treatment of Data

Utilizing data generated from the two questionnaires, and applying the molar approach to domain inquiry as discussed above, reliability levels (Cronbach alpha) were computed for the REP domains. Table 1 shows the reliability coefficient for

Table 1. Reliability coefficients for 12 recreation experience preference domains.

RECREATION EXPERIENCE PREFERENCE DOMAIN Dimension scale item/statement	Anticipation Phase	Experience Phase	Range of Estimated Cronbach alpha for All Items in Dimension[a]
ACHIEVEMENT-STIMULATION	.57	.86	.94 - .96
Reinforcing Self-Image			
show myself that I can do it			
Social Recognition			
show others that I can do it			
Skill Development			
develop new skills			
improve my skills			
Competence Testing			
learn what I'm capable of			
Seeking Stimulation			
experience excitement			
LEADERSHIP/AUTONOMY	.83	.73	.88 - .90
Independence			
feel my independence and be on my own			
Autonomy			
be free to make my own choices			
Control-Power			
be in control of things that happen			
have others direct me/be in charge			
RISK TAKING	.71	.90	.70 - .81
take risks			
take chances in dangerous situations			
experience uncertainty of not knowing what will happen			
LEARNING-DISCOVERY	.65	.78	.88 - .91
General Learning			
learn about and get to know a new area			
Exploration			
experience new and different things			
RELATIONSHIPS WITH NATURE	.86	.86	.92 - .95
Scenery			
view the scenic beauty			
General Nature Appreciation			
get a feeling of harmony with nature			
gain a better appreciation of nature			
REFLECT ON PERSONAL VALUES	.55	.89	.88 - .91
Spiritual			
think about my personal values			
Introspection			
learn more about myself			
PHYSICAL FITNESS-EXERCISE	.57	.83	.86 - .93
improve my physical health			
be physically active			
ESCAPE PERSONAL-SOCIAL PRESSURE	.54	.78	.91 - .93
Tension Release			
be able to release built-up tensions			
Slow Down Mentally			
recover from my usual hectic pace			
Escape Role Overloads			
get away from the usual demands of life			
Escape Daily Routine			
do something different			

[a] From: Driver, B.L. 1977. Item Pool for Scales Designed to Quantify the Psychological Outcomes Desired and Expected from Recreation Participation. Range of Cronbach alpha from past empirical studies.

Table 1 (Continued). Reliability coefficients for 12 recreation experience preference domains.

RECREATION EXPERIENCE PREFERENCE DOMAIN Dimension scale item/statement	Anticipation Phase	Experience Phase	Range of Estimated Cronbach alpha for All Items in Dimension[a]
ESCAPE PHYSICAL PRESSURES	.73	.85	.94 - .96
Tranquility			
experience solitude			
experience peace and calm			
Privacy			
be alone			
get away from certain people			
Escape Crowds			
experience open space			
get away from civilization for awhile			
Escape Physical Stressors			
get away from my current routine			
ESCAPE FAMILY/FRIENDS	single item	single item	.65 - .78
be away from my family/friends for awhile			
RISK REDUCTION	.76	.81	(not available)[b]
Risk Moderation			
be near others who could help if I need them			
know others are nearby			
Risk Avoidance			
be sure of what will happen to me			
FUN	.89	.95	(not available)[c]
enjoy myself			
have a good time			
have fun			

[a] From: Driver, B.L. 1977. Item Pool for Scales Designed to Quantify the Psychological Outcomes Desired and Expected from Recreation Participation. Range of Cronbach alpha from past empirical studies.

[b] From: Driver, B.L. 1983. Master List of Items for Recreation Experience Preference Scales and Domains.

[c] Twelfth domain added in this study.

each domain during each phase of the study and the range of reliability coefficients from past empirical studies. Reliability levels were found to be satisfactory, although the Cronbach alpha coefficients for Achievement-Stimulation, Reflect on Personal Values, Physical Fitness-Exercise, and Escape Personal-Social Pressure were found to be low for the Anticipation Phase. We do not have an explanation for these low reliability coefficients during anticipation.

Analysis and Findings

Means were computed for both the Anticipation Phase and Experience Phase. Statistical analysis involved performing t-tests on the paired data for the difference of means between these two phases, with regard to the 12 Recreation Experience Preference domains. No statistically significant differences were found for 11 of the 12 Recreation Experience Preference domains (See Table 2, next page).

One domain, Escape Family-Friends, represented by the statement "get away from my family/friends for awhile" approached significance at the .05 level (p=.054). The domain of Risk Reduction was found to be significantly different for the Anticipation and Experience Phases (p=.000). This domain was represented by the dimension of Risk Moderation, which included the scale item statements of "be near others who could help if I need them" and "know others are nearby" and by the dimension of Risk Avoidance, which included the scale item statement of "be sure of what will happen to me." It appears that the students participating in the Outward Bound program considered the domains of Escape Family-Friends and Risk Reduction to be significantly more important during the Experience Phase than during the Anticipation Phase.

Discussion and Conclusion

The one significant difference found could be expected, given some of the objectives of an Outward Bound program—stressing the importance of developing each individual's ability to cooperate with others in the group, learning and applying the concepts of teamwork in decision-making and problem-solving situations, building group interdependence, and increasing an individual's awareness of others—all of which contribute to risk reduction in an Outward Bound experience. The increased importance of escaping family/friends back at home or school during the Experience Phase also could be expected given the Outward Bound objectives stated above. For practitioners, in this case Outward Bound instructors, it appears it is possible to "manage the experience" in such a way that the "group" becomes more important for individuals as the experience evolves over an extended period of time.

However, based on the work of Manning (1986), Kuentzel (1990), and others, more statistically significant differences in the Recreation Experience Preference domains between the Anticipation Phase and the Experience Phase had been expected in this study. As motivational theory regarding recreational experience evolves, it may well be that motivations are not only constant across certain activities, but that motives actually remain relatively stable across the various phases of these outdoor recreation experiences.

This study examined one Outward Bound program, an 8-day experience in which 35 college students participated in various recreational activities, and thus, it will take further efforts in this area to determine whether the study results can be generalized to other activities, and to even similar experiences under different situations, of varying intensity and of various duration.

Table 2. T-tests for the difference between anticipation and experience phases with regard to 12 recreation experience preference domains.

Recreation Experience Preference Domain	Mean Anticipation Phase[a]	Mean Experience Phase[b]	t-value	p-value
Achievement-Stimulation	3.97	3.92	.31	.761
Leadership/Autonomy	3.21	3.31	- .84	.409
Risk Taking	3.37	3.54	-1.23	.228
Learning-Discovery	4.33	4.23	.63	.536
Relationships with Nature	4.19	4.08	.81	.424
Reflect on Personal Values	3.97	3.73	1.15	.259
Physical Fitness-Exercise	3.74	3.73	.08	.934
Escape Personal-Social Pressure	3.55	3.61	-.42	.680
Escape Physical Pressures	3.44	3.40	.32	.748
Escape Family/Friends	2.06	2.57	-2.00	.054
Risk Reduction	2.28	3.08	-4.67	.000
Fun	4.47	4.44	.16	.876

[a] Computed means based on a five-point Likert Scale where 1=Not At All Important, 2=Somewhat Important, 3=Moderately Important, 4=Very Important, 5=Extremely Important.

[b] Computed means based on same five-point Likert Scale as above.

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BLACK/WHITE OUTDOOR RECREATION PREFERENCES AND PARTICIPATION: ILLINOIS STATE PARKS

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Black/white comparisons of outdoor recreation preferences and behavior from a statewide survey identify a significantly greater black orientation to "developed sites" and "social interaction." Strategies are recommended to enhance outdoor recreation opportunities for blacks, and long-term research needs are identified.

Outdoor recreation planners face major challenges in meeting the needs of "minority groups." Understanding the needs of these diverse groups has been difficult for recreation planners and managers because few minorities are on recreation staffs, and minorities have not always been active in recreation planning and public involvement efforts. The problem is especially complex for those concerned with resources outside urban areas who do not know why there is often limited minority use of the areas or what to do differently to enhance opportunities for minority groups. The limited research to date suggests significant differences in recreation preferences and behavior among some racial and ethnic groups that have implications for how we plan for outdoor recreation sites, but there is a need for additional information to guide recreation plans and programs.

This paper focuses on the outdoor recreation preferences and participation of blacks and whites as expressed in a statewide survey. Limited observations preclude the inclusion of Hispanic, Asian, and other minority groups in the analysis. Our approach is to (1) identify black/white differences in recreation preferences and behavior, (2) explain these differences, and (3) discuss the implications for outdoor recreation planning and research. We believe comparisons with whites can be a starting point for efforts to better serve blacks because outdoor recreation planners are most familiar with the recreation behavior and preferences of whites.

The Earlier Study

A previous comparison of the outdoor recreation participation and preferences of black and white Chicago households based on data for 1976 identified a number of similarities and differences (Dwyer and Hutchison 1990). One finding with important implications for planning outdoor recreation sites was a stronger black inclination to select "developed facilities and conveniences" rather than "preserved natural areas" as the more important consideration in developing new recreation areas for people. In addition, when asked whether they view outdoor recreation as an opportunity to "visit or meet new people" or for "getting away from a lot of other people," blacks were more likely than whites to select "meet people." In both instances the black/white differences were statistically significant (.05 level) in simple comparisons as well as when individual and household characteristics were taken into account. Black/white differences in activity participation also suggested a greater black orientation to "developed sites" and "meeting people."

The Present Study

A recent survey (1988) of Illinois adults makes it possible to further explore the recreation orientation of blacks to "developed sites" and "meeting people." The focus of the present effort is on a particular resource -- Illinois State Parks -- and there is a range of responses to support the analysis, as well as additional information on the characteristics of individual respondents, their household, and their location to help interpret responses. This provides for a more focused and stronger analysis than in the earlier study.

The present study is based on data collected for 1987 as part of the Illinois Statewide Comprehensive Outdoor Recreation Planning process. The Survey Research Laboratory of the University of Illinois conducted telephone interviews with 1,015 randomly selected adult residents of Illinois for the Illinois Department of Conservation. Information was obtained on participation in 32 outdoor activities, overnight trips taken within and outside Illinois where an important part of the trip was to enjoy the outdoors, usage of parks and other outdoor facilities, satisfaction with state park facilities, and attitudes on methods for funding state parks. Important limitations on the analysis imposed by the data include the small number of black American respondents (125); the individual, household, and locational characteristics that were gathered; the questions that were asked; 32 activities for which participation data were gathered (one, "other outdoor game/sport," was not used because it was too broad to interpret). The limited number of blacks in the sample restricted the spatial breakdowns of residence to Chicago, Chicago suburbs, and the remainder of the state. Social background variables included family income (4 categories), age of the adult respondent (5 categories), gender, number of individuals in the household, and number of adults in the household.

When the recreation preferences and behavior of blacks and whites are compared, there is a fundamental question of whether the differences are due to culture or to other dimensions. The question often asked is "What differences would there be if we were able to base the analysis entirely on interviews with blacks and whites who were similar in all other respects except for race?" Because black and white respondents often differ along a number of dimensions in addition to race, it is often useful to look at black/white differences in a broader context with these other variables accounted for.

Probit and logit models were used to account for other variables (including individual, household, and locational characteristics) in the analysis of black/white differences. The probit model was used when the response involved two choices; the logit model was used when there were more than two choices. The models tell us whether race and each of the social background variables are significantly associated with the response when all variables are accounted for jointly.

Black respondents were more likely than whites to be from Chicago, to be in the lower categories of household income, and to live in households with a large number of individuals but a small number of adults. These differences explain a number of black/white differences in outdoor recreation participation when considered jointly with all other social background characteristics of respondents.

Main Purpose of the State Park System

When asked to choose between "protect natural resources" and "provide recreation for people" as the main purpose of the Illinois State Park System, blacks were significantly more likely than whites to select "to provide recreation for people" (i.e., 52 percent of blacks, 25 percent of whites)(Table 1). This difference remained significant when all other individual, household, and locational variables were accounted for, with race the only variable out of the set that had a significant association with the choice. These results appear consistent with 1976 survey findings that blacks were significantly more likely than whites to select "developed facilities and conveniences" rather than "preserved natural areas" as more important when developing new recreation areas for people.

Table 1. What should be the main purpose of the Illinois State Park System?

	Percent	
	Black	White
To protect natural resources	38	65
To provide recreation	52	25
Both	6	9
Don't know	3	1

Overall black/white difference significant at .05 level.

Important Attributes of State Parks

When users were asked about the importance of state park attributes, blacks and whites gave similar responses to 11 of 12 attributes presented to them. However, blacks were significantly more likely than whites to rank "has organized events" as very important (blacks = 63 percent, whites = 10 percent) (Table 2). This difference was also significant with all other variables accounted for, and race was the only variable that had a significant association with responses concerning the importance of this attribute. Organized events can be viewed as having a social or "meet people" dimension, and the greater importance of this attribute for blacks can be interpreted as consistent with the earlier finding that blacks were more likely than whites to view outdoor recreation as an opportunity to "visit or meet new people" rather than for "getting away from a lot of other people."

When all other variables were accounted for, blacks were significantly more likely than whites to indicate that "has camping facilities" was an important attribute of state parks. This result was closely tied to the number of adults in the household, indicating that the lower number of adults in black households may have limited the importance they attached to opportunities for camping at state parks (Table 2).

Activities Engaged In at State Parks

Blacks were significantly less likely than whites to hike on a state park trail (55 percent of whites, 27 percent of blacks), but significantly more likely than whites to play ball or other games at a state park (73 percent of blacks, 35 percent of whites) (Table 3). The significantly higher black participation in "playing ball or other games" would seem consistent with the "provide recreation" orientation and perhaps a preference for "organized events" by black respondents. With all other variables accounted for, the significantly higher black participation in "playing ball and other games" at state parks remains; but the black/white difference in hiking on trails drops from just above to just below the level of significance, and a significant black/white difference in fishing at state parks emerges. When all variables were considered jointly, fishing at state parks was more likely among those who live in areas outside Chicago. The concentration of blacks in Chicago apparently tends to suppress their fishing activity at state parks (Table 3).

Table 2. Percent of Illinois State Park users indicating that specified park attributes were very important to them.

	Black	White
Is clean and well maintained	95	97
Is safe	100	91
Has parking facilities	86	80
Special natural features/scenery	81	74
Big enough for variety of uses	77	58
Has a lake or river	73	56
Is not too crowded	59	48
Is close to home	45	44
Has camping facilities	50	29
Has fishing opportunities	36	25
Has organized events	63*	10*
Has hunting opportunities	14	8

* Black/white difference significant at .05 level.

Table 3. Activities engaged in by adults at Illinois State Parks in the previous 12 months.

	Percent Participating	
	Black	White
Picnic	86	2
Hike on a trail	27*	55*
Photograph the scenery	36	41
Play ball or other games	73*	35*
Birdwatch	23	24
Fish	32	20
Camp overnight	18	18
Horseback ride	9	4
Use overnight facilities	9	4
Hunt	5	2

* Black/white difference significant at .05 level.

Black/white differences in responses concerning activities engaged in at state parks were generally consistent with participation patterns in the 31 activities (not limited to state parks) included in the analysis. Out of 31 activities, blacks were significantly more likely than whites to participate in 3 -- all of which are outdoor sports (softball/baseball, outdoor basketball, and soccer). These three activities are generally consistent with an orientation to "developed sites," "organized events," and "meeting people." Whites were significantly more likely than blacks to participate in 15 activities, many of which tend to be associated with water, snow or ice, and natural environments. These activities are likely to be associated with a "natural environment," an absence of "organized events," and opportunities for "getting away from people." Controlling for social background variables reduced the number of activities where there was a significant black/white difference from 18 to 10. However, the same overall pattern remains: blacks are more likely than whites to participate in softball/baseball, and whites more likely than blacks to participate in activities oriented to water, snow and ice, and natural environments.

Choice of State Parks

When respondents were presented with "to enjoy natural surroundings" or "to enjoy outdoor activities made possible by park facilities" as reasons why they use Illinois State Parks, there were no significant black/white differences in the responses, either in a simple comparison or with all social background variables accounted for. Although the lack of a black/white difference in reasons for using state parks appears somewhat inconsistent with the greater orientation of blacks to "provide recreation for people" as the main purpose of the State Park System, ball playing at a State Park, and the interest in "organized events" at state parks, it was entirely consistent with the similar importance attached to a wide range of "developed" and "natural" park attributes by blacks and whites (Table 2).

Blacks were significantly less likely than whites to report that they used a state park or other state-operated recreation areas in Illinois in the previous 12 months (18 percent of blacks, 33 percent of whites). There was, however, no significant difference in the average days of use per year by blacks and whites who used these areas (7 days for blacks and 5 days for whites). When social background variables were accounted for, the black/white difference in percent using state parks or other state-operated recreation areas in Illinois was not significant. Use of these resources tends to be associated with residence outside Chicago and high household incomes.

The responses concerning use of state parks are part of a general pattern of blacks tending to concentrate their outdoor recreation activities in areas close to home such as vacant lots or streets, city or county parks, forest preserves, or school yards in Illinois, rather than in more distant areas or clubs or commercial facilities. In addition, when a wide range of areas was considered, black/white differences tended to be greatest in the likelihood of using an area rather than in the number of days of activity by users (i.e., blacks may be less likely to use a type of facility, but black and white users spend a similar number of days at the facility). There were no significant black/white differences in the average days of use by users of any of the types of areas.

When asked the main reason why they haven't visited an Illinois State Park in the past 12 months, blacks and whites tended to give similar responses to the list of choices presented. There were no significant differences in any of the response categories.

Discussion

When individual, household, and locational variables were accounted for, significant black/white differences in recreation behavior and preferences remained. These differences include a greater black orientation to "providing recreation for people" rather than "protect natural resources" as the main purpose of the State Park System, a greater black inclination to select "has organized events" and "has camping" as important attributes of an Illinois State Park, a greater probability than whites for engaging in outdoor sports at Illinois State Parks and in general (i.e., regardless of the location), and a greater probability of blacks engaging in fishing at Illinois State Parks.

Suggestions For Planners

Planners interested in increasing the outdoor recreation opportunities for blacks in Illinois might consider the suggestions presented below which focus on changes in current efforts to better accommodate those needs of blacks that differ from those of whites. These suggestions must not be interpreted as encompassing all that should be done to meet the needs of blacks (i.e., we must avoid stereotyping blacks by their differences from whites or treating blacks as a homogeneous group). There may be several activities that blacks do not currently engage in and would like to, as well as many kinds of areas that blacks would like to use but currently do not. There are also a great many similarities in outdoor recreation preferences and behavior of blacks and whites, and a number of plans and programs will serve the needs of both groups.

Sites close to home. Because of the significant concentration of blacks in Chicago (and other large cities) and possible limitations on their travel (lower incomes, large families, few adults, fear of discrimination); emphasize the creation and upgrading of outdoor recreation sites in and near Chicago and other large cities.

Facilities for sports. Since some blacks have a significant orientation to outdoor sports such as softball, baseball, and soccer, provide opportunities for these activities at outdoor recreation areas.

Special events. Given the importance that some blacks place on "has special events" at state parks, undertake a program of instituting, expanding, and publicizing such events at state parks and other outdoor recreation areas throughout Illinois, especially near large urban centers such as Chicago.

Low fees. Because low incomes and large numbers of individuals in some black households appear to restrict recreation activity, keep fees and charges low at outdoor recreation areas, and look to economical ways of providing equipment and supplies.

Discrimination. Other studies have shown that discrimination is a key problem that limits the recreation behavior of some blacks (West 1989). Fear of discriminatory behavior may well contribute to the urban-oriented patterns of recreation behavior by many blacks that is reported here. Promising ways of overcoming this may be to have black personnel working at the recreation facility and to encourage large group outings such as church groups.

Group programs. Given that large household sizes and limited number of adults appear to limit the recreation outings of some black households, provide for group outings where mutual support is fostered, and offer guided tours and other programs for children at outdoor recreation areas. These efforts could help overcome some of the barriers to camping at state parks.

Build on similarities as well. Black/white similarities in recreation participation and behavior include similar likelihoods of participating in 8 of 10 activities at Illinois State Parks (Table 3), the attachment of similar importance to 11 of 12 attributes of Illinois State Parks (Table 2), similar probabilities of using four of seven types of outdoor recreation resources, similar probability of participating in 18 of 31 activities, and similar days of participation among participants in 23 of 31 activities, as well as similar responses concerning the importance of barriers to use of state parks. Given these and other similarities in black and white outdoor recreation preferences and behavior, many actions would enhance recreation opportunities for both blacks and whites.

Suggestions for the Longer Term

In the longer term, it is important to look beyond current patterns of behavior, crude measures of preferences, and simple comparisons with whites to learn more about the perceptions,

preferences, and desired outdoor recreation behavior of blacks and other important groups.

Variations within the black population. To avoid stereotyping blacks by their group averages or their differences from whites, explore more fully the wide range of recreation areas used and activities engaged in by blacks. This can follow up on the efforts of Woodard (1988) and Taylor (1991) and must give careful attention to the identification of outdoor recreation from the perspective of blacks. Additional attention should be given to the site preferences of blacks. Variations in recreation behavior and preferences among blacks should be explored, including different ethnic groups within the black race, such as Jamaicans, African Americans, and others.

Learn from those who break the stereotypes. If our interest is in making certain that a wide range of opportunities is available to blacks, there may be a great deal to learn from blacks who participate in activities with traditionally low levels of black participation or use remote natural areas where blacks are seldom found. Organizations made up of black participants in some of these activities could be involved in the research. How did black individuals get started in the activity? What barriers did they need to overcome? Where do they get information about opportunities to participate? What do they think might encourage other blacks to participate in the activity? What are their suggestions for planning and management of opportunities for the activity? Is there need for additional information about opportunities? How should that information be disseminated?

Barriers to use of areas. Although blacks and whites gave similar responses to a list of reasons for not using state parks, additional work is needed to explore the barriers to participation in activities or use of areas. A fundamental dimension of the black/white differences in recreation participation is a greater urban orientation of blacks. Blacks tend to live in urban areas, concentrate a substantial amount of their recreation activity in urban areas, engage in the kinds of activities that can be participated in the urban environment, and express preferences for the kinds of developments at state parks that are often associated with an urban environment, such as facilities for recreation and "special events." Part of this orientation appears to be a function of historical developments and relatively low incomes and mobility, but signs of this urban - oriented pattern exist even when those variables are accounted for. West (1989) suggests that fear of discrimination inhibits black recreation participation -- particularly travel, but we lack information about discrimination and other barriers. To what extent is lack of information about opportunities a problem?

The concept of barriers may be useful in explaining a number of differences. Black/white differences in the percent participating in individual activities are far more significant than is the case with average number of days of participation in Illinois by participants in particular activities. There was a similar finding with the 1976 data. Similarly, black/white differences in portion of each group using particular facilities are far more significant than the number of days of participation in Illinois by black and white users of particular facilities. There are far greater differences in black/white responses concerning the purpose of the State Park System than in reasons for selecting individual parks by those who use the system. Thus the major differences are whether an individual engages in an activity or uses an area, rather than the annual use by participants. This suggests that perhaps barriers to participation are at work and that those who overcome them have participation patterns much like whites who engage in the same activities or use the same areas.

New approaches to gathering information. Analysis of surveys such as the ones on which this paper is based can serve only as a crude tool for planning. Discussions with the black community and its leaders are critical. One approach that we have a great deal of faith in is focus group discussions, and we have or are currently conducting them with college students, community groups, and church groups.

Additional groups. The research should be expanded to other important "minority groups" such as those with Hispanic or Asian origins. Preliminary research suggests that there are substantial differences in recreation behavior between these groups that have significant implications for the management of outdoor recreation resources. By looking at a wide range of groups, we can better understand and improve the recreation opportunities made available to each.

Market segments. The research might also be expanded beyond ethnic groups to define segments of the population with similar recreation preferences and behaviors that could serve as a basis of recreation programs. These segments might consist of combinations of race, ethnicity, age, gender, income, neighborhood setting, access to a personal automobile, and household composition. The analysis presented here suggests that the joint influence of these variables may be more useful in explaining outdoor recreation participation and behavior than race alone.

Summary and Conclusions

The results parallel results from an earlier study and identify a significantly greater black orientation to "developed sites" and "social interaction" that persists when individual, household, and locational variables are accounted for. There are significant black/white differences in activities engaged in at state parks as well as elsewhere in Illinois, and in the kinds of areas used. Some of these differences are reduced in significance when individual, household, and locational variables are accounted for, but others persist.

Planning strategies for increasing the use and enjoyment of outdoor recreation areas by blacks might include developing and enhancing areas near Chicago and other large cities with substantial black populations, providing opportunities for outdoor sports as well as fishing and camping, providing special events, keeping fees and charges low, providing for group outings and programs for children, hiring minority staff and making other efforts to reduce discrimination, and improving the overall quality of opportunities provided.

The development of longer term strategies for enhancing the opportunities made available for blacks must be grounded in further research that includes investigation of the wide range of outdoor recreation activities, behaviors, and preferences of blacks; careful analysis of blacks who do participate in activities or use areas where whites have traditionally predominated and determination of what facilitated their entry into that activity or use of that area; a much more detailed analysis of barriers to the use of recreation resources outside of urban areas, including discrimination, as well as means of breaking down those barriers; an extension of the analysis to other minority groups, and a broader approach to identifying market segments for outdoor recreation planning that consider race and other individual, household, and locational variables.

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THE SPIRITUAL ASPECT OF NATURE: A PERSPECTIVE FROM DEPTH PSYCHOLOGY

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The depth psychology of C. G. Jung provides a set of concepts for exploring the spiritual aspect of nature. According to this view, spiritual experiences occur when basic patterns or archetypes within the psyche are projected onto natural environments. Implications of this viewpoint for natural resource management and research are discussed.

Introduction

There is intense debate about the management of forests in America today. The USDA Forest Service, in response to criticism that it has focused too narrowly on economic values and commodity extraction, has begun a program called "New Perspectives." One purpose of this program is to make forest management sensitive to multiple values, in addition to the economics of timber markets. So far, the discussion of values under New Perspectives has focused mainly on biological values, such as ecosystem diversity, stability, and sustainability. There have, however, been occasional references to a third kind of value. For example, the director of the New Perspectives program states that the wealth of forests "can be measured in economic, ecological, and spiritual terms (Salwasser 1990, p. 32)," and a National Research Council report urges increased support for forestry research so that society can "secure the environmental, economic, and spiritual benefits of forests (National Research Council 1990, p. 58)."

The spiritual value of nature has frequently been celebrated in art, literature, and music (e.g. Fairchild 1989). There has, however, been little serious discussion of this topic by forest managers and scientists. The present crisis in forest management may in part be due to a failure by the forestry profession to understand and respect the strong spiritual values that many people find associated with natural environments. My purpose in this paper is to encourage natural resource researchers and managers to begin looking seriously at the spiritual aspect of nature. I will discuss how spirituality might be defined, present a psychological perspective from which spiritual phenomena can be viewed, and discuss some implications for natural resource research and management.

A Definition of "Spiritual"

Before we can talk about the spiritual aspect of nature, we need to have some notion of what we are talking about. Scientists trained in the natural sciences are often reluctant to talk about spiritual phenomena. Perhaps this is because phenomena such as spirit and soul have traditionally been conceptualized in supernatural terms, a viewpoint rejected by science. It is possible, however, to conceptualize spiritual phenomena in psychological terms that do not require a belief in supernatural entities. When spiritual phenomena are recognized as being psychological in nature, they become a legitimate topic for scientific discussion (Maslow 1974).

In this paper I will outline one approach that psychologists have taken to spiritual phenomena. First, however, I want to offer a tentative definition of what I mean when I use the word "spiritual." This word carries many nuances of meaning and refers to a complex range of phenomena. Any definition must therefore be viewed as provisional and incomplete. Most of the uses of the word that I have encountered in regard to nature, however, can be summed up in the following statement.

"Spiritual" refers to the experience of being related to or in touch with an "other" that transcends one's individual sense of self and gives meaning to one's life at a deeper than intellectual level.

In a spiritual experience, one encounters something larger or greater than one's individual self. The "other" that one encounters need not be conceptualized in traditional religious terms. Depending on the individual, the transcendent other may be seen as a supernatural deity (e.g. God), or as a natural entity (e.g. the Earth). It may be something that exists objectively "out there" (e.g. the process of evolution), or it may be a subjective, inner phenomenon (e.g. creative inspiration). It may originate independently of the human sphere (e.g. wilderness), or it may be a product of human culture (e.g. a community). For some people, the "other" may not be a specific entity at all, but the undefinable "ground of being" that gives rise to all existing things.

Regardless of how it is imaged, the experience of this "other" is more than just a passing, casual occurrence. In some important way the experience gives meaning to one's life and helps to define who one is in relation to the world. The experience of the other is felt at a level deeper than the merely intellectual. It is more than an abstract thought or concept. It may be quite difficult to express in words, but it is felt in the heart and may stir powerful emotions. Experiences of this kind can occur in many contexts and settings, both natural and human-made. For many people, however, natural environments seem to be the primary setting for spiritual experiences.

A Perspective from Depth Psychology

The viewpoint from which I will look at the spiritual aspect of nature in this paper is based on the depth psychology of C.G. Jung. Depth psychology concerns itself with the phenomena of the unconscious mind, which is that part of the human psyche that lies outside the awareness and/or control of the conscious ego. Jung's approach views the unconscious as the medium through which spiritual experiences occur. The book *Man and his Symbols*, edited by Jung (1964), provides a good general introduction to Jungian psychology.

Archetypes

According to Jung, there are different levels or layers to the psyche. Immediately below the level of conscious awareness lies the personal unconscious, which includes personal feelings, attitudes, and memories that have been repressed and remain split off from an individual's conscious ego. At a deeper level is the collective unconscious, which contains basic, instinctive patterns of behavior, emotion, and imagery that are common to all humans. These instinctive patterns, which are called "archetypes," guide and give meaning to our interactions with other people and the world. They are the "other" that people encounter in spiritual experiences.

An archetype functions like a template in the unconscious mind, giving rise to a diversity of symbolic images and expressions that enter consciousness through dreams, myths, religious images, and spontaneous fantasies (Jung 1960). One of the

most important ways in which archetypes express themselves is through projection, a psychological phenomenon in which the contents of the unconscious mind are experienced as if they belonged to someone or something outside of oneself. A classic example of projection is "love at first sight," in which undeveloped, unconscious aspects of an individual's personality are projected onto a stranger, producing a strong feeling of attraction. Projections have been observed and studied most often in the field of interpersonal relationships, but they can occur in other areas too.

From this perspective, we might suspect that spiritual experiences in nature involve the projection of unconscious archetypes onto elements of the natural environment, or onto nature as a whole (Williams 1990). A Jungian psychologist looking at spiritual experiences in nature might then ask what archetypes are being projected, and what implications this has for the individual and the collective psyche.

Mythology

Jungian psychologists often turn to mythology and literature for symbolic portrayals of the archetypes that are active in the collective psyche of a culture. One approach to identifying the spiritual significance of nature therefore might involve an examination of gods and goddesses who have been associated with various aspects of nature. In the Greek tradition this would include Demeter, the goddess of vegetation, fertility, and agriculture; Pan, the rustic deity of woods and fields; and many others. Mythological characters can still capture the imaginations of modern people and are sometimes used to personify the beliefs and values of environmentalists. For example, the moon goddess Artemis, who is associated with forests and hunting, has been nominated as the "Goddess of Conservation" (Hughes 1990), and deep ecologists have adopted the earth goddess, Gaia, as the personification of the whole-earth organism (Lovelock 1979, Devall and Sessions 1985).

To learn about the archetypes underlying the experience of nature, one can also examine the way in which elements of natural environments have been used in the mythological and religious traditions of various cultures. For example, many mythological traditions tell of a symbolic "World Tree" that stands at the center of the universe. The World Tree is the symbolic axis or point of contact that connects mundane earthly existence with the divine (i.e. archetypal) realms above and below the earth (Eliade 1959).

Sacred groves are another common feature in ancient religious traditions (Vest 1983, Hughes 1990). These groves of trees were set aside and dedicated, usually to a goddess. For the Celts such groves provided a link between the mundane and the sacred worlds (Vest 1983), and in this sense their symbolic function was much like that of the World Tree. Sacred groves were considered inviolable, and were protected by civil and religious laws. The modern concern for preserving and protecting wilderness appears to echo this ancient regard for sacred groves. Wilderness managers have been likened to the "Keepers of the Sacred Grove" (Brown and Freed 1990).

Individuation

Jung noted that archetypal symbols and themes arose not only in mythology but also in the dreams and fantasies of individual people. He described several archetypes that characteristically emerged in the course of psychological analysis with his patients. These archetypes are crucial to the process of personal growth and change, a process that Jung called "individuation" (von Franz 1964). A Jungian approach to the spirituality of nature might therefore ask how the archetypes and the process of individuation are expressed in the human-nature relationship.

The most obvious example is the archetype of the Great Mother, a powerful psychological complex that can have either a positive, nurturing effect or a negative, destructive effect on the psychological development of the individual. "Mother Nature" in her benevolent and destructive moods is a personification of this archetype, projected onto nature (Cooper 1978).

Another example is the Anima, which is what Jung called the unconscious feminine side of a man's personality. The Anima is associated with creative, intuitive, and spiritual aspects of life that tend to remain unconscious in many men. The allure and fascination of wild settings may involve a projection of this archetype onto nature. The feminine nymphs and nature spirits that inhabit trees and streams in many mythological and folk traditions can be interpreted as personifications of the Anima.

In Jung's psychology, the guiding force and the ultimate goal of the individuation process is an archetype called "the Self." The Self represents movement toward wholeness and the balancing of the different sides of the psyche into a unique, integrated personality. This archetype, projected onto forests and wilderness, could give rise to the perception of nature as the embodiment of perfect balance, beauty, symmetry, and wholeness.

The Role of Projections in Experiencing Nature

Unconscious archetypes have powerful effects on how people experience and behave in the world (Jung 1960). For this reason it is important for the conscious mind to have methods for relating to the archetypes in a constructive way. This has traditionally been the function of mythological symbols and religious rituals, but these symbols and rituals have lost much of their force in our modern culture. For many people, nature now seems to call forth the archetypal experiences that traditional religious images no longer evoke.

When archetypes are projected onto natural environments, these environments evoke powerful emotions and take on a profound significance for the individual. For the nature-lover, trees and other natural entities can evoke awe-inspiring fascination and reverence. The forest or wilderness may seem like an paradise on earth, a magical place of eternal mystery and perfection, far removed from the mundane world of everyday life. Vest (1983) identifies the experience of solitude in nature with the "soul mood" sought by the ancient Celts in their sacred groves. Even modern, scientifically trained people are apt to experience this mood, as the following description of a giant sequoia grove from an otherwise very technical forestry textbook of the 1950's indicates:

> In their presence, all sense of proportion is lost, and smaller trees which may be 4 to 10 ft. in diameter appear dwarfed by comparison. It is small wonder, therefore, that a feeling of reverence comes over one upon entering a grove ... whose gigantic red trunks are like the supports of some vast outdoor cathedral. The emotions aroused by the silent ageless majesty of these great trees are akin to those of primitive man for whom they would have been objects of worship, and it is unlikely that many centuries of scientific training will ever completely efface this elemental feeling (Harlowe and Harrar 1958, p. 202).

Experiences of this kind are important to psychological health because they draw people toward connection and relationship

with the transcendent archetypes that underlie their individual personalities. This is the psychological meaning of the ancient myths in which the World Tree and the Sacred Grove were points of contact between the mundane and the sacred realms.

Withdrawing Projections

There are potential problems, however, as long as archetypal projections remain unconscious -- that is, as long as an individual does not realize that the experience comes from within the psyche, and instead believes that it is entirely due to something "out there." A person who is projecting an archetype tends to perceive the world in terms of ideals and absolutes, and this can blind the person to the objective nature of the "other" onto which the archetype is being projected. This can cause people to disregard objective information, to hold unrealistic expectations, and to behave in fanatical ways.

From the viewpoint of Jungian psychology, healthy relationships with people and things require one to become more conscious of the archetypal projections in one's perceptions and behavior (Jaffe 1990). One must learn to see the difference between the inner archetype and the outer object or person onto which it is being projected. Withdrawing projections in this way is not easy to do. It can be a painful process, involving feelings of loss and disillusionment. Ultimately, however, it leads to a more balanced and realistic appreciation of both the objective and the subjective aspects of the world.

A person who becomes aware of how archetypes are projected onto nature acquires a sort of "double vision." The experience of nature becomes like looking out of a house through a glass window pane. Through the window one can see objects that lie outside the house, but the glass also shows reflections of things that are inside. Similarly, through our experience of nature we can observe the workings of the outer world of physics and biology, but at the same time nature reflects back to us the images of our own inner, psychological world. This is perhaps most clearly illustrated in the night sky, where the stars and constellations carry the names and images of our mythological heritage while at the same time serving as an entry into a scientific understanding of the physical universe (Grossinger 1988, de Santillana and von Dechend 1969).

Inner-outer Parallels

Jungian psychologists have pointed out that there is a correspondence between the outer wilderness of nature and the inner "wilderness" of the unconscious mind (Meier 1985). The archetypes represent instinctive, intuitive psychological processes that are not under our conscious control. They can be viewed as the inner, subjective counterpart of the processes of outer nature (Jung 1933, ch. 5). In this view, the heavy-handed manipulation of natural environments by Western society parallels the conscious ego's repressive attitude toward the unconscious, non-rational, and intuitive parts of our own psyches. When we manipulate the outer environment without understanding and respecting its physical and ecological functions, these functions return to us in the negative form of pollution and global climate change. Similarly, when instinctive psychological functions are ignored or manipulated by our rational egos, these functions come back to us in the form of neurotic symptoms. The repression of natural functions in the psyche and their return in a negative form are depicted using nature symbolism in the following two examples from Greek mythology.

Pan, the pagan god of woods and fields, was a wild, irrational deity with the horns and hooves of a goat. He was believed to evoke sudden fear in solitary travelers in the wilds -- hence the word "panic." Despite his frightening qualities, he was viewed in a basically positive way by the ancient Greeks. He loved to play the pan-pipes, and the nymphs who inhabited trees, streams, and caves were his partners in dance. He eventually came to be regarded as the representative of paganism and the personification of all nature. The name "Pan" literally means "All" (Bulfinch 1959).

At the time of Christ's birth, a mysterious voice was supposed to have been heard in the Greek Isles announcing that great Pan was dead (Bulfinch 1959, de Santillana and von Dechend 1969). The death of Pan could be interpreted psychologically as the repression of the instinctive, wild parts of the psyche, which occurred with the rise of monotheistic consciousness in Western society. Great Pan did not really die, however. His horned and hoofed image was incorporated into the Christian mythology of Satan. Thus when the natural archetype of Pan was repressed, it reappeared in a negative form as the great Enemy, a source of danger, suffering, and evil (Nichols 1980).

In Jungian terms, we could say that the archetype of the nature deity Pan was cast into the darkness of the collective "Shadow," which is the archetype containing all the impulses and attitudes judged unacceptable by society. The inner psychic struggle between consciousness and instinct was then projected onto the outer world of nature. Ever since, Western civilization has been acting out an archetypal battle between Light and Darkness with wild nature in the role of Darkness, which must be conquered, civilized, and subdued.

Another account of conflict is found in the myth of the wood-cutter Erisichthon, who angered the goddess Demeter by cutting a grove of sacred trees. Heedless of Demeter's pleas, Erisichthon cut an ancient oak at the very center of the sacred grove, thereby killing the Dryad (wood-nymph) who inhabited the tree. In retribution Demeter called upon the goddess of famine to afflict Erisichthon with insatiable hunger. Driven by the craving for food, he spent all his wealth and repeatedly sold his own daughter as a slave in order to feed his hunger. But the great quantities of food that he ate gave him no satisfaction. Ultimately, he died when he tried to devour his own body (Graves 1960, Bulfinch 1959, Hamilton 1942). This myth can be interpreted as a symbolic depiction of our culture's devaluation and repression of the intuitive, spiritual aspect of nature and of the psyche, and the consequences this has produced.

Erisichthon's fault was not that he made a living by cutting trees. There would have been no problem if he had been content to cut only trees that stood outside the sacred grove. Erisichthon suffered because he refused to limit his cutting and because he would not respect the spiritual dimension represented by the Dryad in the oak tree. When Demeter herself, the goddess of vegetation, fertility, and harvest, appeared to plead with him in the sacred grove, he still stubbornly refused to deviate from his course. As a result, the archetype of the benign goddess returned to him in the negative form of hunger and famine. Like the reemergence of Pan in the image of Satan, this represents the psychological fact that a repressed archetype does not disappear, but assumes a negative form that can overwhelm the conscious ego. This interpretation of the myth suggests that our culture's devaluation of the spiritual dimension that the psyche experiences in nature has lead to an insatiable hunger for goods and resources that is undercutting the physical basis of our survival.

The story of Erisichthon seems to foreshadow the multiplicity of compulsive and addictive behaviors that now plague our society. Jungians have suggested that modern people are experiencing a spiritual famine, and that addictive behavior is a futile attempt to fill the spiritual emptiness with an inadequate physical substitute (Jaffe 1990, Johnson 1987). In our culture, which has emphasized objective knowledge of the outer, physical world while neglecting the inner, spiritual side of life, one of the greatest values of nature may be the opportunity it offers us to become reconnected with our own unconscious nature and to fill the spiritual vacuum within (Williams 1990).

Conversely, it can be argued that the crises we have created in the outer world of nature can only be resolved by healing the divisions and conflicts within our own psyches. Reconciliation with both outer and inner nature seems essential if our civilization is to survive.

Implications for Research

The ideas described above are an outgrowth of the work of Carl Jung. As environmental issues become more prominent, the relationship between nature and the unconscious psyche is increasingly being discussed among Jungian psychologists. The book *A Testament to the Wilderness*, edited by Hinshaw (1985), is an excellent example. If we take these ideas seriously, there is clearly an urgent need to recognize and to learn more about the spiritual aspects of nature and psyche.

In approaching the spiritual aspect of nature, it is important to recognize that the human psyche can function and communicate in two quite different modes. Our technological culture places great emphasis on the rational and analytical mode of thought, which seeks to understand and explain everything in terms that are as explicit, precise, and unambiguous as possible. In this mode, mathematics and logic are the tools of choice for understanding how things work and for ordering our affairs.

Spiritual phenomena, on the other hand, emanate from the intuitive side of the psyche, which manifests itself in an ambiguous language of nonverbal imagery and symbolism. This mode of psychological functioning lends itself more naturally to the indirect, many-layered expressions of art, poetry, and music than to the rigorous, literal language of science. It may be difficult for scientifically trained researchers and managers to deal with the spiritual aspect of nature because their training teaches them to devalue and reject the intuitive and emotional mode of functioning in which spiritual phenomena appear (Vining and Schroeder 1987).

To do justice to spiritual phenomena in natural resource research and management, it will be necessary to develop a more balanced relationship between the rational and the intuitive sides of the psyche, with neither function dominating the other. Towards this goal, I think it may be helpful to reconsider and broaden some of the underlying assumptions and attitudes of our scientific approach. Following are a few of my tentative thoughts about how to do this, inspired by ideas from phenomenological, experiential, Jungian, and archetypal psychology.

Spiritual phenomena might best be approached by adopting a phenomenological as opposed to a physical definition of reality. That is, the starting point for investigation would be the "life-world" as it is immediately experienced by people (Keen 1975). Psychological phenomena would be regarded as real in their own right and would be studied on their own terms, rather than being reduced to mechanistic concepts taken from the physical or biological sciences (Giorgi 1970).

Spiritual phenomena in nature are revealed in qualitative accounts of individuals' subjective experiences, rather than in quantitative measurements and statistical models of behavior. Material for study could be drawn from many sources, including surveys and interviews, written materials published by various groups and organizations, art, literature, and mythology. An important source of material would be the researcher's own personal experiences, intuitions, dreams, and feelings regarding nature. The researcher would not be a detached, passive observer, but would be actively involved in discovering the spiritual significance of nature in the context of his or her own life.

In the course of this exploration, the researcher would be engaged in an interplay between the rational and the intuitive functions of the psyche. At times it might be necessary to suspend the rational and analytical mode of thinking, to allow the intuitive process to function without interference. At other times the researcher would need to step back from the flow of intuition to clarify, organize, and evaluate the view that is emerging. The process would not proceed in a straight line. The intuitive process cannot be hurried, forced, or manipulated according to conscious plans. The researcher would need patience and a willingness to follow the process through many unexpected turns.

Methods for approaching this study could be drawn from several areas of psychology. Jungian psychologists have evolved methods for bringing people into contact with the unconscious mind in psychotherapy and for interpreting the symbolic expressions that this process produces (Johnson 1986, Hillman 1975). Elements of the Jungian approach could be valuable for increasing our awareness and openness to the spiritual aspect of nature. Techniques developed by experiential psychologists could also be used to unfold the unconscious meanings hidden in the vague felt senses we experience in natural environments (Gendlin 1981, Schroeder 1990). Methods developed by phenomenological psychologists (e.g. Giorgi 1985) could be helpful for analyzing the meaning structures contained in descriptive accounts of people's experiences in nature.

The findings of research on the spiritual aspect of nature may not lend themselves well to the traditional, "dry" research report. Methods for conveying the researcher's findings may require more personal, evocative, and metaphorical expressions (Maslow 1974, Porteous 1984). Artistic, musical, and poetic works could be an important means for communicating new understandings about the human-nature relationship (Crowfoot 1990).

This approach to the spirituality of nature will not produce any definitive, predictive models, nor will it yield any final, "true" answers regarding the management of natural resources. Its purpose is not to give humans any greater degree of control over outer or inner nature. Its underlying motive is to deepen our awareness of the intuitive relationship between humans and nature, and to allow ourselves to be changed by that awareness. In this way, by balancing and reconciling the rational scientific and the intuitive spiritual processes of the psyche in ourselves and in our society, we may be able to move toward a more viable relationship between humans and the natural world.

Implications for Management

Natural resource managers often seem to believe that opposition to resource management policies is due mainly to ignorance on the part of the public. Many managers view the public as victims of misinformation, and assume that if correct information about resource management could be effectively

communicated, then public protest would greatly diminish. The viewpoint outlined in this paper suggests, however, that the problem goes deeper than a simple question of factual knowledge. Beneath the surface of natural resource conflicts (such as the spotted owl and old growth controversies), there may be powerful unconscious archetypes, which do not respond to logical argument or rational persuasion.

People who have experienced a spiritual connection in nature may find *any* effort toward management and control of natural environments to be disturbing, no matter how scientifically well-founded such efforts are. From a spiritual viewpoint, nature represents an "other" to be loved and respected, rather than a physical and biological process to be controlled and manipulated for human benefit. The projection of unconscious archetypes onto a natural setting results in a deep emotional bond that can make any human intervention in the setting appear morally wrong, especially if it is carried out in a coldly rational way.

Managers who are trained in the physical and biological sciences may be inclined to ignore or discount the spiritual values of people who oppose their management efforts, because such values seem inconsistent with a scientific understanding of the resources. There is a tendency to regard spiritual value as a recreational "amenity" -- a somewhat frivolous side issue next to the "real" concerns of hard science and economics. Arguing that spiritual values do not have a basis in traditional science does not, however, in any way diminish their power to motivate people. To many people, ancient forests and wilderness are genuinely sacred places, even though they are not associated with any officially recognized religion. A threat to the existence of wild nature is a threat to the central spiritual value of many people's lives. Recognizing this, it should not be surprising that people's reactions to such threats can be vehement and violent.

To move toward a better understanding of these conflicts, natural resource professionals need to become more aware and respectful of the psychological and spiritual aspects of natural environments. We need to recognize that humans and nature are not separate, and that spiritual phenomena are therefore an inherent aspect of the natural world. Spiritual phenomena are just as much a part of the real world as are ecological processes like competition and predation. By now most people realize that management efforts that ignore ecological interrelations among species can produce unexpected and disastrous consequences. We need to recognize that ignoring the psychological and spiritual connections between humans and the natural world can result in equally nasty surprises.

At the same time, people who feel a spiritual connection with nature need to recognize that nature also has physical, biological, and economic dimensions that cannot be ignored. I believe it is essential for our civilization to regain a genuine sense of the sacred in nature, but in so doing we must not lose sight of the scientific understandings we have gained. People who experience spirituality in nature should strive for clearer awareness and communication of their own spiritual feelings, but they should resist the temptation to disparage those who hold a different view of nature. No single viewpoint can encompass all the dimensions of nature, but if we respect, listen to, and learn from each other, perhaps we can find a new management perspective that integrates both the science and the spirituality of natural environments.

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THE EXTENT & TYPES OF RECREATIONAL OPPORTUNITIES WITHIN THE STATE OF MAINE FOR PEOPLE WITH DISABILITIES

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The purpose of this study was to determine the extent and types of recreational opportunities within the state of Maine that were available to people with disabilities. The major findings were that people with disabilities participated in recreational opportunities on a limited basis, that the majority of activities offered were stereotypical of people with disabilities and that the majority of activities were integrated into regular recreation programs.

Recreation is a basic right which should be afforded to all people (Austin, 1987), yet various groups in society including people with disabilities often are excluded because of environmental barriers such as architecture, transportation, economics, and public attitudes. In the past, recreation opportunities have consisted of segregated programs sponsored through advocate associations such as the National Association for Retarded Citizens or the National Wheelchair Association. Through litigation such as the Pennsylvania Association for Retarded Citizens (PARC) vs. Pennsylvania court case and legislation such as Section 504 of PL 93-112 (The Rehabilitation Act) and PL 94-142 (The Education for All Handicapped Children Act) individuals have gained the right to live and be educated in the least restrictive environment. This has facilitated the movement of large numbers of people into community living situations and has shifted the responsibility for recreation from advocate associations to community agencies and to the private sector.

The purpose of this study was to determine the extent and types of recreation programs available to adults and children with disabilities within the state of Maine. The study was designed to compile data from federal, state, municipal, private non-profit and camp sources and to compare information concerning the following:

1. The availability of recreational opportunities for people with disabilities.
2. The types of recreational opportunities available.
3. The types of disabilities of people who participated.
4. The numbers of people with disabilities that were being served.
5. The administrative aspects of recreational programs for people with disabilities such as funding, staffing and timing of programs.
6. The current level of integration within recreation programs.
7. The reasons for the lack of opportunities within recreational programs.
8. The assistance needed by programs to provide recreational opportunities for people with disabilities.

Procedures

Because the study looked at programs on the federal, state, municipal, private non-profit and organized camp levels, the population was compiled from many sources. Information concerning federal organizations was obtained from the National Park Service, the National Forest Service, the U.S. Fish and Wildlife Service, and military installations within the state. The Bureau of Inland Fisheries and Wildlife and the Maine Bureau of Parks and Recreation provided information concerning state programs. Information on local government sponsored programs was obtained from municipal park and recreation departments. Organizations including Boys Clubs, YMCAs, YWCAs, Boy and Girl Scouts, Special Olympics, Hurricane Island Outward Bound School, the Recreation Center for the Handicapped, Inc., Maine Special Olympics, Freedom Riders, and Maine Handicapped Skiing provided information on programming in the non-profit area. Information on organized camps was obtained from the 1989 Maine Directory of Children's Camps published by the Maine Youth Camping Association.

A survey was designed and tested specifically for this study and contained structured questions of the multiple choice type with the respondent choosing one or more fixed alternatives. Several researchers (Crocker, 1989; Schleien & Werder, 1985) have developed survey instruments to compile data concerning community recreation for people with disabilities and copies of these surveys were obtained for examination.

An introductory letter was sent to 230 participants which introduced the researcher and explained the purpose and the procedures of the research. The instrument was pilot tested, revised, and then sent to 202 participants along with a letter and a postage-paid return envelope. The number of surveys sent out was reduced from the original number of 230 because of duplication of names, incorrect addresses, and the desire not to participate by several people. As a result of the initial mailing and follow-up procedures, 122 of the 202 surveys (60.4%) were returned. Table 1 represents the return rates for the five groupings of programs surveyed.

Table 1. Survey Return Rates (N =122)

Grouping	Sent	Received	Percentage
Federal	7	7	100.0
State	7	3	42.8
Municipal	70	45	64.2
Private Non-Profit	38	24	63.1
Camps	80	43	53.8

Findings

1. The following percentages of agencies or businesses reported having people with disabilities participate in recreational opportunities: federal grouping = 71.4%; state grouping = 100%; municipal grouping = 77.7%; private non-profit grouping = 95.8%; camps grouping = 44.2%.

2. The program areas offered most frequently on an integrated basis by agencies and businesses were arts and crafts (68.2%), swimming (65.8%), team sports (60.9%), camping (68.1%) and special events (54.9%).

3. The program areas that were offered most frequently on a segregated basis by agencies and businesses were arts and crafts (6.5%), dance (6.5%), swimming (15.6%), team sports (9.1%), camping (5.2%), horseback riding (5.2%) and special events (7.8%).

4. The following groups of people with physical disabilities participated most frequently in recreational opportunities in 1989: federal grouping - no data available; state grouping - no data available; municipal grouping - health impairments (median = 5.0), speech and language impairments (median = 3.5) and hearing impairments (median = 3.0); private non-profit grouping - health impairments (median = 25.0), orthopedic impairments (median = 18.0) and speech and language impairments (median = 12.0); camp grouping - speech and language impairments (median = 30.0), health impairments (median = 3.0) and hearing impairments (median = 6.0).

5. The following groups of people with cognitive disabilities participated most frequently in recreational opportunities in 1989: federal grouping - no data available; state grouping - no data available; municipal grouping - learning disability (median = 5.5), mental retardation (median = 5.0), private non-profit grouping - learning disabilities (median = 16.5), mental retardation (median = 16.0); camp grouping - learning disabilities (median = 4.5), mental retardation (median = 40.0).

6. People with psychological disabilities participated in recreational opportunities in the following frequencies in 1989: federal grouping - no data; state grouping - no data; municipal grouping - median = 2.0; private non-profit grouping - median = 2.5; camp grouping - median = 30.0.

7. The following percentages of people with physical disabilities participated in recreational opportunities: federal grouping - no data; state grouping - no data; municipal grouping - median = .46; private non-profit grouping - median = 1.74; camp grouping - median = 1.49.

8. The following percentages of people with cognitive disabilities participated in recreational opportunities: federal grouping - no data; state grouping - no data; municipal grouping - median = .32; private non-profit grouping - median = .74; camp grouping - median = 2.13.

9. The following percentages of people with psychological disabilities participated in recreational opportunities: federal grouping - no data; state grouping - no data; municipal grouping - median = .11; private non-profit grouping - median = .34; camp grouping - median = .43.

10. The sources of funding for recreational programming varied widely depending on the nature of the agency or business (public or private), yet a certain percentage of the total funding within each grouping came from fees.

11. Programming was provided on a year round basis by 60% of the federal grouping, 66.6% of the state grouping, 71.4% of the municipal grouping and 43.4% of the private non-profit grouping. The majority of the programming in the camp grouping (89.4%) was done during the summer.

12. The largest percentage (57.6%) of respondents indicated that general staff were responsible for providing direct service to people with disabilities.

13. The percentage of segregated activities (12.5%) was considerably less than the percentage of integrated activities (87.5%).

14. Of the agencies and businesses (18.3%) that did not offer recreational opportunities to people with disabilities, 51.4% indicated that one reason for not providing programs was lack of funds and 48.6% indicated inaccessible facilities and leaders who were not trained to work with people with disabilities.

15. Within the group of agencies and businesses that did not provide programs, 81.1% indicated that technical assistance was needed and 78.4% indicated that staff training and professional programming consultation was necessary for them to be able to provide programming.

16. Within the group of agencies and businesses (81.7%) that did provide programs, 63.5% indicated that staff training was needed and 56.5% indicated that financial assistance was necessary for them to be able to expand their offerings.

Discussion

Availability of Recreational Opportunities

The first intent of this study was to determine the availability of recreational opportunities for people with disabilities. Respondents were asked to indicate whether or not people with disabilities participated in their recreation programs. The high percentage of response from the federal (71.4%), state (100%) and municipal (77.7%) groupings indicates that people with disabilities participated in these programs. As a result of federal legislation such as the Rehabilitation Act (PL 93-112), organizations that receive money from the federal government may not discriminate against an individual with disabilities solely on the basis of that disability. It appears from the data that the federal, state and local groupings are cognizant of PL 93-112 and their responsibility to provide recreation programs for all people in the community.

The private non-profit grouping also had a large response to the question (95.8%). This grouping included organizations such as the Girl Scouts, Boy Scouts, YMCAs, YWCAs, and Boys and Girls Clubs whose programs are aimed at the development of the "whole child," and are open to all members of the community (Erickson, 1983). The data suggest that this grouping as a whole provided recreation programs that are open to the community and that include people with disabilities.
The low response from the camp grouping (44.2%) indicates that not many people with disabilities participated in summer camp experiences in Maine. Since there are several summer camps which offer programs specifically to people with disabilities, it appears that these camps were not members of the Maine Youth Camping Association and were not included in the directory of summer camps published by the Association which was used for this study. Consequently these camps were not surveyed. Based on the data from this study, the camp grouping as a whole has a low participation rate from people with disabilities.

Activities Offered

The second intent of this study was to identify what types of recreational opportunities were available to people with disabilities. Results of the survey indicate that the activities offered most frequently to people with disabilities in Maine included arts and crafts, dance, team sports, swimming, physical fitness activities, horseback riding, camping and special events. The majority of these activities are stereotypical of

people with disabilities. Activities such as arts and crafts, swimming, sports and games and special events have historically been offered to people with disabilities because of their therapeutic value (Kraus, 1983).

Within this study it was found that most of the activities offered were similar to the ones historically offered, yet there were some differences. For example, camping was offered as an activity for both people without disabilities and people with disabilties in every grouping except for the municipal grouping. Dance and horseback riding were offered as segregated programs (available only to people with disabilities) in both the municipal and private non-profit groupings. The variety of activities that many agencies or businesses offered broke away from the stereotypical activities for people with disabilities with examples such as auto mechanics, puppeteering, photography, gymnastics, judo, tennis, downhill and cross country skiing, canoeing, and wilderness adventure activities. Although the majority of activities offered by agencies and businesses were stereotypical, there was evidence of a trend towards a wider spectrum of activities being offered to people with disabilities.

People Who Took Part in Programming

The third intent of this study was to determine the types of disabilities of people who took part in recreation programming. The data from this study seem to indicate that within the state of Maine, people with a wide variety of disabilities were served. People with physical disabilities who participated most frequently were those people with speech and language impairments, health impairments, orthopedic impairments and hearing impairments. People with cognitive disabilities who participated most frequently were those people with mental retardation. People with psychological disabilities participated in recreation programs, but it was difficult to obtain an accurate picture because of the hidden nature of the disability.

Numbers of People Who Participated in Programming

The fourth intent of this study was to determine how many people took part in recreational opportunities. The incidence of people with physical disabilities in the general population is as follows: hearing impairments - 1%; visual impairments - .04%; speech and language impairments - 3%; and cerebral palsy - .15% (Batshaw & Perret, 1986). Due to the lack of uniformity in defining orthopedic impairments and health impairments, statistics of incidence are neither meaningful nor accurate (Dunn & Fait, 1989). The percentage of people with physical disabilities participating in programs on the municipal (.46), private non-profit (1.74) and camp (1.49) levels was below the majority of the national incidence rates. These data suggest that people with physical disabilities are being underserved in all three groupings. Specific numbers of people participating in programs was not kept by any of the respondents in the federal and state groupings.

The incidence of people in the general population with mental retardation is 3%, people with learning disabilities is 4-5% (Dunn & Fait, 1989) and people with autism is .04% (Batshaw & Perret, 1986). The percentage of people with cognitive disabilities participating in both the municipal (.32) and private non-profit (.74) groupings in Maine was well below the national incidence rate. The percentage of people with cognitive disabilities in the camps grouping (2.13) was above the incidence rate, however, the majority of the people with cognitive disabilities within the camps grouping had learning disabilities. These findings indicate that people with cognitive disabilities were underserved in terms of recreational opportunities.

The incidence of psychological disabilities is difficult to pinpoint because a growing tolerance for greater variations in acceptable behavior makes it more difficult to label certain patterns of behavior as being unacceptable or abnormal (Carter, Van Andel & Robb, 1985). In the early 1970's psychological disabilities were said to affect one out of every ten persons in the United States (Kraus, 1983). The percentage of people with psychological disabilities participating in each of the municipal (.11), private non-profit (.34) and camp (.43) groupings was below 1% which is well below the general national incidence rate of 10%. One respondent noted that the numbers of people with psychological disabilities was unknown because unless a problem was specifically addressed to administrators or to leaders, the disability would not be recognized. The hidden nature of psychological disabilities make them more difficult to recognize. It is not possible to conclude based on data from this study whether or not the population of people with psychological disabilities is being served adequately.

Extent of Integration

The fifth intent of this study was to determine the extent of integration. The data indicate that the majority of recreation programs in Maine that served people with disabilities were integrated. The percentage of segregated activities (12.5%) was considerably less than the percentage of integrated activities (87.5%). The private non-profit grouping was the largest area in which segregated programs existed, yet within these programs there was evidence that the philosophies of integration and normalization are changing recreation programming. There are also several camps within the state which offer segregated programs. Since the majority of camps within the state offer limited access to people with disabilities other than learning disabilities, these segregated camps remain a viable option for people with disabilities. Summer camps offer opportunities for personal growth and human interaction and when these experiences take place in an integrated setting both people with and without disabilities benefit from the experience.

Administrative Aspects of Programs

Funding. The sixth intent of this study was to determine administrative aspects of recreation programs for people with disabilities such as funding sources, timing of programs and leadership of programs. Respondents were asked to indicate the percentage of funding for their organization which came from public tax funds, fees, grants, voluntary contributions, United Way or other sources. The results indicated that funding sources varied depending on the private or public nature of the agency or business, but that within every grouping fees constituted a certain part of the funding.

The implication of this finding is that for people with disabilities to be able to participate in recreational opportunities, they need to contribute monetarily. A Harris Poll conducted in 1985 indicated that two thirds of the population of people with physical disabilities in the United States between the ages of 16-64 were unemployed (Harris, 1986). When people with disabilities are able to find employment, the positions are frequently low-paying with limited opportunity for advancement. Compounded with this are the higher than average expenses incurred by some people with disabilities to purchase specialized equipment such as vans with wheelchair lifts and/or custom-made clothing. The end

result is less discretionary money available to spend on leisure pursuits.

The principle of normalization promotes optimal independent functioning and encourages integration into the mainstream of society. Part of that responsibility is paying for the things for which other people in the community pay. Free or reduced prices for people with disabilities is discouraged by the principle of normalization. Since many people with disabilities lack the income to be able to participate in recreation opportunities that cost money, the result is less participation in leisure by people who have disabilities (Kennedy, Austin & Smith, 1987). The fact that a certain percentage of the funding in all five groupings from the state of Maine comes from fees could be an important factor as to why more people with disabilities do not participate in recreational opportunities. The economic barrier which is caused by the application of a fee schedule may be a hindrance for participation by people with disabilities.

Timing of Programs. Respondents were asked to indicate if programming took place year-round, during the summer, or at other specific times during the year. Results indicated that the majority of programming for people with disabilities occurred either on a year-round basis or on a summer only basis. In the federal, state, municipal and private non-profit groupings over 50% of the respondents indicated that all of their programs ran year round. In the camp grouping, the majority indicated that programming ran during the summer months only. Since most camps are for children and young adults, it would be expected for them to run during the summer months. The data suggest that programs occurred on a cntifnual basis, not just at certain times during the year. People with disabilities, like the rest of the population, have leisure needs during the entire year. The data from this study indicate that recreational opportunities are available to them throughout the year.

Staffing. It was found that general staff were responsible for providing direct service to people with disabilities the majority of the time. A small percentage (8.2%) of agencies in the municipal and private non-profit groupings indicated that therapeutic recreation specialists were responsible for programming. In order to integrate people with disabilities into recreational programs in the community, general staff need to be responsible for programming and teaching activities. Most agencies or businesses cannot afford to hire a therapeutic recreation specialist to ensure that people with disabilities are being served, and research shows that most people with disabilities living in the community do not want to receive therapeutic recreation in community settings, but simply desire to have the opportunity to take part in recreation experiences (Kennedy, Austin & Smith, 1987). It is the general staff of recreation agencies and businesses who need to be trained in techniques concerning integrating people with disabilities into regular recreation programs in order for recreation integration to be successful. The therapeutic recreation specialists role needs to change from one of organizing and leading recreation activities for people with disabilities to one of consulting and working with recreation organizations on the techniques to integrate programs.

Reasons for Lack of Programming

The seventh intent of the study was to determine the reasons that agencies or businesses lacked programming for people with disabilities. Three major responses were evident: lack of funds, inaccessible facilities and leaders who were not trained to work with people with disabilities. The three major responses dealt with money, as funding is necessary for making facilities more accessible and for training staff. The implication of lack of funds is that if agencies and businesses are committed to the philosophies of normalization and integration, they will need to find methods to overcome the financial problems in order to provide programs for people with disabilities.

Assistance Needed

The final purpose of this study was to determine the assistance needed by agencies or businesses in order for them to be able to provide quality programming for people with disabilities. The largest percentage of respondents who did not provide programming (81.1%) indicated that technical assistance which was defined as accessible facilities and adapted equipment was necessary in order for them to develop recreational opportunities. The next largest percentage of respondents (78.4%) indicated staff training and professional programming consultation as being necessary for them to be able to provide programming. The largest percentage (63.5%) of programs among those that currently offer activities responded that staff training was necessary for them to be able to expand programming. The implication of these data is that in order for more agencies and businesses to develop additional recreational opportunities, facilities must be equipped to handle people with disabilities and staff must be trained to lead programs.

Conclusions

The purpose of this study was to determine the types and extent of recreational opportunities available to people with disabilities in the state of Maine. Data from this study indicate that there is much that recreation organizations can and should be doing to promote integrated recreation opportunities for people with disabilities.

1. The directors of recreation agencies and businesses need to become educated in the concepts of normalization and the methods of integrating their recreation programs. This could be done through professional organizations with (1) workshops at state and national conferences, (2) specific training sessions given to groups of professionals working in similar settings and (3) articles in professional journals at the state and national level.

2. The concept of including people with disabilities in recreational programming needs to be part of all aspects of recreation agencies and businesses (e.g.) policies and procedures, marketing, staff hiring and training, and program evaluation. Policy manuals should reflect the commitment of agencies and businesses to provide recreational opportunities to people with disabilities. Job descriptions should convey the expectation that staff works with a variety of people, including individuals with disabilities. Marketing materials such as advertisements, brochures, public service announcements, etc. should include statements concerning the availability of integrated opportunities for individuals with disabilities.

3. When hiring staff, administrators should seek out persons with experience working with individuals with disabilities and should also consider hiring persons with disabilities as instructors. Comprehensive on-going staff training programs need to be developed to train staff in (1) characteristics of specific disabilities, (2) methods for adapting teaching techniques, activities and equipment, and (3) methods for integrating people with disabilities into regular recreation programs. Program evaluation should be done continually which would indicate if program goals and objectives were being met, if programs were meeting

participant needs, and what changes could be made in programs.

4. Agencies and businesses need to be creative in order to overcome funding problems in developing programs for people with disabilities. Funding could be obtained from grants and donations, and many of the costs involved in running programs could be reduced by (1) developing programs that would not need specialized equipment, (2) sharing resources with other agencies and businesses, and (3) networking with organizations that have expertise in working with people with disabilities. Methods for reducing fees should also be developed by agencies and businesses. Such methods might include (1) a sliding fee schedule for all participants based on their ability to afford the cost of the activity, (2) a policy by which attendants needed by a person with a disability would be allowed to attend free of cost, (3) exchange of volunteer work for program fees, and (4) the development of a scholarship fund.

5. People with disabilities who are living in the community need to become educated concerning the concepts of leisure and recreation and the methods of accessing those resources that are available to them in the community. This could be done through (1) the public school system, (2) agencies serving people with disabilities and (3) advocate agencies. An Individualized Education Plan (IEP) must be developed for every child receiving special education in the public school system. An Individualized Service, Treatment or Program Plan (ISP, ITP, IPP) must be developed for adults with disabilities in clinical/rehabilitation and hospital settings, residential centers, group homes, and day centers (MacMillan, 1982; Howe-Murphy & Charboneau, 1987). The development of specific recreation skills could be incorporated into these plans along with the goal of learning about and becoming involved in community recreation programs. Throughout this process the individual could develop the skills and knowledge necessary to be able to participate in integrated community programs. Advocate agencies could act as resources for people with disabilities by diseminating information concerning recreation opportunities available in local communities.

Based on the results of the present survey and the many positive comments from recreation administrators which were included with the returned surveys, this researcher feels that there is a favorable atmosphere for developing more integrated recreational opportunities for people with disabilities. Through education of people with disabilities concerning their leisure needs and the resources available in the community, education of administrators concerning the importance of and methods of accomplishing integration, and education of staff concerning teaching integrated recreation activities, it will be possible to develop integrated recreation programs within many communities. The result will be that people with disabilities will have the same opportunity for recreation and leisure experiences as other members of the community.

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IMPLICATIONS OF BOY SCOUT GROUP USE OF PUBLIC LANDS FOR NATURAL RESOURCE MANAGERS: A REGIONAL COMPARISON

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Resource managers can apply group-specific rather than generic communications and management strategies to different public land user groups. This study compares use patterns of one user group, Boy Scout troops, from two regions of the United States. It identifies their public land use patterns, activities, needs, and motivations. Results can be used by resource managers to develop communications and management strategies to guide this group's appropriate behavior, enhance their experience, and solicit their help in protecting the resource.

Introduction

Resource managers of both natural and cultural sites use interpretation and other communications strategies for a variety of purposes: to enhance visitors' experiences, to achieve specific management goals, and to promote their agencies' images (Sharpe 1982). Managers often apply the same communications messages and strategies to all their visitors. Additionally, managers often apply a single technique to guide appropriate visitor behavior (such as using law enforcement to reduce vandalism) for all visitors. However, just as it is minimally effective to promote a program, site or product to a "typical" or "average" client or user, it is unlikely that carbon copy management or communications strategies used with different users will be equally effective in providing appropriate facilities, sites, programs and information; identifying sources of potential user conflicts; or protecting the sites.

Differences in user behavior can be particularly divergent when norms for appropriate behavior at resource sites are not known by the visitors. Appropriate opportunities and facilities cannot be provided unless the visitors' needs are known. Therefore, resource managers must attempt to identify these needs, then target their communications and management strategies for specific user groups just as business persons target market their products and programs (More 1983). Numerous studies have shown that such strategies can be effective. (See references listed in Vander Stoep, 1990 NERR Proceedings.)

At last year's NERR Symposium, I presented a paper describing the use patterns, activities, resource needs, and behavior motivators of Boy Scout groups in the southcentral region of the United States. Since that time, the survey of Boy Scout troops in the northeast region of the United States was completed. This paper presents the results of that study as well as compares them with results from the southcentral region.

Statement of the Problem

The purpose of this study is to identify land use patterns, activities engaged in, information and other resource and service needs, effective methods for motivating and controlling behavior, and characteristics of Boy Scout groups who use public lands in both the northeast and southcentral regions of the United States. Results are used to identify implications of Scout group use of public lands, to help resource managers understand Scouts and their program, and to develop strategies for effective management of and information dissemination to Scout groups which use public lands.

Methods

Based on Dillman's (1978) "total design method" (TDM), surveys were sent to Scoutmasters in the southcentral United States (Arkansas, Alabama, Kentucky, Mississippi, Missouri and Tennessee) and the northeastern United States (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont). In the southcentral region, surveys were sent to five troops in each of 30 councils (total sample size of 150); in the northeast region, surveys were sent to a stratified random sample of 258 troops based on community size in each of the Boy Scouts of America (BSA) councils. The southcentral region sample was drawn with the assistance of staff from the national BSA headquarters in Irving, Texas while the northeast region sample was generated by staff in the northeast regional BSA office located in Dayton, New Jersey.

The national BSA staff actually mailed the surveys and reminder postcards for the southcentral region, limiting control by the researcher. For the northeast region, mailing labels for the stratified random sample were sent to the researcher, thereby permitting more control of the timing and consistency of survey administration. Also, second followup letters, containing assurances that the survey was authorized by BSA, and a duplicate survey were sent to non-respondents in addition to the initial reminder postcards. This improved the response rate for the northeast region.

Before final printing and distribution of the original survey to the southcentral region in 1985, the survey instrument was reviewed by several recreation and parks researchers and Boy Scout leaders, then revised. The survey contained both closed- and open-ended questions used to identify the troops' public land use patterns, activities, information and service needs, motivations, and Scoutmasters' strategies for guiding youth behavior during their visits to public lands. Some group demographic information was collected.

Only two revisions were made to the second survey, both based on differences in public lands available in the two regions. For the northeast region survey, *Tennessee Valley Authority (TVA) projects* was deleted and replaced by *Military Facilities*; *State Lands*, which included a regional clarification, replaced *State Parks*. An additional question asked which level of development (ranging from highly developed to primitive) was preferred by the troop.

Open-ended questions for the southcentral survey were content analyzed independently by two social scientists (Labaw 1982). Each response was written on an individual index card. Each judge grouped and labelled several response categories based on general concepts included in the answers. Where differences existed, a final decision was made based on primary intent of the question. The same categories were used during analysis of the northeast region survey. Frequency tabulation of concept-coded responses was used to analyze data.

Results[1]

A total of 65 questionnaires of the 150 mailed in the south-central region were returned, resulting in a response rate of 43.3%. Two questionnaires were unusable. One was not completed because the troop did not use public lands, the other because the Scoutmaster was new and, therefore, unfamiliar with troop activities and use of public lands. A total of 173 north-east region surveys were returned, resulting in a response rate of 67%. Of these, three were undeliverable and seven were not usable for a variety of reasons, primarily because the troops were urban or served disabled populations which do not use public lands.

Troop Characteristics

Almost half of the southcentral troops (48% of those responding to this question) using public lands were relatively large, having more than 20 members, with 18% having 30 or more members. Only 35% had 15 or fewer members. Troops in the northeast tended to be smaller, with 52% having fewer than 15 members and only 21% having more than 20 members. Less than 9% had 30 or more members.

Eighty-five percent of the troops responding to the community size question were from communities having fewer than 50,000 residents, while approximately 19% of these were from quite small communities of less than 5,000. Only about 8% percent of the troops were from communities of more than 500,000 residents. Surprisingly, 70% of northeast troops were from communities smaller than 50,000 and only 6% from towns with populations larger than 500,000. Perhaps this is because residents in the northeast tend to identify more with their own towns than with a larger metropolitan area.

Many troop leaders in the southcentral region appear to be highly dedicated and committed to the BSA program as 48% of those responding had more than ten years of experience as Scoutmasters. Only 24% had three or fewer years of experience. Northeast troop leaders tend to have less experience, with 28% having three or fewer years experience and 31% having more than 10 years of Scoutmaster experience.

BSA Public Land Use Patterns

Types of lands used by Scout troops are varied in both regions. Southcentral troops use, in order of use frequency, state parks, national parks, water-based areas, (Army Corp of Engineers projects, TVA projects, and other waterways combined), national forests, local parks, state forests, and miscellaneous other federal and Canadian lands. Northeast troops also heavily use state parks, but other use differs. In order of use frequency, these troops use state forests, local parks and military areas extensively, followed by national parks and national forests. Water-based resources, used by 21% of troops, are used much less frequently than by southcentral troops. (See Figure 1.)

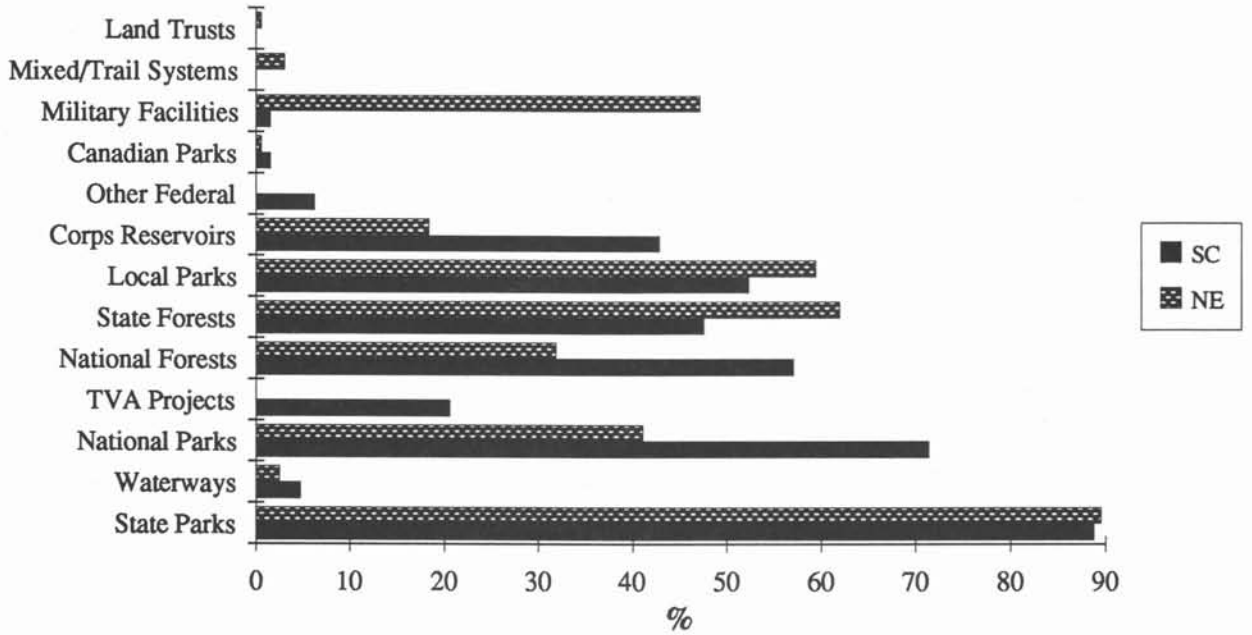

Figure 1. Types of public lands used by Boy Scout troops.

Patterns for day trips and overnight trips to public lands appear to be similar in both regions. Of the troops that take day trips, about 50% in each region take one to three per year while approximately 5% take 10 or more day trips per year. About 40% of the troops in each region take one to three overnight trips per year while about 41% take four to nine overnight trips. Some troops appear to be quite active, with 12% of southcentral troops and 18% of northeast troops taking 10 or more overnight trips each year. The combined day/overnight trip pattern seems to indicate that troops tend to take about one day trip and/or one overnight trip each month, with the possible exception of December or August (possibly due to holidays or family vacations).

A variety of adults accompany Scout troops on their trips to public lands. BSA-trained adult leaders accompany 90.5% of southcentral and 81% of northeast troops. Both untrained volunteer parents (for 52% of southcentral and 69% of northeast troops) and trained volunteer parents (for 18% for southcentral

1/ Some discrepancies between results reported in 1990 for the southcentral region and this paper are due to previously incomplete survey data and some errors in data entry, discovered when combining and cleaning data for the two regions.

and 39% for northeast troops) either assist trained BSA leaders or take troops themselves on trips to public lands. About 12% of the troops in each region use college student or other adults to accompany youth during these trips.
Though only 44% of the southcentral respondents answered the question regarding ratio of Scout youth to adults, the ratio (regardless of the level of training of adults) seems to vary quite a bit. Of those who responded, 39% of the troops have one adult for every five Scouts. Fifty-one percent have one adult for every six to ten Scouts. Less than 10% of the troops have only one adult for every 11-15 youth. Youth/adult ratios in the northeast region appear to enable better supervision, with 83% of troops having one adult for every five Scouts and 15% having one adult for every six to ten youth.

The relatively high rate of non-response (56%) to this question in the southcentral region raises the question of "why?" Was it because they did not want to admit to a youth to adult ratio that did not meet BSA standards? If so, such low levels of adult supervision could have major implications for control of Scout behavior during trips to public lands. This does not seem to be a problem in the northeast region.

Types of activities, activity patterns, and the source of trip/ activity planning may all have implications for troop interactions with and impacts on the resource base. In both regions, about 72-75% of all the troops indicate that trips are planned by the adult leaders with some degree of input from the youth. Only about six percent of troops in each region indicate that trips are entirely adult-planned. Another 14-16% in each region indicate that trips are planned primarily by the Scouts themselves. Only a few trips are planned by youth with minimal adult input.

Scout troops take trips to public lands to engage in a variety of activities. Sometimes there is a primary activity; other times they engage in a variety of different activities during the same trip. By far the most frequently engaged in activities in both regions are camping and hiking/backpacking. More south-central troops engage in canoeing and other aquatic activities than do troops in the northeast (40% as compared with 24%). Other activities include nature-related activities, development of Scouting skills, sightseeing, and conservation projects. Less than five percent of the troops mentioned having fun or miscellaneous other activities as the primary trip activity. Within the miscellaneous category, northeast troops tend to indicate more participation in civic or career develop-ment activities than do southcentral troops. (See Figure 2.)

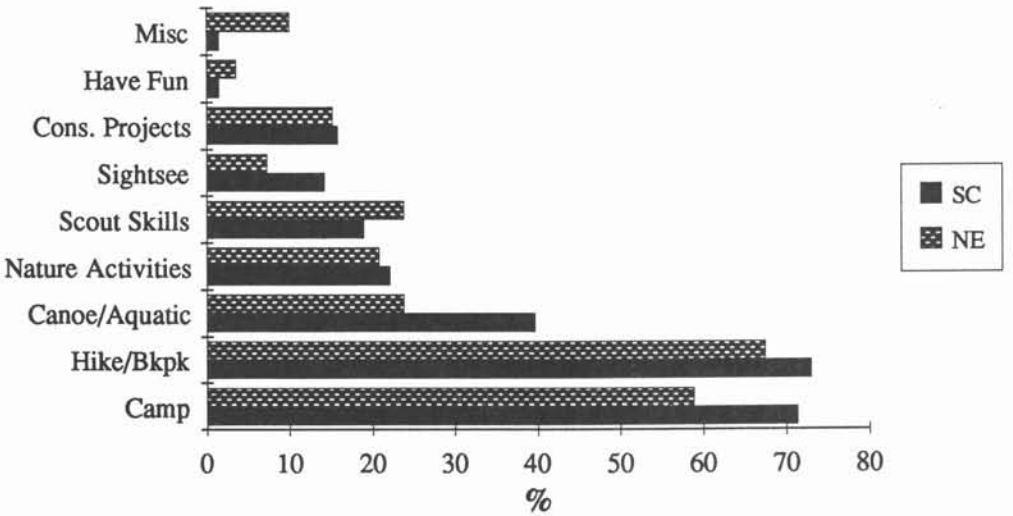

Figure 2. Activities engaged in by Boy Scouts on public lands.

Although troops usually have major programs of activities during their trips to public lands, most troops have some "free" or uplanned time. Most troops (about 98% in the southcentral region and 83% in the northeast) indicate four or fewer hours of free time. About 16% of northeast troops indicate five or more free hours, with almost 4% indicating more than 11 hours of unprogrammed time each day.

Often (for 90% of trips in the southcentral region and for 84% of trips in the northeast) activities engaged in by Scouts during trips to public lands result in their receiving some type of patch or award. Sometimes these are simply place identification patches which serve as souvenirs (13-14% in both regions). Participation awards (received 64% of the time in the southcentral region and 43% of the time in the northeast) also provide souvenir value. Other patches include awards received for demonstration of special skills or achievements. Achievement awards result from 30-32% of trips to public lands in both regions while BSA badges are earned during 24% (southcentral) to 34% (northeast) of the trips. Such patches and badges can serve as motivators for Scouts.

Linking BSA Troops and Public Land Managers
The purposes of other questions in the survey were to determine (1) effective metods of information dissemination to Scout troops, and (2) Scoutmaster perceptions of appropriate troop/ public land management agency interactions.

Responses to questions concerning Scout/management agency interactions suggest that, in addition to provision of facilities and supplies to facilitate troop activities, Scout groups would like to have more frequent and postive interactions with agency personnel. Direct staff involvement with Scouts, provision of programs, and provision of literature and informational services rank second through fourth (each cited by 11-18% of Scoutmasters) behind facility provision. Other troop needs (rule enforcement, reward system, and miscellaneous, or "nothing") identified in both regions follow similar patterns, with the exception that almost 22% of northeast troops indicate a desire for interpretive programs. (See Figure 3.)

Although the majority of Scoutmasters (almost 70% in both regions) report reading all information that they receive from

public agencies, the largest percent of troop leaders share with their troop members only the information that is considered interesting or pertinent. Results indicating that only 11-14% of the leaders in both regions share rules and regulations with boys suggest that this information is not deemed interesting or pertinent. This finding supports other research (Bradley 1981; Christensen 1981; Clark et al. 1972a, 1972b; LaHart and Bailey 1975; Petty and Cacioppo 1981; Ross and Moeller 1974; Roggenbuck and Berrier 1982) suggesting that written information seldom is attended to unless it is particularly interesting to, or needed by, the reader. More direct, personal methods may be needed in disseminating such information as regulations and management policies.

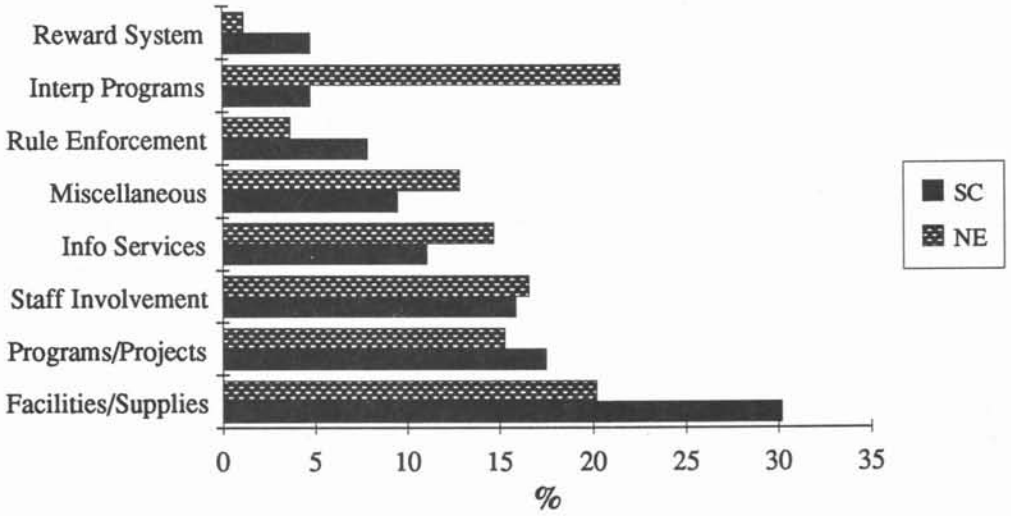

Figure 3. Services which Scoutmasters believe public land managers should provide.

Inappropriate BSA Behaviors Observed by Leaders
Several of the survey questions requested information relating to Scoutmaster perceptions of (1) types of depreciative behavior committed by other Scout or youth groups while visiting public lands, (2) the reasons for inappropriate behavior, (3) effective methods for dealing with young offenders, and (4) effective motivators for appropriate behavior.

Almost 15% of southcentral and 26% of northeast respondents stated they had never seen any Scouts behaving inappropriately while visiting public lands. Others identified a variety of general and specific behaviors engaged in by some Scouts. As observed by Scoutmasters, the most frequently reported inappropriate behavior by Scout groups using public lands was general misuse of and damage to the resources (56% in the southcentral region and 45% in the northeast). Other identified inapporpriate behaviors included: little regard or respect for other visitors (24%/southcentral and 20%/north-east); lack of leader control of Scouts (14%/southcentral and 19%/ northeast); legal violations (11%/southcentral and 1%/northeast); other rule violations (10%/southcentral and 3%/northeast); and miscellaneous actions resulting in a poor Boy Scout image (6%/southcentral and 2%/ northeast). (See Figure 4.)

The four most frequently cited reasons for inappropriate behavior are (1) inadequate leadership and supervision, (2) lack of consistent, enforced behavior standards throughout the year, (3) lack of training (of both Scouts and leaders), and (4) no knowledge or understanding of ageny regulations or expected behavior.

Appropriate & Inappropriate Behavior Motivators
Reflected in the reasons for inappropriate behavior are methods found by Scoutmasters to be most effective in controlling inappropriate behavior. The most frequently mentioned method by southcentral Scoutmasters (though rated considerably less and ranked third by northeast Scoutmasters) is to follow through with disciplinary sanctions (or to use the "big stick" approach). While this method involves post-behavioral sanctions, the other most often identified reasons by southcentral Scoutmasters are preventive. These include (1) keeping youth involved in planned programs or activities, (2) informing youth of and explaining reasons for expected behavior, (3) providing appropriate role modeling by sincere, caring adults, (4) clarifying and adhering to behavioral expectations throughout the year, and (5) using boy-focused techniques such as using the patrol system, activating peer pressure for appropriate behavior, and giving specific responsibilities to the youth. Though northeastern Scoutmasters also cite preventive techniques, they rank them differently. "Keeping them busy" and "providing adequate supervision" are considerably more important. These strategies are followed by (1) using a variety of peer techniques, (2) pre-trip training, (3) enforcing BSA standards, and (4) providing conservation projects. (Figure 5.)

The two factors ranked by Scoutmasters in both regions as the most effective motivators for troop participation in service projects are positive adult reinforcement and providing individual badges and patches. Receiving comparable medium rankings for motivation effectiveness, with slightly a different order in rankings between the two regions, are (1) peer approval, (2) formal verbal recognition, (3) troop awards or certificates, and (4) challenge. Informal verbal recognition is ranked last in effectiveness by Scoutmasters in both regions. (See Figure 6.)

Discussion

As in any research, there are limitations to this study, many resulting from limited researcher control of survey administration and the low response rate to the southcentral region Scoutmaster survey (discussed more fully in Vander Stoep 1990). Most of these problems were resolved with the north-east survey. However, differences in survey administration should be considered when comparing regional results.

Some respondents answered only some of the survey questions, ocassionally leaving open-ended questions unanswered. For such questions it is difficult to know if they were unanswered

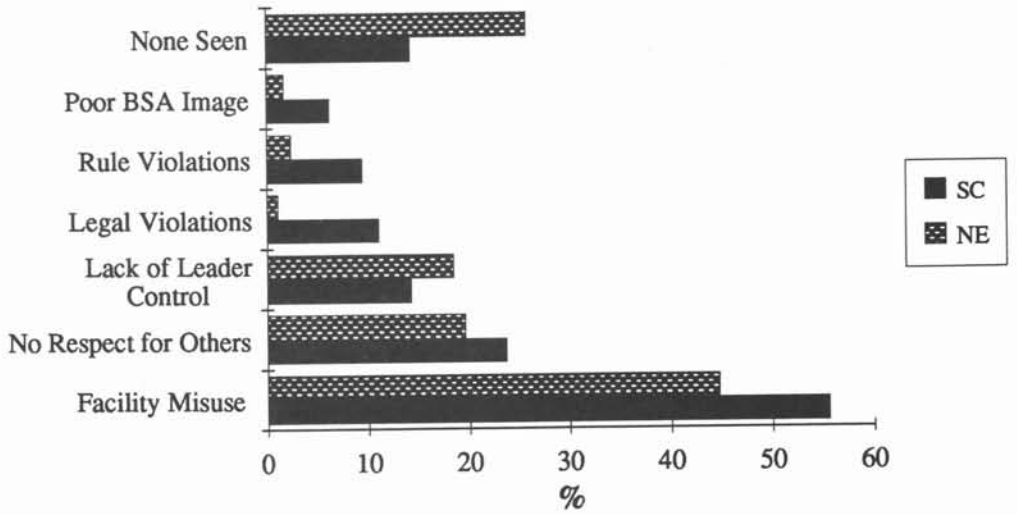

Figure 4. Boy Scout behavior problems on public lands as observed by Scoutmasters.

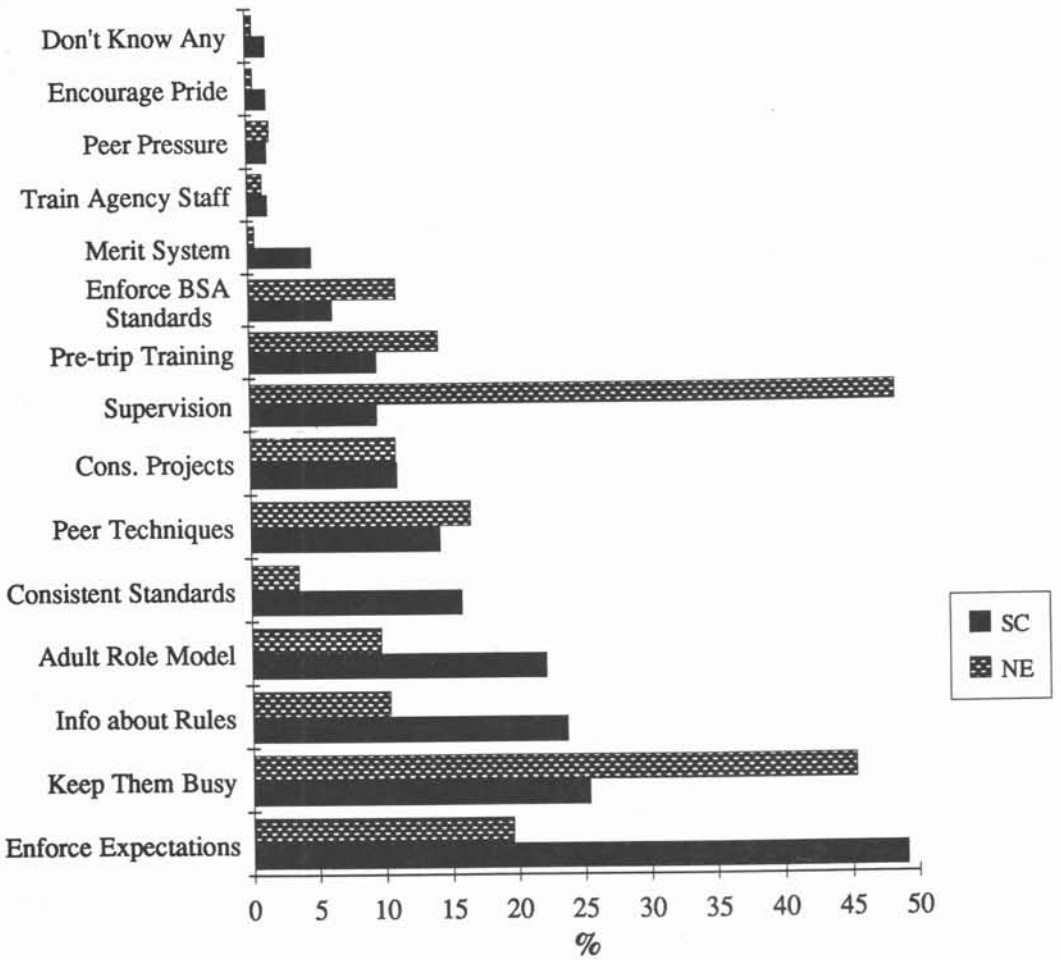

Figure 5. Effective behavior control techniques as identified by Scoutmasters.

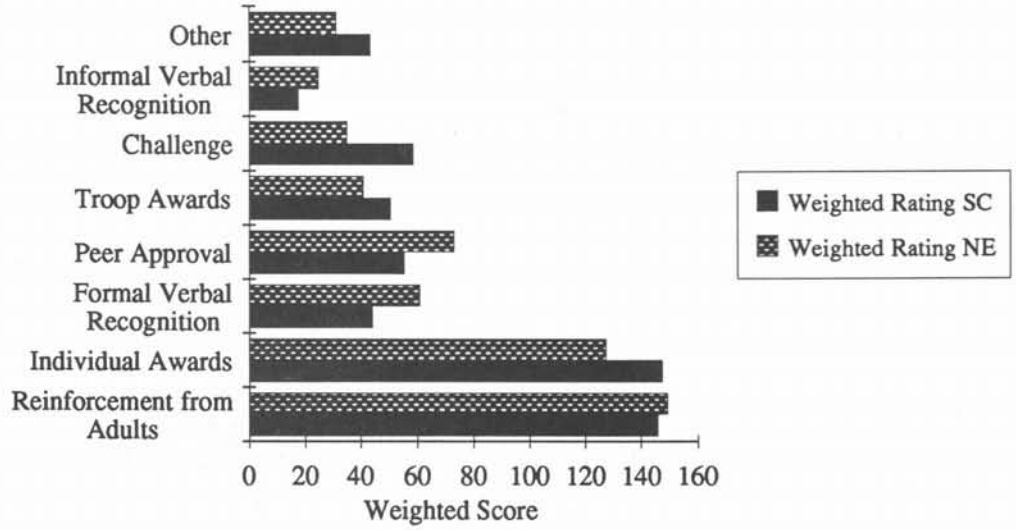

Figure 6. Motivators for appropriate Scout behavior, weighted by respondent rankings.

because they took more effort or because respondents chose not to address the specific issues. Some questions, such as the one asking for the ratio of adults to youth during trips, may have been left unanswered because of potential guilt or embarassment about low levels of adult supervision. If this is the case, low levels of adult supervision could have implications for control of Scout behavior during trips to public lands.

Despite limitations of the survey process, the responses in combination with specific comments made on the open-ended questions provide insights which can be useful to public land managers who work with Scout group users on their sites. Taken together, results indicate that most Scoutmasters in both regions would like increased involvement of public land managers with their troops. Such interactions can occur both prior to and during troop visits to public sites. It should be noted also that many respondents took the time to make additional comments on the back of the survey or requested copies of results (23 in the southcentral region and 58 in the northeast, about 35% of usable surveys in each region).

Implications of Regional Differences in Troop Characteristics

Smaller troops and better adult to youth ratios (increased supervision) during trips to public lands in the northeast may help reduce the amount of depreciative behavior exhibited by Scouts. However, because northeast troops use more volunteer parents (untrained as well as BSA-trained) and because more Scoutmasters tend to have fewer years of experience, troops in this region may be looking for increased interaction with and information and/or programs from public land managers. Several comments and requests for brochures about public lands written on the surveys seem to reinforce this need.

Implications of Regional Differences in Use of Public Lands

Though northeast troops take slightly fewer trips to public lands than southcentral troops, they tend to take more overnight than day trips. Additionally, they tend to have more "free" or unprogrammed time than the southcentral troops which have more experienced Scoutmasters. Again, this may indicate a need for more direct agency involvement and/or programming for Scout troops, or at least more contact and perhaps information/training opportunities for Scoutmasters.

Northeast troops use slightly more local and state areas and considerably more military sites than southcentral troops. This indicates that local as well as state and federal land managers need to be aware of Scout troop needs, behavior and activity patterns. Additionally, northeast troops do more bicycling and winter activities, indicating multi-seasonal Scout use of public lands and participation in corridor activities for which troops may be using public lands during only part of their trips. This can make information dissemination by public land managers more difficult.

General Implications for Public Land Managers

Some things that managers might do in preparation for Scout visits are described below.

Understand the BSA Program and Participants. If new to a specific public site, or new to public land use in general, Scout groups may feel unwelcome or uneasy, either because they are placed away from other visitors, they are not sure what to expect, or because they have no direct contact with agency personnel. In some cases, agency staff may have negative perceptions of or reactions to Scout groups, often due to previous negative experiences or misperceptions. Because Scout groups are highly visible during their visits (groups often are large and Scouts often wear uniforms, making them recognizable), any inappropriate behaviors are noticeable. Scouts might feel more welcome if managers made efforts to understand the Scouting program and troop activities.

Just as important is that Scout leaders make efforts to communicate with managers about their planned activities and schedules, and seek out information about rules, regulations and appropriate behavior for public lands. This information must be relayed to the youth in a positive and justified manner. Perhaps collaborative information-sharing programs could be established between specific land management agencies and a variety of organized youth groups. Development of mutually beneficial on-site and outreach programs could be incorporated.

Identify Site-specific Periods of Intense Scout Use. By identifying periods of heavy Scout use, managers can plan more effectively how to allocate staff, programs, campsites, and other resources. Additionally, they can reduce potential conflict between Scouts and other site users by spatially or temporally separating use or specific activities.

Identify Troop Expectations for Site Use. As is clearly evident in the outdoor recreation literature, visitors whose actual experiences do not match their expectations will be less satisfied with the visit than those whose match. If managers could identify troop expectations (via phone or letter during troop inquiries or site reservations, or during collaborative programs as suggested above), they could better link troops with sites, facilities and programs to meet their needs. Also, they could direct troops to other, more appropriate sites if the agency's site could not adequately accommodate or meet the group's needs.

Use Interpretation to Clarify Appropriate Behavior. Northeast Scout troops appear to want much more information, participatory projects, and interpretive programs than they currently receive. Use of all of these can help disseminate agency information, can contribute to development of environmental ethics, and can provide project help for short-staffed agencies.

Also, groups often engage in inappropriate behavior because they simply are unaware of negative consequences of some behaviors. Informing them, preferably through interpretive strategies rather than through more authoritative or threatening strategies, can reduce negative behaviors as well as promote positive images of the agency. It also can establish positive relations between Scout groups and the agency. Direct personal interactions often are more effective than written regulations. Additionally, messages to guide appropriate behavior and achieve other management goals can be incorporated into other interpretive programs.

Final Comments and Recommendations

Involve Scout Groups in Public Land Projects. Scout groups can become involved in a variety of service and conservation projects such as trail building and maintenance, litter cleanup, bridge-building, and sign painting. Many agencies already participate in such cooperative programs. They often require staff time to plan, coordinate and supervise, but benefits are numerous. They include keeping Scouts active during their visits, accomplishing needed maintenance and management tasks for the agency, improving Scouts' self-image, teaching them new skills, and contributing to development of an appropriate land ethic. The Scouting program is structured to support such service activities. Also, such activities often can be linked directly into an existing award system (particularly with Scout groups), or with an agency recognition program.

Although it may not be feasible, particularly with staff and budget constraints, to assign a staff person to work primarily with Scout and other youth groups, it can be beneficial to ensure that each Scout or other youth group has some type of direct, personal contact with an agency representative. This can take the form of pre-trip phone conversations with a group member or leader, an informal welcome and overview of the site at an entry booth or visitor center, a special interpretive program (such as an evening campfire program) for all youth group visitors at one time, or simply an informal welcome during a patrol through the group campsite.

For sites which receive intensive local Scout troop use, the agency might consider an open house/training session for adult and/or youth leaders. All the issues (as discussed previously) could be addressed in an open and personal manner. Such a program could increase understanding of and appreciation for each others' roles, responsibilities and expectations. It could produce supportive advocacy rather than an adversarial relationship.

Regardless of the package of strategies used, it is important that public land managers and Scout groups communicate openly and personally about their roles, responsibilities and expectations of each other. In this time of increasing use of cooperative ventures between agencies and between public and private sectors, perhaps we should consider also building cooperative ventures between managers and public land users whenever possible. Scout troops provide a ready-made user group for such cooperative programs.

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OUTDOOR RECREATION

OUTDOOR RECREATION II

RECREATIONAL PROGRAMMING IN A FAMILY CAMPGROUND: AN EXPLORATORY STUDY

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The purpose of this study was to determine if recreational programming within family campgrounds was a valid approach to deal with management problems found in public outdoor recreation areas. A survey of 399 respondents at Lieber State Recreation Area (Indiana) showed that programs offered tended to add to overall levels of camper satisfaction. Seventy-two percent of the campers have camped there before an average of 9.6 times in the past five years and 96% of the respondents intend to return.

Introduction

According to Jones (1988, p. 1), "camping has long been a favorite activity of outdoor recreationists." Technological advancement has resulted in a gradual change in the camping industry, as well as in the campers themselves. The concept of "roughing it" is rarely seen in modern camping facilities today (Jones, 1988).

Camping use in both public and private camping areas began to decrease in the mid-1980s. According to Cottrell (1990), "this trend continues today." The reasons are quite complex: decreased funding; lack of emphasis, in some cases a disdain for family campers on the part of management; greater expectations on the part of the user; attempts at privatization at the federal level; greatly increased user fees; and the lack of fun programming, which may contribute to youth boredom in public campgrounds (Cottrell, 1990).

Since visitation to both public and private campgrounds has declined, an assessment of public recreation need in a technologically advanced society is critical for both public and private sector campground managers. Declining use, an increase in camper discrimination when selecting a place to camp, and the increasingly more competitive campground marketplace, mean pleasing the customer is a necessity (Jones, 1988). Obviously, managers should consider a change in the traditional approaches to customer service.

Most camping clientele come from an urban setting, where general knowledge of ecology and nature is rather limited. As noted by Cottrell (1980, p. 38), "research data and recent history tells us that public park camping use is not rural in origin." In fact, most campers are from urban areas and are accustomed to an assortment of recreational activities. Those activities, at the municipal level, typically involve such program categories as arts, crafts, dance, drama, music, sports, games, social events, and some environmental activities.

Community recreation programs serve to enrich family unity by providing activities that encourage entire family participation. Traditional interpretive programs on boating safety and smokey the bear do not provide a comfortable tie to municipal programs (Cottrell, 1990). Therefore, public agencies, for the sake of continuity, might also tailor programs in family campgrounds to encourage entire families to camp together (Hultsman et al., 1987). According to Cottrell (Hultsman et al., 1987, p. 250), "the lack of outdoor recreation programming is the most serious shortcoming of the profession today." Recreational programming can provide familiar activities in an unknown setting, a bridge or stepping stone over the fear of the foreign and of the unknown for those citybred campers who feel out of place in a wooded environment (Cottrell, 1980).

In a recent study involving the factors that influence outdoor recreation participation as outlined by McClaskie, Napier and Christensen (1986), familiarity with an activity or activities in which prior participation produced positive rewards was more likely to breed future repeat participation. Simply stated, people will normally repeat known safe positive experiences. These findings suggest that participation in outdoor activities as a youth may carry over into adult leisure time activities. Therefore, the provision of recreational programs intertwined with interpretive programs might be an avenue for managers to do a better job serving campground visitors as well as enhancing visitor knowledge about the outdoors.

Another study focusing on the relationship between adolescent and adult leisure patterns indicates that a certain percentage of youthful leisure time experiences will carry over into adulthood (Scott and Willits, 1989). Using a longitudinal model, Scott and Willits compared data from 1298 subjects who were studied during their high school days and again when the same subjects were in their fifties. "For the sample members, the greater the involvement in a specific type of activity during adolescence, the more frequent the participation in the same type of activity at midlife" (Scott and Willits, 1989, p. 323). In support of this idea, Kelly (1974, 1978) found that leisure patterns of adults are augmented from childhood leisure time activities and experiences.

Prior recreation program research in family campgrounds is quite limited. One of the first studies in this area was conducted by Winn (1975), who examined the characteristics, camping background, and program preferences of campers at Hillman Ferry campground, Land Between the Lakes in western Kentucky. In 1975, campground occupancy rates at Land Between the Lakes increased eight percent over the 1974 use figures. Interestingly, 90 percent of the teenagers campers had were camping with them. Research being rather limited in this respect, one can only speculate based on authoritative opinion that such high numbers of teenagers camping with their families in Land Between the Lakes may be attributable to the aspect of lots to do. A typical summer week in Land Between the Lakes campgrounds in the mid to late 1970s featured 75 to 100 scheduled activities ranging from sports and games, skills activities, arts and crafts, interpretation, aquatic activities, dancing, and evening campfire programs (Cottrell, 1990). Winn implies that recreational 'fun' programs may increase campground occupancy rates, camper satisfaction, and teenage camping participation.

As a follow up to the Winn project, Hultsman (1977) conducted an applied study looking at teenage program preferences. Of the 96 respondents, 86% had participated in campground programs. Results imply that teenagers, typically a group that park

managers do not program for (Cottrell, 1990), will participate in programs of interest to them.

Purpose

The purposes of this study were to: 1) determine if programming within a family campground was important to campers, and how this importance rating relates to overall camper satisfaction, 2) determine if there was a relationship between performance of campground programs and overall satisfaction, and 3) determine if there was a relationship between participation in campground programs and camper feelings towards overall camper satisfaction. The overall intent of this exploratory research was to determine if recreational programming within family campgrounds was a valid approach to deal with management problems found in public outdoor recreation areas.

Methods

Study Setting

Lieber State Recreation Area (LSRA), operated by the Indiana Department of Natural Resources, is located 50 miles due west of Indianapolis, Indiana. Adjacent to Cagles Mill Reservoir, program facilities include a marina, boat docks, boat ramp, swim beach, basketball courts, amphitheater, activity center, hiking trails, and a sports/activity field. Don Albietz (1990), Property Manager, LSRA, says that "recreational programs in the campground have been a solution to several of his management problems in the park." Those problems, typically associated with insufficient generation of revenues, were identified as excessive vandalism and poor visitation rates during the week and on non-holiday weekends. Prior to the 1986 season, campground programming had mostly been interpretation with low camper participation. In 1986, Albietz minimized interpretation and began to incorporate recreational programming into the overall management scheme of LSRA.

Albietz (1990) states that "the implementation of recreational programs in the campground has increased both camping and overall property revenues." Camping revenue declined from 1984 to 1985. Following the advent of the treatment (recreational programming), camping revenue has increased 39% from 1985 to 1989; likewise, overall property revenue has increased 66% from 1985 to 1989. There has only been a marginal increase in user fees from 1987 to 1990. For instance, in 1987, camping fees were $8.00 per site with electrical hookups and $5.00 per site without electricity, which increased to $9.00 per site with electrical hookups and $5.50 per site without electricity in 1989. Likewise, no fees were charged for campground programs. In addition, the incidence of vandalism has decreased ($5,000 in 1985 allocated for repair of damaged property versus $2,000 in 1989).

Data Collection

A twelve-page self-administered questionnaire was used to solicit responses about camper participation characteristics, program attendance patterns, levels of experience satisfaction, and demographics. A stratified systematic sample with a random start represents those campers in camp the last night of their trip. State park rangers and activities staff distributed and collected the surveys on site. Approximately 6% of those campers asked to participate in the study refused to do so. The total of 399 subjects represents the entire camping season from Memorial Day weekend through Labor Day 1990.

Description of Sample

Indiana state residents represent 92% of the user population. Forty-three percent of those campers were from Indianapolis, Indiana. The average distance traveled per camper from Indiana was approximately 53 miles one-way.

The average size group of LSRA campers included five people. Fifty-eight percent of the users were family campers with children while 25% were couples. Forty-four percent of the campers were camping with another group of family members or with friends. The average number of vehicles per group on this trip was 1.76. In addition, there was an average of one boat per group. Tents (62%) were the most frequently used type of camping equipment, followed by fold down campers (17.9%).

When the respondents were asked "do you have children living with you," 66% said 'yes.' The average number of children living with the subjects was 2.2. Over two-thirds (67.9%) of these campers reported having children with them on this camping trip. Approximately three-quarters of the children with families on this camping trip were between one and twelve years old. Of those campers with teenagers living with them, 69% of the teenagers were with them on this camping trip.

LSRA visitors were quite avid campers. Seventy-six percent of the respondents camped in public campgrounds last year while averaging 24 days camping per year in the last five years.

Satisfaction

LSRA campers appear to be quite satisfied with their overall camping experience (Table 1). On a scale of one to ten (with ten being the perfect experience), 88.9% rated their experience a seven or higher. Nearly one-third of the campers rated their experience an eight, and the average satisfaction level was 8.0.

Other variables indicative of campers' overall high levels of satisfaction with the camping experience at LSRA included the high number of return visitors and campers' intent to return. Approximately three-quarters of the respondents have camped at the site before, with the number of visits per camper over the last five years averaging 9.6. When asked if they plan to return to LSRA, 96.1% said 'yes.' Of the 3.9% of the respondents who do not intend to return, 53.3% were just passing through the area enroute to some other destination. Some of the most frequent reasons why campers plan to return were: close to home (24.3%), clean park (16.4%), nice place to camp (15.3%), and we like the park (15.3%). Additionally, 44.8% of the respondents intend to return this year. These findings suggest that campers are very pleased with their camping experience at LSRA. One assumption may be that campers feel welcome, comfortable, and safe. Although not directly measurable, campground programs may be a major contributing factor towards increased feelings of being welcome and increased perceptions of safety.

Table 1. Overall satisfaction of LSRA campers as measured by 10-point satisfaction scale.

Satisfaction Level	Frequency	Percent	Cumulative Percent
2	1	.3	.3
3	2	.5	.8
4	1	.3	1.1
5	20	5.3	6.4
6	19	5.1	11.4
7	74	19.7	31.1
8	118	31.4	62.5
9	84	22.3	84.8
10	57	15.2	100.0
Total	376	100.0	100.0
Mean = 8.0		Median = 8.0	Std Dev = 1.4

Program Participation

Twenty program categories were identified as those structured opportunities scheduled on a weekly basis throughout the summer 1990 camping season. Campers were asked to indicate what program(s) members of their group participated in.

Approximately 67% (N=253) of the respondents indicated that some member of their family had participated in one or more of the programs. Some of the most frequent reasons why campers did not participate in campground programs were because these activities were not why we came here (45.5%) and they did not know of the programs (35.3%).

When asked "Are you familiar with the program activities at LSRA," 60% of the respondents said 'yes.' The relationship between program attendance and camper familiarity with programs was statistically significant at the .001 level (X^2=33.157, df 1). Of those campers familiar with the programs at LSRA, 78% attended campground programs. Likewise, of the 40% not familiar with programs, 49% attended programs as well. The most effective methods of informing campers about the programs were by program brochures given at the main gate (53.3%), the activity center bulletin board (51.5%), and rest room bulletin boards (40.2%).

Approximately 32% of the respondents answered 'yes' to the question "Does the opportunity to participate in various programs influence your family's decision to camp here rather than in other public or private campgrounds?" There was a strong relationship between program attendance and the influence of programs on campers decision to camp at LSRA, which was statistically significant at the .001 level (X^2=25.120, df 1). Among those campers for which program opportunities at LSRA influenced their decision to camp there, 85% attended campground programs. Moreover, of those campers not influenced by program opportunities, 57.5% attended campground programs.

Another finding concerning the independent variable, familiarity with programs, was its relationship to previous camping experiences. This relationship was statistically significant at the .001 level (X^2=18.562, df 1). Two-thirds (67%) of those who had previously camped at LSRA were familiar with its programs, compared to only 43% who had not camped there before.

The relationship between past camping at LSRA and program attendance was statistically significant at the .05 level (X^2=5.286, df 1). Of those campers who had camped there before, 70.6% attended campground programs, while 57.5% of those campers who had not camped there before attended campground programs.

Importance-Performance Analysis

Upon examination of the importance and performance placed on the various activities, there was considerable variance among the different activity means. Table 2 shows the twenty program categories included in the camper survey. Those activities rated 5.0 or above in importance (listed from high to low) were recreation equipment issue (5.8), activity center (5.6), nature hikes (5.6), beach activities (5.5), boat rides (5.4), dances (5.1), and children's movies (5.0). It was surprising to find that campfire programs were not as important to campers as other activities. Interestingly, the only educational/nature oriented activity scoring above the 5.0 rating was the nature hike category. Slides/speakers, rated 3.2, was the lowest of all the program activities, probably because of its lecture oriented connotation.

Table 2. Program activities mean importance-performance ratings.

Sym-bol	Program Activity	Importance Ratings Average	N	Performance Ratings Average	N
A.	Beach Activities	5.5	180	5.5	187
B.	Boat rides	5.4	158	6.2	163
C.	Worship Service	4.3	71	5.1	74
D.	Bicycle programs	4.5	61	4.7	65
E.	Campfire programs	4.7	66	5.1	71
F.	Court games	4.2	70	4.9	75
G.	Educational programs	4.8	59	5.1	66
H.	Field sports/games	4.0	62	5.1	65
I.	Musical programs	4.8	72	5.4	77
J.	Late night movies	4.6	77	5.6	82
K.	Children's movies	5.0	72	5.7	74
L.	Nature hikes	5.6	106	5.8	110
M.	Night hikes	4.8	71	5.4	73
N.	Contests	4.1	59	5.1	60
O.	Square dances	3.9	53	5.0	57
P.	Slides/speakers	3.2	47	4.6	52
Q.	Teen scene	3.9	51	4.9	53
R.	Dances	5.1	89	5.6	92
S.	Activity Center	5.6	95	5.7	101
T.	Recreation Equipment Checkout	5.8	99	5.8	105

Note: The sample size for both ratings represents only those campers that participated in each of the programs.

Generally, mean performance ratings were higher than importance ratings (Table 2). For instance, boat rides had the highest rating at 6.2 in performance in comparison to 5.4 for importance. Both recreation equipment checkout and nature hikes (5.8) were the second highest rated activities followed by activity center and children's movies (5.7), dances (5.6), late night movies (5.6), beach activities (5.5), etc. Only four of the activity categories averaged below a five point rating: teen scene, court games, bicycle programs, and slides and speakers.

Figure 1 (see next page) presents the Importance-Performance Action grid for program activities at LSRA. Recreation equipment checkout was evaluated as the most important and well performed item. Bicycle programs, court games, teen scene, slides and speakers were the only four activity items to fall within the "Low Priority" quadrant.

Of the importance variables, the relationships between court games (F=2.20), contests (F=2.28), slides/speakers (F=2.56), and activity center (r=2.44) and the dependent variable, overall camper satisfaction were statistically significant at the .05 level (Table 3). Those respondents reporting higher importance for those programs tended to also report higher overall satisfaction.

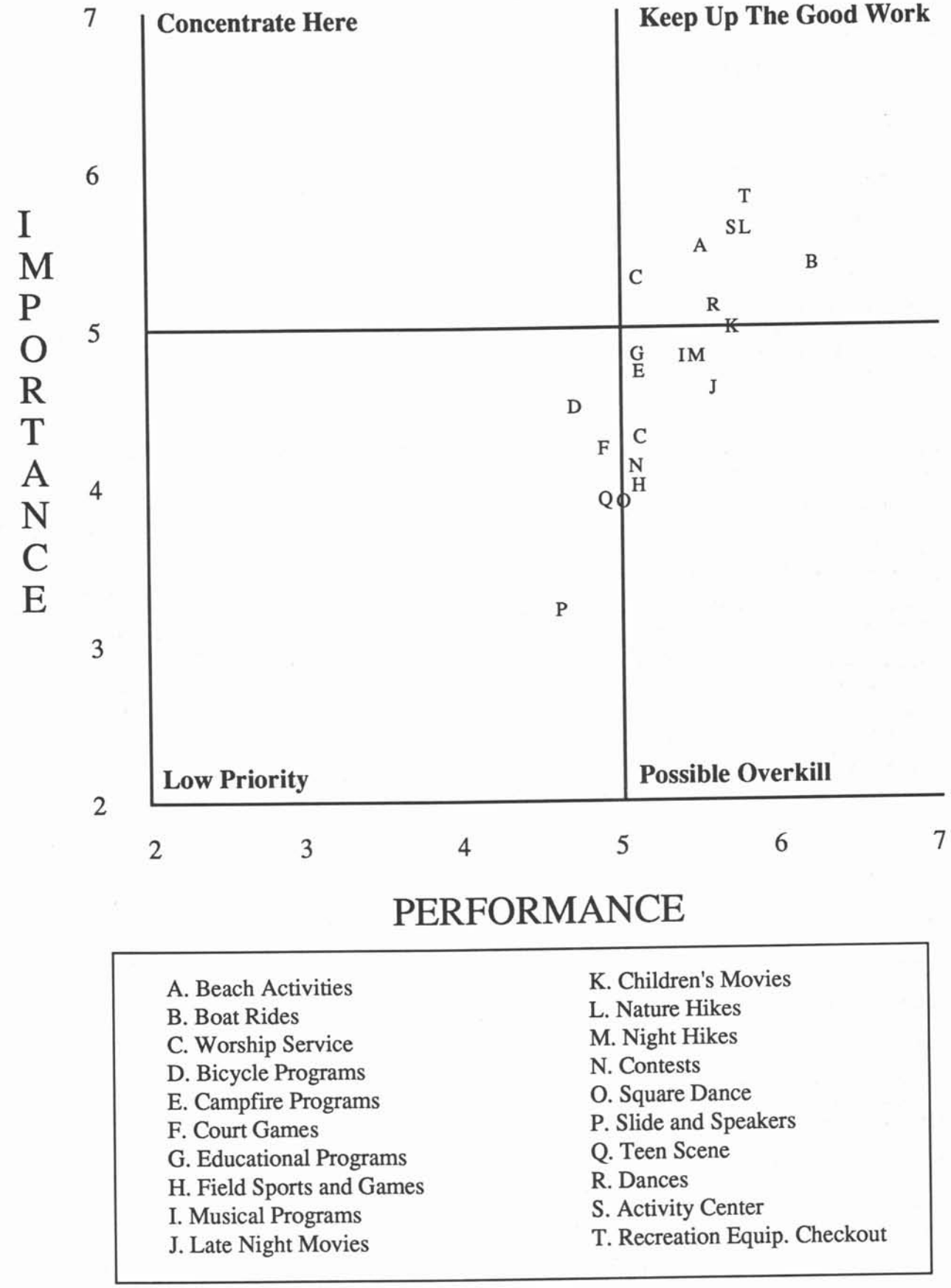

Figure 1. Importance performance action grid for program activities at Lieber State Recreation Area.

Table 3. Mean values of overall camping satisfaction by importance of the campground programs.

	Not Important 1	2	3	Somewhat Important 4	5	6	Quite Important 7	$\bar{x}$	F-Value
	(111)	(32)	(46)	(63)	(21)	(21)	(21)	(315)	
Court Games	7.8	7.8	7.6	8.2	8.2	8.6	7.8	7.9	2.20*
	(116)	(34)	(41)	(53)	(27)	(20)	(31)	(322)	
Contests	7.8	7.6	7.8	7.9	8.1	8.6	8.5	7.9	2.28*
	(54)	(22)	(29)	(57)	(38)	(39)	(92)	(331)	
Activity Center	7.6	7.9	7.8	8.4	7.7	7.6	8.2	7.9	2.44*
	(138)	(37)	(36)	(55)	(17)	(18)	(15)	(316)	
Slides/speakers	7.9	7.4	8.0	8.0	7.3	8.5	8.6	7.9	2.56*

* Significant at the .05 level
() Values in parenthesis denote sample size

Of the performance variables (Table 4), the relationship between contests (F=3.64) and overall camper satisfaction was statistically significant at the .05 level. Campfire programs (F=3.88) and beach activities (F=4.42) were significant at the .01 level and nature hikes (F=6.92) was significant at the .001 level. Those respondents reporting higher performance for these programs tended to have higher overall satisfaction.

To determine if campers were satisfied with the programs at LSRA, campers were asked to rate their level of satisfaction for campground programs. Campers appear to be quite satisfied with the programs overall. On a scale of one to seven (with seven being the highest), 83% rated their experience a five or above. One-third of the campers rated the quality of the programs a seven, and the mean program satisfaction level was 5.7. As expected, the relationship between program satisfaction and overall camper satisfaction was statistically significant at the .001 level (r=.298).

Although program participation (nominal scale) was not significantly related to overall camper satisfaction, those campers who participated in programs rated overall satisfaction (mean=8.09) slightly higher than those campers who did not participate (mean=7.98) in the campground programs. The relationship between the independent variables of previous experience at LSRA (F=6.43, p=.05), programs influence on decision to camp here (F=7.63, p=.05) and camper intent to return (F=13.39, p=.001) to overall camping satisfaction were all statistically significant (Table 5).

Table 4. Mean values of overall camping satisfaction by performance of the campground programs.

	Mostly Dis-Satisfied 3	Mixed 4	Mostly Satisfied 5	Pleased 6	De-lighted 7	$\bar{x}$	F-Value
	(6)	(14)	(15)	(11)	(13)	(59)	
Contests	7.5	7.6	7.5	8.9	8.7	8.1	3.64*
	(12)	(14)	(10)	(16)	(17)	(69)	
Campfire Programs	7.8	7.4b	8.4	8.3	8.8a	8.2	3.88**
	(20)	(16)	(36)	(66)	(45)	(183)	
Beach Activities	8.1	7.6b	7.9c	7.9d	8.8a	8.1	4.42**
	(3)	(11)	(24)	(38)	(32)	(108)	
Nature Hikes	7.7	7.6b	7.6c	7.9d	8.9a	8.1	6.92***

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Scheffe Test: Letter superscripts indicate differences between groups significant at the .05 level.
() Values in parenthesis denote sample size

Table 5. One-way analysis of variance: Mean values of levels of overall camping satisfaction by attendance in programs, previous camping at LSRA, influence of programs on camping decision and intent to return.

		N	$\bar{x}$	F-Value
Level of Overall Camping Satisfaction				
Attendance at Programs	Yes	244	8.09	ns
	No	115	7.98	
Previous Camping at LSRA	Yes	278	8.12	6.43*
	No	97	7.70	
Influence of Programs on Camping Decision	Yes	113	8.30	7.63**
	No	239	7.86	
Intent to Return	Yes	357	8.11	13.39***
	No	8	6.38	

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Conclusions

Upon review of camping participation at Lieber State Recreation Area, apparently most of the subjects like to camp there. Data show the park to be clean, safe, as well as desirable for family campers. These attributes were demonstrated by: 72% of the campers have camped there before on the average of 9.6 times in the past five years; 96% of the campers intend to return of which 45% intend to return during the same calendar year; over two-thirds of the respondents with children living with them had those children on this trip, and 69% of those people with teenagers living with them had those teenagers on this trip.

In summary, programs offered at LSRA tend to increase overall levels of camper satisfaction. As program satisfaction increases, so does the overall satisfaction of campers with the camping experience. These findings present implications for the use of program satisfaction as a management tool for indirectly manipulating overall camper satisfaction. By focusing management action on the types of programs offered and on types of activities the user prefers, overall camper satisfaction should increase. Continual effort is necessary, however, to monitor and assess user participant patterns, program interests, trends, and camper satisfaction. For simplification, individuals seek alternatives of interest to them. The availability of freedom of choice results in happy, healthy individuals, "the happy camper." The notion of the happy camper could mean return visitation, increased revenue, ... and ultimately, a happy management team.

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FEAR IN THE OUTDOOR ENVIRONMENT: DESCRIPTION AND MODIFICATION THROUGH RECREATION PROGRAMS

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Using the Situational Fear Inventory, outdoor course participants identified the degree to which they experienced social-based and physical-based anxieties at the beginning, middle, end of their course. Levels of social-based fears were higher and more resistant to modification. Females expressed higher levels of fears. Most fears were reduced significantly through program participation.

Introduction

One interesting aspect of recreational activities taking place in a natural environment is the "push and pull" attributes of the experience. Similar to the dialectical view of leisure behavior (Iso-Ahola 1980:135), for some of the outdoor recreation experience provides a number of appealing attributes while also presenting some challenging and anxiety-producing situations. Bass (1989) reports that this dualism in the outdoor recreation experience epitomizes a coming to terms with the subjective feelings experienced through situations that are challenging and with unexpected outcomes. For many, these outdoor recreation experiences are first experienced through a structured educational program taking place in a natural environment (Kaplan and Kaplan 1989:121).

In an earlier study, Ewert (1988) identified situational fears before, immediately after, and one year following participation in Outward Bound, a wilderness challenge program. In addition, he found that individuals reported reduced levels of situational anxieties following participation in the program.

The purpose of this study was to identify and measure the levels of situational fears and anxieties held by participants of a different type of outdoor program and to measure fears during as well as before and after the course. Because gender was identified as an intervening variable in the previous study (Ewert 1988), this study was also designed to determine if males and females report different levels of anxieties at the beginning, the middle, and end of the course. Based on the literature and past findings (Leary 1982; Gray 1987) it was expected that the items representing social-based fears (e.g., fear of confrontation in the group) would be rated more anxiety-producing than those representing physical fears (e.g., falling or becoming injured). It was also hypothesized that females would report higher levels of fear than males. Finally, based on the cognitive restructuring model (Beck 1976), it was hypothesized that levels of anxiety would decrease significantly throughout the course.

Methods

Subjects in the study were college recreation and physical education majors completing separate, but similar Outdoor Education Practicum (OEP) courses at the Cortland College Outdoor Education Center in the Adirondacks. As mentioned, the OEP courses are notably different from the Outward Bound courses of the earlier study. The course, which runs for 13 days, includes a 5 or 6 day "pretrip" period at the Center and a 5 or 6 day extended canoe and/or backpacking trip in various wild forest areas of the Adirondack Park. The pretrip period at the Center is operated on a schedule that emulates life in a traditional, centralized summer camp. Activity periods are devoted to teaching camping skills and environmental awareness that will enhance students' readiness for and enjoyment of the subsequent trip. The trips take place in remote areas and require primitive camping and traveling skills. Although involving physical and emotional stress, neither the trips nor the in-camp, pretrip experiences center around the systematic progression of challenges associated with the "Outward Bound" formula. The purpose of the OEP is to improve students' appreciation of the natural environment and to complement their professional preparation with knowledge and skills related to centralized camping, trip camping, and outdoor pursuits. Although differing programmatically and objectively from Outward Bound, the OEP, like Outward Bound, has been found to effect significant changes in self-concept (Young and Steele 1989).

Subjects completed a version of the Situational Fear Inventory (Ewert 1988) (1) upon arrival at the Center, (2) after completing the in-camp pretrip phase, and (3) following their backcountry trip. In completing the instrument, students responded to 33 potentially fearful situations by placing a slash (/) across a 10 cm. line ranging from "not at all anxious" to "very anxious." The measured distance from a zero point to a slash mark provided a numerical expression of the level of fear. A number of research questions were addressed in this study including the effects of pretesting. This report, however, is designed to provide a description of the type and level of fears expressed and the influence of gender. To determine any significant differences between the data, one-way ANOVAs with post-hoc Scheffe tests were utilized.

Findings

Across two summer seasons (1989-1990), individuals from eight courses consisting of 42 different trip groups were queried. From this sample, 380 usable questionnaires were obtained. Based on these data, the first hypothesis (social fears would be more anxiety-producing than physical-based fears) was supported. Figure 1 depicts the consistently higher average level of all social fears compared with physical fears at each point of measurement. A similar pattern is apparent when one compares the number of elevated mean scores (e.g., above 40.0) in Table 1 (social) with those of Table 2 (physical). The frequency of elevated social fears (26) is greater than that of physical fears (11) $\chi 2$ (1, N = 168) = 10.844, p <.001.

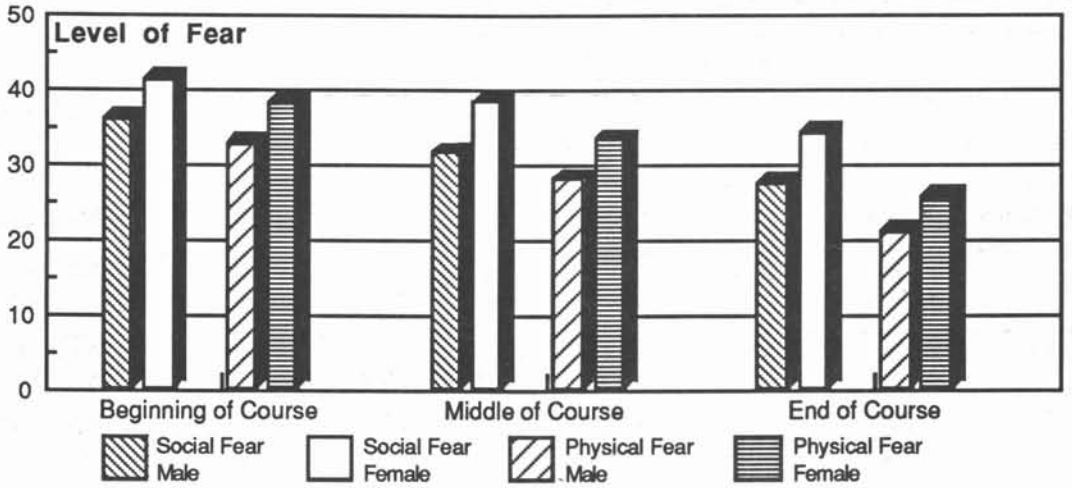

Figure 1. Average levels of social based and physical fears of males and females at the beginning, middle and end of course.

Table 1. Changes in social-based fears of outdoor program participants.

Expressed Fear	Gender	Means Pre-Course	Means Mid-Course	Means End of Course	F Value	P	Difference
Unable to Control Social Environment	Male	37.9	32.8	25.7	12.8	.00	Pre/Middle-Post
	Female	38.9	35.9	30.4	5.1	.01	Pre-Post
Exposure to Un-expected Situations	Male	42.3	38.5	29.6	11.9	.00	Pre/Middle-Post
	Female	46.4	45.9	33.8	14.0	.00	Pre/Middle-Post
Making Wrong Decisions	Male	43.0	38.1	31.6	9.7	.00	Pre-Middle-Post
	Female	49.0	47.7	40.1	5.8	.00	Pre-Middle-Post
Letting Self Down	Male	40.3	35.5	31.7	4.5	.01	Pre-Post
	Female	49.4	47.3	43.7	1.5	.22	No Difference
Letting Others Down	Male	49.9	44.2	39.9	5.6	.00	Pre-Post
	Female	57.4	56.2	53.3	0.8	.44	No Difference
Task Too Demanding	Male	42.5	35.1	26.3	20.2	.00	Pre-Middle-Post
	Female	46.4	43.6	33.3	12.5	.00	Pre/Middle-Post
Confrontation With Others	Male	32.0	28.7	26.3	2.4	.09	No Difference
	Female	35.1	31.0	30.6	1.3	.29	No Difference
Going Unrecog-nized in Group	Male	31.1	26.1	25.0	3.4	.04	No Difference
	Female	34.7	29.7	29.4	1.8	.17	No Difference
Not Performing Up to Group Expectations	Male	39.0	33.0	31.2	4.1	.02	Pre-Post
	Female	50.0	45.6	40.6	4.5	.01	Pre-Post
Not Fitting in With Group	Male	35.2	31.1	28.8	2.8	.06	No Difference
	Female	41.3	36.7	35.0	2.0	.14	No Difference
Not Performing Up to Leader Expectations	Male	38.7	35.1	31.5	3.3	.04	No Difference
	Female	45.6	44.5	40.9	1.2	.31	No Difference
Being Sexually Harassed	Male	18.0	14.0	13.7	2.1	.12	No Difference
	Female	28.6	23.1	23.0	1.5	.22	No Difference
Not Getting Money's Worth	Male	28.9	26.4	22.0	3.5	.03	No Difference
	Female	27.3	21.7	21.1	2.3	.10	No Difference
Course Not Meeting Expectations	Male	26.5	23.7	22.5	1.3	.27	No Difference
	Female	29.9	27.7	24.2	1.9	.15	No Difference

Table 2. Changes in physical-based fears of outdoor program participants.

Expressed Fear	Gender	Means Pre-Course	Means Mid-Course	Means End of Course	F Value	P	Difference
Unable to Control Physical Environment	Male	39.6	37.9	25.4	17.9	.00	Pre/Middle-Post
	Female	42.5	40.4	32.3	6.9	.00	Pre/Middle-Post
Bad Weather	Male	35.0	33.7	21.3	15.89	.00	Pre/Middle-Post
	Female	42.6	38.6	23.0	23.4	.00	Pre/Middle-Post
Poisonous Plants	Male	29.6	21.7	15.9	15.3	.00	Pre-Middle/Post
	Female	33.9	27.3	18.0	15.7	.00	Pre/Middle-Post
Poisonous Snakes	Male	36.2	26.9	21.6	11.4	.00	Pre-Middle/Post
	Female	48.4	38.6	31.3	9.5	.00	Pre-Post
Darkness	Male	27.7	23.1	17.9	7.2	.00	Pre-Post
	Female	31.3	27.8	22.6	4.3	.01	Pre-Post
Dangerous Animals	Male	38.6	33.7	22.7	16.1	.00	Pre/Middle-Post
	Female	47.1	41.0	29.6	14.9	.00	Pre/Middle-Post
Insects	Male	42.7	38.7	29.8	9.4	.00	Pre/Middle-Post
	Female	46.1	44.3	37.3	3.5	.03	No Difference
Becoming Sick	Male	31.0	26.1	22.3	6.0	.00	Pre-Post
	Female	35.6	32.1	25.3	6.0	.00	Pre-Post
Fast or Deep Water	Male	30.1	26.2	20.0	8.0	.00	Pre-Post
	Female	37.9	31.4	26.7	5.9	.00	Pre-Post
Becoming Lost	Male	35.7	29.3	20.7	17.0	.00	Pre/Middle-Post
	Female	41.9	37.1	30.1	7.2	.00	Pre-Post
Getting Dirty	Male	21.3	17.7	12.5	8.0	.00	Pre-Post
	Female	19.4	16.4	11.4	6.5	.00	Pre-Post
Inadequate Clothing	Male	30.0	28.3	21.5	6.4	.00	Pre/Middle-Post
	Female	36.3	35.9	24.7	10.4	.00	Pre/Middle-Post
Not Enough Training	Male	29.8	22.9	21.5	6.4	.00	Pre-Middle/Post
	Female	40.9	30.7	26.8	11.8	.00	Pre-Middle/Post
Insufficient Food	Male	31.4	27.4	23.8	4.1	.02	Pre-Post
	Female	34.7	28.0	22.7	7.7	.00	Pre-Post
Cold/Hot Temperatures	Male	31.6	27.3	19.6	12.7	.00	Pre/Middle-Post
	Female	32.9	31.2	23.6	5.7	.00	Pre-Post

The data indicated that gender was an important mediating variable in all three levels of measurement (beginning, middle, and end of course), with females consistently reporting higher levels of anxiety (see Tables 1 and 2). These findings were particularly pronounced in the items of "letting others down," "not performing up to group expectations," and "letting myself down." In these cases and particularly for females, the level of fear remained relatively high. Comparing the occurrences of elevated (i.e., <40.0) fears of women and men in Table 3, the differences were significant $\chi 2$ (1, N = 174) = 18.16, p <.001.

Table 3. Frequency of elevated fears levels of males and females.

	Fear Level		
Gender	> 40	< 40	Total
Females	30	57	87
Males	7	80	87
Total	37	137	174

a/χ^2 (1, N = 174) = 18.16, p <.001.

The data also supported Hypothesis 3 with levels of anxiety consistently lessening with later measurements. All fear levels were reduced; 71.6% were reduced significantly (p <.05). In most instances, the degree and significance of fear reductions were similar for men and women. The timing of the significant change (pre- to mid- and mid- to post-course) varied more widely.

As indicated in Table 4, the social fears, found earlier to be higher, were also more difficult to change. All physical fears, except the female's anxiety about insects, changed significantly. In contrast, only 12 (42.9%) of the social anxieties were reduced significantly.

Table 4. Frequency of significant change in levels of social and physical fears.

	Significance		
Fear	<.05	>.05	Total
Social	12	16	28
Physical	29	1	30
Total	41	17	58

a/χ^2 (1, N = 58) = 20.24, p <.001.

Implications

There are two sets of implications relative to the findings of this study. From a marketing and programmatic perspective, useful information can be gained by knowing what participants of structured natural environment and wilderness-challenge programs fear. As has been reported in past research, the findings of this study suggest that the social-based fears such as not meeting the expectations of others are more anxiety-producing than the physical-based fears. Further, this study found that the social-based fears are more resistant to change. It would seem that learning facts and skills and completing the experience alleviate most physical fears. The persistence of some social fears (e.g., not fitting in with the group) may stem from the students' doubts about their acceptance by their group in the course. Or, it may stem from the knowledge that acceptance by their course group does not necessarily assure them of acceptance by the next group with which they travel or work. These points and the item-specific findings may suggest ways some providers of these courses can market and deliver wilderness-challenge and similar programs (Goodale 1985:359).

From a sociological perspective, the findings support past work that suggested that females report higher levels of fear in outdoor programs such as the one studied than do males. These differences were particularly evident in the "letting down" variables. While reassuring in the sense that the data are in line with past research, the findings are disturbing in another sense. Despite the common belief that attitudes about leisure and recreation were becoming less differentiated based on gender (Ibrahim 1991), the differences reported in this study suggest that with respect to fear in outdoor programs, there may be persistent and widespread differences between men and women. Although this trend was first ascribed to more honest responses on the part of females (Ewert 1988), the strength of these differences suggest that a powerful phenomenon may be in play-perhaps social learning. If social learning is an influencing factor in the development of fears, particularly among females, programs such as the one studied can play an important role in reducing those fears. From the broader context of society, the true value in programs such as this one may lie more in the modification of fear and feelings of inability and less in the learning of any particular skill or technique.

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MONITORING THE VISITOR EXPERIENCE AT BUCK ISLAND REEF NATIONAL MONUMENT

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This paper examines relationships between visitor density levels and perceptions of crowding at a Caribbean coral reef. Reef visitors were more likely to report that the quality of their experience was enhanced, rather than reduced, by their encounters with other visitors. Perceived crowding was related to visitors' previous experience and the location of encounters with other visitors as well as various density-related measures.

Introduction

Buck Island Reef National Monument is a small undeveloped island adjacent to St. Croix in the U.S. Virgin Islands. One of the main attractions at Buck Island is an "underwater trail" designed by the Park Service to allow visitors to snorkel through coral formations and view marine life guided by interpretive signs. The trail can only be reached by boat. Although both private and commercial boaters frequent the trail, the typical user buys a space on a commercial outfitter's sailboat or motorboat and is ferried the eight miles from St. Croix to one of eleven moorings at the trail just off Buck Island. There, visitors snorkel on and near the trail for an hour or more and then move to the beach for a picnic or sunbathing before returning by boat to St. Croix.

This paper is derived from a study commissioned by the National Park Service to examine the quality of the visitor experience at Buck Island Reef. Park management expressed the view that current conditions were generally acceptable, but they were worried about future impacts resulting from growing numbers of tourists visiting the area. The main objective of the study was to document current conditions in order to provide a baseline against which future changes could be assessed. Accordingly, the study measured selected indicators of quality in the visitor experience and examined the relationships between these indicators and various density-related and background variables.

Study Methods

The data set used for this paper was derived from a 1988 survey of visitors to Buck Island Reef National Monument. Data were gathered from over 1,000 visitors through a self-administered questionnaire completed during their return boat trips from Buck Island. Various measures of visitor density and perceived crowding were employed, the most novel of which was perceived "busyness." This term was used at the request of Park Service staff who preferred it to the value-laden term, "crowding". In light of the experimental nature of this variable, an additional indicator was employed to measure perceived crowding. Visitors responded to the question, "Please circle the number that best describes how the visitors you encountered at Buck Island affected your overall experience?" Response categories ranged from "increased my enjoyment" (1) to "no effect" (5) to "reduced my enjoyment" (9). This allowed for not only negative (i.e. crowded) responses but also responses from visitors whose overall enjoyment was actually increased by the others they encountered. This measure has been used in previous studies (Ditton, Fedler, and Graefe 1983; Drogin, Graefe, and Titre 1990) as an alternative measure of crowding that avoids the possible confounding effects of using the word, "crowding," yet measures the perception of crowding in a manner consistent with the term's conventional definition.

Respondents were categorized into three groups based on their responses to the 9-point "influence of others" scale. Those responding with one through four were grouped into an "increased enjoyment" group, those responding with a five ("no effect") were classified as a "neutral" group, and those responding six through nine were grouped into a "decreased enjoyment" (crowded) category. One-way analysis of variance tests were employed to determine if these groups varied significantly in terms of variables related to perceived visitor densities and selected aspects of visitors' experience levels and types of trips. These same predictor variables were then entered into a multiple discriminant function analysis in an attempt to predict membership in the three groups. A further analysis was carried out after collapsing the three groups into two by combining the increased enjoyment group with the neutral group to form a single "noncrowded" category. Minimum Wilk's Lamda was used as the selection criteria for entry of variables into the discriminating function.

Results

Consistent with the original perceptions of park staff as well as the results of many previous studies, few of the Buck Island visitors felt crowded. Only 10% of the 1,083 respondents reported that the others they encountered decreased their enjoyment. Fifty-seven percent reported that others had no effect on their experience and 33% experienced increased enjoyment as a result of the others they encountered.

There were significant differences among the three groups in terms of all five density-related variables considered (Table 1). Interestingly, those who reported that their enjoyment had been increased by the others they encountered reported having significantly more people on their boats than those from the crowded and neutral groups. On the other hand, the crowded group reported seeing significantly more snorkelers on the trail and perceived the beach and the trail to be significantly "busier" than both the group whose enjoyment had been increased by others and the neutral group. The crowded group also reported seeing significantly more boats moored at the trail than the increased enjoyment group.

Three of the four experience and trip-related variables also produced significant differences among the three groups. The crowded group had significantly more snorkeling experience than the other two groups and was more likely to have visited the island before. Those whose enjoyment was increased tended to visit the island for significantly longer periods of time (more full-day trips as opposed to half-day excursions) than did the neutral group. The neutral group was slightly older than the other two but not significantly so (Table 1).

Table 1. Density level, experience, and trip-related variables by how visitors encountered affected overall experience.[1]

	Effect on Experience			
	Increased Enjoyment	Neutral	Decreased Enjoyment	F Value
Density-Related Variables				
Number of people on boat	21.92[a]	19.43[b]	19.16[b]	7.88***
Number of other boats at mooring	4.49[b]	4.67[ab]	5.28[a]	4.43*
Number of snorkelers seen on trail	19.63[b]	19.29[b]	24.45[a]	5.17**
How "busy" the trail felt[2]	4.82[b]	4.77[b]	6.06[a]	23.81***
How "busy" the beach felt[3]	3.61[b]	3.62[b]	5.43[a]	52.97***
Experience and Trip-Related Variables				
Snorkeling experience level[4]	1.69[b]	1.77[b]	2.05[a]	12.89***
Prior visits to Buck Island[5]	.20[b]	.20[b]	.30[a]	3.90*
Visitor's age[6]	2.52	2.64	2.60	1.31 ns
Length of trip[7]	1.52[a]	1.44[b]	1.48[ab]	3.66*
Sample Size	358 (33%)	616 (57%)	109 (10%)	

* p<.05; ** p<.01; *** p<.001

Means with different superscripts are significantly different at the .05 level.

[1] Variable coded on a 9-point scale ranging from "increased my enjoyment" (1) to "decreased my enjoyment" (9).
[2] Variable coded on a 9-point scale ranging from underwater trail was "not at all busy" (1) to "extremely busy" (9).
[3] Variable coded on a 9-point scale ranging from beach was "not at all busy" (1) to "extremely busy" (9).
[4] Variable coded as "beginner" (1), "intermediate" (2), and "advanced" (3).
[5] Variable coded as "no previous visits" (0) and "have visited before" (1).

Multiple discriminant analysis was employed in an attempt to predict the membership of these three groups. How busy the beach felt was the most powerful predictor variable followed by the visitors' level of snorkeling experience. Overall, seven of the nine variables entered the discriminant function (Table 2). However the predictive value of the resulting function was quite weak. Less than 45% of the cases were successfully classified into their correct groups. The group whose enjoyment was reduced due to the influence of others (i.e. the crowded group) was more likely than the other two groups to be classified correctly (64 percent versus 35 percent and 52 percent for the neutral and increased enjoyment groups, respectively).

Table 2. Results of discriminant analysis classifying visitors into increased enjoyment, neutral, and decreased enjoyment groups.[1]

Classification Variable	Discriminant Coefficient	Wilk's Lamda
How busy the beach felt	.852	.932***
Snorkeling experience level	.322	.920***
Number of people on boat	-.179	.912***
Length of trip	-.194	.908***
Number of snorkelers seen on trail	.229	.904***
Visitor's age	.058	.901***
Prior visits to Buck Island	.121	.898***

*** p<.001

CLASSIFICATION RESULTS

Actual Group	n	Predicted Group Membership: Increased Enjoyment	No Effect	Decreased Enjoyment
Increased Enjoyment	363 (33%)	51.5%	24.2%	24.2%
No Effect	633 (57%)	37.3%	35.2%	27.5%
Decreased Enjoyment	112 (10%)	17.9%	17.9%	64.3%

Percent of Total Cases Correctly Classified: 43.5%
N=1,108

[1] Includes only significant variables included in discriminant function.

Because the initial analysis revealed few differences between the increased enjoyment and neutral groups, these two were combined into a single "noncrowded" category for additional analysis. Two of the statistically significant relationships from the three-group analysis became non-significant when the cases were grouped into only crowded and noncrowded categories. Now, the crowded and noncrowded groups did not differ significantly in terms of number of people on their boats or the length of their trips (Table 3). However, after combining the increased enjoyment and neutral groups, the predictive power of the discriminant function was dramatically improved. Seventy percent of the visitors were correctly classified into their appropriate crowded or noncrowded categories (Table 4). Of the five variables entering this discriminant function, the "busyness" of the beach and snorkeling experience level remained the most powerful predictors of group membership.

Table 3. Density level, experience, and trip-related variables by how visitors encountered affected overall experience.[1]

	Effect on Experience: Increased or Neutral (Noncrowded)	Effect on Experience: Decreased Enjoyment (Crowded)	F
Density-Related Variables			
Number of people on boat	20.37	19.16	1.51 ns
Number of other boats at mooring	4.60	5.28	7.59**
Number of snorkelers seen on trail	19.41	24.45	10.25**
How "busy" the trail felt[2]	4.79	6.06	47.49***
How "busy" the beach felt[3]	3.62	5.43	106.02***
Experience and Trip-Related Variables			
Snorkeling experience level[4]	1.74	2.05	22.20***
Prior visits to Buck Island[5]	.20	.30	7.81**
Visitor's age[6]	2.60	2.60	0.00 ns
Length of trip[7]	1.47	1.48	0.00 ns
Sample Size	974 (90%)	109 (10%)	

* p<.05; ** p<.01; *** p<.001
N=1,083

[1] Variable coded on a 9-point scale ranging from "increased my enjoyment" (1) to "decreased my enjoyment" (9).
[2] Variable coded on a 9-point scale ranging from underwater trail was "not at all busy" (1) to "extremely busy" (9).
[3] Variable coded on a 9-point scale ranging from beach was "not at all busy" (1) to "extremely busy" (9).
4 Variable coded as "beginner" (1), "intermediate" (2), and "advanced" (3).
[5] Variable coded as "no previous visits" (0) and "have visited before" (1).

Conclusions

Overall, visitors' feelings about how the others they encountered affected their enjoyment were not surprising. Ten percent of the Buck Island visitors reported being crowded while 33% reported increased enjoyment and the majority (57%) reported that others had no affect at all on their enjoyment. Using the same 9-point scale, Ditton, Fedler and Graefe (1983) found similar proportions among river floaters on the Buffalo River in northern Arkansas (22% reported decreased enjoyment, 27% increased enjoyment, and 51% felt their trip was unaffected by the others they encountered). The fact that even fewer Buck Island visitors reported crowding than did users of the Buffalo River may be related to the Buck Island visitors' expectations. The Buffalo River is floated by small groups in rafts, canoes, and kayaks while Buck Island is generally accessed by commercial "head boats" that often carry twenty or more people at a time. Such a visitor certainly expects to be in contact with others and may adjust other trip expectations accordingly (Heberlein et al. 1979 and Schreyer and Roggenbuck, 1978).

Table 4. Results of discriminant analysis classifying visitors into noncrowded and crowded groups.[1]

Classification Variable	Discriminant Coefficient	Wilk's Lamda
How busy the beach felt	.883	.933***
Snorkeling experience level	.266	.925***
Number of snorkelers seen on trail	.209	.922***
Number of previous visits	.166	.920***
Length of trip	-.163	.918***

*** p<.001

CLASSIFICATION RESULTS

Actual Group	n	Predicted Group Membership: Noncrowded	Predicted Group Membership: Crowded
Noncrowded	1,011 (90%)	70.3%	29.7%
Crowded	115 (10%)	33.0%	67.0%

Percent of Total Cases Correctly Classified: 70.0%
N=1,126

[1] Includes only significant variables included in discriminant function.

Another consistency between the Buck Island results and those obtained using the same scale at the Buffalo River is the finding that the neutral and increased enjoyment groups were very similar. The dramatic improvement in the predictive power of the two-group discriminant function over the three-group function is an indication of how similar these two types of users were. In other words, the three-group discriminant function had a very difficult time distinguishing between increased enjoyment users and neutral ones. Those whose enjoyment was increased by the others they encountered and those who reported that others had no affect on their enjoyment clearly had a great deal in common, with only two significant differences emerging between these two groups. Consistent with other studies, however, both of these groups were different from those who experienced crowding.

As has been found in previous studies, the experience level of Buck Island users and their experience with the setting itself were significantly related to how the presence of others affected their enjoyment (e.g., Vaske et al. 1980 and Nielsen et al. 1977). Members of the crowded group were significantly more experienced as snorkelers and with Buck Island than members of either of the other two groups. These findings again are consistent with those obtained at the Buffalo River and may indicate that more experienced users are either more sensitive to the presence of others or that conditions in the area had changed since their previous visits or perhaps an interaction of these two effects.

There are two apparent inconsistencies between the results of this study and previous ones. Both of these differences relate to the densities of other users reported by visitors and how these densities seemed to affect these visitors' experiences. Previous literature has found only a weak and indirect relationship between the density of other users and perceived crowding and satisfaction (e.g. Absher and Lee 1981). The first inconsistency with these previous findings is the result that the increased enjoyment group actually had *more* people on their boats than those who reported being crowded. This might be explained by visitors adjusting their expectations to make the best of the relatively high densities on many of the commercial "head boats." The fact that several of the companies operating these tours serve drinks and other refreshments on their return trips indicates that they recognize the importance of enhancing these social interactions. It may also be true that these tours simply attract customers who are more gregarious in nature or who are at least willing to tolerate the presence of others.

The second unexpected result was the finding that the perceived density of others *on the beach* at Buck Island seemed to be highly related to visitors perceptions of crowding. In fact, "how busy the beach felt" was the single best predictor of how other people affected the visitors' experiences in both the two-group and three-group analyses. Those from the crowded group consistently reported seeing the most people on the beach. This was surprising in that the original concern leading to the study was with crowding on the water and at the snorkeling trail. However, both of these unexpected findings may reflect the theory that recreationists' sensitivity to crowding varies depending on the location of the contacts (Stankey 1973; Badger 1975). In the case of Buck Island, it may also relate to the nature of the overall experience and the specific activities in which visitors engaged.

The typical excursion to Buck Island can be viewed as three separate experiences: the boat trip out and back, the snorkeling experience on the underwater trail, and the experience on the island's beach itself. As mentioned earlier, visitors appeared to regard the boat trips as social experiences where the presence of others often increased their enjoyment. While the crowded group did see significantly more people on the trail and regard it as significantly "busier" than did the other two groups, they seemed to be less sensitive to the density of others on the trail than on the beach. This may suggest that many snorkelers felt safer while underwater if others were present. This is probably particularly true of the many beginner snorkelers who made the trip. However, once visitors arrived at the beach, the safety factor was much less potent and visitors became more sensitive to the presence of others.

Finally, this study suggests several implications for further research. First, it provides additional evidence that measuring a broad range of possible effects that others might have on recreationists' experience is more meaningful than simply focusing on the negative dimension of perceived crowding. Secondly, the findings support the notion that perceived crowding is related to experience level, location of contact, and visitor expectations as well as the numbers of other visitors encountered. Finally, this study shows that our understanding of recreational crowding may be more generalizable than previous studies of backcountry and wilderness users might have led us to believe. This study has shown that visitors to tropical reefs and island beaches appear to perceive the influences of others on their experiences in much the same way as do many other water and land-based recreationists.

From a management standpoint, study results do not suggest the need for any immediate management response since they generally confirmed management's opinion that current conditions were acceptable. The relationships found between perceptions of crowding and the various measures of visitor density at the trail and on the beach imply, however, that these variables should be monitored as use levels change in the future.

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OUTDOOR RECREATION

OUTDOOR RECREATION PLANNING

SHOREBIRD AND BOATER IMPACT MANAGEMENT PLANNING

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This paper integrates social and ecological impact data from a barrier beach to demonstrate the value of an inter-disciplinary approach to resource allocation and visitor management. The ecological data included observations of shorebird distributions and causes of human disturbance. The social data were obtained from on-site surveys of boaters and pedestrian visitors. The ecological findings indicated that shorebird habitat preference was limited to two of the four areas where boaters were present. The social data indicated that some boaters engaged in activities that caused shorebird disturbance, and were not ecologically aware of their impacts. A management plan was developed to restrict boaters from areas used by shorebirds. Educational programs were developed to increase boater awareness of the impacts they cause.

Introduction

Stretching along the U.S. Atlantic coast from New England to Florida are a series of sandy islands and beaches. These fragile and dynamic ecosystems, consisting of sand, shell, and gravel, provide a protective barrier along 2,700 miles of shoreline. Wind, tides, and ocean waves constantly move sand and change the size and shape of barrier beaches, as they buffer their wetlands and the mainland from the forces of nature. Coastal barrier habitats include open ocean beaches, broad salt marshes, and dense forests which support a variety of flora and fauna. Salt marshes, for example, are nurseries for many ocean fish which would not exist without the protection afforded by coastal barriers. Migratory shorebirds depend on barrier beaches for feeding, nesting and resting habitat.

Although rich in natural resources, coastal barriers are susceptible to human activity and developmental pressures. Due to their exceptional scenic quality and proximity to large urban centers, barrier beaches along the east coast attract millions of visitors each year. This demand for recreational access has increased the potential for deleterious consequences. Recreation activities can disrupt coastal processes, destroy the ecological integrity of the coastal barriers and reduce the quality of the visitor's experience. In recognition of these potential problems, public concern over protecting these environments has grown dramatically in recent years.

Unfortunately, despite decades of ecological research, the tools for managing coastal barriers remain to be fully developed (Ray and Gregg 1991). This paper examines a program of research and management initiated by The Trustees of Reservations (TTOR) at Crane Beach in Ipswich, Massachusetts. Findings from social and ecological impact studies are used to demonstrate the value of an inter-disciplinary approach to resource allocation and visitor management. The goal was to develop a visitor impact management plan that recognized the existing impact of visitors on shorebirds and made recommendations to mitigate such impact. We begin by briefly reviewing the ecological and social impact literature.

Shorebird Impacts

Information on the effects of recreation on shorebirds is incomplete. Findings are often mixed and the responses to human intruders are divergent, even in a single species (Ream 1980). The impacts of recreation activity can be a direct result of harassment of shorebirds, or can occur indirectly through the loss of habitat, food supply or productivity (Ream 1979, Cairns and McLaren 1980, Haig and Oring 1985, Sidle 1985, Flemming and others 1988).

Direct shorebird harassment includes events which cause excitement and/or stress, disturbance of essential activities, severe exertion, displacement or death. Recreationists engaged in nonconsumptive activities can have a major impact on nesting shorebirds by unknowingly producing stressful situations for the birds (Wilkes 1977, Ream 1979). Piping plovers (*Charadrius melodus*), for example, nest on or just behind the sandy beaches. Because the nests blend in to the sand, plovers are prone to accidental human disturbance. Piping plover chicks are unable to fly for several weeks after hatching, but do leave the nest site with parents and travel along the high tide line in search of food. The chicks blend in well with the sand and are especially vulnerable to Off-Road Vehicles (ORVs). Findings from Cape Poge-Wasque (Swanson 1990) and Coskata-Coatue (Litchfield 1990), two barrier beaches managed by TTOR, indicated that ORVs frequently disturbed nesting sites and altered the behavior patterns of piping plovers.

While ORVs can impact shorebirds directly by destroying nests and possibly killing some birds, the vehicles also affect the birds indirectly by compacting the sand and reducing their food supply (Kuss and others 1990). When the ground flora are lost to trampling, the insects dependent upon the flora also disappear (Speight 1973).

Other research on least terns (Blodget 1978), shows that the shorebirds response to vehicles may be less than that resulting from foot traffic. Controlled experiments using ORVs and pedestrians demonstrated that ORVs had significantly less impact on birds flushing from nests. Vehicles could come twice as close to sitting birds before they would fly than people on foot (Blodget 1978). When the nesting areas were well marked and protected, the birds developed a high tolerance level for ORVs passing close to the nesting areas.

Human disturbance on birds has been shown in some investigations to result in reduced productivity rates and species decline. Disturbing nests causes adults to fly off, leaving eggs vulnerable to hatch failure or predation (Garber 1972, Hunt 1972, Bart 1977). Studies conducted along the Atlantic coast suggest that mammalian and avian predation has severely

limited nesting success and the size of piping plover populations (Cairns 1982, Ailes 1985, Rimmer and Deblinger 1990, Litchfield 1990, Swanson 1990).

Overall, the available empirical evidence highlights the complexity involved in understanding recreational impacts on specific shorebird populations. Among certain species of shorebirds, encounters with even a few humans can alter behavior patterns and influence productivity and survival rates.

Visitor Perceptions of Shorebird Impacts

How visitors perceive impacts on shorebirds is not well documented. Available evidence suggests perceptions of the impact varies among different user groups and different locations. At Cape Poge-Wasque, for example, pedestrian visitors were more likely to recognize the impact of humans on shorebirds than ORV users (Donnelly and Vaske 1989, Deblinger and others 1989). At Coskata-Coatue, ORV visitors were more likely than Cape Poge-Wasque ORV users to think 4-wheel drive vehicles harm the shorebirds (Donnelly and Vaske 1991).

Other comparisons between the pedestrian and ORV users at both Cape Poge-Wasque and Coskata-Coatue show that nearly three quarters of all respondents thought managing for wildlife was more important than managing for other uses. Consistent with this belief, visitors at these two barrier beaches felt a personal obligation to protect the birds, and were willing to reduce the number of their visits to achieve that end (Donnelly and Vaske 1989, 1991).

These observations from two barrier beaches, when combined with data from other natural environments (Lucas 1979; Graefe and others 1984; Kuss and others 1990), suggest three aspects of the impact issue: (1) recognition of the impact, (2) perceived importance of the impact relative to the other attributes of the setting, and (3) evaluation of the impact condition as acceptable or unacceptable . Resource impacts may be recognized or unrecognized by the user (Cole and Benedict 1983). If recognized, the effects may be minimal if the impact is unimportant relative to other setting attributes (e.g., amount of area for sunning), or if the impact is acceptable to users.

In summary, the challenge for barrier beach managers is to develop management plans, based on an understanding of ecological and social relationships, which minimize human impact on shorebirds while providing opportunities for recreation activities (Deblinger and others 1989). The following examines the strategies adopted by TTOR at Crane Beach.

Study Site

Crane Beach is a portion of the 560 ha Richard T. Crane, Jr. Memorial Reservation that also includes a wooded and landscaped drumlin estate. The beach is 6 km in length and is located between the mouths of the Ipswich and Essex rivers. Habitats include fine sand beach, salt marsh, red maple swamp, cranberry bog and pitch pine forest. Crane Beach also provides nesting, feeding and resting habitat for migratory shorebirds.

Numerous species of shorebirds stop over at Crane Beach to rest and feed as they migrate from Canada and the Arctic to southern climes such as the Caribbean and South America. The most abundant species include Sanderlings (*Crocethia alba*), semipalmated plovers (*Charadrius semipalmatus*), semipalmated sandpipers (*Ereunetes pusillus*) and black-bellied plovers (*Squatarola squatarola*). The timing of their arrival at Crane Beach (July, August and September) corresponds to the peak visitor use times.

Crane Beach receives approximately 400,000 visitors per year. Visitors arrive by car at a centralized parking lot or by boat anywhere along the beach except at a lifeguard patrolled swimming area (Deblinger 1991).

Essex End of Crane Beach

Essex End of Crane Beach is used by both boaters and shorebirds. For research purposes, we separated the Essex End into four sub-sections: outer beach, inner beach, steep beach and sand spit. The outer beach is located on the Atlantic Ocean side of Crane Beach, extending 300 m to the north and is adjacent to the sand spit to the south. The outer beach is relatively wide from the low to high tide line with an extensive dune system behind. The sand spit is located at the extreme southern end of the property and is an area that receives daily flooding, the extent of which depends on the tidal cycle. Generally, the sand spit is covered by water during high tide. The steep beach is located to the west of the sand spit and receives its name from the steep incline of the beach below the high tide line. This area provides an excellent natural dock for boats. The steepness of the beach allows a boater to anchor a boat to shore without fear that it will touch bottom as the tide goes out. The inner beach is located on the Essex River side of the property and is composed of a very wide mud flat. In contrast to steep beach, the inner beach slope is gradual, creating a wide mud flat during low tide.

Methods

Both ecological and social research methodologies were used to describe the magnitude of impact and evaluate acceptable mitigation strategies.

Ecological Procedures

Two researchers observed shorebird distributions, abundance and behavior at 30 minute intervals while overlooking the Essex End from a promontory atop a sand dune. Observations were made five days a week including three weekdays and both weekend days, weather permitting, from 3 July to 13 September, 1990. The average duration of observation was six hours. Approximately 200 hours over 41 days were spent observing shorebirds.

Because shorebird distribution and behavior are related to tides (Burger 1981), hours of observation varied according to the tidal cycle. Observations were conducted three hours before and three hours after high tide. Direct counts of shorebirds, people, boats, dogs, TTOR trucks and all terrain vehicles (used by rangers) were recorded before, during and after high tide at each area. The cause and duration of shorebird disturbance were also measured. Disturbance was defined to occur when more than 50% of the birds in a flock took flight.

Social Procedures

A visitor survey was conducted at Crane Beach during the summer of 1990. A total of 174 boaters completed the two-page self-administered questionnaire. Only one member from each boat was interviewed.

The survey contained questions pertaining to the boaters: 1) knowledge of ecological impacts on shorebirds, 2) beliefs about the appropriate number of visitors, and 3) evaluations of current management practices.

Results

Shorebird Ecology and Behavior

A total of 20 species of migratory shorebirds were observed using Crane Beach for feeding and resting. Many of these species, however, were present in low numbers. Only four species reached numbers greater than 100 during any one census period. These four species - semipalmated plovers, black-bellied plovers, semipalmated sandpipers, and sanderlings - are the focus of this paper.

Shorebird distributions varied significantly ($F = 12.06$; $p < .001$) according to location and tide (Fig. 1).
On average, however, the shorebirds preferred the tidal flats on the inner beach for feeding (Table 1). As the tide increased, most of the shorebirds on the feeding flats moved above the high tide line to rest along either the outer beach or the sand spit. Sanderlings, the one exception, preferred the outer beach for both feeding and resting. Steep beach, the area with the greatest concentration of boaters, was almost never frequented by the shorebirds for either feeding or resting. These behavior patterns were independent of the presence of boaters. The shorebirds preferred the beaches with the gradual inclines for feeding and resting, while most of the boaters preferred the steep beach with its good anchorage.

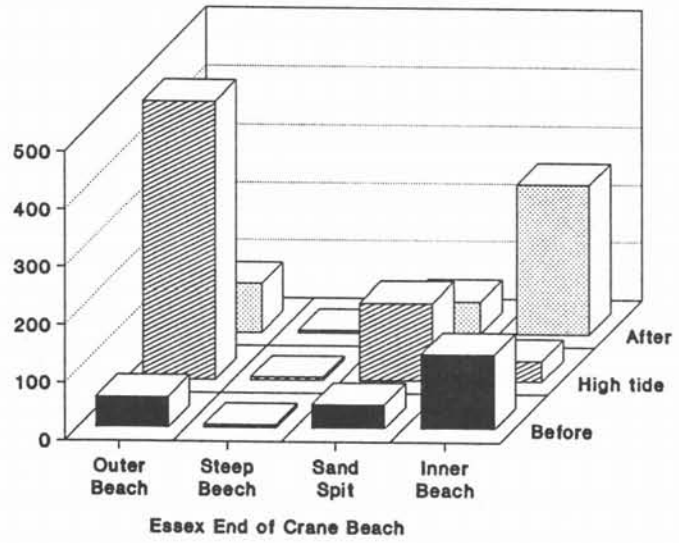

Figure 1. Shorebird distributions.

Table 1. Shorebird and visitor distribution patterns.

Average Number:	Outer Beach	Steep Beach	Sand Spit	Inner Beach
Semi-palmated plovers	81.4	0.8	27.3	77.9
Black-bellied plovers	7.9	0.1	2.3	5.9
Semi-palmated Sandpipers	101.2	3.8	42.5	48.3
Sanderlings	33.4	0.5	9.1	1.7
Boaters	13.9	40.3	13.4	3.0

Human Use

The maximum number of boats observed at one time was 163, with 143 anchored off steep beach. Once visitors anchored their boats, they walked to shore to recreate. Most visitors remained within close proximity of their boat while sunbathing or picnicking. The maximum number of visitors recorded was 461. Of that, 54% occurred at the steep beach, 25% at the outer beach, 19% at the sand spit, and 3% at the inner beach.

Shorebird Disturbance

Shorebird disturbance was defined to occur when more than 50% of the birds in a flock took flight. Determining the cause of disturbance was usually difficult to precisely identify. Of the 627 observed incidences of disturbance, 53% were for unknown reasons, 6% were caused by natural factors such as predators, and 41% were human induced. The largest single cause of disturbance (33%) was pedestrian encroachment into a shorebird area.

The frequency and duration of shorebird disturbance varied greatly. While the frequency of disturbance was related to the number of visitors, duration of disturbance was influenced more by predators than visitors. Of the 294 disturbances with a known cause that were observed throughout the study period, duration ranged from 45.7 seconds for pedestrians to 106.7 seconds for raptors.

Boater Beliefs about Impacts

A number of the survey items addressed the visitors' awareness of the ecological impacts. Nearly 90% of the boaters at Crane Beach recognized that barrier beaches are fragile environments (Table 2). Over three quarters agreed with the general statement that managing for wildlife was more important than managing for other uses. Fewer than half, however, felt that preservation is more important than recreation at Crane Beach.

Table 2. Boaters' beliefs about shorebirds impacts.

Belief	Boaters Agree (%)
Crane Beach is a fragile environment	88
Managing for wildlife is more important than managing for other uses	76
Preservation of natural resources is more important than recreation at Crane Beach	48
More measures should be taken to protect shorebirds	79
Boaters landing at Crane Beach are harmful to the shorebirds	31
I feel a strong personal obligation to protect the shorebirds	92
I would be willing to reduce my visits to Crane if it would help to protect the birds	42

Although three quarters of the boaters believed more measures should be taken to protect shorebirds, less than a third thought they were harmful to the birds. Similarly, while nearly all boaters (92%) felt a strong personal obligation to protect the

shorebirds, only 42% were willing to reduce the number of their visits to help protect the birds.

Other survey items concerned the boaters' beliefs about social considerations (Table 3). Fifty-five percent believed Crane Beach is approaching the limit of the number of *people* the area can tolerate. While nearly three quarters thought the number of *boats* was approaching a tolerance limit, only about a third favored restricting the number of boats permitted to land on the beach. A similar percentage agreed to prohibiting boats from designated swimming areas.

Table 3. Boaters' beliefs about social impacts.

Belief	Boaters Agree (%)
Crane Beach is approaching the limit of the number of:	
people the area can tolerate	55
boats the area can tolerate	71
It would be more desirable if the number of boats were reduced at Crane Beach	36
Boaters should be restricted to designated no swimming areas	38

Visitor Impact Management Planning

The Trustees of Reservations fundamental mission is to preserve for public enjoyment places of exceptional scenic, historic or ecological value throughout Massachusetts. More specifically, the goal is to protect endangered shorebirds and fragile dune systems from the impact of human use, while simultaneously providing opportunities for recreation activities. In light of this objective, the results from the ecological and social research were used to develop a management plan at Crane Beach.

Findings from the shorebird research indicated that predators were causing greater impact than the visitors. Two types of protection were applied to mitigate these impacts. Small wire-mesh fences were installed around nests to protect piping plovers from skunks, raccoons, foxes, gulls and crows. Outside of these exclosures, symbolic fencing composed of a single strand of twine was erected to eliminate disturbance by visitors. These areas were posted with signs to educate visitors about nesting shorebirds.

The Crane Beach shorebird disturbance study indicated a natural zoning existed between visitors and the birds. Most boaters were attracted to a portion of the beach which, due to habitat considerations, the birds did not use for either feeding or resting. By designating restricted boat landing areas outside of the feeding flats and restricting visitors from bird resting areas in dunes, migratory shorebirds could stop over at Crane Beach undisturbed.

The social research indicated that the beliefs held by some of the visitor groups conflicted with the management goals. Comparisons of questionnaire responses between the boaters and another survey of pedestrians at Crane Beach (Deblinger 1991), for example, revealed a clear distinction. Boaters were less educated about property regulations and human impact. At Crane Beach, pedestrian visitors enter via a gatehouse where they receive educational information. Conversely, boaters land at many sites along the beach where educational information is unavailable. The management plan designated boat landing areas where boaters would receive educational information, be segregated from swimmers to promote safe recreation, and be segregated from wildlife and dunes.

The social research results also indicated that a majority of the visitors felt that Crane Beach was approaching its tolerance limits for both boats and people. In response to these findings, designated boat landing areas were specified to segregate the boaters from the swimmers. While current use levels do not necessarily warrant restricting visitor numbers at this time, future research and planning will monitor shifts in these baseline data.

Discussion

Early in the study, it became apparent that the majority of shorebirds were using Crane Beach for a resting area during high tide. Moreover, the tidal cycle explained shorebird distribution and behavior patterns. Shorebirds were located on the feeding flats (shallow sloped beaches) below the high tide line before and after high tide. During high tide, they shifted distribution to the sand dunes above the high tide line along the outer beach. The steep beach used by boaters for safe anchorage was not used by shorebirds. A natural spatial separation, therefore, segregated the visitors from birds. The management plan reinforced this natural zoning by designating a boater landing area, consistent with the location used by most boaters.

As for frequency and duration of disturbance, fencing and signage were used to restrict onshore visitors' activities to an area beyond the flushing distance from shorebirds. Offshore boater activities did not disturb resting or feeding shorebirds.

Boaters that landed at Crane Beach were less aware of the fragility of barrier beaches and their natural inhabitants than visitors that accessed the property through the parking lot entrance. The visitor impact management plan established education programs to increase the boaters awareness of the impacts they can create.

Although ecologists continue to search for solutions to protect fragile dune environments and increase endangered shorebird populations, it is apparent that information regarding visitor attitudes must be combined with ecological data. At a time when the public's thirst for barrier beaches as recreational sites or locations for summer houses seems unquenchable, management strategies, such as beach closure, that do not include visitor attitude information may be deleterious to barrier beach environments in the long run. Conversely, the combination of visitor education and management techniques that balance preservation with recreation can result in a situation where the environment can be protected from recreationists and predators, and the visiting public can still enjoy the area.

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VERMONT LAKES AND PONDS:

A PILOT RECREATION PLANNING PROCESS

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This report analyzes a pilot planning study conducted on two Vermont ponds by University of Vermont outdoor recreation planning students. It discusses the planning process used for these ponds and offers ways in which a statewide lake and pond planning process could be implemented.

Introduction

Vermont is known as the Green Mountain state. It has a unique combination of mountains, valleys, farmlands, forests, lakes, and ponds. These natural resources have made Vermont a popular attraction for residents and visitors alike. Population growth and economic development have caused a growing concern for many of these resources. Can Vermont allow growth and development to occur and still adequately protect its natural environment?

Land use change occurring around many of Vermont's waterbodies has resulted in the official concern of the Vermont State Legislature and other officials (VSA 1985). Vermont has approximately 600 lakes and ponds over 5 acres. These waterbodies, their shorelines, and watersheds are used for several purposes. Recreation, commercial, and potable water supply, sewage treatment, and fish and wildlife management areas compete for space and resources. The demands placed on Vermont's lakes and ponds will undoubtedly increase in the future. For both economic and environmental quality reasons, the state cannot allow the quality of its lakes and ponds to decline.

The 1988 Vermont Recreation Plan and the Lakes and Ponds Task Group Report identified six issues related to lake and pond management. Water quality, aesthetics, boating, public access, remote ponds, and fish and wildlife resources were identified as problems. Improved public access can create boating and other recreation conflicts. Lakeshore development can impact scenic values, water quality, and fish and wildlife. Trying to protect the quality of Vermont's lakes and ponds and manage their various uses is a complex task, but warranting concerted effort.

In an attempt to protect these resources, the Vermont Legislature has directed the Vermont Agency of Natural Resources to prepare a lake and pond management plan for each of the 288 waterbodies in the state over 20 acres. The Agency has begun to collect information on these waterbodies and formulate management strategies for their protection. The first step in the process is the development of a lake and pond planning method. This process identifies problems, resources and alternative solutions that can be used to manage these diverse areas effectively over the long term.

Pilot Planning Study

The State Department of Forests, Parks and Recreation decided to utilize the efforts of an upper division outdoor recreation planning class taught in the University of Vermont's School of Natural Resources to develop techniques that could be used in a statewide lake and pond planning effort.

Study Areas

Colchester Pond and Indian Brook Reservoir, Chittenden County, Vermont are, man-made waterbodies that were originally developed as water supply reservoirs, were selected for the study. They are located in adjacent watersheds 10 miles from Burlington, Vermont. Both areas are experiencing growth pressures because of their proximity to the Burlington urban area. They have a variety of land uses including villages, suburban development, and rural residential, agricultural and forested lands.

Organizaing the Planning Teams

The natural resource students were divided into two planning teams, one assigned to each waterbody. They had the task of preparing an Environmental Assessment and a General Management Plan, to include alternatives for the protection and recreation use of each waterbody. The students selected planning coordinators and the course instructor and graduate student served as advisors.

Schedule of Planning Tasks

The planning process was divided into the following ten major steps:

1. Familiarization with the project sites. Meetings with state and local agency representatives.
2. Organization of the planning teams. Identification of data sources and development of cartographical information.
3. Development of an environmental assessment which involved obtaining natural, cultural, and socioeconomic information.
4. Identifying jurisdictions, applicable rules and regulations, law enforcement issues, land use regulations and responsible public agencies.
5. Collecting information on recreation use.
6. Administering a public opinion survey.
7. Analyzing all information and issues.
8. Developing a set of alternatives.
9. Selecting the preferred alternative.
10. Preparing and presenting the final plan.

Study Area Characteristics

The two watersheds contain just over 2,000 acres. There is minimal development along the shorelines of each pond. The Colchester Pond shoreline and watershed is privately owned by seven different property owners. Indian Brook Reservoir shoreline is entirely in public ownership. The Town of Essex purchased a 574 acre parcel surrounding the shoreline in 1986 from a private developer for $435,000. Both watersheds are predominantly forested and contain large residential lots, agricultural and private forest lands. The existing forest cover is a typical mix of northern hardwoods and coniferous species for this region of Vermont. Indian Brook Reservoir is used for public recreation. Public access to Colchester Pond is restricted because of the private lands surrounding the shoreline. From a regional planning perspective, these watersheds are the remaining large open space areas in the Towns of Colchester and Essex.

The Winooski Valley Park District is currently negotiating with private landowners in an attempt to obtain land for public use. A network of informal trails is found throughout both watersheds. They are used for hiking, running, mountain biking, cross country skiing, and for fishing and hunting access.

What was Accomplished

The Pilot Study resulted in the preparation of an Environmental Assessment and a General Management Plan for both the Colchester Pond and the Indian Brook Reservoir. The student planning teams collected information on these areas that did not previously exist. They developed reasonable alternatives for each watershed and selected a preferred alternative that they determined would best protect the natural resources in the area.

The environmental assessment phase of the pilot study was perhaps the strongest and most useful part of the project. Much information on the natural and cultural resources in each watershed was collected, analyzed and presented as new information.

The public survey effort was limited due to time constraints. The students did conduct a phone survey of area residents and obtained some valuable information. They also conducted interviews with key town and state officials which helped to identify issues considered in the planning and management recommendations.

The students presented a range of alternatives for each watershed ranging from no action to various levels of recreation management and development. These alternatives were preliminary and would be more intensely developed after public meetings and input into their objectives. The planning teams' preferred alternative represented reasonable management solutions based on the results of the environmental assessment process. The option of developing a plan for managing both watersheds as one management unit was discussed.

A Regional Alternative

Colchester Pond and Indian Brook Reservoir watersheds can easily be thought of as one management unit. Both shorelines are undeveloped and their combined watersheds are just over 2,000 acres. There are 30 private property owners involved. Most of the parcels are relatively large and are zoned for either conservation or agricultural use. The Indian Brook watershed is approximately 95% forested and Colchester Pond is about 65% forested. The Town of Essex owns 574 acres in the Indian Brook watershed, including the entire shoreline of the reservoir. The shoreline of Colchester Pond is entirely private. The Winooski Valley Park District is currently seeking easement and ownership rights to provide public access to the water. It seems logical that it may be prudent to develop a single management plan for both watersheds. This plan could allow for quality recreation suitable for the local environments and protect them from overuse. In addition, property rights of the private landowners could be carefully protected.

A combination of easements, development restrictions, land swaps and land acquisition techniques holds potential, but is time consuming and complex. The information presented in this Planning Study can be a useful guideline. A set of regional park development alternatives could be formulated after consultation with the state, towns, private landowners, and Winooski Valley Park District.

The combined watersheds of Colchester Pond and Indian Brook Reservoir offer unique opportunities for significant open space protection and outdoor recreation in a primarily urban region. As the Champlain Valley area continues to grow, these areas will become increasingly valuable as natural recreation areas.

Developing a Lake and Pond Planning Model

The secondary purpose of this study was to recommend ways in which a Statewide Lake and Pond Planning Process could be implemented and Colchester Pond and Indian Brook Reservoir serve as appropriate case studies.

Because of the diversity of types and location of lakes and ponds in Vermont, it is difficult to develop a planning process that will fit all situations. The case study ponds were relatively small and undeveloped. They are man-made reservoirs and are currently used for only limited amounts of recreation. Many other Vermont lakes and ponds are larger, have heavily developed shorelines, and a variety of conflicting recreational uses. They pose greater planning and management challenges.

Still other lakes and ponds are even more remote and have a wilderness or primitive characteristic to them. These areas are increasingly rare and the plans and management actions that are carried out on them will, in many cases, have irreversible impacts.

Common Elements of a Lake and Pond Planning Process

While each lake and pond area is unique, there are common elements in a planning process which could be utilized on all lakes and ponds. A list of these elements is given below:

1. Designation of the Planning Team
2. Appointment of an Advisory Body
3. Development of Planning Goals and Objectives
4. Planning Process Organization and Schedule
5. Environmental Assessment and Resource Based Inventory
6. Public Involvement Procedures and Guidelines
7. Development of Management Alternatives
8. Selection of the Preferred Alternative
9. Plan Implementation
10. Plan Evaluation

The elements listed above are not unique to Lake and Pond Planning. They are usually found in any local land use plan. Lakes and ponds, however, are unique resources. They combine land and water resources that are used for private and public recreation, water supplies, and wildlife habitat. There may be a very diverse group of interested publics. The two most important elements may be the environmental assessment and the public involvement procedures.

The Environmental Assessment

This part of a lake and pond planning process must find, collect, organize, analyze, and present a variety of information in a format that can be easily understood. This includes information on geology, soils, climate, topography, forest and plant species, water quality indicators, and wildlife species and their habitats. It also includes land use data, demographic and socioeconomic information, and recreation use statistics.

Although a general outline of the basic types of environmental assessment information can be developed, the availability and usefulness of the information will vary. The information should be accurate and up-to-date, relevant, and useful. Without good information, any planning process will be inadequate. It is critical that the lake planning process collect and utilize the best information available from a variety of sources to make certain that planners and the public have the resources to

develop viable alternatives for planning, management, and protection of these resources.

The Public Involvement Process

After the environmental assessment phase, implementing a comprehensive public involvement process may be the most difficult, time consuming and costly part of the lake planning process. Over the last decade, public involvement has evolved from a purely information function toward an interactive function. Planners must be comfortable with the process and help create a sense of openness and trust in the process on the part of the public.

The decisions that affect public resources must be presented and discussed in a public forum. Developing public review and involvement procedures as part of a lake and pond planning process will help ensure that all segments of society have an opportunity to participate and that all views on how to protect and manage these resources will be heard.

Recommendations for Implementing a Vermont Lake and Pond Planning Process

Listed below are the twelve recommendations developed as part of this report. Some of these have already been implemented. They represent the opinions of the authors and can serve as one point in which to further develop a workable Vermont lake and pond planning process.

1. Designate a State Lake and Pond Planning Unit within the Vermont Agency of Natural Resources. This unit would be responsible for:

    a. collecting information on lake and pond resources from a variety of areas and sources,
    b. developing a statewide classification system for lakes and ponds that will be appropriate for implementing a lake planning process,
    c. working with local governments and other agencies and organizations to identify local and state lake and pond planning issues,
    d. coordinating the statewide lake and pond planning effort and acting as mediator if disputes over jurisdiction or other issues arise,
    e. developing a set of guidelines for obtaining environmental assessment information necessary for conducting lake and pond planning studies,
    f. developing slide and videotape programs and brochures useful in explaining the current situation on lakes and ponds and the importance of the planning process, and
    g. developing a list of key contact agencies, organizations and persons that should be involved in the process or who can supply information on lake and pond issues and resources.

2. Define three types of planning boundaries that can be used in preparing lake and pond management plans:

    a. Watershed Boundary - using topographic maps.
    b. Lakeshore Impact Area - can be defined for each lake as appropriate.
    c. Overall Planning Area - would include a designated zone outside the watershed area that has a potential impact on lake resources. This would have to be determined for each lake and pond area. Roads, town lines, or other features could be used as appropriate.

3. Utilize regional planning techniques and greenline park concepts engaged in lake planning projects. This would promote the idea of lakes and ponds as being regional resources and examine ways to designate regional open space areas and greenway recreation corridors.

4. Appoint a statewide lake and pond advisory committee. This committee would be comprised of 20-30 members who would assist the State Lake and Pond Planning Unit in promoting and implementing the lake and pond planning process. Each member should have a particular area of expertise and should be able to act as a liaison to a specific agency or organization to obtain information for the State Lake and Pond Planning Unit, or local planning team as requested.

5. Develop a set of guidelines for lake and pond planning projects which could be used by federal and state agencies, local governments, and other organizations which may be engaged in lake and pond planning studies.

6. Make developing management plans for wilderness type lakes and ponds a high priority. Wilderness ponds should be identified and should have established management and protection plans and regulations enacted to protect their resources as quickly as possible. Wilderness resource values can be very easily altered by even small intrusions and unplanned developments.

7. The State Agency of Natural Resources should work with other organizations, such as colleges and environmental and sportsman's groups, and lake associations, to conduct periodic surveys on statewide and local lake and pond issues and problems.

8. Some guidelines for the lead agency in lake and pond planning efforts should be established.

9. The State Agency of Natural Resources should report on the status of lake and pond resources on a regular basis.

10. Public involvement in the lake and pond planning process should be a high priority and guidelines for implementing public involvement should be established.

11. The Public Trust concept, as it relates to lakes and ponds in Vermont, should be further clarified. This will be a major issue to consider in the lake and pond planning and management process.

12. In the effort to protect Vermont's "inland" lakes and ponds, Lake Champlain and Lake Memphremagog must not be overlooked. The complexities of land use, recreation, pollution, environmental impact, and overlapping political and governmental jurisdictions make these large lake areas a major challenge. The value of these lakes is immeasurable to two countries, three states, the northeast region, and many local towns and counties. These resources cannot be allowed to become international sewage systems for regional growth and development. The importance of the Lake Champlain Basin is evident internationally, since it has recently been designated a World Biosphere Reserve.

Summary

Vermont has been a national leader in implementing environmental laws and planning programs. Acts 250 and 200 are examples of this leadership. They were not processes that were easily enacted or implemented, yet they are attempts to look ahead, anticipate changes, and plan for the future.

Vermonters have indicated that they want to protect their way of life, their towns, their history, and their environment.

The lake and pond planning process is just getting underway in Vermont. The implementation of a viable lake planning and management process will be the result of public involvement, up-to-date information, leadership, and cooperation between various levels of government, interest groups and individual citizens that are concerned with the future management and protection of lakes and ponds in Vermont. The lake and pond planning process will be a real test of the regional planning process and Act 200, the statewide planning program.

Aldo Leopold advocated the idea of a "land ethic." Vermont is attempting to develop a lake and pond ethic by trying to implement a process to plan and manage these resources widely over the long term. Because of the number and diversity of the lakes and ponds in Vermont, it is an awesome task. The people of Vermont should be commended for their effort and will be rewarded when these resources are used widely and preserved for the future.

Recreation is but one use of lake and pond resources. Managing recreation use in and around land and water areas and also attempting to protect natural resources is a very complex task. Attempts are made to strike a balance between use and protection. There are rarely easy answers and almost always an abundance of controversy. The idea of Visitor Impact Management is emerging with some new ideas and concepts.

We can say over and over that lakes and ponds are pristine, fragile, and irreplaceable, but that idea is one that is hard to grasp. We become numb to these descriptions and adjectives. It is a simple fact that lakes and ponds cannot be produced on demand like cars and clothes and houses. What we have now is all that we are going to get. Natural resource managers have the responsibility of making the decisions on how to best manage these resources. If they are to be protected for the future, a lake and pond planning process must be implemented.

Literature Cited

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ENVIRONMENTAL GLASNOST:

PROTECTING A RESOURCE YOU DO NOT OWN

Malcolm Ross, Jr.

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The Upper Delaware River management plan offers an alternative to outright purchase and subsequent management of natural recreation areas. Advantages include providing for appropriate growth, pooling agency manpower and funding, and making the private sector more responsive to finding solutions to resource issues.

I am very pleased to be here and sincerely appreciate the opportunity to speak about what it means to protect natural resources without federal land ownership. For the past ten years, I have been deeply involved in a new and very controversial approach to land management for governmental agencies...one which requires a personal dedication to convincing those who own the land that it is in the best interest of both the public and private sectors to work together to prevent resource degradation without substantial federal control through land acquisition.

The conflict between land acquisition for public use and private property rights has been around for a long time. Prior to World War II, federal land acquisition in the western half of the country was less impacting on private land ownership because most of the newly established parks came out of lands already publicly owned.

Demand for nationally managed public recreation areas in the eastern half of the United States is best illustrated by the development of Shenandoah National Park in Virginia (better known as the Skyline Drive), and the Blue Ridge Parkway, which stretches from northern Virginia over 460 miles to the Great Smoky Mountains National Park in North Carolina. Both areas were conceived and built in the late 1930s. Each was set up to provide open space to meet recreational needs for a growing mobile urban population.

One of the lesser known bits of history related to the development of these two park units was the fact that virtually thousands of rural families, who had lived in these picturesque Blue Ridge Mountains for generations, were bought out and resettled in the valleys, whether they wanted to move or not. Family land and ancestral history meant more to many of those folks than any price the government offered, but the greater need for public recreational opportunities prevailed.

Until very recently, land acquisition for National Park Service areas and other federal agencies was based on a policy that outright ownership by the federal government was the method of choice to preserve, or conserve, the best of America's natural resources. Each area had a well delineated boundary, federal law enforcement jurisdiction and a ton of written guidelines for every conceivable resource or administrative issue.

Until the late 1950s, land acquisition for public use did not create a very large or well organized outcry from private land holders. During the sixties, many national recreation areas were authorized by Congress to provide open space for public use within reasonable distances of major metropolitan areas. Each new area caused a louder and louder controversy over the taking of private land from either willing sellers or acquisition through condemnation procedures from unwilling sellers.

Places like Assateague Island National Seashore, Fire Island National Seashore, and the Delaware Water Gap National Recreation Area were established only after thousands of small landholders, who dearly loved their rural hideaways, were bought out. Buying out all private land ownership within a defined boundary got tougher and tougher because of the costs, and due to organized and very vocal resistance against the loss of home and home rule. Various incentive methods were offered to land owners, such as life tenure and ten to twenty-five year continued use options, but for those who did not want to sell, there was no acceptable method of compensation for their loss.

Long before Congress created the National Wild and Scenic Rivers Act in 1968, urban dwellers, on a nationwide basis, had been carving up prime river edge land into quarter-acre plots with cheap summer homes. They often used converted school buses or built shacks becuase good land management practices, like zoning, did not exist. This quest for a summer place in the country during the sixties somehow passed right by the Upper Delaware River Valley. Recreation boating activity was minimal, so land in the river valley remained in large parcels.

During the seventies, recreational boating along the upper Delaware River with canoes and rafts increased dramatically. This section of the Delaware River is no more than a three-hour drive from twenty-five million people, which has caused our visitor use statistics to jump from approximately 100,000 in 1980 to over 225,000 for 1990. Most want to come for the day to rent canoes or rafts or just spend the day enjoying a drive along the river. However, subdivision signs shot up along major roads in the mid-1980s and the race was on to own a piece of land near the Delaware River. Seasonal home development has not been as great in the upper Delaware as further downstream, but it is increasing and we are trying to prepare the local communities to plan effectively for it.

The upper Delaware River legislation is designed to protect both public use rights on the Delaware River and private land rights adjacent to the river. It involves a management structure that requires a maximum of public involvement and a minimumof direct federal control. There is heavy reliance on the use of citizens' advisory groups, the local political structure and existing agency jurisdictions to mitigate resource issues affecting the river.

To demonstrate how the upper Delaware management approach differs from traditional methods and why many federal managers might balk at accepting this approach, I would like you to imagine yourself in the following situation.

You are a twenty-year veteran in the National Park Service, having worked primarily in traditional land -based parks. You have just received a vacancy announcement for the position of Superintendent at the Upper Delaware Scenic and Recreation River which states:

The incumbent will be responsible for recreational use management and resource protection along a 73.4-mile stretch of the upper Delaware River basin. Congressional legislation for the area has identified approximately 56,000 acres of land as a federal area of interest for developing and maintaining land management practices that will sustain the high water quality in the Delaware River for public recreation and as a water supply for millions. Resource impacts may involve the jurisdiction of up to nine federal agencies, environmental law for two states and local zoning in fifteen communities along the river edge.

The following management guidelines have been established for the area:

A. *Lands actually owned by the federal government are currently 15.2 acres that have been purchased over the past ten years. Land acquisition is very limited and acquired primarily for administrative offices. The area's river management plan calls for land acquisition to not exceed 130 acres corridor-wide.*
B. *All land will only be purchased with the consent of the local government where the land is situated and approved by a local "council" which represents all local, state, and federal management interests in the river corridor. All land acquisition will be on a willing buyer, willing seller basis.*
C. *Condemnation authority, although provided in the enabling legislation, will only be used if a significant resource threat exists which cannot be mitigated or resolved by existing legal authority.*
D. *Agency jurisdiction will be restricted to the surface of the river, and the acreage actually owned by the agency. All river access points managed by the National Park Service are leased from existing state agencies.*
E. *The incumbent will have full responsibility for public use and safety concerns for a park where public visitation exceeded 200,000 in 1990. Over 30% of the canoe safety patrols are carried out by volunteers from local canoe clubs.*
F. *The incumbent will present agency objectives as a non-voting advisor to a local council made up of volunteer representatives from the fifteen towns or townships that border the river. The council also has a representative from the states of Pennsyvania and New York, and a representative from an interstate compact concerned with water quality and quantity over the entire Delaware River basin.*
G. *Every effort will be made to encourage local communities to zone in such a manner so as to be compatible with the intent of a set of land management guidelines established by consensus among all parties to the "council." These guidelines are not legally binding.*
H. *All development by the NPS unit will conform to local zoning, and projects taken on by the unit will be reviewed for approval by the municipality where the development occurs.*
I. *All land-based law enforcement, emergency rescue response, and trash removal (related to public use on the river) will be subsidized through contracts to local jurisdictions.*

The upper Delaware management approach stimulates communication between governmental factions that have not been really talking with each other for a long time. Local politicians can now find just who is supposed to deal with their problem and they know how to apply pressure to be heard by a very thinly spread state resource protection organization. Each landowner, local supervisor, county executive, agency bureau head, and agency director has been identified and educated to the concept.

Will this approach work? Well, if your management objectives are to stop development, totally protect the wildlife habitat, and keep the area in a totally natural state, the answer is, "probably not."

On the other hand, if your objective is to allow for well planned appropriate growth, to pool agency manpower and funding in order to monitor or prevent resource threats from new dams, mining, landfills, toxic spills, soil erosion, etc., and make the private sector more responsive to finding solutions to resource issues, then this concept is definitely working.

There will be lost open space, but with good planning, the impact will be far less than without this approach. With hard work and good communication, we will prevent major pollution to the federal area of interest and influence the prevention of pollution for the entire upper Delaware water shed.

This approach reaches out to all of those affected by a public project. It provides the opportunity for each citizen to understand the environmental impacts that are affecting their community and the delicate balance between economic development and maintaining open space to keep the natural processes functional. It offers land owners a real chance to help manage the public use generated by a scenic river designation rather than just cussing out the federal government for "bringing all those noisy city folk to their peaceful valley."

The fear over federal condemnation ran rampant during the planning stages for this concept. It is still there to some degree because of past and existing governmental land acquisition policies. During the intense public debate there was a recurrent theme from those landowners who could be affected by this approach. "This is my land and I will do whatever I want with it or to it."

Unfortunately, the world is too small and the environmental problems too complex to assume that land ownership carries no responsibility toward the world's environmental problems. We also can no longer lay the total burden of preventing environmental degradation on public officials and government agencies. Today, the cry should be, "This is my land but I must work to preserve its natural values in order to protect the world's environment for the survival of future generations."

Protecting the upper Delaware River Valley is now the responsibility of a labyrinth of governmental entities, every private landowner, and those who come to use the resource. Minimizing human impacts on the environment starts when each individual becomes concerned about their own impact. That responsibility cannot be delegated because the future of mankind depends on our ability to manage our environment which is a resource that we do not own.

LAKES AND PONDS RECREATION MANAGEMENT: A STATE-WIDE APPLICATION OF THE VISITOR IMPACT MANAGEMENT PROCESS

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The Visitor Impact Management (VIM) process is designed to identify unacceptable changes occurring as a result of visitor use and to develop management strategies to keep visitor impacts within acceptable levels. All previous attempts to apply the VIM planning framework have concentrated on specific resources. This paper expands this focus to an entire state. Based on the Vermont Lakes and Ponds Recreation Management study, the VIM process can be applied regionally. Differences between site-specific and state-wide applications are noted.

A large body of literature demonstrates that environmental and recreational quality are multi-faceted concepts that can be threatened by a number of interrelated types of impacts (Kuss and others 1990). The amount, type and location of use, for example, influences use/impact relationships in complex, and often non-linear ways. Some types of recreation create impacts faster or to a greater degree than other types of activities. Even within a given activity, impacts can vary according to the type of transportation or equipment used, and the visitors' characteristics (e.g., party size or behavior). Because environments and user groups have different tolerance limits for human disturbance, the extent and severity of impact varies widely. Moreover, given a basic tolerance level, the outcome of recreation use may still depend on the time and place of human intrusion.

In an attempt to summarize this knowledge for managers, planning frameworks have emerged that integrate the scientific data within the judgmental process of balancing values related to preservation and use (Stankey and others 1985, Shelby and Heberlein 1986, Graefe and others 1990).[1] The Visitor Impact Management (VIM) process (Graefe and others 1990), for example, is based on the premise that effective management involves more than setting carrying capacities and use limits. While use quotas represent one possible strategy for reducing the impacts of visitors, it is important to remember the lessons from previous studies that found only weak or indirect relationships between impacts and overall use levels (Hendee and others 1978, Manning 1986, Kuss and others 1990). In such instances, establishing capacities and limits may do little to reduce the impact problems they were intended to solve, whereas other potential management strategies may be quite effective for reducing the impact conditions.

Previous applications of the VIM planning framework have examined the model's utility in two national parks (Great Smoky Mountains National Park, Glacier National Park), a national monument (Buck Island Reef National Monument), an Army Corps of Engineers Reservoir (Raystown Lake), a barrier beach owned and managed by The Trustees of Reservations (Cape Poge Wildlife Refuge and Wasque Reservation), and a state wild and scenic river (Youghiogheny River). These site specific applications suggested that the VIM process offers a logical approach for managers concerned with ameliorating the impacts caused by recreational use. This paper applies the VIM process to the management of lakes and ponds in Vermont. *By broadening the focus to an entire state, the goal is to identify issues that should be addressed when VIM is applied to multiple locations in a region as opposed to a single resource.* We begin by briefly reviewing the VIM process.

The Visitor Impact Management Process

The VIM framework includes an eight-step sequential process for assessing and managing visitor impacts. The first five steps in the process are devoted to the important, yet often slighted, task of problem identification. While this may appear to be a simple matter, it has often proved to be a stumbling block to effective resource management and related investigations. In state-wide planning efforts, characterized by a diversity of environments and experience opportunities, the importance of these considerations becomes even more crucial. Consequently, the problem identification issue is separated into several steps to isolate the various decisions that must be made in assessing existing conditions. The steps in the VIM process are listed below:

1) Preassessment Data Base Review
2) Review of Management Objectives
3) Selection of Key Impact Indicators
4) Selection of Standards for Key Impact Indicators
5) Comparison of Standards and Existing Conditions
6) Identification of Probable Causes of Impacts
7) Identification of Management Strategies
8) Implementation

These steps are designed to facilitate dealing with three basic issues inherent to impact management: (1) the identification of problem conditions (or unacceptable visitor impacts); (2) the determination of potential causal factors affecting the occurrence and severity of unacceptable impacts; and (3) the selection of potential management strategies for ameliorating the unacceptable conditions.

Applying the VIM Process

There are 295 lakes and ponds, 20 acres or larger in Vermont. Ninety-six of the lakes are at least 100 acres in size. This diversity offers numerous water-based recreation opportunities. Fishing, swimming, boating, camping and a host of other

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1/ In addition to the Visitor Impact Management process discussed here, other planning frameworks include: the Limits of Acceptable Change (Stankey and others 1985) and the Carrying Capacity Assessment Process (Shelby and Heberlein 1986).

activities are engaged in by hundreds of thousands of Vermonters and visitors to the state (Bevins and others 1987).

The provision of such opportunities occurs on many governmental levels. Federal agencies, such as the U.S. Forest Service, the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers administer lands adjacent to lakes and oversee water impoundments, on which water-oriented recreation activity occurs. On the state level, approximately 200 fishing access areas are maintained by the Department of Fish and Wildlife. The Department of Forests, Parks and Recreation also administers recreation areas on lakes and ponds. Municipalities and towns provide swimming beaches, boat access areas, docks, and fishing facilities available to the general public. When VIM is applied on a state-wide or regional level, this diversity of management authority must be recognized and dealt with specifically, if the process is to be effective.

Increased participation in water-based recreation activities, coupled with unequal dispersion of lakes and ponds within the state, have led to user conflicts, crowding at existing public access points, loss of diversity of recreation opportunities, and private land closure in some locations. Increased developmental pressure has likewise threatened the ecological integrity of the few undeveloped ponds left in Vermont.

As a result of these identified concerns and needs, a Lakes and Ponds Recreation Management study was initiated by the Vermont Department of Forests, Parks and Recreation. The VIM process was selected to assess visitor impacts and to provide recommendations for implementing management and protection strategies. Because each lake and pond in the state can be characterized according to the setting's unique physical features, the presence or absence of specific recreational activities and amenities, and by the desired management objectives for that resource, the eight steps in the VIM process need to be conducted for each lake and pond separately. At the same time, commonalities among lakes can be identified in the process. When viewed in a regional context, therefore, a system for categorizing lakes and ponds with common management objectives, impact indicators and standards is required. The discussion to follow outlines general data collection requirements and decision points that were and should be used in these evaluations.

Step 1: Preassessment Data Base Review

The objective of Step 1 is to identify and summarize what is already known about the area(s) in question so that existing information can be put to its best use as the process continues. During the preassessment data base review for Vermont, it was necessary to delineate the physical area(s) to be included throughout the visitor impact management process. For convenience, management areas were patterned after the 12 planning regions in the state.

Two types of data were relevant for Step 1. The first involved an inventory of the physical features associated with each lake, while the second cataloged the recreational activities and amenities. The physical feature inventory included information regarding the area surrounding the lake, as well as data on the characteristics of the lake itself. The former provided an indication of the types of indirect impacts that may be occurring, while the latter described the existing conditions and suggested variables which may increase or decrease the direct impacts associated with human activity. Examples of variables measured in the physical feature inventory are listed below:

Physical Feature Inventory Data:

- Lake surface area
- Shoreline configuration
- Water level fluctuation
- Lake bottom sediment type
- Critical/unique habitats
- Types of aquatic plants
- Shoreland ownership patterns
- Development of the lakeshore
- Type of road/trail access
- Lake surface area used for recreation
- Shoreline length
- Shallowness ratio
- Water clarity
- Phosphorus levels
- Specific biota
- Shoreline vegetation
- Watershed uses
- Homes around lake
- Distance to nearest road
- Scenic/aesthetic qualities

Data on some of these variables existed in data bases maintained by the state. Information for the other variables was and continues to be gathered. While gaps in these data bases were inevitable, the intent of the physical feature inventory was to determine what is currently known about each lake, and to identify where additional data about the setting should be gathered.

The data base review also identified the need for an inventory of the current recreational use of the water, estimating the range and percentage of type of use occurring, determining how much of the use was attributable to day users (e.g., boating use from designated launch areas versus use by shoreline owners), and estimating peak use (i.e., the maximum recreation use at any one time). The estimate of the range and percent of use of activities occurring on a lake will be accomplished through on-site counts, or through volunteer monitoring of the recreational use of the lake. Counts and activity use percentages will be taken at random times over the primary recreation season to ensure a more representative sample. Estimates of the percentage of boating use attributed to day users will be determined through on-site observations of day user launches. Similar methods may be used to determine day use shoreline fishing, day use picnicking, and swimming. The following delineates examples of suggested criteria for the recreation inventory.

Recreation Activity / Amenity Inventory Data:

Management
- Management authority for the lake (public vs private)
- Existing management objectives
- Type and presence/absence of lake zoning practices
- Prevalence of law enforcement
- Existing use restrictions

Facilities
- Location and number of boat launching areas
- Location and number of marinas, moorings and docks
- Location and number of camping / picnic areas
- Location and number of designated swimming areas

Activities
- Range / mix of recreation activities
- Current usage patterns
- User satisfaction / crowding / user conflicts
- Type of experiences provided / desired

Of the two types of inventory data (physical feature and recreation activity / amenity), the state had a more complete understanding of the physical feature data. To apply the VIM process on either a site-specific or regional basis, however, both types of information and the interaction between the setting and social attributes are important. Recreational

activities, for example, affect and are effected by water quality factors such as clarity, pH, temperature, macrophyte coverage, and plankton abundance.

Step 2: Review of Management Objectives

The second step in the process is to review management objectives pertinent to the situation. In recent years, authors have emphasized the importance of clear and specific management objectives (Hendee and others 1978, Shelby and Heberlein 1986). To be effective, management objectives need to define the type of experience to be provided in terms of appropriate ecological and social conditions (Stankey 1980, Graefe and others 1990).

Early in the study, it became apparent that the management objectives for Vermont's lakes and ponds were not clearly delineated. A classification scheme was developed to help managers set objectives for acceptable recreational uses and impacts. In general, some lakes could be characterized as high density recreational experiences where motorized watercraft are common, while others provided low density wilderness opportunities with no motorized use. While no single set of objectives existed for all areas, the VIM process allowed different sets of objectives to be established for broad categories of lakes and ponds throughout the state.

Based on the manager interviews conducted as part of the project, four initial categories were identified: 1) solitude and/or wilderness, 2) non-motorized recreational, 3) low-speed motorized use and compatible non-motorized recreation, and 4) lakes or ponds managed for high-speed use and compatible low-speed uses. This array provided a range of environments in which alternative experiences and activities could occur.

The process of setting objectives was further facilitated by categorizing each of the initial classifications according to the amount of use found on the lake. Low, medium, and high use occurred within each of the four classifications.[2] The state operationally defined boundaries of what constituted low versus medium versus high use within each experience classification. Little Averill Pond, for example, was classified as high-speed use because water-skiing is permitted, but because the magnitude of use was low, the pond was categorized as a high-speed, low use resource. Lake Paran, on the other hand, had a high level of use on the peak swimming days of summer even though motorized watercraft were prohibited. This lake was classified as a non-motorized, high use lake. All lakes and ponds in Vermont over 20 acres in size were classified in a similar manner.

Although judgments regarding the initial four categories and the amount of existing use were somewhat subjective, the classification process was enhanced by incorporating other lake characteristics into the formation of management objectives. Remoteness, range and mix of recreation use, modifications to the surrounding natural environment, extent of access, size of lake, shoreland development, and existing management controls are examples of additional criteria that proved useful in the classification process. Each pond or lake was cross-classified using the four initial categorizations, use level, and the above criteria.

2/ Wilderness / solitude lakes were the exception to this general rule. By definition, high use does not occur on solitude lakes, however, low to medium use may exist.

Bean Pond in Lyndon, for example, is managed for non-motorized recreation, has relatively few recreationists, provides substantial isolation from the sights and sounds of mankind, and allows for a considerable degree of interaction with the natural environment. Using the proposed classification scheme, Bean Pond was considered a remote, non-motorized, low use lake. Lake Bomoseen provides an example where there is a wide range and mix of recreation activities and all types of watercraft are in evidence. In this instance, the resource was classified as a high-speed motorized lake, with high concentrations of use, where interaction with the natural environment was not a primary objective of the experience. Colchester Pond illustrates a limited access lake with minimal recreation use. Only two private owners have abutting property, restricting use and the number of encounters occurring on the lake. The lake has a relatively unmodified natural environment and provides an opportunity to escape the sights and sounds of humans. These setting characteristics suggested classifying Colchester Pond as a low use, non-motorized recreation lake.

The aforementioned characteristics or indicators function interdependently. In most instances combinations of the setting characteristics delineated the most appropriate type of recreation experience opportunity. For example, a remote, low density lake with limited access, and no shoreland development was classified as wilderness. This lake, however, would be classified differently if it lacked the remoteness associated with solitude (e.g., Colchester Pond). In these cases, setting inconsistencies became key indicators of the experience categorizations. The four categories when considered in conjunction with additional defining attributes (e.g., amount of use, remoteness, etc.) enabled management to set objectives for opportunities that met the diverse experiences users desire. While such categories of experience/use environments provided for development of standardized management actions, they also allowed for individualized lake management plans and implementation strategies. Thus, similar to a single large resource with many different subunits (e.g., a large national forest with both wilderness areas and developed campgrounds), visitor impact management objectives for a state-wide planning context should incorporate a range of acceptable impact levels to accommodate the diversity of environments and experience opportunities.

Step 3: Selection of Key Impact Indicators

The third step in the VIM process involves identifying measurable indicators for the pertinent management objectives. Once the objectives described the type of environmental conditions and visitor experiences to be provided, this step served to identify how the specified conditions and experiences were to be measured. The specific decision required here was the selection of the most important variables or attributes to serve as indicators of the desired conditions.

While there was no single indicator or set of indicators that were appropriate for all lakes and ponds, commonalities within and between lake classifications were sought. Several criteria were used to evaluate the potential usefulness of alternative indicators. Useful indicators included those that were directly observable, relatively easy to measure, directly related to the objectives for the lake, sensitive to changing use conditions and amenable to management. Depending on the resource, any of the defining characteristics discussed in Step 2 were considered key impact indicators. Selection of one indicator over another depended on the specific characteristics of the lake and the level of measurable impact (low, medium or high).

A nominal group meeting and a Delphi survey were also used to identify key impact indicators across all lakes and ponds in the state. Previous applications of the VIM process highlighted the importance of including representation of a diversity of interest groups (e.g., managers, users, property owners, etc.). When applied to a state-wide perspective, it is equally important to incorporate regional interests.

The goal of the nominal group was to generate issues of common concern and arrive at a consensus regarding the importance of each. Eleven experts participated in the nominal group session, representing a range of interest groups and agency perspectives. The results of these sessions were used to develop the Delphi survey. The Delphi sequence was conducted through a series of three rounds of questionnaires presented to a panel of 97 individuals, representative of various interest groups and geographic locations in the state. The surveys used in the Delphi sequence not only asked questions about significant issues, but also provided feedback to the panel members regarding the degree of group consensus.

Respondents to the survey were asked to evaluate 21 specific issues (e.g., milfoil spread, amount of development, access, recreational conflict, etc.) in terms of the severity of the problem, the extent to which the issue was being addressed, and whether they perceived the issue to be a future trend. Overall, the results indicated that physical impacts on Vermont lakes (milfoil spread, development around lakes, pollution from run-off, and excessive weed growth) are not only the most severe problems currently facing recreation managers, but are also likely to continue to be problems in the future. Social impacts such as amount of recreation use, year round recreation use of lakes, insufficient power boating access, and conflicts between recreation user groups, while not considered to be extreme problems at this time, were seen as areas of major concern for the years to come.

Graphing the responses to these three sets of questions highlights these interrelationships. Figure 1 plots the severity of each issue against the extent to which the problem is being addressed, while Table 1 describes the items in each of the quadrants. Regardless of how severe a problem was perceived, the panel members did not believe the issue was being dealt with adequately. From a management perspective, the items in the lower right quadrant of Figure 1 represent the key impact indicators. These issues were considered extreme problems that are not being addressed. The top three issues in Table 1 show that the most important impact indicators are ecological in nature (milfoil spread between lakes, polluted run-off into lakes, excessive aquatic weed growth). A social indicator ranked fourth (development around lakes and ponds), while a managerial indicator ranked fifth (insufficient shoreland zoning).

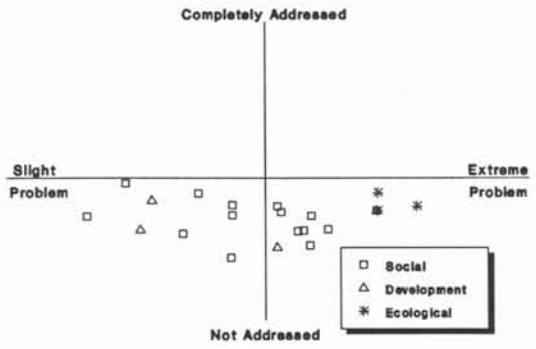

Figure 1. Vermont lake problems are being addressed.

Table 1. Perceived problems versus perceptions problems are being addressed.[1]

Lower Right (Perceived Problem / Not Addressed)
- Milfoil spread between lakes
- Polluted run-off into lakes
- Excessive aquatic weed growth
- Development around Vermont lakes and ponds
- Insufficient shoreland zoning
- Specialized user groups influencing decision makers
- Too much power boating on remote lakes
- Lack of stable funding sources
- Conflict between recreation user groups
- Pressure on local & state govt. to regulate use
- Amount of recreation use of lakes
- Development of undeveloped lakes

Lower Left (Not Perceived as Problem / Not Addressed)
- Insufficient swimming access to lakes
- Pressure on local & state govt. to provide services
- Winterization of lakeshore homes
- Not enough handicap facilities and access
- Year round recreation use of lakes
- Not enough recreation facilities and services
- Utility company constraints on access
- Insufficient power boat access to lakes
- Insufficient trail access to undeveloped lakes

1. Quadrant descriptions are based on Figure 1.

Figure 2 plots the intensity of the 21 items against panel members' perceptions that the problems are increasing. Table 2 identifies the items in each quadrant. With respect to these relationships, items contained in the upper right quadrant were the immediate focus of management. Again, the first five items in Table 2 are the same as those in Table 1. Items in the upper left quadrant of Figure 2 (e.g., insufficient swimming access, more government services, winterization of summer homes), were considered less problematic at this time, but are likely to become key impact indicators in the future.

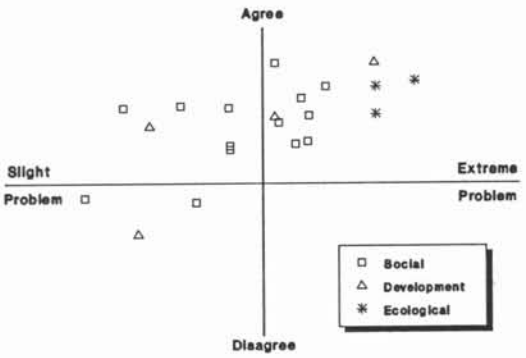

Figure 2. Vermont lake problems are increasing.

Overall, the findings from the Delphi survey indicated that the key impact indicators for Vermont lakes and ponds were primarily ecological. Social and managerial indicators, while considered important issues, were judged to be less problematic at this time. These issues, however, may increase in importance as the demand for water-based recreation grows.

Table 2. Perceived problems versus perceptions problems are increasing.[1]

Upper Right
(Perceived Problem / Agree Problem is Increasing)
- Milfoil spread between lakes
- Polluted run-off into lakes
- Excessive aquatic weed growth
- Development around Vermont lakes and ponds
- Insufficient shoreland zoning
- Specialized user groups influencing decision makers
- Too much power boating on remote lakes
- Lack of stable funding sources
- Conflict between recreation user groups
- Pressure on local & state govt. to regulate use
- Amount of recreation use of lakes
- Development of undeveloped lakes

Upper Left
(Not Perceived as Problem / Agree Issue is Becoming Problem)
- Insufficient swimming access to lakes
- Pressure on local & state-wide govt. to provide services
- Winterization of lakeshore homes
- Year round recreation use of lakes
- Not enough recreation facilities and services
- Insufficient power boat access to lakes

Lower Left
(Not Perceived as Problem / Disagree Issue is Becoming Problem)
- Not enough handicap facilities and access
- Utility company constraints on access
- Insufficient trail access to undeveloped lakes

1 Quadrant descriptions are based on Figure 2.

In general, the nominal group and the Delphi survey proved useful for identifying impact indicators on a state-wide basis. This technique could be equally helpful for defining issues for a single site.

Step 4: Selection of Standards for Impact Indicators

Step 4 adds one further layer of specificity to the VIM process by calling for standards for the previously selected impact indicators. This step, in essence, calls for a restatement of management objectives in quantitative terms. Standards differ from management objectives by specifying appropriate levels or acceptable limits for the impact indicators designated in Step 3. The standards selected become the basis against which the existing situation is evaluated. Thus, this step serves the important function of describing the environmental conditions and type of experience to be provided in definable units of measurement.

Specific standards for evaluating each lake were established. For some indicators, the standard was the total absence of the impact. The presence of *any* Eurasian milfoil, for example, was judged to be unacceptable. For other indicators, a range of acceptable impacts was defined. Littoral zone coverage, for example, was considered acceptable if less than 25 percent of the lake was covered. Greater than 50 percent coverage was deemed high impact. Values between these extremes were evaluated as moderate impact.

Some of the standards could be established for the entire state (e.g., milfoil). Other standards, however, had to be lake specific and tied to the management objectives for that lake. Development standards for lakes classified as wilderness, for example, differed from the standards applied to high density, high use lakes. In the former situation, zero development was the standard, while standards in the latter case varied according to the desired type of experience.

Step 5: Comparison of Standards & Existing Conditions

After the first four steps in the process clarified the conditions the state was trying to achieve for a given lake, the existing situation could be compared to this desired state of affairs. This step requires an inventory and assessment of current conditions for those impact indicators that were selected in Step 3. This assessment does not necessarily require elaborate and costly studies. What is necessary, however, is a level of observation and measurement that provides for a reasonable comparison of existing conditions and their corresponding standards.

When no discrepancy between current measures of pertinent indicators and corresponding standards exists, the managers can monitor the situation for future changes. In this situation, the lake or pond is currently providing the environmental conditions and type of experience that are defined as appropriate for the area in Step 2. The monitoring should include the impact indicators that are most susceptible to future changes, as well as the use patterns that may lead to changes in the status of these impact indicators. Because these data are collected prior to the time problem conditions are identified, the evaluation of the probable causes of the problem can be more easily determined.

When current measures for certain indicators do not meet the standards for the lake or pond, a problem situation is documented. It is then appropriate to move on to the identification of probable causes of the unacceptable impacts. The State of Vermont is currently in the process of making these comparisons.

Step 6: Identification of Probable Causes of Impacts

Because of the many potential factors that may contribute to impact conditions, the challenge of Step 6 is to isolate the most significant causes(s) of the problem situation. This task is approached by examining the relationships between visitor use patterns and the impact indicators that exceed their respective standards. In examining potential causal factors, it is important to consider the full range of specific aspects of visitor use that may influence the situation, including type of use, size of groups, time of use, concentration of use, frequency of high use periods, overall amount of use, and behavior of visitors. It is also important to remember that use/impact relationships may be mediated by site characteristics and consequently may vary for different times and places.

The introduction of Eurasian milfoil, for example, is typically caused by a change in the numbers or types of visitors using a lake. Milfoil becomes entangled in boat motors or trailers. Visitors who have boated on a lake where milfoil is present, may inadvertently introduce the weed to another lake where none exists. In situations where the number of motor boaters is increasing or where motor boating is being introduced on a lake, the probability of Eurasian milfoil spread also increases.

Step 7: Identification of Management Strategies
With some understanding of how the amount, type and distribution of people using a given area affect the quality attributes of the area and experience, it is possible to identify a range of alternative management strategies. Just as many aspects of use contribute to the problem, many management alternatives are available for dealing with the problem. It is important at this phase to focus on the probable causes of the visitor impacts rather than on the impact conditions themselves. It is also important to recognize that one may never have a complete understanding of the causes underlying certain visitor impacts, nor can one predict exactly how a given management action will affect a particular problem situation.

Management techniques aimed at reducing a particular impact problem may adversely affect other aspects of the situation or may introduce other problems for managers. A given management option may seem quite desirable according to some criteria but less desirable from the perspective of other criteria. A strategy with high odds of producing the desired outcome may be impractical due to the difficulty or cost of implementation. It may also be inadvisable if it causes as many problems as it solves in terms of visitor acceptance or other experience indicators. In the case of Eurasian milfoil, a program could be established to inspect boats at launch areas. Milfoil found on boats could be eliminated before entering the water. This management strategy, however, is costly to implement due to increased personnel requirements, and may cause increased congestion at the launch site. Less costly alternatives might involve boater education about milfoil spread, and/or volunteer monitoring of boats at the launch areas.

Step 8: Implementation
Because lakes and ponds classified as wilderness are the most susceptible to impacts, these resources should receive priority when implementing the identified management strategies. Appropriate management actions for lakes in the remaining classifications should be taken as soon as the necessary resources are available. Given the highly variable nature and causes of visitor impacts, management programs designed to deal with these impacts need to be flexible and quick to respond to changing conditions.

At the present time, for example, milfoil is most common in southern Vermont, and least common in the Northeast Kingdom. If evidence of the presence of milfoil is found in the northeast, a combined effort of boater education and boat inspection by lake association volunteers may need to be implemented quickly to curb further spread.

Once a management program is implemented, it is important to continue monitoring the key impact indicators and use patterns to determine whether the management actions are producing the desired outcomes without altering other characteristics of the experience. Regardless of the outcome of any particular step in the VIM process, continuous monitoring is essential for understanding the current status of each lake and pond and predicting when unacceptable impacts may occur.

Discussion

The Vermont lakes and ponds recreation study highlighted similarities / differences between multiple versus single resource applications of the Visitor Impact Management process. When applied to multiple locations, it was important to consider the unique physical and social characteristics of each resource. In essence, the eight steps in the VIM process were conducted for each resource separately. However, because commonalities between the lakes and ponds were evident, it was possible to develop a classification scheme for setting objectives (Step 2), identifying key impact indicators (Step 3) and specifying standards (Step 4) within broad categories.

This classification scheme offered several advantages. First, categorizing the lakes provided a structure for comparing and contrasting the diversity of environments and experiences within the state. Second, the framework established a foundation for setting objectives by differentiating what is currently offered from what should be offered. Third, the categories of lakes allowed for broad policy development and initiatives. Rather than dealing with each lake individually, state legislators and planners could mandate appropriate management actions for different classes of lakes. Fourth, by considering the state as a system of lakes, it was possible to assess differences in geographic distribution of lake classes within and between regions.

The state-wide evaluation process allowed for consideration of other conceptual issues related to the VIM process. For example, the potential substitutability of resources could be considered. When the classification process highlighted deficiencies in the availability of particular experience opportunities (e.g., wilderness lakes) in sections of the state, protecting the existing areas became paramount since there were no substitutes. Alternatively, if lakes of the same class were common in a region, managers could reduce use levels or change the type of use on a specific lake, since other similar resources existed. Because resource substitutes are not necessarily symmetrical (Shelby and others 1989), and because the other lakes may not have the capacity to absorb the influx of additional visitors, information about resource characteristics still needs to be interpreted in light of corresponding information about user perceptions of those characteristics.

The nominal group and Delphi survey proved useful for determining the extent of agreement about key impact indicators (Step 3). For both site-specific and region-wide applications of VIM, a diversity of interest groups should be represented in this step. With a regional focus, representation of the different geographic areas is always necessary. For site-specific evaluations, the significance of the resource determines the extent of geographic representation needed. Applying VIM to a nationally known landmark, for example, would require broad input. Less diverse feedback would be necessary for a small locally used resource.

In this study, graphing the potential impact indicators highlighted the interaction between the perceived severity of problems, the extent to which they were currently being addressed, and the likelihood of the indicator becoming a future trend. This technique is useful for either site-specific or regional applications of VIM.

Regardless of the focus, site-specific or region-wide, both ecological and social standards need to be established for specific resources (Step 4). In regional applications, some of the standards will cross all resources. The standard of no milfoil, for example, was applied to all lakes and ponds in Vermont. Other standards may not be universal. The amount of acceptable development, for example, varied according to the lake's classification (i.e., zero for wilderness, higher for other classes).

Steps 5 through 8 of the VIM process are also similar for both site-specific and region-wide applications. With a regional focus, however, they must be applied to each resource individually. This process does increase labor costs and is more

time consuming, but by classifying the resources into discrete categories, managers can prioritize areas of greatest need. Wilderness areas, for example, should receive priority because they are more sensitive to change. Once modified, they are lost. Impacts occurring on other classes of lakes (e.g., lakes managed for high speed use), may be more acceptable to both managers and users. Management strategies for these lakes can be implemented as funds and resources become available.

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OUTDOOR RECREATION

INNOVATIONS IN OUTDOOR RECREATION

RIVER RECREATION MANAGEMENT OPPORTUNITIES IN HYDROELECTRIC RELICENSING

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Between now and 1993, more than 200 existing hydroelectirc projects will come up for relicensing before FERC, the Federal Energy Regulatory Commission. This provides a rare opportunity for agencies and individuals to markedly influence the ecological and recreational balance of these projects. This paper presents an overview of the relicensing process, describes some of the types of river recreation issues that can be addressed through the process, and explains how you can become involved.

Between now and 1993, more than 200 existing hydroelectirc projects will come up for relicensing before FERC, the Federal Energy Regulatory Commission. In Michigan, the Huron-Manistee National Forests are participating in the relicensing process for 10 of these projects, which involve 11 dams and 4 river. These include the AuSable, a designated Scenic River and the Pine and Manistee, which are currently proposed for designation under the W & S Rivers act. Here in the northeast, the process is also on going for many rivers with significant recreational value. The Androscoggin River in New Hampshire and Maine with 12 dams, the Kennebec River in Main with 8 dams and the Genesee River here in New York with 4 dams are a few examples. For most of these dams, indeed, for many of these rivers, this is a once in a lifetime opportunity for agencies and individuals alike to markedly influence the ecological and recreational balance of these projects.

My purpose here today is to tell you very briefly what the relicensing process is all about, to give you some ideas of the types of river recreation issues that can be addressed through the process and to let you know how you can become involved.

With the passage of the Federal Power Act in 1935, Congress asserted federal supremacy over hydroelectric facilities and established FERC to regulate their operation through the issuance of federal licenses. Over the next 10 to 15 years the FERC licensed most of the existing dams that had been built between 1910 and 1935 for 50 year terms. Consequently, we have this large number of license renewals coming due here in the early 90s. Recognizing this fact, Congress decided revisit and amend the Federal Power Act with the Electric Consumers Protection Act in 1986.

As opposed to the Federal Power Act and other hydro power legislation that had been enacted in the interim years between 1935 and 1986, ECPA was primarily oriented toward addressing the environmental impact of hydro power dams. It says that hydro projects should be licensed with equal consideration being given to energy conservation, fish and wildlife protection, the enhancement and preservation of recreational opportunity and other aspects of environmental quality, as well as to the traditional purpose of water power development. The legislation's architect, Congressman John Dingell, said that these projects, built and licensed in another age, need to undergo the scrutiny of today's environmental awareness before new licenses are issued for their continued operation.

The rules that implement ECPA provide for a very significant role in the relicensing process for resource management agencies and citizens and also for indian tribes when the project affect reservation lands. There has been a considerable amount of attention paid to the fisheries management aspects and attendant water flow issues associated with relicensing. Receiving less attention, at least in my experience in the north central states, has been some off the other issues that can be addressed under the legislation, including recreation. This is often due to the way state resource management agencies are organized and which division has been given primary relicensing responsibility, rather than the agencies ignoring some of these other resource areas. I don't know what the experience has been to date here in the northeast. However,with most license applications being due by the end of this year, the next 6 months is a very critical period. The new licenses will have 30 to 50 year terms, so, as I noted earlier, this is truly a once in a lifetime opportunity to address the recreation issues, as well as other issues, associated with these projects. Specifically what might some of these opportunities be?

The first source for determining recreation needs for each facility should be available from the utility itself. As a part of the relicensing process, dam owners have been conducting environmental studies to provide an information base for the decisions related to their new license. Included in these studies should be on related to recreation needs. This study should be available directly from the utility or from the state agency personnel involved in relicensing work. It should include a complete inventory of existing facilities and there condition along with an assessment of demand for additional facilities. Development and quality maintenance of camping, picnicing, and access facilities on the reservoirs created by the dams, is an obvious responsibility. In most cases utilities have developed and/or leased lands to local governmental units to develop and operate such facilities. May of the facilities, however, are relatively old now or may not be of very high quality. They may need substantial maintenance work or in many cases, complete rehabilitation. These improvements should be sought in the relicensing process, as well as any new facilities or expansions that can be justified based on future needs. Apart from the reservoir accesses, access to riverline stretches, particularly below the dams is also an appropriate discussion items. Recreational trails should also be considered where the opportunity and demand for such facilities exist.

River flows that are favorable to recreational boating are another major category that is open to negotiation in this process. River flows are generally the single most contentious issue associated with the licensing process. It is central to the efficient economic operation of the power house, the quality of fish habitat, and downstream erosion and cultural site degradation, as well as to recreational boating. In order to strike an optimum balance on this issue the recreation interests must be well represented.

Within these broad categories the FERC can and has required many types of recreational developments in hydro project licenses. However, they do so largely based on the negotiations that take place between resource agencies, citizens and the utilities, rather than of their own accord.

So, how can you become involved? First, I would recommend that you contact your state resource management agency and find out who is responsible for hydro relicensing. They should be able to provide you with the names and contact information for the people at the utility and at FERC who are handling the process for the rivers and projects you are interested in. In addition, they should be able to provide you with a substantial amount of information on the status of the relicensing process at these facilities and specifically, who is providing state leadership for recreational issues.

The fact that most final applications are due at the FERC by the end of this year means that resource agencies will be receiving draft applications for review by June or July. This is the most effective time for you to become involved in the process. You can do that by providing comments directly to the agencies and the utility. The utility is required to include these citizen comments in the records they send to the FERC and to address the concerns raised in their license applications. Any concerns or needs that you can tie to comprehensive resource management plans, such as river basin plans or statewide recreation plans have a stronger standing with the FERC process as a result of provision of ECPA.

If you don't feel your concerns are adequately addressed in the license application you can also become a formal party with legal standing in the process by filing a motion to intervene once the utility has filed the application. If you are contemplating such action, an essential guide is Rivers At Risk: The Concerned Citizen's Guide to Hydropower, which is available from American Rivers in Washington, D.C.

In addition to state agencies and the utilities, the National Park Service has individuals in their regional offices who are responsible for relicensing recreation issues. Finally, there are a number of conservation groups who are heavily involved in the relicensing process, led by American Rivers, who can help you out.

If you have an interest in a northeast river that is affected by hydroelectric projects I would urge you not to let this opportunity pass by without involving yourself to see that these issues are addressed.

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HOW THE WHITE MOUNTAIN NATIONAL FOREST IS ADDRESSING ACCESSIBLE RECREATION OPPORTUNITIES FOR EVERYONE

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The White Mountain National Forest recently began a new direction in improving accessibility of outdoor recreation opportunities for people of all abilities. For 25 years under mandate of existing laws the Forest made facility and site specific efforts at accessibility. A Forest proposal in 1990 to construct motorized vehicle access for people with mobility disabilities to a backcountry pond proved the catalyst for a review of our accessibility policy. The result is a more wholistic and participative direction in providing accessibility of outdoor recreation opportunities for everyone.

General

People are searching for links to the land, it is our job to help them find those links; we must ask ourselves, will what we are doing reconnect american people to the land? (G.Elsner, 1991 NERR Conference)

Specific mandates of law and regulation on accessibility has existed for 25 years. The Architectural Barriers Act (ABA) of 1968 requires buildings constructed or renovated with Federal money be accessible to and usable by people with disabilities. Based on this Act, Uniform Federal Accessibility Standards (UFAS) were developed and are enforced by the Architectural and Transportation Barriers Compliance Board (ATBCB). The Rehabilitation Act of 1973, and the Rehabilitation, Comprehensive Services and Developmental Disabilities Act (1978), added "handicap" to the more commonly known list of prohibitions against discrimination on the basis of race, color, religion, sex, age and national origin. The Americans with Disabilities Act (ADA) of 1990 prohibits discrimination against people with disabilities in all public accommodations and transportation.

Under these laws, especially the first two, the Forest addressed outdoor recreation opportunities for people with disabilities. Early efforts were simplistic, we assumed we knew what people with disabilities wanted for outdoor recreation opportunities and how to provide it. Law and the specifications in UFAS provide the basic standards and reinforced our assumptions. Some campgrounds, picnic areas, and day use areas were made accessible by altering the toilets and tables to meet the standards. It was thought that some roadside facilities were what people with disabilities desired and would use. The specifics of Law were met, but not the intent.

In addition, managers seemed to lack the sensitivity to recognize, evaluate and correct the many invisible barriers to people with visual, audio, mobility, and other disabilities.

Why Change?

The need to expand our concept of accessibility was recognized and acted on when the decision and subsequent controversy on accessibility to a backcountry pond brought it to the forefront. This began in 1988 when the Forest, in response to a public request, proposed to improve sections of a seven mile route for motorized vehicle access by people with mobility disabilities into a backcountry pond (Flat Mountain Pond), adjacent to a Congressionally designated Wilderness Area (the Sandwich Range Wilderness). In February 1990, following a study and public response, the Forest announced its decision to improve the route to Flat Mountain Pond. Several organizations and an individual appealed the decision. Following lengthy discussions with the appellants, in November 1990, the Forest Service withdrew its decision. In the decision Rick Cables, Forest Supervisor, said:

> During discussions on the appeals, the Forest Service concluded that they did not understand as fully needed the outdoor recreation needs of the disabled and had not done all that should have been done to help others understand them as well. The Forest will, therefore, try to learn and help others to learn more about that issue before taking any further action. The first step in doing that will be to invite persons from the disabled community and others who are knowledgeable in the field of outdoor recreation for the disabled to to form a work group and meet with the Forest and discuss the settings, activities, and facilities that might be suitable components of the Forest's recreation program.

How is Change Identified?

The Forest then developed a strategy for accessible recreation on the Forest. That strategy stated the need for more information. The information should answer the questions, 1) who are the expected users? 2) what types of recreation opportunities would these users like to share? 3) what on-the-ground conditions are necessary for a recreation opportunity to be available?

The strategy would be consistent with existing policies, particularly the Recreation Opportunity Spectrum (ROS) framework. ROS is a nationwide system for managing recreation in the Forest Service. Recreation on the Forest is more than just camping, fishing, and hiking. Research has shown that people choose a specific setting for each of these activities in order to realize a desired set of experiences. For example, camping in a large undeveloped setting with difficult access and few facilities offers a sense of solitude, challenge, and self-reliance. In contrast camping in a setting having easy access and highly developed facilities offers more comfort, security, and social opportunities.

The Recreation Opportunity Spectrum, or ROS offers a framework for understanding and managing these relationships and interactions. Maintaining a broad spectrum of ROS classes is very important to provide people with choices. The end product of recreation management is the experience people have. The key to providing most experience opportunities is the setting and how it is managed. The primary setting indicators are type of access, remoteness, naturalness, facilities, social encounters, visitor impacts, and the visitor themselves. The ROS system is used by managers in guiding on-the-ground actions that facilitate (or hamper) various recreation experiences.

ROS classes range from primitive to urban. In general, the primitive end of the spectrum provides recreation experiences that are derived from a natural appearing environment with no motorized vehicles and low visitor interaction. The basic recreation experience is isolation, remoteness, independence, closeness to nature, and self reliance with a high degree of challenge and risk.

At the other extreme, the urban recreation opportunity class is facilitated by an environment that is highly modified and developed, more like a traditional urban park. The recreation experience is primarily built around affiliation with others. Challenge and risk opportunities are unimportant. The classes between primitive and urban are: semi-primitive non-motorized, semi-primitive motorized, roaded natural and rural.

As a starting point for the strategy, the Forest solicited and is considering consumer generated recommendations for making White Mountain National Forest recreation accessible to persons with disabilities. To do this we formed an Accessibility Work Group with the New Hampshire Governor's Commission on Disabilities. Members were also drawn from Maine and Massachusetts, and reflect a variety of disabilities and recreation interest. Their role is to; 1)research and report population of disabled citizens within the Forest market area, 2)recommend criteria for on-the-ground conditions to be met in providing a wide range of accessible recreation opportunities, 3)recommend goals for recreation opportunities and associated improvements to meet the need for accessible recreation choices and 4)recommend education and accessibility awareness training programs for Forest Service staff and the Forest user community. It is anticipated that this work will be completed by Fall 1991.

At the same time the Forest began to implement this strategy on a local level the Forest Service National Office was going through a similar examination. An Accessibility Task Force was formed at the National Office in 1990 which identified a series of "key policies" defining a strong foundation upon which a long term program serving persons with disabilities could be built. These policies aren't a serious departure from current policies but a clearer articulation of current law and regulation within the framework of accessibility for all. This work didn't gain attention until we became involved in our local effort - and they provided excellent direction consistent with our local effort. They can be summarized as follows:

All recreation visitors, including persons with disabilities, should have the opportunity to participate in or use the benefits, services, and information available at buildings and facilities open to the public.

The Forest Service should strive to provide a diversity of recreation opportunities for persons with disabilities comparable to that offered other visitors.

The Forest Service should strive to provide programs and services in a setting that allows persons with disabilities to interact with other visitors and does not separate them from the able-bodied population.

In the provision of recreation programs, services, and facilities, the Forest Service should strive to achieve the highest level of access to persons with disabilities practicable considering the experience level, capabilities of the area, nature of the program, and cost.

The Forest Service should involve persons with disabilities in the planning, construction, renovation, and operation of recreation programs, activities, and facilities to establish the optimal mix appropriate to each specific geographic area.

The Forest Service must develop and maintain reliable information on the accessibility of recreation facilities, services, and facilities for use by persons with disabilities.

The Results

The output of the work groups has been very valuable and worthwhile. The development of the strategy, the implementation of the work group process and involvement in the work groups were also important in increasing our accessibilty awareness. The results, arranged by work group tasks are:

Research and Report Population of Disabled Citizens Within the Forest Market Area

This task was an effort at getting an expression of demand, we wanted to know how many people with disabilities were going to use the Forest. A common theme at the meetings was that people with disabilities have the same needs and mirror interests for outdoor recreation opportunities of the public at large. The concept of National Forest Recreation management is to maintain the greatest range of recreation opportunities consistent with the resource so as to provide the greatest diversity of recreation experience opportunities to the public. Persons with disabilities are really a part of the public. They are not to be looked at as a separate demand group but as part of the public demand as a whole. If we maintain a range of ACCESSIBLE recreation opportunities we meet the FS recreation management policy and make Forest recreation opportunities available to people of all abilities.

This means that 1)program accessibility and activity accessibility need to be included in our planning, information and implementation 2)the ROS framework the FS uses for recreation management is consistent with accessibility as we don't change the setting to bring in accessibility we build accessibility into what's there and 3)we must make sure all our sites facilities are considered for accessibility. We need inclusive design, planning and construction. We need to change the "design bias" from one of exclusivity to one of inclusivity.

Recommend Criteria for On-the-ground Conditions to be Met in Providing a Safe Range of Accessible Outdoor Recreation Opportunities

In the group discussions it became apparent the Forest didn't take the wholistic view in relation to accessibility. We looked at this facility or that facility but didn't look at the entire area for accessibility. An example, at one particular roadside stop we made the toilet accessible and we made the short path from the toilet to the parking accessible. But we failed to recognize that in this particular location there was also a gated road easily travelable by wheelchair labeled "foot traffic welcome". But there was no way for the person in a wheelchair to access the gated road (although they could easily get to the gate) because the design of the gate effectively prohibited wheelchairs. Another example, we sometimes take the person with disabilities partially into the area and then make it impossible for them to get to the main attraction. We did this at the Rocky Branch Scenic Area where the parking lot and toilets are accessible but people with disabilities cannot get on the bridge for a scenic vista of the falls. We have to lengthen our view to include the entire area not just specific facilities.

We used UFAS which doesn't translate to the woods. We've missed the boat using these standards alone to design our facilities. The work group discussed the national effort to establish design standards for accessibility - the interim draft Guide. The group focused on the the guides content and identified several shortfalls in that guide. Some of the groups concerned that surfaced were, 1)the use of motorized prosthetic appliances was not well addressed, 2)some of the terminology was weak, - they recommended several places where wording should be changed from "should" to "will" or "shall", 3)some of the legal references were not inclusive - they recommended others, 4)there were several technical drawings and specification they though were inconsistent with the real need, 5)there was lack in some places of identifying the needs of people with visual or audio impairments etc. It was a very worthwhile exercise, we are continuing with the review of the Guide.

It was also identified that providing recreation opportunities in the more primitive, rustic or less developed areas provides a new challenge for the manager and for the recreationist with disabilities. Until this time accessibility has been measured against standards such as barrier free architectural designs, ramps and paved paths designed for urban areas. In more natural areas these standards are difficult to apply, and in most cases would require such serious alterations or changes to the recreation environment that the desired recreation experience would be destroyed. As we have discovered one of the key elements to the manager and recreationist alike in providing and participating in recreation in a backcountry environment will be a higher level, and more accessible information about the travel condtions and situations that will be encountered.

Recommend Goals for Recreation Opportunities and Associated Improvements to Meet the Need for Accessible Recreation Choices

This is a distinct and separate step from the work group. The work group will write the "text book" and the next step is applying the information in our practices on the ground through our usual decision processes. But, they can be a pool of experts to assist as long as they are given access to our usual decision process. When we get to the point of action, doing things on the ground, we must provide opportunity for our full spectrum of users including this particular community of users to provide input. The group expressed a willingness to become involved in Interdisciplinary Team reviews of proposed projects and evaluations. This would serve an additional role besides expert advice, that of instilling accessibility awareness in our employees.

The Forest Plan and other Forest policies need to be examined in the light of accessibility to see if there are adjustments to be made. There most likely are inadvertent biases against people with disabilities. One example that came up in the group discussions was the direction given for closing system roads, no consideration was given to their use, motorized or wheelchair, by people with disabilities.

Recommend Education and Accessibility Awareness Training for Forest Service Staff and the Forest User Community

It was stated at the meetings that the manager seems to have a problem of perspective. We haven't accepted the person with disabilities as a person and we haven't trained and educated our staff to this end.

Including people with disabilities in our planning and public involvement processes will not only give us a better job it will provide accessibility awareness as well. The mixing of Forest employees with this group of experts will undoubtedly increase our sensitivity to people with disabilities. In addition to this informal training the work group is planning to help the Forest in presenting more structured accessibility awareness training programs.

How does what we've learned in this new direction match with what our earlier view of accessibility? Our early efforts were shortsighted in matching only certain recreation facilities to people with disabilities as opposed to the longer view of providing a wide range of accessible recreation opportunities, from developed camping and picnicking to general undeveloped backcountry. Until recently most managers were oblivious to the relationship between recreation opportunities and people with disabilities. People with disabilities are looking for the same kinds of recreation experience opportunities as the millions of visitors without disabilities on the Forest. We only need to make sure they have access to these opportunities.

What was wrong in providing access to toilets and tables at campgrounds and picnic areas? - nothing! but it addresses only part of the spectrum of outdoor recreation opportunities. About half of the 6,000,000 recreation visits provided by the Forest are road related; campgrounds, picnic areas, driving for pleasure, etc. The other half are backcountry kinds of recreation opportunities of all kinds from those near the road to those miles from any road. Many times these are the same activities but are being done in different settings. The Recreation Opportunity Spectrum (ROS) is used to define this range of settings, relating them to outdoor recreation opportunities.

What is needed for a course correction to make outdoor recreation opportunities accessible to those people with disabilities? UFAS standards were not enough. What's needed is a sensitivity to all types of disabilities, a close working relationship with all kinds of experts including experts who have learned by being. Managers were relying too much on published specifications without a real insight of what was desired and necessary by those who are looking for these outdoor recreation opportunities and what information is communicated to recreationists. Information communicated in traditional ways does not make the recreationists that is disabled aware of the opportunities nor doe it provide sufficient information for the recreationist with disabilities to match his or her skills and desires to the situation.

This new effort, addressing a participative and wholistic view of accessibility appears to fit within the framework of Forest recreation management principles while having the ability to improve accessibility for outdoor recreation opportunities for everyone, people with and without disabilities.

MARYLAND DEPARTMENT OF NATURAL RESOURCES CAMP INITIATIVES PROGRAM

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The Camp Initiatives Program was developed to increase revenue and visitation through a series of policy changes. During the summer of 1990, the program was evaluated at six Maryland State Parks and found to increase revenue and visitation by 3% and 16%, respectively. More intensive marketing efforts, implementation of a computerized reservation system, increased community relations, and status of interpretive programs were specifically addressed as management recommendations. With minor policy revisions, the Camp Initiatives Program will continue to enhance the visitor experience and meet management objectives.

Introduction

Natural Resource managers are continually challenged with providing quality recreational services and more so in light of recent budget cuts at the federal, state, and local level. A review of current policy is warranted to determine the optimal balance between services and available resources. This review may result in innovative approaches to accomplishing the overall goals of an agency.

As a result of substantial reductions in the operating budget, the Maryland Department of Natural Resources-Forest and Park Service (DNR) began to focus on past, present, and future visitation with the prospect of increasing revenue through increased visitation. Specifically, a decrease in camping visitation in 1988, 1989, and a projected decrease for 1990 was found. Efforts were focused on the camping sector to increase overall revenue and expose more people to Maryland State parks. New policies were designed to encourage the use of Maryland State park campgrounds. Incorporating these new policies, the Maryland Camp Initiatives Program was established in April 1990 to encourage use of Maryland State parks and enhance the recreational experience.

Prior to the 1990 Camp Initiatives Program, DNR camping policies included: 1) camping on a first come, first serve basis; 2) a pet policy which allowed animals in designated areas in 5 parks; 3) a two week limit on length of stay; and 4) employment of seasonal naturalists to provide nature and recreational programs. The Camp Initiatives Program incorporated the following five policy changes:

1) An expanded reservation system allows campers to reserve up to one year in advance with the option to reserve sites for other groups.
2) Pets were permitted at 4 of the 6 pilot areas.
3) No limit was placed on the length of stay (except Rocky Gap State Park).
4) A Campground Programmer was hired to specifically provide tourist information, recreation, and nature programs for campers.
5) "Camping packages" were developed in cooperation with local merchants/businesses to encourage a partnership and symbiotic relationship with the community.

Methodology

Six pilot parks were chosen to evaluate the success of the Camp Initiatives Program. The six parks (i.e., Swallow Falls, Rocky Gap, Greenbrier, Point Lookout, Elk Neck, and Pocomoke River State Parks) were selected to represent the various geographical areas in Maryland and for the ease of program implementation.

An on-site survey was conducted to evaluate the impact of policy changes, as well as to gain information about Maryland State park campers. The survey addressed camper's past experience in Maryland State parks or forests, frequency of visitation, importance of, and satisfaction with, various site and service attributes, and attendance at interpretive programs. Two hundred and thirty five on-site interviews were conducted from Friday through Sunday during the months of June and July, 1990. A list of occupied sites was provided by the park manager and one adult per occupied site was selected. Additionally, campers with pets were contacted to assure representation of this user group. In addition to conducting the formal survey, interviewers remained in the campgrounds throughout the survey weekends to informally observe campers.

Findings

Twelve states and the District of Columbia were represented by the 235 campers interviewed. Fifty-six percent of the campers were male and 44% were females. The median age was between 34-49 years, with 40% aged 21-34 years and 41% aged 35-49 years. Young adults comprised only 1% of the campers and seniors (i.e., campers 65 years or over) comprised only 4%. Children were well represented at the parks with 29% aged 5-9 years, 28% aged 0-4 years, 21% aged 10-13, and 12% aged 14-18 years. The most frequently reported camping groups were couples (32%) and groups of four persons (23%). Over half of the respondents (65%) were weekend campers spending 2-4 days. Only 7% camped seven or more days during a particular visit. Over half of the respondents (64%) were tent campers, 18% used motorhomes and trailers, and 14% utilized pop-up trailers. Repeat visitors comprised 64% of those campers surveyed.

The success of any new program can in part be determined by participant awareness. Of significant interest to DNR officials was camper's knowledge of the Camp Initiatives Program prior to contact with the interviewer. Of those interviewed, only 36% were aware of the policy changes. Campers at Rocky Gap State Park were most aware of the Camp Initiatives Program. However, overall, a low level of awareness was reported by campers and can be attributed in part to delayed publicity. Information sources were analyzed to highlight potential marketing avenues. The top sources by which campers became aware of the Camp Initiatives Program included brochures (18%), friends/family (19%), newspapers (23%), and "other sources" (24%). "Other sources" included information from other persons in the local area, those at other parks, or DNR headquarters information hotline.

The new reservation system was generally well received. Sixty-four percent rated the ability to make reservations as moderately to very important and 74% rated the campsite reservation system as excellent. Most complaints about the system involved campers who were unaware of the reservation system and arrived to find all the sites "reserved." Some repeat campers were unhappy that "preferred" sites could be reserved by a select few for the entire summer or specific holidays; no

longer first come, first serve. The $2.00 reservation fee increase did not seem to displace the majority of campers. Campers at Rocky Gap State Park however, were adamantly opposed to additional fee increases.

The policy of allowing pets in four of the six pilot parks was received with mixed results. Forty percent of the campers indicated that having pets in the campground was of little to no importance; similarly, 32% felt it was moderately to very important. The majority of those adamantly opposed to pets in the campground cited noise, disturbance of wildlife, and pet waste as reasons for not allowing pets in the campground. Few problems with pets were recorded by park managers and rangers; most were site specific. Park personnel who reported conflicts noted the lack of undeveloped areas for pets, noise, failure to clean wastes from the site upon departure, and non-compliance with rules as to where pets can go within the park.

Interpretive programming in Maryland State parks has historically been the first budget area to feel the repercussions of fiscal restraint. Programs, personnel and materials/supplies are often drastically reduced or eliminated. The DNR was eager to identify the number of campers attending interpretive programs and the importance of these programs to the overall visitor experience. Only 33% of the campers interviewed attended interpretive programs. However, of the 67% that did not attend, 57% rated interpretive programs moderately to very important. This suggests a discrepancy between what campers feel is important to their experience and their actual behavior. Only 9% indicated that interpretive programs were of no importance to their camping experience. The campground programmers noted that many campers had personal itineraries often involving travel and activity outside the park. Although campers seemed enthusiastic and interested in the park programs, they chose not to attend. The most frequently attended programs in the six pilot parks were the traditional campfires (n=35), Junior Ranger programs (n=7), and those programs involving live animals (n=7).

To better understand recreational behavior in the campgrounds, campers were asked to select activities in which they participated during their camping visit. The top five activities within the park included: reading/relaxing (72%), walking/ hiking (70%), swimming (64%), fishing (55%), and picnicking (33%).

The Camp Initiatives Program was created to address declining revenue and visitation. In 1990, the total visitation for the 23 Maryland State camping parks declined 3% to just below 100,000 total sites occupied. In examining the six Camp Initiatives parks, an increase of 3.2% in total sites occupied during June-August 1990 was found. This translates to a 16% increase in revenue for the initiatives parks up from $433,699 in 1989 to $503,029 in 1990. The non-initiatives parks experienced a 2% reduction in revenue during the same time period.

A primary objective of the campground programmer was to solicit support from the surrounding community with the expectation of building a symbiotic relationship with the parks. This partnership was intended to promote not only the park, but local tourism and merchant retailers in the area. A great deal of effort was made to solicit support from businesses, restaurants, and tourist attractions in the area to provide informational brochures, coupons, or other special discounts for campers. This effort was particularly attractive at those campgrounds where campers were inclined to participate in activities in the local area. The campground programmers also promoted special in-house camping deals such as a "mid-week special," where campers would get a free night of camping if they checked in on a Tuesday or Wednesday. Other promotions included free boat rental, free pizza delivery to the campground, holiday packages (i.e., Father's Day, 4th of July celebrations), and caravan tours. While this particular aspect of the policy changes was not specifically measured by the survey, park managers, rangers and programmers provided valuable information.

Conclusions

The following recommendations are based on an analysis of interviews with campers, park rangers, and park managers. First and foremost, investment in a computerized system to oversee the reservation system appears warranted. A computerized system would drastically reduce errors presently occurring as a result of keeping the campsite reservation information in hand written ledgers. These ledgers are often handled by many personnel. The computer system could be further utilized for word processing and budget preparation. To reduce user conflict over the next few years, a percentage of sites should remain available on a first come, first serve basis for campers unaware of the new reservation system.

Campers with pets should be assigned to one specific area (i.e., a camp loop for pets), to eliminate user conflicts. Undeveloped areas in the parks should be utilized and managed for pet and owner recreation (i.e., mowed paths as opposed to developed trails), and alternative areas in the surrounding community (i.e., circuit trails, community parks/ponds that permit pets) should be offered as options for recreation.

Interpretive program resources should be allocated to traditional programs with special emphasis on children's activities. Parents enjoy one-half to one hour, active, educational programs for children. The Campground programmer position was eliminated for 1991-92 due to additional funding cuts. However, the responsibilities of this position should be absorbed by the remaining park staff. The relationship that the park builds with the community is vital to promoting the parks and increasing visitation.

In 1991, the Camp Initiatives program will include one additional park, eliminate the campground programmers position, and explore options for utilizing a centralized, privately operated reservation service. With the increase in visitation (2-10% in the Initiative parks) and revenue, as well as provision of services and facilities most important to campers, the Camp Initiatives program has been a success and will continue. This evaluation demonstrated that positive and innovative programs can help ease budgetary constraints while continuing to provide quality services for those campers wishing to utilize Maryland State park resources.

OUTDOOR RECREATION

STATE PARKS

WHAT MAKES DISSATISFIED STATE PARK CAMPERS?

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This paper reports the findings of a joint project of the University of Vermont and the Vermont Department of Forests and Parks. The goal of the project was to develop a reliable system for monitoring camper satisfaction. Camper complaints were translated into demerits based upon the rated importance of the complaint. The summation of demerits was correlated with the camper exit grade and written comments to determine the threshold of major dissatisfaction.

Introduction

LaPage and Cormier (1977) found that the public's image of an activity like camping explains to a major extent participation in that activity. In like manner, the public's image of a specific campground or park is closely associated with likely future visits to that area.

Marketing research suggests that while positive images are important to the future purchase of a product, negative images are more influential in final product choice (Echelberger and McEwen 1986). Image analysis is further complicated by the fact that the image created in the mind of a camper or park visitor may differ significantly from the image of a park manager (Clark et al. 1971).

This paper is based on the 1990 survey of Vermont state park campers. On two Wednesdays and two Saturdays in July and August 1990, all campers in all Vermont state parks were given an opportunity to fill out a "report card". This paper is based on the tabulation and analysis of these report cards. The focus of this report is on the dissatisfied camper rather than the camper who has had a satisfying experience.

Methods

LaPage and Bevins (1981) developed a "report card" for campers to register their degree of satisfaction with 12 park amenities (ease of check-in, cleanliness of restrooms, control of pets, control of noise, cost of the site, availability of firewood and supplies, recreational opportunities, rules and regulations and their enforcement, safety/security, and helpfulness of staff).

A Likert scale was used to translate report card alpha grades to a more useable numeric measurement (a = 95, b = 85, c = 75, d = 65, e = 55). The LaPage/Bevins report card has been used for the last 6 years to measure camper attitudes in Vermont State Parks. A space at the bottom of the card (2" by 4") was reserved for camper written comments.

Additionally, campers were asked to grade their first impression and their final recommendation of the park. This was, essentially, an entry/exit rating. Theoretically, if the camper had a good experience, there should be no drop in grade between entry and exit.

Campers were asked to place a check mark next to the five items on the report card which were most important to them when camping. This feature of the report card was considered critical in the separation of important from unimportant items.

Report cards were printed on 6" by 4.25" stock and were pre-addressed (postage paid) to the University of Vermont. Campers were urged to mail them in any U.S post office, rather than returning them to the ranger station.

Results

Average grades and the importance of park amenities in the minds of 1,760 Vermont State Park campers in 1990 are shown in Table 1.

Table 1. Satisfaction grades reported by 1,760 campers, 34 Vermont State Parks, 1990 (individual park means weighted by number of cards returned from campers at that park).

Item	Average Grade	Standard Deviation	Importance Votes (%)
First impression	91.05	1.57	2.18
Ease of check-in	92.02	1.44	4.70
Cleanliness of restrooms	88.11	3.76	17.99
Pet control	90.55	1.94	3.98
Noise control	89.42	2.29	12.91
Site cost	86.99	2.48	9.08
Availability of firewood	89.94	2.65	4.57
Availability of supplies	83.83	3.06	2.76
Recreation opportunities	87.04	2.76	8.80
Good rules and regulations	89.92	1.61	5.63
Enforcement of rules	89.73	2.19	6.15
Safety and security	90.66	1.72	10.62
Helpfulness of staff	92.10	1.74	10.64
Your recommendation of us	87.85	1.65	-------

On the average state park campers appeared to be quite satisfied with their camping experience in 1990. However, averages can be deceiving and lead to a sense of complacency on the part of management unless exceptions to the average are carefully evaluated. One unhappy camper will discuss his/her experience with at least 9 to 10 other campers (TARP 1976). This can potentially lead to a rightly or wrongly imposed blotch on the park image. Park management should attempt to identify the most unhappy campers, listen to their problems, and attempt to devise a method of solving complaints as quickly as possible.

Using the average of all grades on a single report card disguises an unhappy camper. There are usually enough good grades to offset a few poor grades. So the research question becomes one of developing a statistically sound procedure for identifying truly unhappy campers. A system of "demerits" was tested using only the scores assigned to the five most important elements checked on report cards (Table 2).

Table 2. Demerits assigned for report card grades of C, D, or E.

Report Card Item	Importance Vote %	Demerits Grade C Times 1	Demerits Grade D Times 2	Demerits Grade E Times 3
Clean restrooms	17.99	17.99	35.98	53.97
Noise control	12.91	12.91	25.82	38.73
Staff helpfulness	10.64	10.64	21.28	31.92
Safety/security	10.62	10.62	21.24	31.86
Site cost	9.08	9.08	18.16	27.24

Total demerits were calculated for each of the 1,760 campers in the study. The next step was to identify the threshold in total demerits where a camper was really dissatisfied with the camping experience. Two methods were employed to identify this threshold: (1) Determination of the point where exit grade (your recommendation of us) appeared to be influenced by demerits. (2) Determination of the point where strongly worded negative written comments were triggered by demerits. It seemed wise to use two methods at this point as regression analysis didn't indicate a strong relationship between total demerits and exit grade (correlation coefficient = .52, r-squared = .28).

From Table 3 it appears that where 80 or more demerits have accrued, the exit grade drops quite substantially. The exit grade does not appear to be influenced by demerits ranging between 50 and 79.

Table 3. Relationship between total demerits and exit grade.

Total Demerits	Observations	Mean Exit Grade
100 or more	12	70
80 to 99	16	75
70 to 79	8	82
60 to 69	20	84
50 to 59	22	82

The second method for determining the threshold of real dissatisfaction related to a quantification of written comments on the report card. Very detailed negative written comments were reported on 28% of the report cards that had 80 or more demerits. Similar written comments were found on only 7% of the cards with 50 to 79 demerits. This finding corroborates the relationship shown in Table 3 and indicates that the dissatisfaction threshold lies somewhere around the 80 demerit level.

The specific content of the written comments was analyzed in detail and classified. One-fourth of the comments related to cleanliness--either of restrooms, campsites, or general public areas like the beach. Another 22% of the comments related to dissatisfaction with the physical facility, either buildings or grounds. Sixteen percent of the negative comments related to the actions of fellow campers--noise, drinking, inconsiderate actions etc. Twelve percent of the negative comments concerned dissatisfaction with the on-site staff. Only 7% of the comments were directed at the cost of the camping experience. The remainder of the comments represented unique situations not easily classified.

At the onset of this project, it was hypothesized that the greatest degree of dissatisfaction would be prevalent among non-residents, and especially among campers from the more urban northeastern states. The assumption was that residents of the more urban states would be accustomed to a higher service level and want more conveniences (like hook-ups which are not available in any Vermont State Park). Data analysis found the reverse to be the case. The greatest dissatisfaction was found among the Vermont resident campers. While Vermont residents represented 26% of all campers returning report cards, they represented 63% of those who gave 50 or more demerits to the parks.

As was mentioned earlier in this paper, report cards were given to all campers on two Wednesdays and two Saturdays in July and August. Camper volume is significantly higher on weekends than on weekdays. In like manner dissatisfaction was much greater on Saturday than it was on Wednesday. More than three out of four (76%) campers giving 50 or more demerits were Saturday campers. Only 24% of the campers assigning 50 or more demerits were Wednesday campers. This finding substantiates the general feeling that degree of dissatisfaction is somewhat related to park congestion and associated problems.

Implications

Marketing surveys indicate that businesses have more dissatisfied customers than they realize (DSEF 1982). U.S. Department of Commerce data indicate that for every complaint received by management, there are an additional 26 persons who have problems, but haven't complained. Complaints will not be heard from most people unless some formal mechanism is in place through which the customer can register a complaint.

The report card mechanism serves this purpose well. However, park managers must carefully evaluate report card results. Averages can be misleading. Most campers are highly satisfied with their camping experience. This high degree of satisfaction more than offsets the low degree of satisfaction experienced by a few campers.

The demerit system employed in this research showed that a minor degree of dissatisfaction was experienced by 50 campers out of 1,760 (demerits ranging from 50 to 79). A major degree of dissatisfaction was experienced by 28 campers (80 demerits or more). This latter group represented only 2% of the respondents. On the surface this would seem to be relatively unimportant; however, if the unhappy 2% discuss this with 10 other campers, there may be as many as 20% of the public that has a rightfully or wrongfully tarnished image of a park. In the long run this could be serious.

Most of the issues cited by dissatisfied campers are controllable by management. Two thirds of the complaints related to cleanliness, facility maintenance, or the actions of other campers. Most of these issues could have been solved with very little additional expenditure.

Most of the dissatisfaction (76%) occurred on weekends. This would indicate that dissatisfaction is congestion related. Efforts by management to relieve congestion by greater dispersion or other techniques may significantly reduce the dissatisfaction level.

Management should (1) put in place a system which makes it easy for campers to register complaints, (2) develop a system of prioritizing complaints to identify critical issues, (3) attempt to solve camper complaints as quickly as possible, (4) keep a record of all complaints and the follow-up action taken by management, and (5) evaluate the long-run effectiveness of the system.

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RESIDENT PERCEPTIONS OF VERMONT STATE PARKS

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This report describes results of a survey to determine Vermont residents' opinions about their state park system. Over 400 responses were obtained from current park users and nearly 300 came from non-users. Results suggest that both day and overnight state park users are quite satisfied with the quality of services and facilities at the Vermont park they had most recently visited. Non-users also had positive feelings about the system as a whole. User fees were not felt to be a problem for users, or deterents for non-use of the parks. One very useful aspect of the study was that over 200 respondents volunteered extemporaneous comments about the park system and the survey.

Introduction

Even though open space is in short supply and has become valuable, especially in the densely populated Northeast, there are places where people can go in search of relief from urban pressures. Vermont is such a place. It is a state known for its scenic beauty, rural character, cultural heritage, and outdoor recreation opportunities. Skiing probably gets the biggest play in the press, but summer activities like camping, hiking, swimming, and boating also are popular. Spring draws fishermen to lakes and streams, and in the fall, hunters and foliage viewers bring out the "No Vacancy" signs throughout the state.

Vermont is rural in character. With 535,000 people living in the state in 1985, its density was only about 58 people per square mile. This compares with more than 100 per square mile in New Hampshire, more than 350 in New York, and more than 700 people per square mile in Massachusetts. Vermonters are proud of the state's rural character, its scenic characteristics, and opportunities available for cultural and leisure pursuits. In fact, most Vermonters believe they participate in more outdoor activities than the average U.S. citizen. They have voted with their pens and their pocketbooks to preserve the qualities that make the state an attractive place in which to live and visit.

One of Vermont's major attractions is its state park system. It offers recreation opportunities that range from the developed to the primitive. This report describes Vermont residents' opinions of the Vermont state park system.

Several studies have shown that recreationists are usually satisfied with the overall management of public recreation areas they visit (Lucas 1970; Echelberger and Moeller 1977; McDonald et al. 1987), but few studies have described the attitudes of residents of a single state (users and nonusers) toward the management of its entire park system. State park administrators need to know how all residents feel about the quantity and quality of opportunities the parks offer, the distribution of recreation opportunities within the system, and pricing policies. Administrators also need to know why some people have stopped using the system and others have never started.

Methods

Resident opinions were obtained from a mail survey that followed procedures described by Dillman (1978). A representative sample of Vermont's residents was drawn from telephone directories that cover the entire state without overlaps. Examination of several directories indicated that approximately 270 nonbusiness telephone numbers were on each page. By randomly drawing three names from each page of each directory, we were able to obtain a representative sample of Vermont residents. Telephone calls were made to 1,318 residents during November of 1986. They were asked if they had visited a state park in Vermont within the past 24 months and if they would be willing to participate in a mail survey of their opinions of the park system. The calls resulted in 1,143 residents who agreed to participate in the survey. Of these, 587 had visited a Vermont state park recently and 556 had not. Two types of surveys were mailed: one for recent park users and another for those who had not recently or had never used a Vermont state park.

Results

We received 424 usable responses from recent park visitors, a 72-percent response rate, and 278 from nonusers, a 50-percent response rate. Information obtained during the initial telephone interviews suggests that nonrespondents to the surveys were older than respondents, less likely to be state park users, and probably less active in outdoor recreation as a whole. Respondents cited August most often when describing their most recent visit to a Vermont state park. This was followed by July, September, and June. Many of those who had visited in later months also may have visited in June. The parks mentioned most often were Sandbar (a 15-minute drive from Burlington, the largest city in Vermont), New Discovery at Groton (about a 30-minute drive from either St. Johnsbury or the Barre/Montpelier areas), and Branbury State Park, just south of Middlebury.

Since 41 percent of the respondents said they had stayed less than a half day, and another 43 percent said they had stayed more than a half day but less than one day, we estimated that the average length of stay for day visits was 4 to 6 hours. Only 15 percent of the respondents said that their most recent visit included an overnight stay. The average length of stay for these 58 Vermont residents was about two nights. As the following tabulation shows, the responses indicated that more than 90 percent of these Vermonters stayed less than four nights during their most recent overnight visit to a state park:

Number of nights	Percent responding
1	28
2	38
3	26
4	5
5	2
6	2

Respondents visited the parks in many group sizes. The average group size was nearly 12 people, but this figure is somewhat inflated because of several large groups. The median as well as most prevalent group size was four people. There also

was considerable variation in the type of group. Five percent said they came alone; 49 percent were in family groups; 16 percent consisted of groups of friends; 18 percent said they were part of a group of family and friends; and 13 percent were part of an organized group, such as a church group, office, or plant party.

Most resident visitors to Vermont's state parks have been satisfied with their visits. In fact, 76 percent specifically stated this to be the case with respect to their most recent visit. Another 20 percent stated they were somewhat satisfied and only 2 percent were somewhat dissatisfied. The remaining 2 percent said they were neither satisfied nor dissatisfied. This concept of satisfaction was examined more thoroughly by asking residents about their intentions of returning to the park. More than three-quarters said it was either extremely likely or likely that they would return within a year. Another 19 percent said they probably would return; only 4 percent probably would not return. We did not explore reasons for plans not to return but believe that in some cases, reasons other than dissatisfaction with the park played a role in the responses--moving out of state, substitute opportunities, loss of transportation, lack of interest, etc.

To further quantify visitors' satisfaction or dissatisfaction with their most recent park visit, we asked respondents to grade the park they visited most recently on 11 criteria and then assign an overall grade for recommending the park (LaPage and Bevins 1981). We asked respondents to use the standards of A for excellent, B for better than average, C for average, D for below average, and E for poor. By assigning numeric values of 1 for A to 5 for E, we were able to quantify in a rough manner the perceptions of these users of the Vermont state park system (Table 1).

Table 1. Average grades given to Vermont's state parks by resident visitors based on a scale of 1 (excellent) to 5 (poor), n=224.

Criterion	Quantified Grade
Helpfulness of employees	1.9
Availability of sites	2.0
Privacy of sites	2.2
Rules and their enforcement	2.1
Control of noise	2.1
Recreation opportunities	2.2
Safety and security	2.0
Control of pets	2.1
Availability of firewood	2.3
Cleanliness of grounds	1.6
Cleanliness of restrooms	1.9
Your recommendation of the park	1.8

The grades for these criteria suggest that current users are satisfied with the quality of the Vermont state park system. This assessment agrees with one given by overnight visitors to state campgrounds in 1982.[1] However, it does not address the issue of satisfaction or lack of it from the perspective of former users who may have stopped visiting Vermont state parks for any number of reasons, or from the perspective of "potential users," those who have not yet used the parks but who may do so in the future. This is discussed elsewhere in this paper.

We also examined residents' perceptions about Vermont state parks in general using a semantic differential (Osgood et al. 1957). They were asked to describe a visit to a state park using 12 bipolar pairs of adjectives, i.e., interesting/boring, dirty/clean, work/fun, etc. Respondents were asked to express the strength of their feelings for each adjective-pair by making a checkmark on a scale between them.

For example, if a person believed that visiting a state park in Vermont was more easy than complicated, he/she would put the checkmark more toward the easy end of the scale than the complicated end. Visiting a park is perceived by recent users as interesting, refreshing, easy, clean, somewhat convenient, fun, and very safe (Fig. 1). Together, the adjective-pairs for these seven adjectives form an evaluative factor in the respondents' perception of a visit to a Vermont state park.

INTERESTING	_:X_:_:_:_	BORING
INEXPENSIVE	_:X_:_:_:_	EXPENSIVE
TIRING	X_:_:_:_:_	REFRESHING
EDUCATIONAL	_:X_:_:_:_	NOT EDUCATIONAL
EASY	X_:_:_:_:_	COMPLICATED
DIRTY	_:_:_:_:X_	CLEAN
CONVENIENT	_:X_:_:_:_	INCONVENIENT
WORK	_:_:_:_:X_	FUN
SAFE	X_:_:_:_:_	DANGEROUS
UNCROWDED	_:X_:_:_:_	CROWDED
PLEASANT	X_:_:_:_:_	UNPLEASANT
COMFORTABLE	X_:_:_:_:_	UNCOMFORTABLE

Figure 1. Semantic differential describing Vermonters' perception of visiting a Vermont state park (includes responses by users and nonusers, n=617).

Osgood et al. (1957) stated that the evaluative factor of the semantic differential is an index of attitude. Thus, Vermonters who have recently been to a park seem to have a positive attitude about their state park system. Visiting a park also was perceived as being just slightly uncrowded, very pleasant, and comfortable. Finally, Vermonters perceive visiting a state park as relatively inexpensive and only slightly educational. In fact, nonusers and past users expressed even more positive feelings about the parks than current users, though the differences were not significant.

To ascertain why nonusers stopped using the parks or why some people have never used them, we asked recipients of the nonuser survey to rate the importance of 17 reasons for nonuse on a scale of 1 (very important) to 4 (unimportant). The reason given most often by nonusers, and with the greatest amount of conviction, was that they had other things to do, such as household chores, work, etc. (Table 2). This may correlate closely with Reason 14, "Park facilities don't appeal to me anymore." A second and significant reason why people do not use the state parks is that they have closer, more convenient substitutes (which may be closely correlated with reason 6, "I prefer private (commercial) facilities." The third most frequently cited reason was "My children have grown up." This corroborates characteristics of nonrespondents to the survey--older, less likely to use the parks, and probably not as physically active as those classified as current users.

1/ Bevins, Malcolm I. 1983. Personal communication on file at Northeastern Forest Experiment Station, Burlington, Vermont.

It is interesting that most people did not believe the parks cost too much, reason 12 in Table 2. Former users and people who have never used the parks (and never intend to) believed price is even less important a reason for not using the parks than potential users. This suggests that pricing of Vermont state parks is not a major issue among Vermonters. The insignificance of prices is further confirmed by the relatively high importance that nonusers assigned to a preference for private facilities, substitutes for state park opportunities, and doing other things than visiting a state park. These reasons appear to be more important than entry or user fees.

Comparisons between park users versus nonusers revealed that users were, on average, 10 years younger and had lived in Vermont 9 years less than those who had not recently used the parks. Nonusers tend to have somewhat less education than users, but their incomes and where they were raised (urban, suburban, or rural environments) did not appear to be related to use or nonuse of the park system.

Table 2. Importance of reasons for not using Vermont's state parks based on scale of 1 (very important) to 4 (unimportant).

Reason	Former User	Potential User	Non-user
1. I'm not interested in using them	3.19	3.31	3.14
2. I have no means of getting to them	3.74	3.81	3.76
3. My children have grown up	2.28	3.23	3.55
4. I have health problems	3.52	3.72	3.57
5. I don't have time	2.75	2.55	3.76
6. I prefer private (commercial) facilities	3.25	3.16	2.57
7. I don't know where any state parks are	3.72	2.97	3.71
8. The parks are too far away	3.54	3.18	3.76
9. I don't like the people who use state parks	3.73	3.55	3.71
10. I have closer more convenient substitutes	2.56	3.02	2.48
11. I don't have the skills necessary for participating in park activities	3.59	3.48	3.57
12. The parks cost too much	3.67	3.31	3.81
13. I don't have anyone to go with	3.54	3.47	3.62
14. Park facilities don't appeal to me anymore	3.24	3.35	2.81
15. I wouldn't know what to do at a state park	3.71	3.48	3.76
16. I have other more important things to do (household chores, work, etc.)	2.34	1.94	2.29
17. I haven't lived in Vermont long enough to take advantage of state park facilities	3.72	3.43	3.90
Sample size	**173**	**72**	**33**

Summary and Discussion

Several reports state that as our Nation continues to urbanize, there will be increased demand for outdoor recreation trips closer to home and of shorter duration (Market Opinion Research 1986; Mill 1987; Task Force on Outdoor Resources and Opportunities 1988). State parks are uniquely situated to fulfill this demand, but park administrators should move cautiously in responding to increased urban needs. We submit that the appropriate niche for state parks generally is in the middle range of the Recreation Opportunity Spectrum (ROS) (Clark and Stankey 1979). Federal areas can and should offer experiences at the primitive end of the ROS while municipal facilities provide developed programs and opportunities. State park systems should offer recreation opportunities that touch both ends of the ROS but should tend to emphasize opportunities in the middle of it. Some state parks might provide some primitive and/or developed opportunities depending on the environmental setting of the area, history of experiences that have been offered in the past, and expectations of users.

This study showed that only 15 percent of park user respondents stayed overnight on their most recent visit to a Vermont state park, and that those visitors seldom stayed more than three nights. We cannot say whether Vermonters tend to leave the state for extended vacations or if this finding was a result of the "most recent visit" wording of the question. However, departmental records indicate that between 1986 and 1990,two-thirds of camping use at Vermont state parks was by nonresidents. Further, More et al. (1990) stated that Vermont residents do not favor subsidizing overnight users of state parks but expressed considerable support for subsidies at day-use park facilities. Perhaps the reason Vermonters do not wish to subsidize camping at Vermont state parks is that they know that most of the campers using the park system are nonresidents and/or they seldom use the system themselves for extended vacations. Further research on the issue of where Vermonters spend extended camping vacations may be useful to tourist agencies and associations.

Both day and overnight users of Vermont state parks indicate that they had very satisfactory experiences. This positive attitude toward the parks was verified by most of the current users, intentions to return in subsequent years. Nonusers had even more positive feelings than users based on the results of the evaluative factor of the semantic differential. We believe that the positive feelings of the latter may be due in part to the "aura" associated with Vermont and partly to promotional efforts by tourist agencies and associations.

We were surprised to find that of the 1,318 calls made to establish the study, 1,143 agreed to participate. Vermonters are genuinely concerned about the welfare of their park system. Nearly three-quarters of the state-park users who received questionnaires responded. There also was a 50-percent response from people who did not use the parks, and more than 200 people volunteered extemporaneous comments about the system and the survey. The following are examples of these comments.

"People want state parks. They do not want to pay for them, in either taxes or fees. While this is human nature, it is not realistic."

"You (state park administrators) are doing as fine a job as any state and better than most. Let's not lose our park system--they can never be replaced."

"More restrooms and with easier access for older and handicapped persons are needed at Ellis (State Park). There should be more recreational activities for all age groups."

"It (the survey) also brought a good discussion to the household. Vermonters do like to have a say in things that go on around them."

"Let's not bureaucratize (sic) the parks by finding ways to 'improve' them. The pressure to develop and exploit these parks

will increase with every passing year. The time will come when certain parks will have to turn away people, otherwise they will not be parks but Disneylands. Keep the parks simple and undefiled."

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MEASURING USERS' RESPONSE TO HIGHER RECREATION FEES

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One of the arguments against higher fees at publicly-provided recreational facilities is that higher fees may force low-income users to reduce their use of facilities more than high-income users, or force them to stop using the facilities altogether if they cannot afford the higher fee. Measuring the impact of higher fees on current users with different income levels is an important factor to consider when contemplating fee increases. In this paper we develop a conceptual framework that can be used to determine whether higher fees have a differential impact on current users with different income levels.

Introduction

Few topics have received more attention during the last 25 years in the field of recreation economics than recreation user fees. In 1966, Clawson and Knetsch advocated greater use of fees for resource-based recreation facilities provide by the public sector. Since 1966, numerous article have been written on the subject, describing both the advantages and disadvantages of fees for publicly-provided recreation (for example, see Harris and Driver 1987, Manning and Baker 1981, Manning et al. 1988, and Cockrell and Wellman 1985). The Reagan administration's effort to expand the use of fees at federal recreation areas during the 1980s motivated a renewed interest in the question of fees for recreation. In general, the new "federalism" of the 1980s and the large federal budget deficits both focused attention on fee levels at federal recreational facilities.

Currently, many state governments have fallen on hard fiscal times. The growth of state government that occurred in the 1980s outstripped state governments' ability to collect sufficient revenues to finance its activities now that the economy has entered a recession. In response to the fiscal problems, some states have implemented or are considering the implementation of higher fees at state parks during these tight fiscal times. Consequently, state legislators and recreation professionals are again asking themselves what is a reasonable fee to charge for state-provided recreation facilities.

One of the important issues surrounding the implementation of higher user fees at publicly-provided recreation facilities is that higher fees may affect current users with different income levels in different ways. For example, the higher fees for recreation may force low-income users to decrease their recreation participation proportionally more than high-income users. Some low-income users may stop using the facilities altogether, thereby eliminating them from the user population (Dustin 1986). On the other hand, higher fees may not have a differential impact on current users with different income levels (Cordell 1985). That is, low income users may decrease their use of the facilities in the same proportion as by high-income users, thereby suggesting that the higher fees do not have a differential impact on campers with different income levels. Clearly, the potential for differential impacts of higher fees across user groups with different income levels is of concern to recreation managers and to economists as fee increases are considered. Decisions regarding future fee levels for recreation facilities should be made with the knowledge of how the higher fees will affect different segments of the user public.

Although the literature suggests that the potential differential impact associated with fee increases is an important factor that should be considered when contemplating higher fees, we are not aware of any studies designed specifically to empirically determine whether such a differential impact exists. In fact, no conceptual framework for measuring the differential impact has be presented in the literature.

The purpose of this paper is to present a conceptual framework that can be used to test for the existence of a differential impact across income groups as fees are increased. Although no empirical results are presented, we are currently in the process of testing the framework using data obtained from campers who camped in Maine state park campgrounds during 1984.

In the next section, we present the theoretical model developed to determine whether higher fees have a differential impact on users with different income levels. We also present a discussion of a procedure that can be used to empirically estimate the theoretical model.

Theoretical Framework

The theoretical framework is based on neoclassical demand theory. For the purpose of illustration assume that the recreational activity under study is camping a state parks. Then, the consumer's utility function can be represented by:

$$U = f(C, Y)$$

where C represents the number of nights camped at state parks during the year and Y is a composite commodity representing all other goods the consumer could purchase. The objective of the consumer is to maximize utility subject to her budget constraint which is depicted as:

$$I = P_C C + P_Y Y$$

where I represents the consumer's income, P_C is the "price" of camping or the per night campsite fee and P_Y is the price of the composite good.

The constrained optimization problem of the consumer can be stated mathematically using the Lagrangian function:

$$\text{Maximize: } L = f(C, Y) + \lambda(I - P_C C - P_Y Y)$$

where λ is the lagrangian multiplier. Solving the first-order conditions for utility maximization simultaneously, one can derive the consumer's demand equation (C^*) for camping at the state park campgrounds. In implicit form, the demand for camping will depend on the income of the consumer, the campsite fee and the price of the composite good Y:

$$(C^* = f(P_C, P_Y, I).$$

Once the demand curve for state park camping is obtained, it can be used to investigate the potential effects associated with changes in the fee level. The approach developed below focuses on two aspects of the demand curve. First, we are interested in how camping participation is affected by the income level of campers while holding all other factors constant. That is, we want to determine whether the number of nights of camping increases or decreases as income increases. This "income effect" is determined by taking the partial derivative of the demand equation with respect to income ($\delta C^*/\delta I$). If the partial derivative is positive, then we can conclude that camping at state park campgrounds is a normal good, and that the Engel curve for camping has a positive slope. That is, an increase in the income of the consumer will result in an increase in the number of nights camped at a constant fee level. Similarly, a positive income effect suggests that the demand curve of a high-income camper will lie above and to the right of the demand curve of a camper with a lower income, other things being equal. This situation is illustrated in Figure 1, where D_L and D_H represent the demand curves of a low-income and high-income camper, respectively.

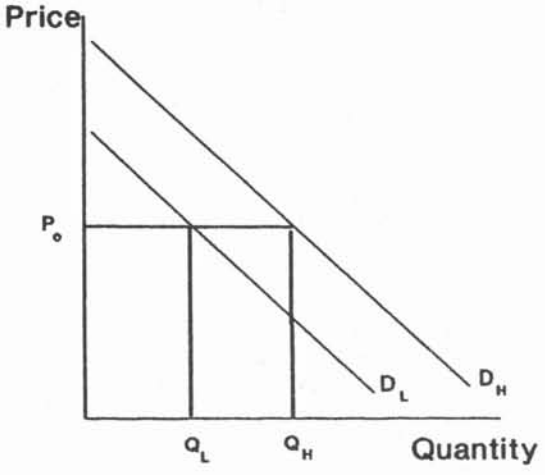

Figure 1. The relationship between the demand curves of high and low-income campers when the income effect is positive.

On the other hand, if $\delta C^*/\delta I$ is negative, then camping at state parks is an inferior good and the Engel curve for camping has a negative slope. In other words, at a given fee level, campers will camp fewer nights as their income increases. The negative income effect also signifies that the demand curve of the low-income camper will lie above and to the right of the demand curve of a high-income camper, other things being equal. This situation is illustrated in Figure 2.

Measuring the income effect associated with camping is important when considering differential impacts because differences in the number of nights camped by different campers can be caused in part by differences in the income of the campers. In other words, the income effect determines the relative position of the demand curves of campers with different income levels. If the income effect is positive, the demand curve for people with high incomes will lie above and to the right of the demand curve for low-income campers, other things being equal. Conversely, if the income effect is negative, the

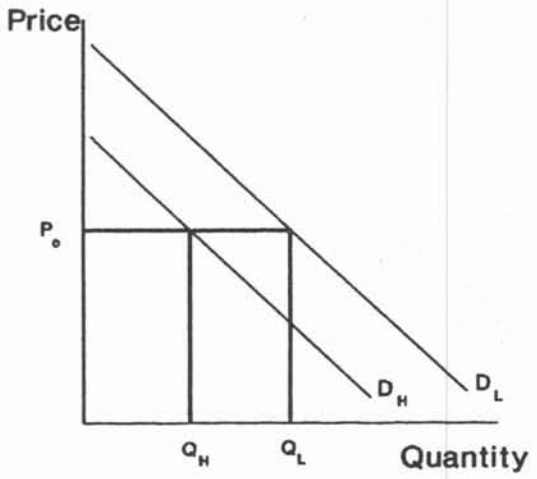

Figure 2. The relationship between the demand curves of high and low-income campers when the income effect is negative.

demand curve of low-income campers will lie above and to the right of the demand curve of campers with higher incomes, other things being equal.

The second aspect of the demand curve that is important when measuring the effects of higher fees is the "own-price effect". The own-price effect is measured by taking the partial derivative of the demand function with respect to the camping fee: ($\delta C^*/\delta P_C$). The own-price effect is the inverse of the slope of the demand curve. We know that $\delta C^*/\delta P_C$ is negative since demand curves are almost always downward sloping. However, the magnitude of the own-price effect may differ for people with different levels of income, which means that their demand curves will have different slopes. In fact, if higher fees have a differential impact across income groups the demand curves of campers with different incomes must have different slopes. Specifically, the demand curve for high income campers should be more inelastic (have a steeper slope) than the demand curve for low-income campers. This situation is shown in Figure 3. The steeper demand curve for high-income campers indicates that changes in their camping activities are less responsive to a change in camping fees than are the camping activities of low-income campers who have a flatter demand curve. For example, if the camping fee increases from P_o to P_1 as illustrated in the Figure, the camping activity of the high-income camper will decrease from Q_o to Q_H, while the camping activity of the low-income camper will decrease from Q_o to Q_L. Clearly, the fee increase causes a greater reduction in the camping activity of the low-income camper than the high-income camper. This type of differential effect would represent an adverse differential impact across income groups in that low-income campers would reduce their camping activity more than high-income camper and may stop camping at the facility altogether.

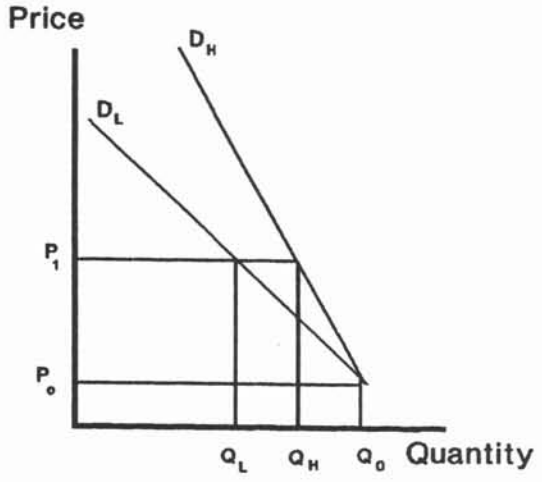

Figure 3. Demand curves illustrating differential impact on campers with different levels of income as fees are increased.

Empirical Considerations

An empirical test of the existence of differential impacts can be performed by estimating a demand curve for the recreation facility that includes an interaction term between the fee level and income. Assume that the following demand curve is estimated:

$$C^* = b_0 + b_1 P_C + b_2 I + b_3 (I * P_C)$$

Where $b_0 \gtrless 0$

$b_1 < 0$

$b_2 \gtrless 0$

$b_3 \gtrless 0$

Given this specification, the income effect defined above is:

$$\delta C^* / \delta I = b_2 + b_3 P_C$$

Clearly, if b_2 and b_3 are both statistically significant and positive, then the income effect is positive and the demand curve of high-income campers will lie above and to the right of the demand curve of low-income campers, ceteris paribus. Similarly, if b_2 and b_3 are both statistically significant and negative, then the income effect is negative and the demand curve of low-income campers will lie above and to the right of the demand curve of high-income campers. If b_2 and b_3 are both significant but have different signs, the income effect will be positive for some fee levels and negative for other fee levels. Finally, if both b_2 and b_3 are both statistically insignificant, the income effect is zero and the demand curves of the low and high-income campers would be the same, other things being equal.

The own-price effect for the demand function with an interaction term between price and income is:

$$\delta C^* / \delta P_C = b_1 + b_3 I$$

As noted above, b_1 is negative; however, the magnitude of the own-price effect also depends on the sign and magnitude of b_3. If b_3 is positive, then the own-price effect will become smaller as income increases. That is, the reduction in camping activity associated with an increase in camping fees will be smaller for high-income campers than for low-income campers. Since this corresponds to the adverse differential impact described above, the adverse differential impact exists if the estimated coefficient b_3 is positive in the estimated demand equation.

If b_3 is negative and statistically significant, the own-price effect will be larger for high-income campers than for low-income campers. That is, high-income campers decrease their camping activity more that low-income campers in response to a fee increase, other things being equal. Although this would also represent a differential impact, it is not considered to be an adverse impact since high-income campers' greater response to higher fees does not reflect an inability to pay the higher fee. Finally, if b_3 is not statistically different from zero, the own-price effect is the same over all campers, regardless of their income level, and no differential impact exists across income groups.

The theoretical and empirical framework outlined above can be tested by estimating the demand curve for a recreational activity that includes an interaction term between income and the campsite fee. The interaction term is required to allow the income effect to vary with the fee level. It is also required to allow the own-price effect to vary with the income level of campers. Since the differential impact across income groups implies that the own-price effect associated with higher fees must differ for campers with different levels of income, the interaction term must be included in the demand equation.

Preliminary empirical work has been completed using the procedures outlined above. Data from people who camped in Maine state parks campgrounds during 1984 are being used to estimate both resident and nonresident demand curves for Maine state park camping. The preliminary work suggests that a differential impact may, in fact, exist as camping fees are increased. However, additional work must be performed before these results are presented.

Summary and Conclusions

The purpose of this paper was to develop a theoretical framework and empirical procedure that could be used determine whether higher fees at recreational facilities create differential impacts across income groups of current users. The procedure developed focuses on measuring the income effect and own-price effect derived from the estimated demand curve for the facility. Since a differential impact across income groups implies that the slopes of the demand curves of high and low-income users must be unequal, an interaction term between income and the campsite fee must be included in the estimated demand equation. Adverse differential impacts exist if the coefficient on the interaction term is positive and statistically significant.

Preliminary estimates using data obtained from Maine state park campers suggest that adverse differential impacts may, in fact, exist at higher camping fees. However additional empirical would is required before the results are presented.

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ECONOMIC EFFECTS OF STATE PARK RECREATION IN PENNSYLVANIA

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The economic effects resulting from the use and operation of Pennsylvania's state park system were analyzed with an input-output model of the state's economy. Direct expenditures by park users and park operations were estimated at $263 million for the 1987 study year. Secondary effects, stemming from interindustry trade and recreation-related employment, provided an additional $299 million in total sales.

Introduction

The current attention placed upon travel and tourism as a source of economic development parallels the increasing importance of service industries within the U. S. economy. Our nation's dependence on educational, financial, healthcare, housing, and recreational services was underscored during the 1986-1989 period, when over half of the gross national product was attributed to the consumption of these services (U.S. Bureau of Economic Analysis 1989).

Documenting the total value of recreation-related expenditures is a difficult assignment. Existing measures of output from such sectors as lodging and food services do not differentiate recreation from business-related trade. Similar problems arise when attempting to measure recreation-related expenditures within the transportation, retail, and manufacturing sectors.

Improved estimates of recreational expenditures have been obtained from studies addressing the actual consumption patterns of particular user groups (Mittleider and Leitch 1984, Donnelly and Nelson 1986). These investigations have typically involved direct survey methods to identify the expenditure and demographic characteristics of various user groups. As a further extension of this work, recreational expenditures have been entered into regional input-output models to determine the subsequent value of interindustry trade generated by the initial expenditures and the added household consumption originating from recreation-supported employment (Alward and Lofting 1985, Fritschen 1989).

In an effort to measure the financial effects of state park recreation within Pennsylvania's economy, a cooperative research effort was initiated between the Pennsylvania Department of Environmental Resources and Penn State's School of Forest Resources. Two basic objectives were involved: (1) to determine the expenditure and demographic characteristics of state park users and (2) to evaluate the total economic effects of park-related expenditures within the state's economy. An earlier paper presented the details of the survey methodology and the expenditure profiles of state park users (Strauss and Lord 1990). The following paper focuses on the demographics of park users and the total economic effects of park-related expenditures within the state.

The State Park Setting

Pennsylvania's state park system includes 114 parks and is distributed uniformly throughout the Commonwealth. The size and distribution are credited to the early history of state park development, coupled with a general state mandate to provide increased public access to recreational areas (Forrey 1984). Over the past three decades, a combination of state and federal funds was used to more than double the size of the state park system.

Operational costs have also increased, with $36 million required in 1987 to operate and maintain the system. Renovation of many of the older parks, coupled with the first cycle of major maintenance in the relatively newer parks has placed an increased cost burden on the overall system.

State parks also serve an economic purpose within their immediate regions through the employ of local resources and the generation of expenditures by park users. This particular attribute of state parks is poorly defined and has received little attention in the past. In an effort to correct this oversight and to identify the financial role of state parks within Pennsylvania's economy, the following project was established with Penn State's School of Forest Resources.

Procedures

The initial stage of research was directed to obtaining information on the expenditures and demographics of park users. A controlled sampling design was used in conducting over 7000 visitor interviews at 30 state parks during the 1985, 1986, and 1987 summer seasons. Park audiences were stratified on the basis of six major activities: camping, picnicking, swimming, fishing, boating, and hiking. Typically, these activities attract over 80 percent of annual park attendance on a statewide basis. Details on the study procedures and expenditures patterns of various activity groups were previously reported (Strauss and Lord 1990). The second stage of work, initiated in 1989, analyzed the economic effects of park-related expenditures within Pennsylvania for the 1987 study year.

The economic effect of park user and agency expenditures was analyzed with a computerized, input-output model of the state's economy. The Pennsylvania model was generated from the Impact Analysis for Planning (IMPLAN) System, organized by the USDA Forest Service for the national economy (USDA Forest Service 1985). The Pennsylvania IMPLAN model identified the network of trade relationships between business, government, and household sectors. More than 500 individual sectors are described in terms of production, employment, and the between the sectors. IMPLAN also enumerates the economic functions necessary for balancing production, consumption, and the import and export of goods and services during a given period. On the downside, the model is dependent on 1982 data, with many of the state's production and trade relationships based on national averages for the same period.

In using the IMPLAN model, user and state expenditures were deflated to 1982-equivalent values and entered as direct payments to the primary sectors receiving this money. Since the park system largely serves a resident population and with Pennsylvania representing a major-sized geographic region, the analysis of economic impacts, or effects, was not limited to the inflow of nonresident expenditures. Rather, the analysis considered all in-state expenditures made by the total park audience and the agency itself in estimating the subsequent cycles of secondary effects resulting from these payments.

Secondary effects included the indirect business trade from sectors providing inputs to the primary sectors and the related chain of interindustry trade generated by this process. Additional secondary effects were identified in terms of the consumer expenditures induced by the salaries and wages earned from the direct and indirect business activities. All secondary effects were inflated back to 1987-equivalent values.

Results

Demographics of State Parks Users

State park users were characteristically young, family-oriented people with moderate-level incomes. Their average age was 32 years. Fifty-five percent were male and 45 percent female, with nearly 60 percent of the park usage identified with family groups. Average annual family income approached $28,000.

Age distributions indicated that nearly one fourth of the park users were under 15 years old (Figure 1). Another 9 percent were teenagers in the 15- to 19-year class. Persons 20 to 39 years of age represented over one-third of the total audience. Middle-aged persons, 40 to 59 years of age, represented 22 percent of park use, with persons over 60 years contributing 9 percent of use.

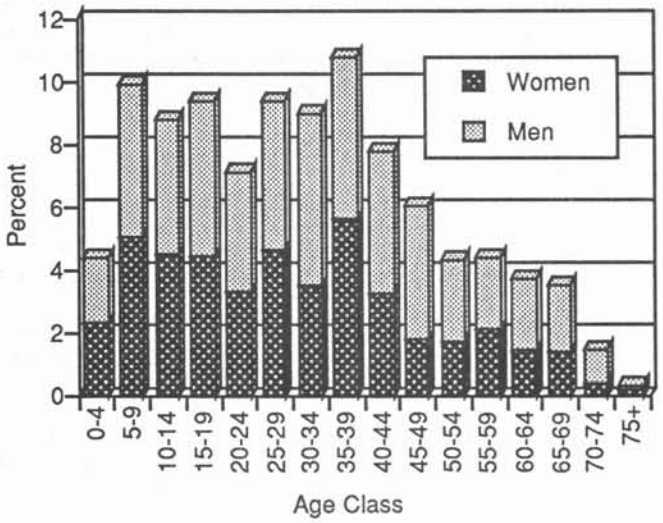

Figure 1. Distribution of state park users by age and gender.

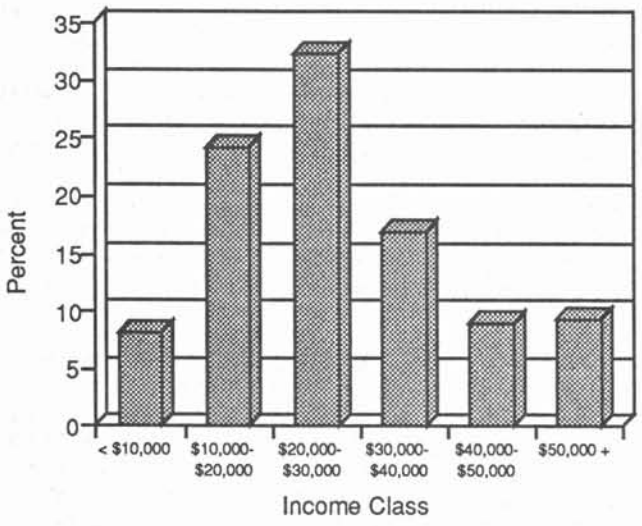

Figure 2. Distribution of respondents by family income.

Park usage was greatest among low- to moderate-income families, with 65 percent of the attendance tied to individuals having annual family incomes under $30,000 (Figure 2). Twenty-six percent of the park users were in the family income brackets of $30,000 to $50,000 per year.

Forty percent of those interviewed had post-high school educations, with another 56 percent having high school or technical school degrees. Paralleling these results, 35 percent of the respondents were employed in blue collar occupations, with nearly the same percentage employed in white collar jobs. Fifteen percent of those interviewed were retired.

Day use activities provided the major recreational focus at state parks during 1987. In total, day use activities accounted for 95 percent of annual attendance, with picnicking, swimming, and hiking representing the more popular recreational pursuits (Strauss and Lord 1990).

Most park users lived near the parks where they were interviewed. One-fourth of the users were within a 20-minute drive of the park and over three-quarters were within 40 minutes of the park. Twenty percent of the audience traveled over an hour to reach their park destinations.

User Expenditures

Activity costs included the specific charges for activity-related items and the prorated costs of equipment and such general expenses as food, lodging, and travel. Equipment costs represented the major recreational items purchased over the past year and used at a state park location. These expenditures were proportioned specific to state park usage and averaged among all park users. General recreational expenses were also prorated in terms of the time spent in state parks and in particular activities. Costs were identified on an activity day basis, representing an individual's cost of pursuing a given activity over some portion of a day's visit.

The six activities fell into two cost ranges (Figure 3). Swimming, hiking, picnicking, and fishing were in a moderate cost range, averaging $5 to $9 per activity day. Over 85 percent of these expenditures were directed to general and activity-related items, with less than 15 percent involved in equipment. Camping and boating were more expensive, averaging $20 and $26, respectively, per activity day. Most of their increase was for equipment costs.

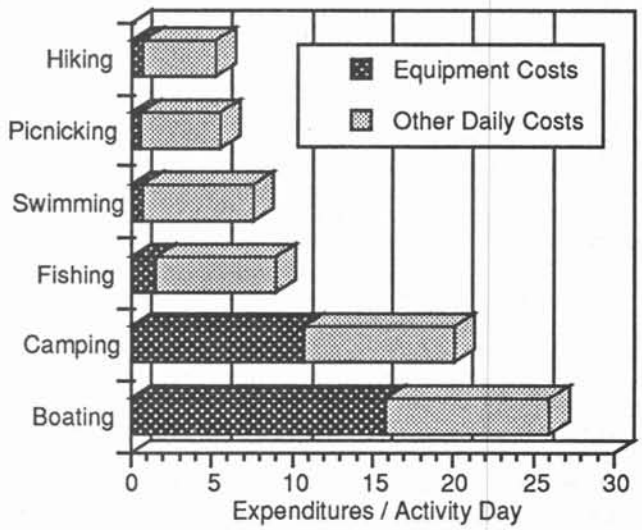

Figure 3. Expenditures per activity day by activity.

Total Expenditures

Total user expenditures were developed by multiplying the average activity costs by respective annual attendances and summing over all parks and all activities. Expenditures for non-surveyed activities were estimated from auxiliary studies. Total user expenditures for the 1987 calendar year were estimated at $250 million.

Food and food-related services were the largest cost item, amounting to 32 percent of total user expenditures. Equipment purchases nearly matched food costs, for another 32 percent of the total. Transportation costs, measured on the basis of fuel purchases and minor vehicle repairs, accounted for 14 percent of the total. Activity-related items, involving expendable recreational supplies and fuel for boating and fishing, constituted another 9 percent of the total. Lodging and incidental trip costs were the final 13 percent of expenditures.

The cost of operating, maintaining, and developing state parks during 1987 was obtained from Department of Environmental Resources records. Total expenditures from all sources amounted to $36 million, with 95 percent used in the operation and maintenance of existing park facilities and the remainder directed to the construction of new facilities. On the basis of key inputs, 65 percent of the expenditures went to the employ of state personnel, 19 percent to contract services, and 16 percent for park supplies and utilities.

Economic Effects to Pennsylvania

The economic effect of state park recreation within Pennsylvania, as determined from IMPLAN model analysis, was $562 million in total sales. This included in-state expenditures of $263 million from park users and park operations and secondary demands of $299 million from interindustry trade and recreation-based employment (Table 1).

In-state expenditures by park users were $241 million, and for park operations, $22 million.

Principal sectors receiving the $263 million in direct expenditures were manufacturing (41 percent), service industries (27 percent), and wholesale and retail trades (21 percent) (Table 1). Most of the manufacturing sales was tied to recreational equipment and apparel, food products, and transportation fuels. Service industries benefited from the trade realized in food services, lodging, and associated recreational services (e.g. photo processing). The wholesale and retail sector participated in the direct expenditures process on the basis of retail food and recreational product sales.

As a result of the direct expenditures, secondary effects were generated through inter-industry trade and employment-based demands in the amount of $299 million. The major sectors participating in these secondary effects were manufacturing (25 percent of secondary sales); finance, insurance, and real estate (24 percent); and service industries (24 percent) (Table 1). Manufacturing again played a prominent role on the basis of goods sold to other production sectors and to the household sector. Finance, insurance, and real estate participated in the secondary process through the banking services and real estate sales provided to the household and business sectors. Secondary demands within the service sector included health care, food services, and other domestic services.

The $562 million in total sales showed a value added to production of $262 million (Table 1). Value added represented the amount of total sales directed to wages and salaries, interest payments, taxes, d epreciation, and profit. Sectors with a high ratio of value added to total sales were typically labor-intensive and service-oriented industries. These included wholesale and retail trades, the finance, insurance and real estate group, and the service industries. Two social measures of this economic process were the employment income and the number of jobs originating from total sales. Nearly 27 percent of total sales was directed to employment income, amounting to $154 million (Table 1). In turn, almost 10,000 jobs were credited to this recreation-based demand. Sectors having the highest levels of employee income and jobs were the service industries, manufacturing, and wholesale and retail trades. Further employment was also credited to the Bureau of State Parks in terms of 640 full-time positions and 950 seasonal jobs, representing an annual equivalent of nearly 880 positions within the agency.

Table 1. Economic effects of state park recreation in Pennsylvania.

Sectors	Direct Sales	Second Sales	Total Sales
	---------- ($ millions) ----------		
Agriculture	2.5	13.2	15.7
Construction	1.9	10.9	12.8
Manufacturing	108.0	75.3	183.3
Transport. Commun. and Utilities	6.9	29.0	35.9
Wls. & Rtl.Trade	54.2	19.8	74.0
Fin., Ins. and R. Est.	3.9	72.9	76.8
Services	71.8	71.8	143.6
Government	13.7	5.1	18.8
Other Sectors	.0	.8	.8
Total	262	9 298.8	561.7

	Value Added	Employee Income	Employ
	-----($ millions)-----		(jobs)
Agriculture	4.4	1.4	223
Construction	5.8	5.3	175
Manufacturing	47.6	38.5	1,693
Transport. Commun. and Utilities	13.6	8.1	256
Wls. & Rtl. Trade	52.9	33.7	3,634
Fin., Ins. and R. Est.	54.8	11.2	487
Services	74.7	50.2	3,220
Government	8.0	5.5	282
Other Sectors	.6	.4	28
Total	262.4	154.3	9,998

Discussion

Although outdoor recreation is often characterized as a cyclical and largely service-oriented industry, the IMPLAN analysis of park-related expenditures showed a broader economic involvement with a composite of industrial sectors. Nearly 41 percent of the direct expenditures went to the manufacturing sector, with 27 percent channeled to the service industries sector and another 21 percent to wholesale and retail trades. Secondary effects of these direct expenditures showed a further involvement with the manufacturing, financial, and service sectors.

Overall, park-related expenditures created a wide array of economic benefits on a sector-by-sector basis and, in all probability, represented an economic process not confined to any particular season. Results from this study suggest that the business process may involve substantial lead time in preparing for this recreational market and may also create certain lagged effects in terms of secondary expenditures. For example, although 76 percent of the direct expenditures was associated with the "summer recreational season", nearly 30 percent of this amount was for equipment purchased over the previous year. In addition, food products, recreational equipment, and apparel would require a certain lead time in their manufacture and distribution. Finally, the secondary effects realized by other supporting industries and from induced consumer demands would involve a continuing span of time.

Summary

Implications to Park Management

State park users are largely a family-oriented audience, have moderate-level incomes, and live within close proximity of state parks. Most of their recreational expenditures were tied to food and food services, recreational equipment, and transportation. In turn, these monies were channeled into the manufacturing industries, the service sector and the wholesale and retail trades. All told, expenditures tied to the use and operation of state parks resulted in total economic effects of $562 million within the state. Total industrial employment attributed to park expenditures represented 10,000 industrial jobs and an additional 880 positions within the Bureau of State Parks.

These economic results can be largely credited to the statewide system of 114 parks, with the operation and maintenance of the system representing a certain catalyst to the overall process. During 1987, the $36 million in park operations led to a fifteen-fold increase in economic activity throughout the state. Pennsylvania's park system is an established recreational entity that provides three basic types of benefits to our society. First, they meet the recreational needs of the public in terms of a diverse set of activities and park locations. Second, they represent ecological reserves that contribute to the maintenance of a healthy environment. Third, they support a substantial volume of economic activity. The challenge presented to park management is sustaining this unique set of natural resources for future generations while continuing to meet the public need for recreational opportunities. As an ancillary feature of this system, the public's pursuit of outdoor recreation will continue to contribute to our state's economy.

Acknowledgement

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IMPACT OF USER FEES ON DAY USE ATTENDANCE AT NEW HAMPSHIRE STATE PARKS

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This paper examines state park day use attendance data over a ten year period, 1980 - 1990, for variations in attendance effected by increases in user fees. A non-controllable variable the weather has been taken into account. The results of this paper suggest that user fees can be successfully collected at specific locations and provide positive income without significantly decreasing attendance.

Introduction

The changing economy and public opposition to new or additional taxes is forcing many public recreational agencies to investigate the feasibility and impact of user fees for public property. New Hampshire State Parks have successfully collected user fees at many locations and have historically recovered up to one hundred percent and more of their operating expense. The purpose of this study is to examine existing state park data for variations in attendance relative to increased user fees at New Hampshire state beaches, day-use areas, and historic sites over a ten year period.

Study Areas

For the purpose of the study 27 state parks were categorized into three types; beaches, day-use areas, and historic sites. User fees are charged at all of the parks chosen in each category. The three categories are described as follows:

Beaches

New Hampshire state beaches made up the largest percentage of the properties in this study. There are 16 swimming beaches in the state park system. Two of these are large salt water beaches and are extremely popular among day-trippers and residential tourists during summer months. The other 14 in-land beaches are smaller and located on various N.H. lakes and ponds.

Day-Use

Six day-use parks were studied. These areas are typically mountain areas and offer such recreational opportunities as hiking, picnicking, and sight-seeing.

Historic Sites

New Hampshire state historic sites made up the smallest percentage of the parks studied. Although there are only five state historic sites they are important cultural assets to the state park system. These sites include: the Robert Frost Farm, the John Weeks Estate, the Daniel Webster Birthplace, the Franklin Pierce Homestead, and the Wentworth-Coolidge Mansion.

Findings

Beaches

During the study period of 1980 to 1990 there were four fee increases at New Hampshire state beaches(table 1). User fees gradually increased from $.75 per person in 1980 to $2.00 in 1984. The $2.00 user fee remained constant from 1984 to 1989. During 1990 the fee was increased by $.50 to $2.50 per person on weekends and holidays.

Table 1. Beach attendance and user fees, 1980-1990.

Year	Attendance	Fee $
1980	1,011,200	.75
1981	865,600	1.00
1982	804,700	1.50
1983	1,035,100	1.50
1984	870,600	2.00
1985	986,000	2.00
1986	897,000	2.00
1987	754,300	2.00
1988	866,800	2.00
1989	770,600	2.00
1990	736,500	2.00

Overall, beach attendance shows a general decline between 1984 and 1990 even though user fees remain constant from 1984 thru 1989 (Fig. 1). The fluctuation in attendance during the study period suggests that fee increases are not the sole variable impacting beach attendance as there are increases and decreases in attendance that do not coincide with fee increases. Other variables considered were precipitation (Fig. 2) and temperature.

1980 had the second highest attendance during the study period with the lowest user fee, moderate rain and high temperatures. Though there were considerable fee increases, 33% in 1981 and 50% in 1982, the weather was less than desirable with 11.6" of rain and cooler temperatures in 1981 and the same for 1982 with more than 13.2" of rain. Overall beach attendance declined from 1980 to 1982. 1983 was the driest year of the study period with 6.76 inches of rain along with being one of the warmest and had the highest attendance of any year from 1980 to 1990. User fees increased from $1.50 to $2.00 in 1984 and remained constant through 1989, however park attendance did not. 1984 saw attendance slightly higher than 1981 with a similar temperature and 3" less rain. A 13% increase in attendance was noted in 1985 over 1984 with very similar weather conditions.

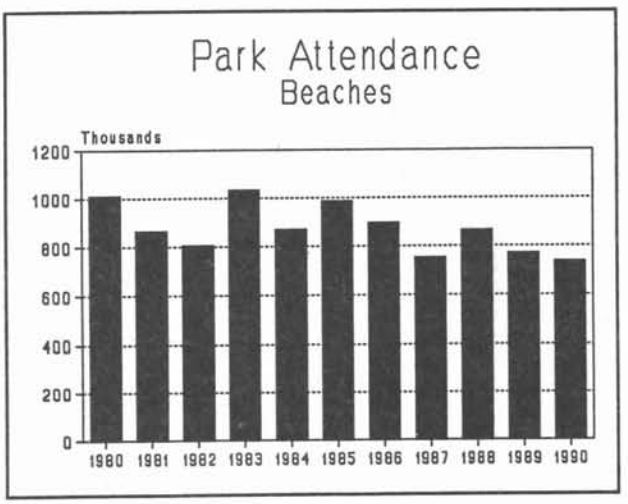

Figure 1. Annual park attendance at beaches.

Precipitation in the years 1986 through 1990 was quite high ranging from 11.42" to 13.44". Temperature and precipitation appeared to be the deciding factors for beach patrons.

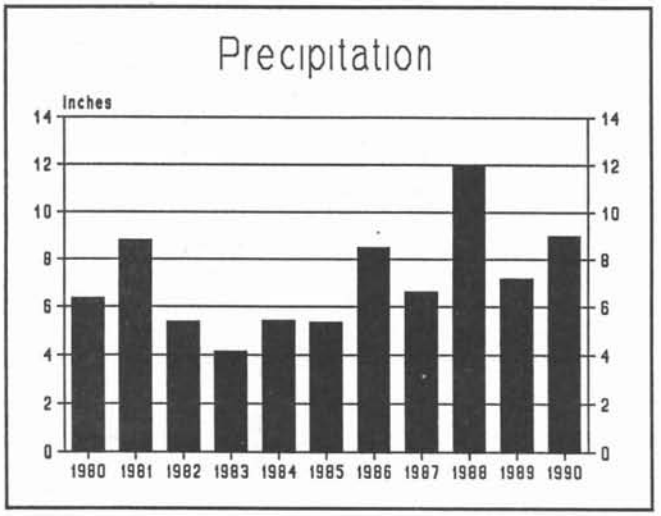

Figure 2. Average annual precipitation.

Day Use

Day use areas experienced three fee increases during the study period of 1980 to 1990. During 1980 and 1981 the user fee was fifty cents per person. The fees was increased to $1.00 per person in 1982 and remained constant until 1988 when it was increased 100% to $2.00 and unified the fee structure through out the park system. The last increase occurred in 1990 when fees were raised to $2.50 per person on weekends(Table 2).

Table 2. Day-Use Attendance and User Fees, 1980-1990.

Year	Attendance	Fee $
1980	143,700	.50
1981	137,600	.50
1982	130,700	1.00
1983	132,600	1.00
1984	139,000	1.00
1985	131,500	1.00
1986	133,500	1.00
1987	137,900	1.00
1988	156,800	1.00
1989	175,600	2.00
1990	127,700	2.00

Overall, day-use attendance has remained relatively constant during the study period (Figure 3). In 1982 the fee increase appears to have had an impact as attendance fell more than 5% from 1981 with similar rain fall (Figure 4) but a cooler temperature. Attendance at day use areas recovered during 1983 through 1985 while rain fall was down, temperatures were up and the fee was constant. In 1986 total precipitation for the summer increased sharply and remained up through 1990. Attendance increased constantly from 1986 to 1989 with a substantial increase, 12.1%, coinciding with a doubling of the fee to $2.00 in 1989. 1990 experienced a 37.8% decrease in attendance while the only significant variable change was the 50 cent fee increase on weekends.

Historic Sites

During 1980 and 1981 operating seasons user fees at state historic sites were fifty cents per person. Fees were increased to $1.00 per person in 1982 and $2.00 in 1984. From 1984 to 1990 the fee remained constant (Table 3).

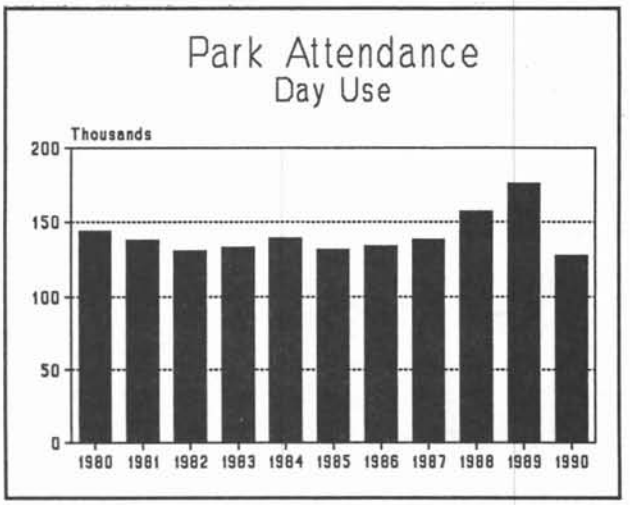

Figure 3. Annual park attendance at day use areas.

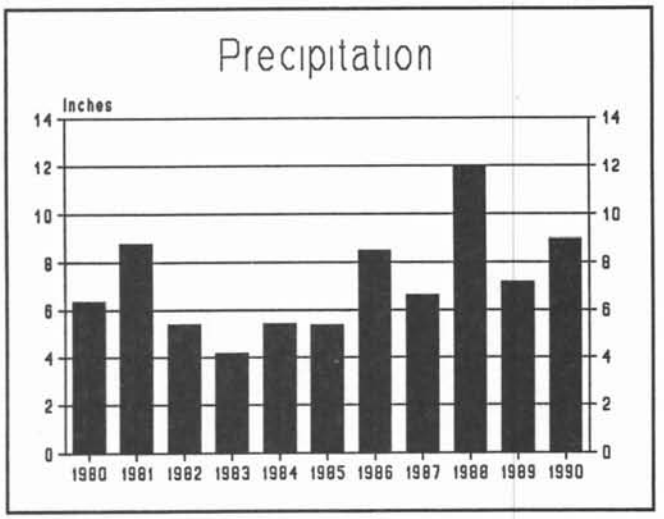

Figure 4. Average annual precipitation.

Table 3. Historic site attendance and user fees, 1980-1990.

Year	Attendance	Fee $
1980	10,392	.50
1981	4,816	.50
1982	5,752	1.00
1983	8,600	1.00
1984	9,100	2.00
1985	12,300	2.00
1986	10,600	2.00
1987	10,500	2.00
1988	13,600	2.00
1989	10,600	2.00
1990	11,200	2.00

During the study period attendance at NH state historic sites demonstrated a steady increase in attendance even though there were two fee increases (Fig. 5). When compared to the weather it becomes apparent that historic sites may do better when outside activities are limited due to rain (Fig. 6) as years of high attendance correlate to years of higher rainfall.

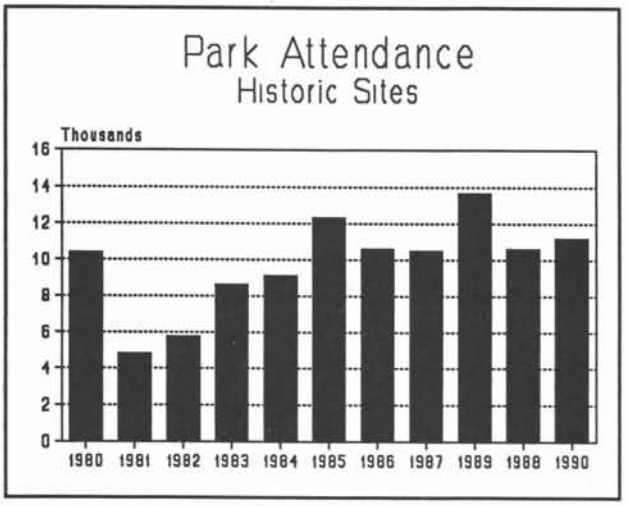

Figure 5. Annual attendance at historic sites.

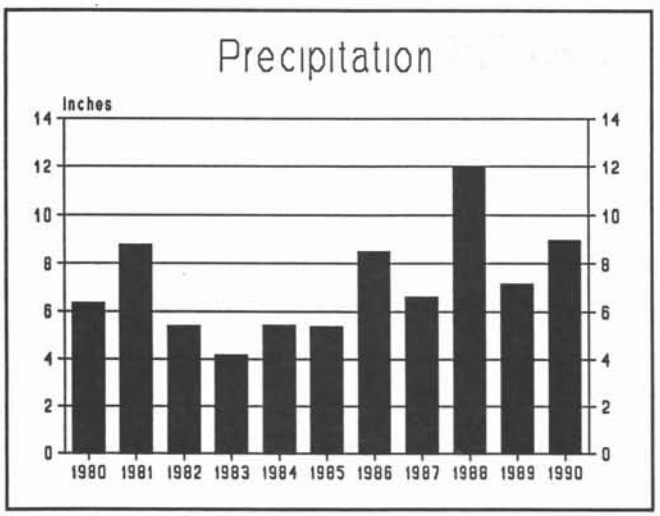

Figure 6. Average annual precipitation.

Overall Attendance

Overall there was a decline in park attendance during the study period of 1980-1990 but 87% of all patrons visit beaches which appear to be weather dependent more than price dependent. Historic sites appear to be unaffected by user fees and unlike beaches do well when the weather is inclement. Day use areas appear immune to the effects of either weather or increased user fees at these levels.

Summary

The results of this study suggest that park visitation is influenced to a great degree by the weather and to a much lessor degree if at all by user fees of up to $2.00 per person. It is important to mention that there have not been any written complaints received relative to user fees during periods of increase. The results of this study further suggest that user fees can be can be implemented over a period of time and used to generate income to offset operating expenses with out significantly impacting visitation levels.

OUTDOOR RECREATION

MANAGEMENT OF RECREATION RESOURCES

COUNTING VISITORS AT NATIONAL PARKS: CONCEPTS AND ISSUES

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Unless attendance is treated as a multidimensional concept, it can mislead a manager as to what is happening in his park. The Canadian Parks Service recently revised its attendance measures so that they can provide both meaningful information about individual parks and be used consistently in all parks.

1. The History of Attendance in the Canadian Parks Service

In the sixties and early seventies, many myths grew up around attendance reporting in the national parks of Canada. Some park managers firmly believed that budget allocations for their parks depended in some direct and rational way on levels of attendance. Some managers believed that their positions depended on attendance levels. There was also a widely held organizational view that it was important that attendance be increasing from year to year, even if one was not sure exactly what attendance was. On the other hand, some managers diligently sought an accurate measure for attendance in the belief that it could tell them something useful, even indispensable, about their operations, and in particular, workload.

Of course, the number of visitors has something to do with workload in a park. It is almost axiomatic, and like a lot of axioms, we do not often think much about it. If a park offers services to visitors or tries to influence their behaviour (e.g., tries to keep them from destroying the resource), then more visitors means more serving and more influencing. However, number of visitors has a very complex (and poorly understood) relationship with workload. And that relationship varies from place to place and from time to time. Where things are complex, not well understood, and surrounded by myth, you would expect a lot of confusion, and a diversity of approaches. Not surprisingly, therefore, there were a lot of different things being reported as park attendance across the system of parks.

In the mid-seventies, the "socio-economic" group at the Canadian Parks Service headquarters was charged with the task of putting some order into attendance counting and reporting. We took our mandate seriously, and tried to find and correct arbitrary and unsound definitions and ad hoc and unstable counting methods. Our aim was to transform attendance measures with little or no management utility into new reporting formulas so that attendance figures would show us what was going on in parks, or at least would signal events that required management attention.

While trying to untangle the confusion, we recognized that visitors do not all impact workload the same way in every circumstance. We came to understand that different parks were going to need different attendance measures: there was no one best way to do the job. For the same reasons, we also recognized that attendance was not necessarily a useful measure at all parks. Still, for political reasons, it was necessary to count attendance everywhere. Can you imagine a park manager not being in a position to answer the question "How many people visit your park?"

As a result, in some parks we had ways of counting attendance that measured nothing other than entering traffic. In some cases, we measured party nights of camping, and in other cases, we measured entries for the purpose of visiting the park and using the services provided. The reason for this variety is that in some parks, the primary workload is related to pass-through traffic. Attendance that does not include pass-through traffic (even though these people can only loosely be called visitors) does not reflect true park workload. In other parks, virtually everyone who comes to the park spends time overnight camping. Party-nights of camping is therefore a good measure of the park's workload. In some parks, there is a mix of day-users, campers, sightseers, and some pass-through traffic. The best solution here seemed to be to identify, through surveys, those persons who enter the park and make some use of it consistent with our primary mandate of heritage appreciation and recreation and calibrate their proportions against some easily recorded measure.

It is important to recognize that attendance has not been the only statistic reported by the Canadian Parks Service. Since 1971, a variety of use statistics, reflecting day to day operations, have been recorded by the parks. For example, if you wanted to know if camping in a park was increasing, you did not look at attendance, you looked at the camping statistics. If you wanted to know if vehicle entries to a park were increasing, you looked at vehicle entry figures by gate. If you wanted to know what was happening in interpretive programs, there were interpretive program utilization statistics.

2. The Search for Consistency

We did not, however, live happily ever after. After over ten blissful years of relatively satisfactory attendance reporting, a new force arrived on the scene: the Auditor General of the Canadian Parliament. In 1983, a comprehensive audit was conducted of the Canadian Parks Service. The Socio-Economic function, of course, was one of the groups whose activities were reviewed. Where we saw healthy and useful diversity in attendance reporting, the Auditor General's team saw inconsistency and cross-purposes. They looked at the attendance calculating formulas for different parks and saw that different things were being measured. Therefore, according to them, no overall measure of attendance was possible, so that what we had been reporting nationally as attendance was erroneous and misleading.

Attendance formulas were being used consistently from year to year at individual parks, and more and more parks had attendance figures that had value to park management. However, this was not enough to make the attendance measures acceptable to the auditors. The fact that attendance was virtually defined as pass through traffic in some cases, as campers in another, and as something else in other cases was viewed as inconsistent. There is no denying it, it was inconsistent! To be fair however, the Auditor General was looking for something quite different from what we had been aiming for. The Auditor General's Office wanted a "performance indicator" for the whole of the Canadian Parks Service, a single number used consistently at over 100 parks and historic sites which could be used to indicate to the

Canadian Parliament how the Service was performing. We, on the other hand, were trying to find measures in each park and historic site that would indicate to individual park managers something about how their individual parks were doing. So the problem was not a question of inconsistent attendance measures, but of inconsistent objectives.

Of course, the search for the single number to describe performance is an activity surrounded by at least as many myths as once surrounded attendance measurement. In fact, it is somewhat akin to the search for the holy grail: the biggest myth is that it exists at all. If attendance is to mean anything at all to anybody, it must somehow relate to workload at a park. However, through a somewhat Arrow-like paradox, what is meaningful at the individual park level is not meaningful when it is aggregated to the system level. This is, of course, because visitors affect workload differently in different parks, and there is no common denominator like the dollar to reduce all this diversity to a comparable unit so that a single revenue or profit or return on investment figure can be calculated. So what do you do to comply with the Auditor General's direction?

3. Analytical and Theoretical Approaches to Defining Dimensions

You will have noticed that in this paper, we have avoided using the term visitation, a term which has often been used to describe the number of people who visit a park. The Concise Oxford Dictionary defines a visitation as an inspection by a bishop, or a divine dispensation of punishment or reward. We certainly welcome any bishops who would like to visit our parks, and auditors as well (there appears to be a part of the definition for each of them), but these kinds of visitations are only one dimension of park attendance. Our concern with the Auditor General's comments was that there were too many important dimensions to pick just one.

Dimensions are of course used in science and in common speech to describe things clearly and consistently. (Beaman and Grimm, 1989) Imagine a series of boxes, all of different sizes. We could go a long way to describing them merely by telling you their length, width, and height. The mathematically inclined among you will immediately see that we have characterised a them using a three-dimensional vector. Limiting ourselves to any one number or dimension to describe the boxes will give an incomplete picture. (see Cooley and Lohnes, 1961, for a factor analysis example)

Now "dimension" is often used very loosely in the social sciences, as in "the dimensions of a problem". It can however be used with rigour. Take a variety of variables that measure things that go on in a park, such as answers to a questionnaire. The values of these variables can be arrayed as a table or matrix. If there are 20 variables, any one set of 20 values for those variables (one respondent's questionnaire) defines a point in a 20-dimensional space. By factor analysis, one could determine how much of the variance in that space appears to be concentrated around one, two, or three, or a limited number of underlying factors or dimensions. (Harman, 1976 and Muliak, 1972).

Operations in a park can be "explained" by visits using just such a multi-dimensional model. Some sort of "complexity of operations" or "workload" variable could be specified as a function of a variety of other variables, as in the following:

> WORKLOAD = f (number of visits of various types, number of vehicles entering, number of picnics, length of stay of various visit segments, number and complexity of programs run for these visit segments, number of campers, ...)

If all these variables could be defined operationally (especially the dependent variable "workload", which has eluded us for many years), and appropriate data collected, a factor analysis could be run to reduce the variables to their underlying factors. In fact, we suspect there would probably be around three or four that would explain 90% or more of the variance.

What was just described was an analytic approach to finding dimensions. There has however been much reaction in the social sciences to applying methods without knowing what problem was to be solved (Beaman, 1977). The alternative to ad hoc use of methods is a theoretical approach, that is, an approach which identifies quantitative measures that are understandably related to the main aspects of the business that we are in, and that do not just duplicate each other. For example, the main business of some of our parks, and the item which absorbs the majority of the budget of those parks, is servicing the major highways that pass through them. The measurement of the number of entries by persons to that park, regardless of the purpose of their entry, provides an indicator that reflects a major workload of such parks. On the other hand, if we measure the number of people who stop in a park to do something, such as participate in a recreational activity or an interpretive program, we have a measure of another kind of workload, and it is "somewhat" independent of the number of entries.

Because there are as many ways to measure visitor behaviour as there are analysts to do it, the Auditor General's quest for a measure of attendance which is both valid and generalizable to all parks led us to make somewhat arbitrary selections from among the various alternatives available. Taking a general view, we reasoned, three things can happen at a park. A visitor passes through the park on his way to somewhere else, the park being a convenient travel corridor. A visitor stops for a brief time to participate in an activity (e.g., a picnic). A visitor stops for a significantly longer time to participate in a series of activities, often camping overnight. This kind of split provides a good general purpose way of presenting what happens. We are talking about very generalized behaviour when talking about reporting attendance for the Auditor General's purposes).

The time dimension can be tricky to capture here. It may be useful to split attendance into only two segments: those who enter just in order to pass through, and those who enter for park related purposes (heritage appreciation or recreation) for any period of time, long or short. Once the latter group is identified, it can then be measured two ways, by absolute number, and by some measure of duration, since clearly, the longer you stay, the more workload you represent, although here again the relationship is complex, regrettably ill understood, and of course, surrounded by myths.

The result of our considerations was a set of four measures: the person-entry, the person- visit, the person-visit-day and the person-visit-hour. A person-entry occurs whenever a person enters a park for any purpose. A person-visit occurs when a person enters a park for the first time on a given day or for the first time on the first day of his stay in the park, and his stay in the park is for the purpose of heritage appreciation or recreation, our mandated reasons for having the park. A person-visit-day occurs when a visitor stays in a park for a day or part day. Each day he or she stays counts as an additional person-visit-day. The person-visit-hour measure is used for visits to places like historic sites, where the visitor cannot stay overnight (there are no facilities provided for accommodation), but where different lengths of stay, ranging from minutes to hours, can be significant for management.

4. Testing Our Measures

Were our measures good ones? We tested the attendance data using factor analysis to see if we could reduce the number of variables from three. Then we submitted the data to cluster analysis to see if the measures provided any meaningful perspective on what was happening in parks.

To conduct these tests, we used person-entry, person-visit, and person-visit-day data for all national parks for the months of July and August for 1988, 1989, and 1990. For the purposes of this paper, we restricted ourselves to national parks. Since, as pointed out above, historic sites do not have overnight accommodation, have a length of stay of hours or minutes, and rarely have pass-through traffic, historic sites should be considered as different spaces, measured against different dimensions.

We have also limited the data in our example to the peak summer season (July and August). Some national parks do not operate in the winter. Others have radically different "operational" parameters in winter since accommodation, trail use, etc.,play a different role in park use at that season. The difference reflects both what can be offered and the different markets being served. We conducted a factor analysis on the three attendance variables person-entry, person-visit, and person-visit-day. Tables 1 and 2 show the results of two different factor analyses. The analysis in Table 1 shows the initial result.

Table 1. Results of factor analysis on untransformed variables.

VARIABLE	FACTOR LOADINGS		
	FACTOR 1	FACTOR 2	FACTOR 3
person-entry	0.92		
person-visit	0.97		
person-visit-day	0.98		
eigenvalues	2.769	0.213	0.019

All the variables load on Factor 1. One factor explains over 90% of the variance. However, it turns out that this is because the sheer scale of visits to parks overwhelms all other variation. Some parks receive as many as 650,000 person-visits in a month (with a commensurate number of entries and visit-days) while some parks get as few as 15 visits. Any subtle (or not so subtle) relationship between person-entries, person-visits and person-visit-days is wiped out by the fact that high attendance parks also have high person-entries and high person-visit-days as well.

We performed the factor analysis again on data transformed to make two of the variables "independent" of the third. We divided person-entries and person-visit-days by person-visits in order to turn them into the ratios "entry per visit" and "visit-day per visit". The results of the factor analysis are shown in Table 2.

We now had three variables. "Visits" showed the number of visits as before, with the influence of scale left in (high attendance parks still had big numbers; low attendance parks had low numbers). "Entries per visit" showed the proportion of entries to visits: where there was a great deal of pass-through traffic, the proportion of entries to visits should be high, regardless of whether the park had high or low attendance. "Visit-days per visit" indicated the proportion of long stays to one day visits: Where visitors stayed a long time, the ratio would be high; where visitors tended to stay only for a day, the ratio would approach one, again regardless of the scale of person-visits to the park.

Table 2. Results of factor analysis on variables transformed to eliminate effects of scale.

VARIABLE	FACTOR LOADINGS		
	FACTOR 1	FACTOR 2	FACTOR 3
entry/visit	-0.82	-0.06	
visit-day/ visit	0.41	0.78	
visit	0.55	-0.67	
eigenvalues	1.140	1.058	0.802

The factors with eigenvalues ranging from 1.1 to 1.06 to 0.80 show that if a reasonably large proportion of the variance is to be explained, three dimensions will be needed.

The conclusion is that there is no single relationship, particularly a linear one, that lets person-entries, person-visits, and person-visit-days be explained by each other. You cannot predict visits from entries by a general formula that applies to all parks. You can develop such a formula for a particular park for a peak summer season, but the formula will, at most, apply to a small group of parks that by chance have the same multipliers.

To see if we could use the three dimensions of attendance data to draw conclusions about how parks were behaving we used cluster analysis (Everitt, 1980). We ranked all the data using the "SAS PROC RANK" procedure and created a transformed normal distribution value for each ranked value using Tukey's algorithm. This is the same transformation as mentioned above, and had the result of eliminating the effects of scale. We then used the "SAS FASTCLUS" procedure to derive clusters from these transformed data. The results are shown in Table 3.

Table 3. Results of the cluster analysis.

CLUST #	N	CENTROID COORDINATES			CENTROID DISTANCE
		ENTRY/ VISIT	DAY/ VISIT	VISIT	
1	2	2.69	0.14	-2.69	2.21
2	13	0.80	1.92	-1.96	1.90
3	28	0.35	0.90	2.69	1.55
4	11	2.28	-1.60	-0.34	1.63
5	31	-1.68	-0.17	0.45	1.43
6	12	0.52	-1.60	1.12	1.03
7	26	-1.68	-2.69	-0.80	1.63
8	19	-1.68	1.17	-1.32	1.59
9	7	0.63	-0.75	-2.19	1.47
10	39	1.42	0.06	0.19	1.03

As can be seen from the centroid distances, a number of distinct clusters arose from the analysis. An easier way to understand this information is to list the parks which make up each cluster. This is done in Table 4. Recall that what were clustered were data from individual months, so it is possible for a park to appear in more than one cluster. It is a measure of the distinctness of the clusters that this "splitting" of a single park into several clusters occurred, with one exception, only to parks that are remote or extremely hard to get to, and so receive very few entries, visits or visit-days. The numbers in brackets are the number of months of attendance of a park that occurs in a cluster.

Table 4. Parks arranged in clusters.

CLUSTER 1: Northern Yukon (2)
CLUSTER 2: Auyuittuq (4), Northern Yukon (3), Ellesmere Island
CLUSTER 3: Banff, Jasper, Kootenay, Riding Mountain (4), Cape Breton Highlands
CLUSTER 4: Glacier (5), Mount Revelstoke
CLUSTER 5: Kejimkujik, Pacific Rim, La Mauricie, Kluane (1), Elk Island, Point Pelee
CLUSTER 6: Forillion, Prince Edward Island
CLUSTER 7: Pukaskwa (1), Kluane (5), Nahanni (1), Grasslands (2), Mingan Archipelago, St. Lawrence Islands, Wood Buffalo (4), Georgian Bay Islands (1)
CLUSTER 8: Pukaskwa (1), Nahanni (5), Auyuittuq (2), Prince Albert, Georgian Bay Islands (5)
CLUSTER 9: Pukaskwa (4), Northern Yukon (1), Wood Buffalo (2)
CLUSTER 10: Waterton Lakes, Yoho, Glacier (1), Riding Mountain (2), Fundy, Terra Nova, Kouchibouguac, Gros Morne

Anyone familiar with the Canadian Parks Service parks will have a good feeling about the groups as they are displayed above. Quite frankly, it was a surprise that we obtained this good a grouping from the attendance data. For example, Cluster two consists of very remote northern parks, with no roads, let alone any pass-through traffic. When visitors get there, they tend to stay for a relatively long time, and probably camp in the park. Cluster three consists of parks that have mixed use, with a lot of pass-through traffic, a lot of person-visits lasting only one day (e.g., skiing at Banff) but a lot of long stays for the world class attractions, particularly in Banff, Jasper, and Cape Breton Highlands. Cluster five parks can be characterised as end use parks, appealing mostly to regional residents who would use the parks over the weekends, but have very little pass through traffic. Finally, cluster ten consists of parks which have significantly more pass-through than five, but similarly attract a lot of regional short term visitors.

5. Uses and Limitations of Attendance Measures

Table 4 shows the clustering of the parks based on the three attendance dimensions. It should be noted however that what happens in some parks is a reflection of circumstances and not what was planned. CPS may have planned that the parks which happen to be in a cluster should in fact be quite different. Examination of target markets for each park in a cluster, and the "opportunity structure" for each park could well imply that different development options should be followed. This may be particularly true if sustainable tourism has become a driving objective for new development. The attendance measures may not provide enough information to allow an analyst or planner to define the clusters that parks should be in. They do , however, give a perspective on what is happening in the park. For general managerial tracking, the three attendance measures provide enough information to give some insight, but do not provide so much detail as to be unmanageable.

To answer the kinds of questions that might be raised, however, data beyond attendance must be examined. In the Canadian Parks Service, data that are to be regularly captured and monitored are being defined in a data plan for each park. The data plan must be based on the nature of the park and what is likely to happen to it. Furthermore, because money is scarce, the plan must be developed with due consideration of what is being collected anyway, what can be collected cheaply by automation, how accurate data must be and how often they need to be collected if they are to be useful.

What is wrong with combining the three measures to get one? In terms of the earlier discussion of the way to describe boxes, there are several ways to combine length, width and height, depending on what you want to do with the boxes. If you are going to keep liquid in them, you could combine length, width, and height into volume, and have a good measure. If you want to store solid objects in them, volume is a much less useful measure. If you want to minimize space wasted, then you have to know all three dimensions in order to match your objects with the correctly sized box. Therefore, what is the "best" measure depends directly on the problem you are trying to solve. In one park, person-entries can drop as person-visit-days increase. In another park, person-visits can increase as person-visit-days decrease. Person-entries to parks can rise and fall as exogenous factors influence the volume of pass-through traffic, yet a park's workload can remain unchanged. In another park, workload can primarily be determined by entries. All three measures are needed to provide a measure of attendance which will be useful for the variety of issues parks managers face. It is important to realize that the three measures are not selected on the basis of mathematical analysis. They were selected on the practical basis of being general yet useful.

6. Conclusion

The multi-dimensionality of attendance is a concept that can easily be applied to pool attendance, community centre attendance, festival and special event attendance and so on. This fact should be kept in mind when one sees a statistical report or an entire statistical system being designed around one statistic for each facility. Worse yet is a situation where the same statistic is reported for a variety of facilities or services regardless of its appropriateness to represent the work load of the facility or service. If management wants attendance measures that are consistently defined for different locations, and yet measure something remotely meaningful and useful, they must accept that they will have multiple measures which cannot be reconciled to a single "index" that gives an "overall" perspective on what is happening.

Attendance reporting is a political necessity. It can be little more than supplying numbers to meet political requirements. The emphasis of this paper has been that attendance can be consistent, relevant, logically justified and logically related to general data collection plans. It is to be hoped that more and more attendance reporting will be of the type just described.

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THE EFFECT OF TRENDS IN FOREST AND OWNERSHIP CHARACTERISTICS ON RECREATIONAL USE OF PRIVATE FORESTS

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Probit analysis was used to estimate correlations between recreational use of private woodland and forest, owner, and surrounding community characteristics. Land held by more highly educated owners or those reared in large cities was more likely to be used for recreation, while the opposite was true for land held by older owners.

Introduction

Forests provide opportunities for recreational and aesthetic relief from the pressures of modern society, as well as the raw material for a diverse wood products industry. Ownership changes are taking place that may drastically alter the flow of forest benefits.

Diamond International's recent sale of nearly 1 million acres in northern Vermont and New Hampshire focused attention on the public benefits associated with large undeveloped parcels. Fears emerged over the possibility, if not inevitability, that corporate restructuring and leveraged buyouts would bring extensive forest acreage, traditionally open to the public, to the auction block. Increased demands for recreation has led to overcrowding on many public lands. Recreational use is expected to become an increasingly important reason for owning woodland, particularly in the highly populated Northeast (USDA Forest Service 1989).

This study identified landowner characteristics associated with recreational use of nonindustrial private forest land. The influences of forest characteristics and population density in the surrounding community on recreational use were also examined. The results aid in understanding the effects of trends in landownership characteristics on recreational use of forests. Since landowners who use their land for recreation may manage differently, insight may be provided into a variety of forestry concerns.

Data and Methods

Information on forest characteristics were obtained for privately owned plots sampled in conjunction with the U.S. Forest Service's periodic survey of Vermont and ownership data were obtained from a questionnaire sent to the owner of each plot. Frieswyk and Malley (1985) and Widmann and Birch (1988) provide detailed discussions of survey techniques for the respective forest and ownership surveys. These data included species composition, elevation, proximity to a maintained road, parcel size, and owner characteristics, such as, age, education level, occupation, tenure of ownership, and whether the land was used for any of a variety of recreational pursuits (e.g. hunting, hiking, camping, bird watching or winter sports). Observations for 258 individually owned nonindustrial private ownerships were analyzed.

A nonlinear regression technique (probit) was used to estimate the relationship between a dichotomous dependent variable, coded "1" if the woodland was used for recreation and "0" otherwise, and variables measuring characteristics of the forest, owner, and surrounding community. Probit analysis provided estimates of the strength of correlations between recreational use and selected explanatory variables, as well as the probability that parcels with a given set of characteristics are used for recreation. Judge and others (1982) provide a thorough discussion of probit models.

Results

It appears that much of Vermont's privately owned woodland is used for recreation. Approximately 77 percent of the 258 sample plots were within ownerships that were used for recreation.

Table 1 provides a brief description of the variables and Table 2 shows the probit results and estimated elasticities. The signs for the coefficients indicate the direction of change estimated to result from an increase in an explanatory variable, but since the model is nonlinear, the magnitude of the change is influenced by the values for all the variables and coefficients. Elasticities estimate the percentage change in the probability that woodland is used for recreation resulting from a 1-percent increase in an explanatory variable, and those listed in Table 2 were evaluated at the mean values of the explanatory variables. The estimated probability that a parcel with characteristics equivalent to the sample means was used for recreation was 0.57. (See Tables 1 and 2, next page.)

Forest stands with larger portions of eastern white pine were more likely to be used for recreation. There is no clear intuitive explanation for this correlation other than preference for the aesthetic appeal of white pine or that white pine is more likely to occur on better drained sites. Other parcel characteristics examined but not statistically discernible at the 10-percent level included: size of ownership, proximity to a maintained road, per-acre timber volume, and several variables measuring species composition other than white pine. However, since forest characteristics were measured on only one plot per ownership and may not portray average conditions or indicate diversity, results with respect to forest characteristics should be used with caution.

Stronger correlations were found between landowner characteristics and recreational use. A strong positive correlation was found between recreational use and the landowner's level of formal education. Woodland held by owners who were reared in large cities also was more likely to be used for recreation. It appears that recreation is a more important reason for owning woodland for these owners than for those with a more rural background. Preliminary regressions provided weak evidence significant only at the 20-percent level, that farmers were less likely to use their woodlots for recreation.

Woodland held by older or professionally employed landowners was less likely to be used for recreation. These results were statistically significant at the 2.7-percent and 12.9-percent levels, respectively. Older owners may face physical restrictions, while professionals may have less free time or may prefer more developed types of recreation.

Several other ownership variables were examined but the correlations were not statistically discernible. Population density in the surrounding community, tenure of ownership, retirement status, and income levels were not correlated with recreational use.

Table 1. Definition of variables.

Variable	Definition
REC	Dependent variable, coded "1" if woodland is used for recreational purposes and "0" otherwise
PINE	Proportion of eastern white pine in stand
ED	Years of formal education
AGE	Age of landowner (years)
PRO	Variable, coded "1" if owner is employed in a white collar or professional occupation and "0" otherwise
CITY	Variable, coded "1" if landowner spent the first 12 years of his or her life in a large city (population > 100,000) and "0" otherwise

Table 2. Probit results and estimated elasticities.

Explanatory Variable	Coefficient	Standard Error	Mean		Elasticity
			Recreational Use	No Recreational Use	
Constant	0.511	0.613	1.00	1.00	-------
PINE	0.828*	0.432	0.13	0.06	0.05
ED	0.083**	0.028	14.90	13.00	0.60
AGE	-0.017**	0.008	55.58	60.51	-0.47
PRO	-0.308	0.204	0.42	0.41	-0.06
CITY	0.506*	0.302	0.19	0.07	0.04

N = 258
-2 LOG (Likelihood Ratio) = 26.63

** Significant at 5-percent level.
* Significant at 10-percent level.

Discussion

Several correlations were found between owner characteristics and recreational use of private woodland. Parcels held by more highly educated owners or those reared in large cities were more likely to be used for recreation. The opposite was true for land held by older individuals. Although trends show increases in the education level of landowners, the owners are also growing older as the baby boom generation ages. Baby boomers have generally been more active in their recreational pursuits than the preceding generation and may continue using their woodland for recreation as they grow older. The low estimated elasticities indicate that changes in the portion of forest land used for recreation, resulting from shifts in the characteristics of the landowning population will come about slowly.

Demands for both timber and recreation are expected to increase. Concerns over the loss of recreational opportunities on some large industrial holdings and intense use on many public lands may motivate more individuals to purchase forest land for recreation. Understanding the characteristics of these individuals provides insight into a variety of forestry concerns. Timber harvesting, forest management, posting, and participation in voluntary forestry programs have been linked to forest and landowner characteristics (Binkley 1981, Widmann and Birch 1988, Dennis 1989, Dennis and Sendak, in press). For example, more highly educated owners were less likely to harvest timber and more likely to post their land and participate in voluntary tax saving programs even when these programs required management stipulations. This suggests that voluntary tax relief programs that encourage timber harvesting and discourage posting may be effective in mitigating potential negative effects of changes in land ownership motivated by increased demand for recreation.

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WILDERNESS MANAGEMENT THROUGH VOLUNTARY BEHAVIOR CHANGE: AN EVALUATION OF THE PEMIGEWASSET WILDERNESS MANAGEMENT PLAN

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The management plan for the Pemigewasset Wilderness Area of New Hampshire represents a departure from traditional plans. Results of this study indicate limited evidence of the Pemigewasset Wilderness Management Plan (PWMP), as currently implemented, having a large direct impact on diverting hikers from their planned destinations and promoting dispersed usage and low impact camping.

Wilderness Management

The Wilderness Act of 1964 states that the principal value of wilderness is the protection of areas which "generally appear to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" and that "it is the policy of Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness" (PL 88-577, Section 2A). A multitude of uses, outside influences, and legal mandates make management of the nation's 90,000,000 acres of wilderness areas necessary (Lucas and others 1985). While the Act establishes general guidelines for the management of wilderness areas, it leaves the development and implementation of specific management objectives to the individual federal agencies governing each designated area. Management techniques may be grouped into five broad areas (Lucas and others 1985): required permits; fees charged for area use; open access, with no fees or permits required; restricted use of certain areas; and open access systems which seek to voluntarily change use patterns. We focus on the last technique.

The Study Area

In 1984, 45,000 acres of the White Mountain National Forest in New Hampshire were designated by Congress as the Pemigewasset Wilderness, the largest tract in the National Wilderness Preservation System east of the Mississippi. Served by 11 trails totalling approximately 45 miles, the area is estimated to generate 19,000 recreation visitor days per year (USFS 1989).

In order to address the unique mix of historical and physical characteristics within the Pemigewasset Wilderness the management plan implemented by the Pemigewasset National Forest Ranger District divides the area into separate "zones," each with a specific management strategy. Areas where heavy use requires "active management to restore and maintain the wilderness condition" are designated as "Zone C" (USFS 1989). The implicit assumption made by the Forest Service is that dispersed usage is preferable to concentrated usage in meeting the Wilderness Act's goals. Previous studies have found that visitor usage is highly concentrated in most wilderness areas (Lucas and others 1985; Hendee and others 1978), that solitude is a quality sought by many wilderness users (Hampton and Cole 1988; Lucas and others 1985), and that the quality of the experience declines in the presence of other people (Lucas 1980; Roggenbuck and Berrier 1982). Hence, unmanaged use patterns are tending to cause the very situation that visitors to wilderness areas seek to avoid. An increasing number of studies have also suggested that the growing number of wilderness users are causing considerable physical damage to the natural resource (Cole 1989; GAO 1989). Based on this information, it appears that diverting overnight hikers to less traveled parts of the wilderness should increase total utility generated from the PWA.

The management plan for Zone C incorporates an innovative strategy with two components: 1) an active wilderness education program; and 2) a system of managed, designated, and dispersed camp sites. A central feature of the program is the use of "wilderness rangers" who promote dispersed camping, wilderness ethics, and the "no trace" camping ethic. These rangers contact hikers on the trail and provide information in hopes of persuading hikers to frequent less used areas and use lower impact hiking and camping practices, helping to mitigate many problems of overuse. Zone C is thus a "field school" where users learn low impact skills and wilderness values which can be carried to more remote parts of the PWA.

The Survey

In order to determine whether the PWMP was effective in altering backcountry users' behavior, a survey of area users was conducted in summer of 1989. The self-administered survey collected data on users' ages, incomes, environmental attitudes, reasons for visiting the area, and party characteristics. A total of 281 survey interviews were completed. Of these 281, 84 were hikers who had been contacted by wilderness rangers in Zone C; this group forms the basis for this analysis.

Information Obtained by Survey Respondents

A prime objective of the PWMP was to transmit information on low impact camping techniques and wilderness ethics. However, when asked to describe "helpful" information they received from the wilderness ranger, most respondents noted area- or trip-specific information such as camping sites (25.8 percent), weather (9.7 percent), points of interest (8.6 percent), and trail conditions (7.5 percent). Only one respondent (1.1 percent) related receiving helpful information on low impact camping techniques.

The Models

Prior to conducting the survey, two logit models were constructed to evaluate the effectiveness of the PWMP. The first or "behavior change" model examined the probability that respondents who had been contacted by a wilderness ranger changed their destination. Responses to the question "Did you change your original plans as a result of this (wilderness ranger) information?" ranged from not at all to slightly (dependent variable = 0) or moderately to greatly (dependent variable = 1). The second model, the "useful information" model, examined factors which determined whether respondents considered the information provided by the rangers as "useful." The question "Do you think that you will use this information on future trips?" similarly ranged from not at all to slightly (dependent variable = 0) or moderately to greatly (dependent variable = 1).

Previous research on characteristics of backcountry users has focussed on age, experience, occupation, education, gender, and group size (Leonard and others 1978; Echelberger and Moeller 1977). This information was used to guide selection of the models' explanatory variables: total number of hikers in party (TOTAL); number of children in party (KIDS); previous plans to stay at a designated tent platform site (1 if planned to stay at platform, 0 otherwise)(PLAT); number of previous visits to area (VISIT); age of respondent, in years (AGE); self-assessed experience of respondent (1 = beginner [EX1], 2 = intermediate [EX2], 3 [EX1 = EX2 = 0] = expert); education level of respondent (1 if college graduate, 0 otherwise)(EDUC); income of respondent, in $10,000 increments (INC); and likelihood of visiting the area again in next five years (1 if likely, 0 otherwise)(FUTU).

Results

The Behavior Change Model

Eighteen of the 84 respondents indicated that they had changed their destination as a result of the information obtained from the wilderness rangers. Results of the first model are presented in Table 1. Three variables--total number in party, likelihood of future use, and beginner-level experience--were statistically significant. The sign of the TOTAL variable indicates that hikers in large parties were more likely to change their destinations than those in smaller parties. This is an encouraging result, since diverting larger parties could substantially reduce environmental impacts in heavily used areas.

The sign and significance of the experience variable indicate that those with less developed camping skills (about 8 percent of respodents) were more likely than either intermediate or expert hikers to be influenced by the information provided. Backcountry users who were more likely to return (about 51 percent of the total) found the information influential in altering their destinations.

The McFadden R^2 of .193 indicates that the independent variables explain about 19 percent of the variation in the dependent variable. However, using a 50/50 criterion, the model predicts about 84.5 percent of responses correctly. (Under this test, predicted values of greater than .5 are assigned a value of 1, with 0 value otherwise. These assigned values are then compared to actual responses in the prediction success table).

Table 1. Factors influencing change in respondents' wilderness destination. Dependent variable = information provided caused respondent to change destination.

Maximum Likelihood Estimates			
Variable	Estimated Coefficient	Standard Error	Asymptotic T-Ratio
TOTAL	0.554	0.294	1.880*
KIDS	-1.508	1.130	-1.334
PLAT	-0.362	0.644	-0.563
FUTU	1.599	0.738	2.167**
VISIT	0.017	0.058	0.296
EX1	2.250	1.356	1.659*
EX2	1.235	0.907	1.361
AGE	0.005	0.037	0.147
EDUC	0.782	0.718	1.090
INC	0.139	0.159	0.874
CONSTANT	-5.499	2.111	-2.605***

* = significant at .10 level
** = significant at .05 level
*** = significant at .01 level
n = 84 McFadden R-Square: 0.193

Prediction Success Table			
	Actual		
		0	1
	0	64	11
Predicted	1	2	7

Number of Right Predictions: 71.0
Percentage of Right Predictions: 84.5

Calculation of Probability Estimates

One of the attractive features of logit analysis is that it allows prediction of individual behavior based on different values of the independent variables (Capps and Kramer 1985). The probability that an individual with mean characteristics would change behavior due to information provided is approximately 14.3 percent. Thus, the information program is effective in diverting less than one-seventh of those contacted from their original destinations in zone C. When considering only experts (that is, EX1 = EX2 = 0, 21 of the 84 surveyed), the probability of changing destinations is only about 5.7 percent. Given these results, it appears that the PWMP is not very effective at redirecting hikers from Zone C.

The Useful Information Model

Despite the results of the behavior change model, the program might still be considered a success if hikers used the information obtained on future trips. If this were the case, over the long run dispersed usage might be achieved. For this reason, the model attempted to determine whether hikers would use the information provided by the wilderness rangers in the future.

Sixty-four of 84 respondents indicated that they found the information provided by the rangers helpful. As noted previously, however, most of this information was site- or area-specific, and not directly related to the objectives of the PWMP.

Table 2. Factors influencing usefulness of information provided. Dependent variable = respondent's perception that information was helpful.

Maximum Likelihood Estimates

Variable	Estimated Coefficient	Standard Error	Asymptotic T-Ratio
TOTAL	0.965	0.482	2.001**
KIDS	-0.531	0.573	-0.927
PLAT	-1.336	0.829	-1.612
FUTU	3.439	0.974	3.352***
VISIT	0.031	0.043	0.719
EX1	2.239	1.684	1.329
EX2	0.641	0.801	0.799
AGE	0.175	0.064	2.720***
EDUC	-1.447	1.008	-1.434
INC	0.139	0.163	-0.183
CONSTANT	-0.030	2.111	-2.605***

** = significant at .05 level
*** = significant at .01 level
n = 84 McFadden R-Square: 0.375

Prediction Success Table

	Actual	0	1
	0	11	6
Predicted	1	9	58

Number of Right Predictions: 69.0
Percentage of Right Predictions: 82.1

Results of the second model are presented in Table 2. A total of three variables were statistically significant at or beyond the .05 level: total number in party, likelihood of future use of the area, and age. The FUTU variable is especially interesting given the magnitude of its coefficient (3.44). About 51 percent of respondents indicated that they were likely to return to the Pemigewasset; hopefully, they will use the information received on these later trips. Older respondents and those from larger parties were more likely to find the information helpful. The sign of the platform variable implies that hikers who camp at the tent platform sites in the PWA are less flexible about changing their behavior. Unlike the behavior change model, the experience variables apparently play little role in determining whether the information provided will be used in the future.

The McFadden R^2 for the model was .375, indicating a moderate amount of explanatory power. Using the 50/50 criterion outlined in the preceding section, the model was able to successfully predict about 82 percent of the actual responses.

Calculation of Probability Estimates

Following procedures outlined above, the probability that an individual with mean characteristics would find the information helpful is about 90 percent. Further analysis of the results indicates that the program is more effective in influencing returning hikers. For hikers who answered that they were not likely to return (about 49 percent of the total), the probability of judging the information helpful was only 60 percent. When one considers the group likely to return, this percentage increases to nearly 98 percent. The differences in these two probabilities can be attributed to the area-specific information provided by the PWMP, which will not be used again by those not returning to the area. Finally, for the expert hiker group, the probability of judging the information helpful was about 82 percent, indicating that even expert hikers perceive benefits from the information provided.

Conclusions

Results of this study indicate that there is at best limited evidence of the PWMP, as implemented in the summer of 1989, having a large direct impact on diverting hikers from their planned destinations. Less than 20 percent of hikers contacted intended to change their camping destinations due to the information obtained from wilderness rangers. Respondents' accounts of what information received was "helpful" indicated that the information on low impact camping and wilderness ethics which will hopefully divert hikers from heavily used areas is not being transferred, a conclusion reinforced by logit results. This may indicate a need for changed emphasis in the information provision techniques of the wilderness rangers. Despite this, there is evidence of a substantial amount of information being disseminated to users of the PWA. Similarities among PWA and other wilderness area users (see Brown and others 1991) indicate that what is successful in the PWA may well prove successful elsewhere. It seems evident that the PWMP is effective at information provision on the area; whether this proves effective in managing our wilderness areas remains to be seen.

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USE OF PAIRED MANAGEMENT ACTION GRIDS FOR EASE IN DEPICTING DIFFERENCES BETWEEN USERS' AND MANAGERS' PERCEPTIONS OF PROBLEMS

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This research was to determine whether differences exist between users and managers concerning perceptions of actual and perceived problems in parks and primarily to present a method of graphically depicting the differing perceptions of problems which exist between users and park managers which can be easily employed by area managers and related to the public, upper management and governing bodies.

Introduction

The purpose of this research was to determine whether differences exist between users and managers concerning perceptions of actual and perceived problems in parks. One point of significant interest generated by this study was the graphic depiction of the differing perceptions of problems which exist between users and park managers. A growing body of research findings demonstrates that significant differences exist between users' perceptions and preferences and management's perceptions of users' preferences regarding recreational opportunities and support services (LaPage, 1983; Harris, 1979; Driver, 1974; Peterson, 1974; Moeller et.al., 1974; Clark et.al., 1971; Hendee and Harris, 1970; Lucas, 1964). As shown by Hendee and Harris (1970) and Moeller et. al. (1974) the attitude that the manager is eminently qualified to make decisions concerning users' needs on the basis of the manager's knowledge, without adequate input from the users, is often erroneous. These authors have shown that managers' perceptions concerning users' desires for services are not compatible with the users' actual expressed desires. Without sufficient data sources and input, the managers cannot efficiently allocate resources to address users' service needs.

There are a number of studies which deal with user expectations from a recreational experience and setting (Wagar 1966; Shafer 1969; Hancock 1973) and an abundance of literature on how a manager can provide these services (Lime 1971; Wagar 1966; Fish and Bury 1981; Lime and Stankey 1971; Clark et. al. 1971; and Hendee and Harris 1970). There is also a significant body of literature which describes the manager's perceptions of the recreation setting and how he executes his job of providing recreation services (Lime and Stankey 1971; Wicker and Kirnmeyer 1976; Philly and McCool 1981; and Wadzinski 1983).

A growing body of research demonstrates that significant differences exist between users' perceptions and preferences and managers' perceptions of user preferences regarding recreational opportunities and support services (Lucas 1964; Hendee and Harris 1970; Peterson 1974; Driver 1974; Harris 1979; LaPage 1983). Lime and Stankey (n.d.) proposed that "... what the recreationist perceives as acceptable or desirable may be quite different from what the manager perceives." As LaPage (1983) states: "... there is a growing mountain of evidence of substantial differences between managerial and user perceptions...". The question which plagued Lime and Stankey's research (n.d.) was: "Whose values are to count most - the managing agency's or the public's?" If public values are to be relied upon, which 'public'? - there are so many of them!" There is no such thing as an "average recreationist", so management must make decisions concerning services to be offered and how to manage areas for the greatest range and number of users desired (Wagar 1966; and Shafer 1969).

Hendee and Harris (1970) found in a study of foresters' perceptions and attitudes and of users perceptions and attitudes that managers did not have an accurate perception of users' attitudes and perceptions. This study was limited to how managers felt users would respond to various policy and behavior rules in wilderness areas. It was found that, while foresters responses were similar to users responses in their personal perspective of wilderness, they were found to be significantly different in their perceptions of user attitudes concerning wilderness. The authors suggested that:

> "These misperceptions of user attitudes suggest limited exposure to typical users and bias from excessive contact with organized conservationists and comfort seeking users commanding attention as well as selective perception based on differences between managers and users."

The management sample in this study was restricted to upper level managers, those individuals not directly involved with the day-to-day operations of wilderness areas, who made management decisions based on information passed up to them by their staff or from input from vocal special interest groups. This study did not consider the line manager who was actually dealing with users on a day-to-day basis and was responsible for on-site response to user problems. Thus, these researchers attributed bias in decision making to the upper level managers without considering on - site management.

In 1974 a study was completed on the "Opinions of Campers and Boaters at an Allegheny Reservoir". This study addressed a wide range of considerations including fees, law enforcement, recreational zoning and facility development. The area managers responsible for decision making were surveyed and perceptions of these managers were again, as in the Hendee and Harris study, found to be significantly different from the perceptions of campers and boaters (Moeller, Larson and Morrison 1974). Another apparent phenomenon in this study was that significantly different perceptual responses were elicited from users pursuing different types of recreation activities. This further supports the statement that there is no such thing as an "average recreationist" (Wagar 1966; Shafer 1969; Moeller, Larson and Morrison 1974).

To offer services desired by users, a manager must first be aware of what the users want and be willing and capable of offering those services. According to Driver (1974), managers, when consulted, often respond that they are aware of the data collection techniques required to ascertain user expectations and what constitutes user satisfaction. However, because of time and money constraints, most managers related that they cannot

afford to collect and analyze the data necessary so they often rely on their "gut" feelings when making decisions. As Driver and Knopf (1981) state;

> "... Individuals attracted to the managerial profession tend to be less abstact and more "down-to-earth (than researchers) and like to deal with more tangible things. As a rule, they have less interest in things that are uncertain, unpredictable and abstract. They need an environment that is clearcut and familiar. The solution to problems must be more immediately evident, and they tend to seek immediate results from their efforts."

Managers state that they are "recreation professionals" who deal with users and park problems daily. On the basis of their training and continued exposure to these problems they maintain that they are adequately informed to make decisions about what the users want, and what will satisfy the users within the framework of their individual park situations and budgetary constraints, without expensive, time-consuming research (Driver 1974; Wicker and Kinmeyer 1976).

As shown by Hendee and Harris (1970) and Moeller et. al. (1974) the attitude that the manager is eminently qualified to make decisions concerning users' needs on the basis of the managers' knowledge, without adequate input from the users, is often erroneous. These authors have adequately shown that managers' perceptions concerning users' desires for services are not compatible with the users' actual expressed desires. Without adequate data sources and input, the managers cannot efficiently allocate resources to address users' service needs.

Methodology

Two study populations were considered in this research. The first consisted of a sample of March 1984 "Spring Break" users at Port Aransas City Beach Park on North Padre Island on the Texas Gulf coast. The population of managers included all beach park managers who had responsibility for implementing policy concerning problems at the beach during "Spring Break" 1984.

A total of 187 beach users and 10 managers were interviewed during the one week study period. Only four (4) users (2%) of the 191 persons selected for interviews, declined to be interviewed. Thus, the user response rate for this study was 98%. All ten (10) managers agreed to the interview. Thus the manager response rate for this study was 100%.

To develop an instrument to collect data which would adequately answer the research, data needs were first determined. To provide a field of valid research questions which would provide viable data for analysis, a number of previously completed research studies which addressed similar objectives were reviewed, and a set of possible questions were assembled for inclusion into the survey instrument.

The questionnaire was designed to evaluate: (1) the importance of beach services & facilities, and (2) the perceived performance of the managing agency in providing those services & facilities. The seven response choices for the importance rating were presented in a Likert-type scale and ranged from "extremely important" to "not important at all". Respondents were also asked to "grade" or rate the performance of the beach managing agency in providing each service & facility. Response choices for performance ranged from a grade of "A" (outstanding) to "F" (totally unacceptable).

Treatment of the Data

A one-way analysis of variance (ANOVA) was performed on the response data which was gathered on the surveys. Data for all questions included in the survey were analysed using a contrast of responses to each individual question between the user sample and the manager population. The ANOVA determined whether there were statistically significant differences in response means for each question between groups. Statistically significant differences were tested in this study at the .05 alpha level (Ott 1980; Weisberg and Bowen 1977).

Findings

Beach users' and managers' perceptions were compared to identify statistically significant differences in responses. "Perceived Importance and Performance of Services Provided", the paired service delivery items, showed that users and managers at Port Aransas City Beach Park had statistically significant differences in perceptions on fifteen (15) items. For each of the items the managers' responses were higher than the users (See Table 1, next page).

The use of paired Management Action Grids can graphically reproduce the statistical findings (Figure 1). This method uses a three-step process to evaluate an existing marketing strategy or to develop a new strategy. First, a set of attributes or features is identified through a literature review, focused group interviews, and the use of managerial judgement (Martilla and James 1977).

Second, consumers or users are asked two questions about each attribute or feature: (1) "How important is it" (2) "How well did the provided product or service perform in satisfying their expectations?" The third step involves calculating importance and performance scores for each attribute or feature.

The importance and performance scores are calculated by assigning a numerical code to each response (i.e., a five point scale with "5" being a high score and "1" low), summing the numbers and dividing by the "n" (total number of responses). These resultant scores are the statistical mean responses for importance and performance.

These scores provide "x" and "y" coordinates which are then plotted on a two dimensional scale termed the "Action Grid" (Blake et al. 1978). When plotted, the two axes ("x" & "y") divide the grid into four quadrants (Figure 1). The upper right quadrant contains responses to those services or features which are perceived to be important to the respondent and which the respondent believes are being adequately provided by management. Items which fall into this area require little or no attention by management. The upper left quadrant includes responses to those services which are perceived to be important to the respondent but which are not being adequately addressed by management. Items which fall into this area require attention by management so improvement can be made to better satisfy the users. The lower right quadrant includes responses to those services which are perceived to be unimportant to the respondent and which are being well provided by management. Services which fall into this quadrant require less attention and resources. These resources may be re-assigned to improve services in the upper left quadrant. Finally, the lower left quadrant includes those services which are perceived to be unimportant to the respondents and which are poorly provided by management. Items which fall into this quadrant do not require much attention from management due to the low priority in the opinion of respondents. Attention and resources should only be allocated to services which fall into this quadrant after much more important services are adequately provided. A second grid containing managers responses was prepared by the

Table 1. Differences in perceptions between beach park managers and users at Port Aransas City Beach Park to questionnaire items related to perceived importance and performance of services at the beach

Type of Service	Mean	2 - Tail Probability
1. Lifeguards	*Importance*	
Users	3.31	0.010
Managers	4.44	
	Performance	
Users	1.54	0.006
Managers	3.50	
2. Enforcement patrols	*Importance*	
Users	4.24	0.004
Managers	5.20	
	Performance	
Users	3.78	0.000
Managers	4.67	
4. Public telephones	*Importance*	
Users	4.01	0.049
Managers	4.78	
	Performance	
Users	2.39	0.031
Managers	3.63	
6. Emergency first aid	*Performance*	
Users	2.66	0.002
Managers	4.33	
7. Traffic control	*Performance*	
Users	3.14	0.022
Managers	3.89	
8. Camping sites	*Importance*	
Users	4.04	0.033
Managers	4.78	
9. Crowding	*Importance*	
Users	2.72	0.010
Managers	3.89	
13. Hotels/motels	*Performance*	
Users	3.84	0.025
Managers	4.38	
14. Restroom/showers	*Performance*	
Users	2.70	0.029
Managers	4.13	
15. Staff friendlyness	*Performance*	
Users	3.70	0.001
Managers	4.63	
16. Facilities well maintained	*Performance*	
Users	3.14	0.002
Managers	4.38	
19. Clean swimming area	*Performance*	
Users	3.45	0.009
Managers	4.38	

above mentioned methods for comparison with the users' grid and placed with the users' grid.

The Management Action Grid was easily adapted for the purpose of this research since it graphically presents to management the preferences and perceptions of users. Figure 2 graphically reproduces the statistical findings of Table 1. These graphics further identify and exemplify the dramatic gulf which exists between managers and users perceptions and suggest management responses to remedy these shifts. When responses between perceptions of management and users are compared, management can determine the degree to which differences exist, whether managerial action is warranted, and what specific concerns should be addressed. By using the grids as a guide for reassigning resources, management can better address the problems important to their respective user clientele.

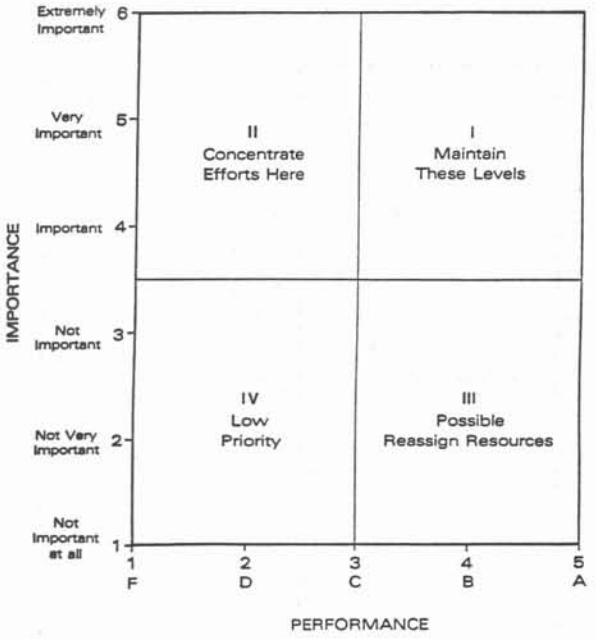

Figure 1. Importance Performance "Management Action Grid."

Summation

This study revealed that the perceptions of users, concerning actual and perceived problems, were significantly different from managers perceptions, thus supporting previous research findings. This importance-performance analysis has become increasingly popular for measuring consumer acceptance of product attributes in a variety of fields (Duray and Crompton 1983). From the standpoint of managers, this system is very easy to use as it requires a fairly simple questionnaire format which employs paired responses. The questionnaires employed can be very simple and may be easily administered in on-site personal interviews, on-site individual self-administered surveys or by mail returns. The need for computer and/or statistical expertise is minimal and the final presentation of the data in graphic form is easily understandable, which enables the user to present the data to groups of their superiors, local politicians, and/or consumers, with ease and without confusion (Guadagnola 1983).

The projected end result of this research was to assist managers in other park settings to realize that differences exist between managers' perceptions and their users' perceptions of problems and to provide a tool which can be easily adopted by today's managers to identify, communicate and correct problems. By better understanding the concerns of a park's users, managers can more effectively assign priorities, manage limited resources and achieve a more positive rapport with the public. The method employed by this research should be easily replicable by managers in other park settings to identify similar problems with the ultimate goal of reducing the differences in the actual and perceived concerns of managers and their area users.

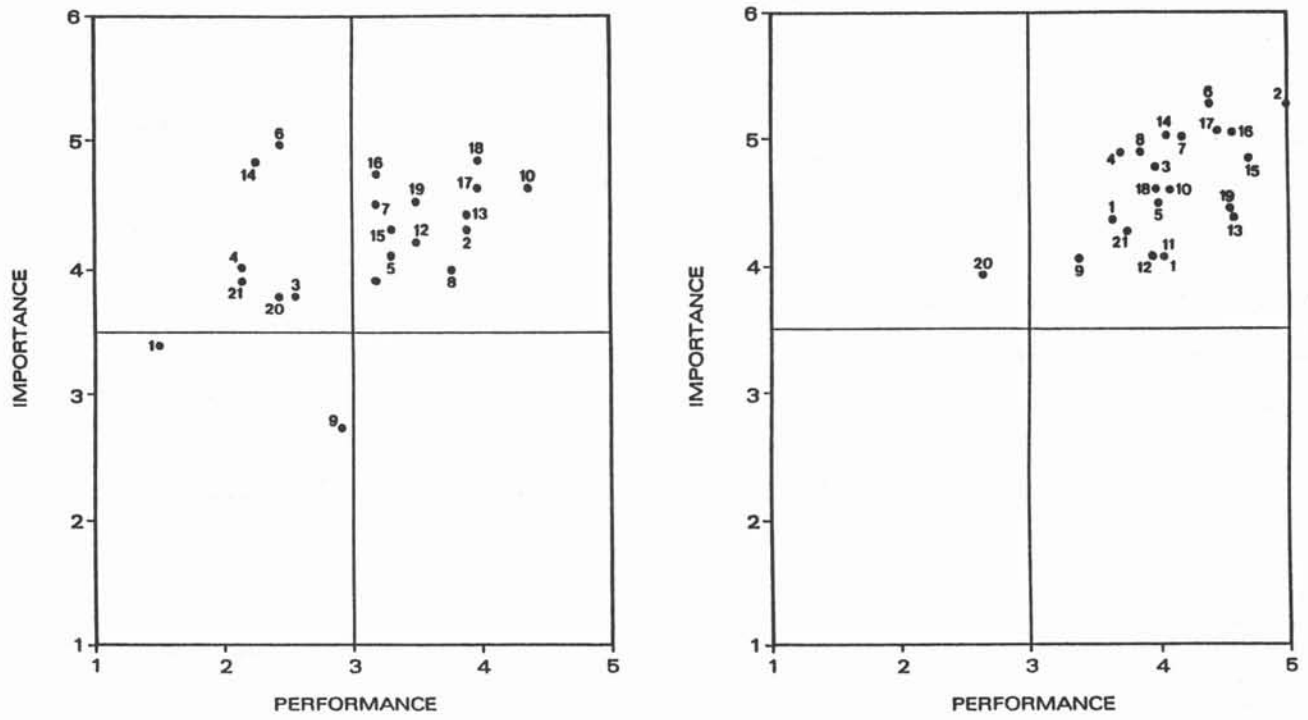

Figure 2. Paired management action grids: Importance vs. performance of services at Port Aransas City Beach Park.

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FISHERIES AND WILDLIFE

FISHERIES AND WILDLIFE MANAGEMENT

ANGLERS' BELIEFS ABOUT TAG-AND-RELEASE PROGRAMS

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Scientific research and the popular literature have emphasized the biological value of tag-and-release fishing. Relatively few publications, however, have examined the anglers' beliefs about the importance of this activity. This paper summarizes sport fishermen's behavior and attitudes related to tag-and-release programs. The data were collected from three sport fishing forums, a shark tournament, and a mailed survey to offshore marlin and tuna anglers. Almost all participants believed that tag-and-release fishing is important for conservation and research. The primary reasons for not participating were lack of knowledge about existing programs and who to contact, not wanting to be bothered with tagging, and concern about how the data are used. The findings suggested that education and incentives may significantly increase participation in tag-and-release programs.

Fish tagging programs have existed for a number of years. Tags typically have a serial number and instructions for returning the tag to the tagging agency. Monetary rewards are sometimes offered to encourage participation (Dell 1974). At a minimum, individuals who tagged the fish are informed by the agency when one of their tags is returned. This feedback provides additional incentive for participating in the program.

The popularity of tag-and-release fishing has increased dramatically. This growth can be partially attributed to the decline in fish stocks resulting from increased angling pressure and decreased water quality. Size limits and bag regulations have also contributed to the number of anglers who return caught fish to the water. In addition, tag-and-release efforts fit well with an increasing conservation awareness. Anglers can still enjoy their activity, while helping to maintain healthy fish stocks.

Both the scientific and popular literature have stressed the biological value of tag-and-release. The existing research emphasizes two major areas. Some research has concentrated on the tag-and-release process itself; examining such things as the effectiveness of different types of tags, and the factors related to hooking stress. Other studies have used the data obtained from returned tags to estimate growth and mortality rates.

Relatively few publications have considered the social aspects of tag-and-release fishing. The goal of this paper is to summarize sport fishermen's behavior and attitudes related to tag-and-release fishing. More specifically, the objectives are to: 1) assess angler involvement in the programs, 2) evaluate the perceived effectiveness of tag-and-release practices, 3) determine perceptions of the importance of the activity as a conservation measure, and 4) identify ways to encourage future participation.

Biological Effects of Tagging

The impacts of tag-and-release on fish growth and mortality rates are complex. Numerous interrelated variables such as hook type, water temperature, anatomical hooking site and fish size influence this relationship, and the responses of fish are divergent even within a single species.

Additional complications arise because the findings from some biological studies do not always coincide with popular beliefs. Many anglers fish with barbless hooks, for example, because they believe that captured fish are easier to release. Other anglers prefer barbed hooks because they believe that fish are not hooked as deeply, and are less likely to be injured. The available empirical evidence indicates that there is no difference in mortality rates of fish caught on barbless and barbed hooks (Hunsacker and others 1970, Falk and others 1974, Bjornn 1975), and that the effect of hook type on fish survival is often related to other variables. Research comparing single barbless, treble barbless and treble barbed hooks (Titus and Vanicek 1988), found differential mortality among hook types was apparent *only* during high water temperatures. In this instance, the highest losses (59%) occurred with fish caught with single barbless hooks. Other investigations suggest that fish mortality is higher when single hooks as opposed to treble hooks are used (Klein 1965, Warner 1976, 1978).

Independent of hook type, other studies have found a relationship between water temperature and hooking mortality. Titus and Vanicek (1988), for example, show that for trout caught with lures, mortality was less than 1.5 percent at water temperatures between 5.5 to 15.5 degrees Celsius, but rose to nearly 50 percent as the temperature approached 21 degrees. Similar relationships have been noted for black bass (Bennett and others 1989) and large mouth bass (Schramm and others 1985). For those fish who did survive the tag-and-release process, the higher the water temperature, the more delayed their recovery (Wydoski and others 1976).

The anatomical site of hooking also influences mortality rates. Warner and Johnson (1978) found higher mortality rates for Atlantic salmon which were hooked in the esophagus as opposed to the jaw or mouth. Fish who bled after hooking were also more likely to die than fish who did not bleed.

Research findings on the impacts of size and age of fish on hooking mortality are mixed. In one study, the mortality of legal sized salmon was not significantly different from that of sub-legal salmon, nor were there differences in mortality of different age groups (Warner and Johnson 1978). Wydoski and others (1976), on the other hand, found that hooking imposed greater stress on larger than on smaller hatchery rainbow trout.

Contradictory results were also found for the effects of tagging on growth rates. Studies of lake trout (DeRoche 1963), walleyes (Smith and others 1952), redfish (Kelly and Barker 1963), and haddock (Jensen 1963) suggest that tagging impedes growth. The longer the tagged fish lived, the more retarded was their growth. These studies suggest that tags may have a signal effect, in that they startle live prey on which the tagged fish are attempting to feed. Tags may also interfere with the swimming abilities of fish. Contrary results were obtained by Jensen (1967) in a comparison of the growth rates of tagged and untagged cod fish. The tags had little effect on the growth of cod. It was hypothesized that the larger, robust cod can compensate for the attached tag better than the smaller species.

The suitability of different kinds of tags has also been studied. Eames and Hino (1983), for example, examined tag loss rates for different types of tags on Chinook salmon and found the tag-loss rates were low (2%-5%) for each tag tested (Floy anchor tags, machine- and hand-implanted coded-wire tags, modified Carlin and Swedish trailer tags). In a comparison of the Atkins streamer and Monel metal jaw tags, streamer tags were evaluated as unsatisfactory for long-term population studies, but were satisfactory for short-term river studies. The former judgment stemmed from the streamers' poor retention rates and considerable injury to the fish (MacGrimmon and Robbins 1979). Jaw tags, on the other hand, were effective for long-term ecological studies, because they had a high retention rate and caused little injury to fish. Neither tag proved effective for obtaining reliable growth rate data on smallmouth bass.

Davis (1959) found that bass tagged with streamers were recaptured less selectively by gill nets than those with Petersen tags. The streamer tag was also more durable, more legible, and less subject to physical and chemical change than either type of spaghetti tag. Contrary to MacGrimmon and Robbins (1979), the streamer tag was selected as the most satisfactory of the four tags tested.

Overall, the biological research shows no uniform or consistent relationship between tagging and fish growth and mortality. The type of hook used can influence survival, but the death rates are greater and recovery is slower in warmer waters. Some studies suggest that tagging results in greater stress for larger than smaller fish, whereas other investigations show no difference. Conversely, the growth rate of larger fish is less effected by tags than smaller fish. Summarizing the suitability of tags is difficult because the studies compared different types of tags and there is no clear pattern of findings. The complexity of this issue, when coupled with the divergent biological findings, highlights the difficulties in educating anglers about the importance of tag-and-release.

Social Research

A successful tag-and-release program requires three elements: 1) anglers must believe the technique benefits fish populations, 2) anglers must be willing to tag fish, and 3) even if they are not involved in tagging programs, anglers must return the tags they find on their catch. Most previous social research has focused on the last criteria; the percentage of anglers who return tags and the reasons for not engaging in this behavior.

During routine creel surveys, for example, the U.S. Fish and Wildlife Service secretly implanted fish tags into fish that had already been caught (Matlock 1981, Green and others 1983). In both investigations, less than a third of the implanted tags were returned. The return rates for some species (e.g., flounder, sea trout and red drum) were significantly higher than for other species (e.g., sheepshead, black drum and Atlantic croaker). A follow-up survey with a sample of these anglers, asked individuals to specify why they had not reported their tags (Matlock 1981). Failure to report the tag was most often a result of failure to find the tag.

Dell (1974) looked at tag returns by type of tag (Carlin dangler, Petersen disk, and Floy anchor pendant). Rewards of $1.00 for each disk and $10.00 for each dangler tag returned were offered during the first year of the study. No reward was offered for tags from fish released in the following year. Returns were generally the same for the three types of tags, however, more tags were returned when a reward was offered.

The study reported here builds on the previous social research by examining the all three criteria for a successful program. Anglers' beliefs about tag-and-release fishing, their reported participation in tag-and-release programs, as well as the reasons for not engaging in this behavior are investigated.

Methodology

Data for this paper were collected from three different sources. On-site surveys were administered to all individuals participating in three sportfishing forums held in New Hampshire, New York and Virginia during 1989. The survey was also distributed at a Fishermen's Magazine Shark Tournament in New Jersey during that same year. Finally, the identical questionnaire was mailed to offshore marlin and tuna fishermen in Virginia. A total of 378 surveys were completed.

The four-page questionnaire assessed anglers' participation in and beliefs about tag-and-release programs. Specific items addressed:

* years participating in tagging programs
* number of fish tagged and tags returned
* species of tagged fish caught
* problems with tagging programs
* benefits of being involved in tag-and-release
* reasons for not trying tag-and-release
* ways to encourage tag-and-release

Results

About a third (38%) of the anglers participated in tag-and-release programs (Figure 1). Among the participants, 25 percent had been involved with a program for only 1 or two years, while nearly a third each fell in the 3 to 5 (31%) and 6 to 10 (28%) year participation categories. Sixteen percent had done tag-and-release for more than 10 years.

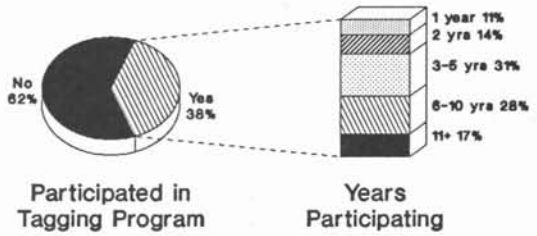

Figure 1. Years participating in fish tagging programs.

The National Marine Fisheries Service (NMFS) Cooperative Gamefish Tagging Program, and the NMFS Cooperative Shark Tagging Program were the two most popular programs (43% and 33%, respectively). Fifteen percent listed the American Littoral Society program, and 2 percent specified Tag-a-Tuna.

Anglers were asked how many fish they had tagged since joining a program (Figure 2). Only 3 percent reported tagging no fish. A third had tagged between 1 to 10 fish, about a quarter between 11 to 30, and about a fifth between 31 to 50 fish. Twenty-seven percent had tagged more than 50 fish.

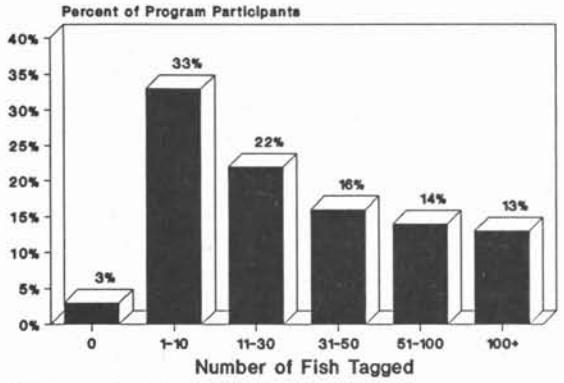

Figure 2. Number of fish tagged.

Each of the tagging programs notifies participants when a fish is returned with their tag. Sixty-one percent of the individuals who had tagged fish had none of their tags returned (Figure 3). A quarter (28%) had received back 1 to 5 of their tags, and 11 percent reported returns of more than 5 tags.

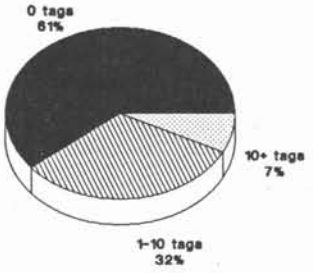

Figure 3. Number of tags returned.

Most participants (61%) had not encountered problems with their tagging program. For those who had difficulties, a quarter (26%) complained about inadequate instruction on tagging procedures (Table 1). Almost as many felt that either their tags had not worked well (23%) or the tagging apparatus had caused problems (21%). Nineteen percent had received slow feedback from the program or had problems getting new tags. Only one individual did not know who to contact for more tags.

Table 1. Types of problems encountered with tagging programs.

Types of problems encountered	Number of Respondents	Percent of Respondents
Inadequate instruction on tagging procedure	16	26%
Tags not working well	14	23
Problems with tagging apparatus (not tags)	13	21
Slow feedback, problems getting new tags, not enough tags	12	19
Not sure of survival of fish	6	10
Don't know who to contact for more tags	1	1
Total	62	100%

All respondents were asked about the types of tagged fish they had caught (Figure 4). Thirty-seven percent of those who responded had never caught a tagged fish. Tagged sharks and striped bass were caught most often (18% and 14%, respectively). Under a tenth reported catching tagged tuna, billfish and flounder.

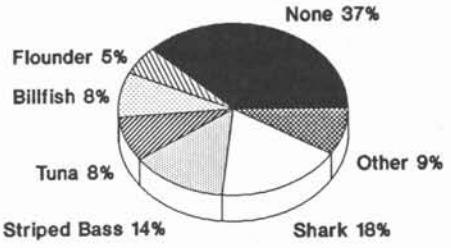

Figure 4. Species of tagged fish caught.

Nearly all (83%) of the individuals who had caught a tagged fish reported returning the tag. Of the 25 individuals who had trouble returning tags, 36 percent lacked knowledge or training in the tagging process (Table 2). Sixteen percent did not understand the importance of tagging and equally as many expressed concern over what happens with the data from tagged fish. A small number of respondents thought the programs were not effective (8%), wanted more incentives (8%), or simply lacked interest in participating (8%). Only one individual was unaware of existing programs.

Table 2. Problems which inhibit returning tags.

Problems which inhibit returning tags	Number of Respondents	Percent of Respondents
lack of knowledge or training in tagging process/techniques	9	36%
lack of understanding of the importance of tagging	4	16
concern over what happens with the data	4	16
believe programs not effective	2	8
lack of interest	2	8
need for incentive to return tags	2	8
lack of awareness of existing programs	1	4
too many different tag programs	1	4
Total	25	100%

General Beliefs About Tagging Programs

Non-participants were asked why they were not involved with tag-and-release programs. Although nearly half (49%) were aware of tagging programs, they did not know who to contact (Table 3). Eight percent each either did not know tagging programs existed or did not want to be bothered with tagging.

Seven percent were concerned about injuring fish, while a equal number questioned how tagging data are used. A small percentage of non-taggers were uncomfortable tagging fish, caught too few or too small fish to tag, or kept all their catch for personal consumption.

Table 3. Reasons for not trying tag-and-release.

Reasons for not trying tag-and-release	Number of Respondents	Percent of Respondents
Knew programs existed but did not know whoto contact	131	49%
Did not know tagging programs existed foranglers	22	8
Fish for fun/don't want to be bothered with tagging	22	8
Concerned about injury to fish	19	7
Concerned about how tagging data are used	19	7
Not comfortable with tagging fish/too awkward	13	5
Not enough/too small fish caught	10	4
Keep catch for personal consumption	9	4
Do not fish for big gamefish	7	3
Too much trouble to keep up with tags & record data	7	3
Haven't sent for tags	4	2
Other	3	1
Total	266	100%

Almost everyone (99%) believed that there are benefits associated with becoming involved in tag-and-release. Education was seen as the most viable approach for encouraging more tag-and-release fishing (Table 4). These education efforts should include information on existing programs, the benefits of the programs, the status of fish stocks, and procedures for obtaining tags and handling fish. Twenty-two percent of the respondents believed incentives would increase participation. About a tenth felt more information on how the data are used would increase involvement, while increasing tag availability was mentioned by 6 percent.

Table 4. Ways to encourage tag-and-release fishing.

Ways to encourage tag-and-release	Number of Respondents	Percent of Respondents
Improve education and exposure for program	186	62%
Encourage tagging through incentive programs	65	22
Explain results of the tagging program	27	9
Make tags readily available	17	6
Other	6	2
Total	301	101%

Conclusions and Recommendations

Although the sample for this investigation was admittedly small, the findings suggest a number of issues for tagging agencies to consider. Most of the individuals who completed the survey were participants in either a sportfishing forum or a fishing tournament. One might expect to find a higher level of participation in tag-and-release programs among this sample when compared to the general angler population. While almost all recognized the benefits of tag-and-release, only a third of this group participated in a program. This suggests that additional promotional efforts are needed if participation is to increase.

Most participants reported no problems with their tagging programs. For those who had experienced problems, inadequate instruction on tagging procedures, ineffective tags, problems with the tagging apparatus and problems with getting new tags were cited most often. Each of these concerns are under the purview of the tagging agency, and therefore, can be improved upon.

Regardless of the anglers' involvement in a tagging program, most individuals reported returning tags from the fish they caught. Lack of knowledge about tagging procedures, the importance of tagging, and what happens with the tagging data were listed as reasons for not returning the tags. These findings again suggest that increased education efforts may stimulate greater participation.

Four of the five primary reasons for not participating in a tagging program were related to lack of knowledge about 1) existing programs, 2) who to contact, 3) proper procedures for tagging fish, and 4) how the data are used. Promotional information distributed where licenses are sold or through fishing supply outlets could increase anglers' knowledge and address these questions.

Finally, relatively inexpensive rewards (e.g., certificates, pins, hats) may increase participation in programs as well as the return of tags. Even simple acknowledgement of tag returns has been shown to provide an incentive for continued participation. Regardless of the reward structure, it appears that tagging agencies can increase the effectiveness of their programs by promoting their efforts through education and incentives.

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TRAPPERS IN NEW YORK AND VERMONT: COMPARISONS OF SOCIAL CHARACTERISTICS AND MOTIVATIONS

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Although trapping has a long history in North America, it is currently the focus of heated debate. Part of this debate concerns the reasons for trapping: is it a sport, a business, or a subsistence activity? Unfortunately, we know little about trappers, their attitudes, motivations, and personal characteristics. This paper presents the results of two trapper surveys--one in New York and one in Vermont. The results show great similarity across the trappers of both states. Muskrat and mink were the most common target species and most trappers in both states utilized foothold traps. The majority had an educational level of high school or less, and a median family income of between $20,000 and $30,000. These results may reflect more recreational than profit-oriented trappers, however, as many of the latter may have left trapping after several years of declining pelt prices.

Introduction

Furbearer trapping has a long tradition in North America. Long before European exploration, Native Americans engaged in trapping activities using primitive devices such as deadfalls and babiche snares. Fur trade and furbearer trapping provided much impetus for early exploration and settlement by Europeans. Over time, steel traps and wire snares were introduced and cash outlets for furbearer pelts became available. As the Nation developed trapping of furbearers was the primary source of income for some individuals, but many others supplemented income by capturing and selling furbearer pelts. In more recent times, recreation trapping has become more prevalent.

In recent years, Northeast trapping has been affected by a number of factors. Anti-trappers have attempted, by legislation, to outlaw or modify severely trapping equipment and practices. Trapping opportunities have been diminished by both loss of habitat and rights to access as a result of commercial and residential development, shifts in land ownership, and land use changes. Pelt prices for most furbearers also have declined substantially during the past decade. As a result of these and possibly other factors, the number of trappers in New York and Vermont have declined considerably since the early 1980's. In Vermont, the number of licensed trappers dropped from a high of 3,090 in 1980 to 879 in 1989. For New York (a state with a substantially larger population), the number of licensed trappers fell from over 32,000 in the 1981-82 season to 12,338 in the 1989-90 season.[1]

In order to gain a better understanding of trappers--their dependency on furbearers as a source of income, the motivations underlying participation, and their views toward various aspects of natural resource management--surveys were conducted of trappers in New York and Vermont by their respective state agencies. While the two studies were conducted independently of each other, they provide information on some of the human dimensions of furbearer trapping for two populations: one state which is essentially rural in character (Vermont) and one in which major urban centers play an important role in the socio-political climate (New York). In this paper, the similarities in and differences between these trappers are examined.

Methods

Information on trappers in New York and Vermont was collected through two separate mail surveys conducted during separate years. During summer 1989, the Vermont Department of Fish and Wildlife, in cooperation with the U.S.Department of Agriculture, Forest Service, Northeastern Forest Experiment Station at Burlington, conducted a survey of individuals who procured a Vermont trapping license for the 1988 calendar year (Glass et al., in press). A questionnaire solicited information on trappers' characteristics, motivations, satisfactions, level of effort during the 1988 season, views toward the changing trapping environment, and proposed changes in regulations. The questionnaires were sent to 293 randomly selected individuals who trapped during 1988, with 151 returning completed questionnaires--a return rate of 51.5 percent.

The New York survey (Siemer et al. 1991) was conducted through a cooperative agreement between the New York State Department of Environmental Conservation (DEC), the Human Dimensions Research Unit at Cornell University, and the Northeastern Forest Experiment Station. In February 1990, a subsample of 1,000 trapper-license holders was selected randomly from a sample also taken at random of 1989-90 trapping license holders used by DEC to conduct their annual telephone survey of furbearer harvests. An initial mailing and up to three follow-up reminders to nonrespondents were mailed during the spring of 1990, producing a response rate of 73.6 percent (n=718) excluding nondeliverables and nonusables.

The questionnaires used in the two states were similar but not identical. The analytical techniques employed also differed for several key areas of inquiry. For example, scales of trapper motivations were clustered using different techniques. In Vermont, the SPSS-X hierarchical-cluster analysis technique was applied to a list of motivation statements weighted by the respondents, while in New York, similar data were subjected to principal components factor analysis with varimax rotation. Different scales also were used to weight the responses from each state, but general comparisons of the results can be made.

1/ Trapping licenses are valid for the calendar year in Vermont, but from October 1 to the following September 30 in New York.

The New York questionnaire originally contained 26 motivation statements; this number was reduced to 23 in the final factor analysis in order to increase overall scale reliability (Siemer et al. 1991). The Vermont study contained 41 motivational statements. Some of the motivational statements in the two questionnaires were identical but, once again, involved different time periods and different populations.

The responses from the two states were subjected to student t-tests and Bonferroni's Correction, where appropriate, to determine if differences among sample respondents statistically were significant.

Results

Generally, trappers in both states sought the same species of furbearers with similar intensity (Table 1). A higher proportion of New York respondents trapped beaver and raccoon, while more Vermont trappers pursued fishers, but no statistically valid inference could be made regarding differences in the total trapper populations within the respective states. Even though New York has longer trapping seasons than Vermont for most species of upland furbearers, there was little difference in the average number of days that respondents had traps set for given species. Meaningful comparisons of average furbearer harvests are difficult to make because of the different years involved.

Table 1. Trapper participation by species, number of days trapping for given species, and average harvest of furbearers by species, New York (1989-90 season) and Vermont (1988 season).

Furbearer species	Percent of trappers who attempted to trap species		Number of days traps set for species over season				Average harvest of furbearers for those pursuing given species	
			New York		Vermont			
	New York	Vermont	Mean	Standard deviation	Mean	Standard deviation	New York[a]	Vermont
Beaver	44	27	23	20.5	17	12.2	4	9
Bobcat	7	9	15	4.8	10	2.7	[b]	1
Coyote	26	28	22	13.9	23	15.8	[b]	4
Fisher	11	29	16	6.1	9	2.8	[b]	2
Gray fox	28	18	23	16.9	20	10.7	3	5
Mink	48	45	24	56.5	18	11.8	4	5
Muskrat	59	56	24	23.3	22	20.4	38	70
Opossum	5	[c]	14	4.7	[c]	[c]	6	[c]
Otter	10	12	27	11.5	23	22.0	[b]	1
Raccoon	53	40	23	20.1	20	12.3	12	13
Red fox	49	42	22	17.8	21	14.3	5	6
Skunk	3	4	22	5.9	24	20.4	[d]	13
Other	0	2	7	0.3	31	23.9	[d]	4

[a] Information provided by New York State Department of Environmental Conservation.

[b] Average harvest less than one furbearer per trapper.

[c] Information not available. While opossum exist in Vermont, they are not considered an important furbearer and were not included in the survey by the Vermont Department of Fish and Wildlife.

[d] Information not reported.

The number of traps owned by respondents did not vary substantially between the states (Table 2). In fact, the median number of traps owned by category were almost identical, although the means differed to some extent (mean number of foothold traps was 89 for New York trappers and 78 for Vermont trappers). With respect to body gripping traps, the average for New York trappers was 64, compared to 48 for Vermont trappers. Neither of these differences was statistically significant at the 5 percent level.

While an overwhelming majority of trappers in both states sold furbearer pelts to local buyers, they also were likely to utilize other outlets. The two samples revealed some differences in secondary product utilization. Other parts of furbearers besides the pelts were sold by 21 percent of New York trappers, but only 14 percent of Vermont trappers. New York trappers (24 percent) also produced more handicrafts from furbearers than their Vermont counterparts (13 percent). Slightly less than 30 percent of the trappers in each state utilized furbearer meat for personal consumption.

Table 2. Trap ownership by New York and Vermont trappers.

Type of Trap	Number of traps owned			
	New York trappers		Vermont trappers	
	Mean	Median	Mean	Median
Foothold	88.5	56.0	77.6	54.0
Body gripping	63.8	36.0	48.0	35.0
Padded foothold	1.2	0.0	0.4	0.0
Other	1.9	0.0	1.9	0.0
All	155.4	92.0	127.9	89.0

A minority of respondents in each state indicated that monetary income from trapping exceeded expenditures. Approximately 29 percent of Vermont trappers reported positive net returns, compared to 20 percent in New York. Another 27 percent of Vermont trappers and 21 percent of New York trappers broke

even. The remainder of the trappers (48 percent in New York and 44 percent in Vermont) had expenses that exceeded income. Eleven percent of the New York respondents indicated that they couldn't recall their expenses. It should be reemphasized that these surveys were conducted in different years, so the differences might be attributed, in part, to changing pelt prices.

In both states, trapping occurred principally on private lands, but about 40 percent of the respondents in each case also used public lands.

For the most part, the trappers of the two states had similar socio-economic and demographic characteristics (Table 3). Based on the sample alone, there is some evidence that the age structure of New York trappers is somewhat younger than that for Vermont; both mean and median ages for Vermont trappers exceed those of New York. Further, one-third of New York respondents were under 30 years of age, compared to 12 percent of Vermont trappers. A higher proportion of Vermont trappers also were over 60 years of age. While these sample characteristics are of interest, they are not statistically significant at the .05 level.

Table 3. Characteristics of New York and Vermont trappers.

Characteristic	New York	Vermont
Age		
Mean	39.8	48.0
Standard deviation	17.2	14.3
Median	37.0	50.0
Percent over 60 years	14.6	20.0
Percent between 30 and 60 years	52.8	68.0
Percent under 30 years	32.6	12.0
Education: highest level of attainment		
Below high school	26.3	19.9
Percent completing high school	42.4	46.4
Percent attending college	21.9	20.5
Percent completing college	5.5	9.9
Attended graduate school	3.9	3.3
Household income		
Median	$20,000-$29,999	$20,000-$30,000
Percent under $10,000	14.4	13.3
Percent over $50,000	13.6	9.1

Measures of education attainment and income were quite similar for the trappers of both states. Over three-quarters of the respondents from each state indicated that they had completed at least high school, and it should be noted that many younger trappers were still attending school, so their final level of educational attainment had not yet been reached. Median household income levels were in the $20,000 to $30,000 range in both cases. For both states, household incomes less than $10,000 were reported by approximately one-seventh of the respondents. On the other hand, over 10 percent of the respondents from both states were in excess of $50,000.

In terms of trapping background and experience, trappers from both states were similar (Table 4). Vermont respondents indicated somewhat greater experience, but this might well be attributed to differences in wording of the questions. Experience in New York was related to purchase of a trapping license, whereas Vermont trappers were asked only to indicate the number of years they had trapped. Since younger trappers are not required to purchase licenses, this, alone, might explain the slight discrepancy between the two states. Age when an individual began trapping was also based on purchase of a license in New York, but not in Vermont. For both states, both the mean and median ages that individuals began trapping was in the teens.

Table 4. Background and experience of New York and Vermont trappers.

Characteristic	New York	Vermont
Years of trapping experience		
Mean	15.9[a]	21.4[b]
Median	12.0[a]	16.5[b]
Age began trapping		
Mean	19.0[c]	16.9[d]
Median	16.0[c]	13.0[d]

[a] Years in which a New York trapping license was procured.

[b] Total number of years trapped

[c] Age at purchase of first New York trapping license.

[d] Age first began trapping regardless of trapping license purchase.

Even with the differences relating to data collection and analysis with respect to motivational statements, some general comparisons for the trappers of the two states can be made. Trappers in both states tended to have a wide range of motivations, but there also was considerable commonality with respect to motivations among individuals and between states. Motivations such as being outside and interacting with wildlife, were acknowledged widely by the respondents from both states. Other reasons for trapping cited by a high proportion of respondents related to escape from daily routine, achievement, exercise and physical health, stimulation, and solitude.

For the New York study, the factor analysis grouped trapping motivations into six dimensions or factors (Table 5). Based on the loadings retained, the factors are identified as: (1) escape and relaxation; (2) appreciation of wildlife, nature, and the outdoors; (3) personal accomplishment or achievement; (4) utilitarian incentives (obtaining meat, nuisance or damage control); (5) personal health and fitness; and (6) affiliation with other people, especially family members. Sample group means indicated that the strongest dimensions of motivation related to nature appreciation and personal achievement, while motivations related to socialization and affiliation were less important.

The cluster analysis of the Vermont data reduced the number of viable motivations from 42 to 27 and identified nine clusters (Table 6). The mean weights indicate the clusters most favored by the respondents, with the maximum possible score being 5.00. As with factor analysis, each cluster is described on the basis of the elements that it contains. For Vermont trappers, the highest weighted clusters were challenge, interaction with nature, and personal achievement. Other clusters with high ratings were technical achievement, escape, health and fitness, and socialization. Disseminating trapping skills had a rating somewhat above the median but below the clusters previously described. The cluster relating to the importance of income from trapping was at mid-scale, indicating that it tended toward a neutral overall rating.

Table 5. Factor descriptions and loadings for 23-item motivational scale for New York trappers, 1989-90 season.

Factor Description	Motivational Scale Element	Factor Loading
Factor 1 Nature appreciation	To experience/enjoy nature	.8197
	To observe wildlife	.7358
	To learn about wildlife	.6829
	To spend time outdoors	.5406
	To feel like a part of nature	.5080
Factor 2 Escape	To get away from everyday problems	.7030
	To get some time to think	.6883
	To relax and relieve stress	.6198
	To get a chance to spend time alone	.5853
	To get a change from my routine	.3895
Factor 3 Personal achievement	To get a sense of accomplishment	.6030
	To test my skills and abilities	.5892
	To do something challenging	.5335
	To get a sense of self-sufficiency	.5072
	To do something exciting	.4275
Factor 4 Affiliation/socialization	To maintain family tradition	.6239
	To be with family members	.5496
	To teach or share my skills	.4916
Factor 5 Economics	To control nuisance animals	.8120
	To control predators	.7647
	To obtain meat for myself, family	.5435
Factor 6 Health, fitness	To get exercise	.7982
	To stay in shape	.5264

Percent variance explained by Factors: F1 (28.8) + F2 (6.1) + F3 (5.9) + F4 (4.3) + F5 (3.4) + F6 (3.0) = 51.4
Source: Siemer, W.F.; Batcheller, G.R.; Brown, T.L.; Glass, R.J. 1991. Characteristics, motivations, and involvement of trappers in New York. Human Dimensions Research Unit Series Publication 91-1. Dept. of Natural Resources, College of Agriculture and Life Science, Cornell University, Ithaca, N.Y. 37 p.

Table 6. Cluster analysis and mean weights by cluster for Vermont trappers' motives, 1988 season.

Cluster Description	Motivational Scale Element	Mean Weight
Challenge	I enjoy being outdoors	4.71
	I find trapping exciting	
Interaction with nature	Trapping is a good change in my daily routine	4.48
	I like being outside in trapping season	
	Trapping helps me get away from some of life's routine demands	
	Trapping is a real change of pace	
	Trapping makes me feel at one with nature	
	I enjoy learning about all kinds of wildlife	
	I enjoy observing wildlife while on the trapline	
	My relationship with wild animals is personally important to me	
Personal achievement	The anticipation is a big part of trapping	4.40
	Trapping gives me a sense of personal achievement	
Technical achievement	I enjoy perfecting my trapping techniques	4.33
	I enjoy the art of camouflaging sets	
Escape	I enjoy the solitude on my trapline	4.23
	Trapping helps me relax and relieve tension	
	Trapping gives me time to think	
Health/fitness	Trapping helps me keep in shape	4.11
	Trapping keeps me physically healthy	
	I like the challenge of trapping	
Socialization	I enjoy being part of the trapping community	4.11
	I enjoy the company of other trappers away from the trapline	
Disseminate skills	I like to teach others about trapping	3.77
	I like to help others develop trapping skills	
	I enjoy sharing my trapping skills with others	
Income	Trapping helps pay the bills	2.94
	Trapping provides extra spending money	

Source: Glass, Ronald J.; More, Thomas A.; and DiStefano, Jim. (in press). Vermont trappers: characteristics, motivation, and views. U.S. Department of Agriculture, Northeastern Forest Experiment Station.

Summary and Discussion

The numbers of licensed trappers in both New York and Vermont have steadily declined since the early 1980's. A general decline in furbearer pelt prices certainly is a major factor in this decline, but other factors are also relevant. Trapping opportunities are becoming more scarce, and anti-trapping sentiment appears to be increasing. Since profit-oriented trappers are more likely to be discouraged by low pelt prices than recreational trappers, the results of these two surveys may be more reflective of those trapping for non-monetary motivations. Profit-seeking trappers are more likely to sit out years having low pelt prices and to seek alternative sources of income in the interim. Nonetheless, almost one-third of the respondents indicated that securing additional income was an important motivation for trapping. In the current market situation, recreational motivations predominate, but a significant subpopulation of income-motivated trappers remains active.

Trappers in each of these two states were quite similar in the species trapped and the average number of days in which traps were set, even though New York had longer trapping seasons for most upland species. While sample responses differed in some cases, such as a higher proportion of trappers in New York seeking beaver and raccoon, these differences were not different significantly at the 5 percent level. Only minor differences were reported in harvest levels for most species, muskrats being the lone exception. Again, the difference in muskrat harvest was not statistically significant, and did involve different years, so species availability and pelt prices may have been an influence.

Trap ownership by type was also similar for both states. In both cases, few respondents owned padded foothold traps, so regulations outlawing conventional foothold traps would require most trappers to invest in new equipment or rely on greater use of body gripping traps. The latter are viewed as more humane, but kill non-target species as well as target species.

In terms of demographic characteristics, there were, again, considerable similarities between the trappers of the two states. Educational attainment among trappers from New York and Vermont approximated one another. Household incomes were within the same range. An important consideration is that nearly 14 percent of the respondents from each state had household incomes of $10,000 or less. Participation in trapping may provide a source of income, as well as psychological and sociocultural payoffs for which low-income, rural households have limited alternatives.

With respect to the age structure of trappers, there were apparent differences between New York and Vermont respondents. While statistically valid differences were not found, both the mean and median age of Vermont trappers exceeded those for New York trappers. Twelve percent of the Vermont trappers were under 30 years of age compared to almost one-third of New York trappers.

In both states, the strongest trapping motivations were "nature appreciation" and "personal achievement." Vermont trappers also had a strong measure for "challenge," but the variables in this cluster were included in the personal achievement factor for New York trappers. In both states, income or economic factors were at the bottom of the scale.

While there are considerable differences in the general perception of Vermont and New York with respect to pressures on resource use related to population density and urbanization, the characteristics and motivations of active furbearer trappers were quite similar. Obviously, information on the large number of trappers who have become inactive would improve our understanding of trapper behaviors, motivations, and anticipated payoffs. Certainly, the potential for dropouts to reenter the trapping community as various factors change over time is an important consideration in furbearer management. Further, trapping must be considered within the broader context of the diverse public demands for common property resources including furbearers.

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NEW HAMPSHIRE RECREATIONAL OYSTER HARVESTERS: PROFILE, PERCEPTIONS, AND ATTITUDES

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A survey of holders of a 1989 New Hampshire oyster-harvesting license revealed that recreational oyster harvesting is pursued mostly by older men. The 1988 closing of some parts of Great Bay to oyster harvesting resulted in license holders' taking one fewer trip and taking about six minutes longer to harvest one bushel of oysters in 1989. The average annual harvest also decreased almost one bushel. Respondents generally believed that Great Bay oysters were safe to eat. The majority of respondents were not interested in oyster depuration but were willing to contribute toward a fund dedicated to oyster-bed management. Logit analysis revealed that the probability of willingness to contribute to an oyster-bed management fund decreases when the respondent's annual income is smaller than $20,000, and when the respondent's oyster-harvesting experience is fifteen years or fewer.

Introduction

Oyster harvesting in New Hampshire's Great Bay and its adjoining waters has a long tradition. A report entitled The Fisheries and Fishery Industries of the United States, published in 1887, says that Native Americans in pre-colonial times took oysters from the Bay [U.S. Commission of Fish and Fisheries]. The same publication reports that a commercial oyster industry that started in the area in 1874 declined in 1879 because of over-raking of the oyster beds.

Today only recreational oyster harvesting is allowed in the Bay. Many people in New Hampshire, particularly those living in the southeastern part of the State, pursue this pastime. All areas of the Bay were once open to oyster harvesting, but in 1988 the New Hampshire Fish and Game Department, the State agency that has jurisdiction over this activity, announced that because of pollution, oysters may not be harvested from certain areas.

The closing of those areas raises some important issues: first, how safe for consumption are the oysters taken from the remaining open beds? If the surrounding waters are polluted, wouldn't the open area become polluted eventually? Second, because the restrictions concentrate oyster harvesting in a smaller area than before, the threat of over-harvesting in the open beds exists. How real or immediate is this problem? If license holders feel that the Great Bay oysters are unsafe to eat, or if they find that it is getting more difficult to harvest, they may cease the pursuit of this recreational activity. Oyster harvesting is generally, a pleasant and harmless way of enjoying nature's bounty. Compared to other outdoor activities, oyster harvesting poses minimal threat to the environment. Oyster harvesters, in their purchase of boats, equipment, and supplies also contribute to the economic well-being of businesses and towns around the Bay. For these reasons the possible demise of recreational oyster harvesting is a source of concern.

There are strategies that could solve the oyster-safeness and diminishing harvests problems. In particular, depuration has been used to rid oysters of contaminants that make them unsafe for human consumption. The process involves placing just-harvested oysters in tanks through which clean water runs. The oysters have to be kept in the tank for about twenty-four hours which allows them to filter out the contaminants. The problem of over-harvesting in the open area can be addressed by managing the oyster beds to maintain or increase oyster population numbers. Management could include activities like raking of the beds and planting cultch (i.e., materials like shells, etc. to which oyster larvae may attach) [Maryland Department of Fisheries].

There is little available information about oysters and oyster harvesting in Great Bay. The N.H. Fish and Game Department keeps a record of people who purchase licenses, and estimates the total oyster population periodically. Beyond these, information about the harvesters, the volume of harvest, and other oyster-related factors and activities do not exist.

The Survey

In April 1990, a survey of 1989 New Hampshire oyster-license holders was conducted. The study objectives included the following: (1) determine the socio-economic characteristics of the people who harvest oysters; (2) determine how the area restrictions affected their oyster-harvesting activities; (3) determine their perceptions about the safeness of eating Great Bay oysters; and (4) assess their attitudes toward (a) oyster depuration which could ensure safeness of oysters for consumption, and (b) management of oyster beds which could maintain or increase the oyster population.

The names of license-holders were obtained from the N.H. Fish and Game Department. The mailing list contained the names of 771 individuals who paid for a license in 1989 plus those of thirty people who had permanent licenses[1]. Of the 801 questionnaires sent out in the first mailing, 240 were returned. A second mailing to the non-respondents resulted in an additional 126 responses for a total of 366, or a response rate of forty-six percent.

1/ Those who obtain a New Hampshire oyster-harvesting license when they are 68 years old obtain a permanent license that allows them to harvest oysters in succeeding years without paying a fee.

Summary of Findings

Characteristics of Oyster Harvesters

The survey results suggest that recreational oyster harvesting is pursued mostly by older men. Ninety-five percent of the respondents were male, and sixty-two percent were fifty-five years old or older. Only ten percent of the respondents were below thirty-five years in age, and only two respondents were younger than twenty-five years.

On the surface these figures may imply that this activity may be in danger of dying out. But an analysis of the ages of people who went oyster harvesting for the first time in the period 1984-89 reveal that a high proportion took up this pastime when they were older than fifty-five years. It appears that people tend to pursue other forms of recreation when they are younger and some go into oyster harvesting in their later years.

Thirty-eight percent of the respondents had been harvesting oysters for fewer than five years, 19% for six to ten years, and 25% for more than 20 years. Those in the 55 to 67 years age group predominated in each length-of-harvesting-experience category. Seventy-five percent had an annual income of at least $20,000, and 60% had a higher than high school education.

Effects of the Closing of Some Oyster Beds

Respondents were asked for information on the following factors before and after closing of some parts of the Bay: number of oyster-harvesting trips per year, time it took to harvest one bushel of oysters, amount of annual harvest, size of oyster-harvesting party, mileage from home to place of harvest, boat fuel used per trip, and time it took to reach the oyster bed from the respondent's boat mooring. The closing of some parts of the Bay appear to have had an effect on most of the oyster-related activities of the respondents. The changes in the average number of trips per year, the average time it takes to harvest a bushel of oysters, and the average amount harvested per year were statistically significant. Respondents took, on average, about one fewer trip in 1989 than before 1988 and they also took about six minutes longer to gather one bushel of oysters. The average quantity harvested was lower by almost one bushel in 1989 than in the years before the closing of some oyster beds.

The changes appear to be minor, but it must be emphasized that at the time of the study only about two years have elapsed since the imposition of area restrictions. The long-term effects could potentially be more significant.

Perceptions as to Safeness of Eating Oysters

Respondents generally believed that Great Bay oysters were safe to eat; however, more people felt they were safe to be eaten cooked (91%), rather than raw (55%). This safe perception was confirmed by their answers to the question as to which they considered safer health-wise, eating oysters purchased from stores or consuming oysters they harvested themselves. Only 9% of the respondents felt that purchasing is definitely safer than harvesting. Fifty-two percent felt that Great Bay oysters are safer; and 39 percent felt that both are equally safe.

Ninety-nine people who believed that harvested oysters are as safe as purchased oysters gave their reasons for that perception: 27% said that Great Bay oysters are tested by the N.H. Fish and Game Department[2], and 18% said that they believe Great Bay is a safe oyster source while they do not know the pollution status of other oyster sources.

One hundred seventy respondents who thought that harvested oysters are safer than purchased oysters cited their reasons: Forty-six percent said that because they harvested their own oysters they were sure about their freshness. Forty-four percent said that they know the pollution status of Great Bay and they are confident that the oysters from the open area are safe to eat. Furthermore, they do not know how polluted the sources are of purchased oysters. Four percent said that the State Fish and Game Department monitors oyster beds and inspects the oysters.

Attitude Toward Depuration

The survey contained a question on whether the license holder would be interested in having oysters that they harvest depurated so that they will meet acceptable health standards. Forty-one percent said they were interested; 59% said they were not interested.

Respondents were asked as to the amount of money they are willing to pay for depuration and 66% answered that they are not willing to pay any amount. They cited the following reasons: 29% said they are not interested in depuration because they like oysters fresh out of the water; 18% said that the real problem is cleaning up Great Bay; and 12% believed that depuration is not necessary because oysters from the open area are safe to eat.

Attitude Toward Contributing to a Fund Dedicated to Management

The problem of potential over harvesting of oysters in the open areas can be addressed by managing the beds to assure that the oyster population remains high or at least enough to sustain the demand. Such activities would not be costless and revenue from licenses may not be enough to support a management program. Survey respondents were asked about their willingness to contribute to a fund earmarked for oyster-bed management.

Fifty-two percent of the respondents said they were willing to contribute; the average amount that they were willing to pay was $21.00. Those unwilling to contribute cited the following reasons: license fees should be used for oyster-bed management (31%); the costs of oystering are already high (16%); a management program is not necessary because there are plenty of oysters and oysters grow by themselves (12%); and the real problem is cleaning up Great Bay (10%).

The differences in the willingness to pay response in the sample was analyzed with the use of a logit model. It was hypothesized that a respondent's income level, length of oyster-harvesting experience, round-trip distance from the respondent's home to the oyster bed, and the change in average harvest per trip would affect the probability of that respondent's willingness to pay a positive dollar amount for oyster depuration. The model specification is as follows:

$$\ln \frac{(\pi_{ijkl})}{(1-\pi_{ijkl})} = \mu + Y_i + E_j + D_k + C_l$$

where π_{ijkl} is the probability of a respondent's willingness to pay a positive amount for oyster management when the

2/Contrary to some respondents' perception, the N.H. Fish and Game Department does not test oysters for the presence of contaminants or monitor water pollution levels in the open area.

respondent's annual income (Y) is i (i=1, $20,000 or less; 2=greater than $20,000), length of oyster-harvesting experience (E) is j (j=1, less than or equal to 15 years; j=2, more than 15 years), round-trip distance (D) from home to the oyster bed is k (k=1, less than or equal to 50 miles; k=2, more than 50 miles, and change (C) in average oyster harvest per trip from before 1988 to 1989 is l (l=1, greater than or equal to zero; l=2, less than zero); μ represents the mean of the logits (the dependent variable) for all combinations of the independent variables; and _ represents the effect on the logit of each category of the independent variables. The model was estimated using the SAS CATMOD procedure because the independent variables were measured on a categorical scale.

The results (Table 1) indicate that the probability of a positive willingness to pay response is associated with the respondent's annual income level and length of oyster harvesting experience. The probability of a positive response decreases when the respondent's income is smaller than $20,000 a year. Similarly, the probability decreases when the respondent has been harvesting oysters for fifteen years or fewer.

Table 1. Maximum Likelihood Estimates of Effects of the Independent Variables on the Probability that the Amount a Respondent is Willing to Pay for Oyster-Bed Management is Greater than Zero

Parameter	Coefficient	Std. Error	Chi-Square
Intercept	-0.26	0.17	2.46
Income	-0.38*	0.14	7.76
Experience	0.46*	0.13	12.81
Distance	0.05	0.13	0.13
Change	0.10	0.13	0.56
Likelihood Ratio Statistic=5.73**			

* Statistically significant at the a=0.01 level.
** Unable to reject H0: There is general association between the independent and dependent variables, at the ∂=0.10 significance level.

Implications

It appears that many respondents were not familiar with oyster biology, particularly in the area of how oysters could become unsafe for human consumption. For example, many license-holders said that they believed that Great Bay oysters were safe to eat because they were fresh. Oysters may be fresh but if they came from polluted waters they may still be unsafe.

It would be helpful to provide those who purchase a license printed information on oyster biology. Information on ways license-holders could help to ensure a viable oyster population could also be included. For example, returning shells into the water would increase the number of oysters by enhancing cultch formation.

Many respondents felt that, because harvesting was allowed in the open area, the oysters were safe to eat. This perception raises some questions: is it a fact that oysters are safe to eat? Are they safe to eat all year, or are there times when one should refrain from taking oysters from the Bay? This issue is highlighted because in some states the regulatory agencies close oyster beds after periods of heavy rain. Runoff increases the levels of coliform bacteria in the waters and in the oysters. Studies that would periodically analyze the safeness of oysters for human consumption, especially after heavy rainfall, would be helpful to the license holders in making their harvesting decisions.

Based on the survey responses, many license-holders did not understand the oyster-depuration process. An education effort that would explain the procedure as well as its benefits and costs could rectify this situation. The license-holders could then make a better-informed decision regarding the usefulness to them of this process.

The survey results show a minor decline in average harvest, as well as slightly more time involved in harvesting a bushel of oysters, after the area closing. These were the effects after only two years; the long-term effects could be greater. Although this does not necessarily indicate that the open area is being over-harvested, it does suggest the need for estimating the total harvest rate in the Bay. This information, together with knowledge about the size of the oyster population and how they thrive under current conditions, would help determine if the existing harvest pressure poses a threat to the oyster population. If over-harvesting is indeed an actual or potential problem, oyster-bed management could be practiced to assure ample quantities of this shellfish in the long run. The survey results indicate license-holder support, and even willingness to pay, for oyster-bed management.

The results of the logit analysis indicate that some care should be exercised in instituting a program that would ask oyster harvesters to contribute to a fund for management. Increasing license fees to raise the money for this purpose may drive some people, those in the lower income categories in particular, out of oyster-harvesting. Although this approach can reduce the demand for oysters and the need for management, it will likely be at the expense of the poorer people. If the objective is to raise funds (not reduce the demand for oyster-harvesting) then other approaches should be considered.

The logit analysis results also show that those who have been harvesting for more than fifteen years are more likely to contribute than those with shorter harvesting experience. Those in the first group are likely to be more familiar with the long-run history of oyster harvesting in Great Bay, and thus perceive a need for management. Perhaps those who have shorter experience could be encouraged to contribute by providing them with information on the history, current situation, and future prospects of oyster harvesting in the Bay.

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MEASURING THE ECONOMIC VALUE OF WILDLIFE: A CAUTION[1]

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Wildlife values appear to be very sensitive to whether species are evaluated separately or together, and value estimates often seem inconsistent with neoclassical economic theory. Wildlife value estimates must therefore be used with caution. Additional research about the nature of individual value structures for wildlife is needed.

Introduction

Attempts to derive economic values for wildlife are undertaken for a variety of reasons. The earliest studies focused on the value of wildlife to "users," such as hunters. Shortly thereafter the ecological sciences brought attention to the importance of species that have no traditional "use" value. Economists responded with the suggestion that wildlife might produce several types of "nonuse" or existence values. Krutilla (1967), for example, argued that people often value natural resources that they have no desire to ever actually use or see.

Empirical evidence has tended to confirm Krutilla's hypothesis (see Boyle and Bishop, 1987); in fact, nonuse values may often be the most important component of total economic value. Information about nonuse value is becoming increasingly important because litigation for environmental damages frequently requires it, and because the opportunity costs of wildlife preservation continue to grow. But as the scope of valuation expands, new problems emerge, and wildlife value estimates continue to be viewed with skepticism (see Sagoff, 1988).

This paper examines the validity and meaning of wildlife value estimates derived from the contingent valuation method (CV). [2] CV is the only method which can estimate both "use" and "nonuse" values. However, CV results often appear to be very sensitive to whether a natural resource is valued on its own or as part of a more inclusive category. Another concern is that since decisions about wildlife often involve ethical or moral considerations, many people may be unwilling or unable to assign meaningful economic values to wildlife.

These problems suggest that wildlife value estimates must be used with caution. We conclude that better information is required about the nature of individual value structures for wildlife and about "what goes on in peoples' minds" when they respond to CV questions.

Concepts of Economic Value

Some wildlife species have market value, and both implicit and explicit economic values are derived from the recreational opportunities associated with wildlife. However, these measures do not necessarily capture all aspects of public preferences and valuation; a more complete valuation includes "nonuse" or existence values.

Weisbrod (1964) and Krutilla (1967) introduced the notion that economic value may accrue to individuals not actually using wildlife. Weisbrod suggested that in an uncertain world "nonusers" might pay an option price to retain the possibility of future use while Krutilla argued that people often value natural resources that they have no desire to every actually use. Several motives for Krutilla's existence value have been suggested: some may value the knowledge that the resource is available for the enjoyment of others, some may wish to leave an endowment or bequest to future generations, and some believe that natural resources have intrinsic value independent of any benefit or harm to humans.

There is, however, substantial debate about the structure of individual preferences which give rise to these values. Loomis (1988) suggests a general form of an interdependent utility function:

$$U_a = F_a(f_{1a}(X_a, R_a) + f_{2a}(Q_a, (R_a, Q_b)))$$

Where U_a is a weakly separable function relating the utility of individual a to a's own consumption of private goods, X_a; a's use of the natural resource, R_a; knowledge that other people (represented by b) are able to use the resource, R_b; personal satisfaction from knowing that the resource exists, Q_a; and the knowledge that others derive satisfaction from knowing that the resource exists, Q_b.[3]

The total resource value in this formulation consists of several self-interest and altruistic components which can be held simultaneously by each individual. These components can be aggregated into three main categories; (1) personal use values (including option value); (2) use by others (including bequest separability means that the marginal rates of substitution between goods purchased in the market, X, are independent of Q and consequently contingent valuation is the only technique capable of measuring these values.

Many important questions about the valuation of wildlife remain. Two problems are of primary concern here. First, strong embedding effects have frequently been observed in which the value of a natural resource is much larger when evaluated on its own than when valued as part of a more inclusive category (Kahneman and Knetsch, 1990). This result is inconsistent with neoclassical economic theory unless people are willing to pay a large portion of their income (or budget) or unless the natural resources contained in R_a, R_b are

1/ This research was sponsored, in part, by the Forest Service, U.S. Department of Agriculture.

2/ Contingent valuation uses survey questions to elicit the mazimum amount individuals would be both willing and able to pay for wildlife.

3/ The bundle of private goods, X_a, can include wildlife related commodities, such as books and televised nature programs. Each individual is assumed to have a unique set of tastes and preferences which change over time with experience, development of skills and learning. The current preference structure is therefore directly related to previous use and experience (Randall and Stoll, 1983).

close substitutes. Neither condition is likely and as pointed out by Kahneman and Knetsch, "...if the value (of a resource) is much larger when it is valued on its own than when it is evaluated as part of a more inclusive package of public goods, which measure is the correct one?"

Other problems arise from the public good nature of nonuse values associated with wildlife.[4] Economic theory often fails to explain individual behavior abut the provision of public goods. Examples abound: Why do we contribute to public broadcasting when we know that others will contribute, and if we do contribute, how do we decide on how much?

Several competing theories attempt to explain cooperative or "social" behavior related to the provision of public goods. Margolis (1982) purposes a dual utilities model to explain how individuals allocate resources (income, time, etc.) to satisfy preferences for both public and private goods. Preferences for public goods are assumed to be irreducibly distinct from those associated with private goods; there is no "grand maximand." Rather, Margolis suggests that individuals attempt to seek a balance or "fair share" allocation between private goods and social spending. CV results might therefore represent individual's judgements about paying their "fair share" as opposed to the economic value of the goods in question.

Another perspective is presented by Holl nder (1990) who argues that individuals gain social approval by contributing toward the provision of public goods. As a result, willingness to pay represents the combined value of "social approval" and of the good itself. Frank (1987), Sen (1979), Elster (1989) and Edwards (1986) suggest that individuals attempt to maximize programs. Each individual is assumed to have a unique set of personal satisfaction subject to constraints imposed by social norms and commitment to moral duty. Edwards (1986), for example, argues the need to identify CV respondents with ethical preference structures. According to Edwards, ethicists may be motivated by commitment to the existence of wildlife "...rooted in what one thinks as being right or wrong from a moral or ethical point of view regardless of how one's own welfare might be affected" (Edwards, 1986, p. 147). Some CV respondents might therefore refuse to make tradeoffs between money and wildlife. A more important concern, however, is that some ethicists might be willing to pay, but the amount might not represent economic value in the usual sense. Kahneman and Knetsch, for example, argue that CV responses "...reflect the willingness to pay for the moral satisfaction of contributing to public goods, not the economic value of these goods." Opaluch and Segerson (1989) and Harper (1989) take a slightly different view and argue that choices involving moral principles produce conflict and ambivalence which results in avoidance (nonresponse to CV questions), and use of simple lexicographic decision rules about monetary commitment.

A fundamental concern about wildlife valuation which emerges from this brief review is that economic values derived from CV may not be comparable (if significant nonuse values are involved) with those associated with other goods and services. CV respondents may be "paying" for social approval, for moral satisfaction, or their "fair share." Therefore, CV results may frequently be misinterpreted. Yet there is little empirical evidence about whether or not CV respondents assign meaningful economic values to wildlife. This issues is examined below.

Empirical Evidence

A CV survey about the value of bald eagles and wild turkeys in New England was mailed to 1,500 randomly selected households in the spring of 1989.[5] The survey included introductory information, general questions about outdoor activities and the importance of wildlife, valuation questions, and several follow-up questions to examine individual decision making processes and the consistency of results obtained from the valuation question. The total design method suggested by Dillman (1978) was followed throughout.

Most respondents reported very limited contact with bald eagles and wild turkeys. Only 25 percent had ever seen these animals in New England, yet 53% of respondents considered the existence of bald eagles in New England to be very important. Existence was somewhat important to 36%, and not important to only 11%. Wild turkeys were considered very important by 41% and somewhat important by 40%.

When asked why bald eagles are important, only 12% of the respondents indicated a personal use value, while 80 percent indicated some type of nonuse or existence value; either giving others a chance to view eagles (16%), to insure that eagles are available for future generations (23%), or an intrinsic value, "because eagles have a right to exist" (41%).[6] Consequently, nonuse or existence values are likely to be very important components of the total economic value of these species.

For economic valuation, the sample was partitioned into three groups, each of which received an identical questionnaire except for the valuation question. The first group received a valuation question about bald eagles. The second group was asked about bald eagles and wild turkeys combined, and the third group was asked about wild turkeys. The economic valuation question confronted each individual with a specified amount of money, N (randomly selected within fixed intervals over a range of $5 to $150), which she/he could contribute to ensure wildlife existence. Respondents were then given an opportunity to bid an amount less (or greater) than the stated value, N. For example, the bald eagle valuation question was specified as follows:

> Wildlife management efforts sponsored in part by state, federal and local governments have helped to return some wildlife species from the brink of extinction. The bald eagle and the wild turkey, for example, have both been brought back to New England. Suppose that budget cuts eliminate these programs and that a private trust fund for the management of the bald eagle is set up to preserve and protect the bald eagle population in New England. Please assume that the bald eagle will not continue to exist in New England unless this fund is created. Would you contribute N $ per year over the next five years to this fund?

4/ Existence is a pure public gook; one individual's enjoyment of existence does not reduce that of another. Consequently, $Q_a = Q_b$.

5/ Preliminary results from this data were discussed at the 1990 NERR meeting (see More, Glass and Stevens, 1990.) 41% and somewhat important by 40%.

6/ A comparable question was not asked about wild turkeys.

This formulation may create incentives for "free riding." An individual could, for example, refuse to pay, hoping that everyone else might contribute. Incentives for free riding in contingent valuation are often minimized by using payment vehicles, such as taxes, which exact payment from everyone. Taxation was not used in this study for several reasons. Given the prevailing political climate, tax vehicles might have created strong incentives for protest and nonresponse. Voluntary payments, on the other hand, closely correspond to commonly experienced methods of contributing to wildlife preservation. Moreover, little evidence of free riding behavior has been found in previous studies, and a donation vehicle is quite realistic in light of recent budgetary problems facing many New England communities.

Results obtained from the donation vehicle must, however, be carefully interpreted. Some respondents may view this valuation question more as a way to express a desire for wildlife preservation than as a measure of how much they would actually pay. Other responses may reflect the satisfaction of contributing to a "good cause" rather than the value of the resource itself. Respondents were therefore asked a series of follow-up questions about why they were or were not willing to contribute.

The survey response rate was 37 percent which is slightly below average for academic surveys of the general population (Loomis, 1987). Average bids, maximum bids and standard deviations for each species are reported in Table 1. The average respondent was willing to pay $21.25 annually for bald eagles,

Table 1. Statistics for Amount Bid

Species	Mean Amount Bid ($) Per Year	Standard Deviation	Maximum ($)
Bald Eagles	$21.25	38.36	200
Wild Turkeys	$11.67	27.34	150
Bald Eagles & Wild Turkeys Combined	$9.00	16.23	75

$11.67 for wild turkeys, and $9.00 for bald eagles and wild turkeys combined. However, since many respondents refused to place a dollar value on wildlife, these values must be adusted. Over 80 percent of survey respondents said that bald eagles and wild turkeys are either very or somewhat important to them, but a majority of respondents, 62 percent, would not pay any money for restoration. When asked why, 40 percent of those refusing to pay protested the method of payment used in this CV; they stated that these species should be preserved but that the money should come from taxes or license fees. Twenty five percent protested for ethical reasons; they said that wildlife values should not be measured in dollar terms. Only 6 percent of those not willing to pay said that these species were worth nothing to them. [7] This implies that the average values in Table 1 are underestimated and when protest responses were removed from the data set the average respondent was willing to pay about $31 per year for bald eagles, $18.85 for wild turkeys and $13.12 for bald eagles and wild turkeys combined (see Table 2).

Table 2. Adjusted Statistics for Amount Bid

Species	Protest (%)	Mean Amount Bid ($ Per Year) (without protest)	Standard Deviation	t*	t**
Bald Eagles	31	$30.81	42.99	2.56	1.36
Wild Turkeys	38	$18.85	35.55	1.01	
Bald Eagles & Wild Turkeys Combined	31	$13.12	18.21		

* Compared to Bald Eagles & Wild Turkeys combined.
** Compared to Wild Turkeys.

The value estimates for bald eagles and wild turkeys seem "reasonable" when compared to previous research findings (for example, see Boyle and Bishop, 1987). The adjusted willingness-to-pay results also appear "reasonable" when compared to actual donations made by respondents during the previous year. Evidence obtained from follow-up questions showed that 32% of the respondents had actually made donations for wildlife preservation during the previous year; the average being approximately 70 dollars. However, the average value for bald eagles and wild turkeys combined was much less than when each was valued separately and added together. Moreover, the value of the "t" statistic in Table 2 suggests that this difference is statistically significant, which casts doubt on the validity and meaning of these value estimates.[8]

Further analysis revealed other potential problems with these value estimates. Many of those who were willing to pay expressed attitudes about wildlife which, when viewed from the perspective of neoclassical economic theory, appear "irrational." For example, forty-four percent of all respondents agreed with the statement that "preservation of wildlife should not be determined by how much money can be spent," and 67% of all respondents agreed with the statement that, "As much wildlife as possible should be preserved no matter what the cost." These respondents may have failed to give meaningful responses to the willingness-to-pay question, and when the bids by respondents who strongly agreed with these statements were also removed from the data, the average respondent would pay $25.35 for bald eagles, $18.90 for wild turkeys, and $10.66 for bald eagles and wild turkeys combined.

Regression analysis was used to obtain additional evidence about the decision-making behavior of survey respondents. The dependent variable was the actual dollar amount respondents would pay. Independent variables included dummy variables for region of residence (S), membership in environmental organizations (ORG), type of residential neighborhood (U), and whether or not the respondent hunts or has hunted (H).

7/ Protest bids are quite common in contingent valuation. For example, Desvousges, Smith and McGivney (1983) identified nearly half of the zero bids in their study of water quality as protest bids.

8/ No significant differences were found in the distribution of the initial bid "N," or of the socio-economic or demographic characteristics of respondents between groups which might explain this result.

Variables for amount of money actually donated for wildlife preservation during the previous year, the initial amount asked for, N, and for the respondent's age, education and income were also included. The data from the three subsamples were pooled and dummy variables were used to represent survey type (D1=1 if bald eagle, D3=1 if bald eagles and wild turkeys combined). [9] The results presented in Table 3 show a statistically significant relationship between payment and the variables representing hunting, education, previous donation amount, and the initial bid, N. Hunters and respondents with more education were willing to pay a greater amount and payment increased with the amount actually donated. [10] However, this model does not adequately describe how individuals responded to the CV question because it explained very little of the variation in willingness-to-pay (R^2 = .15 to .17).

Table 3. Regression Model Results

Variable	All Data		Data with Protest Deleted	
Constant	-1.03	(.11)	-1.48	(.11)
D1	9.28	(1.89)*	12.26	(1.75)*
D3	-.72	(.15)	-2.48	(.37)
S	6.80	(1.47)	9.40	(1.42)
U	2.87	(.61)	1.40	(.22)
H	11.50	(2.56)**	16.61	(2.60)**
ORG	-2.05	(.41)	-1.80	(.26)
Age	-.09	(.75)	-.21	(1.21)
Education	11.64	(2.58)**	16.00	(2.37)**
Income	-2.41	(1.42)	-1.59	(.66)
Donation ($)	.08	(3.72)**	.07	(2.79)**
N ($)	.08	(1.84)*	.11	(1.89)*
R^2	.15		.17	
N	191.00		127.00	

"t" statistic in parenthesis (absolute value)
* significant at .05 level (2 tail)
** significant at .10 level (2 tail)

Summary and Conclusions

The results suggest a substantial economic benefit associated with bald eagles and wild turkeys in New England, most of which is attributed to some form of nonuse value. Consequently, nonuse or existence values cannot be ignored in economic analysis. Yet, evidence from the follow-up questions raises several concerns about the meaning and validity of CV value estimates.

The value estimates were very sensitive to whether or not species were evaluated separately or together; the value of bald eagles and wild turkeys combined seems logically inconsistent with the results for bald eagles alone. The survey response rate was relatively low (37%) and many respondents protested the CV. They believed that wildlife should not be valued in dollar terms or that the money should come from somewhere else (taxes and license fees). Furthermore, a majority of those who would pay exhibited behavior which appears inconsistent with the neoclassical economic theory of tradeoffs between money and wildlife.

My principle concern is that we know very little about how people interpret CV questions and even less is known about their decision making strategy in CV. Consequently, we cannot be very certain about the meaning of the CV results. One explanation for the results reported here is that questions about wildlife existence created ambivalence among respondents resulting in nonresponse, protest, and lexicographic behavior. This implies that wildlife values were underestimated.

Another possibility is that individual decisions about monetary commitment might be based primarily on social, cultural, or moral (as opposed to economic) considerations. According to Sagoff (1988), many people believe that natural resources should be managed on the basis of normative, political, and cultural grounds, rather than from an economic efficiency perspective. Moreover, proponents of environmental ethics argue that wildlife have a right to exist independent of human attitudes toward their existence. Consequently, we might expect that CV respondents would often fail to make meaningful tradeoffs between money and wildlife.

Questions about the extent to which these results measure the economic value of wildlife remain unanswered. The monetary values reported here might measure the value of wildlife, they might reflect the amount of money which could be raised through private donations, or they might simply indicate the value of contributing to a "good cause."

These difficulties raise several obvious concerns about the meaning and validity of wildlife value estimates. Because very little is known about the process used by individuals in making choices about public goods involving altruism, ethical commitments, moral considerations, and ambivalence, we must investigate how individuals interpret CV questions. Wildlife value studies should include follow-up questions to examine the quality and nature of respondents' decision making processes; questions about motivation should be used to cross-check the valuation results; and, nonmonetary preference scales should be used in conjunction with economic valuation questions. As suggested by Smith (1985), "we must learn to communicate with the individuals we wish to interview. This will often mean asking them what they think we are asking for!"

9/ The model was estimated with two sets of data (protest responses included and excluded). The results remained relatively stable when protest responses were omitted (see Table 3).

10/ Since payment increased with N, some starting point bias may have occurred.

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FISHERIES AND WILDLIFE

FISHING SPECIALIZATION

TOWARD A COMPREHENSIVE UNDERSTANDING OF ANGLER INVOLVEMENT

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This paper synthesizes recent Cornell University studies on recreation involvement, with special emphasis on fishing. It examines angler involvement from a broader perspective that includes goals/motives for involvement, and changes in these goals that may occur over time, or even from one experience to the next.

Introduction

The development of a more complete understanding of angler involvement is both a topic of great interest to management agencies and a substantial academic challenge. At the state level, anglers provide substantial revenues for fisheries programs through their purchase of fishing licenses. Because of their interest in their sport, anglers frequently provide meaningful lobbies for water quality enhancement, the protection of fish habitats, and stocking policies that fully utilize potential fishery resources. Angler groups frequently take strong positions on a variety of issues, ranging from the mixture of species stocked in particular waters to allocation decisions between commercial and sport fishing interests. While issue-oriented surveys may adequately portray where a given group of anglers stands on a particular issue at a specific point in time, fisheries agencies need a broader and deeper information base for comprehensive planning efforts. Central to this information base is a better understanding of fishing involvement. By "involvement", we mean motivations for fishing, satisfactions sought from the activity, and the stability of fishing participation in both an individual and an aggregate sense.

Researchers in the Human Dimensions Research Unit at Cornell University have worked over a period of nearly two decades on analogous questions concerning hunting involvement. As this research progressed through the latter half of the 1980s, we became convinced that the approaches we used to examine hunting involvement had direct application to fishing involvement. Research funded by the New York Sea Grant Institute and the New York State Department of Environmental Conservation have allowed us to conduct recent inquiries into fishing involvement. This paper presents a synthesis of some of that research.

Methods

The framework for examining fishing involvement parallels that used for hunting involvement (Decker et al. 1987). In brief, this framework involves a goal-driven model that presumes that a particular form of recreation activity such as fishing, or more specifically, a Lake Ontario salmon boat-fishing trip, is considered by the angler or the angler's friends or family as a means of satisfying certain goals. A variety of intervening influences, both personal or internal and social or external, mediate along with situational factors such as weather and available time to affect whether and when the proposed activity or outing is actually pursued. This and other models have been formulated by researchers to explain whether or not individuals will initially try or adopt a new activity. However, we have proposed that this goal-driven model operates not just initially in the case of someone who chooses to try salmon fishing for the first time, or when an experienced participant decides to take a boat fishing trip rather than to play golf on a specific Sunday afternoon. It also operates temporally in reference to a particular activity, from the development of initial interest to trying the activity, pursuing it, adopting it as an activity to pursue regularly, continued pursuit of the activity, and eventual desertion from the activity. Discontinuation is possible at any stage, however.

The concept of personal investment theory (Maehr and Braskamp 1986) was also easily integrated into the framework for fishing involvement and made the framework more robust. Maehr and Braskamp portray a "personal investment-product-evaluation triangle" operating over time in which individuals (not necessarily in a leisure setting) make a personal investment of time, energy, and resources in some type of product or activity (e.g., a place of employment, further education, a particular type of vehicle) and periodically evaluate that investment in deciding whether or not to continue it. This portrayal is entirely consistent with our previous temporal model of pursing a recreation activity, described above. Personal investment can also be viewed as the decision to invest in and pursue a particular type of recreation activity such as fishing. Maehr and Braskamp note that similar external and internal factors as those noted in the Decker et al. (1987) model affect the motivation that results in particular personal investments. Maehr and Braskamp also note three general types of outcomes from personal investment as achievement, personal growth, and life satisfaction. While somewhat different as itemized from the overall satisfaction concept and its various components that are found in recreation research, we still find personal investment theory to be a concept that enriches our previous framework and have therefore integrated it into our work in fisheries research. Personal investment theory was used previously in a study of Indiana and Illinois Great Lakes anglers (Absher and Collins 1987).

This paper draws upon several recent fisheries studies. These include studies of Lake Ontario salmonid boat anglers (Siemer et al. 1989a, 1989b), a statewide mail survey of licensed New York anglers (Connelly et al. 1990a), and a study of Salmon River salmon anglers (Connelly et al. 1990b). The Lake Ontario salmonid boat angler survey was conducted in two phases consisting of in-depth personal interviews which were tape recorded for further analysis, and a mail survey to a random sample of 1,101 boat owners who registered a boat for primary use in one of five counties bordering western or central Lake Ontario (437 respondents had fished Lake Ontario by boat in the previous two years). The 1988 New York statewide angler survey involved a mail survey with responses from over 10,000 anglers about fishing activity, motivations for fishing, and valuation of fishing, among other topics.

This synthesis is divided into segments dealing with various aspects of fishing involvement. After presenting overviews of findings from our studies, we examine gaps in knowledge that remain and suggest areas of research that should prove fruitful.

Motivations for Fishing

Preliminary interviews of Lake Ontario boat anglers indicated that achievement, affiliation, and appreciation, motivations shown by previous research to be important to hunting (Decker and Connelly 1989), were each important to fishing. As a result

boat anglers were asked in the mail survey specifically about the importance of deriving these three types of satisfaction from fishing. The majority of respondents indicated that each was at least moderately important, although 39% indicated that achievement had little or no importance. However, factor analysis using principal components extraction showed five motivational groupings of these boat anglers for recreation activities generally (challenge, accomplishment, affiliation, escape/appreciation, and novelty), and four motivations for fishing generally (challenge, accomplishment, affiliation/appreciation/escape, and novelty). Somewhat different individual components were used for hunting than fishing. As a result, some of the domain included by "accomplishment" for boat anglers overlaps with the domain termed "achievement" by Decker and Connelly. However, the novelty factor uncovered for these recreationists both for recreation generally and for salmonid boat angling has received little previous attention in the literature for fishing, and did not appear to be important in exploratory interviews of hunters (Decker et al. 1984).

The presence of a novelty-related factor for fishing was also confirmed in a statewide study of New York anglers (Connelly et al. 1990a). Among a broader group of respondents that included nonresidents as well as residents of New York, five factors were identified by factor analysis: catch, appreciative/affiliative, eating fish, solitude/exploration, and new skills. While the individual scale items did not factor out in a manner that different components related to achievement or accomplishment grouped together, it seems clear that catching fish was very important to this diverse group of anglers. A majority (55%) indicated that catching at least one fish was essential to a satisfying fishing experience. Catching several fish and catching large fish were rated as important by a majority of respondents. The factor "eating" included not only catching fish to eat, but fishing in areas where fish are safe to eat. The latter item was rated essential to a satisfying experience by 66% of respondents, the highest rating received for any item in the scale. The factor "solitude/exploration" included fishing where there are few people and exploring new fishing areas. The factor "new skills" received high factor loadings for trying out new gear and for mastering fishing skills and thus appears to overlap at least partially with the novelty domain found in the Lake Ontario boat-angler survey.

One would expect motivations of anglers who engage in or prefer specified types of fishing to differ from those of other anglers. Siemer et al. (1989b) found that Lake Ontario boat anglers who participated in fishing tournaments had much higher mean factor scores for challenge and accomplishment than those who did not participate in tournaments. Similar results were found for those who had snagged for salmon in tributaries versus those who had not. A subset of highly invested anglers was also defined on the basis of years of fishing experience, days fished in 1988, and whether or not salmon fishing was their most important recreation activity. These highly invested anglers had mean scores for each factor that were significantly higher than those of anglers who were less invested.

Bryan (1977) identified for fishing and Jackson et al. (1979) identified for hunting stages of specialization or maturation that they felt these recreationists pass through over time. To the extent that these groups pass through stages, and regardless of whether some type of hierarchy such as increased specialization or appreciation of the total outdoor experience is involved, Cornell researchers have hypothesized that this represents behavior that is at least in part situationally determined or influenced and represents a more basic change in goals and motivations for fishing experiences. While we do not have longitudinal studies, we do have limited evidence for this from studies where we have asked recreationists to compare current motivations for participation with those in the past. In the Lake Ontario boat angler study, where anglers had a mean of 16 years experience fishing this lake, respondents reported increased interest or importance since they started fishing in maintaining the fishery (74%), enjoyment of nature (70%), catch-and-release fishing (69%), fishing method (65%), learning the habits of salmonids (64%), catching trophy fish (54%), and the surroundings while fishing (53%). Overall interest and importance had stayed at a similar level for specializing for certain species, using lighter tackle, teaching others to fish, and catching fish. For the vast majority, the importance of catching fish to eat and limiting out had either stayed the same or decreased.

This general concept was also tested by dividing respondents into 3 groups according to years of experience at salmonid fishing (2 - 5 years, 6 - 10 years, and 11 - 15 years) and examining the degree to which the groups indicated the above factors had increased in importance since they started fishing. No significant differences (via chi square analysis) were found for the categories enjoyment of nature, catching fish, catching fish to eat, and limiting out. A significant difference was found for surroundings while fishing, probably due to too few observations in several cells; responses to this category were similar for all three groups. For some factors, the primary change in importance was between those with 2 - 5 years experience and those with more experience. That is, the importance did not continue to increase for anglers with 11 - 15 years, versus 6 - 10 years experience. This was true for maintaining the fishery, catch-and-release fishing, fishing method, and teaching others to fish (the latter of which may be related to age of anglers and their children). Several categories showed continuing increases in importance for each of the three age groups: learning salmonid's habits, catching trophy fish, specializing for certain species, and using lighter tackle.

Recreation and leisure scientists probably all suffer at times from a myopia of viewing the total personality and make-up of recreationists in the setting in which they were interviewed or in the context in which they responded to a mail survey. To use our own case as an illustration, we send questionnaires to a sample of registered boat owners, many of whom fish Lake Ontario, and we ask them questions about their motivations for fishing and what constitutes a satisfying fishing experience. Usually we don't ask about one specific trip, so anglers are forced to generalize their responses to a typical Lake Ontario fishing trip. We get information about their fishing for salmonids, and we characterize them as Lake Ontario salmonid boat anglers. Indeed, these people do and have fished Lake Ontario by boat for salmonids, most for a number of years.

What we tend to forget in our eagerness to classify these anglers into meaningful motivational or other slots is that their fishing "personality" is probably much more diverse and complex than this data snapshot leads us to believe. In fact, the data themselves indicate this. Some of these salmonid boat anglers (15%) also snag for salmon in tributaries. Some (60%) enter salmonid fishing tournaments. Some (21%) go fly fishing in streams, probably outside of Lake Ontario tributaries. While we don't have further data from this study, we know from the statewide studies of anglers who fish in New York that most anglers over the course of the year fish several bodies of water, use several types of fishing gear to fish for a variety of fish species. Often these fishing sites vary considerably not only in

terms of species available, but also as to how remote they are from population centers and development, how crowded they are, how aesthetic their surroundings appear, whether one would fish from shore, from a boat of varying size, etc. In short, most would agree that some of these sites would provide very different experiences.

We would hypothesize that anglers who choose very different fishing experiences over the span of relatively short time periods have different motivational sets and hence different expectations of those experiences. This probably needs to be extended even further, however. Anglers probably have different motivational sets at different points in time specifically for boat angling on Lake Ontario. As an illustration, on one occasion, an angler may go out with his family and concentrate on improving the fishing skills of the children and trying to catch a lake trout. On another occasion the same angler may be fishing with skilled friends and be pursuing trophy-sized chinook salmon. On the first trip affilative motivations may prevail, while on the second trip challenge and accomplishment motives may prevail. Appreciation/escape and novelty aspects may be meaningful secondary motives for both experiences. This is consistent with the findings of Allen and Donnelly (1985) that strong relationships exist between social units of participation and reasons for participation. It is also consistent with information provided in focus groups by Salmon River anglers, who indicated that their goals and expectations changed within a given day as they moved back and forth from snagging to nonsnagging sections of the river to fish for salmon by different methods (Connelly et al. 1990b).

While further research is clearly needed, the above arguments would refute the idea that anglers could be classified as being in a single goal or motivational stage. It would also refute the notion that anglers unidimensionally move through stages of fishing in which they never "regress" to a previous stage. Although this view makes motivational analysis more complex, it does not detract from the usefulness of understanding and quantifying the motivational sets or expectations of anglers concerning particular fisheries. A better understanding of these allows fisheries managers to either manage resources consistently with those expectations (to the degree that sound resource management allows this), or to mount educational programs to try to place expectations in line with resource realities. A better understanding of these angler motivations is also helpful to the private sector in providing facilities, equipment, and services that would enhance these fishing experiences.

The finding that many anglers over time develop a greater concern for maintaining the fishery and for learning more about the habits of the species they fish for may be related not only to their experience but to their personal investment. That is, as anglers spend more time fishing a particular resource and purchasing equipment to facilitate fishing, they gradually become more invested not only in the fishing experience, but in the resource itself. Although not well researched, this is closely related to a general premise of fisheries managers over the decades, namely that actively involved anglers will be spokespersons for maintaining quality fishery resources.

Temporal Involvement in Fishing

Temporal involvement in fishing is of strong interest to both resource management agencies and the private sector, and is fertile ground for academic research. As suggested above, fisheries management agencies depend on anglers not only for a portion of program revenues, but also to be lobbyists for a clean environment in which fishery resources are protected and, where possible, enhanced through stocking or habitat improvement. The development of the Great Lakes salmonid fisheries has provided economic expansion opportunities for the boating and marine trades industries, and in many localities for lodging, restaurant, sporting goods, and other services. Some of these businesses have large capital investments, however, and owners as well as financial institutions want to know whether to expect continued long-term growth, stability after a period of growth, or a fad that declines substantially in a few years, as was the case of snowmobiling in New York a decade or so ago.

Limited work has been done on temporal involvement in fishing, but several researchers have put forth frameworks for studying involvement in or commitment to recreation activities. Brandenburgh et al. (1982) developed a conceptual model of recreation activity adoption in which initial preoccupations and interests are coupled with each of the conditions of opportunity, knowledge, a favorable social milieu, and receptiveness. These prerequisites in combination with one or more key events were often followed by adoption of a recreation activity. Others including ourselves have looked at such market segments as continuous participants, usually defined as those who participate every year for some period, versus sporadic participants who discontinue participation for at least a year but then participate again, and former participants or "drop-outs" who abandon an activity. High, medium, and low-potential nonparticipants have also been identified based on initial interest in activities.

In conjunction with knowing something about the population dynamics of fishing (i.e., rate of entry into and departure from the activity) and demographics and psychographics about the various market segments, it is important to gain some understanding of the dedication or faithfulness that anglers hold toward the sport because this should be correlated both with the likelihood that they will continue participating and that they will be active in support of fisheries issues. Several overlapping constructs have been suggested for measuring this. We have already mentioned personal investment theory. Although no single measure has been suggested for the concept of personal investment, it may include time, education, expenditure of funds, and quite likely a psychological or emotional investment in which one identifies with the activity. Thus, the idea of personal investment has similarities to commitment, a term used frequently in past research and further defined by Buchanan (1985) as the pledging or binding of an individual to behavioral acts which result in some degree of attachment to the behavior or its associated role and which produces side bets (i.e., investments not necessarily associated directly with participation but which will likely encourage continued participation) as a result of that behavior. Commitment denotes among other things an affective attachment to an activity. McIntyre (1989) uses the construct of enduring involvement to denote personal meaning of participation. Enduring involvement, according to McIntyre, has four facets: importance, enjoyment, self-expression, and centrality.

No single index of involvement was developed for Lake Ontario boat anglers. The average angler had boated on Lake Ontario for 16 years, fished for salmonids for about 8 years (stocking of salmonids was interrupted in the latter 1970s because of the contaminants mirex and PCBs), and fished 27 days in 1988, including 11 days for salmon. About 40% expected their participation to increase in the coming year, 46% expected it to remain the same, 7% expected it to decrease, and 3% expected to

stop completely. We defined highly invested salmonid anglers as those who fished for salmonids for at least the mean number of years of all respondents and who fished at least the mean number of days of all respondents in 1988, but who also said they spent more time on salmonid fishing than any other activity and said salmonid fishing was their most important recreation activity. Slightly over one-third of all respondents met this operational definition of being highly invested.

Many of the constructs for measuring commitment or involvement are now available, although they will likely be expanded or refined by other researchers. Complementary to the idea of some tie between ego and identity to fishing as a measure of involvement is that of a sociocultural identity with fishing. For some, fishing has been an important family activity for many years and thus has become a part of their culture. One would hypothesize that people who fit this description would be more likely to continue fishing, regardless of the number of days they fish currently, than others who enjoy fishing and may even be somewhat heavily invested in fishing, but who do not have this cultural attachment to fishing. Thus, anthropological research into cultural meanings and significance of fishing should also be fruitful to providing a fuller understanding of angler involvement.

Summary

Through recent research we have developed a broader conceptual model of investigating recreation involvement that we have applied to fishing. This model recognizes involvement in fishing as a means of meeting certain basic goals that may be related to the individual and/or to social groups of which the individual is a part. These goals may change over time and consequently cause individuals to seek different types of fishing experiences (or activities other than fishing). These goals may also be different at different times for the same type of fishing on the same body of water. The degree to which the goals set for a particular experience are met should largely determine overall satisfaction with the fishing experience. If one accepts these premises, one must reject the notion that anglers can be placed into single stages of fishing behavior at any point in time and that they move into more specialized stages over time from which they never "regress" into previous stages.

Several constructs are currently being used to evaluate angler involvement and the likelihood that given anglers will continue fishing participation. These include personal investment theory, commitment, and enduring involvement. We suggest that each of these constructs, which we believe overlap to a considerable extent, are useful to examining involvement. In addition, an anthropological construct reflecting the degree to which one has been acculturated to fishing should prove useful to predicting continued involvement in fishing.

Acknowledgment

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THE ANGLER SPECIALIZATION CONCEPT APPLIED: NEW YORK'S SALMON RIVER ANGLERS

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The concept of angler specialization was applied to a study of Salmon River anglers to test this concept when using a variety of angling techniques and two species groups within the same environmental setting. A revision of the concept is suggested to account for angler expectancy and cognitive processes.

Introduction

The concept of angler specialization proposed by Bryan (1976, 1977, and 1979) states that there were four basic types of anglers: (1) the occasional angler of novice ability and only casual interest in the sport; (2) the generalist angler who is interested in catching some fish in any environment by any legal method; (3) the tackle-species specialist who specializes in the skill of a particular angling method and/or angling for a particular species; and (4) the method-species-setting specialist who specializes in the method, species, and setting which make up a particular experience. These angler types are based on degree of specialization in fishing and specific motives in using the fishery resource. The four basic types of anglers reportedly changed their attitudes and motivations as specialization increased so that their emphasis shifted from consumption to conservation and natural settings. More specialized anglers were predicted by Bryan (1979) to: decrease their interest in harvest motives; increase their interest in non-harvest motives and specialized fishing equipment; and increase their dependence on the resource setting "to determine the difference between luck and skill".

Research on New York's Salmon River (Dawson and Brown, 1989; Connelly et al., 1990) suggests that the concept of recreational specialization may not hold true for some segments of anglers. For example, Connelly et al. (1990) reported that 45 percent of steelhead anglers (highly specialized) also participated in salmon snagging/lifting activities (low specialization and focused on harvest more than skill) in 1989. The goal of this paper is to attempt to apply the angler specialization concept to data available from a 1989 survey of Salmon River anglers (Connelly et al.,1990). While this data was collected for other purposes, it provides some information to test the angler specialization concept and helps illustrate the need for a revision of the concept. The concern over the general lack of empirical evidence to support the specialization concept is outlined in a paper by Dawson, Buerger, and Gratzer (1991) in this same proceedings.

New York's Salmon River Fishery

The 1989 Salmon River angler survey was designed to measure angler impacts on the fishery resources, angler attitudes toward existing and potential fishery regulations, and economic impacts on the local communities. The study consisted of three survey components: (1) a streamside creel census of 5,755 anglers to estimate their catch and effort; (2) a mail survey of 1,609 anglers (69% responded) to estimate trip characteristics, attitudes about salmon fishing, and reactions to potential changes in salmon fishing regulations; and (3) focus group interviews with 8 angler groups (115 anglers) to investigate in-depth reactions to potential fishing regulations and attitudes about salmon fishing (Connelly et al., 1990).

During August 15 to December 31, 1989, anglers were generally in pursuit of either Pacific Salmon or Steelhead that were returning to the Salmon River to spawn after leaving Lake Ontario. Pacific Salmon return earlier than Steelhead during the fall season. Pacific Salmon die after spawning and can be taken by a variety of methods at different times and locations. For example, as the season progresses, salmon can be taken in some locations by legally snagging the fish in the body with a weighted treble hook since the fish will soon die anyway. Steelhead return later in the fall and winter to spawn; however, they do not die after spawning and can return to spawn in subsequent years.

For this study (Connelly et al., 1990), anglers were divided into three groups based on their fishing methods. Anglers who claimed to use only snagging methods on the Salmon River in 1989 comprised 17% of all anglers and are referred to as snagging-only anglers. Anglers who reportedly only used artificial or bait tackle comprised 40% of all anglers in 1989 and were referred to as non-snagging anglers. The remaining 43 percent of the anglers reportedly used both snagging and non-snagging methods at some point during the season and were referred to as mixed-method anglers.

The fishing method definitions used for this study were:
Snagging (or snatching) -- fishing with a weighted treble hook with the purpose of catching a salmon in the body; this method is legal for Pacific Salmon during certain days of the season in specific sections of the river using specific tackle.
Lifting (or lining) -- fishing with a single pointed hook and with the weight at least 24" from the hook, with the intent of foulhook a fish or catching it in the mouth; while the tackle is legal, the technique is not legal for either salmon or steelhead since the fish is generally foulhooked.
Foulhooking -- snagging or lifting; catching a fish not hooked in the mouth.

Respondents from the mail survey reported using a variety of angling methods for both salmon and steelhead. For example, 45 percent of steelhead anglers reported participating in snagging/lifting activities for salmon and/or steelhead. Information gathered in the focus group interviews revealed that some anglers who fished for both salmon and steelhead expressed different values and expectations when fishing for each species. The main difference stated was that salmon were going to die anyway and lifting, lining, and snagging were acceptable to those anglers. Anglers reported that they tried different sections of the river within the same day due to the number of anglers present, number of fish evident, water flow,

and perceived success at catching a fish. Anglers tended to report in the focus group interviews that they used a variety of techniques, fished avidly, and often sought salmon and steelhead in season.

Connelly et al. (1990) reported that during the in-depth focus group interviews "some anglers expressed the view that they evolved or matured from a generalist to a more specialized type of angler who considered foulhooking salmon to be unethical. The more frequent viewpoint was expressed by a more opportunistic type of angler who considered foulhooking as ethical since it allowed for the harvesting of a resource that would otherwise be lost (from their perspective and experience). Generally, these opportunistic anglers stated that they changed their motivations, expectations, and behavior when going back and forth from nonsnagging to snagging for salmon or when going from salmon to steelhead fishing" (p.17).

Angler Specialization Applied

The angler specialization concept reported by Bryan (1979) included a hierarchy from lowest to highest specialization as follows:

1) occasional angler;
2) generalist angler;
3) tackle-species specialist; and
4) method-species-setting specialist.

The underlying principles were that an angler progressed from one type to the next and that this was a hierarchical typology.

A parallel typology for New York's Salmon River, from lowest to highest type of angling method and species, may look like the following:

1) snagging or lifting steelhead;
2) snagging or lifting salmon;
3) natural or live bait fishing for salmon;
4) natural or live bait fishing for steelhead;
5) artificial lure fishing (artificial eggs) for salmon; and
6) artificial lure fishing (artificial eggs) for steelhead.

The environmental setting would remain constant for each fishing type since each is practiced on the same river environment.

A cluster analysis (Norusis and SPSS, 1990) of the 1989 angler participation was conducted using the squared euclidean distance method (SPSS/PC+) to attempt to classify the anglers into angler groups with similar participation characteristics. The variables used for classification were the 6 types of angling participation listed above. The participation variables were calculated for each individual based on the percentage of participation within each fishing type and each anglers' total for 1989 was 100%. This approach allowed for a standardization of the measurement unit and minimized the absolute difference between those anglers who had very high or low participation rates in 1989.

The result of the cluster analysis was a five angler group cluster solution based on participation. The centroids of each of the five angler group clusters is shown in Table 1 based on the 6 participation variables. Specialization in fishing participation is conceptualized as increasing from top to bottom and the five angler clusters increase in specialization from group 1 to 5 (left to right).

Table 1. Five group cluster solution for Salmon River angling participation in 1989.

	Cluster Group Centers				
Fishing Participation	Group 1	Group 2	Group 3	Group 4	Group 5
Snag/lift steelhead	2	0	1	0	2
Snag/lift salmon	**69**	6	2	5	4
Natural bait salmon	1	**63**	5	2	2
Natural bait steelhead	4	**11**	**70**	4	**10**
Lures salmon	**9**	**21**	**9**	**78**	**17**
Lures steelhead	**9**	3	**10**	**10**	**63**
Number Cases	366	22	102	237	320

The centroid numbers for each group in Table 1 represent the percent of participation in each fishing method. The trend of the majority of anglers (63 to 78 percent) is toward participation in one primary type of participation and this is evident in the diagonal line (i.e., the majority of participation is underlined) from the upper left to the lower right corner of the table. This suggests that this set of angler experiences generally supports the angler specialization concept. However, the centroid data is highlighted to show that many other angling methods have greater than 5% participation in any given cell. These highlighted cells indicate that anglers may be primarily using one technique but they also move up and down within the specialization continuum both between species and between methods.

The other observation from the cluster analysis is that these classified groups are, in reality, part of a continuum and do not form a clearly defined hierarchical typology as suggested by the specialization concept. The analysis of these "groups" is instructive for the sake of assessing the specialization concept and for reviewing the implications of fishery management regulations on these subgroups of anglers.

Angler Attitude Statements

The angler group responses to several attitude statements and proposed regulations are shown in Table 2. The three attitude statements were based on a Likert scale from strongly agree to strongly disagree The percentage agree and strongly agree are shown for each angler cluster group in Table 2. Statistically significant differences were found for each of the three variables ($X^2 > 135$, df = 16, $P < 0.001$). Group 1 , snagging-oriented anglers, consistently has the majority of anglers in support of snagging related statements; the other four groups exhibit the declining support expected as specialization increases from Group 2 to Group 5, with the exception of Group 4 which does not directly follow the pattern.

The response to the two proposed regulation statements were based on the percentage of anglers in each angler cluster group that reported support (Table 2) with the possible response categories of support, oppose, and undecided. Statistically significant differences were found for both variables ($X^2 > 200$, df = 8, $P < 0.001$). The percentage of anglers supporting the ban on salmon snagging and ban on foulhooking salmon and steelhead generally increases as expected from Group 1 to Group 5 as specialization increases, with the exception of Group 4 which does not directly follow the pattern.

Table 2. Five angler group cluster agreement regarding salmon fishing attitude statements in 1989.

Fishing Related Attitudes	Cluster Group Percentage Agreement Group 1	Group 2	Group 3	Group 4	Group 5
Salmon will not strike a lure once they enter a stream to spawn	76	50	33	49	24
Snagging is necessary for full use of resource	77	43	40	50	37
Snagging salmon is not inconsistent with good conservation ethics	68	43	33	50	36
Fishing Regulations					
Support ban on salmon snagging	22	32	58	47	61
Support ban on foul-hooking salmon & steelhead	8	32	58	26	51

Conclusions

The specialization concept has some value in fisheries management in assessing Salmon River angler attitudes when the analysis is based on the relative number of anglers and angling participation represented by each of the five angler group clusters, and the diversity of angling techniques used and species sought. What is also evident from this analysis and the focus group interview data (Connelly et al., 1990) is that the specialization concept is too simplistic and needs to better account for the expectations and multi-dimensionality of angler motivations.

A motivational model that appears more appropriate to apply in recreational settings is expectancy theory (see Dawson, Buerger, and Gratzer, 1991 in this proceedings) which includes cognitive processes as central to the behavior decision-making/involvement process experienced by anglers. Cognitive theory approaches the motivation phenomenon from the perspective of expectancy whereby behavior is influenced by past outcomes but is more selective in anticipation and ascribing response-outcome probabilities than is the specialization concept (reinforcement theory). For example, an angler who highly values catching a salmon and has confidence in his/her ability and specialized equipment perceives that a reasonable amount of effort has a low probability of catching a fish, then he/she will either not engage in the activity or will change the setting or equipment to increase expectancy. This may be an explanation for Salmon River anglers who believe that Pacific salmon will not normally feed when spawning and so they change to a lower specialization position to increase their expectancy. Expectancy is relative to the fishery situation and is highly variable, salmon and steelhead are relatively difficult fish to catch, so angler expectancy has to be relative to the species, tackle, and setting.

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A REASSESSMENT OF THE ANGLER SPECIALIZATION CONCEPT

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The angler specialization concept was reviewed and compared to other theoretical frameworks that are more based in multi-determinate behavioral approaches and cognitive processes. Personal investment theory and expectancy theory are suggested as more theoretically appropriate to measure angler specialization.

Introduction

Angler typologies have been proposed and evaluated since Plato noted in the Sophist that it is necessary to "come to an understanding not only about the name of the angler's art, but about the definition of the thing itself" (Hamilton and Cairns, 1961) to determine the angler's impact on the resource and upon society. The importance of those typologies to fishery and recreation management is partially based upon the resource considerations as well as the economic value that we place upon the angler's activities and travel-related expenditures.

For example, the reported positive economic impacts of sportfishing on New York's Great Lakes coastal communities emphasizes the need to maintain angler participation and satisfaction since it is important for fishery managers and coastal communities. More than 295,000 anglers fished 2.6 million angler days on New York's Lake Ontario waters in 1988 and they spent $87.5 million in trip expenditures within the coastal areas (Connelly et al., 1990a). This participation was a dramatic increase in the number of anglers (490%) and angler effort (285%) for Lake Ontario from 1973 to 1988 (Connelly et al., 1990b). Angling participation in New York's Great Lakes waters is estimated to increase to the year 2000 (Dawson and Brown, 1990).

Sportfishery management in the Great Lakes will require an understanding of angler motivations and developmental maturation over time to anticipate angler behavioral reaction to various fishery management alternatives. Information on the motives and expectations of anglers can help fishery managers to determine which management alternatives will meet, redirect, or change angler expectations and motives (Dawson and Wilkins, 1980; Brown, 1987; Gale, 1987).

Angler Motivation and Specialization Theory

The concept of angling specialization to explain the formation of motives and the process of motivational change that leads an angler to seek different species, settings, equipment, and experiences was proposed by Bryan (1976, 1977, and 1979). Bryan (1979) concluded that there were four basic types of freshwater anglers: (1) the occasional angler with novice ability and only casual interest in the sport; (2) the generalist angler who is interested in catching some fish in any environment by any legal method; (3) the tackle-species specialist who specializes in the skill of a particular angling method and/or angling for a particular species; and (4) the method-species-setting specialist who specializes in the method, species, and setting which make up a particular experience. These angler types are based on their degree of specialization in fishing and their specific motives in using the fishery resource. Anglers reportedly changed attitudes and motivations as specialization increased so that the emphasis shifted from consumption to conservation and natural settings. More specialized anglers were predicted to decrease interest in harvest motives and increase interest in non-harvest motives and specialized fishing equipment.

Several angler studies (Fedler and Ditton, 1986; Absher and Collins, 1987; Siemer et al., 1989; Steele et al., 1990) have reported general support for Bryan's (1979) concept that as anglers become more specialized "the fish are not so much the object as the experience of fishing is an end in itself." For example, boating anglers on Lakes Ontario and Michigan reportedly undergo a maturation or motivational change process over time toward more interest in fishing methods and technique, more interest in the management and conservation of fisheries, and stable or declining interest in the number of fish caught or harvested (Absher and Collins, 1987; Siemer et al., 1989).

Research on the Salmon River (Dawson and Brown, 1989; Connelly et al., 1990c) suggests that the normative concept of recreational specialization and sequential stages of development may not hold true for some segments of anglers. Connelly et al. (1990c) reported that 45 percent of steelhead anglers (highly specialized) also participated in salmon snagging/lifting activities (low specialization and focused on harvest more than skill) in 1989. Neither the researchers nor the fishery managers anticipated the magnitude of the overlap in the salmon snagging, salmon non-snagging, and steelhead angler segments due, in part, to the implicit acceptance of the recreational specialization concept.

The general acceptance of the recreational specialization concept in recreation and fishery management literature (Decker et al., 1987) appears to be its intuitive appeal to both researchers and managers. However, the concept has not been rigorously researched and evaluated via statistical tests in empirical studies on recreational or angler involvement and decision-making. Rather, the concept has been generally accepted and incidental evidence of its appropriateness offered ad hoc. Some re-evaluation of the specialization concept appears necessary to foster additional research. For example, Ditton et al. (1992) note that Bryan has essentially developed a tautology or circular path of logic whereby the specialization hierarchy is defined and measured by the same variables.

Theoretical Comparisons

Bryan's (1979) specialization concept is based on human needs (such as Maslow's hierarchy of needs) and reinforcement or social learning theory. The sequence of events begins with a motivation or stimulus which results in individual behavior and is followed by an intrinsic and extrinsic reward, and then at some interval a repeat of the same action or a similar action. The concept map (Figure 1) outlines the basic sequence of

events and illustrates the feedback or reinforcement loop that provides the behavioral modification necessary for continued involvement. Intrinsic rewards are related to the individuals own internal evaluation of his/her performance (e.g.,satisfaction at catching a valued fish species in a challenging situation and using specialized equipment). Extrinsic rewards are provided by the social group sharing the experience or observing the results of the performance (e.g., praise and social status within the peer fishing group based on an outstanding performance).

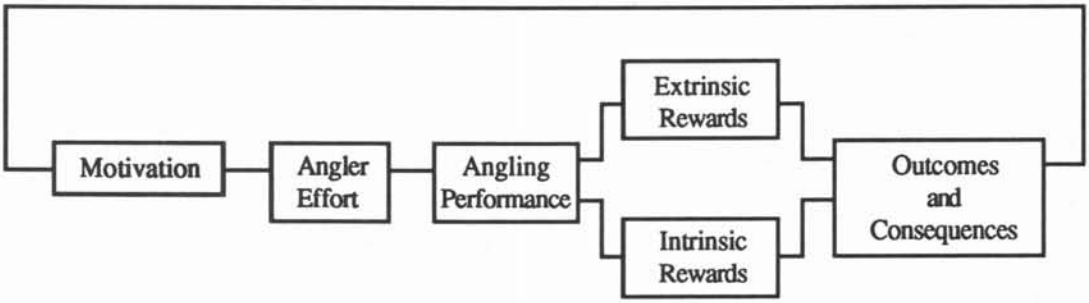

Figure 1. Reinforcement theory model of angler behavior and specialization (adapted from Bryan, 1979; Hamner et al., 1983).

The Recreation specialization concept is based on the human need theory and the reinforcement theory that behavior is closely associated with the positive and negative outcomes learned from past behavior. For example, Bryan (1979) acknowledges that the specialization concept is based on human needs theory such as Maslow's hierarchy of needs, although expressed in recreational specialization stages. The recreation specialization concept has some similar research dilemmas as reported for Maslow's hierarchy of need theory. Wahba and Bridwell (1983) note that the Maslow theory has received little clear or consistent support from available research findings due to the generalized nature of the theory (i.e., it is difficult to operationalize and interpret) and the rigidity of the theory that predicts a fixed hierarchy (i.e., how can a fixed hierarchy model predict behavior that the literature has described as multi-determinate?). Similarly, research questions have been raised about the validity of reinforcement models that consider behavior as determined by the consequences of past behavior and do not consider the cognitive domain in which an individual makes decisions about future behavior based on conscious and subconscious evaluations of actions and consequences (Hamner et al., 1983). More recent motivational research has focused on process models such as personal investment theory and expectancy theory.

A second motivational model that has been proposed by Absher and Collins (1987) for use with the recreational specialization concept is personal investment theory. The difficulties inherent in operationalizing the specialization concept were considered and partially resolved by Absher and Collins (1987) using Maehr and Braskamp's (1986) motivation domains in personal investment theory. The five domains or characteristics of motivation are listed by Absher and Collins (1987) as: (1) choice - selection from a set of potential actions or behaviors; (2) persistence - the tendency to choose and return to the same activity or set of activities over a given period of time; (3) continuing motivation - the tendency to return to the same activity or set of activities following some interruption in time; (4) performance - a skill level or perceived ability to perform a task or activity; and (5) intensity - the commitment level to an activity and its relative importance compared to other activities in life.

The personal investment theory and motivational domains were utilized by Absher and Collins (1987) to develop a three level specialization typology for analysis of anglers fishing on southern Lake Michigan. A specialization index score was computed for each angler through five motivational domain subindices. Absher and Collins concluded that the resulting specialization index provided a angler typology that permitted discriminant analysis to be used to detect differences among the groups regarding management preferences and that the analysis was useful in evaluating potential management actions and regulations.

Siemer et al. (1989) conducted an analysis of the motivations of Lake Ontario boat anglers fishing for salmonids by using personal investment theory. The study reported using participation as a measure of investment and two motivation scales (i.e., motivation to participate in recreation, motivation to participate in salmon fishing) to compare the differences between two levels of personal investment. Siemer et al. (1989) reported "some evidence to support the notion that anglers undergo a process of motivation change or maturation over time involving increased importance on fishing methods and conservation/management of fisheries resources, and a stable or decreased interest in number of fish caught or kept."

A third motivational model that appears appropriate to apply in recreational settings is expectancy theory which includes cognitive processes as central to the behavior decision-making/involvement process experienced by recreationists and anglers. Cognitive theory approaches the motivation phenomenon from the perspective of expectancy whereby behavior is influenced by past outcomes but is more selective in anticipation and ascribing response-outcome probabilities than is reinforcement theory. Expectancy theory proposes that three variables are necessary to predict motivation: (1) Expectancy - the probability (ranges from 0 to 1) that an individual ascribes to his/her ability to perform a task successfully; (2) Instrumentality - the probability (ranges from -1 to +1) of attaining the desired outcome; and (3) Valence - the perceived desirability or value (ranges from -1 to +1) the individual places on the expected outcome or reward (Vroom, 1964; Nadler and Lawler, 1983). Motivation is multiplicative for these three variables so that each variable must have a relatively high positive value to provide the motivation for effort and activity. If, at any time, one or more of the variables approaches zero or turns negative, then the motivation to act will diminish correspondingly. A conceptual map of the expectancy theory model in Figure 2 illustrates the relationship of fishing motivation to performance and satisfaction.

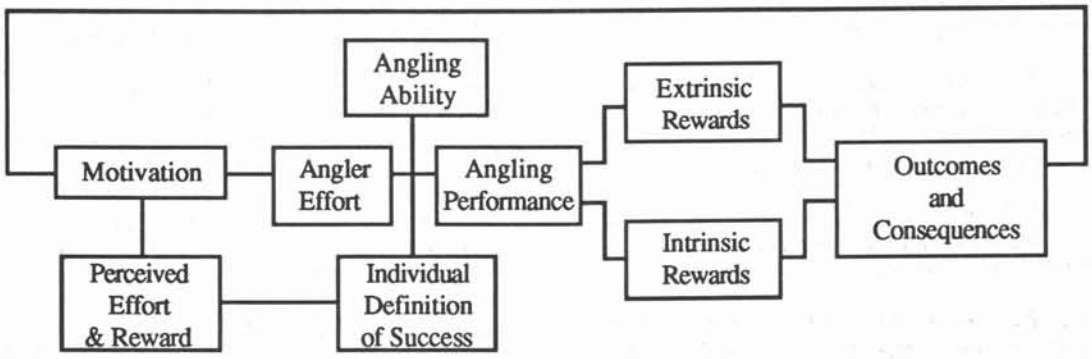

Figure 2. Expectancy theory model of angler behavior (adapted from Hamner et al., 1983; Landy & Trumbo, 1983; Nadler & Lawler, 1983).

Stating the expectancy model in recreational salmon fishing terms, if an angler believes he/she is able to successfully catch a salmon by a particular angling method and in a specific river setting, then a high expectancy value will be assigned. The angler who believes that catching a salmon (performance) leads to desired extrinsic (e.g.,social recognition of achievement by peers) and intrinsic (e.g., sense of self-achievement) rewards will assign a high value to instrumentality. If the rewards are perceived by the angler to be of personal importance, then a high value will be assigned to valence. The multiplicative result of these three variables via the cognitive process outlined in expectancy theory is motivation.

Conclusions

The literature indicates little direct support for the fishing specialization concept. The parallel with Maslow's theory is important to understand because both have similar research implementation difficulties, as noted by Wahba and Bridwell (1983): "Maslow's Need Hierarchy Theory presents the student of work motivation with an interesting paradox: the theory is widely accepted, but there is little research evidence to support it." The theoretical improvements suggested herein are to assess the utility of adding cognitive dimensions to the fishing specialization concept to reflect the cognitive and multi-determinate behavior of anglers and to develop a more testable theory that addresses the conditions under which the concept is valid and reliable. For example, how does angler expectancy for success relate to specialization? Are the relationships in behavioral outcomes (i.e., satisfaction) and motivations causal or correlational?

The two theories reviewed herein, personal investment theory and expectancy theory, appear to have some promise for adding cognitive dimensions and antecedant conditions. The former has been explored by two research projects and many unanswered questions remain as to its applicability and utility. The latter theory has not been tested in recreational or fishing recreation research and appears to hold some promise to integrate motivational research with a more comprehensive theoretical base so that the implications will be more apparent for fishery and recreation managers. Recent work by Ditton et al. (1992) suggests that additional approaches also merit investigation as more information is published on alternate or revised approaches to defining specialization.

Sportfishery management on the Great Lakes will require a more comprehensive model of angler specialization over time to anticipate angler behavioral reaction to sportfishery management alternatives. This information can help fishery managers and educators to evaluate management alternatives that help to meet, redirect, or change angler motives and expectations. Anticipating angler development and redirecting and encouraging anglers toward higher degrees of specialization (i.e., shift from harvesting fish to a greater emphasis on resource conservation and appreciation) may, ultimately, lead to more effective indirect angler management and partially relieve the enforcement burden of direct angler regulations. Given the current economic impacts of sportfishing on the Great Lakes, the need to maintain angler participation and satisfactions is economically important for coastal communities and sportfishery dependent businesses.

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RECREATION SPECIALIZATION AND THE ANALYSIS OF ANGLER DIFFERENCES ACCORDING TO AGE COHORT

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We segmented a sample of sport fishermen into six unique age cohorts for the purposes of determining if significant differences existed on four recreation related dimensions. No significant differences for activity or non activity-specific elements of the experience were found. Some differences were found for mediated interaction and resource dependency, and clear differences were found for support of various management rules and regulations. Predictions and results were framed in terms of recreation specialization.

Introduction

Determining the current and future levels of demand for any given recreational activity or experience has been an important and ongoing task for managers and researchers. Most early efforts at forecasting future participation levels used simple straight-line extrapolations (Loomis and Ditton, 1988; West 1983). However, such work was limited in that it lacked a detailed demographic component (Murdock et al., in press). As such, they could not take into account the effects of demographic forces (such as age, race or gender).

In response to this limitation, cohort-based projection models have been developed (Loomis and Ditton 1988; Murdock et al. 1990). The use of these cohort component models allows demographic characteristics to be accounted for in calculations of demand projections. The demographic characteristic receiving the most attention has been age. Projections of future demand have taken into account how the population age structure will shift over time, and consequently how the demand structure will shift over time as well. Results show that demand is not evenly distributed across age cohorts, and that the distribution of demand by cohort will shift over time as the population age structure shifts (Loomis and Ditton 1988; Murdock et al. 1990).

These studies have provided greater insight into the level of demand for certain activities, its distribution by age and how it will shift over time. However, these studies are still limited in that they provide only an understanding of days of demand by a given age cohort. It forces one to assume that a day of participation by a sixty-year old is the same as a day of participation by a twenty-year old. As such, demand projections using a cohort-component model have limitations in their usefulness as currently applied. The effort to understand other key factors relating to demand for recreation opportunities, such as user characteristics, motivations, expectations, and preferences, for example, has not yet been made.

The first purpose of this paper is to extend our current understanding of demand as based on cohort component models by testing for differences between five distinct age cohorts on a variety of recreation-related dimensions. Specifically, we will examine activity and non activity-specific motivations, level of resource dependency, level of mediated interaction and support for rules, regulations and management policies. We will not be determining demand, but instead determining differences between cohorts on these dimensions, which could subsequently be attached to demand projections and thus provide a better picture of the actual demand for experiences.

Our conceptual framework is recreational specialization, as reconceptualized by Ditton et al. (1992). This will provide us an opportunity to test several propositions of this recent version of specialization, which is the second purpose of this paper.

Conceptual Framework

Our conceptual framework is based on recreation specialization, as reconceptualized by Ditton et al. (1992). Building upon the social world/social subworld literature, Ditton et al. define specialization as:

1) A process by which recreation social worlds and subworlds segment and intersect into new recreation subworlds, and
2) the subsequent ordered arrangement of these subworlds and their members along a continuum.

"At one end of the continuum is the least specialized subworld and its members, and at the other end of the continuum is the most specialized subworld and its members. Between these two extremes are any number of subworlds having intermediate levels of specialization" (Ditton et al., 1992).

From this definition and the related literature, Ditton et al. (1992) state eight propositions. We will test propositions four, six, seven and eight (see Ditton et al., 1992, for further details).

Ditton et al. (1992) subjected propositions six, seven and eight to empirical testing, and found strong support for all three. Results showed that high specialization anglers have a higher level of resource dependency, a higher level of mediated interaction, and attached less importance to activity-specific elements and more to non activity-specific elements of the fishing experience than do low specialization anglers.

In their study, Ditton et al. (1992) segmented their sample (or social world) of sport anglers into four ordinal subworlds based on total days fished during the previous twelve months. Anglers who fished the most were defined as the most specialized, and those who fished the least were the least specialized. Ditton et al. (1992) suggest that "participant's age" or "number of years of participation" should also be considered as a means of classification, with the older or more experienced anglers being more specialized.

We too will use a single dimension for categorizing and ordering our specialization subworlds. Based upon our purpose for this paper, and the work of Ditton et al. (1992), we will use age as our classification variable. More specifically, we will segment our study sample into five unique age cohorts. The ages contained within each of the five cohorts are consistent

with the age cohorts used in previous work (Loomis and Ditton, 1988). The youngest age cohort will anchor the least specialized end of the specialization continuum, and the oldest age cohort will anchor the most specialized end.

Hypotheses

Ha1: Anglers in older age cohorts attach greater importance to activity-specific elements of the fishing experience than do anglers in younger age cohorts.

Ha2: Anglers in younger age cohorts attach greater importance to non activity-specific elements of the fishing experience than do anglers in older age cohorts.

Ha3: Anglers in older age cohorts will have a higher level of mediated interaction than will anglers in younger age cohorts.

Ha4: Anglers in older age cohorts will have a higher resource dependency than will anglers in younger age cohorts.

Ha5: Anglers in older age cohorts will agree more strongly with rules and regulations than will anglers in younger age cohorts.

Methods

Data collection was accomplished through a mail survey of licensed Iowa sport fishermen. Using license receipts as a sampling frame, a systematic random sample of 600 licensed anglers was manually selected from state files. The survey was administered during the spring of 1989, following procedures outlined by Dillman (1978). A final return of 434 usable questionnaires was achieved (a response rate of 78.8% when non-deliverable and non-usable questionnaires were excluded).

Classification Procedure

We segmented our sample into five distinct age cohorts (Table 1). These five age cohorts, when arranged from youngest to oldest, form our specialization continuum with the youngest being the least specialized and the oldest being the most specialized. This classification served as the independent variable for analysis purposes.

Table 1. Age cohort categories.

Age Cohort	n	%
15 - 24	50	11.8
25 - 34	115	27.1
35 - 44	111	26.2
45 - 54	72	17.0
55 +	76	17.9
Total	424	100.0

Dependent Variable Measurement

Activity and non activity-specific elements. A total of seventeen items were used to measure the activity and non activity-specific elements of the sport fishing experience. The activity-specific elements of the experience are specific to the sport of fishing, and cannot be pursued or obtained in other activities. Six of the eight items are attitude statements developed by Graefe (1980), with the other two being motive statements (Ditton et al., 1992). All eight items were measured on a five-point Likert-type scale.

The generic, or non activity-specific elements of the fishing experience were measure with nine motive statements. These motives are common to many outdoor recreation activities, and are not specific to the sport of fishing. Each motive statement is a single-item measure from the following Driver (1977) domains: Family Togetherness, Being with People, Learning-Discovery, Relationships with Nature, Physical Rest and Escape Personal-Social Pressure. As with the non activity-specific elements, these nine motive statements were measured on a five point Likert-type scale.

Mediated interaction. Survey recipients were asked to indicate the extent to which they made use of seven varied sources of information. These sources ranged from Iowa state agencies, to printed information, to electronic media to word-of-mouth. Angler responses were measured on a five-point Likert-type scale.

Resource dependency. Respondents were asked to indicate, on a five-point Likert-type scale, the extent to which they agreed or disagreed with seven attitude statements (Graefe 1980) concerning the catching of fish. These items focus on the size, number and species of fish to be caught. The more they agreed with a statement, the greater their resource dependency.

Support for rules and regulations. Our final hypothesis examines differences between anglers in different age cohorts on the extent to which they support or oppose various rules and regulations concerning sport fishing. Respondents were asked to indicate on a five-point Likert-type scale the extent to which they supported or opposed ten existing or possible management rules and regulations, and three management policies.

Data Analysis

The procedure used to test the null hypothesis of equality of group means for age cohort categories was a one-way analysis of variance (ANOVA). A null hypothesis was rejected at the p=.05 level of significance. To identify where specific between-cohort differences existed, a Student-Newman-Keuls post-hoc test was performed, which is considered an appropriate all-around test for this purpose (Kirk, 1982).

Results

Hypothesis One

Results of the ANOVA show significant differences between age cohorts on only one of the eight measures of activity-specific elements of the fishing experience (Table 2). We therefore fail to reject Ho1.

Hypothesis Two

Results of the ANOVA revealed significant differences between age cohorts on only two of the nine items used to measure the non activity-specific elements of the fishing experience (Table 3). We therefore fail to reject Ho2.

Hypothesis Three

Results of the ANOVA revealed significant differences on three of the seven items (Table 4). These results provide some support for our null hypothesis, and we therefore tentatively reject Ho3. Our results relative to the alternative hypothesis were not, however, as predicted. We had argued that anglers in the older age cohorts would have a higher level of mediated interaction than would anglers in the younger age cohorts. Results show, in general, that the opposite occurred. For each of the items having significant results, anglers in the youngest age cohort had the highest level of mediated interaction. As a result, we cannot accept Ha3 as stated.

Table 2. Results of test for differences in mean scores for activity-specific elements of the fishing experience scale items between age cohorts.

Items	Group Mean Score Student-Newman-Keuls test					F	p
I'm happy if I don't keep the fish	4 2.97	5 3.13	3 3.37	2 3.44	1 3.52	3.065	0.017
For the experience of the catch	5 3.29	3 3.32	4 3.37	2 3.40	1 3.86	2.192	0.069
I'm happy if I release the fish I catch	4 3.07	5 3.30	1 3.34	3 3.42	2 3.50	1.950	0.101
I'm happy if I don't catch a fish	4 2.68	5 2.74	3 2.86	1 2.88	2 2.88	0.724	0.576
Fishing is successful if no fish are caught	5 3.62	2 3.64	4 3.71	1 3.74	3 3.78	0.484	0.747
Fish for eating	3 2.46	4 2.49	5 2.52	2 2.62	1 2.67	0.428	0.788
For sport and pleasure	1 3.10	4 3.11	3 3.21	2 3.27	5 3.27	0.391	0.815
I give away the catch	4 2.25	3 2.31	2 2.32	1 2.36	5 2.37	0.210	0.933

Table 3. Results of test for differences in mean scores for importance to non activity-specific elements of the fishing experiences Scale items between age cohorts.

Items	Group Mean Score Student-Newman-Keuls test					F	p
To be with friends	3 2.89	4 3.09	2 3.11	5 3.13	1 3.84	5.807	0.000
To be close to the sea	2 2.75	3 3.03	1 3.16	4 3.35	5 3.41	4.531	0.001
For family recreation	1 3.35	5 3.35	2 3.49	3 3.69	4 3.73	2.058	0.086
To experience new and different things	3 2.77	4 2.86	5 2.91	2 3.11	1 3.14	1.807	0.127
For relaxation	2 3.99	1 4.04	3 4.13	5 4.21	4 4.31	1.411	0.230
To be outdoors	3 3.96	4 3.97	5 3.99	2 4.07	1 4.26	1.275	0.279
To experience natural surroundings	3 3.46	2 3.61	4 3.61	5 3.71	1 3.84	.159	0.328
To get away from other people	5 3.63	2 3.71	3 3.82	1 3.92	4 3.94	0.906	0.460
To get away from the regular routine	4 3.86	2 3.96	3 3.97	1 4.06	5 4.06	0.484	0.748

Table 4. Results of test for differences in mean scores for mediated interaction scale items between age cohorts.

Items	Group Mean Score Student-Newman-Keuls test					F	p
TV Shows	4 2.49	5 2.55	3 2.72	2 3.00	1 3.22	5.096	0.001
Bait Shops	5 2.86	4 3.00	3 3.21	2 3.30	1 3.36	3.133	0.015
Magazine Articles	4 2.63	3 2.64	5 2.66	2 2.90	1 3.14	2.814	0.025
Newspaper Articles	5 2.44	3 2.59	4 2.66	2 2.76	1 2.78	1.532	0.192
Fish Clubs	3 1.76	5 1.78	2 1.92	4 1.92	1 2.08	1.209	0.306
Iowa Department of Natural Resources	4 2.74	5 2.79	3 2.91	1 2.98	2 3.03	1.029	0.392
Radio Shows	3 1.95	4 2.06	5 2.08	2 2.10	1 2.22	0.647	0.629

Table 5. Results of test for differences in mean scores for resource dependency scale items Bbetween age cohorts.

Items	Group Mean Score Student-Newman-Keuls test					F	p
To obtain a "trophy" fish	3 2.65	4 2.75	2 2.99	5 2.99	1 3.26	7.393	0.000
The bigger the fish the better the trip	3 2.85	4 2.93	2 3.11	5 3.13	1 3.51	4.022	0.003
The more fish I catch, the happier I am	4 3.31	5 3.32	3 3.33	2 3.60	1 3.76	2.587	0.036
A successful trip is catching many fish	3 2.77	2 2.96	4 3.01	1 3.14	5 3.16	2.025	0.090
I prefer one or two big fish to ten small fish	4 2.91	3 3.06	2 3.11	5 3.20	1 3.34	1.293	0.272
I like to fish where there are several kinds of fish to catch	3 3.82	4 3.93	5 3.93	1 3.94	2 3.97	0.523	0.719
The type of fish I catch doesn't matter	3 3.19	4 3.20	2 3.27	5 3.30	1 3.38	0.389	0.817

Hypothesis Four

Results of the ANOVA show significant differences between the age cohorts on measures of resource dependency for three of the seven items (Table 5). As in hypothesis three, these results are not conclusive. They do, however, provide tentative support for our argument that the age cohorts would differ in their resource dependency. We therefore reject Ho4 as stated. The results for the three significant items, however, were again not in agreement with our alternative hypothesis. The younger cohorts were not the least resource dependent, as predicted. They instead were the most resource dependent. As a result, we cannot accept Ha4 as stated.

Table 6. Results of tests for differences in mean scores for agreement with Vvarious rules and regulations.

Items	Group Mean Score Student-Newman-Keuls test					F	p
No fishing in certain restricted areas	1 2.92	2 3.34	4 3.51	3 3.62	5 3.76	5.500	0.000
Prohibiting certain sport fishing gear	1 2.96	2 3.31	4 3.36	3 3.51	5 3.72	4.939	0.001
Banning species during times of the year	1 3.10	2 3.28	4 3.50	3 3.56	5 3.76	4.412	0.002
Prohibiting certain types of bait	1 2.84	2 3.09	4 3.10	3 3.28	5 3.49	3.688	0.006
Maximum size limit	1 2.70	4 2.97	2 3.15	3 3.15	5 3.42	3.387	0.010
Stocking fish not native to Iowa	4 3.50	3 3.56	5 3.62	2 3.81	1 4.00	3.131	0.015
Banning certain species in certain areas	1 3.14	2 3.30	4 3.39	5 3.60	3 3.61	2.945	0.020
A closed season	3.20	3.25	3.51	3.51	3.68	2.591	0.036
A voluntary catch and release program	5 3.46	3 3.47	4 3.57	2 3.71	1 3.86	1.989	0.095
A slot limit	4 2.72	3 2.94	5 2.99	1 3.06	2 3.06	1.394	0.235
A daily bag limit	3.91	3.95	3.95	3.98	4.20	1.002	0.406
A minimum size limit	4.01	4.04	4.14	4.21	4.24	0.816	0.515
Stocking native fish	4 4.21	1 4.22	3 4.22	5 4.25	2 4.27	0.033	0.998

Hypothesis Five

Our fifth hypothesis predicted that anglers in the younger age cohorts would be less supportive of rules, regulations and management policy than would anglers in the older age cohorts. Results of the ANOVA provide substantial support for this prediction (Table 6). Eight of the thirteen items were significantly different between the age cohorts. In addition, for seven of the eight significant items, the ordering of the means were as predicted. Anglers in the older age cohorts were more supportive of various rules, regulations and management policies than were anglers in the younger age cohorts. We therefore reject Ho5, and accept Ha5 as stated.

Discussion and Conclusions

Results of this study indicate that for some dimensions, differences exist between anglers in different age cohorts. For other dimensions, few differences were found. No significant between cohort differences were found on measures of the activity-specific and non activity-specific elements of the fishing experience. There were some significant findings relative to mediated interaction and resource dependency, but the results were not strong or pervasive. The strongest and clearest findings were that anglers in older cohorts were much more supportive of various management rules and regulations. Information of this type can be useful to resource managers as they seek to provide the type of experience sought, and as they seek support for management policies.

These results provided some support for recreation specialization as presented by Ditton et al. (1992). Where results were not significant, and null hypotheses not rejected, questions can be raised. For hypotheses one and two, is the re-conceptualization flawed, or is age cohort an inadequate or inappropriate classification variable? Results from Ditton et al. (1992) suggests that age cohort may not be an adequate classification tool. Continued research is necessary to further develop and understand recreation specialization.

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TRAVEL, TOURISM AND COMMUNITY DEVELOPMENT I & II

EFFECTS OF ALTERNATIVE SILVICULTURAL METHODS ON SCENIC AND RECREATIONAL QUALITY

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Timber stands harvested using different silvicultural regimes were evaluated for acceptability as places for hiking, camping, and scenic viewing. "New Forestry" stands were more acceptable than stands managed using traditional practices. Stands were rated differently for different uses, with camping quality judged lower than hiking or scenic quality.

Introduction

Managers of America's forests increasingly must address concerns over the impacts of prevailing forestry practices. Questions have been raised from within and outside the forestry profession as to whether traditional methods constitute proper land stewardship (Clark and Stankey 1991). Among foresters, much debate has focused on the effects of common forest practices on biodiversity and longterm site productivity. Many foresters advocate a "New Forestry" that augments traditional methods with non-traditional silviculture based on new scientific findings about natural disturbances (Franklin 1989).

The USDA Forest Service has made New Forestry a cornerstone of its "New Perspectives" initiative, an integrated approach to forestry that encompasses ecosystem components beyond those associated with dominant tree species, and values beyond those associated with commodity extraction (Salwasser 1990). Yet distrust of scientific solutions is an important contributor to public skepticism about forestry. New methods cannot gain acceptance if they fail to address social concerns along with scientific ones (Clark and Stankey 1991). Integrated management strategies, especially those to be used on public lands, must therefore address social values.

Among the more significant social values are those related to public enjoyment of forests, especially scenic viewing and outdoor recreation. If the non-traditional New Forestry practices are perceived as detracting from public enjoyment as much or more than current methods, widespread acceptance is unlikely no matter how much those methods benefit biodiversity or site productivity.

This paper describes a pilot study of the scenic and recreational impacts of New Forestry practices. Two questions are addressed:

1) How do judgments of the scenic and recreational quality of New Forestry stands in the Pacific Northwest compare to judgments of uncut stands and of stands managed using traditional methods?

2) Do judgments of a stand's scenic quality differ from judgments of the same stand as a recreation setting?

Previous Research

Scenic Quality in Managed Forests

Studies of the scenic impacts of forest management have been conducted in the U.S. since the 1960s. One line of inquiry, dominated by researchers trained in landscape architecture, has examined aesthetic quality at the landscape level. One product of this research is the USDA Forest Service's (1974) Visual Management System.

Stand-level studies like the one described in this paper have been conducted largely by social scientists interested in features of forests that influence perceived scenic quality. These "near-view" studies have been conducted in most major U.S. forest types, including eastern hardwoods (Vodak et al. 1985), Southern pines (Hull and Buhyoff 1986), northern hardwoods (Ribe 1990), and Rocky Mountain ponderosa pines (Brown and Daniel 1986), as well as in Europe (Savolainen and Kellom ki 1981). The one major timber-growing region where such research has not been done is the Pacific Northwest.

Many stand-level studies have looked for attributes of managed and unmanaged forests that are linked to scenic quality, often focusing on inventory data could be fit into regression equations resembling growth and yield models (Hull and Buhyoff 1986). A few researchers have examined harvest methods and other practices such as slash piling and burning (Benson and Ullrich 1981; Brown and Daniel 1986). No research has yet examined the recently developed "New Forestry" practices.

Ribe (1989) synthesized stand-level findings in a review of aesthetic research in forests. He found high scenic beauty to be associated with large trees, low stand densities, grass/herb cover, high visual penetrability, and multiple tree species. Low scenic beauty is associated with small stems, dense shrub cover, bare ground, large amounts of woody debris, and evidence of mechanical disturbance (logging, road-building). Partial harvests are preferred over clearcuts, and scenic quality tends to recover quickly in the first few years after logging is completed.

Recreational Quality in Managed Forests

A fundamental premise of outdoor recreation management is that the quality of recreation experiences is linked to setting attributes. The Recreation Opportunity Spectrum (Clark and Stankey 1979), a primary tool in recreation planning, stems from landscape-level research showing that recreationists tend to seek settings with attributes that can help them achieve experience goals.

At the stand level, Scandinavian scientists have analyzed forest attributes to predict their quality for generalized recreation (Hultman 1983; Pukkala et al. 1988). The resulting models are better predictors for some activities than for others, and the distinction between recreational and scenic quality is not always clear.

Research on campsite preferences has identified features of settings that may enhance or reduce camping quality (Brunson and Shelby 1990). In one study, Clark et al. (1984) found that former timber harvest sites are sought out by some campers. These studies generally have not compared impacts of harvest techniques, although Foster and Jackson (1979) did evaluate preferences for various densities of vegetative screening between sites.

Hiking quality has gotten less attention. Axelsson-Lindgren and Sorte (1987) showed that stand heterogeneity increased the quality of hiking trips, but they examined no other stand attributes. Haakenstad (1972) found that hikers and skiers preferred open, forested terrain such as that found in shelterwood stands over the patchy forests produced by group selection systems.

Methods

Quality was evaluated using on-site surveys administered at the Oregon State University research forest in September-October 1990. Study sites included an old-growth Douglas-fir stand with diverse hardwood/softwood understory, and five Douglas-fir stands that had been logged within the past two years.

Representing traditional methods were a 45-acre clearcut logged in 1988, burned, and replanted; and a 16-acre stand of 30- to 40-year old trees thinned in spring 1990. The New Forestry stands, cut from a tract of 100-year-old trees in winter 1989-90, included a "patch cut" stand where one-third of the volume was removed in half-acre units; a 17-acre "snag-retention clearcut" from which the entire volume was removed except for wildlife trees; and a "two-story stand" from which two-thirds of the volume was removed, leaving a residual of 8-10 trees per acre.

In all three stands, wildlife habitat was enhanced by topping 1.5 scattered live trees per acre. Logging debris was left in situ except where removal was necessary for replanting. Hiking and/or skid trails crossed all sites except the snag-retention clearcut.

Surveys were completed by 77 student volunteers (forest management, outdoor recreation, and fish and wildlife majors) and 18 non-students from school parents' groups. Respondents rated each stand for scenic quality, as a place to hike, and as a place to camp. Ratings were made by circling the best response on a nine-point scale ranging from -4 (most unacceptable) through 0 (neutral) to 4 (most acceptable).

Based on previous research outside the Northwest, we expected scenic quality to be highest for the old growth stand; moderate for the patch cut and thinned stands; and lowest for the two-story, clearcut, and snag-retention clearcut. Because New Forestry calls for retaining or creating snags and woody debris, we expected those stands to be rated less acceptable than "cleaner"-looking traditionally managed stands having comparable residual volumes.

We did not attempt to predict recreational quality, as prior studies offered little basis for such predictions. However, we did expect ratings to be influenced by non-scenic aspects of stands that could affect one's ability to participate in an activity (e.g., flat ground for camping quality, or trail conditions for hiking quality).

Results

Mean acceptability for each site is shown in Table 1. A positive rating means that, on average, the site is considered acceptable. The old-growth stand was rated most acceptable for all three uses (scenic viewing, hiking, camping), though the difference in camping quality ratings between the old-growth and patch cut stands was not significant. In general, the New Forestry treatments were judged more favorably than either the thinned or clearcut area, except that the thinned stand was judged more acceptable for hiking than the snag-retention clearcut.

Table 1. Mean quality ratings for different stands

Scenic quality	Mean	Hiking quality	Mean	Camping quality	Mean
Old growth	3.1^{a}	Old growth	3.4^{a}	Old growth	0.4^{a}
Patch cut	1.4^{b}	Patch cut	1.8^{b}	Patch cut	-0.0^{a}
Two-story	0.6^{c}	Two-story	0.5^{c}	Two-story	-0.7^{b}
Snag retention	0.4^{c}	Thinned	0.1^{cd}	Snag retention	1.4^{bc}
Thinned	-0.4^{d}	Snag retention	-0.1^{d}	Thinned	-1.5^{c}
Clearcut	-1.2^{e}	Clearcut	-1.1^{e}	Clearcut	-2.7^{d}

^{a,b,c,d,e} Ratings with same subscript are not significantly different within uses (Kruskal-Wallis multiple comparison test)

All ratings of scenic and hiking quality were significantly higher those of the same sites for camping ($p<.05$, Wilcoxon signed rank test). The old growth, thinned, and patch cut stands were rated more acceptable as places to hike than as places for scenic viewing, while the snag-retention clearcut was rated more acceptable for scenic viewing than for hiking. Hiking and scenic quality ratings were not significantly different for the traditional clearcut and the two-story stand.

Discussion

Scenic Quality

This study is the first to assess scenic quality at the stand level in the Douglas-fir region of the Pacific Northwest, but the results were not unlike those from other parts of the U.S. and Europe. Acceptability ratings reflect a preference for mature forests over young ones, "natural-looking" stands over ones where human impacts are obvious, and partial-cutting techniques over clearcuts. The old-growth stand was judged most acceptable, the traditional clearcut least acceptable, and partial cutting methods somewhere in-between. Among the latter, the stand with the most residual volume (patch cut) was also the most acceptable. The two-story stand, with its residual of 100-year-old trees, was more acceptable than the thinned 30- to 40-year-old stand.

These results do not reflect the predicted adverse influence of down wood and artificially created snags. Previous studies had found that slash volume is negatively related to aesthetic quality (Arthur 1977; Brown and Daniel 1986), and skeptics often suggest that New Forestry will fail to gain public acceptance because it "looks sloppy."[1] The scenic impact of slash in the study stands is unclear, however.

Large amounts of woody debris existed in the thinned stand, where slash was in small-diameter pieces, and in the two-story and snag-retention stands, where piled and unpiled slash was evident along with the lopped-off tops of created snags and a

1/Brunson, Mark. 1990. Summary of findings: New Forestry field trip survey. Unpublished report.

few trees blown down in a storm shortly after harvest. Although the two-story and snag-retention stands had greater amounts of down woody debris, the thinned stand was rated less acceptable.

Due to the exploratory nature of the research, we discussed preliminary findings with a group of 38 survey respondents. They attributed low ratings for the thinned stand partly to slash volumes, and partly to a perception that the thinning was poorly done, causing too much damage to residual trees. Conversely, they said the scenic quality of the snag-retention clearcut was enhanced by a timbered slope beyond it. Despite specific instructions to rate stands without judging their surroundings, participants said scenic judgments cannot be made totally independent of the broader context in which they occur.

Recreational quality

The quality of recreation experiences depends not only on setting attributes, but also on the psychological, social, physical, and managerial context (Clark and Stankey, 1979). Accordingly, we expected judgments about the forest environment to vary depending on whether the setting were viewed as a scenic backdrop or as a place to hike or camp. Previous research has found that favored scenic backdrops are not necessarily valued as recreation sites (Zube et al. 1975; Pukkala et al. 1988). In the present study, while the *order* of preference for different stands varied only slightly across activities, there were significant differences in *mean acceptability* depending on the use for which the site was being evaluated.

Three sites (old growth, patch cut, commercial thin) were more acceptable for hiking than for scenic viewing. Each contained a well-defined trail which appeared to have had no recent use by motorized vehicles. The one stand judged more acceptable for scenic viewing than for hiking (the snag-retention clearcut) was the only one with no trail.

Camping quality was judged uniformly lower than hiking or scenic quality. Previous research (Brunson and Shelby 1990) suggests that campsite preferences often are influenced by factors other than site attributes, such as the distance to water or to other recreation activities. Participants interviewed after their visits reported taking such off-site factors into consideration when judging camping quality.

Management Implications

A key finding of this study is that New Forestry stands were rated higher than those where established practices were used. While the results of this pilot study cannot be used to predict judgments of any other stand, it is clear that New Forestry practices are *capable* of producing stands whose scenic and recreational quality is superior to that of clearcuts or commercially thinned stands. A more pertinent question for managers might be: Are New Forestry stands "good enough" from a visitor's standpoint, or simply not quite as bad? Re-examination of the results suggests that the New Forestry treatments may indeed meet visitors' standards.

Figure 1 shows the percentage of respondents calling each stand acceptable (i.e., chose a rating above zero) for each use. A stand may be defined as meeting visitors' standards if judged acceptable by a given proportion of the public. Choosing that proportion is a political decision; for purposes of discussion, let us suppose a simple majority would be sufficient.

For scenic viewing, the old-growth stand and all three New Forestry treatments met the standard, even though the latter were evaluated within a year after harvest, when scenic quality is typically lowest (Hull and Buhyoff 1986). For hiking, all but the snag-retention and traditional clearcuts met the standard, and a trail across the snag-retention site might be enough to make that site acceptable for hiking. Conversely, only the old-growth stand was acceptable for camping, and it just barely cleared the standard. However, it is quite possible that similar treatments on flatter ground could produce satisfactory levels of camping quality, especially in the patch cut units, which made natural campsite-sized openings.

This study has only begun to explore questions that are likely to become increasingly important. We do not know whether New Forestry stands will be generally acceptable to forest visitors. But it does seem possible to develop silvicultural prescriptions that achieve biodiversity objectives while at the same time meeting visitors' standards for scenic and/or recreational quality. The differences in scenic and recreational quality ratings underscore the need to consider in those prescriptions what kinds of experiences visitors may seek at a given location.

The future of forestry may depend on our ability to successfully integrate economic and biological objectives of forest management with social values, including recreation and aesthetics. The results of this study suggest that this can be done if social values receive the same attention in research and planning given to biological objectives.

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OPPORTUNITY POTENTIAL MATRIX FOR ATLANTIC CANADIANS

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Opportunity for provision of Parks Service benefit to Atlantic Canadians was investigated by mapping travel behaviour into a matrix in terms of origin, season, purpose, distance, time, and destination. Findings identified potential for benefit in several activity areas, particularly within residents' own province.

Introduction

The Canadian Parks Service (CPS) operates seven National Parks and twenty-six National Historic Sites within the four Atlantic provinces. These parks and sites are the primary leisure travel destinations in the region and provide exceptional opportunity for Canadians and foreign visitors to experience Atlantic Canada's rich natural and cultural heritage and to enjoy a variety of outdoor recreational pursuits.

In order to gain additional knowledge and understanding of one primary CPS beneficiary segment, Atlantic region residents, the Atlantic Resident Study (ARS) was undertaken. The purpose of this study was to investigate the level current benefit provided residents of Atlantic Canada in terms of awareness, support, and use of the Canadian Parks Service and, to examine the potential for provision of direct benefits to Atlantic Canadians by the program. This examination of the potential provision of direct benefit led to development of the opportunity potential matrix discussed here.

Current CPS Benefit to Atlantic Canada Residents

Understanding of the current benefit being provided Atlantic Canadians was gained from analysis of the 1988 CPS National Market Study (NMS). Support of the Parks system is generally quite high among Atlantic Canadians as approximately 70% are supportive of protection of natural areas, marine environments, and rivers and over 80% are in favour of increased advertising of national parks.

In terms of awareness, less than 20% of Atlantic Canadians can correctly identify the federal government department, Environment Canada, responsible for management of the National Parks and only 12% concerning National Historic Sites. However, awareness and use of actual parks and sites is very high. Virtually all Atlantic residents are aware of at least one national park or historic site, more than 80% are aware of at least seven national parks or sites and nearly 60% are aware of 10 or more. More than 97% of Atlantic Canadians have visited a national park or site at some time in their lives. During the previous two year period, more than 76% have made at least one visit to either a national park or site and more than 30% of the approximately four million visits made annually to the national parks and sites in the Atlantic Region are made by Atlantic Canadians.

Awareness and visitation to Atlantic region national parks and sites is affected by the distance required to travel to them, their relative location to the population base, and the need to use ferries to access two provinces. This is particularly evident in the case of Fundy National Park in New Brunswick. Awareness is extremely high within New Brunswick and adjacent provinces of Nova Scotia. However, it is substantially lower in Newfoundland. This distance pattern becomes more pronounced when considering the 'ever visited' results for Fundy. A very high percentage of New Brunswick residents have visited the park, but the proportion of residents of other provinces visiting drops dramatically as distance increases. This pattern is consistent for nearly all of the parks and sites.

Over 62% of trips to the Region's parks by residents are over two hours travelling time one way and 40% are of travelling times of four or more hours one way. Even relatively nearby parks can require substantial time investments, particularly in Newfoundland. However a substantial percentage of the population of the Atlantic provinces is within a two hour travelling distance of the national parks and sites in their home province. In the case of New Brunswick and Nova Scotia, 100% of the population is within a six hour travelling distance. This indicates much visitation to the parks (65%) considering the substantial distance from home should occur within province.

Atlantic Canadians' ability to visit a specific or set of specific parks and sites is conditioned by the number of opportunities available and competing destinations within the time frame of the opportunity. Motivations for visiting must also be considered when attempting to determine potential opportunities for providing CPS benefit. The main reasons for going to parks are to enjoy nature and beautiful scenery. Considering the distances required to travel to many parks or sites, the locations which become competitors to CPS for the shorter opportunity times are destinations close to the potential visitor and those which offer similar experiences. The destinations which become competitors for longer available periods of time are not necessarily other outdoor recreation and historic sites in the region.

Understanding Potential Travel Behaviour

Understanding the level of awareness, support, and general use of the Atlantic region parks and sites is important, but does not provide for complete understanding of the potential opportunities for providing CPS benefits to Atlantic residents. Additional factors influence travel behaviour. Atlantic residents' trips with visits to national parks or historic sites are only one component of the larger phenomenon of travel behaviour.

The factors of perception, awareness, distance to travel, available time, and others must all be considered in an attempt to determine potential opportunity for provision of CPS benefit. However, the process of calculating a conversion rate for each park or site and averaging that conversion rate in comparison to the percentage of the population having made a visit in the past two years leads to the conclusion of a current, low conversion rate for each facility. Considering the high degree of specific park or site awareness, this would indicate a substantial amount of potential. However, such a process neglects other factors operating to influence travel and destination choice.

When compared to the volume of travel generated to either similiar destinations, or to travel motivated by seeking to fulfil

a set of similiar experiences, a better understanding of potential can be achieved. If studied in terms of potential trips generated and the behaviour and motivation behind those trips in relation to the current CPS market niche, opportunity for potential provision of benefit can be more accurately determined.

Travel behaviour is influenced by several factors. Research regarding travel attempts to understand why people travel and what factors influence decision making processes (Burnett, 1981). Travel generally occurs as a result of people seeking alternative spaces where they can participate in activities. Recreation related travel has long been thought to be particularly influenced by factors such as socio-demographic characteristics, availability of alternative destinations, and the availability of activities sought.

Although socio-demographic characteristics have been considered primary influences of travel behaviour, recent studies have provided support for substantial consideration of activities participated in during travel as strongly dictating destination choice. To understand opportunity to provide CPS benefit to Atlantic Canadians, it is necessary to consider motivations to travel and activities participated in while travelling. In addition, it is key, in investigating potential participation, to consider the market share of trips whose destinations were national parks or sites in comparison to total trips generated.

However, determining potential travel behaviour is, at best, difficult. Researchers make use of numerous methodologies and models attempting to predict or forecast quantities of travel behaviour. Several factors must be considered in attempting to forecast tourism and travel demands and the nature of forecasting can take various forms or models including: trend extrapolation; structural models; simulation models; and qualitative models (Smith, 1989). No single model is best for all criteria and often trade-offs must be considered between models which will provide ideals, the greatest accuracy, and precision and constraints imposed by time, budgets, and other resources.

Forecasting market potential is an essential aspect of market measurement. Forecasting is not, however, an exact science. The objective of forecasting is to guide or assist informed judgements for marketing and development (Jefferson and Lickorish, 1988). That is, identifying potential can indicate possibilities, a range of options, or perhaps orders of magnitude, not necessarily precise figures. Additional procedures exist in examining travel or tourism potential and forecasting in this vein. Kent (1990) discusses opportunity sets concerning people, places, and priorities in regards to their holiday choices. This is a multi-dimensional consideration beginning with a perceived opportunity set which includes those destinations of which a traveller is aware. This set is conditioned by pre-search decisions of the type of holiday and possible destinations able to provide the most satisfying experience. Thus, the search for possible destinations to provide for the desired experience is limited by available information concerning those places.

A consideration set is subsequently formed as the perceived opportunity set is condensed to the number of options worthy of detailed consideration. The perceived set of all known opportunities is thus reduced to a consideration set of the preferred options. The identification of a realisable set of opportunities is further conditioned by an individual's attainment ability. Here, operational models of spatial behaviour can be used to identify more specific predictions or forecasts.

the current CPS market niche is more accurately attainable than precise predictions or forecasted numbers of travellers. The identification of this opportunity potential, in a manner similiar that discussed by Kent (1990), is considered in determining the potential for provision of CPS benefits to Atlantic Canadians. Travellers have to be aware of CPS to be considered potential beneficiaries. In order to inform them, CPS must know in advance what their travel behaviour is and what they are doing in order to know what to make them aware of and to develop methods of providing the information.

Methodology

The Canadian Travel Survey (CTS) information for each province, by each quarter of 1988, was analyzed separately. Quarter breakdowns were winter (January through March), spring (April through June), summer (July through September), and fall (October through December). These compare favourably with the CPS peak and shoulder operating seasons. Analysis and discussion here pertain to a breakdown of person trips generated by New Brunswick residents only in the second quarter of 1988. Each person trip generated was broken down by: province of origin; main purpose (pleasure or business/personal); visit to a national park, historic site, or neither; duration (number of nights away from home); distance (travelled one way measured in kilometres); province of destination (including international); and activities participated in.

As a result of this exercise segments of travel behaviour, or patterns of trip generation, were established. Many activities in which travellers participated were recorded and subsequently measured against meeting the current CPS offer of: i) active outdoor recreation; ii) passive recreation; iii) sightseeing; and iv) history or culture. Several activities, and the resulting trips generated, did not match the CPS market niche and were not considered as activity areas for potential. These trips and activities represent many of the alternative activity and destination choices available to travellers.

The volumes of trips and park or site visits were mapped in terms of origin, season, purpose, distance, time, and destination. Trips to national parks and sites were then compared to provide an actual capture rate of total trips generated by residents. Further, the volume, destinations, and purposes of trips in the areas of active outdoor recreation, passive recreation, sightseeing, and history and culture were mapped into a matrix similiar, but expanded, as that presented in Figure 1.

Opportunities where benefit from CPS could be provided were subsequently identified and ranked according to actual volume of trips meeting the travel behaviour patterns. Opportunity segments identified by travel behaviour are discussed in actual numbers of person trips qualifying under a trip pattern. CPS could not attract nor service these entire segments. Rather, at an optimistic rate, 10% of these totals would be considered a substantial accomplishment.

Behaviour and Opportunity Potential for New Brunswick Residents - Second Quarter (Spring, 1988) - April Through June

More than 875,000 person trips were generated by New Brunswick residents in the second quarter or spring period. As detailed by information presented in Table 1 just 2.7% and 1.5% of those trips included visits to a national park or historic site, respectively. Nearly 70% of the trips were primarily for pleasure or visiting friends or relatives. Shopping, nightlife and dining and VFR are the most frequently participated activities. 63% and 53% of all trips included these activities respectively.

Sightseeing (21%) and outdoor activities (14%) also are frequently parts of trips.

Table 2 provides information indicating the primary trip patterns which included a visit to a national park during this quarter. All were to a destination within New Brunswick of a distance of 80 to 160 km and included various activities, sightseeing being the most common. No distinct travel patterns were evident for trips including visits to historic sites.

Visit Status: (park, site, neither)
Trip Purpose: (pleasure, business)

Dur Night	Dist (km)	Dest. Province	Active Rec.	Cult Hist	Sight See	Pass Rec.
0	< 80	within own adjacent other Atl. other Can. Internat.				
	80-160	within own adjacent ...				
	160-650	within own adjacent ...				
	> 650	within own adjacent ...				
1 ...	< 80 ...	within own adjacent ...				

Figure 1. Opportunity Potential Matrix.

Table 1. Trip purpose and visit status.

Visit Type	VFR %	Pleas %	Pers %	Bus %	Total
No Park /Site	31.7	35.0	14.0	15.3	840,654 95.8
Park	1.1	1.5	0.0	0.1	24,017 2.7
Site	0.3	1.1	0.0	0.1	12,658 1.5
TOTAL	32.5	37.7	14.0	15.5	877,329

Table 2. National Park visit trip patterns.

Purp	Dur	Dist (km)	Dest Rec.	Active Hist	Cult See	Sight Rec	Pass
Pleas	1	80-160	N.B.			X	
Pleas	0	80-160	N.B.			X	
Pleas	0	80-160	N.B.		X		X
Pleas	2-3	80-160	N.B.	X			

Information presented in Table 3 provides an overview of the CPS opportunity segments, based upon travel behaviour, identified for New Brunswick residents travelling in the second quarter of the year. Significant potential exists for national parks in the areas of active outdoor recreation and sightsee.

Table 3. Ranked opportunity segments.

Purp	Dur	Dist (km)	Dest	Active Rec.	Cult Hist	Sight See	Pass Rec
Pleas	2-3	160-650	N.B.			27,067	
Pleas	0	80-160	N.B.	26,302			
Pleas	2-3	160-650	N.B.		17,051		
Pleas	0	80-160	N.B.			15,491	
Pleas	2-3	160-650	N.B.	12,011			
Pleas	0	80-160	N.B.		9,530		9,530
Pleas	2-3	160-650	N.B.		9,153		9,153
Total				118,275	129,299	174,776	54,272

The significant travel pattern segments of important consideration for parks are those of 2 to 3 nights in duration, 160 to 650 km. in distance travelled, and those of 0 nights duration and just 80 to 160 km. in distance. 15.5% or 27,000 of the 175,000 trips which included sightseeing were of the 2 to 3 night, 160 to 650 km. nature. An additional 12,000 (10.2%) of the 118,000 trips which included outdoor activities were also of this pattern. The 0 night, 80 to 160 km. travel pattern resulted in over 26,000 trips (22%) including active outdoor activities and over 15,000 (9%) trips including sightseeing. Considering only a small percentage of these trips could be attracted, limited but clear opportunity exists.

As most trips which did include a visit to a national park were of the 80 to 160 km distance, the longer trips were potential exists should be explored. Fundy and Kouchibouguac are within 160 km of Moncton but are farther from the larger centres of Fredricton and Saint John and much of the rest of the province. Potential opportunity for consideration of historic sites primarily rests in the 2 to 3 night duration, 160 to 650 km. travel pattern. More than 13% (17,000) of the trips which included cultural and history related activities were of this nature. Again, this total of person trips provides limited but definite CPS opportunity.

Summary and Conclusions

Opportunities for provision of CPS benefit to New Brunswick residents during the second quarter, and generally for all Atlantic residents, were generally found in the activity areas of active outdoor recreation and sightseeing which can be provided for in the national parks. Opportunities also were identified, but to a lesser extent, in the history and cultural activity area which can be fulfilled by historic sites and parks. Travel patterns varied for the primary opportunity segments, but travel behaviour generally took the form of 2 to 3 nights in duration, within a one day drive in distance from home, and for the primary purpose of pleasure.

The amount of opportunity evident during the summer period must be cautioned as CPS facilities, particularly the national parks, are at or near capacity at various times during the summer season. In understanding the type of travel patterns which could lead to increased visitation, CPS subsequently knows which travel segments to necessarily not attempt to attract.

The domestic, provincial traveller is often a neglected, if not forgotten, market particularly with provincial tourism departments and agencies. Opportunities do exist for provision of direct benefit to Atlantic residents by CPS. Consideration of park or site resource and service capacities must be made at various times of the year. However, at most facilities, such capacities generally could allow for increased provision of benefit. Consideration of opportunity segments and travel behaviour identified here should be made in future marketing and communications strategy development.

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FAMILY STRUCTURE AND ITS RELATIONSHIP TO TRAVEL

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This paper examines the relationship between family structure and travel to further understand what differences exist between family groups. Results indicate that the absence of a husband delays travel for single mothers and that they are not as well-off as their married counterparts. We examine other travel and leisure studies to make comparisons with these data, begin to construct a picture of parents who travel and comment on the analysis of family leisure. [1, 2]

Introduction

Kaplan (1974) suggested that leisure, individuals, and family units cannot be understood separately and that a person's leisure is inextricably affected by the family. However, families are changing. In 1970, 40% of America's households were made up of married couples with one or more children under age 18. In 1980, the proportion dropped to 31%. The 1990 census indicates that today only 26 % (or one in four) of American households are traditional nuclear families (New York Times 1991). Some view the female headed household and the rising divorce rate as an indication of the demise of the family. The more accepted view of marriage and family scholars is that this new family form is consistent with changing demographics and emerging economic independence of women (McLanahan and Booth 1989). Currently 14% of all family households are headed by single mothers (United States Bureau of Census 1988). The number of families headed by women without a husband is expected to be 12.9 million by the year 2001 (American Demographics 1987). In a study by Norton and Glick (1986), 88% of single parent families were mother-child families. Bumpass (1984) predicts that if present trends continue nearly half of all children born since 1975 will live in a female headed household during a portion of their youth before they reach age 18. In 1984, 66% of women who had sole custody of their children under 18 years of age were members of the labor force. Approximately one of two single mothers is living below the poverty line, as compared with one in ten married couples with children. (Garfinkel and McLanahan 1986). Economically these families are increasingly holding a disadvantageous position relative to other family groups.

For those involved in planning and providing travel experiences these demographic changes suggest that women who head single parent households and their families may possibly have different travel styles than individuals and families of households where both parents are present. To assume that single parents travel as frequently and in the same manner that parents from husband-wife families do is to assume that the roles, role expectations and everyday demands on members of these families are the same. This mistake could lead to misconceptions about family life, confound the study of family travel and encourage inappropriate management of family or independent travel experiences. Providing professionals with travel data based on the typical notion of the nuclear family encourages the management of family travel counter to demographic trends. In this study we hope to: 1) describe the differences between those parents who travel and belong to husband-wife families and single female headed families; 2) demonstrate the relationship between family structure (single female headed families v.s. husband-wife families) and travel frequency; 3) compare our data to previous studies of family structure and travel; and 4) make recommendations to managers and researchers based on this exploratory study.

Literature Review

Family roles tend to influence leisure decisions through the life course and across social contexts, even when no other family member is present. Shifts in social roles (such as a divorce) and developmental tasks (such as learning to manipulate a ball) could result in a change of leisure motivations and satisfactions (Osgood and Howe 1984). Cornell (1989)[3] suggested that family composition (e.g, children present, number of adults and senior citizens within the family group) may provide different opportunities for leisure participation. Most notably, Kelly (1974, 1978 and 1980) has demonstrated the usefulness of using the family life cycle to describe the leisure participation of individuals and families. Others (Bollman, Moxley and Elliot 1975; Buchanan, Christensen and Burdge 1981; Burch 1964; Burch and Wegner 1967) have demonstrated how leisure experiences are effected by the family life cycle and the the presence or absence of children. The majority of these studies however have focused primarily on the traditional two parent family. This study seeks to further understand single parent families and leisure.

An additional purpose of this paper is to compare our data with that of other family travel research. While the work that covers this topic is limited, two studies are of interest. What we know about family structure and travel comes largely from Better Homes and Garden (BHG) study conducted by the U.S. Travel Data Center (Mason 1990). The study divided the summer of 1989 travel market into families that consist of married couples with children, married adults 18-44, married adults 45 and up,

1/The data utilized in this paper were made available by the Indiana Division of Tourism and Film Development. The data were originally collected by National Family Opionion, Inc. Neither the collector of the original data nor the Indiana Division of Tourism bear any responsibility for the analysis or interpretations presented here.

2/Support for this paper was partially provided through a cooperative research project, U.S. Forest Service, North Central forest Experiment Station, Chicago, Illinois.

3/Cornell, C. 1989. Family Composition and activities auxiliary to developed camping. Unpublished Masters Thesis, Purdue University, West Lafayette, IN.

married couples with children and not married, with and without children. It is those who are not married with and without children that may be the most insightful into how family structure influences travel. Of this group 48% of the households included children. The segment had the highest rate of plane travel, rental car usage, travel agent consultations, weekend trips during summer and fall, and travel for outdoor recreation. When we compare them to the married couples with children in the same data set, it is important to note that married couples with children use hotels/motels at a lower rate than singles and had a high usage of camper/RV's/trailers and tents for lodging. Married couples with children were the most affluent group and highest educated. On the other hand not married with and without children were the least affluent, 18-26 % of the segment were divorced or separated, and they were the least educated.

The second study with comparable data is a study of resort motivations for different family life cycle stages by Hill, McDonald and Uysal (1990) . Although the study concerns resort motivations and not travel frequency or the propensity to travel, the research does include single parents. However they were not able to place any real emphasis on single parents due to the small sample size. In this work, single individuals with children felt that health and social motivations were important when choosing a resort vacation.

We do not know if the marital status of parents inhibits or encourages leisure. With respect to travel, frequency, style, purpose of travel and/or travel destination may be effected by child care issues, income, custody arrangements and/or other factors which occur due to family structure. Questions remain as to whether or not the structure of the family creates the same leisure opportunities for members of different family types.

Methods

To initiate this investigation, secondary data were obtained from the The National Family Organization (NFO). Each quarter of the year NFO sends questionnaires to a panel of over 30,000 households. The data is household based and details the respondents age, ages of other household members, household income, education level of both male and female adults, family living situation, a number of other demographic items and states visited. A second file details four pleasure trips of one hundred miles or more round trip where the respondent stayed at least one night away from home.

Data for this study are from the summer of 1988 (July, August and September). For comparison purposes distributions of both travelers and non-travelers are presented. Households were divided into family structure categories based on the respondents marital status and the presence of children in the home. This study compares households which consist of two parents and households which consist of single females with children. Households that consist of single males with children are excluded from this study because only about two percent of all single parent households are headed by single fathers. Women who had children and were never married, widowed, divorced or were separated were considered single. Life cycle stages were predefined in the data set. They are: 1)'young parents'-parents under 45 with children under 6; 2)'middle parents'-parents under 45 with children 6 and over; and 3) 'older parents'-parents 45 and over with children of any age living in the household. The number of married respondents included 5,362 households and the number of single respondents included 905 households. For respondents who did not travel, married respondents represented 5,734 households and single respondents represented 1,730 households.

Chi-square test and were used to identify unique demographic characteristics of travelers. A multiple analysis of variance (SAS 1985) determined if number of trips were significantly different between the two groups. Demographic variables (identified by Chi-square tests) and marital status were used as independent variables in the model.

Results

Results of the the demographic and economic profile of married parents and single female parents are shown in Table 1 and Table 2. Due to the large number of cases in this sample each of the Chi-square test were significant at the 0.001 level . One of the original goals of this study was to determine if family structure along with other variables would have an effect on travel frequency. After multiple analysis of variance was computed using life cycle, education and income separately with marital status as an independent variable, there were no mean differences in the number of trips taken for either married or single parents. These results were surprising and will be discussed later. Highlighted here are some of the more notable results of the cross-tabulations.

Single women with children who travel, are more often in the middle parental stage, having the youngest child at home between six and twelve years old. Married women with children travel during the early and older parental stages. For married women travel decreases during the middle parent years. These percentages are somewhat similar to non-travelers. However, our population of interest, single parents who travel, show somewhat of a higher incidence during middle parent years and a lower percentage during the early parent years than non-travelers. Being a single parent with preschool children does appear to constrain travel. These single women who had children at home were also slightly older than married women with children. However, this may be due to the life cycle stage during which these women travel .

Table 1. Parental Stage of Travelers and Non-travelers, Summer 1988.

	Travelers		Non-travelers	
Parental Stage	MP[a]	SP	MP	SP
	(%)		(%)	
Early Parent	37.1	15.6	37.5	19.7
Middle Parent	27.7	44.8	28.0	38.9
Older Parent	35.2	39.7	34.6	41.3
Total	100.0	100.0	100.0	100.0

a/ MP = married parent. SP = single parent.

Household income for single women with children who travel is far less than that of married couples. For married couples with children the percent of families in each increasing income category rises. For single women with children the percentage of families in each increasing income category decreases. For summer 1988 non-travelers however, the percentage of female headed households making $15K or less is 52.5%, while among summer 1988 travelers incomes of female headed household making $15K or less is 32%.

Educational attainment for married women with children is higher than single women with children. Slightly more married women with children received college and post-graduate degrees. A majority of single women with children have high school education.

Table 2. Sociodemographics of Travelers and Non-travelers, Summer 1988

	Travelers		Non-travelers	
	MP[a]	SP	MP	SP
	(%)		(%)	
Female Age				
under 30	15.8	11.7	21.1	15.2
30-39	39.8	32.9	38.6	29.7
40-49	27.8	25.8	23.5	22.1
50-59	12.4	13.7	11.5	15.4
60+	4.2	16.6	5.4	17.1
Total	100.0	100.0	100.0	100.0
Household Income				
(Income in dollars)				
Under $15K	4.5	31.9	12.5	52.5
$15-19,999	7.3	22.2	13.0	18.6
$20K-29,999	16.0	21.0	20.9	14.3
$30K-39,999	21.0	11.3	19.1	7.2
$40K-49,999	30.9	8.8	22.8	4.9
$50K-84,999	13.6	3.4	10.6	2.5
Total	100.0	100.0	100.0	100.0
Female Education				
(Years)				
8 years or less	0.8	1.1	2.3	4.7
1-3 years H.S.	2.6	5.5	6.6	12.9
High school	33.6	35.0	45.6	41.3
College 1-3 years	33.5	37.5	27.8	29.7
4yr. College	17.3	11.2	10.5	5.9
Post-Grad	14.1	9.6	7.0	5.3
Total	100.0	100.0	100.0	100.0
Race				
White	97.0	90.3	95.3	84.9
Black	1.4	7.9	2.4	11.9
Asian/Pacific	0.5	0.4	0.5	0.4
Other	0.7	0.8	0.9	2.9
Total	100.0	100.0	100.0	100.0
Market Size				
(Population of Residence)				
Under 50,000	26.0	23.5	34.4	29.4
50,000-499,999	21.0	22.1	19.6	21.5
500,000-1,999,999	18.7	18.1	16.6	19.4
2,000,000 or more	34.5	36.2	29.4	29.8
Total	100.0	100.0	100.0	100.0

[a] MP = married parent. SP = single parent.

The majority of the NFO sample is white. Of non-travelers two percent of married parents are black and 12 % of single parents are black. Of travelers only around one and a half percent of the married parents are black and about eight percent are single. Around eight percent of single women with children who travel are black as compared to two percent of married women with children who travel. Hispanic populations were to small in the sample to be measured.

Discussion

Although these data are cross-sectional and the percentages of persons traveling at different life cycle stages may be a function of the number of respondents in each life cycle stage, these data are consistent with todays life cycle trends. Divorce is the primary cause of a white household being headed by a single female. It is important for leisure and travel planners to note that women often become single parents due to divorce soon after their children enter grade school (approximately during the 7th year of marriage). These women will often remarry after 6 years of heading their household alone (Levitan, Richard and Gallo 1988) and become involved in a two parent family again. If travel opportunity providers encounter single parents the the largest majority of them will be in their middle parent years.

Leisure style and frequency have both consistently been shown to be impacted by the development of the family. Classic family life cycle stages are driven by the presence and/or absence of children and spouses. Variables which are based on the age of the oldest child (Bollman et al. 1975; Burr, Nye and Reiss 1979) stages based on the age of the youngest child (Witt and Goodale 1981), stages based on the number of years married (Orthner 1975) and simple pre-parental, parental and post parental stages (Kelly 1974) have all been used to characterize the development of the family in leisure research. Family scholars however have begun to criticize the traditional family life cycle concept for excluding couples who never have children and one parent families (Nock 1979; Murphy and Staples 1975). We have expanded on the work of leisure scholars (Bollman et al. 1975; Kelly 1974, 1978, 1980; Witt and Goodale 1981) by including marital status which allows for the inclusion of single parents.

The suggestion that travel waxes and wanes according to family structure and family life cycle stage is particularly interesting because of the similarity to Burch and Wenger's (1967) work on three styles of family camping. Burch and Wenger found that the age of children had a significant effect on the camping style in which individuals participated. These data suggest that the age of family members (family stage) and the marital status of parents may influence when travel opportunities will be available to parents.

This research suggest parental travel is either constrained or encouraged by family roles and responsibilities. What is yet to be investigated is how these roles and responsibilities effect the style of travel. For example, the difference in income between single parents and married parents probably influences accommodation choice and activities. A preliminary analysis of the same data indicates that single parents more often will visit family and friends during pleasure trips. With 10.2 million single mothers in the U.S. today (American Demographics 1987) it is crucial that leisure and travel professionals begin to investigate the needs and wants of this market. Currently available data on parental /family travel is limited to an application of the family life cycle to a tourist setting (Kerstetter and Gitelson 1989), family decision making (Jenkins 1980; Nichols and Snepenger 1988), research which includes single parents with single adults (Mason 1990) and work dealing with motivations (Hill et al. 1990). This study has provided a base for comparison of socioeconomic characteristics of single and married parents to future studies.

Now travel research on the family needs to move on and investigate destination and accommodation choice, preferred activities, purpose of trip, booking activities, etc.

When comparing our data to others, results from this study are similar to the BHG study with respect to the economic condition of singles parents. In addition education levels of single and married parents in this study were similar to others. However our preliminary analysis of the purpose of trip for married and single parents showed that single parents more often visit family and friends than travel for outdoor recreation. The differences may obviously be due to the construction of family categories in each data set. The BHG study should be viewed with extreme caution. The category not married with and without children is not mutually exclusive. It is possible that not married individuals without children could skew results, creating an inaccurate travel profile of those who do have children.

Travel data collection needs to be expanded to included single parents and to refine family stages. In particular leisure scholars have been in the habit of using the term 'empty nest'. We are far behind the family scholars who have recognized the stage in a married couples life without their children as not empty but full of life and activity. Retired or older couple might be a more appropriate designation. Not only should travel researchers begin to include the single parent in their analysis of the family but all leisure research needs to consider this family form separate from married parents.

Our analysis found no differences between married and single parents with respect to the number of times traveled during the summer of 1988. This is puzzling, because of what we know about the correlation between income and the propensity to travel. However our analysis is limited to three month periods. We have no way of determining if differences exist between the two groups for an entire year. Our future analysis might further explore the possibility that pleasure travel is different for these populations by examining the number of nights away from home a trip included.

Although this study and the others mentioned are each incomplete and in no way complementary we can begin to sketch a picture of how family structure influences travel. From our analysis it appears as if six stages of family travel exist. These stages of travel will wax and wane along with the family life cycle depending on an individuals marital status. Single women with children over six will be the travel providers main concern. Travel providers will need to be aware that pricing is very important to these women, because of significantly reduced income compared to married couples with children. Singles travelers with and without children are weekend travelers during the summer and fall, they make arrangements through travel consultants and single parents may most often be concerned about health and social motivation when choosing a vacation. These characteristics will have a number of implications for planning activities for family vacationers and for attracting this particular market. Mothers traveling with their grade school children may desire separate programs for children or they may wish travel agents to plan their trips due to time constraints. Single mothers may even perceive different vacation travel as unattainable due to cost or the type of trip available. Further research directed at the motives, perceptions and travel styles of parents will increase our understanding of this new and growing market.

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OBSERVING THE DIFFERENCES BETWEEN WEST GERMAN OVERSEAS PLEASURE TRAVEL MARKETS TO THE U.S. AND CANADA THROUGH THE NOVELTY VS. FAMILIARITY THEORY

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This study identifies motivational factors that aid in the classification of several pleasure travel groups in the West German travel market. Through the use of the 1989 Pleasure Travel Market Survey, factor analysis was used to group items listed in the survey question 'Importance of reasons for taking an overseas trip.' These groups were examined to determine differences among them. Through the use of this survey and past travel theories, a better understanding of travellers' motivations and how they interact during the pleasure travel experience has been found.

Introduction

The purpose of this paper is to test the novelty versus familiarity theory proposed by Cohen (1972) using data on West German international travellers. The objectives of this paper will be to: 1) Examine relationships among motivations for overseas travel to determine whether motivational groups similar to what Cohen has suggested can be found among the West German international travellers; 2) Compare the survey variable 'Importance of Items when choosing an overseas vacation destination' among the resulting motivational groups; 3) Identify any demographic/socioeconomic variables that help characterize the West German motivational groups.

Factors Influencing Travel

Eric Cohen has contributed much to the understanding of tourist behavior. He cited a model based on the visitor's need for the novel. However, this model also included the fact that tourism is accompanied by a large degree of unfamiliarity (Cohen, 1972). The traveller, especially the international traveller, can be considered a kind of temporary stranger who has willingly chosen to enter an area that is geographically, personally, socially, and culturally foreign (Greenblat and Gagnon, 1983).

1/ The data utilized in this paper were made available by Tourism Canada. The data for the West German Pleasure Travel Market Study, 1989, was originally collected by Market Facts of Canada. Neither the collector of the original data nor Tourism Canada bear any responsibility for the analysis or interpretations presented here.

The ability to travel to this new environment is not usually accompanied by the desire to discard all of the individual's native values and patterns of behavior. Most need something to remind them of home, some anchor to cling to in the midst of the strangeness of a new society and culture (Cohen, 1972). The typical reaction to this unfamiliarity, according to Cohen, is the formation of an "environmental bubble" in which the tourist immerses himself as protection from the alien environment. As a result, there is, on the one hand, an expression of a need for the novel, for adventure. However, there also are strong feelings about being guided, making plans before leaving, and being able to find someone that can speak their own language. On this note, it seems that the visitor still needs something like a "safety net" to allow for some assurance that the trip will be a quality experience (O'Leary and Uysal, 1988).

International Traveller Segments

In his work, Cohen (1972; 1979) identifies the fact that tourists do indeed need a measure of security or familiarity to hold on to when travelling, while at the same time wishes to experience the novel, the exciting, and the strange. In other words, each individual can be placed on a continuum, with the least amount of desired novelty (and the greatest amount of familiarity) on one end of the scale and complete assimilation to the host country on the other end.

The result of this continuum is the development of a typology of four tourist roles, based on the amount of influence the "environmental bubble" has on the tourist's interaction with the host culture, namely, the organized mass tourist, the individual mass tourist, the explorer, and the drifter. The organized mass tourist seeks the most familiarity and the least novelty in a trip, by mostly using guided tours to encounter the host culture, travelling with others that speak the same language, and having all of the events of the trip preplanned. As the amount of needed familiarity decreases and the desire for novelty increases, the "environmental bubble" shrinks. Finally, the drifter is found at the other end of the spectrum. This traveller's bubble vanishes altogether. S/he discards the need for familiarity almost entirely and attempts to assimilate with the host culture by going as far as sharing the host's shelter and customs, and even may take on odd jobs to continue living in that destination. The drifter may be considered something other than a traveller at this point.

Kucukkurt (1981) defines two categories of motivation that seem to extend Cohen's novelty theory to another dimension. The first category, described as the "avoidance" category, was hypothesized as including such attributes as seeking mental or physical relaxation, getting away from a mundane home or work environment, or socializing with others. The second category, or the "approach" category, includes the desire to learn new things, discover the self, or to seek adventure. This second category is similar to Cohen's novelty scale. Together, these two broad categories serve to define important motivations for pleasure travel.

Trends in travel to the U.S.A. and Canada

Some analysis has been done to place West German travellers into segments in order to classify different groups by feelings towards overseas travel (for the travel philosophy segment), reasons for taking an overseas vacation (for the benefit segments), and facilities and services used (for the product segments). As O'Leary and Uysal (1988) have stated, the next logical step is to link the underlying feelings (motivations) of

those surveyed with their reasons for choosing the destinations that they visit. These factors along with the demographic and socioeconomic characteristics of the West German traveller will allow the development of more specific and useful user groups for a greater understanding of the overseas traveller to the United States and Canada.

Methods

In 1989, 1,212 personal in-home interviews averaging 50 minutes in length were conducted in West Germany. Respondents in the country were those 18 years of age or older who took an overseas vacation of four nights or longer by plane in the past three years, or who intended to take such a vacation in the next two years. Overseas travellers include any country outside of Europe (including the United Kingdom) and North Africa. It must be noted that, though all of the West German travellers surveyed are potential visitors to the United States and Canada, they may also travel to the Orient, Australia, Asia, etc.

In applying Cohen's constructs to these data with Kucukkurt's escape category addition, it is important to note that the sample of travellers does not represent the full spectrum of all travellers. These travellers are those who have chosen to take a longer trip away from home in which the proportion of time and money spent would generally be assumed to be much higher than found in other types of tourism travel. In addition, because this travel represents an overseas trip, the barriers to information flow about the destination are greater. Therefore, we would expect the traveller to be more dependent on institutional sources of information.

Determining motivational groups

In order to determine the motivations behind why people travel the way they do, the items in the questions 'Importance of reasons for taking an overseas trip' from the West German international travel survey were grouped into seven different classes through factor analysis by using the SPSS-X statistical package.

Factors with an eigen value greater than 1 were selected for examination. Items with factor score coefficients greater than 0.4 were included in the identified factors. With the help of previous literature (Statistics Canada, 1986), Factor 1 could be identified as the 'novelty' group and Factor 3 was identified as the 'escape' group. Other factor groups, such as the 'status' and 'physical activity' groups in the literature from Statistics Canada were excluded from this study. In order to weight the responses of each group accordingly, factor scores were computed for each travel group. The variable 'Importance of reasons for taking an overseas trip' has a 4-point scale ranging from very important (a value of one) to not at all important (a value of four). In this case, a low factor score means the items in a factor group are important. The lower the respondent's factor score, the more likely s/he was to identify the reasons in one of the factor groups as being important. Utilizing the two factor groups simultaneously results in four possible categories in which a respondent could be placed:

1. A low factor score (less than 0) for both the novelty and escape factor groups
2. A low factor score (<0) for the novelty factor group, but a high factor score (>0) for the escape factor group
3. A high factor score (>0) for the novelty factor group, but a low factor score (<0) for the escape factor group
4. A high factor score (>0) for both the novelty and escape factor groups.

Variables of interest in the data set

There were several characteristics that Cohen (1972) identified as being important in describing his novelty group. Several of these variables can be found in the international travel data set for West Germany. His explorer category is a good example of how an individual with a high desire for the novel might be characterized. This type of pleasure traveller does not have all plans made in advance, is not always bound to a group, and makes decided efforts to get off the beaten track. This role also tries to communicate with the people of the host country by speaking their language, and arranges the trip alone rather than with an outside agency. Kucukkurt's escape group identifies the desire to seek new and physically thrilling experiences, socialization, and relaxation. The individual who has a high propensity to escape also should express a need for convenience during the trip. All of the above characteristics can be identified as variables from the West German data set.

The four combined factor groups identified at the beginning of the Methods section were utilized to test Cohen's and Kucukkurt's tourist role typologies. The variables that Cohen and Kucukkurt used to identify their typology roles were compared among the four derived categories.

Results

Each of the four categories contained a reasonable sample of individuals. Of the 1,212 respondents in the survey, 384 (31.7%) were described as having a high propensity for novelty and escape, 218 (18.0%) had a high desire for the novel, but low for escape motivations. Conversely, 245 (20.2%) of the respondents expressed a low desire for characteristics in the novel category, but were high on the escape scale, and 365 (30.1%) were described as low on both the novel and the escape scales. For some of the tables provided, the groups are summarized with smaller frequency totals than those specified above. The discrepancy was caused by missing values present in those variables. This does not, however, affect the resulting percentages reported in those tables.

Trip characteristics

There were a few significant differences among the trip types for the four groups. Touring trips were significantly higher for those respondents who were high on the novelty scale, but low on the escape scale. The only other significant trip type was the resort trip. The 'novelty only' group was significantly lower in the percentage of respondents who took this type of trip, while the 'escape only' group was just the opposite, with 42.9 percent of those individuals indicating that they had taken an overseas resort trip in the past year.

All other trip characteristics were not significantly different, and therefore were not listed in a table for the sake of brevity. All four groups seemed to be accompanied by the same people on their trip, with approximately half of each group being accompanied by their spouse. The most important source of information used to plan the trip was also similar among the four groups, with the travel agent as the source used most. The number of nights spent on the trip were also not significantly different among the four groups, ranging from average of 22 nights for the 'escape only' group to 27 nights for the 'novelty/escape' group.

Demographic characteristics

There were greater differences among the demographics, however, as Table 1 shows.

Table 1. Selected demographic characteristics.

Characteristic	Group 1 (%)	Group 2 (%)	Group 3 (%)	Group 4 (%)[a]
Age				
18-24	16.7	12.4	13.1	15.6
25-34	32.3	21.6	27.8	22.2
35-44	22.9	10.6	27.3	17.8
45-54	17.4	23.4	20.8	17.8
55-64	8.3	17.9	8.6	15.1
65+	2.3	14.2	2.4	11.5
Education completed				
Primary	25.5	19.7	31.0	34.8
Junior high	28.9	28.9	33.9	27.1
Technical	8.3	13.3	9.8	7.7
High school	24.7	19.7	17.1	20.5
University	12.5	18.3	8.2	9.9
Marital status				
Single	40.6	28.4	29.4	31.5
Married	44.5	50.9	55.9	48.5
Living together	5.2	3.7	3.7	2.7
Divorced/Separated/Widowed	9.6	17.0	11.0	17.3
Total respondents in each group	**378**	**209**	**243**	**355**

a/ Group 1 = Individuals who are high on both novelty and escape scales
Group 2 = Individuals who are high on novelty scale only
Group 3 = Individuals who are high on escape scale only
Group 4 = Individuals who are not high on either motivation scale

The average ages were significantly higher in the 'novelty only (45.3 years)' and 'neither reason (42.9 years)' groups than the other two (37.1 years for the 'novelty/escape' group and 38.4 years for the 'escape only' group). The escape aspect of the groups seems to affect the age distribution more than the novelty aspect. Education, on the other hand, seems to be more affected by the novelty motivation. The 'novelty/escape' and the 'novelty only' groups have a significantly greater proportion of individuals who attended a university than those individuals in the groups who are low on the novelty scale. The 'novelty/escape' group contains a greater proportion of unmarried individuals than the other three groups with 40.6 percent of the respondents, compared to 28.4 percent for the 'novelty only' group, 29.4 percent for the 'escape only' group, and 31.5 percent for the 'neither reason' group. A slightly greater proportion of the married individuals were in the 'escape only' group, shown in Figure 3. In general, the income levels were higher when the escape motivation was high.

Travel philosophy

Table 2 lists several travel philosophies in which at least one of the four groups has a significantly different mean score (Student's t-test, $p <= 0.05$).

Interesting characteristics appear in each group from these statements. Group 1 (high novelty and escape scores) had a significantly high proportion of respondents who stated that they enjoy making their own vacation arrangements (75.9% agreed or strongly agreed). Conversely, they were less likely to leave others to do the organizing (25.3% agreed or strongly agreed), or to travel on an all-inclusive vacation (42.6% agreed or strongly agreed).

Group 3, the 'escape only' group, had the opposite set of philosophies. These individuals are significantly more likely to use a travel agent to decide on the vacation destination (71.0% agreed or strongly agreed with the statement), to prefer leaving others to do the organizing (44.2% agreed or strongly agreed), and to buy vacations with transportation and accommodations included (66.9% agreed or strongly agreed).

Table 2. Distribution of the variable 'Feelings towards international vacations' for the four West German motivation groups (% 'strongly agree' or 'agree somewhat').

Item	Group 1 (%)	Group 2 (%)	Group 3 (%)	Group 4 (%)
Major trip arrangements a bother/don't travel	14.4	13.9	16.3	22.5
Rather spend money on things besides travel	14.7	13.3	14.7	24.4
Enjoy making own vacation arrangements	75.9	66.0	58.8	63.5
Like to stay put at vacation destination	31.3	26.6	58.4	47.6
Do not have to travel to enjoy vacation	31.6	36.4	32.2	41.7
Like different place on each new vacation	79.9	79.3	60.4	60.0
Important that people speak my language	29.5	29.8	48.1	46.4
Usually use travel agent to decide place	66.3	63.8	71.0	62.1
Prefer leaving others to do organizing	25.3	35.9	44.2	37.7
Usually buy vacations with accom./trans. inc.	55.6	60.0	66.9	58.0
Prefer travelling place to place	62.4	63.7	38.4	46.8
Usually travel on all-inclusive vacation	42.6	49.6	53.0	49.8
Total respondents in each group	**383**	**218**	**245**	**365**

The 'novelty only' group was significantly less likely to stay put at one vacation destination (26.6% agreed or strongly agreed). Groups 1 and 2, those groups that had a high novelty score, had a significantly higher percentage of individuals who agreed or strongly agreed that they like to visit a different place on each new vacation (79.9% for Group 1, 79.3% for Group 2, 60.4% for Group 3, 60.0% for Group 4), and that they prefer travelling place to place (62.4% for Group 1, 63.7% for Group 2, 38.4% for Group 3, and 46.8% for Group 4). Groups 1 and 2 were also less likely to agree that it is important that the people at the travel destination speak their language.

Finally, Group 4 indicated a low propensity to travel at all. These respondents were significantly more likely to agree to statements such as 'Major trip arrangements are a bother/don't travel (22.5% agreed or strongly agreed),' 'Rather spend money on things besides travel (24.4%),' and 'Don't have to travel to enjoy vacation (41.7%).'

Activity participation

The activities found to be significantly different among the four groups are listed according to the percentage of participation in Table 3.

Table 3. Distribution of the variable 'Activities participated in during holidays' for the four West German motivation groups (% who responded yes).

Activity	Group 1 (%)	Group 2 (%)	Group 3 (%)	Group 4 (%)
Attending festivals/ special events	47.4	50.0	37.5	35.6
Getting to know inhabitants	86.9	78.5	71.9	69.2
Fishing	14.6	3.1	12.5	10.6
Sightseeing in cities	83.6	76.9	60.9	68.3
Sunbathing/beach activities	50.7	52.3	62.5	52.4
Swimming	62.0	55.4	70.3	61.5
Tour countryside	70.9	66.2	64.1	57.7
Visit wilderness areas	49.3	45.4	35.2	35.1
Visit galleries/museums	23.0	32.3	12.5	21.6
Visit mountains	25.8	34.6	19.5	23.5
Visit entertainment places	31.0	22.3	34.4	21.2
Visit places historic	63.4	59.2	32.8	39.4
Visit commemorative places	46.5	55.4	22.7	31.3
Visit archaeological places	38.5	42.3	16.4	23.1
Visit scenic landmarks	71.4	66.2	62.5	52.4
Total respondents in each group	**213**	**130**	**128**	**208**

Twenty-three of the thirty-seven provided activities were found to be significantly different at the 95% level for at least one of the four groups. Group 1 (the novelty/escape group) is significantly more likely to get to know the inhabitants of the host country (86.9 percent) and to tour the countryside (70.9). This group is very active, participating in many different activities during their overseas trips.

Group 2 (the novelty only group) is more likely to visit the mountains (34.6 percent), but less likely to go fishing (3.1 percent). Again, the novelty motivation in Groups 1 and 2 seems to influence several natural and cultural based activities. These groups were found to be more likely to visit wilderness areas, historic/archeological/commemorative sites, local festivals, and go sightseeing in cities.

Group 3 (the escape only group) seems to be more interested in the sun/surf/sand activities. This group is significantly higher in sunbathing and participating in beach activities (62.5 percent), and swimming (70.3 percent). The escape motivation also increases the likelihood of visiting entertainment places. On the other hand, this group is less interested in cultural aspects of the host country, such as visiting galleries and museums (12.5 percent).

Finally, Group 4 (neither novelty nor escape motivation) is not significantly more likely to participate in any of the listed activities. This group is significantly less likely to visit scenic landmarks (52.4 percent). It is important to note, however, that all four groups had high percentages of participation in eating local foods and dining out, and shopping.

Importance of items when choosing a destination

Several important aspects about each motivational group were also found when considering what each group cites as being important when selecting an overseas destination (Table 4).

Table 4. Distribution of the variable 'Importance of items when choosing an overseas destination' for the four West German motivation groups (% 'very important' or 'somewhat important').

Item	Group 1 (%)	Group 2 (%)	Group 3 (%)	Group 4 (%)
Budget accommodation	84.1	77.1	78.4	74.2
Seaside	65.1	53.2	73.0	59.4
Historic old cities	76.8	84.8	40.4	52.2
Nightlife and entertainment	38.8	25.3	48.2	32.7
Reliable weather	84.9	78.4	92.3	77.2
Local cuisine	91.4	85.3	73.5	72.3
Good beaches for sunning/ swimming	78.9	68.8	85.7	72.0
Local festivals	58.8	47.7	45.1	35.9
Museums/art galleries	59.9	67.4	25.0	43.0
Interesting/friendly local people	97.1	93.0	96.8	89.9
Inexpensive restaurants	79.5	69.2	71.5	69.6
Culture different from my own	95.3	96.3	79.6	79.4
Historical/military/ archaeological sites	65.6	79.4	29.9	46.6
Opportunity to increase knowledge	92.5	94.9	75.9	77.2
Total respondents in each group	**384**	**218**	**245**	**365**

Group 1 identifies cost related items as being important, such as budget accommodation (84.1 percent cited it as 'important' or 'very important'), and inexpensive restaurants (79.5 percent). It also follows from earlier findings that this group finds local festivals (58.8 percent) and interesting/friendly local people (97.1 percent) to be important factors as well.

Group 2 also cited several items as being important or very important. Again, these items are consistent with the activities participated in during their most recent overseas trip, and their feelings about such trips in general. For instance, this group is significantly more likely to find historic old cities (84.8 percent), museums/art galleries (67.4 percent), and historic/military/archeological sites (79.4 percent) as being important or very important.

In addition, the novelty motivation in general seems to correlate with an expressed importance of big cities and interesting towns/villages, outstanding scenery, wilderness, open spaces, local cuisine and different cultures, and opportunities to increase knowledge. In other words, a respondent with a motivation for novel experiences literally "wants it all" when taking an overseas trip. These preferences are reflected in the high values of those items for Group 1 and Group 2.

Group 3, on the other hand, is much more interested in the seaside (73 percent identifies it as being important or very important), nightlife and entertainment (48.2 percent), reliable weather (92.3 percent), and good beaches for swimming and sunning (85.7 percent). This escape group is significantly less interested in those things that the novelty group (Group 2) finds to be important, such as museums and historic sites.

Once again, Group 4 finds nothing to be especially important when choosing an overseas vacation destination. It seems that the motivations, activities, and destination features in this study do not capture the special characteristics of this group.

Summary

Some generalizations can be made about the four motivational groups constructed in this study. For instance, respondents in Group 1 (those with high novelty and escape factor scores) are the youngest on average, are well educated, and are more likely to make their own vacation arrangements. In addition thy are more likely to participate in a variety of activities, and have a high propensity to stress the importance of destination characteristics such as interesting and friendly local people, and unique cultural groups.

Those respondents in Group 2 (the group with a high novelty motivation score but low escape score) are the oldest on average, are better educated, and take significantly more touring trips when vacationing overseas. This enables them to visit several destinations during one trip, placing a high level of importance on sites such as museums, art galleries and historic places.

The group with a high escape motivation score but a low novelty score (Group 3) contains respondents who are less educated, more likely to take a resort trip, would rather leave others to organize the trip and often take advantage of package deals. These people are more interested in the sun/surf/sand activities, and climatic and entertainment features of a destination.

Finally, Group 4 is the least understood in this study. It is indistinct demographically, and does not seem to be especially interested in pleasure travel. Respondents in this group are less likely to participate in any physical activities, and are less concerned about any specific characteristics that may be important to destination choices.

Conclusions

This study appears to support the travel motivations formulated by Cohen and Kucukkurt in the West German overseas pleasure traveller segment. Though the results of the study are on the right track, it is only a first approximation. Group 4 is especially in need of exploration. For example, if the respondents in this group are not interested in travel, why did they take an overseas vacation in the first place? In addition, no conclusions can be made about travel party interactions, or how the group influences the travel decision making process.

Regardless of outside influences, formulation and analysis of motivation groups such as these aids in effective target market development for either public or private organizations. In this way, a destination is able to direct its attentions on those target markets that the destination can best accommodate.

Finally, further exploration is necessary to determine whether similar groups exist in the United Kingdom, Japan, France, or other important overseas pleasure travel markets. It will also be interesting to identify the changes that will occur in the German market as the East and West come together. Subsequent studies should focus on building and correcting upon previous works and theories in order to improve the understanding of pleasure travel motivation.

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THE SUBSTANTATIVE KNOWLEDGE BASE FOR TRAVEL AND TOURISM: A SYSTEMS MODEL

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Strategies for education and professional preparation in travel and tourism have generally been based in traditional tourism-related disciplines providing somewhat narrow perspectives of the tourism phenomenon. The need exists for models that provide comprehensive, holistic perspectives of travel and tourism. This paper presents one such systems model showing that travel and tourism is both a complex social phenomenon and also an industry or application area. The model may provide a solid foundation (philosophy) for study and managerial practice in travel and tourism.

Introduction

Mass domestic and international travel has nurtured and is nurtured by a mass industry in service to the needs, wants and desires of people living away from their home quarters. Depending on sources and statistics, some say the travel industry is the world's largest. It has also been shown to be a substantial industry in terms of employment and sales in the United States as well accounting for approximately 12% of our Nation's GNP and 14% of the civilian labor force in 1988 (Waters, 1990).

Such claims not withstanding, there is little doubt that the travel and tourism industry, considered an export in terms of economic development, generates income and sales taxes, sales receipts, jobs, and other "spill-ins" for local, regional and national economic and social systems alike. Furthermore, the enormous size and comprehensiveness of the industry with the many positive and negative potentialities associated with tourism development, have created many conflicting forces and a complex management milieu with which tourism developers, entrepreneurs, civic leaders, educators and tourism professionals at all levels must deal. It is recognized that tourism development which maximizes economic and social well-being, provides for the proper management and tourism resources, and promotes long-term profitability to owners and managers requires a team of skilled professionals to plan, organize and manage the complex tourism systems.

In response to these needs, there has been an increase in interest in travel and tourism professional education in the United States, Canada, and elsewhere. Generally, most of the educational offerings that have evolved in tourism are included as single courses or concentrations in traditional business, geography/regional planning, recreation/leisure studies, hotel,programs have contributed a great deal to professionalism in and forest/recreation resource management programs. These programs have contributed a great deal to professionalism in travel and tourism; many of the students who have experienced these programs now work in the travel and tourism industry. However, one drawback with these types of programs is that there remains a strong bias in favor of the traditional curriculum at the expense of travel and tourism core content areas (cf. Hawkins and Hunt, 1988). Moreover, few holistic tourism curriculum models exist and concerns are often raised about what core courses to offer, where to "house" the program, the appropriate mix of general education and professional courses, appropriate electives, and so on.

For tourism professionals and travel resource managers in the field, the lineage of thought and philosophy from this current educational approach to tourism sometimes leaves them ill prepared to cope with the comprehensiveness and systemic nature of the tourism phenomenon. Many have understandably limited views of tourism; they do not comprehend the totality of the tourism phenomenon and the many positive as well as negative impacts of tourism. The hotelier does not care to ask how the regional park may relate to his business; the forest manager does not seem to understand how the travel agent or tour packager relates to the efficacy of the resource base and management practice. The need exists for comprehensive, holistic models to provide direction for education, practice, and research in travel and tourism.

This paper deals with these issues by providing a broad systems model of the substantive knowledge base for travel and tourism. The model conceptually structures the total tourism system showing the interrelationships among traditional disciplinary content areas related to the phenomenon.

The Model

The model recognizes that travel and tourism is both a phenomenon and an industry (cf. Hawkins and Hunt, 1988; Riegel, 1987).

The Phenomenon of Tourism

The phenomenon of tourism creates the need for the travel and tourism industry. The tourism phenomenon is comprised of three highly interrelated analytical components: people (demand), place (supply), and activity (what). These components are outlined in Figure 1.

Figure 1. Basic systems model.

1/ The contributions of Neal Cheek and others to the basic analytical framework utilized in this paper are acknowledged.

Knowledge bases related to the "people" component would involve a behavioral orientation focusing on "who" is participating in travel/tourism and the functions (benefits) of tourism to the participants. Three appropriate levels of analysis would involve the individual, the group and the collective (society) at large. At the individual level, the focus is on the "subjective" tourism experience. Some areas of study are: needs/wants/expectations in tourism; leisure attitudes and orientations; psychological states and tourism; psychological outcomes/benefits of travel; motivations for tourism behavior; identify formation/development through tourism; and sex, age, personality, and life-cycle differences in tourism styles. A shift in analysis to the social group level would involve the role of travel behavior as related to primary association bonding and bond maintenance, type of social group and travel choices, tourism decision processes, and the primary group as a deterministic medium for socially constructed motives for travel and regularities in travel behavior. At the collective or societal level, appropriate areas of study would involve the history of travel/tourism; the social and economic impacts of travel; aggregated demand determinants of travel; the study of social circles, occupational groups, class structure and ethno-religious groupings as social structural contexts for travel motives; and the study of the latent functions of tourism/leisure/sport for society including collective identity (solidarity) and others.

The "place" component of the tourism phenomenon involves an analytical approach to the setting where tourism activity occurs including physical, cultural and geographical analysis. Some substantive knowledge areas would involve: the social definition of tourism places (establishment of normative order); image analysis; locational tendencies/spatial distribution of tourism places; ecological/physical impacts of tourism activity; tourist attractions and their classification (historic, memorial, cultural, natural); actual use history of places; ownership/management patterns; and the functions of tourism places involving bonding, solidarity, and fantasy concerns.

The "activity" or participation component is concerned with what tourism participants do in tourism settings. Some content areas would involve the incidence and prevalence of tourist activities across populations/over time (patterns of participation); how patterns emerge, change, stabilize over time; activity and place dependency or non-dependency; activity and social group dependency; activity specialization (travel careers); activity substitutability; structural properties of tourism activities; and the bundling (packaging) of activities and places.

The Travel and Tourism Industry

The broad systems focus also presents travel and tourism as an industry or application area. The application area is called the "organization/logistics" component (Figure 1). This component ties the three primary components (tourist-setting-activity) together as it provides formally organized tourism services to the traveling/touring public. The organization/logistics component is comprised of three interrelated sub-components: (1) distribution systems (travel suppliers and intermediaries), (2) management/administration of the distribution systems, and (3) regulation and support of the components (Figure 2).

(1) Distribution Systems (tourism industry/application area)

- Primary Suppliers
  - Carriers
  - Accommodations/food service
  - Attractions/entertainment/destinations
- Intermediaries
  - Tour operators/wholesalers
  - Meetings/conventions planning
  - Retail travel agency system

(2) Management/Administration of the Distribution Systems

(3) Regulation/Support of the Distribution System

- Tourism PublicPolicy Issues
- Public/Private Sector Support

Figure 2. Organization/logistics subcomponents.

Distribution Systems

Travel distribution systems involve both formally organized travel suppliers and travel intermediaries. Travel suppliers can be further subdivided into carriers, accommodations/food service, and attractions/entertainment. Emphasis on the carriers would involve air, rail and sea transportation as well as private car, motorcoach and car rental services. Emphasis on accommodations/food service would involve study of hotels, motels, condos, campgrounds, resorts, restaurants, and cafeterias. Attractions/entertainment would involve study of contrived attractions of all sorts, forests, parks, lake shores, sea shores, entertainment and planned tourism destinations overall.

Travel intermediaries involve all the various producers, operators and agents in the travel and tourism industry. Travel intermediaries connect the tourist with the primary suppliers. Emphasis would be placed on the study of tour operators/wholesalers, incentive travel companies, meeting/convention planning, and the retail travel agency system overall. The distribution systems sub-components (primary suppliers and intermediaries) provide the range of services necessary for the tourism experience including trip planning, travel to, on site and travel home components.

Management/Administration of the Distribution Systems

Management and administration of the suppliers and intermediaries involves all the activities for the daily, weekly, and long-term survival of these travel/tourism businesses and organizations. This would involve all normal business functions including sales, accounting, personnel, marketing, promotion, finance/budgeting, and overall management of the public and private organizations in the tourism industry. Although many of these functions are universal, it is important to recognize the unique management circumstances involved in the organizational systems of the wide array of tourism suppliers and travel intermediaries that exist. Although they both must consider people, their activities and settings (destinations), the state park and the travel agency each faces certain unique management challenges. The travel agency manager must monitor the challenges of automation, agency to agency competition, and employee motivation. The state park manager, somewhat insulated from the need to maintain profits,

must face equally complex management issues such as establishing appropriate management objectives, selection of appropriate management tools, carrying capacity considerations, crowding and overuse issues, multiple-use, depreciative behavior, ORV use/conflict, and others.

Regulation/Support of the Distribution Systems

The final organization/logistics sub-component involves regulation and support of the travel suppliers and intermediaries. This sub-component is primarily concerned with tourism public policy issues (allocation/regulation issues) that cut-across any particular tourism business or natural resource management agency. The tourism public policy framework includes a complex mixture of public, quasi-public and private sector organizations involved with the allocation and regulation of tourism business, tourism resources, and the movement of people. Emphasis would be placed on the politics of the provision of "public goods" (roads, harbors, airports, forests, parks, museums, water/sewage); the management/ regulation of common property resources and tourism "assets"; positive and negative externalities of tourism development; safety, health, sanitation, building, zoning codes and regulations; land use planning, master planning and project planning of tourism concerns by general purpose governmental units; air transport agreements; visa, passport, customs regulations; regulatory agencies (FAA, ICC, etc.); destination marketing organizations (national, state, local); the role of the Airlines Reporting Corporation (ARC); travel/tourism trade associations; and the functions of visitor and convention bureaus and chambers of commerce.

Public/private sector support would involve the unique promotional, educational and service roles of travel writers, guides and maps, travel publications, travel trade associations, travel finance and insurance businesses, and destination marketing organizations as they aid and abet the traveler and the travel business.

Conclusion

Travel and Tourism is an interconnected phenomenon and industry requiring skilled professionals in the planning, organization, and overall management of tourism businesses and travel resources. Many of these professionals have been trained in traditional travel-related disciplines such as hospitality, geography, recreation and parks and others. Oftentimes, the focus in these programs is understandably a somewhat narrow "product" or "functional" one leaving the student without a broad, more liberating orientation to the total travel and tourism system. Presented in this paper is a broad, systems model of one approach to the substantive knowledge base for travel and tourism. The model explains the three primary analytical components of tourism involving people, place and activity. The organization/logistics component (travel suppliers and intermediaries) brings the three primary components together as it provides for a wide range of travel and tourism related services. The model then illuminates in preliminary fashion the importance of basic business skills and role of the public policy framework for tourism allocation and regulation decisions. Overall, the model shows that travel and tourism may represent a discrete body of knowledge that can be codified and communicated.

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OUTDOOR RECREATION ACTIVITY TRENDS BY VOLUME SEGMENTS: U.S. AND NORTHEAST MARKET ANALYSES, 1982-1989

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The purpose of this review was to examine volume segmentation within three selected outdoor recreational activities -- swimming, hunting and downhill skiing over an eight-year period, from 1982 through 1989 at the national level and within the Northeast Region of the U.S.; and to determine if trend patterns existed within any of these activities when the market size and market volume of infrequent and frequent segments were examined. Different trends exist between national and Northeast Regional trends when volume segmentation was examined. Implications and discussion points were provided. Keywords. Volume segmentation, swimming, hunting, downhill skiing, marketing, Northeast U.S., outdoor recreation, and activity trends.

Introduction

With the advancement of the recreation field in the last decade has come the increased interest in the topic of marketing recreation activities and amenities. This interest has also been fueled by the growth in travel and tourism and an increasing variety or recreational products and services. In recent years, there has been substantial growth in a variety of outdoor recreational activities. These include golf, wind surfing, cross country skiing, and fly-fishing plus the introduction of new pursuits such as snowboarding, mountain biking, and "roller-blade skating." However, in other outdoor activities the growth of activity participation has either remained stagnant or actually declined. These activities include swimming, power boating, and snowmobiling to name a few. Furthermore, regional economic downturns, budget and international crises, such as the Persian Gulf Conflict, have had negative impacts upon recreational businesses and tourism areas. Given all of these changing conditions, the implementation of marketing strategies and the monitoring of trends has become critically important for those agencies and businesses which depend on selected outdoor recreational activity pursuits either directly or indirectly. Growth cycles change rapidly and more innovative market approaches are necessary. Kelly (1988) and others (Warnick and Loomis, 1990; Schwaninger, 1989) have conducted work which serves to predict future recreation participation. Others have also found that national activity trends are not necessarily reflected at the regional level (Warnick and Vander Stoep, 1990). Nevertheless, more detailed analyses of recreational activity trends are needed at the national, regional and local levels.

To understand the nature of recreational activity trends and participation, two major components of activity demand must be understood. First there is the "number of people who participate in the activity." This statistic is called "market size." Often, much is made of this statistic; however, in and of itself it is somewhat less meaningful than a statistic which more specifically quantifies demand. "Participation days" or "times played" is a much more meaningful statistic for recreation agencies and businesses. This addresses the actual volume or amount of people who pass through the area or facility or who play the activity any number of times. It is referred to as "market volume." In marketing, business volume when examined by groups is described as a form of user or behavioral segmentation and is called "volume segmentation." Volume segmentation is the examination of usage rate and size of specific markets within an activity or product category. Romsa and Girling (1978) wrote one of the more definitive articles on volume segmentation of recreational activities. Others have alluded to the market concept called the 20-80 rule (which indicates that a small portion of all customers comprise a large portion of all business transactions). Warnick and Vander Stoep (1990) have indicated that there are regional differences for many recreational activities. However, their review of selected activities did not focus on participation volume. Consequently, the review of participation volume within selected activities in the Northeast was undertaken.

Purposes of Study

The purposes of this study were two-fold: 1) to examine volume segmentation within three selected outdoor recreational activities -- swimming, hunting and downhill skiing over an eight-year period, from 1982 through 1989; and 2) to determine if trend patterns exist within any of these activities when the market size and market volume of infrequent and frequent segments were examined.

Methods

For the analysis of volume segmentation of these activities, data were drawn from *Study of Media and Markets* (Simmons Market Research Bureau, Inc., 1982-1989). These annual market studies were stratified, national random probability samples for each year from 1982 through 1989. The methods included the distribution of self-administered questionnaires and follow-up telephone interviews. Sample sizes ranged from approximately 15,000 to 20,000 adults. The sample statistics were then extrapolated to the U.S. adult population of 18 years of age and older. The activities in this review were selected because they represented outdoor seasonal events and the data were available and complete over this period of time by segments and by region for each activity. The data were made available through Simmons Market Research Bureau of New York and the University of Massachusetts Library.
Definitions of terms are important here and must be read carefully. The way segments are described can be confusing; so, please read carefully and use caution in use of these data. The terms are explained as follows. First, use segments or volume patterns at the national level were defined by three groups: 1) "Light Users" -- those that participated 1 to 4 days during the 12-month period; 2) "Moderate Users" -- those that participated 5 to 19 days during 12-month period; and 3) "Heavy Users" -- those that participated 20 or more days during 12-month period. These definitions of activity demand as provided by Simmons Market Research Bureau do provide stable trend data on an annual basis; however, they are not linked to demographic or regional distributions of demand.

Simmons Market Research Bureau does provide demographic definition and regional distribution of all activity participants and frequent participants (i.e., "those involved in the activity more frequently based on an activity play level.") However, the detailed definition of this group, the frequent segment or "those involved more frequently," varies from activity to activity. For the purposes of this study, within each activity, frequent and infrequent groups were defined. Knowing the overall national

and regional activity population as detailed by demographics and regional distribution, one can extrapolate to an infrequent user group. In this review for swimming -- frequent swimmers are those who swim 20 days or more per year and infrequent swimmers are those who swim less than 20 days per year. For hunting, frequent hunters are those who hunt 10 days or more per year and infrequent hunters those who hunt less than 10 days per year. For downhill skiing, frequent skiers are those who ski five days or more per year and infrequent skiers those who ski less than five days per year. Please note the use of different terms here -- frequent and infrequent versus light, moderate and heavy users. Infrequent participants are not the same group as light users. For swimming, infrequent swimmers are those who swim less than 20 days per year and light swimmers are those who swim one to four days per year. Differences in these definitions must be carefully considered when reviewing the findings for each of these activities. Light, moderate, and heavy represent volume groups are described at the national level only and are a more refined segmentation of the infrequent and frequent groups. But, it was not possible to examine these segments at the regional level due to the way Simmons Market Research Bureau presented the data.

Other definitions used in this study include: a) "Volume or Participation Days" -- an estimate of the number of activity occurrences, the medians were used from each grouped category (1 to 4 days; 5 to 9; 10 to 14; 15 to 19; 20 to 24; 25 to 29; 30 to 39; 40 to 49; 50 to 59; and 60 or more) times the number of participants who indicated playing at this level; b) "Market Size" -- the total number of adults (18 years of age and older) who played the activity in the previous 12 month period for the year; c) "Average Annual Growth Rate" -- the percent change in terms of the size of the market or participation calculated as a percentage; derived by taking current year number (market size or market volume) subtracting previous year number and dividing by the previous year number; percent change from year to year was then averaged over the study period; d) "Average Size" -- the percent distribution of participants by user group in terms of number of players and number of activity days averaged over the study period; e) "Days Played Per Year" -- the volume or participation days divided by total number of participants per segment; f) Market Share -- percent of all volume played within a specific region (which are defined as Northeast, South, Midwest, and West); g) Northeast Region -- includes the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, and New Jersey; and h) "Moving Average (MA) 3-Point Change" -- a moving average trend calculation based on a three-point moving average where change is calculated based on increments of three year averages (i.e., 1982, 1983, and 1984 would be used to determine a 1983 average; 1983, 1984, and 1985 would be used to determine a 1984 average, etc.). Changes were then determined by developing moving averages for three year periods from 1983 through 1988. Moving averages are used in trend extrapolations to smooth the effects of short-term variation and to provide the opportunity to construct trend patterns (McClave and Benson, 1982).

Selected Findings

The findings from this review are presented by activity with reference first to the national trends and then presentation of the regional findings from the Northeast. The summary of national trends by total participants and participation days; and light, moderate and heavy users for each activity are summarized in Table 1.

Swimming

National Trends. Swimming is an activity which has declined nationally in market size over this time period. Approximately 51 million people swam at least once per year in 1982; but, by 1989 only 47 million swam. The activity has decreased in market size at an average yearly rate of one-half (.5) percent and at a 3-point moving average rate of 1.4 percent. However, swimming was not in a steady decline throughout this period. Swimming, in terms of both numbers of participants (market size) and participation days (market volume) actually grew during the first half of this period. Swimming peaked in market size (53.7 million swimmers) and market volume (1.0 billion swimming days) in 1985. After that year, there was rather steady decline. On average at the national level, the heavy swim segment accounts for 35 percent of the all swimmers, but nearly 73 percent of swimming activity. When light, moderate and heavy segments were examined over time, the only user segment which grew from 1982 through 1989 was the light segment. The number of light swimmers and swimming days among this group grew at an average annual rate of two percent per year.

Northeast Trends. The market size of swimmers in the Northeast has declined also, but at a higher rate. In 1982, 11.8 million swimmers were from the Northeast and in 1989 the number equalled 8.9 million. However, the market size did not continually decline throughout this period. The swimming market actually grew in size in the Northeast from 1982 through 1984 when it peaked at 12.9 million swimmers. Since 1984 it has declined in size. The Northeast market is down 3.6 percent per year at an annual average rate and at a 3-point moving average rate of three percent. Participation days are also declining in the Northeast. At the peak in 1983, nearly 304 million swimming days occurred, but this declined to as low as 182.9 million days in 1987 and in the most recent years examined here (1988 and 1989) settled at approximately 204 to 205 million days. Furthermore, the market share of swimmers who reside in the Northeast has also decline. The Northeast's share of all swimmers peaked in 1983 at 26.2 percent and declined throughout the remainder of the period and in 1989 stood at 18.7 percent.

When the distribution of frequent and infrequent swimmers was examined additional insights into activity trends within the Northeast were found. The distribution of frequent and infrequent swimmers in the Northeast is different than the distribution at the national level. In ever year examined here, the distribution of infrequent swimmers in the Northeast is less than at the national level. For example in 1982, 74 percent of all swimmers at the national level were infrequent swimmers while slightly less than 70 percent (69.6 percent) of all swimmers in the Northeast were infrequent swimmers. At the national level, there was an indication that an increasingly smaller distribution of all swimmers were infrequent participants. In 1982, 74 percent were infrequent swimmers and by 1989 only 64 percent were infrequent swimmers. The trend has been somewhat similar in the Northeast, but the actual distribution is markedly different. Approximately 70 percent of all swimmers in the Northeast were infrequent swimmers in 1982. In 1989, only 53 percent were infrequent swimmers. While this is revealing, the other segment, the frequent swimmer group is accounting for a larger portion of the swimming types and this segment actually grew slightly -- at an average annual rate of about three percent and at a 3-point moving average rate of one-half (.5) percent. The national trends indicate a stronger growth pattern within the frequent segment. This segment grew at an average annual rate of 5.1 percent and at a 3-point moving average rate of three percent.

Table 1. Swimming, Hunting and Downhill Skiing by Light, Moderate and Heavy Volume Segments at the National Level: 1982 through 1989.

	Year	*Distribution of Participants ('000) and Participation Days ('000) by Volume Segment Levels)*														Ave. Size of Parts. and Part. Days		Ave. Annual Change (%)	
		1982		1983		1984		1985		1986		1987		1988		1989					
Swimming	Volume Segments	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Ave. % Part.	Ave. % Day	Parts.	Part. Days
	Light (1-4 days)	10,114	27,814	9,873	27,151	10,985	30,209	12,035	33,096	11,039	30,357	11,740	32,285	11,138	30,630	11,423	31,413			2.0%	2.0%
	Percent Light Participants	20%	3%	21%	3%	21%	3%	22%	3%	23%	4%	25%	4%	27%	4%	24%	3%	23.0%	3.4%		
	Moderate (5-19 days)	22,558	248,236	19,958	219,106	22,340	241,120	22,742	246,169	21,310	227,840	20,555	222,195	13,206	108,410	19,029	195,732			0.1%	2.8%
	Percent Moderate Participants	44%	25%	43%	25%	43%	24%	42%	24%	44%	26%	44%	28%	32%	14%	40%	21%	41.7%	23.5%		
	Heavy (20+ days)	18,381	712,706	16,581	614,814	18,916	734,762	18,890	730,407	15,775	607,257	14,298	548,262	16,294	657,087	16,975	691,048			-0.5%	0.5%
	Percent Heavy Participants	36%	72%	36%	71%	36%	73%	35%	72%	33%	70%	31%	68%	40%	83%	36%	75%	35.3%	73.1%		
	Totals Size and Days ('000)	51,053	988,756	46,412	861,070	52,241	1,006,091	53,667	1,009,672	48,124	865,454	46,593	802,742	40,638	796,126	47,427	918,194			-0.5%	-0.4%
Ski (DHill)	Volume Segments	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Ave. % Part.	Ave. % Day	Part.	Part. Days
	Light (1-4 days)	3,376	9,284	3,396	9,339	3,814	10,489	3,691	10,150	4,031	11,085	3,815	10,491	4,086	11,237	4,006	11,017			2.7%	2.7%
	Percent Light Participants	50%	18%	50%	16%	53%	20%	48%	16%	56%	21%	52%	19%	57%	23%	50%	17%	52.0%	18.5%		
	Moderate (5-19 days)	2,815	27,750	2,654	27,348	3,092	30,869	3,287	34,479	2,707	25,414	2,924	30,188	2,756	23,776	3,363	31,758			3.4%	4.0%
	Percent Moderate Participants	42%	52%	39%	47%	43%	59%	43%	53%	38%	48%	40%	53%	38%	48%	42%	48%	40.6%	51.0%		
	Heavy (20+ days)	544	15,838	762	21,923	330	11,210	660	20,211	444	16,896	543	16,182	370	14,534	628	23,230			15.8%	14.1%
	Percent Heavy Participants	8%	30%	11%	37%	5%	21%	9%	31%	6%	32%	8%	29%	5%	29%	8%	35%	7.4%	30.6%		
	Totals Size and Days ('000)	6,735	52,872	6,812	58,610	7,236	52,567	7,638	64,840	7,182	53,395	7,282	56,861	7,212	49,547	7,997	66,005			2.6%	4.7%
Hunting	Volume Segments	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Parts.	Part. Days	Ave. % Part.	Ave. % Day	Parts.	Part. Days
	Light (1-4 days)	3,190	8,773	3,929	10,805	3,214	8,839	3,713	10,211	4,574	12,579	3,165	8,704	3,208	8,822	2,924	8,041			0.8%	0.8%
	Percent Light Participants	25%	5%	32%	7%	27%	5%	31%	6%	34%	7%	27%	5%	26%	5%	22%	4%	28.2%	5.4%		
	Moderate (5-19 days)	6,405	66,425	5,635	61,015	5,695	60,850	5,511	60,097	6,087	65,554	5,930	62,870	5,898	62,595	6,333	63,511			0.1%	-0.5%
	Percent Moderate Participants	51%	37%	46%	37%	49%	35%	46%	37%	45%	37%	50%	35%	48%	33%	49%	31%	48.0%	35.2%		
	Heavy (20+ days)	3,000	104,750	2,670	94,339	2,794	103,036	2,650	92,253	2,798	97,702	2,771	106,508	3,101	119,608	3,775	135,161			3.8%	4.1%
	Percent Heavy Participants	24%	58%	22%	57%	24%	60%	22%	57%	21%	56%	23%	60%	25%	63%	29%	65%	23.8%	59.3%		
	Totals Size and Days ('000)	12,595	179,947	12,234	166,158	11,703	172,724	11,874	162,561	13,459	175,835	11,866	178,081	12,207	191,025	13,032	206,713			0.8%	2.2%

Source: Simmons Market Research Bureau, Inc. 1982 through1989; New York.

Table 2. Swimming Trends in the Northeast for Infrequent(a) and Frequent(b) Segments: 1982 through 1989.

Year	Overall Size ('000)	Overall Ave. Days	Overall Part. Days ('000)	Northeast Size ('000)	Northeast Share	Northeast Ave. Days	Northeast Part. Days ('000)	Nat. Infreq. Size ('000)	National % Infreq.	NE Infreq. Size ('000)	Northeast % Infreq.	National Freq. Size ('000)	National % Frequent	NE Freq. Size ('000)	Northeast % Frequent
1982	51,053	18.55	947,174	11,870	23.3%	22.97	272,638	37,845	74.1%	8,256	69.6%	13,207	25.9%	3,614	30.4%
1983	46,412	19.26	893,832	12,150	26.2%	22.23	270,087	34,814	75.0%	8,568	70.5%	11,598	25.0%	3,582	29.5%
1984	52,241	19.37	1,011,764	12,985	24.9%	23.45	304,510	37,928	72.6%	8,792	67.7%	14,310	27.4%	4,193	32.3%
1985	53,667	18.81	1,009,672	12,870	24.0%	19.68	253,312	34,778	64.8%	7,975	62.0%	18,889	35.2%	4,895	38.0%
1986	48,124	17.98	865,454	11,668	24.2%	18.10	211,155	32,349	67.2%	7,800	66.8%	15,775	32.8%	3,868	33.2%
1987	46,593	17.23	802,742	10,039	21.5%	18.23	182,993	32,294	69.3%	6,629	66.0%	14,299	30.7%	3,410	34.0%
1988	40,638	19.59	796,126	10,738	22.5%	19.01	204,153	31,382	65.8%	6,612	61.6%	16,294	34.2%	4,126	38.4%
1989	47,427	19.36	918,194	8,879	18.7%	23.08	204,951	30,451	64.2%	4,707	53.0%	16,975	35.8%	4,172	47.0%
Ave. Annual Inc/Dec	-0.5%	0.8%	0.0%	-3.6%	-2.6%	0.7%	-3.3%	-2.9%		-7.0%		5.1%		3.2%	
Moving Average 3 Point Change	-1.4%	-0.2%	-1.7%	-3.0%	-2.3%	-1.7%	-4.8%	-6.8%		-8.0%		3.0%		0.5%	

(a) Infrequent Participants -- swim less than 20 days or more per year
(b) Frequent Participants -- swim 20 days or more per year
(Source: Simmons Market Research Bureau, Inc. 1982 to 1989, Volume P-10, Sports and Leisure.)

The overall Northeast swimming market has declined in size and most of the decline appears to be the result of simply fewer new, infrequent swimmers and a number of infrequent swimmers who have stopped swimming. However, the swimming market in the Northeast has become increasingly configured by a higher distribution of frequent swimmers. The average number of swimming days per swimmers actually increased from 1986 through 1989, from 18.1 days per swimmer to 23.1 days per swimmer -- an increase of nearly five days per swimmer. Compared over the same time period at the national level, the average number of swimming days per swimmer changed only modestly from 17.9 days in 1986 to 19.4 days in 1989 -- an increase of only 1.5 days per swimmer. (See Table 2.)

Hunting

National Trends. Hunting is a relatively stable activity nationwide. The overall market is growing at an annual average rate of less than one percent per year (3-point moving average rate of two-tenths of a percent). Hunting activity days are up though -- nearly two percent per year (3-point moving average rate of 1.3 percent). Approximately 12.5 million people hunted at least once per year in 1982 and by 1989, 13 million hunted. Hunting should not be characterized as a stable activity over this period. In terms of market size, it declined from 1982 through 1984 and has since rebounded in terms of both market size and volume. The number of hunting days alone increased from 162 million in 1985 to 206.7 million days in 1989. On average at the national level, the heavy hunting segment accounts for 24 percent of the all hunters and 59 percent of all hunting activity. When light, moderate and heavy segments were examined over time, the only user segment which grew substantially from 1982 through 1989 was the heavy hunting segment. The number of heavy hunters and hunting days among this group grew at an average annual rate of nearly four percent per year.

Northeast Trends. Hunting is the Northeast is for the most part stable; but, there is evidence of fluctuations both up and down in the activity. The market size for hunters in this region remained at approximately 2 million in 1989 (it was at 2.0 million in 1982). It was as high as 2.4 million in 1983 and as low as 1.6 million in 1988. The average number of hunting days has increased slightly, but remains between 15 and 16 days per year. There were no dramatic changes in the number of frequent and infrequent hunters which reflect strong growth or decline trends. The distribution of hunters in the Northeast reveals a market configured by higher distribution of frequent hunters and a slightly higher average number of hunting days per hunter per year. During this time period, the distribution of frequent hunters at the national level only twice exceeded 50 percent (in 1983 -- 50.1 percent and in 1985 -- 51.7 percent); however, the distribution in the Northeast was substantially different. Only once did the distribution of frequent hunters drop below 50 percent (in 1989 -- 49.2 percent) in the Northeast. The distribution has normally been above 53-54 percent and has been as high as 60 percent (in 1984). Nevertheless, in the Northeast, there has been a decline in the number of frequent hunters. (See Table 3.)

Downhill Skiing

National Trends. Skiing is an activity which has grown modestly for most of the 80s. Approximately 6.7 million people downhill skied at least once per year in 1982 and by 1989, 7.9 million skied. The overall average annual growth rate in market size was 2.6 percent and for participation days 4.7 percent. The growth in skiing appears to be largely accounted for by the growth in the heavy use segment. While, all segments grew in the skiing market, the heavy segment grew the most. The average annual growth rate for market size was nearly 16 percent and for participation days was slightly over 14 percent. But, these statistics are misleading. The changes were the result of uneven, year-to-year fluctuations and not necessarily sustained, consistent growth. For example, the year-to-year numbers and percent changes for the heavy user ski market for a few years indicate the magnitude of these fluctuations: there were 544,000 heavy skiers in 1982, 762,000 in 1983 -- 40 percent increase from 1982; 330,000 in 1984 -- 56.7 percent decrease from 1983; 660,000 (1985) -- an 100 percent increase from 1984, etc. These fluctuations make it more problematic to monitor and predict trends for downhill skiing. The fluctuations in the activity are most noticeable when the moving average statistics were examined. This statistic reveals little growth in downhill skiing during this period -- a small 1.2 percent growth in market size and a .9 (less than one percent) percent growth in skiing days. On average, the heavy skier segment (those who ski 20 or more times per year) accounts for only 7.4 percent of all skiers and 30.6 percent of all skiing segments. The bulk of skiing is accounted for by the skier who skis 5 to 19 times per year. They comprise 40.6 percent of all skiers and 51 percent of all skiing days.

Northeast Trends. The Northeast downhill ski market was characterized by a large increase in the number of skiers in the last two years of this report period. The overall market size more than double from 1987 to 1988 and even grew more in size in 1989. Here again the moving average statistic is probably a better indicator of the changes in the activity for the region; however, this number also reveals substantial growth of over 5 percent increase in market size per year and 5.5 percent growth per year in market volume (skiing days). The Northeast share of all downhill skiers exceeded 42 percent in 1988 and 1989. However, even though the market size and volume increased due to this surge in the late 80s, the average number of skiing days per skier in the region did not change. The number of skiing days per skier in the region remained around seven to eight days per year.

The distribution of frequent and infrequent skiers in the Northeast is somewhat different from the national distribution. In the Northeast, on average over the time frame examined here the distribution in numbers was about 50-50. About 50.1 percent are frequent skiers and 49.9 percent are infrequent skiers. This compares to 52 percent infrequent skiers and 48 percent frequent skiers at the national level. While both segments of the ski market in the Northeast appear to have grown substantially, this is largely due to the large increases in the 1988 and 1989. The average annual increase for infrequent skiers in the region was 19.9 percent (3-point moving average change of 6.8 percent) and for frequent skiers, the average annual increase was 17.6 percent (a 3-point moving average change of 8.4 percent). (See Table 4.)

Discussion

Trends are evident in these three recreational activities. Furthermore, more insights into an activity may be gained by examining carefully the regional and volume segments of the activity. National trends are not always reflected in the regional statistics. For example, in swimming, the trend patterns were similar in some market conditions at the national and Northeast levels. The infrequent swimmer markets were declining in size and the frequent swimmer markets were increasing in size in both the U.S. and the Northeast. But, the distributions of frequent and infrequent swimmers were very different. The difference between the distribution of frequent and infrequent markets was more distinct in the Northeast than at the national level. There was a higher proportion of frequent swimmers in

Table 3. Hunting Trends in the Northeast by Infrequent(a) and Frequent(b) Volume Segments: 1982 through 1989.

Year	Overall Size ('000)	Overall Ave. Days	Overall Part. Days ('000)	Northeast Size ('000)	Northeast Share	Northeast Ave. Days	Northeast Part. Days ('000)	Nat. Infreq. Size ('000)	National % Infreq.	NE Infreq. Size ('000)	Northeast % Infreq.	National Freq. Size ('000)	National % Frequent	NE Freq. Size ('000)	Northeast % Frequent
1982	12,595	14.29	179,947	2,001	15.9%	15.18	30,382	6,481	50.1%	937	46.8%	6,112	49.9%	1,064	53.2%
1983	12,234	13.58	166,158	2,441	20.0%	14.85	36,257	6,405	49.9%	1,117	45.8%	5,830	50.1%	1,324	54.2%
1984	11,703	14.76	172,724	1,888	16.1%	16.76	31,651	5,849	52.7%	756	40.0%	5,854	47.3%	1,132	60.0%
1985	11,874	13.69	162,561	2,019	17.0%	15.42	31,132	6,204	48.3%	874	43.3%	5,670	51.7%	1,145	56.7%
1986	13,459	13.06	175,835	1,798	13.4%	15.16	27,254	7,263	56.1%	772	42.9%	6,195	43.9%	1,026	57.1%
1987	11,866	15.01	178,081	1,733	14.6%	16.35	28,329	5,892	52.4%	747	43.1%	5,974	47.6%	986	56.9%
1988	12,207	15.56	189,931	1,663	13.6%	15.99	26,586	6,001	56.6%	784	47.1%	6,206	43.4%	879	52.9%
1989	13,032	15.86	206,713	2,016	15.5%	15.58	31,416	6,456	50.1%	1,025	50.8%	6,576	49.9%	991	49.2%
Ave. Annual Inc/Dec	0.8%	1.8%	2.2%	1.3%	0.9%	0.6%	1.2%	0.5%		3.3%		1.2%		-0.2%	
Moving Average 3-Point Change	0.2%	1.3%	1.5%	-2.1%	-2.3%	0.3%	-1.7%	-0.3%		-1.1%		0.8%		-2.9%	

(a) Infrequent Participants -- hunt less than 10 times per year
(b) Frequent Participants -- hunt more than 10 times per year
(Source: Simmons Market Research Bureau, Inc. 1982 to 1989, Volume P-10, Sports and Leisure)

Table 4. Downhill Skiing Trends in the Northeast by Infrequent(a) and Frequent(b) Segments: 1982 through 1989.

Year	Overall Size ('000)	Northeast Size ('000)	Northeast Ave. Days	Northeast Part. Days ('000)	Nat. Infreq. Size ('000)	National % Infreq.	NE Infreq. Size ('000)	Northeast % Infreq.	National Freq. Size ('000)	National % Frequent	NE Freq. Size ('000)	Northeast % Frequent
1982	6,735	1,622	8.40	13,623	3,376	50.1%	726	44.8%	3,359	49.9%	896	55.2%
1983	6,812	2,396	8.16	19,558	3,396	49.9%	1,285	53.6%	3,415	50.1%	1,111	46.4%
1984	7,236	1,685	7.40	12,462	3,815	52.7%	865	51.3%	3,422	47.3%	820	48.7%
1985	7,638	1,808	8.64	15,623	3,692	48.3%	849	47.0%	3,947	51.7%	959	53.0%
1986	7,182	1,874	7.70	14,422	4,030	56.1%	1,006	53.7%	3,151	43.9%	868	46.3%
1987	7,282	1,459	7.81	11,396	3,816	52.4%	764	52.4%	3,466	47.6%	695	47.6%
1988	7,212	3,055	7.60	23,232	4,085	56.6%	1,491	48.8%	3,127	43.4%	1,564	51.2%
1989	7,997	3,362	8.54	28,721	4,005	50.1%	1,596	47.5%	3,993	49.9%	1,766	52.5%
Ave. Annual Inc/Dec	2.6%	18.0%	0.7%	18.8%	2.7%		19.9%		3.6%		17.6%	
Moving Average 3-Point Change	1.2%	5.4%	0.0%	5.5%	2.4%		6.8%		0.9%		8.4%	

(a) Infrequent Participants -- ski less than five (5) times year year
(b) Frequent Participants -- ski five (5) or more times per year
(Source: Simmons Market Research Bureau, Inc. 1982 through 1989, Volume P-10, Sports and Leisure.)

the Northeast. While there was growth at the national level for downhill skiing, the Northeast experienced a large increase in both market size and volume. The frequent hunter market increased slightly at the national level, but declined in the Northeast. Consequently, regional trends do not necessarily reflect national trends.

It is probably equally important to examine local trends where possible to determine if there are further differences. Local "hot spots" may not reflect the national or even the regional trends. A local market may also be either ahead of or behind the growth or decline curve. However, knowing the characteristics of the national and regional markets will help local agencies better understand and predict local changes. The market statistics do emphasize the need to monitor activities and participation volume carefully.

The causes of these changes in activity user segments are still unknown. The trends were followed and documented here, but no specific reasons were given by responses as to why their interest has changed nor has the study population been continually studied such as in a panel study. Many questions are still unanswered. Why has the swimming market declined in both size and number of swimming days? For example, do distinct differences between heavy and light users exist? How do these markets differ both demographically and psychographically? How depended are activity trends on resource conditions? These data do not address or answer these questions.

There is some evidence as to the factors that contribute to the decline or changes in activity participation. For example, one can see that the major reason swimming has declined in the Northeast is due to the decline in the infrequent swimming market segment. Those people who swim infrequently have either stopped swimming or no new large segments of individuals have taken up swimming. Furthermore, a core group of swimmers, those who swim frequently, remains strong in the Northeast; and, comprises more of the Northeast swim market. The average number of swimming days per swimmer has increased and appears to be fueled by the larger number of frequent swimmers. Swimming appears to have become a mature activity. There is no strong new influx of new swimmers, but a steady, growing market who desire to swim often and who are swimming more frequently.
"Segmentation change" over time is an important issue which also must be addressed. People who participate in recreational activities often change their rates of play. It is very possible that people who in one year played an activity very frequently might the following year not play the activity nearly as frequently. There are numerous speculative reasons: poor resource conditions (i. e., no snow for snow skiing); climatic changes for weekend participation; changing social conditions (i.e., adult family members who find participation affected by the presence of young children in the household), etc. Consequently, a decline in the frequent participation segment may be reflected by an increase in the size of the infrequent participation segment. This appears to be the case for hunting in the Northeast. The market size of the frequent hunting segment has declined while the infrequent hunting segment has increased in size. It is doubtful that frequent hunters have simply stopped hunting and new participants have taken up the activity to result in the growth in the infrequent segment. Rather, it is probably more likely that a number of frequent hunters have reduced their frequency of hunting and are now classified as infrequent participants.

While there is limited understanding as to why such conditions exist, a recognition of the strengths and limitations of the Simmons Market Research Bureau's data must be also considered. First, the data are representative of the U.S. adult population and are consistently collected on an annual basis in the same manner. This provides the opportunity to conduct on-going trend analysis. Unlike other activity trend studies which were conducted at best every five to ten years and which often use different methods and questions, the data provided here were collected on an annual basis using the same format and procedures.

Nevertheless, there are limitations to the data. First, the data are only available in summary tables which limits any type of detailed statistical analysis. Data may be manipulated to examine selected segments as was the case in this review; but, individual case-by-case data were not available. Some assumptions must also be made with the data. Statistics are often provide in grouped format in tables. One must assume for example when calculating activity days that the midpoint of a group category is representative of the distribution of activity days in the category. Also, in open-ended categories, the low-end of the category must be used in activity day estimates as the category is not framed by an upper range limit. Consequently, the assumptions made here about activity day participation may actually be conservative and under-estimate the entire size of the activity demand. Furthermore, Simmons draws a new sample each year in their studies. They do not survey the same 20,000 individuals each year or conduct panel surveys to follow individual changes over time. Rather, they project the market based on sample statistics. While there sampling procedures are highly sophisticated by stratification, weighting and over sampling techniques, there is the real likelihood that "sample bounce" may occur. "Sample bounce" is a condition where samples which reflect the true or actual mean of participation apear to fluctuate dramatically when presented over time. Sample meands often cluster around the true mean of the population; however, there are times when a more distance or outlying mean is used to represent the actual mean. The selection of certain sample means for each year or an individual year may create a condition referred to as "sample bounce." It is possible to control sample mean estimates if more samples were drawn; but, this is very costly especially with large national sampling techniques.

Recreation participation patterns are complex, dynamic and not always easily understood. This review of three selected activities by volume segmentation within the context of one regional market area sheds some new light on trends. Simply following national trends can be misleading. However, there are still needs for more closely monitoring recreational participation data.

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RURAL COMMUNITY VALUES AND COMMUNITY TYPE: A STUDY OF ATTITUDES TOWARD TOURISM

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Introduction

Distinctive types of Vermont communities have been documented based on population density and relative measures of the type of property within the community. No matter how diverse communities appear, most display remarkably similar value structures. Agricultural communities, however, are somewhat distinct in their values and associated attitudes toward growth and development. A personal orientation in values was found to have a direct relationship with positive attitudes toward growth and development, but value patterns associated with agricultural communities resulted in less favorable attitudes toward growth. Because values are the basic component of the cultural structure of communities, future statewide policy initiatives should address the diversity in values between agricultural communities and the other types of communities within the state.

Rural areas are facing a myriad of changes. Many rural communities are facing economic decline because of downturns in agriculture and forest products industries and the migration of manufacturing to alternative markets. In response, some rural communities have embraced tourism as a means to prevent further erosion of the economic base. The economic benefits of tourism and the cultural diversity visitors bring to a host community are often magnified in the press and by chambers of commerce, and operationalized through economic development efforts. Benefits such as improved services and shopping, increased jobs and taxes, and diversification of the economy are often promoted as the advantages of increased tourism and growth. This optimization of the economic benefits, however, is not without social and environmental costs to the host community (Allen, Long, Perdue, and Kieselbach 1988).

Tourism attractions and recreation amenities have often attracted new residents and resulted in changed demographic profiles for many communities. In some communities, tourism and accompanying growth and development have resulted in congestion, loss of open space, price increases, disruption of the social structure, changes in community values, and negative reactions to increased tourism.

Concomitant with these changes in community, then, have often come changes in resident attitudes (Allen, et.al. 1988), and value systems (Zwick 1990). Values are particularly important because they are at the core of belief systems and a basic component of the cultural structure of communities. Because attitudes are based on values (Heberlein 1981), the study of values may provide insight in differentiating attitudes among individuals and their social aggregates (i.e., communities). Understanding and monitoring the relationship of community values and attitudes toward tourism is particularly important for those types of communities which embrace or host tourism. The continued success, or the demise of tourism, is often seen as dependant on the tolerance for tourism displayed by the host community

Differentiation of community values and their relationship to resident attitudes toward tourism have been limited to small numbers of communities of different types within a small geographic region (Zwick 1990), however, community value patterns have not been examined nor related to attitudes toward tourism over a large set of communities. The purpose of this research is to expand on this previous regional examination of community values by exploring community value patterns over the entire state of Vermont. Two questions were developed to guide the study. 1) Do different types of communities exhibit different value patterns? 2) Is there a relationship between community value patterns and attitudes toward tourism and community growth and development?

As a basis for differentiating values among different types of communities, the study uses a community typology developed by Bevins and Zwick (1988) and refined by Bevins (1990). The community typology classifies communities into eight types: 1) residential commercial centers, 2) residential limited commercial, 3) residential noncommercial, 4) residential rural, 5) recreation commercial centers, 6) recreation noncommercial, 7) agricultural, 8) lowest population density), and a ninth type which encompasses unclassified communities.

The conceptualization of values developed by Milton Rokeach (1973) provides the framework for the study of community value patterns in this study. By ranking separate sets of 18 terminal values and 18 instrumental values, value patterns of individuals may be discerned. Individual value patterns may be aggregated and correlated to represent a value pattern for a community or community type.

Methods

Data was collected from a random sample of selectmen / selectwomen from all 246 rural towns within Vermont. Selectman were considered to be "institutional gatekeepers," that reflect shared values of a community (Rokeach 1979). An initial survey was mailed to 500 selectmen/selectwomen and a follow-up reminder was sent. One hundred forty nine useable responses were received from the initial mail survey and reminder. Thirteen selectmen returned surveys declining to participate, and 11 failed to properly complete the questionnaires. Because of monetary constraints, a random sample of only 74 nonrespondents were mailed a second survey. The sixteen respondents from the follow-up were not significantly different in any demographic patterns from the initial respondents and were found to be significantly different ($p \leq .05$) on only one value ranking (i.e., Family Security). As a result, their responses were combined with the initial respondents for analysis.

Instrumentation

The survey instrument consisted of the Rokeach Value Survey (Rokeach 1973), an attitude survey, and demographic questionnaire. Rokeach (1973) maintains that values exist as hierarchical (i.e., ranked) beliefs about end-states of existence (i.e., terminal values) and preferred ways of behaving (i.e., instrumental values). The reliability and validity of the Rokeach instrument have been thoroughly tested and verified (Homant 1967; Feather and Peay 1976; Rokeach 1979). Because terminal values have been found to be more reflective of personal orientations (Park 1971), they were used in the analysis in this study. Value ranks were rescaled with a normal

(z) transformation (Pitts and Woodside 1986) for analysis with nonparametric statistical techniques.

The attitude scale assessed selectmen/selectwomen's attitude toward tourism and growth and development in their respective communities. Attitudes about growth and development impacts were measured through 17 statements which elicited whether growth and development was having a "positive effect," "negative effect," or "neither positive or negative effect." By aggregating over the seventeen responses, an "attitude toward growth and development" score was calculated. An "attitude toward tourism" score for each respondent was determined by aggregating over twelve statements assessing their degree of agreement (ranging from "strongly agree," to "strongly disagree") with specified tourism impacts on their respective communities.

The instrument also queried respondents about demographics, socioeconomic information, and household data. All three parts of the survey instrument were pretested in an earlier study (Zwick 1990) and revised for clarity before being mailed to the statewide sample.

Analysis and Findings

In order to explore whether communities have similar terminal value patterns, mean value rankings on the 18 terminal values were computed for each of the nine types of communities and subjected to correlational analysis. Spearman Rank Order Correlation coefficients indicated that the value hierarchies for all nine community types were remarkably similar (Table 1) except for Residential/Noncommercial type communities and Agricultural type of communities. The weak rho coefficients between Residential/Noncommercial communities and all other community types may be a result of the small respondent sample size (N=4). An examination of correlation coefficients suggests there may be differences between Agricultural communities value hierarchies and those classified as Residential/Commercial (rho=.722), Residential/Limited Commercial (rho=.671), Residential/Rural (rho=.732), and the Unclassified communities (rho=.613). An examination of the ranked means on the 18 terminal values (Table 2) likewise indicate a stability in the top three values and five lowest ranked values across all communities except Residential/ Noncommercial and Agricultural types.

Similar to a previous study of communities of a small region of Vermont (Zwick 1990), the values "Health," Family Security," and "Freedom," were consistently ranked in the top three values for all communities except for those classified as Residential/Noncommercial and Agricultural. At the other end of the rankings, the values "Exciting life," "A World of Beauty," "Salvation," "Pleasure," and "Social Recognition" were consistently ranked low. The Agricultural community respondents were distinguished by their relatively high ranking on the values "A Sense of Accomplishment" (ranked third) and "An Exciting Life" (ranked fourth).

A Kruskal-Wallis test was used to determine whether the communities differed in their value hierarchies. The analysis revealed a generally stable pattern of value rankings across all communities, except for three values "An Exciting Life," "Family Security," and "Self Respect" The Agricultural communities were differentiated from all other types of communities on the value "An Exciting Life." The Agricultural community respondents mean rank on "An Exciting Life" was significantly ($p < .05$) lower (see Table 3). Residential/Non-commercial community respondents were differentiated from all other community types except for Residential/Commercial (Type 1) and Recreational/Non- commercial (Type 6) respondents on the value "Family Security." The Recreational/ Noncommercial respondents were significantly differentiated ($p < .10$) from Residential/Limited Commercial (Type 2) and Low Population Density (Type 8) respondents on this same value. The value "Self Respect" distinguished Residential/ Noncommercial (Type 3) communities from Recreational/ Noncommercial (Type 6) respondents and Agricultural community (Type 7) respondents. This value also differentiated Recreational/Commercial (Type 5) community respondents from Agricultural (Type 7) and other recreational community respondents (Type 6).

Spearman Correlational (rho) analysis was used to explore the relationship between selectmen/ selectwomen value patterns and their attitudes toward tourism and growth and development. A significant relationship was found between the terminal values "Mature Love," and "Freedom," and respondents' attitudes toward growth and development (Table 4). Respondents who ranked "Mature Love," and " Freedom," high in their value patterns generally had a more favorable attitude toward growth and development. There was an inverse relationship between the value "An Exciting Life," and respondent attitude toward growth and development. The value "Self Respect" was the only value having a significant relationship ($p < .10$) to residents' attitude toward tourism. Both Agricultural and Recreational/Noncommercial community respondents had significantly lower rankings on this value.

Conclusions and Implications

An interpretation of these rankings indicates that Vermont communities display a *personal security* orientation in their top ranked values. Of particular note is the stability inherent in the value rankings on—"Freedom," "Family Security," and "Health." Agricultural community respondents were distinguished by their relatively high rankings on "Exciting Life" (stimulating/active life) and "Sense of Accomplishment" (contribution to life), suggesting a "self fulfilling life," oriented toward initiative or self accomplishment. The significant positive relation of "Mature Love" and "Freedom" combined with the inverse relationship of "An Exciting Life" with attitudes toward growth and development suggest that a *personal orientation* may be driving favorable attitudes toward growth and development in most communities. Similar to a previous study (Zwick 1990), agricultural community respondents have a different orientation in their values (stimulating and active life combined with self accomplishment) that are less favorable toward such growth. The overall consistency of community value patterns suggests that community types do not differ significantly in their basic cultural structure and that Vermont communities, excluding those steeped in agriculture, are becoming relatively homogeneous in their value patterns.

Implications of this study include: 1) the examination of values can provide a clearer understanding of the cultural structure (values) of communities; 2) because it is possible to discern value patterns from "gatekeepers" within a community and a common value pattern that is shared, it is possible to measure changes in values (Rokeach 1979). Examination of long term changes in values (e.g., through longitudinal studies) could provide a clearer understanding of the transformation occurring in communities that are impacted by demographic and socioeconomic expansion related to tourism and growth; 3) understanding of values and value change is seen as a priority in development of rural public policy initiatives needed to improve the quality of life in rural communities (Martin and Luloff 1988); agricultural communities have a distinct value set

and may require policy/planning initiatives to protect and ensure that their unique cultural structures are maintained.

Table 1: Spearman Rank Order Correlation Coefficients for Terminal Values of Vermont Communities

Community Type	Residential/ Commercial (Type 1)	Resid'l/Lmtd Commercial (Type 2)	Residential/ Noncommerc'l (Type 3)	Residential/ Rural (Type 4)	Recreational/ Commercial (Type 5)	Recreational/ Noncommerc'l (Type 6)
Residential/ Commercial	1.000					
Resident'l/Lmtd Commercial	0.845	1.000				
Residential/ Noncommerc'l	0.569	0.587	1.000			
Residential/ Rural	0.918	0.881	0.665	1.000		
Recreational/ Commercial	0.913	0.890	0.601	0.958	1.000	
Recreational/ Noncommerc'l	0.894	0.802	0.433	0.895	0.908	1.000
Agricultural	0.722	0.671	0.228	0.732	0.823	0.817
Low Population Density	0.922	0.848	0.572	0.939	0.954	0.920
Unclassified	0.615	0.662	0.387	0.729	0.752	0.695

Table 1 (cont.)

Community Type	Agricultural (Type 7)	Low Population Density (Type 8)	Unclassified (Type 9)
Agricultural	1.000		
Low Population Density	0.801	1.000	
Unclassified	0.613	0.779	1.000

Table 2: Community Value Patterns

Statewide Average	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9
Health	Health	Family Security	Self-respect	Health	Family Security	Freedom	Family Security	Family Security	Health
Family Security	Family Security	Health	Wisdom	Family Security*	Freedom	Health	Health	Health	Family Security
Freedom	Freedom	Freedom	Freedom	Freedom*	Health	Family Security	A Sense of Accomplishment	Freedom	Freedom
Sef-respect	Wisdom	Self-respect	A Sense of Accomplishment	Wisdom	Self-respect	A Sense of Accomplishment	An Exciting Life	Self-respect	Self-respect
o	o	o	o	o	o	o	o	o	o
o	o	o	o	o	o	o	o	o	o
o	o	o	o	o	o	o	o	o	o
Mature Love	A World of Beauty	An Exciting Life	Social Recognition*	National Security*	Mature Love*	A Comfortable Life	National Security	National Security	Pleasure
National Security	A Comfortable Life	A Comfortable Life*	National Security	Salvation	An Exciting Life*	National Security	A World of Beauty	Inner Harmony	Social Recognition
A World of Beauty	Salvation	Equality*	A World at Peace	A Comfortable Life	A Comfortable Life	An Exciting Life	Inner Harmony	An Exciting Life	Mature Love
Salvation	An Exciting Life	A World of Beauty	A Comfortable Life*	An Exciting Life	A World of Beauty	A World of Beauty	Mature Love	Salvation	An Exciting Life
Pleasure	National Security	Social Recognition	An Exciting Life*	Pleasure	Salvation	Pleasure	Pleasure	Social Recognition	A World at Peace
An Exciting Life	Pleasure	Salvation	Pleasure	A World of Beauty	Social Recognition	Social Recognition	Social Recognition	A World of Beauty	Salvation
Social Recognition	Social Recognition	Pleasure	A World of Beauty	Social Recognition	Pleasure	Salvation	Salvation	Pleasure	A World of Beauty

* Tie in mean value rankings within the community.

Table 3: Differences in Community Mean (x) Value Rankings for the Values "Exciting Life," "Family Security," "Self Respect."

Value	Community 1	Community 2	Community 3	Community 4
Exciting Life*	12.400	10.824	12.250	12.765
Family Security §	5.400	3.118	9.000	4.118
Self-respect †	7.500	6.824	4.500	7.176

Value	Community 5	Community 6	Community 7	Community 8	Community 9
Exciting Life	10.676	11.267	6.834	12.000	12.667
Family Security	4.353	5.667	3.667	3.077	3.667
Self-respect	5.824	9.100	9.250	7.115	6.833

* $p < .05$ Significant difference between Type 7 and all other types.

§ $p < .10$ Significant difference- Types 3 vs.2; 3 vs. 4; 3 vs. 5; 3 vs.7; 3 vs. 8; 3 vs. 9; 6 vs. 2; and 6 vs. 8.

† $p < .05$ Significant difference- Types 3 vs. 6; 3 vs. 7; 5 vs. 6; and 5 vs. 7.

Table 4: Association Between Terminal Values and Attitudes Toward Growth and Tourism (Spearman Rank Order Correlation—rho)

Terminal Values	Aggregate Tourism Score (rho)		Aggregate Growth & Development score (rho)	
A Comfortable Life	-0.035	p=.339	-0.043	p=.302
An Exciting Life	-0.067	p=.209	-0.171	p=.020**
A Sense of Accomplishment	-0.069	p=.205	-0.042	p=.308
A World at Peace	-0.017	p=.419	-0.086	p=.157
A World of Beauty	0.076	p=.182	0.060	p=.236
Equality	0.097	p=.122	0.026	p=.379
Family Security	0.013	p=.438	-0.033	p=.348
Freedom	-0.017	p=.419	0.114	p=.087*
Health	-0.018	p=.415	0.066	p=.125
Inner Harmony	-0.059	p=.238	-0.025	p=.409
Mature Love	-0.131	p=.354	0.149	p=.037**
National Security	0.089	p=.144	0.031	p=.356
Pleasure	-0.062	p=.229	0.046	p=.291
Salvation	-0.024	p=.386	-0.003	p=.499
Self-respect	0.119	p=.077*	0.016	p=.493
Social recognition	-0.051	p=.224	-0.070	p=.206
True Friendship	0.086	p=.151	0.057	p=.248
Wisdom	0.012	p=.444	-0.028	p=.370

* $p \leq .10$
** $p \leq .05$

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TOURISM MEASUREMENTS BASED ON TRAFFIC VOLUME

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Traditional tourism barometers require extensive data collection or require aggregation of secondary data that is insensitive to short run change. This paper explores a more parsimonious means of predicting tourism business activity using traffic flow. Analysis of a small sample of Vermont recreation/tourism centers indicates that a moderate to high correlation exists between traffic flow and tourism business volume. Traffic flow may provide a means for determining tourism activity crucial to future regional and state planning efforts.

Where tourism and travel activity is critical to the economic health of a community, some method of monitoring and reporting current activity is essential for planners and policy makers (Hogan and Rex 1984). Several states are currently exploring implementation of a tourism barometer. The NE-163 Northeast Technical Research Committee NE-163 (CSRS 1990) has placed a high priority on the development of a reliable tourism monitoring device.

The New England Governors have officially requested the six New England Land Grant Universities to establish a New England Travel Information System which would include some sort of monitoring device (Clapp 1989). To accomplish this, a task force of University researchers was appointed and given responsibility to address this issue.

Most of the barometers developed to date require either (1) the generation of extensive primary data on a daily or weekly basis (diaries etc), or (2) the aggregation of secondary data over a longer period of time. The first of these two methods is sensitive to short run change, but it is a costly procedure. The second is less sensitive to short run change, but is more cost effective.

The Vermont Department of Highways Research Division monitors traffic volume through a system of automatic traffic recorders--pneumatic tubes and below road surface inductive counters (Bevins and Wilcox 1978). These devices mechanically tally the number of vehicles passing at recorder stations at 15 minute intervals.

In this paper we have analyzed the relationship between traffic volume, as reported monthly by the Vermont Highway Department, and sales volume (rooms, meals, and retail) as reported by the Vermont Tax Department. If there is a significant degree of correlation between the two, traffic volume might be used as a predictor of business activity. Such a procedure would provide a parsimonious alternative to traditional tourism barometers.

A community typology model developed by the authors classifies all Vermont communities into eight types (Bevins and Zwick 1988). Thirty nine communities were classified as "recreational commercial centers". These communities formed the total population from which the study sample was selected.

Methods

Data for this study consisted of average daily traffic (ADT), and sales volume (rooms, meals, and retail receipts). Average daily traffic is collected by the Vermont Agency of Transportation for contiguous segments of all Interstate, U.S. Routes, and state routes within Vermont as part of a sufficiency rating system to schedule highway improvements. While such data provides excellent traffic volume information, it is only collected every three to five years and was last published in 1987. Rooms, meals, and retail receipt summaries are published annually for each Vermont town and county, however, the data has been disaggregated to the town level only since 1988. As a result of this disparity in obtaining congruent dated data, the study became one of process as well as substance (see Fig. 1, next page).

Using a community typology model developed by Bevins and Zwick (1988) and refined by Bevins (1990), the study focused on thirty nine communities classified as recreational/ commercial centers. The recreational/commercial centers represent communities with either major ski resort attractions or lakeshore developments. Within these communities there were many second homes, food and lodging establishments, and other components of the service sector. Because of the exploratory nature of this study, the authors felt that the study points should be limited to the more rural sections of the state, excluding Chittenden County where traffic flow is heavily associated with commuting to places of employment. With these limitations, 32 communities were identified as the study sample.

A study of the correlation between sales volume and traffic flow in the 32 communities revealed only a moderate relationship($r = .569$). This suggested the need for additional or more refined analysis. Two alternatives could be followed: 1) the analysis could be restricted to known or delineated tourist/visitor routes; or 2) the time period studied could be extended to smooth out short term variations.

The determination of an appropriate tourism/visitor route for analysis was made by geographically mapping and analyzing tourism sales volume. After eliminating areas where localized traffic volume overshadowed tourism traffic, it became clear that Route 100, which runs the entire length of the state in the highest elevations, would be most appropriate for further analysis. Six communities along Route 100 had 1) major tourism attractions and 2) designated recorder stations for the Vermont Agency of transportation (see Fig. 2).

To address the second alternative, three years of sales volume data was readily accessible on a fiscal year basis for 38 of the 39 recreational/commercial center communities (state fiscal years 1988–90) fiscal years. However, complete traffic flow data were available for only eight of these communities (Table 2). A corresponding total sales volume (fiscal years 1988-90) was also calculated for each of the eight communities.

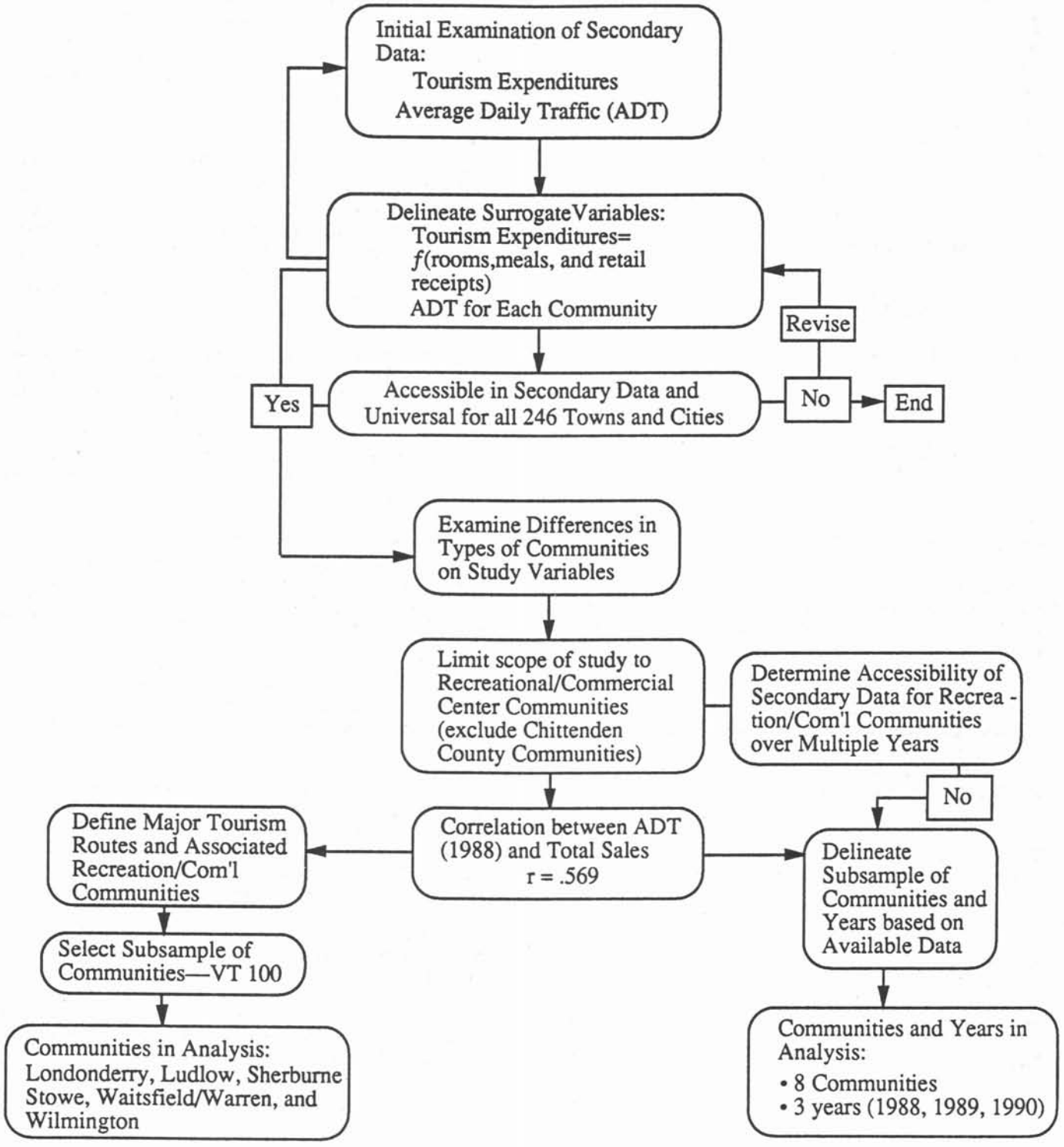

Figure 1. Selection of Variables and Communities for Study

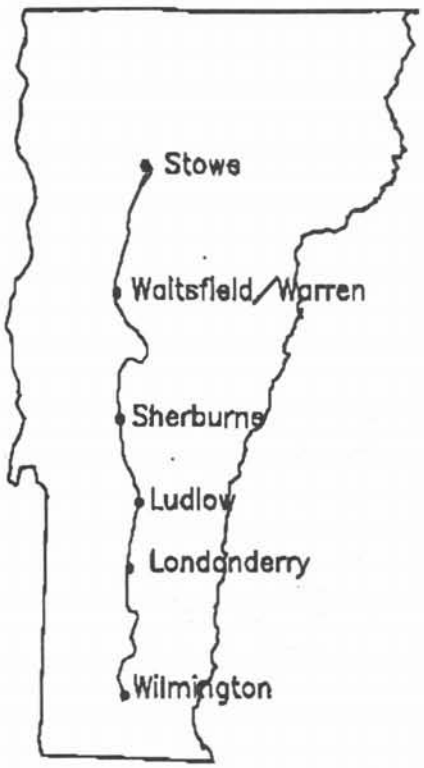

Figure 2. Study Sites for VT. Route 100

Findings

Because the community was used as the unit of analysis and the sample size for each set of analysis was small, nonparametric statistical techniques were used to relate traffic volume to total sales volume.

A Spearman Rank Correlation Coefficient was calculated to determine the strength of the association between ADT and total sales volume for the six VT. Route 100 recreational/commercial center communities (Table 1). The calculated correlation coefficient (rho = .943) indicates a very strong relationship exists between the two variables over these six communities.

Table 1. Spearman rank correlation coefficient for VT Route 100 recreational/commercial centers (ADT and Total Sales).

Community	ADT (1988)*	Total Sales †
Londonderry	2090	$24,539,349
Ludlow	7390	$57,495,336
Sherburne	9780	$93,431,876
Stowe	8260	$88,877,845
Waitsfield/Warren	6040	$71,607,295
Wilmington	5910	$108,403,483

rho = .943

*Source: Vermont Agency of Transportation, Project Planning Division

†Source: Vermont Tax Department.

Spearman Rank Correlation Coefficients were also used to assess the degree of association between sales volume and traffic flow for eight recreational/commercial center communities over the three year period 1988-90 (Table 2, next page). Spearman Correlation Coefficients ranged from rho = .643 to rho = .714 indicating a moderate and stable relationship exists for the eight communities over the time period for which data was available. The stability of the coefficients holds some promise for future research.

Implications

Results of this study indicate that traffic flow (i.e., ADT) can be used to roughly predict rural tourism business volume in certain instances.. Urban tourism is more difficult to predict using this method because of the influence of commuting traffic. Despite these limitations, more timely evaluation of tourism activity is now possible. Future technical improvements in remote sensing should improve, even further, the evaluation of tourism from surrogate measures.

The ability to easily create a computerized geographic map of both traffic flow and tourism activity has greatly expanded the information base for sound planning at the regional and state level. Vermont's planning act (Act 200) calls for the identification of areas of "critical mass" where growth in specific economic activities should be encouraged. Hopefully this research has contributed to the planning process for future tourism activity.

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Table 2: Spearman Rank Correlation Coefficients Recreational/Commercial Centers for Years 1988, 1989, and 1990 (ADT and Total Sales)

Community	1988 ADT*	1988 Total Sales†	1989 ADT	1989 Total Sales	1990 ADT	1990 Total Sales
Derby	2710	$59,994,159	2827	$70,374,777	2929	$68,610,024
Grand Isle	2970	$2,210,807	2435	$2,630,367	2510	$2,585,781
Manchester	10820	$176,821,947	12199	$184,199,640	12331	$138,778,004
Sherburne	9780	$93,431,876	9719	$94,967,740	9861	$90,705,843
Swanton	6660	$108,403,483	6794	$96,465,205	7200	$97,635,110
Wilmington	3770	$39,017,488	3812	$39,035,086	4092	$36,510,458
Winhall	3880	$9,982,891	3746	$10,554,986	3841	$9,331,218
Woodstock	8900	$55,066,102	11063	$55,611,832	11298	$55,847,885
		rho = .643		**rho = .714**		**rho = .714**

*Source: Vermont Agency of Transportation
†Source: Vermont Tax Department

URBAN RECREATION

FOREST VEGETATION IN URBAN PARKS:

PERCEPTIONS OF INNER CITY CHILDREN

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A series of three interrelated studies showed that Chicago inner city children generally disliked dense forest vegetation in urban park and play areas. Trees and forested areas can appeal to children, however, if the natural landscape does not appear too wild. Guidelines are given for increasing the naturalness of urban parks in ways that will encourage children to enjoy and learn about nature.

Childhood is a critical time in the development of a person's environmental perceptions and attitudes. During the years 6-12, children learn to distinguish the animate and inanimate characteristics of their environment, they develop cognitive abilities of place recognition and wayfinding, and they begin to understand the differences between the human-made world and the world of nature (Chawla 1988, Kellert 1985). Children at this age also spend a great deal of time outside, and the outdoor environment they experience can have a profound effect on how they will perceive and relate to nature in later years (Moore 1977, Tanner 1980).

In urban areas, parks can provide important opportunities for city children to enjoy and learn about wild nature. But most urban parks are managed for active recreation, and forests and other natural plant communities either are highly simplified in their vegetative diversity and structure or are missing altogether (Adams and Dove 1989). Thus, unlike those who grow up in suburban and rural areas, children who live in the densely developed inner city may not have readily available opportunities to experience natural areas (Ladd 1977). This may be particularly true for urban minorities and for those whose families may lack time and money to travel to where natural areas are more prevalent (Metro, Dwyer, and Dreschler 1981).

If it is assumed that exposure to nature is an important part of growing up (some, e.g., Holcomb 1977, might argue to the contrary), one important way to increase the opportunities for city children to experience nature is to bring more of it into the parks and play areas they use. But to be more effective, those who manage park landscapes and conduct interpretive programs to promote wild nature need to better understand how city children perceive and enjoy natural landscapes. This paper attempts to identify how forest vegetation in urban park environments is perceived by young inner city children, and suggests how nature-oriented park management and programming might better appeal to this important user group.

Children and Environmental Preference

Most of the research on environmental preference has been conducted with adult populations, which have generally shown a preference for natural environments over those that are developed (Wohlwill 1980). This pattern holds true in urban environments as well as in rural and wildland areas. In urban parks, for example, adults tend to prefer trees and forested areas, water, good maintenance, and peace and quiet, and tend to dislike buildings, poor maintenance, and large open areas (Schroeder 1982).

This same pattern of preferences may not follow for young children, for some environmental preference studies have uncovered substantial divergences in perceptions among different age groups. Rutz and Miller (1980) found that adults were more critical than children in what they regarded as scenic. Zube, Pitt, and Evans (1983) found that children did not seem to judge the scenic quality of a place on the basis of whether it was natural or developed for use by humans. Balling and Falk (1982) and Lyons (1983) also found substantial differences between children and adults in response to natural scenes, and suggested there may be an innate, biological basis for preferences that is modified with age and the indoctrination of cultural tastes. Finally, Medina (in Kaplan 1989) found that environmental educators' preferences for natural scenery were not shared by a group of predominantly black Detroit 12-to-14-year-olds, who tended to prefer urban scenes featuring residential and commercial buildings.

Studies focusing specifically on children's environmental preferences are rare, but the few that have addressed forest environments are illuminating. In surveying Chicago fifth-graders, Metro, Dwyer, and Dreschler (1981) found that although the students generally liked visiting or the idea of visiting forests, they expressed many fears about going there. Similarly, Kaplan (1976) found that the inner city children in her study exhibited a high degree of anxiety about being in a wooded area. This feeling of fear may not be particular to urban children, for Hart (1979) also found that small town Vermont children were apprehensive about entering a wooded area in their neighborhood.

How do children come to appreciate forest environments in the face of their initial fears? Two factors that may play important roles are knowledge and accessibility. In a study of 8-11-year-olds, Harvey (1989) found that students whose school grounds had a large amount and diverse mix of vegetation generally had a greater botanical knowledge and a greater appreciation for vegetation than students whose school grounds were lacking in vegetation. In a similar type of study that focused on animals rather than vegetation, Kellert (1985) found that knowledge and living in a rural environment reduced young children's fears of animals. And in hypothesizing how fears about nature may be overcome, Driver and Greene (1977: 68-69) stated that: "Inner-city children, in particular, often have little exposure to or opportunity to experience forest or other areas that are predominantly natural. Familiarizing experiences are especially needed by these youths who could be missing a very important dimension of being human."

The focus of this present research deals with a third factor that could play an important role in urban children's appreciation of natural areas-- design. Urban parks offer many exciting opportunities to create wild landscapes that minimize children's feelings of fear and offer them chances to explore and enjoy nature's wonders. Some authors have discussed how to incorporate natural elements into the design of children's play areas (e.g. Moore 1977, Kirby 1989), but there is little empirical information available on how to manipulate forest vegetation to create more pleasing landscapes for children. Because the amount of forest vegetation appears to be a key element relating to children's environmental perceptions, a series of studies was designed to look in detail at preferences for urban park and play areas with varying amounts of tree

vegetation. More specifically, the objectives of this research were to:

1) Assess the role that forest vegetation plays in young urban children's preferences for urban parks;

2) Test whether children's perceptions of forest vegetation are affected by the type of park setting;

3) Examine gender differences.

Overview of Methods

Three sequential studies examined the role of forest vegetation in children's preferences for urban parks. A photo-rating approach common to environmental preference research (e.g., Daniel and Boster 1976) was modified for children's use. As employed, this approach proved to be a simple and fun way for young children to be involved in a research study.

Study Population

The children who participated in these studies were visitors to the North Park Village Nature Center, located in and run by the City of Chicago. The children ranged in age from 6 to 10 years. The groups selected for study were from low-income housing or public schools in the inner city, and were either all black or predominantly minority (black, Hispanic, and Asian). The groups came to the center for a program that included both indoor exhibits and a walking tour of the nature trail. For Study 1 participants, the photo-rating task was administered before the nature program; for the participants in Studies 2 and 3, the photo-rating took place after the program. This change in sequence was unavoidable, but as will be seen later, it did not seem to confound study results.

Because a major purpose of these studies was to better understand the needs of urban minority groups who visited the Nature Center, no comparisons were made with white groups or with those who lived in suburban or rural areas. Future comparative studies of this type could be insightful and could aid in improving programs and park opportunities for all children.

Procedure

In each study, a set of 25 or 30 color slides was used to depict park environments with a range of forest vegetation and developed features. The slides were evaluated by groups of 20 to 50 children, in which each child was asked to view and rate each slide according to the question: "how much would you like to be in the place pictured?" Ratings were made on three-point "smiley face" rating scales (Figure 1).

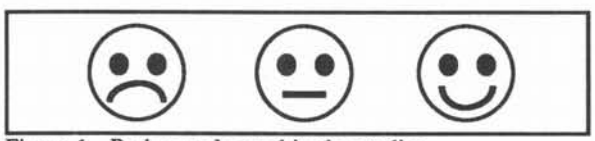

Figure 1. Rating scale used in the studies.

Reliability

A statistical test was used to estimate the level of agreement among the children's ratings. Mean observer-to-group correlations (Brown and Daniel 1990) ranged from r= .52 for Study 1 participants to r= .58 for Study 3 participants. This level of agreement was acceptable, and preference ratings for each scene were averaged across individuals to produce an overall group rating.

Analysis

To examine the relationship between forest vegetation and children's park preferences, the averaged group preference ratings were correlated with the amount of vegetation present in the scenes. To do this, the investigator measured the percent of forest vegetation present in each scene using a grid square overlay procedure (Shafer, Hamilton, and Schmidt 1969). Eight other scene features were also measured; grass, exposed soil or forest/weedy groundcover, and paved area were measured as percent-of-scene features, while playgrounds/athletic courts/play fields, water bodies and fountains, cars, buildings, and people were measured in terms of their presence or absence.

Study 1: Forest Vegetation in Park & Play Areas

The purpose of the first study was to examine the role of natural forest vegetation in urban children's preferences for park and playground areas. Study participants were 3 groups of black 6-to-9-year-olds from Chicago Housing Authority residences, 117 children in all. The study stimuli were 25 natural and developed park scenes, including playground equipment and areas of dense forest vegetation. Playground equipment settings ranged from few to many trees.

Results of the correlation analysis showed that scenes with playground equipment or play fields were the most preferred; large, open areas of grass were also highly preferred (Table 1). The densest tree vegetation received the lowest ratings; areas showing exposed soil or forest/weedy groundcover were also disliked. Children's preferences did not differ for scenes that showed playground equipment in forested versus open settings.

Table 1. Preference ratings/feature correlations, Studies 1-3.

Variable	Study 1(r)	Study 2 (r)	Study 3 (r)
Trees/forest[a]	-.78*	-.51*	.25
Grass[a]	.76*	.21	-.03
Dirt forest floor/weeds[a]	-.45*	-.56*	.17
Paved area[a]	-.20	-.02	-.11
Playgrounds/ courts/play fields[b]	.79*	.27*	-.08
Water[b]	.13	.51*	.34*
Cars[b]	.30	-.14	-.64*
Buildings[b]	.49*	.23	-.31*
People[b]	.13	.10	-.18

[a]Measured as percent-of-scene; [b]measured as presence-absence.
*Significant, $p < .05$

The strong, negative correlation between the children's preferences and the prominence of trees and forest areas was not initially expected. One hypothesis why it occurred was that the presence of the playground equipment in some of the scenes was so attractive to the children that scenes without equipment were rated negatively by default. This did not always happen,

however; undeveloped park areas with large, open fields were also rated quite positively.

Study 2: Forest Vegetation in Park Landscapes

Because of the questions raised by the first study, a second study was devised to look at children's preferences for park landscapes in the absence of playground equipment. Participants in this study were 50 black 7-to-9-year-olds from a Chicago west side public school. The stimuli shown to the children were 30 natural and developed park scenes. Included were scenes with dense natural vegetation and scenes with open fields, ballfields, and athletic courts. No scenes depicting playground equipment were shown until the very end, when two scenes with swing sets were shown. The study design included a 12-scene overlap between this slide set and the set used in the previous study, 7 of which showed dense tree or forest vegetation.

Removing the "playground context" did not seem to greatly affect the children's ratings of forested park scenes. Forested park landscapes were still disliked, as indicated by the moderately strong negative correlations of preference ratings with forest and tree vegetation, and with exposed soil or forest/weedy groundcover (Table 1). Open grassy areas, scenes with ballfields, and play courts and playgrounds were still preferred, though somewhat less so than in the previous study. The new stimuli used in this study included several scenes of ponds and the City's Lake Michigan shoreline, which contributed to the moderately strong preference for water features.

Between-group rating differences were tested statistically to see if removal of the playground context might have influenced ratings. The 12 overlapping scenes were used in a repeated measures analysis of variance (Winer 1971); the main effects of the analysis showed no significant difference between groups. This is illustrated in Figure 2 by the relatively close, parallel lines in the plots of the group mean scores for the scenes. There was, however, a slightly significant group-by-scene interaction ($p = .051$), meaning that the two groups differed in how they rated certain scenes. Visual examination of Figure 2 shows that the largest between-group rating differences were for the dense forest scenes (those to the right of the dotted line in the figure). There is no clear pattern of differences, with some forested scenes rated higher by Study 1 participants and other forested scenes rated higher by Study 2 participants. T-tests of group mean differences on individual scenes showed that only two of these differences were statistically significant ("I" and "J" in the figure), but again there was no strong or consistent evidence to support the idea that removing the playground context increased the chance that forested scenes would be preferred.

This lack of significant change is especially noteworthy considering that Study 2 participants were also exposed to the nature center program before they rated the slides. One might expect that this exposure, if anything, would have increased ratings beyond the effects of removing the playground context. The findings do not show this to be the case.

Open-ended comments given by Study 2 participants reinforced the conclusions of the statistical analyses just mentioned. "Trees" as a category was only mentioned in 5 percent of the positive comments, but formed the bulk of negative comments. "Trees and bushes" were cited in 12 percent of the negative comments, with "forest and woods" cited in another 27 percent of the comments. Other frequently cited negative features included "dirt," "mud," and "puddles," (16 percent), and "cars" (12 percent). For the positive comments, "playgrounds" and other play courts were mentioned in 28 percent of the comments, followed by "the park" (22 percent) and the "beach" or the "lake" (15 percent). Students who further explained their preferences mentioned that they liked open areas and playgrounds because they could do things-- play and have fun -- but they disliked the forested areas because they could not play or ride bikes there, and because the forested areas were "scary" places where one could "get lost."

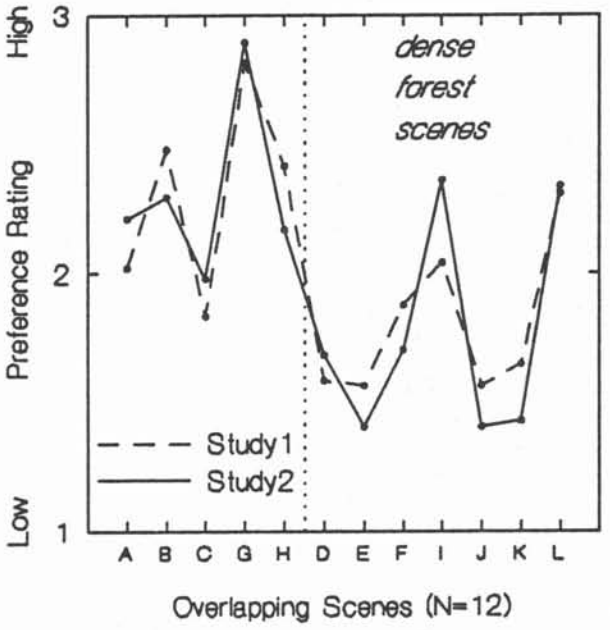

Figure 2. Group means for overlapping scenes, Studies 1-2.

Study 3: Trees & Forests in "Typical" Park Scenery

The stability of low preference ratings for heavily forested scenes in the absence of the playground context led to further speculation about the nature of forest vegetation in urban parks. Under what conditions do urban children like to see trees in parks? What specific characteristics of forested environments contribute most to their displeasure? The results of the first two studies offered some evidence that dense forest undergrowth and unkempt groundcover or areas of exposed soil could be major factors; if these areas were eliminated, would it change children's feelings about the attractiveness of wooded areas?

To address this question, a third study was designed to examine children's preferences for urban park scenes without natural forest vegetation and playground equipment. Study participants were 56 8-to-10-year-olds from a Chicago north side public school, most of whom were minority (black, Hispanic, and Asian). The scenes included in the study were 30 views of Lincoln Park, a large (1,200 acre) park along Chicago's lakefront. These varied landscape views included open grassy areas, developed facilities, and adjacent buildings and highway development. Tree cover still ranged from low to high, but no scenes were included with heavy undergrowth, and most of the wooded scenes had a grassy groundcover. There was a 16-scene overlap between Study 3 and Study 2, 4 scenes of which depicted heavy tree cover.

Without the sample of forested scenes included, the correlation between preference ratings and tree prominence changed from moderately negative to slightly positive (Table 1). The prominence of grassy areas was essentially uncorrelated with this group's preference ratings, while presence of water was

positively related. The strongest negative features were presence/absence of cars and traffic, and buildings.

Mean scores comparisons between Study 3 and Study 2 participants for the 16 overlap scenes showed a highly significant between-group main effect ($p = .001$). The group-by-scene interaction was also highly significant ($p < .001$), indicating that the two groups differed in how they rated certain scenes. These differences could be largely attributed to how the groups responded to the 4 scenes with the heaviest tree cover; t-tests of the group mean differences for these individual scenes were highly significant (all $p < .001$). Figure 3 illustrates these results (the forest scenes are to the right of the dotted line).

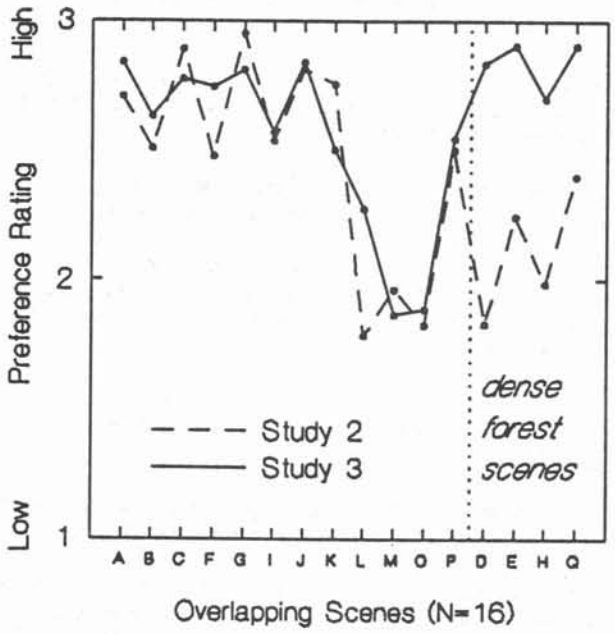

Figure 3. Group means for overlapping scenes, Studies 2-3.

Open-ended comments echoed the change in the children's sentiment for trees compared to Study 2, with 15 percent mentioning "trees" positively. Other features mentioned positively included "parks" in general (18 percent), "grassy areas" or "open space" (15 percent), "peace" (9 percent), and "sunshine" (6 percent). Features mentioned negatively were topped by "streets and paved areas" (35 percent) and "cars" (18 percent). This comparison, along with the changes in the correlations and the magnitude of preference ratings, tended to support the idea that children can like trees and forest-like vegetation if they are not "too wild" and unkempt looking.

There were no significant differences found in the mean ratings between the boys and girls, either within the Study 3 group or in a comparison between Study 2 and Study 3 participants.

Discussion and Recommendations

The findings of this research should be considered preliminary, and there are many further questions to explore before definitive guidelines can be made about the management of forest areas that will appeal to urban children. On the basis of these findings and those from previous research, however, some general recommendations can be offered for enhancing nature in urban park environments and for improving environmental education programs for inner city children:

Design Legible, Maintained Space

Based on the comparison of results across the three studies, it appears that forest vegetation can be a positive element in young children's appreciation of park environments (or at least not a negative one) as long as it is not "too wild." Providing areas within parks, nature centers, and urban forests where forests are "friendly" and inviting rather than foreboding may encourage children to appreciate and explore wild nature. This might be done by having areas with dense trees and shrubs that are well-maintained with defined pathways and small enough to provide easy visual and physical access to open areas. Kirby's (1989) suggestions for using the concept of "refuge" in play area design reinforce the results of this present research. Among her ideas are that successful play areas should provide enclosure through a ceiling or other elements that offer a sense of intimacy, privacy, and safety; should be of proper scale for the intended number of children and type of activity; should provide multiple access and "escape" routes; and should use materials, especially vegetative elements, that can be manipulated by children for creative and dynamic play.

Make Space "Familiar," but Encourage New Experiences

Part of making forest environments attractive to young urban children often means making them more like the park environments the children have previously experienced and feel comfortable in. The results of this research indicate that it may be important to have areas where there is a mowed grass understory so children can play under trees; it might also mean introducing meadows or openings into a predominantly forested setting. In some cases, to make the forest a more familiar environment, it may be appropriate to build play structures within or on the edge of natural settings. Nature education should also try to incorporate concepts and activities that are familiar to an urban child's view of the world (Lewis 1978).

The design of the environment and the programming that takes place there must also try to encourage children to explore new and different opportunities that only natural forest ecosystems can offer. Producing the right blend of the familiar and the exotic can give children options to gain experience with forest environments without producing fear or anxiety.

Provide an Activity Orientation

Young children's experiences in park settings center largely on active play, and activity-oriented settings that foster play are likely to be preferred over settings that are neutral or that inhibit active play. Nature programs should involve children in active games, experiences, and other activities in the natural environment that fulfill some of the same needs and desires children seek in non-nature oriented play. In some cases children's play areas could be designed and located so as to incorporate natural vegetation elements into the play setting. This might be an "adventure forest" that includes play structures like a tree fort or a "see-and-do" nature trail oriented towards young children.

Involve Parents and Educators in Nature Experiences

Adult role models can have an important impact on how children relate to the natural environment (Tanner 1980). Environmental education programs need to aim not only at young children but also at those adults who help children to form their first impressions of the environment. This is true not only for what adult role models say and do, but also for what visual and written information they select for their children. Fairy tales, for example, traditionally portray forests and animals to children as things of danger and fear (More 1977).

Positive messages communicated through direct experience or indirectly through books or television could very much improve the current state of environmental education for urban youth.

Understand Age, Gender, and Cultural Differences
Finally, research has shown that the environmental preferences acquired by mainstream American adults may not shared by children, and preferences may also differ due to gender and ethnicity. As environmental professionals, we must understand that our perceptions and preferences should not always be the sole criteria by which we develop our programs and policies (Holcomb 1977). Recognizing this will help us to better direct our education and management efforts in positive and productive directions. Future research in this area can also help us to more fully understand urban children's perceptions and preferences, and will give us a greater sensitivity in designing parks and building stronger environmental and nature education programs.

Acknowledgements

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URBAN PARK TRAIL USE:

AN OBSERVATIONAL APPROACH

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An observational study of trail users in an ethnically diverse Chicago neighborhood park showed moderate use levels on warm winter days, with use increasing substantially in spring and summer. The asphalt trail was used mostly by white adult walkers, but also included a diverse mix of age and ethnic groups for many different trail-related activities. Observation is presented as an important tool to use along with other research methods to understand trail use, user characteristics, and user and resource interactions.

Trails provide important recreation opportunities in urban park and forest settings. Trail use has increased rapidly in recent years, for a variety of recreational activities. State and national studies show high participation rates in such trail-related activities as walking, hiking, running, and bicycling (Van Horne et al. 1985; Illinois Department of Conservation 1988). While these activities often extend beyond trails, the demand for off-street trail facilities that furnish these opportunities has made urban trail development a high recreational priority.

Employing a variety of research methods, studies of urban trail users have produced some useful information for design, planning, and management. On-site questionnaires have identified the perceptions of trail users and examined their likes and dislikes about the physical, social, and managerial attributes of trails (Gobster 1988, 1990, 1991). Mail questionnaires have examined how people choose among trails with different attributes; models developed from this experimental technique can be used to predict which trails different groups will prefer (e.g., bicyclists vs. cross-country skiers), and how user "market segments" (e.g. racing cyclists vs. cycling families with young children) choose between trail opportunities (Louviere, et al. 1988, Gobster et al. 1990, Allton and Leiber 1983). Finally, monitoring of forest preserve bicycle trails with traffic counters has helped to explain levels and patterns of use as a function of time, weather, and seasons (Dwyer 1988a).

Although this research has given trail planners and managers needed information upon which to base decisions, gaps in our knowledge prevent a more complete understanding of trail users and how they interact with each other and with the environment. Past research has focused on trail use by bicyclists, but many urban park trails cater to a variety of trail users. We have a good understanding of the attributes of trail preference and choice, but do not know how these attributes actually influence on-site activities, behavior, and interactions. And we have incomplete knowledge of who is using trails, for what purposes, and under what conditions. Answering these and other related questions may require different methods of investigation to complement existing tools.

On-site observation is a little-used technique that holds promise for addressing some of these questions. Behavioral observation can be linked with information about the physical and management characteristics of trails, and can provide insights into planning and management not available through other methods. It also offers unique opportunities to analyze interactions between trail users and between users and the environment. Observation has been used successfully in urban settings to understand the use of parks (Hutchison 1987, More 1985), plazas (Whyte 1980), and street-side public spaces (Nasar and Yurdakul 1990), but has yet to receive much attention in urban trail research.

In this study, observation was used to identify use levels, user characteristics, and user and resource interactions taking place on an urban park trail. The trail in Chicago's Warren Park served as a case study. Specific objectives were to:

1) Identify use levels and examine how they vary seasonally, by time of day, and in relation to weather and other environmental conditions;
2) Identify user characteristics including age, race, gender, activities, and group size of those using the trail, and examine how important social and environmental factors might influence trail use;
3) Examine user-user and user-resource interactions to identify social and environmental determinants of use patterns, user conflicts, and resource degradation.

Methods

Observation is particularly well-suited to studying urban trail use. Short trails characteristic of those found in neighborhood parks receive a high proportion of pedestrian use (Gobster 1990); this limits the effectiveness of traffic counters, which are better suited for counting bicycles. On-site questionnaires are valuable for identifying user perceptions and attitudes, but require high participation to ensure a representative picture of who is on the trail, and can be unnecessarily complex for collecting basic user data such as age, gender, activity, and interactions. Furthermore, those who complete self-report behavioral surveys tend not report certain activities, especially those which might be socially unacceptable in nature. Lastly, when park users vary widely in age and racial-ethnic heritage, it is difficult for one survey form to be understood by all.

Observation is not without its disadvantages. There is a potential for error in classifying individuals on social and demographic variables. There may also be problems in interpreting observed behavior and making judgments about what a trail user might actually be doing. These problems can be minimized with training and by developing clear operational definitions for recording behavior. The method does, however, require a very substantial time commitment by the researcher or well-trained assistants.

The Study Site

Laurence C. Warren Park is an 82-acre park on Chicago's Far North Side, owned and managed by the Chicago Park District. The park is surrounded by residential and commercial development in an ethnically diverse neighborhood area. The park is recent compared to most of Chicago's parks--development began in 1976 when the State of Illinois purchased the land from a private country club. Today about half of the park is developed with playing fields and courts, while the other half is a 9-hole public golf course. Use is mainly local, and many who drive to the park come to golf. The main park trail is a 1.2-mile asphalt paved loop surrounding the golf course, with

shorter spur trails extending to park facilities and neighborhood streets (Figure 1). The trail is actually two parallel trails, the inner one intended for bicyclists and the outer for pedestrians.

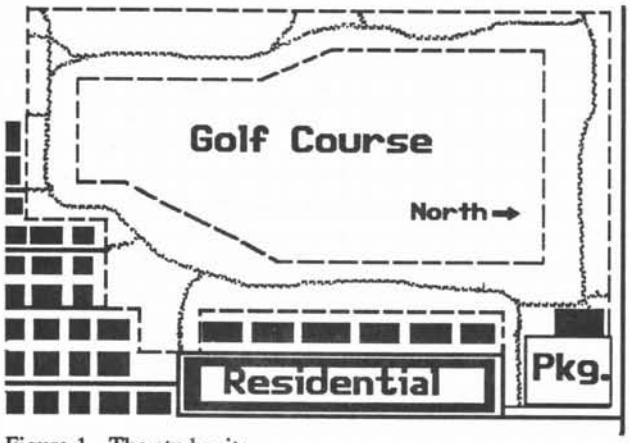

Figure 1. The study site.

Sampling Procedure

A sampling matrix was developed to ensure a representative sample of trail observations (Table 1). Cells were defined as follows: time of day ("morning" 6 a.m. - 10:00 a.m., "midday" 10 a.m. - 2:00 p.m., "midafternoon" 2 p.m. - 5:00 p.m., and "evening" 5 p.m. - 9 p.m.), day of week (weekday, weekend), and season ("winter" Jan 1 - March 20, "spring" Mar 21 - June 20, and "summer" June 21 - September 4). Following sampling methods described by More (1985), the plan was to visit the park at least three times within each cell. This goal was exceeded in most cases; summer observations were cut short because large numbers of trail users made data collection and coding very time consuming. Because of this and because by summer the investigation had not yielded new information sufficient to justify its continuance, sampling was discontinued before entering the fall season. The total sample (January 1 - September 4) was thus based on 151 observation periods.

Table 1. Sampling distribution of trail observations (N= 151).

	Winter		Spring		Summer	
Sample Strata	Wk day	Wk end	Wk day	Wk end	Wk day	Wk end
Morning	13	11	9	9	4	3
Midday	7	13	14	3	1	3
Afternoon	13	10	8	7	1	2
Evening	6	0	1	8	5	0

During each observation period, the investigator entered the park at one of five park entrances and made a full reconnaissance of the trail in a randomly chosen direction. The investigator either walked (20 minute period), jogged (15 minute period), or bicycled (10 minute period) the 1.2-mile trail loop around the golf course, and recorded the following information for everyone encountered on or near the trail:

1) Location on the trail (53 predetermined locations)
2) Number of individuals in the group
3) Race, sex, and age (9 categories) of each person
4) Primary activity of each person (e.g., walking, biking)
5) Secondary activity of each person (e.g., talking, eating)
6) What kind of clothes they were wearing
7) If they had a dog, size of dog, and if it was leashed
8) Direction they were travelling (with or against the investigator, or stationary)
9) Interactions between groups, and type of interaction
10) Was person seen before in the same observation period
11) If the person was seen before in the park

Spur trails near the main trail, grass and seating areas adjacent to the trail, the clubhouse area, and the sledding hill were included along with the trail proper. To minimize interrupting the activities of trail users and to facilitate accurate reporting, observations were recorded discreetly on a microcassette tape recorder.

The decision to record adjacent trail activities as well as those activities that occurred directly on the trail was made for two reasons: 1) in many cases adjacent trail activities occurred in conjunction with using the trail (e.g., doing calisthenics at the "parcourse" stations while jogging around the trail loop); 2) in other cases adjacent activities directly or indirectly affected those who were using the trail (e.g., throwing a ball or frisbee across the trail). A second decision was to record trail activities as "primary" and "secondary." A primary activity was defined as the individual's dominant physical posture or behavior (e.g., walking, sitting, bicycling), while a secondary activity was defined as any other behavioral or situational facet related to the primary activity (e.g., talking, carrying sports equipment, watching, listening to a radio).

In addition to information on each person, the following time, weather, and trail information was also recorded:

1) Month, day, date, and time
2) Temperature, wind direction, speed, and wind chill
3) Sky conditions (sunny, partly cloudy, heavy clouds/rain)
4) Light Conditions (dawn/dusk, daylight, darkness)
5) Trail Conditions (dry, wet, puddles)

User-user and user-resource interactions were recorded as they occurred (e.g., pedestrian-bicyclist conflict, gatherings of people) or as their traces were observed (e.g., litter, dog waste, vandalism). Other relevant observations or insights gained while on the trail were also recorded when they occurred.

The coding system was developed and refined over a two month period prior to data collection. The investigator practiced assigning individuals to categories of variables (e.g., age, race) until he was confident in making reliable assessments. When in doubt on certain variables, individuals were assigned to more general categories (e.g. "adult," "child") or coded as "not identifiable" (e.g. race). New activity codes were added as data collection progressed through the seasons.

Use Levels

The investigator encountered a total of 5,496 individuals during the 151 observations periods. Use level variations were examined in terms of time of day, seasons, and environmental factors. When temperatures were below freezing there were seldom more than 25 people encountered on the trail within an observation period (Figure 2). Use increased with temperature, sometimes dramatically. For example, on a sunny Tuesday afternoon in January when the temperature hit an unusually high 65 degrees, 66 people were observed on the trail at one time, while on a sunny Monday afternoon the week before with the temperature at 33 degrees there were only 38 people. Use levels

peaked when temperatures were in the 70's, then dropped as the temperature rose into the 80's. Data on high temperature days (6 observation periods) is sketchy, however, and more information is needed to substantiate this pattern.

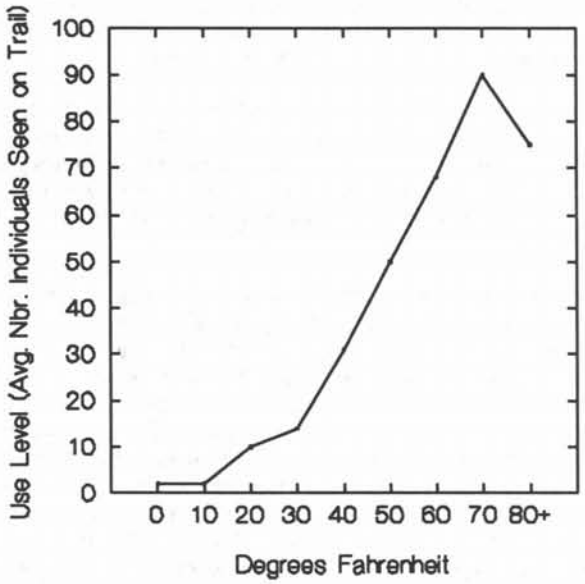

Figure 2. Trail use levels as a function of temperature.

Weekday use was highest in the evening, with smaller peaks in the early morning and around noon (Figure 3). Mid-morning and mid-afternoon were low points in weekday use. This pattern changed for weekends, when use climbed gradually throughout the day before dropping off sharply around sunset.

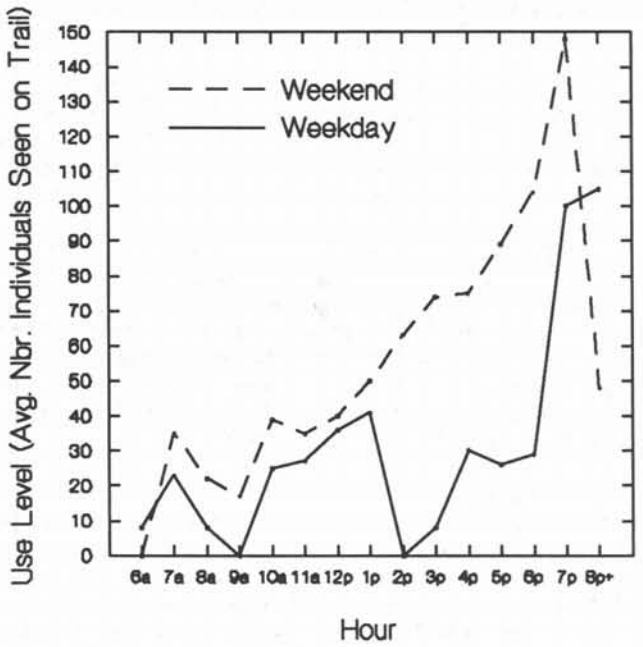

Figure 3. Hourly trail use levels, by weekday and weekend.

There were significant weekend and weekday use variations. To examine these more closely, a simple predictive model was constructed, patterned after Dwyer's (1988b) daily use model of auto traffic in urban forest preserve sites. The initial model for the Warren Park trail included variables for temperature, season (winter, spring, summer), time of day (morning, midday, midafternoon, evening), day of week (weekday, weekend), and cloud cover (sunny, partly cloudy, heavy clouds or rain). Temperature correlated r= .54 with use level but was intercorrelated with season so it was left out of the final model. In the final model, season (winter) accounted for the highest variance of any term, with R^2= .37. The other variables explained only slightly more of the variance, for a total R^2 of .43. The model estimates that use is highest on spring and summer weekend evenings, when skies are sunny or partly cloudy. While not approaching the R^2 of .90 estimated by Dwyer's forest preserve use model, the Warren Park trail model does show the combined importance of temporal and environmental factors in affecting trail use.

User Characteristics

Demographics

The typical Warren Park trail user is a white male adult age 26-39. "Typical" is somewhat misleading, for though "whites," "males," and "adults 26-39" were the categories with the highest frequencies, there was a broad range of trail users. The sample was 55 percent male and 38 percent female (7 percent unidentified). Whites accounted for 62 percent of the sample, Hispanics 20 percent, Asians 6 percent, African-Americans 5 percent, and Indian-Pakistanis 4 percent (4 percent unidentified).

Adults were the primary trail users, with those 26-69 years accounting for nearly 60 percent of total trail use (Figure 4). Adolescents (7-12 years) and teenagers (13-17 years) made up another 20 percent of the trail sample. There was a relatively high proportion of young children using the trail, with babies (0-2) and tots (3-6) accounting for almost 10 percent of the sample. The elderly (70+ years) were the age group seen least on the trail.

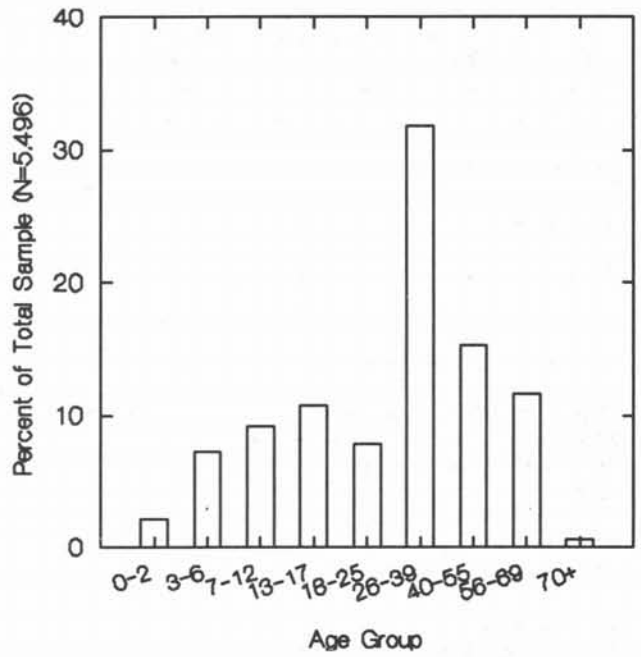

Figure 4. Frequency of trail users, by age group.

User Activities

Table 2 lists the frequency of primary and secondary activities observed on the trail, ordered by major activity type. For primary activities, casual walking or "strolling" far outweighed any other trail activity, with more than half of all individuals engaged in this activity. Other important activities included sitting, bicycling, standing, and jogging.

Secondary activities varied widely. They were difficult to group: "carrying things" was the only major category used to group activities. Nearly three-quarters of the sample was not observed in a secondary activity; of those who were, talking and dog walking were the most common. Other top ranked secondary trail activities included carrying golf equipment, pushing a baby stroller, listening to "Walkman" radios, and carrying groceries.

About a third of those who were talking when observed were speaking a foreign language. Often the language was Spanish, but there were also quite a few whites speaking Eastern European languages. Although most trail users were white, they also seemed to be from a variety of ethnic groups.

Social Groups

The 5,496 individuals were in 3,186 separate groups that ranged in size up to 16. Individuals accounted for 58 percent of all groups; 24 percent were on the trail in groups of two, 9 percent in groups of 3, and 7 percent in groups of 4 or more.

As might be expected, larger groups tended to be more demographically diverse than smaller ones. Individual trail users were more often males (69 percent), while groups of two were more likely to be male-female couples (43 percent) than all male (29 percent) or all female (20 percent). Groups of three or more averaged 40 percent mixed gender, 24 percent all male, and 13 percent all female (the remaining groups included young children who could not be identified by gender).

Table 2. Primary and secondary trail activities.

PRIMARY (N=5,496)		SECONDARY (N=5,496)	
Walking:		**No 2nd Activity:**	73.3
• Strolling	51.3	**Carrying Things:**	
• Fast Walking	1.4	• Groceries	1.6
• Walking Slow	.2	• Books	.3
• Jogging	5.2	• Newspapers	1.0
• In a Wheelchair	.2	• Golf Equipment	4.3
• In a Stroller	1.9	• Sleds	.3
Mechanized:		• Bicycle	.8
• Bicycling	9.2	**Other Activities:**	
• Rollerblading	.3	• Pushing Stroller	1.7
• Skiing	.1	• Push Wheelchair	.1
• Skateboarding	.2	• Talking	6.5
• Police/Maint.	.4	• Talk Foreign Language	3.0
Stationary:		• Walking Dog	8.0
• Standing	7.0	• Reading	.5
• Sitting	13.9	• Eating/drinking	1.2
• Calisthenics	1.0	• Alcohol	.2
• Picnicing	1.0	• Smoking	.3
• Laying Down	.7	• Affection	.2
Playing:		• Sunning	.6
• Free Play	2.3	• Watching	.8
• Ball	1.1	• Radio Listening	1.7
• Sledding Hill	.9	• Collecting Cans	.2
• Swinging	1.1	• Telephoning	.5
• Toy Airplane	.1	• Problem Behavior	.1
• Frisbee	.1		

The range in ages among group members also diversified with group size. Age categories were collapsed to "children" (12 years and under), "teens and young adults" (13-25 years), and "adults" (26 years+). All-adult groups were the most prevalent combination for two-person groups (58 percent), followed by all teens and young adults (17 percent) and children and adults (15 percent). This pattern changed for groups of three or more, with children and adults taking over as the most prevalent combination (39 percent), followed by all adult (25 percent) and all teens and young adults (13 percent). Along with the considerable number of single adult users, this information appears to show that the other principal trail groups include adult couples and families with young children.

The racial composition of groups stayed quite homogeneous with changes in group size. Groups of two, three, and four or more were all the same race more than 90 percent of the time.

Variations by Ethnic Group

Use levels on the trail varied by ethnic groups on a seasonal basis. Whites were most often seen on the trail during the winter season, with other ethnic groups beginning to show in greater numbers as the temperatures reached the 50's (Figure 5). As temperatures hit the 80's the only groups whose numbers tended to increase were blacks and Indian-Pakistanis.

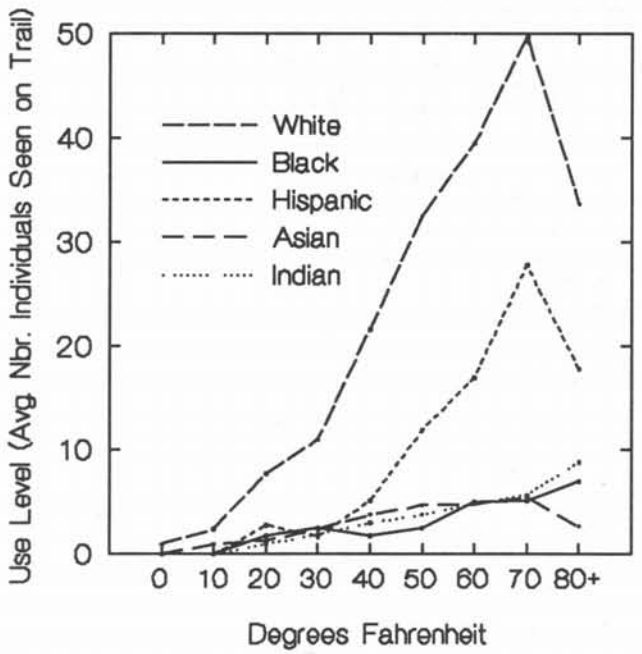

Figure 5. Trail use levels of ethnic groups, by temperature.

Walking, sitting, standing, and bicycling were among the five most frequent primary trail activities common to all ethnic groups. Among other top-ranked primary activities, whites jogged more and Hispanics picnicked more than other groups, while more Indian-Pakistanis were observed in free play and more Asians were seen playing ball than other groups. Top-ranked secondary activities common to all groups included talking and listening to radios. Whites and Asians were more often seen carrying golf equipment and blacks were more often seen carrying balls and other sports equipment than other groups. Hispanics watched others more (especially weekend soccer matches), and Asians did more calisthenics (including Tai Chi) than other groups. Group size also varied by ethnicity, with average group size highest for Indian-Pakistanis (2.6 persons per group) and Hispanics (2.5) and lowest for whites (1.5).

Some ethnic groups tended to concentrate at particular locations along the trail (Figure 6). Hispanics were often seen along the northwest section of the trail; they tended to be in large groups of mixed ages and were most often present on weekends picnicking and watching soccer games. They tended to use this section of the trail to bicycle and stroll along. The other was a concentration of white ethnics who were distinguished by their foreign language. This group concentrated on the southeast end of the trail and tended to be older adults who sat in the shade on benches along the trail and talked or read. They tended to come on weekdays and weekends in smaller, more homogeneous age groups, but were sometimes with small children who bicycled or played near the trail.

Figure 6. Trail use areas of different ethnic groups.

Variations by Season

During the winter months walking was the primary activity, engaged in by 63 percent of all trail users. Walking remained the top-ranked activity throughout the year, but dropped in relative importance to around 50 percent of total primary use in spring and summer. Jogging also dropped in importance, from 11 percent during the winter to 5 percent in the spring and 3 percent in the summer. These drops were accompanied by increases in other activities more suited to warm weather; sitting rose from 2 percent in winter to 15 percent in spring and 19 percent in summer, bicycling increased from 4 percent in winter to 11 percent in spring and 8 percent in summer, and free play rose from 1 percent in winter and 2 percent in spring to 3 percent in summer.

The most dramatic change in secondary activities by season was for dog walking. During the winter months a full 20 percent of trail users were accompanied by dogs. This percentage dropped to 6 percent in the spring and 4 percent in the summer. These statistics suggest that many winter trail users were in the park for reasons that extended beyond their own recreation. Most other changes in secondary activities were in terms of seasonal sports; youths in winter were seen carrying sleds while in summer they carried balls, and adults exchanged winter skis for golf clubs in spring and summer.

Winter groups also tended to be smaller in size, more often male than female, and more often adult, while spring and summer groups were larger and more mixed with respect to gender and age.

It is important to note that the changes noted are relative to total use, and may not reflect absolute numbers of users. For example, the number of groups encountered walking dogs during the winter averaged 3.1; in spring the average was 2.8 and in summer in was 2.9. When looked at in absolute terms, these figures suggest that for some activities there is a steady group of park users who are not affected by seasonal changes.

User and Resource Interactions

User-User Interactions

User-user interactions occurred both within and between groups. Compared to other common park activities like game playing and picnicking, major trail activities like walking, bicycling, and jogging do not generate much within-group interaction. This is in part a characteristic of the activity-- when you are jogging it is hard to carry on a conversation --but is also a function of average group size in which main trail activities takes place. For instance, the average group size for jogging was 1.1 persons, and group sizes averaged 1.6 for walking and 1.7 for bicycling. In contrast, group sizes for picnicking averaged 3.7, 4.3 for free play, and 3.7 for ball playing.

Perhaps more relevant to trail planning and management were the interactions that took place between groups. Between-group interactions were difficult to document because of their short duration; only 2 percent of the groups on the trail were observed interacting with other groups. More than half of these interactions were initiated because of dogs. In some cases, dogs from both groups brought the groups together; most of the time these interactions were amiable and resulted in conversations between the dog owners. At other times a dog (usually unleashed) came up to a group without a dog; this often seemed to be an annoyance to the dogless group.

The other major type of interaction was between-group conversation. Most conversations seemed to be short greetings or polite chatting between groups.

Finally, user interactions were looked at in a spatial context. Use was heaviest in front of the clubhouse and at intersections between the main loop trail and spur trails (Figure 7). These nodes were often congested during busy periods, to the point where they posed safety problems. This was especially troublesome where bicyclists and pedestrians mixed. Pedestrians strolling along or stopped in conversation were often unaware of bicyclists trying to move through the area. There are separate trails for each group, but users rarely paid attention to signs indicating which trail they should be on.

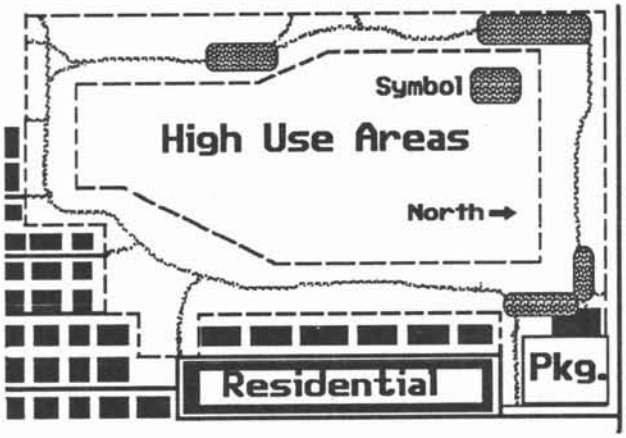

Figure 7. Areas of high use and high social interaction.

User-Resource Interactions

There were many kinds of interactions between users and the resource. Interactions were "bi-directional--" conditions in the environment affecting trail user behavior, and user behavior affecting the environment. The effects could be seen as positive: a sunny winter day bringing people out of their houses, or negative: a heavy snowstorm preventing all but the die-hards (and skiers) from using the trail. The following are a few examples of the kinds of user-resource interactions observed during the course of the study:

Shade and Park Benches. Because Warren Park is relatively new compared to most urban parks, large trees and the shade they provide are at a premium along the trail. Consequently, the demand for park benches in these areas is high, and on warm spring and summer days they are consistently occupied.

Trail Width and Vehicle Use. Police and maintenance vehicles were seen infrequently but regularly along the trail. The presence of these vehicles did not appear to conflict with recreational use of the trail, and might have added a dimension of perceived safety. However, trail width can barely accommodate full sized vehicles (especially utility and garbage trucks), and when the ground was wet they made ruts and muddy areas along the trail.

Seasonal Change and Dog Litter. As noted, winter use of the park by dogs is heavy. With spring snow melt and increased park use, the considerable amount of fecal material deposited by dogs near (and sometime on) the trail is visually offensive and could pose health hazards. This was particularly the case around major park entrance points, where in March the density of dog litter approached one pile per square foot.

Trail Maintenance and Problem Behavior. Incidents of littering, vandalism, and other behavior which could be considered dangerous or inappropriate were rarely observed directly in the course of data collection (.1 percent of all individuals). Signs of littering were apparent, but not as serious as in nearby commercial areas, and park management was generally diligent on cleaning up the trail proper. This was not always the case with gang graffiti, which was apparent on several of the benches and parcourse fitness stations. Damaged facilities were also noted.

Management Implications and Further Study Needs

Observations conducted over the three season period showed that trail use levels were tied closely to the time of day, weather conditions, and the season itself. This information will help park managers understand use flows and enable them to anticipate when to expect use peaks. When compared to data collected on other trails and forest preserve sites, these patterns will also help to understand how use levels vary among different kinds of sites. Additional use level data needs to be collected on the Warren Park trail and other urban park trails before further progress can be made.

The leisure and social characteristics of trail users can help park managers better understand their clientele. The Warren Park trail is used directly and indirectly for a wide variety of activities, and by a diverse mix of age, group sizes, and ethnic groups. Information of the type presented in this paper can be used as a basis for determining priorities for facilities development, for promoting trails to current and potential users, and for documenting trail usership for budgetary reasons. This information could also be compared to the 1990 U.S. Census data for neighborhoods surrounding Warren Park, to get an idea of how well the park serves its nearby clientele.

Recreational activities, age, and group size of trail users vary by season and in some cases by ethnic group, and information from this study can be used to plan for the specific needs of these market segments. For example, in winter there is a demand for cleared trails for walking and jogging but also a demand for snow-covered ski trails. This entails different management strategies that may include special winter signage to direct use. Golfing establishments in some cities have opened their courses for cross-country skiing, and both the course and clubhouse in Warren Park could be looked at for expanding winter park recreation opportunities.

Observing user-user interactions can help define management problems and solutions. For example, park managers could facilitate greater social interaction in places where it is desirable by placing park benches facing each other. In other locations it might be desirable to minimize interactions, such as at high use nodes along the trail. In these areas larger signs might help direct users to the bicycling or pedestrian trails, and park benches could be located further away from the trail. Considering the ethnic diversity of Warren Park's users, multilingual or pictorial signs could also help, and could highlight the multicultural diversity of the trail's users.

Observation of user-resource interactions can also identify management problems and solution. The high use of park benches indicates that park managers may wish to increase seating to accommodate additional trail users, especially along shady stretches. With regard to trail maintenance, future trail development should either plan for large utility vehicles or trail managers should restrict patrol and maintenance operations to smaller vehicles. Greater owner responsibility in policing dogs should be advertised and enforced where possible. Evidence of vandalism and gang graffiti can encourage more of the same, and for this reason it is important for park management to keep trail facilities in good appearance and working condition. At the same time it may be a good idea to post signs notifying trail users about penalties for littering and vandalism, and provide those who see others damaging trail facilities with a phone number they can call to alert park authorities.

Trail user observation, when used in conjunction with other research methods, is a valuable tool for identifying use patterns, user characteristics, and user and resource interactions. Based on this case study, observation appears particularly well-adapted for use on urban trails. Further use of this technique should be extended to other urban trail settings to increase its utility for management and research.

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GEOGRAPHIC INFORMATION SYSTEMS (GIS)

GREENWAY PLANNING: AN APPLICATION OF A GEOGRAPHIC INFORMATION SYSTEM

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This paper describes the implementation of a Geographic Information System (GIS) for greenway planning. Based on McHarg's seminal work, Design With Nature, a GIS incorporates layers of data referenced to a common coordinate system. Thus, the interrelationships between various aspects of the bio-physical and social environment can be identified and utilized in planning.

Introduction

Greenway designation has occurred nationwide in an attempt to provide recreation opportunities for the public while protecting the natural, cultural and historical resources. The President's Commission on Americans Outdoors recommendation has spurred the recent revival in greenway planning (PCAO 1987). As a planning strategy, greenways link resources together, while still permitting a variety of land use in the area. Several types of Greenways have been established, often found along rivers, mountain ridges and replacing the abandoned railroads.

One of the early and ongoing phases of greenway planning is the creation of a data base (Little 1990). This data base tabulates information on the human and the physical resources. Data of this type are found in a variety of formats. The problem remaining for recreation planners is to compile and utilize the data efficiently.

The purpose of this paper is to illustrate the steps for developing a Geographic Information System (GIS) for greenway planning. A GIS permits recreation planners to move from the collection and analysis of data to the decision-making process. Specifically, this paper will introduce the establishment of a GIS for the implementation of the Westfield River Greenway Plan.

Literature

Ian McHarg can be credited as the "Father of contemporary resource planning". His efforts have formulated the creation of a geographic information system based on a series of map overlays, which when placed on a common coordinate system, enable planners to recognize the interrelationships between features on the landscape (McHarg 1969).

A Geographic Information System approach to resource planning is well documented (Burrough 1986). Recent recreation studies include national park planning (Fleet 1987) and a Boy Scout Camp (Wikle and Bryant 1991). In the Northeast, a coordination of a GIS and the State Comprehensive Outdoor Recreation Plan (SCORP) in Massachusetts is being established (Klar et al. 1991).

As one can see, land use studies coupled with socio- economic analysis are presently incorporated in many planning projects. A GIS has an advantage over traditional maps and overlays in that a configuration of computer hardware and software enables the planner to access, compile and analyze a variety of alternative scenarios quickly and efficiently. For example, a recreation planner may be interested in identifying all the publicly owned land, having a slope that does not exceed six percent, is removed from fragile habitats and wetlands, yet accessible to a paved road and a drinking water pipeline. This land may then be made into campsites. A GIS can answer that inquiry in the matter of seconds. Furthermore, several other constraints can be evaluated and the best alternative chosen.

Greenway Planning

A greenway, or greenbelt as it is sometimes called, is a linear park that connects natural areas and open spaces. These greenways provide the public with access to open spaces for leisure pursuits. The concept of greenway planning can be attributed to Olmstead. His efforts established New York's Central Park and Boston's Emerald Necklace. These parks serve the public by providing relief from the urban pressures and preserving some of the natural environments. The open space may be publicly or privately owned and are found along abandoned railroads and canals, along utility corridors or scenic roads and in flood plains Little (1987) contends that the historical trend to separate humans from the natural environment and enclose them in a built one can be reversed with the "revolutionary" establishment of greenways in urban areas.

In summary, Greenway planning is a conservation strategy enabling recreation managers to protect natural resources and wildlife habits. Land that may be unsuitable for construction, such as a flood plain, are fine for a greenway.

Westfield River Greenway Plan

The Westfield River Greenway Plan was prepared by the Pioneer Valley Planning Commission and the Westfield River Watershed Association in 1990. The plan seeks "to protect the special and unique natural character of the Westfield river" (PVPC 1990:v). The goals of the plan are consistent with state and regional plans for Massachusetts waterways.

The Westfield River watershed is found the western part of the Commonwealth and drains a portion of the Berkshires before reaching the Connecticut River. Encompassing an area of 517 square miles, the river flows over a variety of landscape ranging from the Two thousand foot Berkshires to slightly above sea level in the Connecticut River Valley. The watershed has three main branches: East, Middle and West Branches and one major tributary: the Little River.

Most of the watershed is natural second and third growth forest. A timber economy still exists in the hill towns. Large tracts of public land are found and are administered by the U. S. Army Corps of Engineers, Commonwealth of Massachusetts and local towns. Upstream, the rural nature of the river encourages excellent water quality, while downstream, the urban land use threatens the river with pollution.

Methods

A typical GIS employs five steps: 1) data acquisition, 2) data input and preprocessing, 3) data management, 4) modeling, and 5) graphic output (Star and Estes 1990). Each of these steps are described below.

The first phase of a GIS is to collect data. This data serves as the basis for all geographic analysis and is available from a variety of sources. Maps, archives, remote sensed data from aerial photography and satellites and field checks are some of the types of information a GIS uses. Specifically, information

pertaining to the administration of the land (ownership, land use etc.), abiotic and biotic (geology, flora and fauna), and infrastructure (transportation, utility, zoning etc.) can be tabulated. Once the data are collected, it must be encoded into a digital data base.

A GIS employs two forms of data structures to represent the environment. The first, called a Vector, encodes landscape features by a pair of X and Y coordinates that are joined together to form lines. These line segments represent the features on the terrain. A third value (Z) defines the attribute.

An alternative means to represent mapped data is to use a Raster method. Here, the data are found in a grid cell network, with each cell taking on a unique X, Y, and Z coordinate. Raster systems tend to be data intensive since each cell has a value, whether a feature is found there or not. However, data "packing" is available to speed up processing and reduce the size of the data file. Raster systems are appropriate for analysis while vector systems are designed for database management and network computations (Eastman 1990).

The data must be inputed into a digital data base next. This process may be achieved by simple keyboard entry, or may incorporate scanners and digitizing tablets. Alternatively, one can purchase or otherwise acquire data bases that have already been created.

The third phase of a GIS is the data management requirements. Here, the computer and software come into play. Computers can range in power from laptops to mainframes. The software utilized may dictate to a large extent the type of hardware requirements. Further, one should recognize that it is not the size of the system that should direct the implementation but the compatibility and specific needs of the organization. Colleges and Universities may provide GIS labs for planning purposes and therefore increase the effectiveness of the planning process. For example, one cooperative agreement is found between Towson State University, the Baltimore County Department of Environmental Protection and Resource Management and the Baltimore County Office of Planning and Zoning (Johnson et al. 1991). Under this arrangement, the combined strengths of the three departments create a large GIS facility to work on planning issues.

Data modeling is the fourth part of a GIS. This step involves the manipulation and analysis of the planning alternatives. Because computers can work faster than humans, recreation planners can interpret a host of alternative scenarios and choose the best one to suit their needs. One should be cautioned at this point, since a tendency to try to investigate all possibilities may be undertaken, without serious thought to the consequences of the analysis. This attempt to discover relationships may lead the planners down a wrong path. In the Westfield River Greenway project, the goals of the greenway plan direct the analysis phase of the GIS.

The final part of the GIS is graphic output and presentation. The most important, yet essentially invisible part is the data file that has been created. Jack Dangermond, founder of Environmental Systems Research Institute, identified several deficiencies in digital data bases (Dangermond 1991). For example, most of the Earth's geology has yet to be digitized. Compilation of digital data bases and the cataloging of this information is imperative. Beyond the data files, graphic output in the form of maps, charts and tables present the information to a variety of audiences.

Discussion

The establishment of a Geographic Information System can be a laborious project. For the Westfield River Greenway Plan, all five phases are currently underway. The Data acquisition phase is ongoing and several data layers have been created. The feasibility of the project has been supported by the concentration of analysis for one small area northwest of Westfield. The area, named for the prominent peak called Tekoa Mountain has served as a demonstration site for the project. A terrain model has been compiled, showing the topography of the landscape. Hydrologic features, roads and trails, and vegetation have also been digitized for the Tekoa region.

Several problems have been encountered with this project that deserve some attention. One problem lies with the accuracy of data sources. This requires extensive field checks supported by recent aerial photography interpretation. In the creation of an overlay showing wetlands and residential zoning for Westfield, the roads and streams did not line up properly. Are the Town's maps incorrect or does the error lie with the USGS topographic map? Since zoning changes along streets and other cultural features on the landscape, the overlay maps had to be "rubber sheeted" or stretched and shrunk for the information to fit together.

Other problems are expected, but will be dealt with as the occurrences arise. These facts of life are but a part of the establishment of a GIS for resource planning and emphasize the need for accuracy in spatial data (Goodchild and Gopal 1989). If recreation planners have an accurate source of information to work with, a reduction of problems can be anticipated.

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MASSGIS AND SCORP PLANNING PROCESS: THE CAPE COD PILOT PROJECT

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Statewide Comprehensive Outdoor Recreation Plans (SCORP) serve as the means for states to qualify for Land and Water Conservation Funds (LWCF). With the support of the National Park Service, the Cape Cod and Islands Region in Massachusetts was utilized as a case study to determine if SCORP and digitized GIS data could be integrated into a single data set. Portions of both data sets were successfully integrated and this study will serve as a guide for incorporating a Geographic Information System (GIS) into the completion of the 1993 SCORP.

Introduction

The primary purpose of this research was to determine the feasibility of linking data obtained during the completion of the 1988-92 Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) and GIS data of conservation areas in the Cape Cod and Islands region of the Commonwealth. Conservation inventory data were obtained for all 23 Cape/Island communities. A complete account of the processes are contained in the 1988-1992 SCORP: *Massachusetts Outdoors: For Our Common Good*. The inventory contains the following information about each site:

Site Description. Descriptors include site name, site address, site ownership and management attributes, including types of access to the site.

Facility Inventory. Information on many types of facilities has been documented plus the number of those facilities which are accessible to physically disabled persons.

Special and Unique Features. A number of physical characteristics relating to each site have been described including the number and types of water bodies that are present, miles of tidal frontage, coastal zone protection, and specialized trail-use including motorized vehicular trail-use and trails designed for the physically disabled.

Activity Information. Outdoor recreational activities that occur on each site have been identified independently of whether or not facilities for each activity are present.

Site Assessment Information. Assessment information focuses on whether sites could be expanded for recreational use, if parking could be expanded, general descriptions of the site-type (general outdoor recreation area, natural environment area and historic/cultural area) and use-levels (optimal, under, over).

Coding Information. Coding includes town identification codes, regional and county codes, site extension codes (if site extends into another town) and site identification number.

Method

Geographic Information System (GIS) data were gathered primarily from municipal tax maps, recompiled and digitized from 1:25,000 USGS Topographic Quadrangles). Sites were assigned the same code numbers that were used in the 1988 SCORP site inventory. By matching SCORP and digitized sites, it was possible to map exact boundaries and visually present information related to the characteristics of the sites. For example, the number of camp sites available at state-owned campgrounds could be graphically displayed by either colors or shadings in black-and-white. Graphic coding could also be used to represent other site features such as the number of fresh water fishing sites, miles of hiking trails, number of significant cultural features, and so forth.

It is important to note that the primary search could begin with the type of activity, the type of site or the type of agency that manages the site, or any combination thereof. For example, one could search for all of the *state-owned* and managed *beaches* on Cape Cod by selecting *owner type* and *administrative agency equal to state*; and *usable beach frontage* which is greater than "0." On the other hand one could also select simply all *usable salt water beach* frontage which is greater than "0" without reference to *owner* or *management type*. This would yield information on *all* salt water beaches on the Cape. In another scenario, one could simply select the activity *salt water swimming*. This would identify sites where *salt water swimming* occurs whether or not a salt water beach facility is owned or managed by a particular agency. The answers to these queries of information would be somewhat different and yield some useful insights. For example, the second query, *where are the salt water beaches*, would identify all such facilities, regardless of owner type or which agencies manages them. But, by including information about the site management and ownership of these sites, one would be able to identify the distribution of beach areas on the Cape which there is *public access*. By integrating such information with the GIS system, distributions could then be depicted graphically for any particular town, cluster of towns or for the region as a whole.

More than 5,000 Cape/Island sites were identified during the SCORP data collection process. The major purpose of the study, then, was to determine the extent to which site information within the SCORP data set could be matched with sites identified through the GIS digitizing process.

Results

Although not insurmountable, GIS mapping difficulties emerged early in the study. Specifically, there was some loss in accuracy in situations in which assessor's maps at a scale of 1:1000 had to be "shrunk" to 1:25,000.

At the time GIS data were being gathered, one of the limiting factors of the software was that point data and line data could not be used for the same data layer. Version 5.0 software for ArcInfo software later became available which makes it possible to integrate line data with point data in the same data layer. Until the time when all Cape/Islands data have been sorted out between line and point data, small squares will continue to be used to represent the parcels too small to show up accurately at a 1:25,000 scale. Within this particular region, this is a significant problem since there are so many small sites (e.g., those containing boat ramps) which are less than one acre in area.

The GIS data collection process was labor intensive. It involved identifying site information sources, mapping sites on master quads, assigning identification numbers to each site, and digitizing site information into the Geographic Information System. Conservatively, these tasks required approximately 600 person hours.

The matching of SCORP records to mapped polygons and entry of the SCORP ID number into the GIS open space polygon attribute table (PAT) involved the following sequence of steps:

- The creation of a SCORP listing organized similarly to the GIS data which concatenated town codes and site numbers in the SCORP ID.
- The production of plots of the open space data with the open space ID, facility name and owner type as labels for each polygon.
- The recording of the SCORP ID on the GIS plot and on the polygon attribute worksheets.
- Updating the GIS by entering the SCORP ID in the polygon attribute table of the GIS coverage.

A relatively low percentage of the open space polygons were matched with appropriate SCORP records for the following reasons:

- SCORP sites included all conservation, recreation and historic sites whereas the GIS open space inventory included only "dedicated conservation lands" which greatly narrowed opportunities for matches.
- There were many isolated tracts of state-owned undeveloped land which do not appear in the SCORP site inventory. Many of these are lands associated with fire towers or other conservation lands with no formal public access.
- The SCORP site inventory was completed by municipal staff officials who had good information about municipal facilities but not about non-profit lands. Conversely, the GIS open space inventory was compiled by staff members of non-profit organizations who had good information about the land holdings of their particular agencies but not thorough knowledge of municipally held lands.
- In many instances, sites could not be matched either because they were not named identically in both data sets or because it was not always possible to determine the exact name of the area which contained certain GIS mapped facilities (such as boat ramps). In such situations, separate site ID numbers were given for the same site in the two different data sets.

Recommendations

An on-going system for updating existing site records should be developed and put in place. Ideally, legislation would be passed which would require municipalities to update state records on an annual basis. In addition, a larger number individuals within each community should become involved in completing site inventory sheets. This would ease the burden, increase accuracy and strengthen the planning processes associated with updating and completing the SCORP document. In general, a data collection system should be developed which promotes *community processes* for problem solving, particularly related to community open space plans and master planning.

For a complete integration of SCORP and GIS to take place, individual SCORP sites must be accurately plotted and mapped. This will be a long-term project that should begin with the more significant sites that are completely within the boundary of each town. Eventually it will probably be necessary to change the current SCORP method of assigning all site acreage that extends into another community to the community in which the administrative headquarters of that site is located.

As a result of insights gained by holding two workshops for Cape/Island planners, a number of points became apparent. First, many planners and administrators did not know exactly how the presentation of findings through GIS might be of assistance to them. Second, and somewhat related, they did not always know what research questions should be asked of that could be addressed through GIS. Third, without encouragement and guidance, most planners will either forget that the state Data Center exists as a resource or will feel that obtaining data from the Center is too complicated to pursue.

Even if data requests are formulated and submitted to the Data Center, it will be necessary for the state to hire one or more individuals who have knowledge of SPSSX and the ArcInfo software systems. Without such assistance, staff at the EOEA Data Center will be limited to providing descriptive information in report formats rather than reports and maps that are generated by a fully integrated SCORP-GIS system.

This study process has served several purposes. First, it actively involved planners within the Cape Cod and Islands region. New relationships between state and local planners were formed, local planners learned about the availability of data sets that will be of help to them and their communities, and they gained insights about the power of GIS and how it will be used increasingly in state planning in the years to come. Second, a number of barriers to the matching of SCORP and GIS sites were identified. In future SCORP-GIS studies, these can be avoided thereby greatly increasing the power of the data. Third, this study will serve as a model for other regions within the Commonwealth. As the time for completing the 1993 Massachusetts SCORP draws near, the intent is to actively incorporate GIS into the SCORP process.

Finally, aerial photogrammetry may soon play a role in the GIS digitizing process. If aerial data can be scanned and converted into a digitized form, there will be major savings in the data entry process.

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THE REPRESENTATION OF ERROR IN VISIBILITY MODELING [1]

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Visibility analysis has been a significant tool used in recreation planning for 30 years or more. Computer applications assume a deterministic model and apply the visibility algorithm only once, resulting in a classification of visible or not visible areas. The sensitivity of this assumption is investigated using a Monte Carlo approach where a digital elevation model is perturbed within the map's accuracy standards. This process is repeated several times to create a summary map that indicates error or sensitivity.

Visibility Analysis

A visual analysis is one of the few professional services that is normally performed only by landscape architects. It could be argued that much of this "analysis" is very subjective in nature, and that the results would vary from professional to professional. However, most of us would expect visibility or viewshed analyses to be very objective--since they are a simple matter of geometry--with little variation among the findings of different professionals (Palmer 1983). This expectation of objectivity is only enhanced with the reliance on computerized geographic informations systems (GIS) to perform the calculations. However, computers give us a false sense of confidence and are particularly subject to uncertainty errors related to the phenomenon known colloquially as "garbage-in-garbage-out" or GIGO.

A typical visibility map is shown in figure 1. What do you see? What information can it provide a decision-maker? What is left out or is even misleading? A decision-maker interested in the bottom line would reasonably draw conclusions about whether some location in the landscape is seen or not seen from the selected viewpoint. In their reviews of approximately 100 major planning and project impact reports, Felleman (1982) and Griffin (1989) found maps that looked very much like figure 1, with little or no documentation of methods or parameters used. For instance, figure 1 was calculated using a 30-meter digital elevation model (DEM) derived from a USGS 7.5 minute quadrangle topography map. The elevation of the viewer's eye is two meters, the visible points are at ground level, and there is no consideration made for land cover. The program used is MAP II (Pazner 1989), a derivative of Tomlin's (1983) Map Analysis Package, which does not document the algorithm used from among the many available (Sutherland et al. 1974).

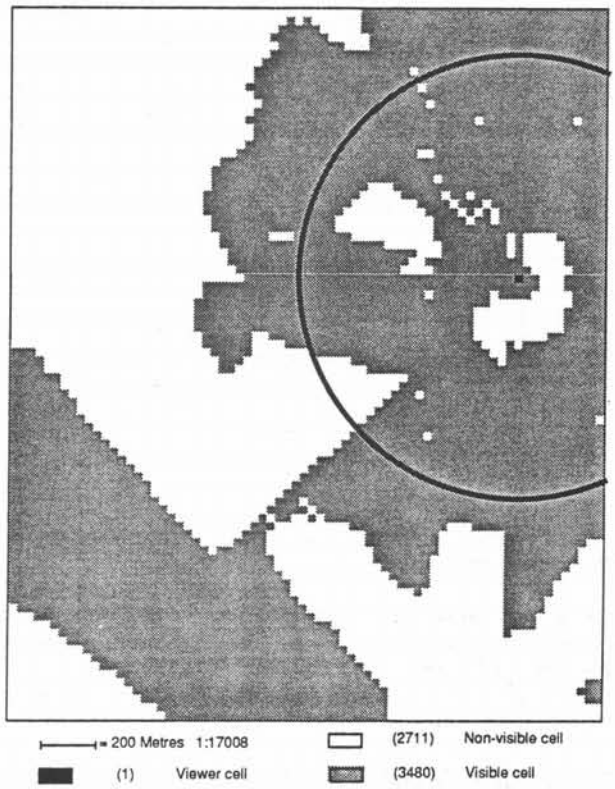

Figure 1. A typical visibility map showing areas seen and not seen from a viewpoint with an arc indicating the boundary between foreground from the middle ground.

Why be Concerned with Accuracy and Precision in Decision-Making?

It is the nature of our political system that those responsible for making decisions demand answers to questions that they know little about. The professional staff who advise about alternative positions can wax eloquently about the subtleties of various options until they are "blue in the face," but decisions will still be made based on a few "bottom line" characteristics. It is, therefore, very important that the professionals develop tools that allow decision-makers to visualize the complexity and subtlety of their options in an accurate and easily understood way.

While most decision-makers see questions of accuracy and precision as technical considerations about which they need not be concerned, there is nothing further from the truth. Self-interest leads any person in a position of authority to seek responses that are tightly focused and right on target. The importance of this situation is graphically portrayed in figure 2, where the desired response has both high accuracy and precision. Frequently, decision-makers find themselves following the fuzziness strategy to protect themselves from making firm proclamations that entirely miss the mark --low accuracy and high precision. When advising decision-makers, we should present our results with a stated precision --degree of focus or fuzziness-- that is appropriate to the accuracy of our data.

1/ This project was funded in part by Cooperative Agreement No. 23-88-27 from the U.S. Forest Service, North Central Experiment Station

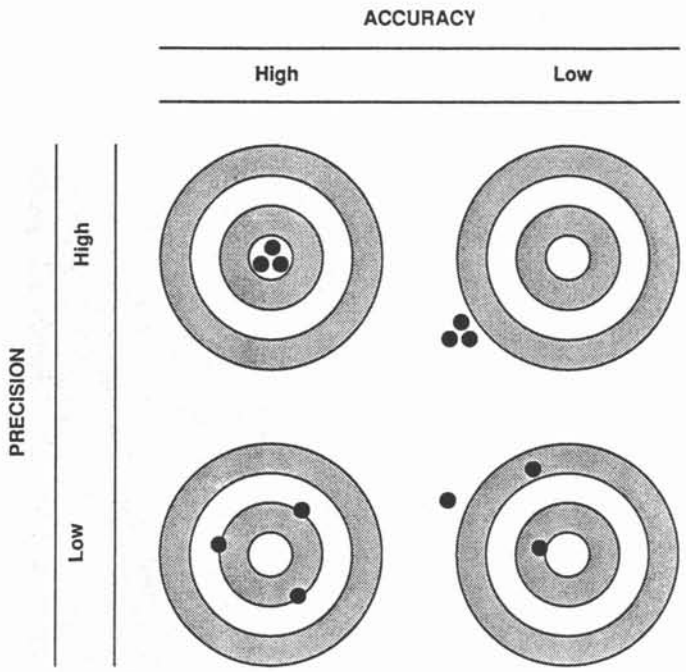

Figure 2. These targets graphically portray the meaning of high and low accuracy and precision.

The sharp lines of the visibility map shown in figure 1 are a delusion that, as professionals, we should not support because they can lead to poor decisions. The remainder of this article outlines one approach to preparing a visibility map that better represents the uncertainty inherent in the analysis.

Evaluating Visibility Accuracy

The U.S. Geological Survey is the source of most topographic data used for visibility analyses. Most of their products conform to the National Map Accuracy Standard "that no more than 10 percent of the points tested shall be in error by more than a certain tolerance" (Thompson, 1988). By assuming that the error at any point is independent of the error at any other point and that these errors are normally distributed, this standard can be can be implemented statistically using the standard error or root-mean-square-error (RMSE):

$$\text{RMSE} = \sqrt{\frac{\sum x^2}{n}}$$

where $x_1, x_2, \ldots, x_n$ are the errors at n checkpoints.

Thompson (1988) show that the allowable tolerance in the elevation contours (in feet) for a 1:24,000–scale map with a horizontal tolerance of 40 feet on the ground for 90 percent of the horizontal test points and a vertical tolerance of one-half contour for 90 percent of the vertical test points is:

$$\text{allowable RMSE} = 0.3\,CI + 24\,t$$

where CI = contour interval, and t = tangent of slope angle.

Because it is related to the normal distribution which is one of the foundations of most parametric statistics, the RMSE provides a convenient method for evaluating map accuracy in statistical terms.

Method for Modeling Probabilistic Visibility

A Monte Carlo approach is used to evaluate the effect of possible map error on the results of a visibility analysis. Monte Carlo methods provide approximate solutions to complex problems by investigating a series of models based on the random sampling of simulated data. The topographic database used for this paper is of Howe Hill near Worcester, Massachusetts. It comes bundled with IDRISI, a GIS for MS–DOS PCs distributed by the Department of Geography at Clark University. It was manually digitized from a 7.5 quadrangle map, but is in the format of a USGS DEM for the quadrangle series. The data base is 86 rows by 72 columns with a cell resolution of 30 meters. The elevation has been converted from ten foot contour intervals to the nearest meter. It ranges from 294 to 360 meters, with a mean of 330 and a standard deviation of 16.0 meters.

A group of fifty separate DEMs for Howe Hill were created, with each one introducing a different set of random normal perturbation to the topography based on the RMSE for each cell. A viewpoint was chosen near the crest of a hill of moderate elevation within the site.

The data for the fifty elevation maps with random normal perturbations were prepared in Wingz (Informix, 1988) using the NORMAL(*standard deviation*) function. The RSME as described by Thompson (1988) for a 1:24,000 series topographic map and adjusted for the change in scale from feet to meters was used as the standard deviation in NORMAL function. The "tangent of the angle of slope" was calculated in MAP II using the GRADIENT operation with the maximum option. This gives a percent slope map, and was divided by 100 to arrive at the tangent of the angle. The random error was added to the original control elevation of each cell. The 3–by–3 cell area surrounding the viewer cell was reset to the original control elevation on the assumption that the error in the immediate foreground relative to the elevation of the viewpoint would be marginal or absent. A visibility map is created for each of the fifty randomly perturbed DEMs using the RADIATE command in MAP II. [2]

The Monte Carlo approach used here adds several of these visibility maps together. The resulting probabilistic visibility map indicates the number of times each cell was seen from the viewpoint. To facilitate interpretation, the boundary between the foreground (0 to 1/2 mile) and middle ground (1/2 to 3 1/2 miles) is indicated. The distances used are appropriate for the Northeastern region where the site is located (Felleman 1982).

Results

The total seen area of the control visibility map in figure 1 is 3480 cells. Only one of the fifty Monte Carlo simulations had a greater seen area: trial 23 is 9.1 percent larger at 3861 cells. The size of the seen area of the other 49 trials ranges between 2889 and 3295 cells with a mean of 3114 cells. Therefore, the Monte Carlo approach indicates that the control visibility map in figure 1 may over-estimate seen area by five to fifteen percent.

2/ The command used was "Radiate <<VIEWPOINT>> To 7620 At 2 Over <<RANDOM ELEVATIONS>>' where the 3X3 cell area surrounding the view point in RANDOM ELEVATIONS was reset to its unperterbed control elevations.

The probabilistic visibility map produced from all fifty Monte Carlo trials is shown in figure 3. While approximately 43.8 percent of the control map is never visible, this percentage is reduced to 33.3 in the probabilistic visibility map. The results are even more dramatic for the always seen areas which drop from 56.2 to 17.3 percent. In other words, approximately half of the total map in figure 3 is in a "gray" zone of less than certain visibility or invisiblity.

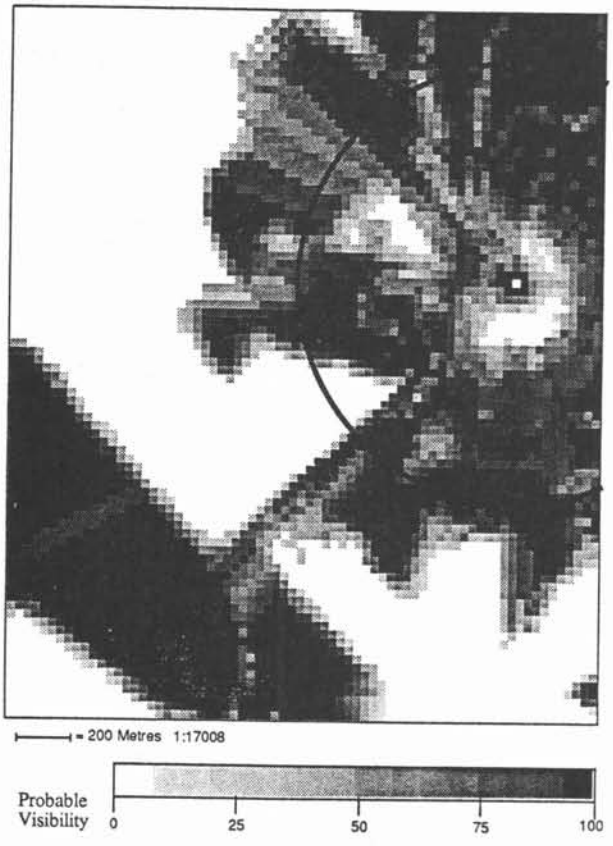

Figure 3. This visibility map shows the probability of a point being seen from the view point based on a summation of fifty Monte Carlo simulations. The boundary between the foreground and middle ground is indicated by the arc.

Even when the Monte Carlo trials are grouped into five bundles of 10, there is significant variation among the different probability profiles of the resulting visibility maps, as shown in figure 4. There is very high agreement about the number of cells with no probability of being seen. For instance, these include areas on the backside of the larger hills, particularly those in the middle ground. There is also considerable agree-ment about the number of cells that are always seen. For instance, these include slopes on the opposite side of the valley.

Looking back at the probabilistic visibility map in figure 3, there is clearly a very high proportion of "gray" area within the near as compared to the middle distance. This pattern is made more apparent in figure 5, which provides separate probabilistic visibility profiles for the foreground and middle ground. The overall U–shaped pattern is evident for both distance zones, though the foreground has an overall greater probability of being seen. In particular, the proportion of the foreground that is never seen is substantially less than the area that is always seen.

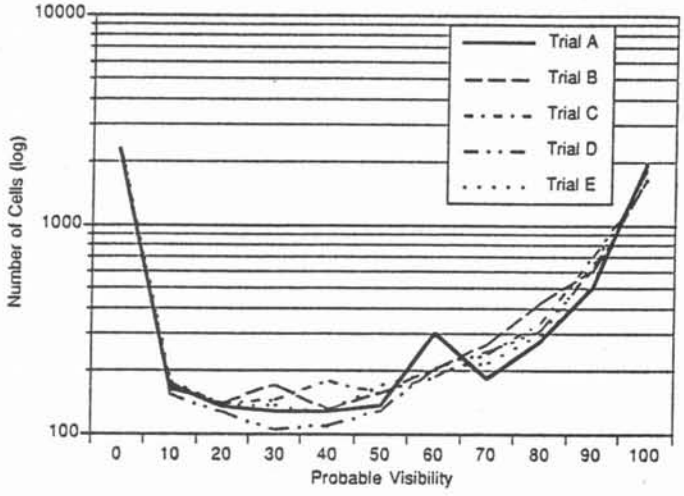

Figure 4. The fifty Monte Carlo visibility maps were grouped in batches of ten to form probabilistic visibility maps. The number of cells in each level of probabilistic visibility is plotted above.

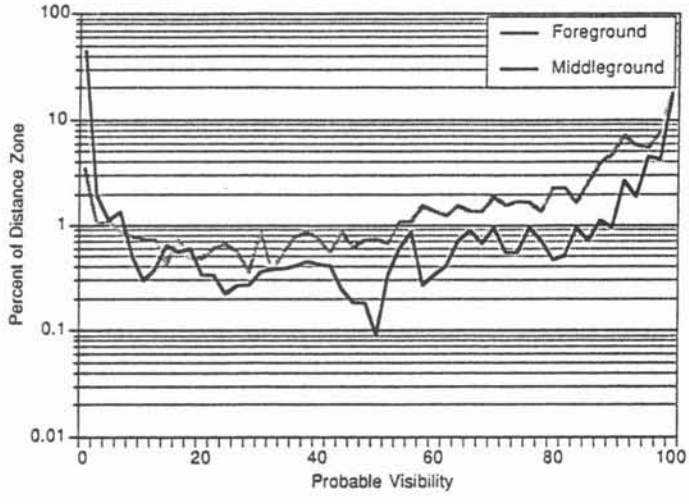

Figure 5. Separate probabilistic visibility profiles for the foreground and middle ground.

A comparison is made among the percent area seen in the control visibility map and the mean probabilistic visibility from the 10-run and 50-run probabilistic visibility maps. In order to make the comparisons using independent data sets, it was necessary to create a sixth set of ten randomly perturbed elevations. The t – tests in tables 1 and 2 are calculated by comparing the probabilistic visibility of corresponding cells for the whole map. The results in table 1 indicate that the means obtained for the control and 10-run visibility maps are significantly different in each of the six trials. However, the means in table 2 for the 10-run and 50-run maps do not give significantly different results. The implication for this view point and topography is that the fuzziness added by the 10-run probabilistic visibility maps is a significant addition to the information contained in the control visiblity map. However, the 50-run simulations do not seem to add significantly to the

information contained in the 10-run probabilistic visibility maps.

Table 1. Comparison of mean percent seen areas for the control visibility Map and 10-run probabilistic visibility maps

	$\bar{x}$ % Seen Area			
Trial	Control	10-runs	*t*	*p*
A	56.2	50.5	6.7	.000
B	56.2	50.0	7.4	.000
C	56.2	49.8	7.6	.000
D	56.2	50.6	6.6	.000
E	56.2	50.2	7.1	.000
F	56.2	50.1	7.2	.000

Note : Independent sample *t* -tests with 6191 data points in each sample.

Table 2. Comparison of mean percent seen areas for 10-run and 50-run probabilistic visibility maps

	$\bar{x}$ % Seen Area			
Trial	10-runs	50-runs	*t*	*p*
A	50.5	50.2	.38	.702
B	50.0	50.4	-.53	.596
C	49.8	50.4	-.80	.426
D	50.6	50.2	.55	.583
E	50.2	50.3	-.20	.843
F	50.1	50.4	-.28	.776

Note : Independent sample *t* -tests with 6191 data points in each sample.

Summary and Conclusions

The importance of considering accuracy and precision in decision-making has been discussed. It is shown that decision-makers demand answers that are both highly accurate and precise, conditions that are frequently lacking in the real world. Fuzzy statements and less than optimal decisions are commonly employed as a strategy to protect decision-makers from making politically disastrous decisions. It is argued that support staff have the responsibility to present study results in ways that accurately reflect their relative certainty. Such presentations would assist decision-makers in arriving at optimal decisions.

An approach for representing the error associated with the map products of GIS models that use data with estimated variance is presented. The approach uses Monte Carlo simulation techniques to randomly perturb the original database within its estimated level of error. Visibility mapping, an analysis frequently conducted by landscape architects, is selected as the GIS modeling technique to demonstrate this approach.

While only one viewpoint in one terrain is considered, the results may still offer some tentative guidance. They indicate that a 10-run Monte Carlo simulation creates a probabilistic visibility map that contains more information than the traditional seen/not seen map. There does not seem to be a statistically significant difference between a 10-run and 50-run Monte Carlo simulation. However, in particularly sensitive situations, it might be advised to conduct more than 10-runs in the foreground, since it appears that areas nearer to the viewpoint are more sensitive to random errors.

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