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PROCEEDINGS OF THE 1990 NORTHEASTERN RECREATION RESEARCH SYMPOSIUM

FEBRUARY 25-28, 1990

SARATOGA SPRINGS, NEW YORK



NORTHEASTERN RECREATION RESEARCH MEETING POLICY STATEMENT

The Northeast 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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The Steering Committee wishes to thank John Nelson for his assistance in developing the conference data base.

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State Parks Management and Research Institute

Saratoga Springs, New York

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RECREATION IN THE 1990's

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The National Park Service is pleased to participate in this year's Northeastern Recreation Research Symposium. I am familiar with the work that many of the participants do through my involvement in recent years in the National Society for Park Resources, as well as the National Park Service.

For those who are not familiar with the inner workings of the Service affecting recreation research, our organization reflects the duality of our mission. Since 1916, the National Park Service has been charged with preserving resources and helping the public enjoy them. An Associate Director for Natural Resources, Dr. Eugene Hester, and an Assistant for Science and Technology coordinate and fund social scientists throughout the Service. On the other side of the table, an Associate Director for Operations and a Chief of Interpretation direct the Visitor Survey Project headed by Dr. Gary Machlis of the University of Idaho. These studies are funded directly by the parks that benefit.

A number of major efforts are now underway at the national level. We are planning to collect visitor baseline data, including demographics, values, expectations, and behavior. We will begin this summer to begin at a number of indicator parks throughout the country, repeating these surveys at three to five-year intervals to establish trends.

With the dramatic growth in visitor use of national parks, projected to total 357 million annually by the year 2000, we anticipate the potential for intergroup conflict. We recently have initiated a sociological carrying capacity research project. It will not attempt to set numerical limits for parks or specific facilities. Instead, we will develop comprehensive guidelines to help park managers recognize and control conditions that contribute to crowding or conflict.

Another example of work in progress in our intent to become more involved in the economic and marketing aspects of park visitation. We need to coordinate our programs with state park authorities, with other Federal agencies that provide recreational services, with neighboring communities, and with the private tourism sector. By learning more about the economics of our parks we can broaden the range of constructive dialogue about common interests.

Finally, the National Park Service plans in the long run to use social science to develop Human Resource Management Plans for parks, balancing the detailed professional plans we have to manage natural and cultural resources. At Glacier National Park and Gateway National Recreation Area current research will give us information to prepare demonstration Human Resource Management Plans. This experience can be replicated over the next two to three years in one park in each of our ten regions, giving us a sound basis for further research and planning to make informed decisions on allocating available staff and funds.

The National Park Service commends your efforts to share your work in a wide range of important fields. There is a formidable recreation challenge for us in the 1990's, and only by working together like this can we hope to muster the knowledge necessary to succeed.

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THE CHALLENGE OF RECREATION MANAGEMENT IN AN ERA OF INCREASING ENVIRONMENTAL STRESS FROM THE PERSPECTIVE OF A NON-PROFIT ORGANIZATION

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Outdoor recreation managers are facing overwhelming public demand for quality recreation opportunities. This challenge can be met through application of ecosystem management principles, better research into the needs of the resources and the users, adoption of professional standards for managers, and increased public education.

Thank you for giving me this great opportunity to participate in what looks to be a very informative and productive conference. I regret that not more representatives of conservation organizations are in attendance because their goals for the environment very much depend upon adequate research of all types.

Today I would like to address the challenges before recreation managers in this era of increasing environmental stress. I would like to focus my comments on the national park system because I think that the challenge facing national park managers are similar to those being faced by many recreation managers. What I would like to do is briefly review the primary stresses facing the national parks, and then discuss some of the recommendations that have been made for responding to these stresses. Finally, I would like to offer some comments on emerging recreation trends that are going to define outdoor recreation, not only in the next decade, but in the next century.

Probably the greatest collection of outdoor recreation settings in this country is contained within our national park system. This fact is not lost on the American public which has increasingly sought out the parks for those opportunities. Although the system has enjoyed sporatic bursts of expansion over its 74 years, its size has not kept up with demand. In 1946, visits totalled less than 20 million to the then 133 units of the system. That equalled 150,000 visits per unit. By 1960, there were 133 million visits to the 200 units comprising the system. That equalled 665,000 visits per unit. In 1989, there were 289 million recreational visits to 354 units which averages to more than 790,000 per unit (Szwak 1988). And there does not appear to be any leveling out in this demand. As a result of this trend, some park areas are so crowded on weekends and holidays that the qualities for which they were established are threatened.

Since the early 1960's, there have been calls for establishing visitor limits at the parks. In 1978, Congress complied and mandated in the National Park and Recreation Act (P.L. 95-625) that visitor capacities should be established for all national park system units via the general management planning process. Over the years, the parks most concerned about visitor impacts have applied a number of impact reduction mechanisms ranging from boardwalks in popular alpine areas to locking the gates of Yosemite Valley after a certain number of vehicles have entered. But very few to date have attempted comprehensive park analyses of the visitor activity in the park. This is in a large part due to not knowing how to conduct such analyses and not having adequate baseline information on visitor activity.

As many of you know, NPCA has been working with Alan Graefe, Jerry Vaske and Fred Kuss in the development of a methodology to assist managers and planners in meeting this mandate. And a number of other people in this room have assisted us along the way. A literature synthesis that analyzes the current research and theories on visitor impacts to ecological resources and visitor experiences has been prepared. And we have drafted a guidebook on the visitor impact methodology we have developed. Both are to be published this spring.

As the Park Service continues to attempt to walk the tightrope between preservation and public enjoyment in this era of increasing environmental stress, it will need a longer and longer balancing pole. We hope that planning processes such as the ones we have devised and others, such as Levels of Acceptable Change, will help the Park Service in this balancing act.

It's not only the visitor pressures within the parks that are challenging park managers, but the pressure of civilization pushing on the parks from outside their boundaries. It has become increasingly apparent that most park boundaries--drawn to suit political rather than ecosystem realities--are inadequate to protect their resources. Since World War II, the wilderness that surrounded parks and served as a buffer has retreated before man's advance, slowly transforming park areas into threatened ecological islands (NPCA 1988b.) The stress of this ecological isolation is making the health and thus the recreational enjoyment of these areas even more precarious. Inspirational natural and cultural vistas are being lost to housing developments. Air and water pollution from nearby towns are pushing park resources to the brink.

These growing internal and external pressures on the parks demand bold and comprehensive policies and programs. Last year a blue-ribbon Commission on Research and Resource Management Policy in the National Park System was convened, with the assistance of NPCA, to provide guidance in the development of such policies. It produced a report, NATIONAL PARKS: FROM VIGNETTES TO A GLOBAL VIEW that proposed a new vision for the National Park Service to ensure its survival and the enhancement of the national park system (Commission on Research and Resource Management Policy in the National Park System 1989).

The Commission's vision is based on the principles of ecosystem management grounded in sound

research. It concluded that "the National Park Service cannot manage what it does not understand." (Commission 1989:1). The Commission recommends that the National Park Service focus on four major tasks:

First, it should "develop and use the concept of ecosystem management, emphasizing the relationship among the natural and cultural resources of the system, and recognizing that an ecosystem encompasses past and present human activities. Units of the national park system must become premier examples of the integration of natural and cultural values and systems." According to the Commission, there are few other opportunities for such developments (Commission 1989:1).

Secondly, it recommended that a research program should be implemented "to meet the needs of the National Park Service and to educate the public. Cooperative research, undertaken in conjunction with other federal and state agencies, universities, and private groups, can be the key to integrated management of ecosystems that include lands outside formal park boundaries. Studies in the natural sciences, in history and historic preservation, ethnography, archeology, and social science are all fundamental." The Commission believes, "it is critical that the National Park Service understand its resources and its visitors and integrate human activity successfully into park management." The Commission further stated that "the research program should draw in and draw on outstanding researchers in appropriate fields, promote information-sharing with other nations conserving world resources, and move generally toward improving the quality of life (Commission 1989:1)

I would like to digress from the Commission's report here a moment to also mention that according to an analysis of the National Park Service's research program conducted by NPCA in 1987, the role of research in the National Park Service is ill-defined, primarily due to a lack of specific legislative mandate making natural, cultural and social science an essential element of its mission. (NPCA 1988a). Conservationists are currently drafting legislation to address this and other inadequacies in the National Park Service's protection mandate.

NPCA also believes that the National Park Service should request from Congress a budget line item for research equivalent to ten percent of its budget rather than the traditional two to three percent (NPCA 1988a).

Back to the Commission's recommendations. The Commission's third broad recommendation was that professional standards should be adopted "for the recruitment, promotion and continued education and development of the people who manage the national park system. The increasingly complicated and technical tools needed to manage complex systems demand a high degree of professionalization." The Commission declared that "the organizational ethos of the National Park Service should be now reflect this in a fully professional staff (Commission 1989:1).

Finally, the Commission urged that the American and international publics be educated about natural and cultural systems and the ways which they change. "This education should be primarily an outward goal of the National Park Service. Education of the public is a critical output of the system, linking diverse sites, their values and purposes, and illuminating what is happening to natural and cultural resources both inside and outside the system." According to the Commission, "education goals should be established for each units of the national park system." The Commission urged that these goals become tools with which to guide management and that they must contribute to the development of a conservation ethic among all segments of society, including those traditionally underrepresented in park constitutencies, such as minorities, single-parent households, the handicapped, and the economically disadvantaged (Commission 1989;2).

This lack of public understanding of natural and cultural processes as addressed by the Commission was highlighted by the public's panic reaction to the Yellowstone fires of 1988. As R.W. Sellars (1989) points out in a recent article for Wilderness magazine, "pretty scenery creates an illusion of environmental health. Leaving parks 'unimpaired' in the public's mind has applied primarily to the parks' scenery, not the subtle elements of the biological community."

Yet I believe that the public can learn about the needs of our parks and other outdoor recreation settings. Not since the early 1970's has the environment as a whole enjoyed the wide public concern that it has today. Proof of the significance of this public interest was dramatically demonstrated when President Bush declared during the 1988 presidential campaign that he wanted to be known as the environmental president. The public's growing concern for the fate of the environment similarly has prompted the president recently to propose that the Environmental Protection Agency be elevated to a cabinet level position.

As we prepare for the twentieth anniversary of Earth Day, the focus of the environmental movement is "sustainability." Earlier this year, the World Watch Institute predicted in its latest "State of the World" report that unless society achieves sustainability by the year 2020, environmental deterioration and economic decline are likely to be feeding on each other, pulling us into a downward spiral of social disintegration (World Watch Institute 1990). Furthermore, the report acknowledged that this sustainability cannot be achieved without fundamental shifts in human attitudes and behavior.

Perhaps the greatest challenge facing recreation managers then, is to find ways to enhance public support for the research and resource management programs that may not necessarily expand recreation opportunities, but can lead to sustaining those opportunities that do exist. The public needs to understand the interrelatedness of all the resources found in a recreation area. And how the health and thus the enjoyment of that setting depends upon the preservation of all, not just the

obvious and the grand.

The public needs to understand the cumulative effect that their activities both indirect and direct can have upon fragile resources. Furthermore, they need to realize that many of our recreation resources, such as our national parks, are more than scenic recreation settings and refuges from civilization. Once considered worthless lands, our national parks may be invaluable to future generations as we try to understand global environmental change. Our national parks are the barometers by which we will measure the health of the world.

To accomplish this understanding it is going to be critical that the public no longer view itself as merely visitors, but instead partners with mangement in the preservation of our great outdoor resources. Broad public interest in the management and funding of our outdoor recreation resources must be fostered.

Despite successful education programs to sustain existing recreation resources, we will still need to expand recreation opportunities. It is probably fair to assume that the growth in park visitation that I described earlier is being experienced by most of the outdoor recreation resources in this country.

It will be critical, though, to locate these new recreation opportunities closer to population centers. A Louis Harris poll claims that leisure time for adults has dropped 31 percent since 1973 (Szwak 1988). Three-day weekend excursions are replacing one and two-week vacations. The urban park idea spawned in the late sixties is going to regain momentum--but perhaps not in the same form as it took then. Opportunities to establish large blocks of urban open space are going to be rare. Instead the greenway, greenline park and urban cultural park approaches to recreation planning, as heralded in the President's Commission on Americans Outdoors report, is going to move to the forefront (President's Commission on Americans Outdoors 1987).

Here in New York is the country's largest greenline park, the Adirondacks, the first urban cultural park system and numerous greenway projects. NPCA's New York chapter, the New York Parks and Conservation Association, for example, has been instrumental in the establishment of a greenway featuring the abandoned Delaware and Hudson Canal. The project involves three counties, the National Park Service, local businesses and private citizens. It is also an example of another emerging trend where the federal government is no longer assuming total control of recreation settings and instead is merely providing a support function for local entities and authorities.

The exciting aspect of this greenway and greenline park movement is that it is forcing people to appreciate the environmental and recreational value of the resources in their own backyards. It is also making them realize that in order to make these types of recreational entities work, there must be a great deal of cooperation on the part of the private and the public sectors. It makes them partners in the management of their own local recreation settings.

In conclusion, national parks and other recreation areas are being pressured by the expansion of our civilization both from within and outside their boundaries. The problems before recreation areas as not new, but the time with which we have to solve them is growing very short. The challenge before us is to both sustain and expand those resources.

The complexity of the pressures upon recreation resources dictate that we adopt an ecosystem approach to management and that we seek to increase the skills and technical abilities of our managers. These pressures, however, will only be eased if the public is educated as to the problems and brought in as partners in the solutions. And I am not just speaking of the actively interested public as represented by conservation groups, but the entire public.

Many of the solutions will depend upon careful and comprehensive research. And support for this research will only come after the public has been made aware of the problems and of the need for research.

Finally, we must face the challenge that the American public is changing and the recreation resources of today may not meet the needs of tomorrow. Emerging recreation trends, such as greenways, greenline parks and urban cultural parks, offer a means to not only meet those needs, but to encourage public involvement in their local and global environment.

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STATE PARKS 2000

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The Pennsylvania Department of Environmental Resources' Bureau of State Parks is undertaking a strategic planning initiative to assess the state park system and to plan for the future to the year 2000 and beyond. The planning process has been successful to date in generating support for the state park system.

The Pennsylvania Department of Environmental Resources initiated a strategic planning process to review and assess the Commonwealth's state park system. An extensive study such as this has not been accomplished since the 1960s.

As we approach our hundredth year in 1993, we in the state park system are facing a challenging time. The strategic plan referred to as State Parks 2000 will be completed in the fall of 1990.

Two major issues emerged in the process concerning resort development and financing of the system.

The chronological history of State Parks 2000 is as follows:

1987

1. Secretary Arthur A. Davis issued his "Agenda for the 90s." Included on the agenda was a strategic plan for the state park system.
2. November, 1987. The Bureau of State Parks' staff met at the Kings Gap Environmental Education and Training Center to begin the strategic planning process.

1988

1. Early 1988. DERs Citizen's Advisory Council began its study of the state park system.
2. June, 1988. Secretary Davis met with twelve invited persons at Kings Gap to review the system.
3. July, 1988. The Bureau of State Parks issued its "State of the Parks, 1988" report.
4. Summer, 1988. Citizen's Advisory Council members visited state parks as part of their study.
5. August, 1988. DER held four public meetings at Moraine, Bald Eagle, Ridley Creek, and Frances Slocum State Parks to recieve input for the strategic plan.
6. October, 1988. On October 17, 1988, the Citizen's Advisory Council adopted its report, "Pennsylvania State Parks to Your Heirs Forever."

1989

1. Early, 1989. DER staff worked on the questionnaire for public input.
2. May, 1989. DER distributed 120,000 copies of the State Parks 2000 questionnaire (110,000 were either mailed out or disbributed at state park offices and 10,000 were mailed out to a "statictical sample" of Pennsylvania residents).
3. June, 1989. the Joint Legislative Air and Water Pollution Control and Conservation Committee of the Pennsylvania General Assembly began its study of the state park system. Seven state parks were visited by Committee members.
4. August 1989. State Parks 2000 questionnaires were returned to the Bureau of State Parks 13,257 were returned).
5. October, 1989. The Joint Legislative Air and Water Pollution Control and Conservation Committee adopted its special report on Pennsylvania State Parks.
6. November, 1989. DER printed 15,000 copies of the "State Parks 2000 Preliminary Plan."
7. December, 1989. DER distributed 10,000 copies of the "State Parks 2000 Preliminary Plan" by mail to those who requested them.

1990

January-February, 1990. Eight public meetings were held throughout the Commonwealth. They were as follows:

DATE	ATTENDANCE	LOCATION
1/16/90	357	Bethlehem, PA
1/18/90	76	Williamsport, PA
1/29/90	185	Erie, PA
1/30/90	240	Monroeville, PA
1/31/90	83	Hollidaysburg, PA
2/13/90	125	Wilkes Barre, PA
2/20/90	250	Norristown, PA
2/21/90	175	Harrisburg, PA

The eight public meetings that were held in January and February, 1990, had a total attendance of 1,491 persons. All meetings were recorded with a standard recording device. The eighth meeting was videotaped by cable Channel 16 in Harrisburg.

In spite of the very high attendance at all meetings by special use groups, there was a great variety of interests presented. Radio controlled model airplane flyers were in attendance in great numbers at all of the meetings. It was an orchestrated effort by the American Modelers Association to show their strength throughout the state.

There were many comments which commended the Department for holding the public meetings whiile the strategic plan is still in a preliminary stage. At every meeting, all persons in attendance were given an opportunity to present their views.

After listening to all the people at the eight public meetings, discussion issues before and after the meetings, and in reading many letters from citizens, observations relative to various issues as they relate to the Pennsylvania state park system follow:

1. A majority supports or is not in opposition to . . . .
   a. The basic concept of the state park system
   b. Keeping the state parks natural in character
   c. Keeping a rustic appearance to our park structures
   d. Upgrading of the sanitary facilities
   e. More environmental education
   f. Increase user fees
   g. The creation of a park classification system
   h. More security in campgrounds and marinas
   i. Adding more staff members
   j. Adding more trails for mountain bikes and equestrians
   k. Additional land acquisition

2. A majority opposes . . . .
   a. Resort development in Pennsylvania state parks
   b. Admission fee
   c. Excluding special interest groups

3. Many suggestionis were offered in lieu of a parking fee. The suggestions are as follows:
   a. Increase user fees
   b. Increase General Fund appropriations
   c. Income tax check off
   d. Dedicated tax, i.e., real estate transfer tax
   e. State Park foundation
   f. Volunteers
   g. Use Welfare recipients
   h. Seek corporate donations
   i. Add a swimming fee or beach fee
   j. Create a trust fund
   k. Fee sticker on R/C model airplanes
   l. Out-of-state visitor license
   m. Add a fee on the motor vehicle license
   n. Bond issue
   o. Charge visitors to campgrounds
   p. Fines
   q. State Lottery
   r. Endowment Fund (Use Oil and Gas Fund)
   s. Percent of state sales tax
   t. Oil and Gas Fund for land acquisition

In addition to the foregoing comments, there was not a majority, either pro or con, relative to exploring the feasibility of one or two rustic lodges.

Also, we must determine a way or a system to aid in selecting special uses for the state parks. Because of the unusual amount of interest shown in radio controlled model airplane flying, mountain bike usage, hot air ballooning, horseback riding, camping, and golfing, we are facing decisions on a frequent basis regarding these activities.

The State Parks 2000 initiative has been very successful in terms of generating news media coverage of state parks and in citizen support. The public meetings were well attended and the subsequent news coverage was very supportive. The citizen involvement has been very encouraging and we look forward to completing the plan for our use and guidance in the future.

THE RELATIONSHIP BETWEEN QUALITY OF RECREATION OPPORTUNITIES AND SUPPORT FOR RECREATION FUNDING

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Rodney Zwick

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The relationship between perceived quality of recreation opportunities and public support for recreation funding was investigated using data from a statewide survey of Vermont residents. While few statistically significant bivariate relationships were found, regression analysis suggests that these variables may be mutually reinforcing.

Introduction

All public park and recreation agencies share a number of overarching objectives. High on this list of common objectives are provision of high quality recreation opportunities and maintenance of adequate public funding support. But what is the relationship between these two important objectives? Does perceived quality of recreation opportunities affect public funding support? Can both of these objectives be maximized simultaneously?

It might be hypothesized that if the quality of recreation opportunities is perceived as relatively low, then public support for recreation funding might be relatively high in order to compensate for low quality. Alternatively, low perceived quality of recreation opportunities might discourage public funding support because recreation is viewed as an ineffective public investment. Alternative hypotheses are also possible given relatively high perceived quality of recreation opportunities. If the quality of recreation opportunities is perceived as relatively high, then public support for additional recreation funding might be relatively low due to a perceived lack of need. Or high perceived quality of recreation opportunities may lead to high public support for recreation funding because it is viewed as an effective public investment. The objective of this study is to investigate these hypotheses.

The Study

This study is an outgrowth of the 1988 Vermont Recreation Plan Resident Recreation Survey (State of Vermont 1988). Study data are drawn from a telephone survey of a representative sample of Vermont residents. A stratified random sampling procedure was used as suggested by Dillman (1978). A response rate of 77 percent was attained yielding a sample size of 494 completed surveys.

The dependent variable, support for recreation funding, was measured by a series of five questions. Each question asked the degree of support for additional recreation funding from alternative sources: government taxes such as income and property taxes; fees and charges paid by recreation users; special tax on the sale of hunting and fishing equipment; special tax on the sale of other recreation equipment; and private gifts, grants, and donations. Responses were recorded by means of a four-point Likert scale ranging from "very good idea" to "very bad idea."

The independent variable, quality of recreation opportunities, was measured by three series of questions. The first series of questions asked respondents to judge the quality of eight major types of state recreation resources using letter grades ranging from A (excellent) to F (very poor). The second series of questions asked respondents to judge whether the quality of these same eight recreation resources was "getting better," "staying the same," or "getting worse." The last series of questions asked respondents to judge the severity of 32 potential state recreation problems using the response categories of "big problem," "small problem," and "no problem."

Findings

Descriptive findings for the dependent and independent variables are shown in Figures 1-3 and Table 1. Public support for recreation funding varied considerably among the five funding sources included in the study (Fig. 1). In general, the public strongly favors funding mechanisms which place much of the financial burden more directly on the recreation user. A strong majority of respondents favored fees and charges and equipment taxes as a source of additional public recreation funding. Only 36 percent of respondents favored additional broad-based taxes, such as income, sales and property taxes, as a source of additional recreation funding. As might be expected, nearly all respondents favored private gifts, grants and donations.

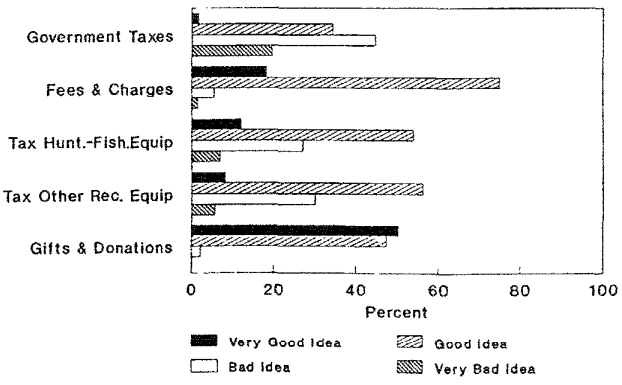


Figure 1. Attitudes toward funding sources for recreation.

The present quality of all eight recreation resources was rated as generally high (Fig. 2). The letter grades assigned by respondents were converted to a traditional four-point "academic" scale where A=4, B=3, C=2, D=1 and F=0. Resulting "grade point averages" ranged from a high of 3.58 for scenic quality of the landscape to a low of 2.41 for local government facilities and services. Resident opinions about trends in the quality of these eight recreation resources were more varied (Fig. 3). Responses were coded as "getting better" = 1, "staying the same" = 0, and "getting worse" = - 1. For only two recreation resources did a majority of respondents feel that quality was staying about the same. Trends were felt to be most favorable for commercial recreation establishments and least favorable for lakes and ponds. Respondent opinions about the severity of 32 potential state recreation problems were highly varied (Table 1). Responses were coded as "big problem" = 2, "small problem" = 1, and "no problem" = 0. Severity of problems ranged from a high of 1.6 for destruction of wildlife habitat to a low of 0.8 for lack of access to rivers and streams.

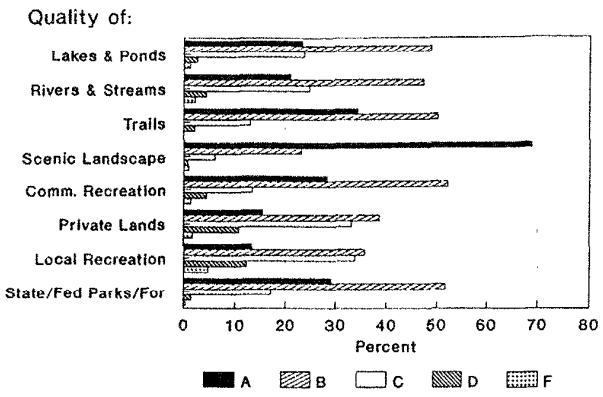


Figure 2. Grading of quality of recreation resources.

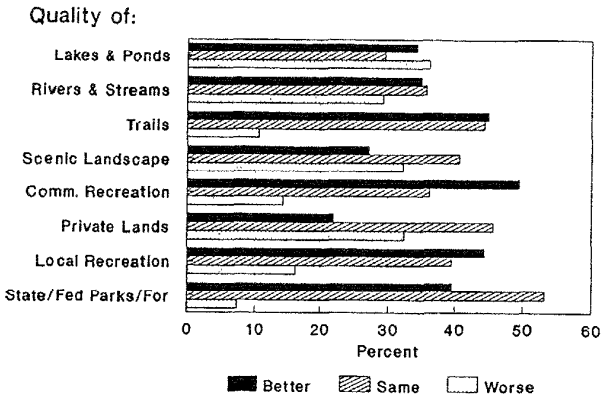


Figure 3. Trends in quality of recreation resources.

Table 1. Importance of recreation related issues.

Issue	Importance: Big Problem	Small Problem	No Problem	Average*
	(Percent)			
Destruction of wildlife habitat	66.0	26.4	7.6	1.6
Water quality of lakes and ponds	63.4	27.0	9.6	1.5
Vandalism of public recreation facilities and areas	58.2	34.7	7.1	1.5
Destruction of fish habitat	58.0	31.7	10.3	1.5
Lack of respect for private property	55.3	35.9	8.9	1.5
Development along lakes and ponds	56.6	31.7	11.7	1.5
Non-compliance with environmental protection laws	53.8	36.5	9.7	1.4
Water quality of rivers and streams	52.9	37.2	9.9	1.4
Loss of scenic landscape	57.2	27.6	15.2	1.4
Lack of recreation opportunities for special populations	47.7	34.4	18.0	1.3
Crowding of boats on lakes and ponds	48.6	32.4	19.1	1.3
Inadequate planning and design of commercial recreation developments	45.1	37.5	17.4	1.3
High cost for use of commercial recreation areas	41.5	40.6	17.9	1.2
Inadequate funding for public recreation	37.6	45.3	17.1	1.2
Loss of wetlands	41.5	33.9	24.6	1.2
Lack of community indoor recreation and sports facilities	38.4	37.1	24.4	1.1
Lack of public information on recreation issues	34.9	40.8	24.2	1.1
Liability of commercial recreation businesses	35.7	36.5	27.9	1.1
Lack of responsiveness by public agencies	30.6	45.4	24.0	1.1
Liability of private landowners	32.6	35.6	31.9	1.0
Posting of private land	30.4	38.8	30.8	1.0
Lack of access to lakes and ponds	28.2	37.3	34.5	0.9
Lack of community outdoor recreation facilities for sports	26.6	40.6	32.8	0.9

(continued)

Table 1. (continued)

Issue	Importance: Big Problem	Importance: Small Problem	Importance: No Problem	Average*
	(Percent)			
Inadequate law enforcement at recreation areas	21.2	48.1	30.7	0.9
Lack of public information on recreation opportunities	23.3	43.4	33.3	0.9
Liability of government agencies	28.2	33.6	38.2	0.9
High cost for use of public recreation areas	21.0	42.4	36.6	0.8
User conflicts on rivers and streams	21.3	40.0	38.7	0.8
Lack of organization of recreation user groups	18.0	43.9	38.1	0.8
Lack of trails linking towns and recreation areas	18.7	42.5	38.7	0.8
Crowding on trails	17.0	43.8	39.2	0.8
Lack of access to rivers and streams	17.5	42.0	40.5	0.8

* Average refers to the mean score derived from the following coding system: Big problem = 2, small problem = 1, no problem = 0.

A variety of statistical techniques was used to examine the relation of quality of recreation opportunities and support for funding alternatives. Correlation analysis revealed only minor associations ($r \leq 0.36$) between ratings of quality, trends in quality, and severity ratings and the dependent variable -- support for funding. A moderate inner correlation ($r = 0.488$) was found in one of the independent variables between quality ratings of lakes and ponds for recreation and quality ratings of streams and rivers for recreation. Inner correlations between all other variables were negligible ($r \leq 0.37$).

Multiple and stepwise regressions of the dependent variable, support for recreation funding, on the independent variables: quality ratings of recreation resources, trends in quality, and severity ratings, were not significant. Subsequently, the independent variable "quality of recreation resources" was disaggregated into its eight independent questions and the dependent variable "support for recreation funding," was separated into the five individual questions comprising the variable. Ratings on the individual questions were transformed to standard scores. A series of multiple regressions were run that systematically regressed each of the transformed support for funding questions on independent variables that included the disaggregated quality ratings of recreation resources, trends in quality and severity ratings. The analysis revealed a relationship between ratings of quality, trends in quality, and severity ratings and the dependent variable "support for governmental funding" ($p = 0.0123$), but explained only six percent of the variance.

As a final exploratory analysis, the independent variable -- quality ratings of recreation resources -- was collapsed into "high quality" and "low quality" categories for each of the eight independent questions comprising the variable, as well as for the aggregate variable itself. Through a similar process, the ratings of the dependent variable were recoded into "support" and "opposition" for funding on each of the five "support for funding" questions and the aggregated variable. Chi square analysis (51 total) indicated a significant relationship between perceived "quality of recreation provided by local government" and respondent "support for government taxes" to fund recreation: $x^2 = 5.127$, $p = 0.023$. A significant relation also was found between ratings of the "scenic quality of Vermont's landscape for recreation" and "support for funding through gifts, grants, and donations": $x^2 = 5.26$, $p = 0.0218$. All other chi squares were nonsignificant.

Conclusions

This study provides selected insights into two issues of central importance for all public park and recreation agencies: quality of recreation opportunities provided and degree of public support for recreation funding. The present quality of recreation resources in Vermont is perceived by state residents as generally high, while trends in recreation resource quality and the severity of recreation problems are seen as more varied. These findings suggest appropriate areas of emphasis for state park and recreation agencies. Public support for additional recreation funding is less positive. The majority of respondents favor provision of additional funding only through user fees and donations.

The relationship between quality of recreation opportunities and support for public funding of recreation is less clear. Few statistically significant bivariate relationships between these variables were found. However, a regression analysis between the independent variables and the dependent varialbe "support for gonvernmental funding" did reveal a positive, albeit weak, relationship. This suggests that, in general, positive public assessment of the quality of recreation resources may enhance public support for broad-based governmental funding of recreation programs. This is encouraging in that it suggests that park and recreation agency objectives of

providing high quality recreation opportunities and maintaining adequate public funding support are mutually reinforcing. However, this conclusion is highly tentative given the lack of strength of this relationship. Refinement of analytical and measurement techniques are needed to further explore this potentially important issue.

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OUTDOOR RECREATION AND ENVIRONMENTAL CONCERN:

A FURTHER EXPLORATION

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The relationship between outdoor recreation and environmental concern has drawn empirical attention in several studies since its original exploration by Dunlap and Heffernan (1975). Only marginal support for such a relationship has been found. This study further explores this relationship, focusing particularly on measurement and analytical techniques including respondent self-assessment of recreation participation, creation of a cumulative recreation participation index, and the use of paired appreciative and less-appreciative outdoor recreation activities. In general, the Dunlap-Heffernan hypotheses are supported. Participation in outdoor recreation activities which emphasize appreciation of the natural environment exhibit the strongest associations with environmental concern.

Introduction

The degree to which people are willing to trade off economic benefits for environmental protection has been one of the major concerns of research into the sociology of natural resources. Attitudes about environmental protection have been found to vary considerably over a variety of populations, but the reasons for such variance are not well understood. Early studies focused on traditional socio-demographic variables -- age, income, education, etc. -- as predictors of environmental concern, but results were less than satisfying. Only a very small percentage of the variance in environmental concern could be explained (Van Liere and Dunlap 1980). More recent research has turned to cognitive and behavioral variables as potential predictors of environmental concern. To what extent do people's thought and behavior patterns influence their attitudes about environmental protection? Several studies have focused on participation in outdoor recreation.

Outdoor Recreation and Environmental Concern

A relationship between outdoor recreation and environmental concern was first suggested by Dunlap and Heffernan (1975). Among the several hypotheses formulated, two have received empirical testing. The first suggested that outdoor recreation participation is positively associated with environmental concern. Four rationales were cited: 1) participation in outdoor recreation creates awareness of environmental problems, 2) participation creates a commitment to the protection of valued recreation sites, 3) participation creates appreciation for the natural state of the environment and an opposition to actions which would alter it, and 4) participants are exposed to informational and educational campaigns which stress the importance of environmental quality. The second hypothesis suggested that "appreciative" outdoor recreation activities, such as hiking and camping, would exhibit stronger associations with environmental concern than "consumptive" ones such as hunting and fishing in which something is removed from the natural environment. Moreover, the authors suggested that participation in "abusive" outdoor recreation activities, such as snowmobiling and trailbiking, might be negatively associated with environmental concern. The rationale was based on the notion that appreciative outdoor recreation activities are focused on enjoyment of the natural environment without altering it, and this is compatible with a preservationist orientation. Consumptive activities are focused on extraction of elements from the natural environment and reflect a more utilitarian orientation to the environment. Moreover, abusive activities inherently involve considerable alteration of the natural environment and may reflect a lack of concern with environmental quality.

Dunlap and Heffernan (1975) went on to test their hypotheses using measures of participation in five outdoor recreation activities and eight questions measuring environmental concern. Nearly all of the associations between these variables (measured as gamma coefficients) were in the hypothesized direction (positive), but most were very weak, at the 0.10 level or below. Appreciative activities did, however, exhibit higher associations with seven of the eight measures of environmental concern than did consumptive activities.

Subsequent research has produced neglibible-to-weak support for both hypotheses. Geisler et al. (1977) reported Pearson product-moment correlation coefficients ranging from -0.02 to 0.15 between six types of outdoor recreation activities and fifteen measures of environmental awareness and support for environmental protection. Although the bivariate relationships weakly supported both hypotheses, most of the relationships were found to be spurious, caused by interaction with demographic variables. The authors, therefore, concluded that little or no support could be offered for the Dunlap and Heffernan (1975) hypotheses.

Pinhey and Grimes (1979) found essentially negligible associations measured by a chi-square test between outdoor recreation participation and perceived value and appropriate uses of Louisiana marsh lands. Appreciative activity participants were more likely to offer support for protection of such areas, but equally or less likely to value the areas. While this study offers little or no support for the Dunlap and Heffernan hypotheses, Jackson (1986) has argued that the measures of

environmental concern were too narrow from which to draw generalized conclusions.

Van Liere and Noe (1981) tested seven recreation activities against the New Environmental Paradigm, developed by Dunlap and Van Liere (1978). Mixed patterns of association and low coefficients measured in betas offered little support for the first hypothesis. However, the authors reported that appreciative activities exhibited slightly higher associations with the Paradigm than did consumptive and abusive ones. While this study was the fourth to find only weak-to-negligible support for the Dunlap and Hefferman hypotheses, the authors maintained that improved measures of concepts and refined study designs might yet yield more substantive results.

Jackson (1986, 1987) did in fact suggest a new tact to study the second Dunlap and Heffernan hypothesis. Using data from a 1984 survey of residents of urban Alberta, Canada, Jackson analyzed attitudinal differences between participants in eight outdoor recreation activities. To do so, Jackson "paired" participants of two activities, eliminating respondents who participated in both activities or in neither activity. A "dummy variable" was then created by assigning participants of the first activity a code of 1 and participants of the second activity a code of 0. The "dummy variable" was then regressed against two measures of environmental concern (based, at least in part, on attitudinal indices suggested by Dunlap and Van Liere (1978, 1984) and Knopp and Tyger (1973)). The resulting correlations and partial correlations (controlling for age, sex, education, and income) served as useful indices of the divergence in attitudes between participants in the first activity and participants in the second activity.

Jackson's reported partial correlations between the dummy variables and his measures of environmental concern indicate that participants in appreciative outdoor activities (cross-country skiing, hiking, and canoeing) are moderately more environmentally concerned than participants in consumptive activities (fishing and, separately, hunting) or abusive activities (trail biking, motorboating, and snowmobiling -- which Jackson refers to as "mechanized" activities). No difference was found between participants in consumptive activities and abusive activities. The author concluded that the data lent substantial support to the second Dunlap and Hefferman hypothesis.

A Further Exploration

This study further explores the relationship between outdoor recreation and environmental concern, focusing particularly on measurement and analytical techniques. Several new research approaches are utilized to test Dunlap and Heffernan's first hypothesis. Advancements by Jackson (1986) for the analysis of "paired" activities to test the second Dunlap and Heffernan hypothesis are employed and refined. This study surveyed a random sample of Vermont residents, addressing their level of environmental concern, their perception of the quality of Vermont's natural environment, their participation in a variety of outdoor recreation activities, and selected demographic characteristics.

The Survey

The survey was conducted by telephone and was administered to 503 Vermont residents. The sample was selected following the procedures suggested by Dillman (1978) with minor modifications to ensure that the sample was representative of the state's settlement pattern and gender distribution. Telephone calls were made by trained, paid interviewers. Interviews were permitted with any full-time Vermont resident answering the telephone who was at least 18 years of age. Ninety-three potential respondents declined to be interviewed or provided substantially incomplete and/or unusable results, for an overall response rate of eighty-four percent.

Environmental Concern

To measure environmental concern respondents were read six statements and asked, using a four-point Likert scale, the extent to which they agreed or disagreed with each. The statements were as follows:

1. The government should acquire more land in Vermont to protect the environment.
2. Environmental protection laws in Vermont are too strict.
3. Vermont should avoid rapid economic growth.
4. We are approaching the limit of the number of people Vermont can comfortably support.
5. Vermont is growing too rapidly.
6. Vermont should do more to promote economic growth.

These statements addressed environmental protection sentiments and attitudes toward potentially environmentally-adverse economic growth. Connerly (1986), based on the work of Neiman and Loveridge (1981), suggests that such statements should exhibit theoretical unity in their conceptual approach to measuring environmental concern. All of the above statements are of the "general" category in that they are largely abstract or hypothetical and do not make explicit the costs which may be associated with specific environmental protection measures. The reasoning behind these statements is that economic and population growth usually entail some degree of environmental damage. An environmentally concerned individual would place a higher personal preference value on the environmental quality benefits of limiting population and economic growth than on the benefits economic growth might bring. Responses were coded so that higher scores for each question represented greater environmental concern. An Environmental Concern Index was created by adding the values of the responses to the six statements, each statement receiving equal weight.

Outdoor Recreation Participation

To measure outdoor recreation participation, respondents were asked whether they participated "often," "sometimes," or "never" in each of seven activities: hiking, camping, picnicking, cross-country skiing, hunting and fishing (asked as one activity), boating, and downhill skiing. The first four activities were considered appreciative since they tend to be motorless and can be accomplished with a minimum of environmental alteration. Hunting and fishing were considered consumptive since they involve removing something from the natural environment. Downhill skiing and boating were considered depreciative since (with the possible exception of sailboating) they involve motorized transport and alteration or disruption of the natural environment. Responses were coded so that a higher score indicated a greater level of recreation participation.

A note of caution is in order concerning the recreation activity classification scheme. It is apparent that classification of recreation activities as "appreciative," "consumptive," or "depreciative" involves some assumptions and generalizations about those activities. Camping, for example, can range from primitive, leave-no-trace backpacking to recreational vehicle camping. However, the majority of camping activity is assumed to be nonmotorized and focused primarily on appreciation of the natural environment. While it is clear that the classification scheme is not empirically precise, it is felt to be reasonable for the purposes of this study in that it follows the previous research described earlier in this paper. The activity category labels "appreciative," "consumptive," and "depreciative" may also cause some consternation. These labels are not meant to cast value judgements on participants or to suggest inherent moral worth of related recreation activities. They are merely shorthand labels used in the literature to suggest varying attitudinal orientations to the environment. The descriptor "depreciative" has been substituted in this study for the more value laden "abusive" which is often found in the literature.

Measurement and Analysis

Measurement and analytic techniques varied from previous studies in three potentially important ways. First, respondents were asked for a relative self-assessment of the frequency of their recreation participation rather than the usual more quantitative, absolute format such as activity occasions per day or week. This distinction may be of importance because the perception of one's own level of participation may be more important in developing attitudes toward environmental protection than actual frequency of participation in the activity. For example, protecting forests may be more important to those who consider themselves to be frequent cross-country skiers than to those who actually participate in the sport more frequently but do not consider themselves frequent cross-country skiers because of their high level of participation in other sports as well, or for any other reason. The variable used here is thus more cognitive than the strictly behavioral variables used in the past. Recent research indicates that cognitive approaches to understanding environmental concern offer considerable promise (Dunlap and Van Liere 1984, Mohai and Twight 1987, Samdahl and Robertson 1989).

Second, this study utilizes a summated index of recreation participation, which was not found in past studies. If participation in outdoor recreation does indeed bring about a greater degree of environmental concern, we might assume that the effect is cumulative, and that a summated measure of participation in all measured outdoor recreation activities would be useful in testing Hypothesis 1. Thus, a Recreation Participation Index was formed by adding responses for each of the seven recreation activities. This analysis must be accompanied by a cautionary note: while a respondent who participates "often" in several activities quite likely participates in outdoor activities more often than a respondent who participates "often" in just one activity, this is not necessarily the case. A hiking enthusiast, for example, could spend more time in outdoor recreation activities than one who more casually participates in cross-country skiing and in boating, yet considers his participation rate in each to be "often." Thus, the Recreation Participation Index may be partially considered a measure of respondent diversity of outdoor recration participation.

Finally, this study heeds Jackson's call for replication of his pairing technique for testing Hypothesis 1, but refines it in several significant ways. First, although Jackson compared 26 pairs of activities, the activities in each pair generally had little in common. For example, biking and motorboating are good examples of appreciative and abusive activities, respectively, but have little commonality in terms of the types of equipment used, exertion required, or type of natural environment in which they are pursued. Other pairs of activities differ in time of year and even in time of day appropriate for such recreation.

One particularly interesting pair of activities pursued by Jackson and also Knopp and Tyger (1973) is that of snowmobiling and cross-country skiing. Both activities are pursued during the winter, often on the very same trails. However, the degree of mechanization, noise, exertion, and equipment type is drastically different.

This study pairs just two activities, cross-country skiing and downhill skiing to examine Hypothesis 2. Both activities require substantial exertion, similar equipment, similar environments and seasons, and are pursued in a relatively similar movement pattern. Yet cross-country skiing is clearly more "appreciative" than downhill skiing, which involves motorized transit and severe alterations to the natural landscape. The degree to which downhill skiing is a "depreciative" activity is debatable, but cross-country skiing is

quite evidently more in harmony with and appreciative of the natural surroundings. While it is true that downhill skiing generally requires greater expense to the participant, the partial correlations used in this study control for socio-economic variance. The effects of factors such as season and equipment type, which were often far different between activities in the Jackson study (and may, therefore, account for some of the variance in environmental concern), could not be statistically controlled in the Jackson study.

A second major deviation from the Jackson study was in the coding of the dummy variables. While Jackson's study did measure frequency of participation in the various activities, the coding scheme masked such differences. Participants in one activity, irrespective of frequency of participation, were coded as 1, while participants of any frequency in another activity were coded as 0. By contrast, the coding scheme in this study differentiated among self-assessed participation rates. The expanded "dummy variable" used in this study, named "SKI," was coded as follows.

	SKI Value
Cross country "often," downhill "never"	4
Cross-country "sometimes," downhill "never"	3
Downhill "sometimes," cross-country "never"	2
Downhill "often," cross-country "never"	1

As suggested by Jackson, participants in both activities and participants in neither activity were excluded from the analysis. This dropped the number of valid cases to 115 for this part of the analysis only.

A final difference between the two studies is that Jackson surveyed only the urban residents of Alberta (residents of Calgary and Edmonton), whereas this study surveyed a random sample of residents statewide. The previous study did not, therefore, need to control for the effect of hometown size; this study did.

Data were also gathered on four other demographic characteristics of respondents: age, income, education, sex. Measures of outdoor recreation participation were related to the environmental concern index using Pearson's product moment correlation. Partial correlation coefficients are reported as the analysis was controlled for the five demographic variables.

Findings

Hypothesis 1, that outdoor recreation participation is positively associated with environmental concern, receives support from the data, although coefficients are fairly low. Table 1 provides a summary of findings. Participation in four of the seven recreation activities was found to be significantly, albeit weakly, associated with environmental concern. The Recreation Participation Index, which serves as a measure of overall outdoor recreation participation, is associated with environmental concern somewhat more strongly than are its individual components. This suggests that the effect of outdoor recreation participation, while weak with regard to individual activities, may well be cumulative.

Table 1. Relationship Between Outdoor Recreation Activity and Environmental Concern.

Outdoor Recreation Activity	Partial Correlation Coefficient	Significance Level
Hiking	0.17	0.00
Camping	0.15	0.01
Cross-country skiing	0.13	0.02
Picnicking	0.11	0.03
Boating	0.09	0.09
Hunting and fishing	0.08	0.17
Downhill skiing	-0.02	0.65
Appreciatives	0.20	0.00
Consumptive	0.08	0.17
Depreciatives	0.04	0.43
Recreation Participation Index	0.18	0.00
SKI (Cross-country vs. downhill)	0.25	0.01

Moreover, when the Recreation Participation Index is added to a multiple regression model containing the five demographic variables, the percentage of explained variance in environmental concern rises significantly from two to six percent. While most of the variance in environmental concern remains unexplained, it should be noted that researchers have historically had difficulty in isolating predictors of environmental concern (Van Liere and Dunlap 1980).

The second hypothesis, that appreciative activities are more likely associated with environmental concern than non-appreciative activities, receives stronger support. Each of the four appreciative activities is positively associated with environmental concern, while none of the other three activities are. A summary index of the four appreciative activities exhibits a significant, moderate association with environmental concern whereas the consumptive activity (fishing and hunting) and a summary index of the depreciatve activities do not.

The second hypothesis is further supported by the significant moderate association of the dummy variable SKI with environmental concern. Thus, skiers in the more appreciative cross-country category tend to be more environmentally concerned than participants in the less appreciative downhill category.

Discussion

The relationship between outdoor recreation and environmental concern has continued to draw attention since its original exploration by Dunlap and Heffernan (1975). The reasons for this continuing interest are at least twofold. First, the level of public environmental concern continues to be a critical, but little understood, factor in the policy debate over appropriate levels of environmental protection. While opinion surveys reveal changes in levels of public environmental concern, the scientific literature offers little guidance as to why these changes are occurring. Participation in outdoor recreation is an intuitively appealing explanatory variable.

Second, studies relating outdoor recreation and environmental concern have reported ambiguous results. The problem, it seems, is that some recreational activities (primarily appreciative ones) usually exhibit significant associations with environmental concern, while other activities (consumptive and depreciative ones) do not.

A solution to this problem would appear to be a reformulation of the original Dunlap and Heffernan (1975) hypotheses. From the research to date, it can reasonably be concluded that participation in appreciative outdoor recreation activities is a valuable predictor of environmental concern, but participation in consumptive or depreciative activities is not. Certainly each study within the past decade (Jackson 1986, Van Liere and Noe 1981) and this study support this conclusion.

The support for the Dunlap and Heffernan hypothesis found in this study is generally stronger than that of previous investigations. While this result may simply be a difference of time and place, as suggested by Geisler et al. (1977) and Pinhey and Grimes (1979), it may also reflect methodological improvements. The use of respondent self-assessment of recreation participation and the creation of a recreation participation index should be of particular note.

Also exhibiting a good deal of promise are the methodological techniques pioneered by Jackson (1986). Studying pairs of recreation activities makes intuitive sense, especially when the activities are essentially similar yet differ in degree of appreciation of the natural environment. Future studies might further investigate divergences in environmental attitudes of sailboat and motorboat enthusiasts, bicyclists and motorcyclists, and participants of other such similar activities.

The positive relationships between appreciative outdoor recreation activities and environmental concern would seem to bode well for the environmental protection movement. While participation rates in many outdoor activities are climbing, the growth in participation in appreciative activities has been particularly robust (LaPage 1980, Kelly 1987). Dunlap and Heffernan (1975) may well have been correct when they wrote that "outdoor recreationists may constitute a potential constituency for environmental activists." Yet to receive adequate empirical attention, however, is the apparently tenuous link between environmental concern and enviromental action Samdahl and Robertson 1989). This is a subject for further investigation.

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BOY SCOUT USE OF PUBLIC LANDS:

IMPLICATIONS FOR COMMUNICATIONS

AND MANAGEMENT STRATEGIES

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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 describes one user group, Boy Scout troops, and identifies their public land use patterns, activities, and motivations. Results can be used to guide appropriate behavior, enhance their experience, and solicit their help in managing 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 strategies 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 user groups will be equally effective in providing appropriate facilities, sites and programs; identifying sources of potential use/user conflicts; protecting the sites; or providing appropriate information.

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 user groups just as business persons target market their products and programs (More 1983). Studies have shown that such strategies can be effective (Bright and Manfredo 1989, Deblinger et al. 1989, Huffman and Williams 1986, Huffman et al. 1988, Peine 1986, Roggenbuck 1986, Sharpe 1988, Vander Stoep and Gramann 1987.)

Statement of the Problem

The purpose of this study is to identify land use patterns, activities engaged in, information and other service needs, effective methods for motivating and controlling behavior, and characteristics of Boy Scout groups who use public lands in the southcentral region of the United States. Results are used to identify implications of and develop strategies for managing and informing these groups in their use of public lands.

Methods

Using a modification of Dillman's (1978) "total design method" (TDM), surveys with reminder postcards were sent to Scoutmasters of five troops in each of 30 councils in Arkansas, Alabama, Kentucky, Mississippi, Missouri and Tennessee. The systematic random sample was drawn with the assistance of staff from the national Boy Scouts of America (BSA) headquarters in Irving, Texas.

Before final printing, 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.

Open-ended questions 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. Frequency tabulation of concept-coded responses was used to analyze data.

Results

A total of 65 questionnaires of the 150 mailed 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 was not completed because the Scoutmaster was new and, therefore, unfamiliar with troop activities and use of public lands.

Troop Characteristics

The majority of troops (71% of those responding to this question) using public lands were relatively large, having more than 16 members. Twenty-nine percent of the troops had 30 or more members while 29% had 15 or fewer members.

Eighty-five percent of the troops responding to the community size question were from communities having fewer than 50,000 residents, while approximately 49% of these were from quite small communities of less than 5,000. Only about 4% percent of the troops were from communities of more than 500,000 residents.

Many of the troop leaders appear to be highly dedicated and committed to the BSA program as 56% of those responding had more than ten years of experience as Scoutmasters. Only 26% had three or fewer years of experience.

BSA Public Land Use Patterns

Types of lands used by Scout troops are varied, including (in order of use frequency) state parks, waterway areas, national parks, TVA projects, national forests, state forests, local parks, Army Corp of Engineers projects, and miscellaneous other federal and Canadian lands (Fig. 1).

When trip patterns are combined, troops take approximately the same number of day trips as overnight trips to public lands. Of the troops that take day trips, about 19% take three or fewer per year. About 60% take 11 or more day trips per year. No groups indicated that they take between six and ten day trips per year.

Overnight trip patterns are similar, with the majority of troops (68%) taking 11 or more overnight trips per year. Ten percent take three trips per year, and relatively low percentages of the rest of the troops (less than four percent in each category) indicate they take other frequencies of overnight trips. The general 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 42% of troops. Both untrained volunteer parents (for 21% of the troops) and trained volunteer parents (for eight percent of the troops) either assist trained BSA leaders or take troops themselves on trips to public lands. Only four percent of the troops use college student or other adults to accompany youth during these trips.

Though only 44% of the 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, almost 41% of the troops have one adult for every five Scouts. Forty-eight percent have one adult for every six to ten Scouts. Less than 11% of the troops have only one adult for every 11-15 youth. The relatively high rate of non-response to this question (56%) 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.

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. About 45% of all the troops indicate that troop trips are planned by the adult leaders with some degree of input from the youth. Twenty-six percent indicate that trips are entirely adult-planned while another 26% indicate that trips are planned primarily by the Scouts themselves.

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 are camping and hiking/backpacking. Other activities include canoeing and other aquatic activities, nature-related activities, development of Scouting skills, sightseeing, and conservation projects. Less than five percent of the troops mentioned having fun or other miscellaneous activities as the primary trip activity (Fig. 2).

Although troops usually have major programs of activities during their trips to public lands, most troops have some "free" or uplanned time. Many of the troops (about 43%) indicate two to four hours of free time. None indicate one or five to ten hours of unprogrammed time. About 27% indicate having more than 11 hours of unprogrammed time each day.

Often (for 45% of the trips) 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 (eight percent). Participation awards (received 24% of the time) also provide souvenir value. Other patches include awards received for demonstration of special skills or achievements. Achievement awards result from 17% of trips to public land while BSA badges are earned during nine percent of the trips.

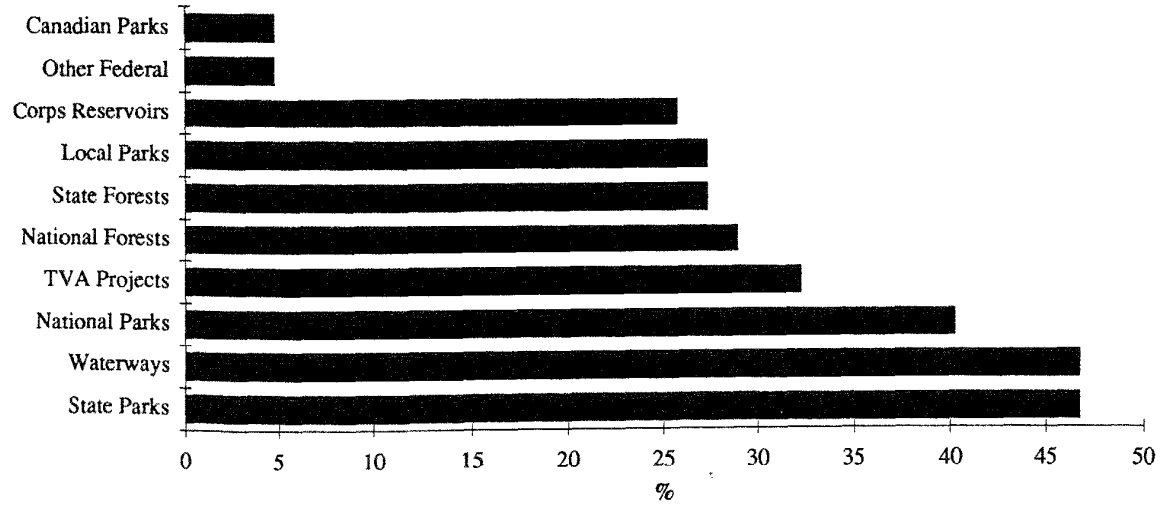


Figure 1. Types of public lands used by Boy Scout troops.

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. Provision of literature and informational services ranks third behind facility provision and direct staff involvement with groups. Although the majority (70%) of Scoutmasters 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 11-12% of the leaders 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 Berrier 1982; Wagar 1971) 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.

BSA Expectations of Public Land Managers

While some Scoutmasters (nine percent) believe that public agency personnel are not responsible for providing any services or programs for Scout groups, the majority state that agenices should provide some level of services, including programs and projects specifically for Scouts. Close to 25% identify a desire for managers to provide programs and projects for Scouts, some type of reward or award system for project completion, and general information services. Almost 18% identify provision of some kind of facilities or supplies for Scouts as a public agency responsibility while 16% identify rule enforcement as the managers' responsibility. Ten percent believe agencies should provide interpretive programs and eight percent express a desire for more staff involvement with Scouts in general (Fig. 3).

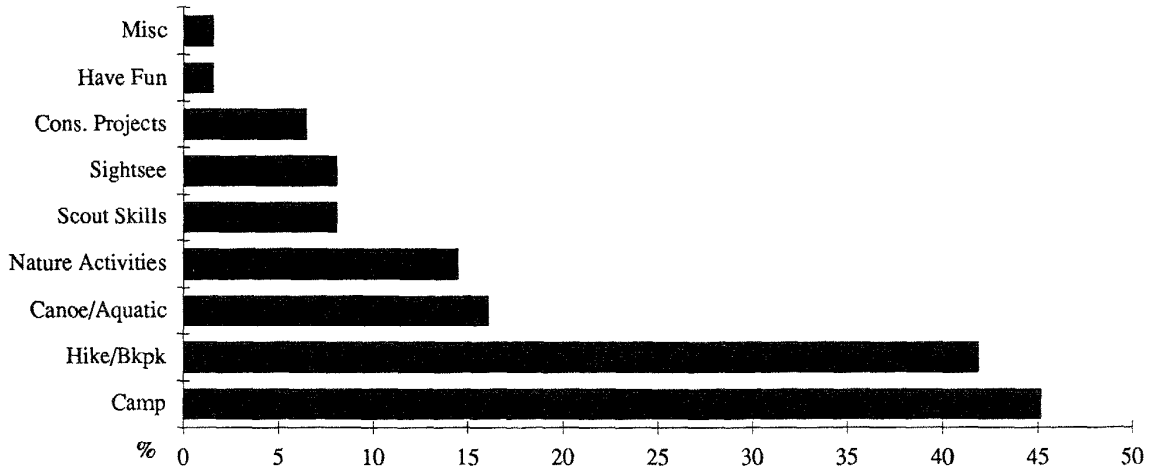


Figure 2. Activities engaged in by Boy Scouts while visiting public lands.

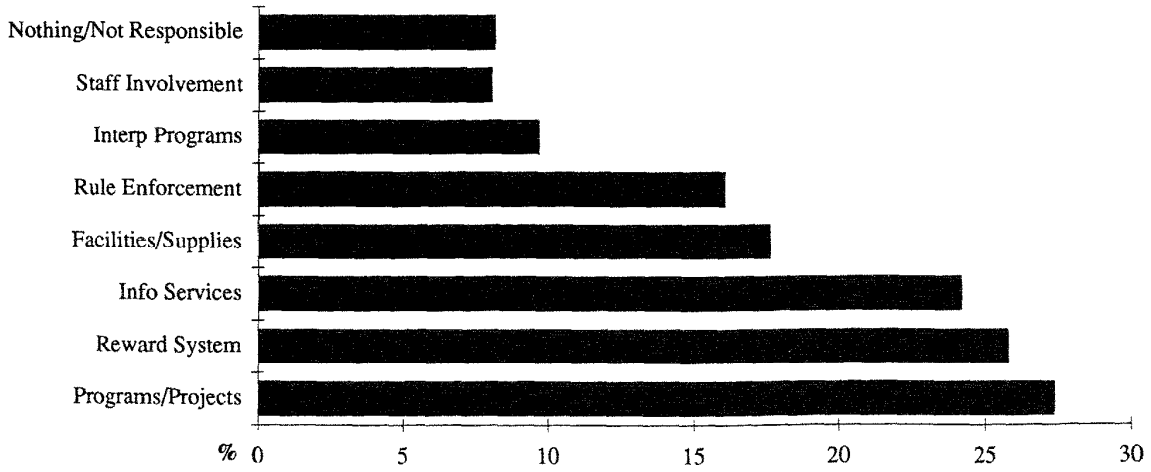


Figure 3. What Scoutmasters believe public agencies should provide.

Inappropriate Scout 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 inapporpriate behavior, (3) effective methods for dealing with young offenders, and (4) effective motivators for appropriate behavior. Results are presented in Figures 4-6.

Almost 28% of the respondents state they had never seen any Scouts behaving inappropriately while visiting public lands. Others identify a variety of general and specific behaviors engaged in by some Scouts. As observed by Scoutmasters, the most frequently reported type of inappropriate behavior by Scout groups using public lands is misuse of and damage to the resources (34%). Others are miscellaneous actions resulting in a poor Boy Scout image (31%), little regard or respect for other visitors (28%), legal violations (26%), lack of leader control of Scouts (11%), and other rule violations (10%).

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 and 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 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 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.

The two factors ranked highest as motivators for troop participation in service projects are individual badges and patches, and positive adult reinforcement. Receiving medium rankings for motivation effectiveness are (1) challenge, (2) peer approval, and (3) troop awards or certificates. Formal verbal recognition is mentioned the third most frequently, but is ranked only sixth in effectiveness.

Discussion

As in any research, there are limitations to this study, many resulting from the low response rate to the Scoutmaster survey. There are several possible reasons. Actual mailing of the survey was handled by the National BSA Office. Conducting the survey was not its primary function; consequently, delays and inconsistencies in mailing time for the survey and follow-up postcards existed. Also, an essential part of the "total design method" (Dillman 1978) is the use of followup letters with duplicate questionnaires enclosed. This was considered an undue burden on the donated time of the BSA personnel. Therefore, they were not used. Logistical delays caused the survey to be received by Scoutmasters during the summer when many were on vacation, at camp with their troops, or attending the 75th anniversary National BSA Jamboree. Comments on several questionnaires received late indicated leaders had been attending the Jamboree. Finally, leadership of Scout troops often changes during the summer. New leaders may be unfamiliar with past troop activities or may not feel qualified to answer survey questions.

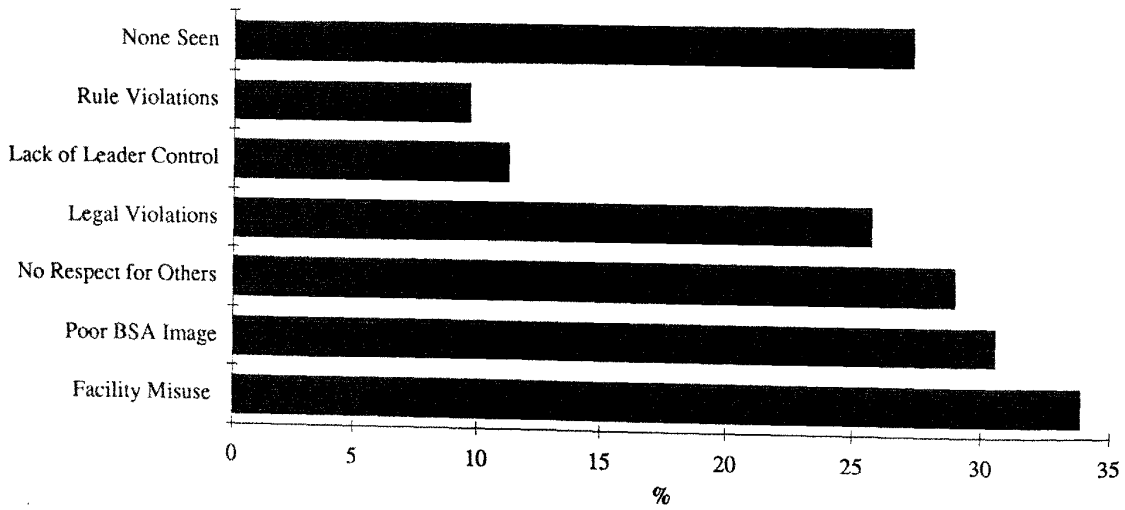


Figure 4. Youth group behavior problems observed by Scoutmasters.

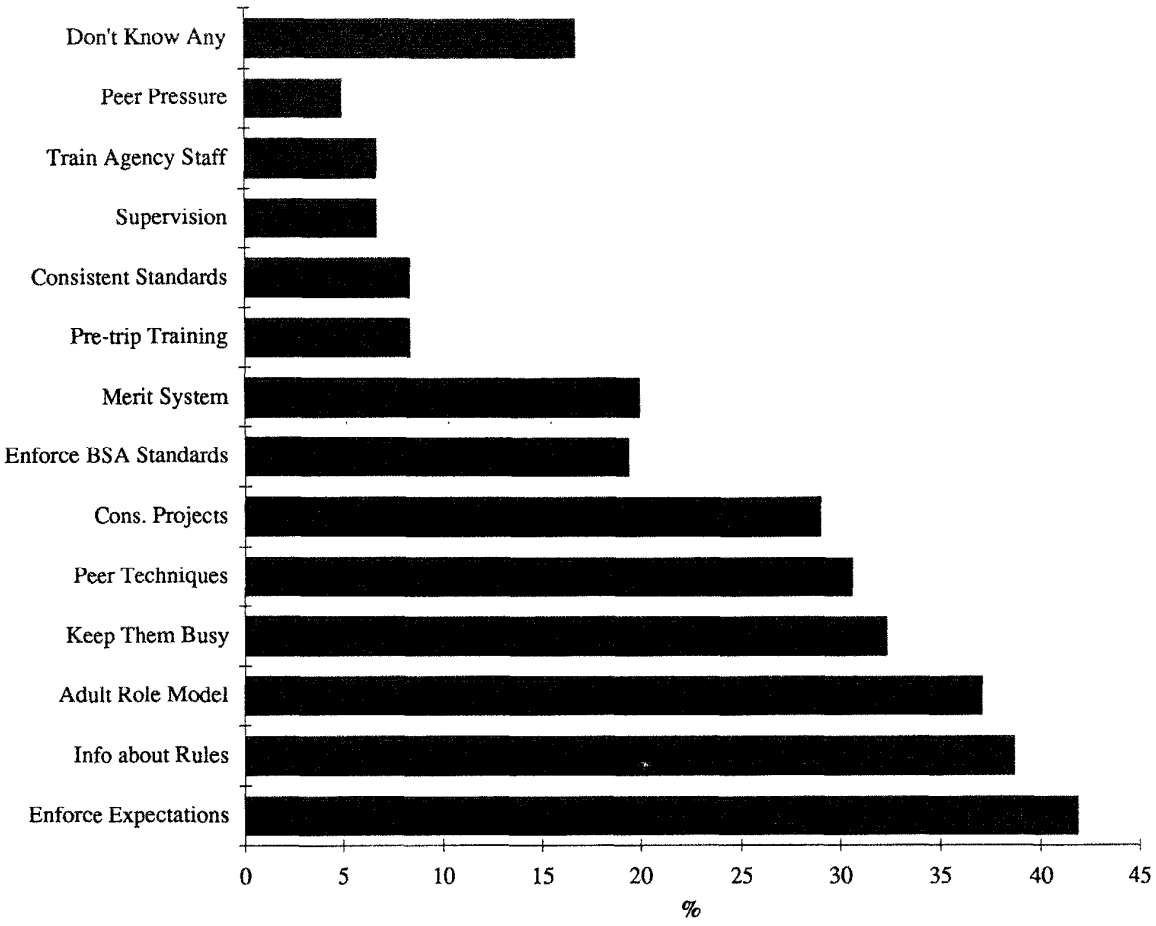


Figure 5. Techniques identified as effective in controlling Boy Scout behavior.

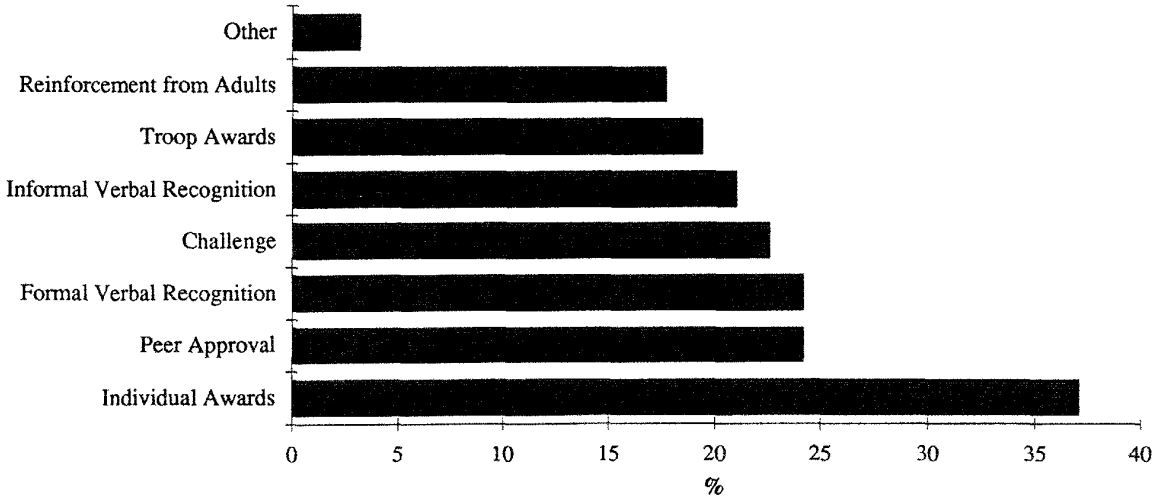


Figure 6. Techniques identified as effective in motivating appropriate Boy Scout behavior.

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 because they took more thought and 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. On that particular question, the non-response rate was relatively high (56%). This 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 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 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.

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

- Understand the BSA program and participants.

  In some cases, Scout groups may feel unwelcome, either because they are placed away from other visitors or because they have no direct contact with agency personnel. In some cases, staff may have negative perceptions of or reactions to Scout groups. Because they 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.

- Identify site-specific periods of intense Scout use.

  By identifying periods of heavy Scout use, managers can plan more easily 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 identified troop expectations (via phone or letter during troop inquiries or site reservations), 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 their own site could not adequately accommodate or meet the needs of the group.

- Use interpretation to clarify appropriate behavior.

  Groups often engage in inappropriate behavior because they simply are unaware of the negative consequences of some behaviors. Informing them, preferably through interpretive strategies rather than in more authoritative or threatening legalese, can reduce negative behaviors as well as promote positive images of the agency and positive interactions 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.

- 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.

Although it may not be feasible, particularly with staff and budget constraints, to assign a staff person to work primarily with Scout 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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INDIVIDUAL CHOICE BEHAVIOR IN THE USE OF COMMON-PROPERTY RECREATION RESOURCES: EFFECTS OF MOTIVATIONAL ORIENTATION AND MULTIPLE RESOURCE OPTIONS

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Many outdoor recreation activities are dependent on common-property resources. An experiment was conducted in which subjects having different motivational orientations harvested from a resource pool having two resources, each being of different value and being depleted at different rates. Results showed that individualistic subjects requested more high valued resources and fewer low valued resources than did cooperative subjects, and that in general, subjects shifted their harvest attention from the less plentiful (although more valuable) resource to the more plentiful resource as depletion occurred.

Introduction

Many outdoor recreation activities are dependent on common-property resources. Examples of such resources include fish and game stocks, lakes or reservoirs, forested lands and wilderness areas. Because most of these resources are common-property resources to which people have free and open access, there exists the potential for overuse. The overuse of renewable resources is not new, nor has it occurred infrequently. An example of overuse can be found off the coast of Texas where the population of redfish has declined to a disastrously low level. Conversely, there are examples of carefully maintained renewable resources, such as the spiny lobster population in Quintana Roo, Mexico (Berkes 1989). The question becomes what distinguishes instances of successful resource maintenance from instances of resource overuse and depletion. The purpose of this study was to examine how the characteristics of individuals and characteristics of the resource might cause or prevent the overuse or depletion of common-property resources.

An influential publication on the topic of overuse of common-property resources is Garrett Hardin's (1968) "Tragedy of the Commons." Hardin presents the situation where a number of herdsman graze their cattle on a common pasture that is free and open to all. It is expected that each herdsman will try to keep as many cattle as possible on the commons and thus maximize his own individual gain. This is an individually rational decision because the profit generated from each animal grazed is pocketed in full by the herdsman who owns it, while the cost, measured as damage to the commons, is shared by all herdsmen. The incentive for each herdsman is therefore to increase the size of his own herd. Unfortunately, this conclusion is reached by all the other equally rational herdsmen. This sets in motion a process by which the carrying capacity of the pasture is eventually exceeded, and the commons overharvested or depleted.

There is growing evidence that quick technological solutions may not always be available, now or in the future, for response to resource overuse. In a recent review of the literature, Messick and Brewer (1983) identify two types of non-technical solutions to the commons dilemma. The first involves structural solutions that come about through coordinated, organized group action (Kramer and Brewer 1984), and include political solutions (Hardin 1968). These solutions typically require group members to relinquish their free access to the commons, and to institute some other system of resource allocation in its place.

The second type of solution relies upon individual preferences and social motives to maximize those factors that influence individuals to include collective or group interests in their personal decision making. Thus, individuals are encouraged to voluntarily restrain their use or consumption in the absence of external constraint or coercion (Kramer and Brewer 1984). This is the solution of interest in this paper.

Literature Review

This study focuses on two general dimensions of the commons dilemma; the characteristics of individuals involved in a commons dilemma, and characteristics of the resource being used or consumed. Specifically, this research examines the relationship of individuals' motivational orientation to use behavior, and the effects of choice options between two resources having different values, pool sizes and depletion trends.

Motivational Orientation

Research has shown that different individuals have different motivational orientations, and that these orientations are related to differences in use or choice behavior (Pruitt 1967; Messick and McClintock 1968; McClintock et al. 1973; Kuhlman

and Marshello 1975 a,b; Griesinger and Livingston 1973). Several recent studies have extended this earlier research by examining the effects of motives on choice behavior in an n-person "sequence dilemma," (Liebrand 1984; Liebrand and Van Run 1985) and in a "replenishable resource dilemma" (Loomis 1989). Liebrand (1984) classified individuals into one of four motivational orientations (altruistic, cooperative, competitive, individualistic). These individuals then participated in an n-person sequence dilemma. Results of his study showed significant differences in harvest behavior due to motivational orientation; competitive persons took the most, individualistic persons took less but more than the average amount, cooperative persons took less than the average and altruistic persons took the least.

Liebrand and Van Run (1985) conducted a similar sequence dilemma study using subjects in the United States and the Netherlands. Two different procedures were used to classify the motivational orientation of subjects, the first being that used by Kuhlman and Marshello (1975b) and the second a geometric procedure (Liebrand 1984). The relationship between choice behavior and motivational orientation was as expected for both the Netherlands and United States participants, replicating the work of Liebrand (1984).

The last study (Loomis 1989) used a replenishable resource dilemma design. Subjects were classified as either cooperative or individualistic using the geometric procedure (Liebrand 1984), who then harvested resources from what they believed was a replenishable resource pool. Results showed a significant difference in harvest behavior between cooperative and individualistic subjects. During three of the four 10-trial stages, and for the full 40-trial experiment, individualistic subjects requested more resources than did cooperative subjects.

Resource Characteristics

Little research has been directed at the relationship between resource characteristics and individual harvest behavior. Of the limited research that has focused on understanding the effects of differences in resource characteristics, however, investigators have found significant results. Rutte et al. (1987) created a situation in which half the subjects began an experiment with the resource pool having few remaining resources, whereas the other subjects began the experiment with the pool having abundant resources. Results showed that subjects in the scarce resource condition made lower harvest requests than did subjects in the abundant resource condition.

Loomis (1989) extended this work by testing whether individuals modified their harvest behavior in response to a resource pool being slowly depleted over time. Subjects harvested from what they believed was a replenishable resource pool. In reality, pool size was programmed to decline over time regardless of subject harvest behavior. Results revealed a reduction in resource units requested as the experiment progressed. Subjects responded to the declining pool size by requesting fewer units.

Conceptual Framework

Independent Variables Operationalized

Prior research has been directed towards the effects of motivational orientation on harvest behavior of individuals participation in commons dilemma-type games. Only one, however, has examined the effects of motivational orientation through the use of a replenishable resource dilemma (RRD) (Loomis 1989). Nor has motivational orientation been examined in the context of multiple, different-valued resources.

Motivational orientation is not a traditional variable in that it cannot be experimentally manipulated. Instead, the concept represents an underlying trait of the subject. This trait can be measured, and the persons orientation determined. Subjects in this experiment participated in an evaluative procedure prior to the experiment and persons with cooperative or individualistic orientations identified. Cooperative subjects are defined as seeking to maximize collective or joint outcome, and individualistic subjects are defined as seeking to maximize their own outcome (Messick and McClintock 1968; Liebrand 1984).

Resource characteristics in this experiment represent a series of scope conditions. The first is that two resources were available from which subjects could harvest. The two resources had different values; resource A was worth 3 points per unit, and resource B was worth 1 point per unit. Second, both resources were declining in quantity over time. Resource A, however, declined more rapidly than resource B. The final resource characteristic was contingent harvest success. This means the number of resource units (A or B) an individual received in response to a harvest request was contingent upon the number of units remaining in the resource pool at the time of the request. As pool size goes down the number of resource units received in response to units requested also goes down. The amount received in relation to amount requested was proportional to pool size.

Such a resource simulates many natural resources in which exact monitoring is difficult if not impossible. Perhaps the best example of such a naturally occurring resource is a fishery resource. The fishery population is dependent upon the harvesting strategies employed by anglers, and harvest success itself may provide anglers with an indication (perhaps not a very good indication) of the status of the resource.

The dependent variables of interest were number of resource A units requested, number of resource B units requested and total units requested (A plus B combined).

Study Hypotheses

A total of seven hypotheses were tested. The first four hypotheses looked for effects due to motivational orientation on harvest behavior during the full experiment, and during four 10-trial stages. It was expected that individualistic subjects, seeking to maximize their own outcomes, would request more resource A and fewer resource B units per-trial during the course of the full experiment than would cooperative subjects. Also, the 40-trial experiment was segmented into four 10-trial stages. It was expected that for each stage of the experiment, individualistic subjects would request more resource A and fewer resource B units per-trial than would cooperative subjects.

HO_1: There is no difference in units of resource A requested per-trial by persons having different motivational orientations.

HA_1: Individualist subjects will request more units of resource A per-trial than will cooperative subjects.

HO_2: There is no difference in units of resource A requested per-trial during each stage of the experiment by individuals having different motivational orientations.

HA_2: Individualistic subjects will request more units of resource A per-trial during each stage of the experiment than will cooperative subjects.

HO_3: There is no difference in units of resource B requested per-trial by persons having different motivational orientations.

HA_3: Individualistic subjects will request fewer units of resource B per-trial than will cooperative subjects.

HO_4: There is no difference in units of resource B requested per-trial during each stage of the experiment by individuals having different motivational orientations.

HA_4: Individualistic subjects will request fewer units of resource B per-trial during each stage of the experiment than will cooperative subjects.

The final three hypotheses focused on effects due to declining resource pools. As the experiment progressed, the resource pools were steadily depleted through false feedback. It was predicted that subjects would request fewer units of resource A over time, and more of resource B over time. For total resources requested (resources A and B combined), it was predicted that requests would decline over time.

HO_5: There is no difference in units of resource A requested per-trial during each of the four stages during the experiment.

HA_5: Subjects will request fewer units of resource A per-trial during latter stages of the experiment than during earlier stages.

HO_6: There is no difference in units of resource B requested per-trial during each of the four stages during the experiment.

HA_6: Subjects will request more units of resource B per-trial during latter stages of the experiment than during earlier stages.

HO_7: There is no difference in total resource units requested per-trial during each of the four stages during the experiment.

HA_7: Subjects will request fewer resource units per-trial during latter stages of the experiment than during earlier stages.

Methodology

Motivational Orientation

To assess which motive was dominant for a particular subject, several measurement techniques using decomposed games were available (Messick and McClintock 1968; Pruitt 1976; Griesinger and Livingston 1973; Kuhlman and Marshello 1975b). The procedure used in this study was based upon the geometric procedure originally proposed by

Griesinger and Livingston (1973). The specific procedure and its details will not be reviewed here, since it has been reported in depth elsewhere. Interested readers are referred to Loomis (1989) and Liebrand (1984).

Experiment Procedure

After the subjects had arrived, the experimenter provided a brief set of instructions concerning operation of the computer terminals, and the nature of the "interactive" computer system. Although the computers were physically linked together, each computer in fact operated as a stand-alone unit. No linkage was necessary because the same false-feedback concerning the resource pools was being provided to each subject. It was important, however, that the participants believe they were interdependent in the harvesting of resources.

Subjects participated in groups of six, but were led to believe they were part of a much larger group of 24 persons which, when the experiment began, would automatically and randomly be split by the computer into two groups of 12 persons each. This deception was necessary for two reasons. The first was to minimize or eliminate a subject's expectation that a drastic shift in their own harvest requests should result in a noticeable difference in pool size as a result of their action, and second, to remove a person's belief that through strategic harvest behavior they could influence the behavior of others. Several steps were taken to cause people to think they were part of a 24-person group. As each subject arrived, the experimenter conspicuously checked their name off a list containing a total of 24 names. Second, subjects were seated in cubicles numbered 19 through 24. Finally, after all instructions had been given and the subjects were ready to begin the experiment, the experimenter called to the "other" experiment location where the other 18 participants were supposedly located to tell them all was ready. The "other group" was never ready, and would require a few more minutes. After a minute or two, the phone would ring one time (the call being made by an accomplice) signaling the experimenter the "other group" was also ready, and to begin the experiment.

Once the operation of the computer network had been explained, subjects were seated and provided with instructions concerning the task itself. The instructions were presented on-screen where subjects could read them at their own pace. All subjects received the same information concerning resource harvesting and pool replenishment. Subjects were told they would be participating in a decision-making task in which they and 11 other persons would individually harvest from a renewable resource pool. Each subject was told they had equal access to and shared a resource pool which initially contained 3,000 units of resource A and 3,000 units of resource B. On each turn (trial) each subject could request up to 20 units of resource A, up to 20 units of resource B or up to 20 units of resources A and B combined. Once all 12 members of the group had made their requests, the computer would respond, indicating to each subject how many units and points they individually received in response to their request, and their cumulative total units and points harvested.

Total units of resources A and B harvested would then be subtracted from the existing resource pool. Subjects were told the remaining amounts would then be multiplied by the replenishment rate of 1.05, thus adding 5% to each resource pool for the next trial. Subjects were told the resource pools could not replenish themselves in excess of 3,000 units each. These calculations never actually occurred, of course, because the computer program was rigged to provide a pre-set pool size for each resource after each trial. Subjects in fact had no effect on pool size. Subjects were in isolated cubicles, and were not aware of the harvest requests or successes of the other participants. Subjects earned 0.5 cents per point harvested, making their decisions and the dilemma they faced have real implications.

Upon completion of the instructions and the answering of any questions, the experimenter made the phone call to the other experiment location to inform that group that the experiment could begin. Once the one-ring start signal was received, subjects were told to begin. The experiment lasted 40 trials.

Results

Manipulation Checks

A post-experiment question sought to determine whether or not subjects realized the size of the two resource pools were decreasing in size over time. Subject responses to the statement "I knew before each turn whether or not the resource pools were increasing or decreasing in size" indicated their understanding of the trend in pool size. Subjects responded on a 7-point scale (1=strongly disagree, 4=neutral, 7=strongly agree). On this item it was important that subjects were aware of the trend in pool sizes since subject behavior under the situation of a diminishing pool size was of interest in this study.

An examination of the mean response to this statement ($\bar{X}$=5.13) indicates subjects did

understand that the resource pools were decreasing in size over time. Based on these results, it was concluded that subjects were aware of changes in pool size over time.

A manipulation check to determine the effectiveness of the group-size deception was also performed. It was important that subjects believed they were part of an interactive group, and not making requests independently on a stand-alone computer. To assess the effectiveness of the group-size manipulation, subjects were asked on the post-experiment questionnaire "How many other persons were harvesting from the same resource pool as you?" Responses to this question ($\bar{x}$=9.1) showed that subjects believed they were part of a group having 8 other members. Based upon these results, it was concluded that the group-size deception was also successful.

Hypotheses Testing

For the t-tests used to test HO_1 through HO_4, a .10 level of significance was used as the decision rule (Blalock 1979; Kirk 1982; Christensen 1977; Gregoire and Driver 1987). For HO_5 through HO_7, a repeated measures ANOVA procedure was used. Since the set of assumptions attached to this procedure is more restrictive, a .05 level of significance was used.

The maximum number of units that could be requested during any single trial was 20 (resource A, resource B, or resources A and B combined). The average per-trial request for resource A during the full experiment was 11.00 units (Table 1). Cooperative subjects requested fewer units (10.10), and individualistic subjects more units (11.90). This difference was significant at the .10 level (Table 2). HO_1 was therefore rejected, and because the difference in requests is in the predicted direction, HA_1 was accepted.

Significant differences in resource A harvest requests were also found between cooperative and individualistic subjects for stages one and two (Table 2). However, the results for stages three and four were not significant. HO_2 was therefore tentatively rejected and HA_2 was tentatively accepted, since differences in requests were as predicted.

The average per-trial request for resource B during the full experiment was 7.52 units (Table 3). Cooperative subjects requested slightly more units (7.98 units), and individualistic subjects slightly fewer units (7.07). This difference was not significant at the .10 level (Table 4). HO_3 is therefore not rejected.

Table 1. Mean units of resource A requested according to motivational orientation and stage.

	Stage				
	One	Two	Three	Four	Total
Individualistic	16.52	12.82	9.56	8.70	11.09
Cooperative	14.25	9.92	8.35	7.90	10.10
Total	15.38	11.37	8.95	8.30	11.00

Table 2. Tests for differences between cooperative and individualistic subjects on units of resource A requested during the full experiment, and during stages one through four.

	Units Requested			
Stage	Individ.	Coop.	t	p
Full exp.	11.90	10.10	2.082	.041
One	16.52	14.25	2.552	.013
Two	12.82	9.92	2.963	.004
Three	9.56	8.35	1.041	.302
Four	8.70	7.90	.657	.513

Table 3. Mean units of resource B requested according to motivational orientation and stage.

	Stage				
	One	Two	Three	Four	Total
Individualistic	3.26	6.51	8.88	9.65	7.07
Cooperative	5.07	8.52	9.18	9.17	7.98
Total	4.16	7.52	9.03	9.41	7.52

Significant differences in harvest requests for resource B were found between cooperative and individualistic subjects for stages one and two. However, the results for stages three and four were not significant. HO_4 is rejected, and HA_4 tentatively accepted.

When harvest requests were examined across the four stages, over time, the results showed a decline in requests for resource A, an increase in requests for resource B and a decline in total

Table 4. Tests for differences between cooperative and individualistic subjects on units of resource B requested during the full experiment, and during stages one through four.

Stage	Units Requested Individ.	Coop.	t	p
Full exp.	7.07	7.98	1.295	.200
One	3.26	5.07	2.302	.024
Two	6.51	8.52	2.381	.020
Three	8.88	9.18	0.306	.760
Four	9.65	9.17	0.430	.669

requests (resources A plus B) (Tables 1, 3, 8). Results of the repeated measures ANOVA showed these differences to be significant. HO_5, HO_6 and HO_7 were therefore rejected. A series of paired t-test contrasts were conducted to determine which between-stage differences were significant (Table 8). In all three cases, significant differences were found between stages one and two, and between stages two and three. No significant differences were found between stages three and four. HA_5, HA_6 and HA_7 were therefore accepted.

Table 5. Repeated measures ANOVA test for differences in resource A units requested according to stage and motive.

Effect	F	p
Stage	121.023	.000
Stage X Motive	2.004	.161

Table 6. Repeated measures ANOVA test for differences in resource B units requested according to stage and motive.

Effect	F	p
Stage	65.538	.000
Stage X Motive	4.042	.048

Table 7. Repeated measures ANOVA test for differences in total resource units requested according to stage and motive.

Effect	F	p
Stage	13.611	.000
Stage X Motive	0.506	.479

Table 8. Paired t-test contrasts to identify between-stage differences in resource units requested.

Units Requested (A)

Stage One	Two	Three	Four	Mean Diff.	t	p
15.38	11.37			4.01	10.378	.000
	11.37	8.95		2.42	5.552	.000
		8.95	8.30	.65	1.361	.178

Units Requested (B)

Stage One	Two	Three	Four	Mean Diff.	t	p
4.16	7.52			3.36	8.843	.000
	7.52	9.03		1.51	3.473	.001
		9.03	9.41	.38	.796	.429

Total Units Requested

Stage One	Two	Three	Four	Mean Diff.	t	p
19.55	18.88			.67	2.797	.007
	18.88	17.98		.90	2.849	.006
		17.98	17.71	.27	1.112	.270

Discussion and Conclusions

Based on the existing literature, a series of predictions were made concerning the harvest behavior of cooperative and individualistic subjects, and the behavior of individuals faced with a pair of resource pools, having different values, declining in size at different rates. The results of this experiment support these predictions. Cooperative subjects requested fewer units of resource A and more of resource B when compared to individualistic subjects. Over time, as both resource pools declined in size, subjects of both orientations reduced their requests for resource A (the more rapidly declining but more valuable resource), and increased their requests for resource B. Total requests declined by a statistically significant amount. However, in

practical terms this reduction was negligible. Results indicate subjects shifted their requests from the higher valued but less plentiful resource A to the more plentiful resource B. Total requests (A plus B) remained near the maximum allowed, 20 units. This can be compared to earlier research in which subjects harvested from a single resource, which was declining over time (Loomis 1989). In that study subjects responded to the decline by reducing their requests. It would appear that given the opportunity, people will substitute or use lower valued resource to allow a higher valued resource the chance to recover.

This study has replicated earlier work, and has extended what is known about the relationship between harvest behavior and resource characteristics. This work, and related research should help recreation resource managers avoid resource overuse or depletion.

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UTILIZATION OF TRENDS IN VISITOR USE, FACILITIES AVAILABLE, VEHICLE REGISTRATIONS, AND LICENSE SALES AS OUTDOOR RECREATION DEMAND INDICATORS

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Considerable funds are allocated by public agencies to gather data for estimating outdoor recreation demands and preferences. Many public and private recreation agencies and organizations collect public use data, recreation facilities available, registrations and license sales. This paper explores the use of such data for predicting demand for certain activities as an alternative to collecting demand information through costly household surveys.

Public agencies often allocate relatively large sums of money towards studies and surveys designed to determine and predict the demands and/or preferences for outdoor recreation areas and facilities. In Maine the Bureau of Parks and Recreation has utilized the results of national recreation surveys, a New England Recreation Demand Survey, several demand/preference surveys and a State Travel Study in 1985, to predict total participation in recreation activities. The Bureau has also utilized the results of other agency surveys conducted in Maine which collected recreation information valuable in preparing the State Comprehensive Outdoor Recreation Plan (SCORP), as well as other planning studies.

It is not the intent of this effort to question the results and value of these many surveys. The survey findings cited were used in Maine SCORP's prepared in 1977, 1983, and 1988 with some degree of confidence and with reasonable results. Rather, this project was undertaken to investigate the possibility that there are other currently collected data in Maine that could be utilized to objectively predict the trend of total participation in the activities most often sought in Maine's outdoors.

The primary purpose of this effort is to estimate an annual growth rate in participation in an activity that can be applied towards predication of total growth in that activity over a short period of time. The annual growth rates estimated can be used in SCORP where growth is predicted for a five-year period, or they can be used in an agency program assessment, such as now underway in the Bureau of Parks and Recreation. Total participation in an activity is estimated recognizing that the state of the economy, fluctuating travel costs, and seasonal weather patterns can greatly influence totals in a given year.

To project total participation in an activity in the 1988 SCORP to the year 1993, the annual growth rates were calculated from participation days from the two Maine Travel Studies completed in 1974 and 1985. Findings indicated that tourism visitation grew at an annual rate of 4.34% for residents and 5.21% for nonresidents between 1974 and 1985. These percent growth rates were applied to each activity studied in the 1988 SCORP. Thus, as a minimum this effort can improve upon the 1988 projection techniques in that a unique growth rate can be determined for each activity for which trend data is available.

The annual growth rates were calculated for the 17 outdoor recreation activities for which some information was readily available. The 17 activities are listed on the attached Table 1. Following is a brief overview of the findings for each activity examined.

Boating - Good boat registration data available but absolutely no use data. Since 1986 registrations have increased at an annual rate of about 8%. An aging population has more income and more interest in upscale activities. A lagging economy and higher gasoline prices could slow growth. An average annual growth rate of 7% over the next five years is predicted. Boating parking

spaces have increased in Maine 75.2% annually since 1972, largely due to a dedicated fund boat access program.

Canoeing - Good use data from two rivers and North Maine Woods, Inc. All three sources charge fees for overnight use, and North Maine Woods charges a day-use fee as well, thus total participation is somewhat controlled by user cost considerations. An aging population with more income and leisure time will move from canoeing to sailing and pleasure boating. Small growth rate predicted over the next five years.

Downhill skiing - No public use data at all, but data could be collected from the private sector. Daily lift capacity in persons increased by 3.73% annually between 1977 and 1988 based upon data collected for the SCORP process. An aging population with more income and leisure time will continue to participate in this activity.

Family camping - Use data from 11 State Parks, the Evans Notch District of the White Mountain National Forest, and Acadia National Park indicates a 2.79% annual growth rate in participation days since 1986. Prior to 1986 visits to most of these facilities declined since the early 1970's. The number of campsites available increased by 1.89% between 1972 and 1988. An aging population with more income will move from family camping to motor home, seasonal home, and resort vacations.

Fishing - Use data from North Maine Woods and license sales for both residents and nonresidents. Slow growth from North Maine Woods of 1% annually is somewhat influenced by user fee system. Growth in license sales of 4% for residents and 11% for nonresidents annually is closer to the difference between national survey results from 1980 and 1985. Aging population with more leisure time and more income will utilize larger, motorized boats and continue to fish.

Freshwater Swimming - Use data from eight State Parks. Annual average percent increase of 3.35% since 1986. An aging population will swim less, thus the average annual percent change in total participation should be lower over the next five years.

Golf - No use data available, but will investigate collection of data from golf courses. Number of golf holes, collected for the SCORP process, has increased by 1.96% between 1972 and 1988. An aging population with more income and leisure time will increase their total participation days in golf.

Hiking - Use data from three State Parks, Baxter State Park, North Maine Woods, and miles of hiking trail collected for the SCORP process between 1972 and 1988. Use data indicates a 2.90% annual increase in participation days since 1986. Facility data shows an average annual growth of 2.75% for miles of hiking trail available. An aging population with more income will move to upscale activities. Average annual growth in participation days will be smaller over next five years.

Hunting - Use data from North Maine Woods and license sales for residents and nonresidents. Nonresident license sales are increasing while resident sales are decreasing. An aging population with more income and leisure time will continue to hunt at same pace. At best, total participation in the activity will remain stable.

Picnicking - Use data from five State Parks. Facility data collected through the SCORP process is not useable because of closure of DOT highway rest areas in the 1970's. Use data indicates a 4.93% annual increase in participation days since 1986. Prior to 1986 there was virtually no growth in the activity. As children leave the homes of the aging population, total participation in picnicking will increase at a slower annual rate.

Primitive camping - User data from Baxter State Park and the North Maine Woods indicates a 2.85% increase in participation days since 1976. An aging population with a continued interest in fishing and boating will use primitive campsites at a greater growth rate than in the past.

Nature walking - Use data from one State Park shows an annual 1.38% increase in total participation since 1986. Between 1972 and 1988 designated trail miles increased by 5.24% annually. An aging population will increase total participation in the activity at a greater rate than in the past.

Rafting - Data from the three major rafting rivers in Maine indicate that the explosive growth of the 70's and early 80's is apparently over. The average annual growth rate since 1984 has been 5.97%. In the last two years total participation days has declined. Maximum use on all three rivers is somewhat controlled either by outfitter daily allocations, trip size limits, or water releases from storage dams.

Saltwater swimming - User data from four State Parks. Average annual growth rate in total participation since 1986 is 6.77%. An aging population will swim less, thus the average annual growth rate in total participation days should be smaller over the next five years.

Sight-seeing - User data from five State Parks, all State Historic Sites, Acadia National Park, and the West Branch Penobscot show an average annual growth rate of 10.89% since 1986. An aging population with more income and leisure time will continue to visit sight-seeing attractions at a relatively high average annual growth rate.

Ski touring - No user data available, but will attempt to collect from the private sector. Designated miles of trail increased by 6.31% between 1972 and 1978. An aging population with more income and leisure time will continue to participate in ski touring at a relatively high average annual growth rate.

Snowmobiling - No use data available. Miles of designated trail have quadrupled since 1972, largely due to a State-administered dedicated revenue program. Number of sleds registered have increased by 3.66% annually since the 83/84 season. The number of sleds registered peaked at 73,737 in 74/75 and, discounting the gasoline shortage years, bottomed out at 42,177 in 82/83. The activity now appears to be on a rebound, perhaps because an aging population has more income and leisure time.

Other major activities which must be examined at the State level for which little or no information is available include horseback riding, all-terrain vehicle trail riding, bicycling, sailing, and ice fishing. Activities which are local in nature--which need not be examined at the State level, include tennis, jogging, softball, baseball, pool swimming, basketball, ice skating, walking

for pleasure and sled and snow play. It is hoped that these activities will be examined in detail by towns when preparing their comprehensive plans towards meeting the State Growth Management legislation.

In the process of collecting data it has been found that more detailed data could be collected from several agencies with ease. For instance, the Bureau of Parks and Recreation tallies its boat site use data with other day-use for the park, thus producing a total day-use number, and consequently losing the boat site user data. Procedures have been initiated with State Park personnel to record and tally the boat user data separate from other day-use.

In these preliminary analyses Maine's aging population has been considered in a general sort of way, towards making a first rough approximation of what the average annual rates of growth might be for each of 17 outdoor activities. It was assumed that an aging population has more buying power, leisure time, and fewer family responsibilities. At a certain age, total outdoor recreation participation begins to decrease as health problems increase. In the preparation of Maine's next SCORP, current participation rates will be compared with predicted shifts in Maine's age groupings and household structure to more accurately predict the average annual growth rates. Meanwhile, public use data will be collected every year and new data, when available, will be added to the data base.

TABLE 1

AVERAGE ANNUAL CHANGES IN RECREATION PARTICIPATION (Visits or Visitor Days) for 17 OUTDOOR RECREATION ACTIVITIES in MAINE

Activity	Predicted Average Annual % Change Next 5 Years	Data Used in Predictions
Boating	7	Total boats registered; pleasure boats registered; boat parking spaces
Canoeing	2	Allagash and St. John Rivers use data; North Maine Woods data
Downhill Ski	4	Capacity increases 77-88
Family Camping	2	11 State Parks; Evans Notch District WMNF; Acadia National Park; Number of campsites available 72-88
Fishing	5	License sales; North Maine Woods data; National fishing surveys
Freshwater Swimming	2	User data from 8 State Parks
Golf	3	Number of golf holes increase 72-88
Hiking	2	User data from 3 State Parks; Baxter State Park and North Maine Woods; Designated trail miles 72-88
Hunting	0	License sales; North Maine Woods; National hunting surveys
Picnicking	3	User data from 5 State Parks
Primitive Camping	4	Baxter State Park; North Maine Woods
Nature Walking	4	One State Park and designated trail miles 72-88
Rafting	2	User data from 3 rivers
Saltwater Swimming	5	User data from 4 State Parks
Sight-seeing	7	User data from 5 State Parks; all State Historic Sites; Acadia National Park; and West Branch Penobscot
Ski Touring	6	Designated trail miles 72-88
Snowmobiling	4	Sleds registered; designated trail miles 72-88

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PUBLIC RECREATION ON NONINDUSTRIAL PRIVATE FORESTLANDS (NIPF) IN THE 1990's

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The occurrence of public outdoor recreation on nonindustrial private forestland (NIPF) is related to parcel size. A sample of Vermont NIPF owners indicates that one-third prohibited public outdoor recreaton on their property and one-third of these prohibitors owned <20 acre parcels. Conversely, all owners of >500 acre parcels allowed public recreation use of their property. NIPF fragmentation, resulting from economic pressures to convert forestland to other uses, has a negative effect on the availability of NIPF for public outdoor recreation.

The NIPF Problem

The future of public outdoor recreation on NIPF is uncertain because of the demand for development space in the continuously urbanizing Northeast. Ninety percent of the region's private forest-land ownerships are nonindustrial and they represent about 70% of all the private forestland in the region. Much of this acreage is constantly exposed to economic pressures that eventually force its fragmentation and conversion to urban land uses. One of the consequences of these events is the elimination of public outdoor recreation opportunities on NIPF. Rural-to-urban land conversion continuously takes place over a large percentage of the Northeast. Driven by the economics of land supply and demand, the multi-billion dollar development industry, which includes willing buyers and sellers, speculators, real estate agents, brokers, investment syndicates, lawyers, bankers, surveyors, developers, and contractors, act as catalysts in the conversion of NIPF to urban land uses for profit.

Land that has been in farm and forest, often compatible with public outdoor recreation, is liquidated for value added revenue. With the passing of the plow and the cow and the tree and the saw, comes the hammer and nail and real estate sales. During this land use conversion, public access to private outdoor recreation resources for such activities as hunting, fishing, hiking, snow-mobiling, cross country skiing, ATV use and nature observation is eliminated. Are extensive wildland sports doomed on private forestlands in the Northeast?

Studies of public outdoor recreation use of private lands, completed over the past decade, have been mostly concerned with landowners' reactions to public use and the conditions placed on use. How much land posting occurs? Is there property damage? What kinds of recreation does the landowner allow? How much and during what seasons is recreation allowed? Is use allowed by default, permission, or for a fee? (Gilbert and Samek 1976, Gilbert 1985, Lindsay 1974, 1976). Now, the more important questions are not those surrounding the conditions of use but if use can continue to take place at all. How much NIPF has been converted to alternative land use? How much remains unconverted in urbanizing sectors and what are the rates of change?

In many rural states like Vermont, there is a long history of public recreation access to private forestland. This implicit public use policy is severely undermined where rural land values are replaced by urban real estate values and the resulting smaller parcel sizes no longer physically or socially support extensive forms of outdoor recreation. A combination of rural in-migration, increased mobility, dispersion of the work force, the desire to live in quality environments, and different attitudes of nouveau rural residents towards public use of their property, results in reduced public access to NIPF now undergoing the fragmentation process.

Driscoll (1985) demonstrated that the frequency of extensive outdoor recreation activities allowed on private land, diminishes with smaller property sizes. One out of three landowners he studied, prohibited one or more forms of outdoor recreation on their property. Of these, 46% prohibited all forms of recreation. Twenty-nine percent of the landowners who denied access owned NIPF parcels in the 10 to 19 acre category. Contrary to this negative relationship between smaller property sizes and public recreation access, the study detected no landowners in the >500 acre category that prohibited public access. Further, landowners of >100 acre parcels reported 36% more public recreation use of their property than did owners of <100 acre parcels.

If smaller parcel size is directly related to a decrease in public access to private recreation resources, consider the impact of forest-land fragmentation in urban states like Connecticut, Massachusetts, Maryland, New Jersey, Rhode Island, and major portions of New York and Pennsylvania where NIPF parcels average 24 acres in size. The rural states of Maine, New Hampshire and Vermont average almost twice this NIPF parcel size (41 acres) but their average is also declining as they urbanize in several locations (Table 1). When a state urbanizes, average NIPF parcels decrease in size and public outdoor recreation becomes more and more restricted.

The reduction in private lands open to public outdoor recreation use is significant in the Northeast and continues to decline. At the end of World War II (1945), for example, Vermont farmland, regarded by many as a valuable outdoor recreation resource, was at a record high of 3.93 million acres. In 1987, less than half a century later, Vermont's farmland had declined 64% to 1.41 million acres (Table 2). Information

Table 1. Average NIPF parcel size in the Northeast Region.

State	NIPF parcel size (acres)
Connecticut	24
Maine	46
Massachusetts	23
Maryland	23
New Hampshire	36
New Jersey	23
New York	27
Pennsylvania	25
Rhode Island	23
Vermont	43
Urban states' average	24
Rural states' average	42

Table 2. Vermont land in farms (1940-1987).

Year	Millions of acres
1940	3.65
1945	3.93
1950	3.55
1954	3.00
1959	2.90
1964	2.46
1969	1.80
1974	1.64
1982	1.58
1987	1.41

on the current use of the abandoned 2.52 million acres is lacking. It is certain however, that the land use has changed on them and the question is, what impact has the transition had on Vermont's outdoor recreation resources?

Vermont has been cited by the Bureau of the Census as the most rural state in the Nation but is currently struggling with development problems and growth control. Other states in southern portions of the Northeast region have experienced rural land conversion problems for decades. If Vermont is experiencing rapid growth in several of its rural areas, what does the future hold for outdoor recreation survival on NIPF in the more urbanized sectors of the Region?

Another indicator of pending land use change involving Vermont NIPF is Armstrong's (1988) reporting of timberland prices for various parcel sizes sold between 1984 and 1988 (Table 3). Not only are the prices rising for Vermont timberland (77% from 1984 to 1988), but the average price for smaller lots (75-99 ac.) is $348 higher than for larger lots (>250 ac.). The average price per acre for Vermont timberland in the 75-99 acre category was $716 in 1988, up $317 (79%) from 1984. Clearly, as time advances and lot sizes decrease,

Table 3. Vermont timberland prices and number of parcels sold between 1984 and 1988.

Parcel Size	1984	1985	1986	1987	1988
75-99	$399	$541	$556	$658	$716
	(31)	(45)	(47)	(114)	(111)
100-249	337	377	392	509	572
	(60)	(79)	(198)	(240)	(232)
>250	201	241	304	296	368
	(22)	(14)	(48)	(32)	(53)

Numbers in parentheses indicate the number of parcels sold. Source: Armstrong 1988.

the price per acre of Vermont timberland increases.

When NIPF parcels decrease in size, values other than natural resource values begin to affect timberland fragmentation and commensurate price increase. The signals are now strong that public access to these outdoor recreation resources are in imminent danger of termination because the NIPF property is in metamorphosis between a natural resource and a commodity and has a high probability of becoming a personal consumption item for a new landowner who will use it for residential or commercial development purposes.

What will the 1990's Bring?

In the 1990's, not only will NIPF continue to be converted to other land uses, but with it, associated outdoor recreation will remain restricted in the face of a worsening national economy and still large national debt. About the only organizations that seem to have the selective financial ability to accomplish land acquisition are the private and quasi-public land conservancies and commonly they deal with land restrictions that prohibit many forms of public recreation.

The only long term answer to the loss of outdoor recreation resources has always been and will remain, the identification of high potential, private lands and their purchase for public use. Planning, zoning, subdivision and tax relief programs have been shown to be vulnerable to rapidly rising land values and have demonstrated their inability over time to hold private land open for public use. If the public desires outdoor recreation opportunities in their communities, they will have to pay for the lands that support them. How are these funds to be raised? -- By taxing the causative land use change agents that result in the loss of open space and its natural resources...the development industry that starts, as we have seen, with a willing buyer and seller and progresses to include the real estate broker and financial institutions. A portion of the tax money collected from these sources operating in rapidly developing Vermont communities, could be distributed to towns where valuable outdoor recreation lands have been identified but not yet threatened and used for land acquisition purposes.

The open space, that is provided by NIPF, is a dear commodity that becomes more dear as the Northeast Region continues to urbanize. The price of open space will continue to rise in the 1990's. How much of it the residents of the Northeast desire and can afford, is the question of the 1990 decade.

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AN OBSERVATIONAL STUDY OF THE SOCIAL AND BEHAVIORAL DIMENSIONS OF A PARK AREA

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The concept of recreation "place" is receiving attention in recreation resource management. One line of study emphasizes the social definition of places whereby locales are assigned meaning through actual use history and managerial directives. Most studies approach place through survey means. This study used unobtrusive observation in the form of checklist data to assess the social and behavioral dimensions of a leisure locale. Findings show that such an approach can be useful in describing the actual use history of leisure settings.

Introduction

"Place" or "setting" is a concept upon which much research in recreation resource management is focused as managers must ultimately deal with actual physical places in carrying out their responsibilities. It is recognized that the recreation "setting" represents the interplay of physical, social and managerial attributes (Driver, et.al., 1987). The social dimension of "setting" pertains to several interrelated issues such as invasion/succession; behavioral problems such as littering, theft and vandalism; subgroups of visitor populations with attendant variation in expectations, attitudes, and behavioral patterns; crowding and conflict issues within and between various user groups.

In addressing the issues noted above, much of the research work evolves around asking users how they feel about managerial actions, other user groups who use the activities at particular sites, and their motives and satisfactions associated with particular sites. However, many of the issues listed above are also very closely related to the actual use history of the "setting" pertaining to who uses the "place", what activities actually occur there, and how the users are responding to managerial activity in their day-to-day behavior at the site.

Moreover, the social and behavioral dimensions of "setting" influence actual and potential use. Recreation places are ascribed meaning through the social groups that share use of the park. These common meanings or schemes-of-order predispose rules of conduct which influence who uses the park, what activities occur there, and how the user groups will respond to managerial actions (Cheek, et.al., 1976). Such statements as "It's too crowded", "This is a family park", "We like the other campers", show the importance of the social dimension of "place" and its influence on actual and potential users. Similarly, designers and managers must assess the actual social and behavioral consequences of their developments and managerial approaches to discern how consequences compare with design/managerial objectives. Research endeavors that attempt to describe the social dimension of locales, i.e., who the users are, what do they do there, and what is the order of fluctuations in visitation, are needed in the field of recreation and parks (Burch, 1964). The administrator " . . . has more interest in description than in causality because his major problem is to know what is there so that he may act accordingly." (Burch, 1964, p. 3).

Objective and Methods

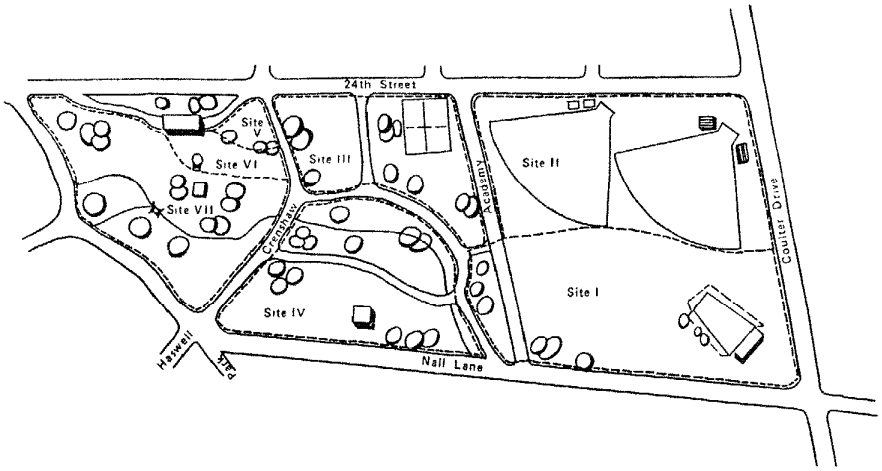
Objective

The objective of this study was a preliminary attempt to delineate selected variables associated with the social and behavioral dimension of a recreation locale. Specifically, this study assessed attendance patterns, activity patterns, age stratification, and gender use descriptions of a composite weekday's use of a recreation place. As this was an initial attempt by the observers to use unobtrusive observation to clarify the use history of a park, it was important to choose a park showing

Acknowledgement: Linda Frey, formerly a graduate student at Texas A&M University, helped with data collection for this study.

Figure 1.

HASWELL PARK



moderate to light use. Sue Haswell Park, in Bryan, Texas, was selected as an appropriate site for this exploratory study.

Selection of Observation Settings and Sampling Times

Seven observation settings were delineatedd by physical attributes and predominant activity at the park (See Figure 1). The settings that were selected permitted the observers to record all descriptors and behavioral units from one vantage point. A composite weekday based upon random selection of time frames and days of the week was compiled to dictate sampling times and days of the week when data were to be collected.

Instrumentation

The technique of unobtrusive observation was used to collect data in this study. The data were in the form of a checklist. For recording purposes, the data were limited to static descriptors and behaviors requiring a minimal amount of observer interpretation and maximal objectivity. In effect, the behavioral units observed were recorded almost instantaneously in predetermined categories. The observers recorded the predominant activity of each individual. Concurrent behaviors were not recorded. As such, reliability and validity were aided by the grossness of the descriptors and behavioral alternatives used. It is generally evident what a person's gender is, and it is relatively simple to discriminate between a person who is throwing a frisbee and one who is utilizing the wading pool. In other words, there exists fairly consistent vocabulary for discriminating such phenomena (Burch, 1964, p. 3). The only interpretation required of the observers was the discrimination of the descriptors and behavioral type for the individual or group. The observers collaborated on the discrimination of descriptors and behavioral alternatives. The static descriptors sampled were age, sex and ethnicity of the user. The behavioral alternatives utilized were adapted from Christiansen (1976). Examples of the instrument and the behavioral alternatives list are presented in Figure 2 and Figure 3.

Figure 2

Behavioral Alternatives

*Physical	*Social
1. Freeplay	8. Card Playing
2. Equipment a. Swing b. Slide c. Climb d. See Saw e. Merry-go-round	9. Conversation 10. Picnicking-Eating-Preparation
	*Cognitive
3. Jogging	11. Reading
4. Bicycling	12. Sitting-Spectator
5. Turfgames a. Badminton b. Croquet c. Frisbee d. Horseshoes e. Volleyball	13. Photography 14. Painting-sketching
	*Resource-Oriented
6. Court Games a. Basketball b. Tennis	15. Swimming 16. Wading
7. Field Games a. Baseball b. Football c. Softball d. Soccer	17. Walking (Strolling, Walking Child, Walking Dog, etc.)

* Categories adapted from Christianson (1976)

Figure

Sample ... Checklist SITE
Observation Form DATE & TIME

	SEX	RACE	AGE CLASS	GROUPING	ACTIVITY CODE OR DESCRIPTION
1.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER. WITH MORE THAN 1	
2.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER. WITH MORE THAN 1	
3.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER WITH MORE THAN 1	
4.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER. WITH MORE THAN 1	
5.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER WITH MORE THAN 1	
6.	M F	BL H-A OTHER	CH AD SR-CIT	ALONE WITH 1 PER WITH MORE THAN 1	

Data Collection

The procedures for actual recording of descriptors and behavioral units were adapted from those of Sears (1963) and Burch (1964). On the appropriate day and time frame, the observers entered the selected observation setting. The observers initially determined functional groups and individuals. Functional groups are defined as a collection of two or more persons involved in a similar activity where the participation of each member contributes and is essential to the prolongation of the activity. In instances of equipment use, a group was defined as all those using a piece of equipment at the time of recording. Under conditions where the discrimination of groups or individuals was difficult, the observers treated each user as an individual.

To guide the sequence of momentary observations, observations began at the far left corner of the observation setting and continued in a clockwise motion across the setting until all descriptors and behavioral units were recorded. Specifically, the observers looked at an individual just long enough to qualify the descriptors and decide what the individual was doing according to the predetermined activity typology.

Instructions for actual recording on the instrument are as follows (the reader should refer to the check-list, Figure 3.) The observer simply circles the appropriate descriptors and enters the appropriate behavioral alternatives in the respective column. For example, if the observer notices two individuals playing with a Frisbee and they appear to be white adult males, the observer goes to column (1) and circles "male", then to column (2) and circles "other", circles "AD" in column (3), checks "with one person" in column (4), and enters (5c) in the behavioral alternative column. Row number two would be similar to row number one and would represent the other individual involved in the activity of throwing Frisbee. To delineate the functional group, the observer places a vertical line in the behavioral alternatives column connecting the two individuals. This indicates that the two were involved in the activity. The observer repeats this process for all the individuals in the observation setting.

The observers proceeded to the next observation setting and repeated the process. All observation settings within the park were sampled in the two-hour sampling time frame at thirty minute time intervals. When data were collected for all randomly selected time frames and days, the composite day was compiled.

The data were analyzed to determine (1) the range of recreational activities in the park; (2) the attendance pattern for total use, age, and gender; and (3) the proportion of park users of different ages, ethnicities, and individual versus group activity. Because of space limitations, only selected parts of the findings will be discussed.

Findings and Discussion

Patterns of Attendance

Figure 4 shows the average pattern of attendance over one composite weekday. Attendance ranged from a low average of approximately 5 people in the morning hours, increased to the noon hours, tapered off between the hours of 1 p.m. and 3 p.m., and peaked at an average attendance of approximately 25 people from 4 p.m. to 6 p.m. After that time, attendance sharply declined.

When age is included in the analysis (See Figure 5), it shows that children were the most frequent visitors to the park for all time periods during the composite day. Frequency of attendance averaged approximately 2 children during the early morning hours, increased during the afternoon hours, peaked between

Figure 4.

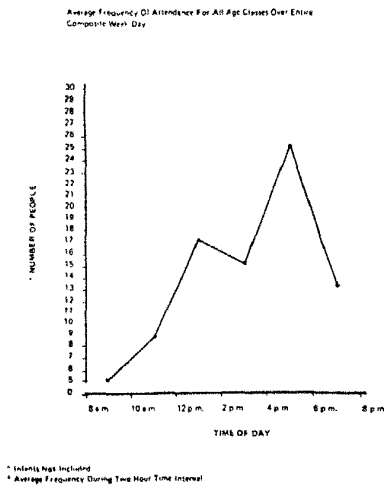
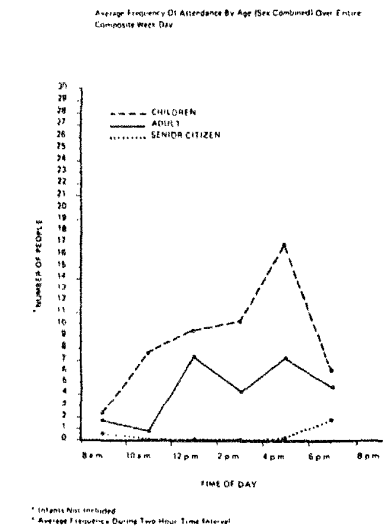


Figure 5.



the hours of 4 p.m. and 6 p.m., and then declined. Attendance patterns of adults in the park generally followed the average attendance pattern across all ages for the entire composite day. For adults, attendance peaked between the hours of 12 p.m. and 2 p.m., declined between 2 p.m. and 4 p.m., and then peaked again between the hours of 4 p.m. and 6 p.m. Attendance of the elderly was greatest in the early morning hours and evening hours. There were no elderly users in the park between the hours of 11:00 a.m. and 5:00 p.m.

Patterns of Activity

The data for the one-half hour time intervals were collectively analyzed in the two hour time frames. The analysis represents a profile of all recreational activities taking place at a particular time and at a particular observation setting throughout the composite weekday. The profile illustrates the frequency with which various recreational activities occur; the frequency with which they occur in different areas within the park; and age stratification, ethnicity, and functional grouping classifications of participants engaged in the activities.

Table 1 presents the proportion of all recreational activities over the entire composite weekday. Over all age classes and times, 26% of all activity is located in the physical recreation activity category, 13% is in the social recreation activity category, 30% of activity is in the cognitive recreation activity category, 27% is in the resource-oriented activity category, and 3% is located in the other activity category.

Located in the cognitive recreation activity category and representing the greatest proportion of all recreational activity during the composite day, the activity sitting-spectating represents 29% of activity. Within the resource-oriented activity category, the water activity wading is predominant, representing 16% of all activity during the composite day. In the physical recreation activity category, the low-organized activity swinging is the predominant activity. Swinging represents 11% of all activity during the composite day. The three aforementioned activities represent a total of 53% of all activity within the composite day. Adding to this table the percentages associated with the activity picnicking-eating-preparation and the activity walking, 74% of all activity during the composite weekday can be explained by these five activities.

By using the age classes in the analysis, predominant activities within age groupings can be discerned. The percentage breakdown of activity by children over the entire composite weekday will be the only age class discussed.

Table 1. Proportion of All Recreational Activities for All Age Classes and Times Combined Over the Entire Composite Weekday

Experience Category														
Physical			Social			Cognitive			Resource-Oriented			Other		
B.A.*	N**	%	B.A.	N	%	B.A.	N	%	B.A.	N	%	B.A.	N	%
1	(16)	4.88	9	(7)	2.13	11	(3)	0.91	15	(4)	1.23	Lying Down	(2)	0.61
2a	(35)	10.67	10	(36)	10.91	12	(95)	28.96	16	(54)	16.46	Standing	(7)	2.13
2b	(11)	3.35	-	-	-	14	(2)	0.61	17	(33)	10.06	-	-	-
2c	(8)	2.44	-	-	-	-	-	-	-	-	-	-	-	-
3	(1)	0.30	-	-	-	-	-	-	-	-	-	-	-	-
4	(5)	1.52	-	-	-	-	-	-	-	-	-	-	-	-
6b	(4)	1.23	-	-	-	-	-	-	-	-	-	-	-	-
7b	(2)	0.61	-	-	-	-	-	-	-	-	-	-	-	-
8	(3)	0.91	-	-	-	-	-	-	-	-	-	-	-	-
Totals	(85)	25.91%	-	(43)	13.10%	-	(100)	30.40%	-	(91)	27.75%	-	(9)	2.74%

*B.A.-Behavioral Alternative

**N-Frequency

Table 2. Proportion of All Recreation Activity for Children Over the Entire Composite Weekday

Experience Category														
Physical			Social			Cognitive			Resource-Oriented			Other		
B.A.*	N**	%	B.A.	N	%	B.A.	N	%	B.A.	N	%	B.A.	N	%
1	(16)	7.51	10	(10)	4.70	12	(37)	17.40	16	(54)	25.30	Lying Down	(1)	0.47
2a	(33)	15.50	-	-	-	-	-	-	17	(26)	12.20	Standing	(3)	1.41
2b	(11)	5.20	-	-	-	-	-	-	-	-	-	-	-	-
2c	(8)	3.75	-	-	-	-	-	-	-	-	-	-	-	-
4	(7)	3.28	-	-	-	-	-	-	-	-	-	-	-	-
6b	(2)	0.94	-	-	-	-	-	-	-	-	-	-	-	-
7b	(2)	0.94	-	-	-	-	-	-	-	-	-	-	-	-
8	(3)	1.41	-	-	-	-	-	-	-	-	-	-	-	-
Totals	(82)	38.33%	-	(10)	4.70%	-	(37)	17.40%	-	(80)	37.50%	-	(4)	1.88%

*B.A.-Behavioral Alternative

**N-Frequency

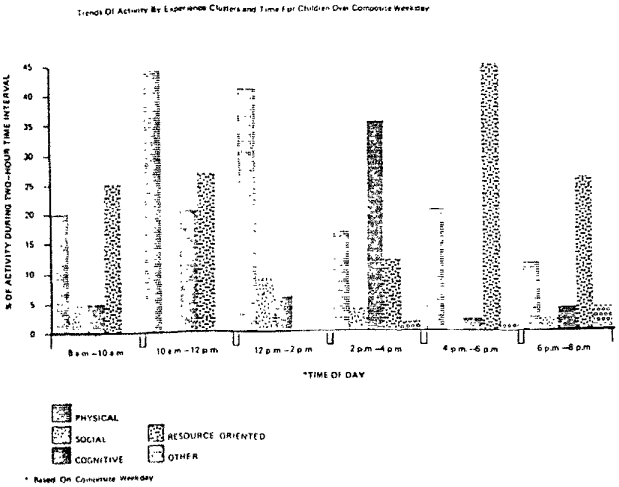
Typology of experience categories and activity clusters adapted from Christiansen (1976).

Within the child classification (Table 2), the physical experience category is predominant. The activities swinging and freeplay account for 23% of all activity in this category. The second most prevalent category is resource-oriented activities; wading is the most predominant activity in the category, accounting for 25% of the activity. Wading is also the most predominant activity across all categories. Two additional activities, sitting-spectating (cognitive) and walking (resource-oriented) account for 30% of all activity in this age classification. Thus, the five activities--wading, swinging, freeplay, sitting-spectating and walking, account for approximately 78% of all child activity.

Utilizing the time variable in the analysis, it is possible to discern trends of activity by time and age classification. The child age class will be the only class presented.

During the time period, 8 a.m. to 10 a.m., the resource-oriented activities cluster is the most dominant in the child age classification (Figure 6). The physical recreation activities cluster is the second most prevalent. Individual activities within the physical recreation cluster and representing the greatest percentage of the cluster are tennis and football. Wading was the most prevalent activity in the resource-oriented activities cluster. During the time period 10 a.m. to 12 p.m.,

Figure 6.



the physical recreation activities cluster becomes dominant. Sliding and swinging were the prevalent activities in the cluster. The second most prevalent cluster is the resource-oriented cluster; wading and walking are the predominant activities. From 12 p.m. to 2 p.m., the physical recreation activities cluster is again dominant. The activities, swinging, freeplay, and climbing the jungle gym are predominant in the cluster. The social activities cluster is second in the rank order with picnicking-eating-preparation the predominant activity. Between 2 p.m. and 4 p.m., the cognitive activities cluster is dominant; however, the resource-oriented activities cluster dominates all other clusters from 4 p.m. until 8 p.m. From 2 p.m. to 4 p.m., sitting-spectating is the prevalent activity. Wading and walking are the dominant resource-oriented activities from 4 p.m. to 8 p.m.

These findings suggest a sequential pattern of use by children. During the morning hours, the park is generally utilized for physical types of activities. By mid-afternoon, the cognitive recreation activities are the most popular. Within the remainder of the afternoon and evening hours, resource-oriented activities become dominant.

Conclusions

The approach and partial presentation of findings of this exploratory study show the potential applicability of using unobtrusive observation in the form of checklist data to explore actual use history of park and resource areas. Using the checklist approach by visual or other electronic means may help managers address some of these issues: who is using their resource, what recreation activities are prevalent, how do changes in users and activities occur over a typical day's use, how do users respond to design alternatives and managerial activities.

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RURAL RESIDENT VALUES AND ATTITUDES TOWARD TOURISM

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Demographic and economic change are becoming commonplace in rural New England. Many rural communities are experiencing increased economic and social stress as agriculture declines in importance as a source of income and as restructuring occurs (e.g., light industry moves out of rural areas) in the manufacturing sector (Murdock et al. 1987). Communities which were formerly identified with agriculture and other extractive industries now embrace the promotion of tourism to bolster eroding economies (Allen, Long, Perdue, and Kieselbach 1988). Tourism is espoused as a new source of local employment, revenues for local business, taxes for government, and an enhanced culture.

Tourism benefits are often nullified by negative impacts. Crime, congestion, price increases, disruption of traditional social structures, and displacement of community values have emerged as new sources of stress on the community. As a result, residents in some rural areas have expressed resentment toward tourism and accompanying growth. Because interactions residents have with tourists are critical to tourism development, resident perceptions of the impacts of tourism on community life should be continually assessed (Allen et al. 1988).

Past studies have examined the consequences of tourism for the host community (Pizam 1978, Rothman 1978), attitudes toward tourism by local residents (Brougham and Butler 1980, Ahmed 1986, Liu and Var 1986), and addressed the relationship between the degree/stage of development of tourism and resident attitudes (Getz 1983, Allen, et. al. 1988). Some of these studies have specifically recognized the importance of keeping in touch with the host community resident's attitudes and perceptions because of their impact on the tolerance for tourism activity (Allen, et. al. 1988). Few studies, however, have attempted to examine the antecedents to such resident's attitudes and perceptions—values.

Values are central to belief systems. They are the basis for formulating evaluative beliefs and linkages between beliefs. Unlike attitudes, values transcend objects , holding constant over many situations and objects (Heberlein 1981). An important contribution to the conceptualization of values was provided by Milton Rokeach (1973). Rokeach (1973), defines a value as "... an enduring belief that a specific mode of conduct is personally or socially preferable to an opposite or converse mode of conduct or end state of existence." He conceptualized that individuals have value systems organized around preferred modes of conduct (called instrumental values), and end-states of existence (called terminal values). Moreover, patterns of values may be inferred by ranking values independently. Through research conducted in the 1960's and early 1970's, Rokeach identified 18 terminal values and 18 instrumental values (see Table 1), which he believed were universal accross individuals, cultural groups, and subcultures. By organizing (i.e., ranking) each set of values, an individual reflects his/her internalized system of values. Similarity in value systems between two or more individuals may be measured by a correlation (rho) of their rank orderings of the values (Rokeach 1971). This congruency has been extended beyond just the realm of values. Researchers have noted that individuals with similar values exhibit similar attitudes and behavior (Rokeach 1973; Pitts and Woodside 1986). Values, thus, are conceptualized as the basic component of cultural structure of individuals and communities; underlying perceptions, beliefs, attitudes, and behavior (Bates and Harvey 1975 ; Solan 1981). An assessment of residents' values, then, may provide a better blueprint for understanding the community, residents' perceptions, and their interactions with tourists.

Table 1: Rokeach Terminal and Instrumental Values

Terminal Values	Instrumental Values
A Comfortable Life	Ambitious
An Exciting Life	Broadminded
A Sense of Accomplishment	Capable
A World at Peace	Clean
A World of Beauty	Courageous
Equality	Forgiving
Family Security	Helpful
Freedom	Honest
Health	Imaginative
Inner Harmony	Independent
Mature Love	Intellectual
National security	Logical
Pleasure	Loving
Salvation	Loyal
Self-respect	Obedient
Social recognition	Polite
True Friendship	Responsible
Wisdom	Sef-controlled

Methods

The purpose of this study was to explore the relationship between resident's value patterns and their attitudes toward tourism and growth and development. Secondarily, the study examined differences in community value patterns between apriori defined types of communities (Bevins and Zwick 1989).

Subjects

Data was collected from a mail survey of a stratified random sample of resident households in the Northeast Kingdom region of Vermont. A non-duplicative sampling frame was constructed for each community from the Grand List (i.e., tax roles) and voter registration list. The sampling process used communities stratified by type under a method developed by Bevins and Zwick (1989); then a random sample of communities was picked

from each type. The sample of resident households was randomly selected from each selected community, proportional to the number of households in the community in relation to the total population. An initial survey was mailed to a sample of 606 households and two follow-up reminders were sent. A total of 240 useable responses were received, thirty-six surveys were returned as undeliverable, and eleven surveys were unuseable. Costs of the standardized survey instrument precluded sending a second survey instrument to all non respondents, however as a check on non respondent bias, 100 of the non respondents from the survey were mailed a follow-up survey. The 28 respondents from the follow-up survey did not differ in any appreciable way from the initial respondents on any of the variables under investigation.

Instrumentation

The survey instrument consisted of the Rokeach Value Survey (Rokeach 1973), an attitude survey, and demographic questionnaire. The Rokeach Value Survey consists of two lists of 18 values to be ranked in order of importance to the respondent. The survey has a median reliability that ranges between .78 and .80 for terminal values and .70 to .72 for instrumental values (Rokeach 1979). Others (Homant 1967, Brown 1976, Feather and Peay 1976) have verified the content validity of the survey and cross-validated the values it measures. Form D of the value survey was used in this study. This particular form uses gummed labels, allowing the respondent to arrange the values in a hierarchial pattern without having to physically write a value rank next to the value. Following a procedure used by Pitts and Woodside (1986), the value ranks were rescaled with a normal (z) transformation for analysis with parametric statistical techniques. Because terminal values are more stable and have been found to be more reflective of personal orientations (Park 1971), only terminal values were used in the analysis.

The attitude scale examined resident attitude toward tourism and growth and development in their communities. Seventeen statements about growth and development impacts were developed; respondents were asked to evaluate for each statement whether growth was having a "positive effect," "negative effect," or "neither positive or negative effect." By aggregating over the seventeen statements, an "attitude toward growth and development" score was calculated and used in the subsequent analysis. An "attitude toward tourism" score for each respondent was determined by aggregating over twelve statements assessing their degree of agreement with specified tourism impacts on their respective communities. Subjects were asked to rate their agreement with each impact on a five-point scale ranging from "strongly agree," to "strongly disagree."

A demographic questionnaire was constructed to obtain socioeconomic information about the respondent and household information which could be used in subsequent analyses. All three parts of the survey instrument were pretested. The attitude and demographic portions subsequently were refined before being mailed to the sample.

Analysis and Results

Because of the exploratory nature of the research, two questions were developed to guide the study: 1) Are resident attitudes toward tourism and growth and development related to patterns of personal values? and 2) Do communities manifest distinctive terminal value patterns?

Correlational (rho) analysis was used to explore the relationship between resident terminal value patterns and attitudes toward tourism and growth and development. The results from the Spearman correlation matrix revealed a significant relationship between the terminal values: "A comfortable life," "An exciting life," "A world at peace," "Equality," and "Wisdom," and respondent attitude toward tourism score. See Table 2. Respondents who ranked "Equality," " A world at peace," and "Wisdom," high in their value patterns generally had a more favorable attitude toward tourism. There was an inverse relationship between the values "A comfortable life," and "An exciting life," and respondent attitude toward tourism. The values "Equality," and "Wisdom" were directly related to residents' attitude toward growth and development. An inverse relation was found between respondents' attitudes toward growth and development and the values: "A comfortable life," "A sense of accomplishment," "Health," and "Social recognition."

To further explore the relationship between values and attitude toward tourism and growth, multiple regression analyses were conducted using the rescaled (z transformations) value rankings. The aggregate attitude toward tourism score was regressed on the value scale scores for "A comfortable life," "An exciting life," "A world at peace," "Equality," and "Wisdom." Although the relationship was significant ($F = 3.645$, $p < .001$), only 7 percent of the variance was explained. Similarily, a regression of attitude toward growth and development on the values: "Equality," "Wisdom," "A comfortable life," "A sense of accomplishment," "Health," and "Social recognition," was significant ($F = 2.86$, $p < .01$), but again only explained 7 percent of the variance. This exploratory analysis appears to support that resident attitudes toward tourism, growth and development are related to values of residents, but the strength of that relationship is only marginal in this study.

In order to explore whether communities have differing terminal value patterns, mean value rankings were computed for each of the six types of selected communities and for the Northeast Kingdom region. Value hierarchies for all six communities and the region were remarkably similar (see Table 3). The values "Health," Family security," and "Freedom," were consistently ranked in the top four values for all communities. At the lower end of the rankings, the values "Exciting life," "Pleasure," and "social recognition were consistently ranked in the bottom four positions. An interpretation of these rankings indicates that Northeast Kingdom residents display a *personal security* orientation in their values versus a *self-fulfillment* concern. Of particular significance to researchers is the stability inherent in the rankings for the value—"A world of beauty." Numerous studies have found this value to be highly correlated with environmental attitudes and consistently ranked in the 13th or 14th position in value hierarchies. The consistency of the position ranking of the value "A world of beauty," is also evident in this study.

A nonparametric version of analysis of variance (i.e., Kruskal-Wallis) was used to test whether the communities differed in their value hierarchies. Nonparametric techniques had to be used because the unit of investigation was the community rather than the individual resident. The analysis revealed a generally stable pattern of value rankings across all communities, except for the values "Family security," and "Pleasure." The apriori defined recreation community (Bevins and Zwick 1989) was differentiated from the other communities on the value "Family security"; the recreation community respondents' mean rank on "Family security," was significantly ($p < .025$) lower (see Table 4). The apriori defined agricultural community (Community 2) was significantly differentiated ($p < .05$) from the more urban community (Community 6) on the value "Pleasure." Resident respondents from the agricultural community had a significantly lower mean rank on "Pleasure." See Table 4.

Table 2: 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	-0.121	p=.029*	-0.188	p=.002**
An Exciting Life	-0.162	p=.007**	0.046	p=.245
A Sense of Accomplishment	-0.105	p=.057	-0.11	p=.048*
A World at Peace	0.131	p=.023*	0.041	p=.268
A World of Beauty	0.059	p=.189	0.044	p=.251
Equality	0.164	p=.005**	0.192	p=.002**
Family Security	0.033	p=.308	-0.012	p=.428
Freedom	0.031	p=.315	0.066	p=.156
Health	-0.107	p=.053	-0.112	p=.044*
Inner Harmony	0.007	p=.456	-0.008	p=.453
Mature Love	-0.102	p=.061	-0.06	p=.182
National Security	0.094	p=.078	-0.051	p=.222
Pleasure	-0.073	p=.131	-0.061	p=.182
Salvation	0.055	p=.200	0.108	p=.052
Self-respect	0.024	p=.359	0.045	p=.281
Social recognition	-0.013	p=.425	-0.126	p=.028*
True Friendship	-0.007	p=.460	0.041	p=.268
Wisdom	0.122	p=.033*	0.187	p=.002**

* Significant at alpha ≤ .05
** Significant at alpha ≤ .01

Discussion and Implications

The study findings indicate a relatively stable pattern of values for the Northeast Kingdom residents; consistent with stability of attitude patterns and political orientations of the region found in other surveys. Values were shown to have a marginal but statistically significant relationship to attitudes toward tourism and attitudes toward growth and development. Examination of these relationships revealed those residents with a more altruistic or societal value pattern (i.e., respondents who ranked "Equality," " A world at peace," and "Wisdom," high in their value patterns) favored tourism more than residents who rated "A comfortable life," and "An exciting life," as primary values. The concept of a "comfortable and exciting life" may be inversely related to a favorable attitude toward tourism because of residents wanting to maintain their communities at a normative level. Perhaps tourism is viewed as creating an "uncomfortable" community atmosphere.

While the Northeast Kingdom region's population is not homogeneous, community value patterns (i,e,. hierarchies) depict a general consistency in values. Differences, howeve were found in the recreation type community, whose residen ranked "Family security," significantly lower. Because thes communities have a high level of second home ownership (i sixty-two percent), and are recreation oriented, family atmosphere may be less important to the residents. The differentiation of the agricultural community (Community 2 from the more urbanized type of community Community 6) their rankings of the value "Pleasure," may confirm populist suspicions--rural residents are less hedonistic than those "bi city folks." The relative consistency of community values o the relatively rural isolated region under study is not surprisi The region is only recently being discovered for permanent residence by out-of-staters; development pressure has been lacking in comparison to other regions in the state. The population of the region, thus, may be relatively more

Table 3: Community Value Patterns of the Northeast Kingdom Region

Northeast Kinngdom	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6
Health	Freedom	Health	Family Security	Health	Health	Health
Family Security	Family Security	Family Security	Health	Family Security	Freedom	Family Security
Freedom	Health	Freedom	A Sense of Accomplishment	Freedom	Family Security	Freedom
Sef-respect	A World at Peace	Self-respect	Freedom	Self-respect	Self-respect	Self-respect
A World at Peace	Self-respect	A Sense of Accomplishment	A World at Peace	A World at Peace	A World at Peace	A World at Peace
A Sense of Accomplishment	Wisdom	Equality*	Self-respect	Inner Harmony	A Sense of Accomplishment	A Sense of Accomplishmen
Wisdom	A Sense of Accomplishment	Wisdom*	A Comfortable Life	Wisdom	Wisdom	Wisdom
True Friendship	Equality	A World at Peace	Mature love	A Sense of Accomplishment	Equality	True Friendship
Inner Harmony	True Friendship	True Friendship	True Friendship	True Friendship	True Friendship	Wisdom
Equality	Inner harmony	A World of Beauty	National security	Mature Love	Inner Harmony	Inner Harmony
A Comfortable Life	A Comfortable Life	Inner Harmony	Inner Harmony	A Comfortable Life	National security	Equality
Mature Love	A World of Beauty	Mature Love	Wisdom	Equality	A Comfortable Life*	National Securit
National Security	Mature Love	A Comfortable Life	Equality	A World of Beauty	A World of Beauty*	Mature Love
A World of Beauty	National Security	National Security	A World of Beauty	National Security	Mature Love	A World of Beauty
Salvation	Pleasure	Salvation	Salvation	An exciting Life	An exciting Life*	Pleasure
Pleasure	An exciting Life	An exciting Life	Pleasure	Pleasure	Salvation*	Salvation
An exciting Life	Salvation	Social Recognition	An exciting Life	Salvation	Pleasure	An exciting Life
Social Recognition	Social Recognition	Pleasure	Social Recognition	Social Recognition	Social Recognition	Social Recognition

Table 4: Community Mean ($\bar{x}$) Value Rankings for the Values "Family Security," and "Pleasure."

Value	Community 1	Community 2	Community 3	Community 4
Family Security	5.000	4.687	3.071	4.267
Pleasure	13.029	14.276	13.071	12.667

Value	Community 5	Community 6	Northeast Kingdom
Family Security	6.933	3.900	4.420
Pleasure	13.267	12.169	12.921

homogeneous in values because it is isolated. Communities of the region may not have experienced an influx of permanent residents who bring differing values to the communities of the region.

Results of the research may have implications for broader understanding of the central beliefs which pilot an resident's attitude toward tourism. Because beliefs are a part of the cultural/cognitive structure of the individual, such beliefs may be modified through education strategies. An examination of community value patterns also could have practical utility for tourism planners and developers in understanding motives of residents who are opposed to development. Often the lack of support for projects is viewed as a clash of values, yet little empirical information exists about the values of those who manifest an opposition attitude. In such situations, tourism planners may wish to emphasize basic values in which there is congruence with rural resident values. The research has shown that it is possible to discern existing value patterns among groups within a community, and a common value pattern that residents may share. Likewise, it is possible to measure changes in values (Rokeach 1979). The examination of long term changes in values (e.g., through longitudinal studies), thus, could provide a clearer understanding of the change in the cultural structure of communities that result from demographic and socioeconomic expansion related to tourism growth.

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COMMUNITY TYPOLOGY MODEL

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When Vermont was admitted into the Union two hundred years ago, the economy was monolithic—there was farming and forestry. Today, based on a community typology model, Vermont communities can be systematically classified into eight cluster types--each with a different set of needs, problems, and opportunities. Future planning efforts must not treat unlike communities as if they were similar. Wise planning will recognize community differences.

Introduction

As Vermont prepares for its Bicentennial birthday in 1991, it is appropriate to look back at development in the state. Vermont has always been a very rural state and it wasn't until 1980 that the Burlington area was classified as an MSA (Metropolitan Statistical Area). The types of communities that are found in the Burlington (Chittenden County) region are much different than communities located in more remote locations of the state. However, one cannot say that all rural communities are alike. Some rural communities have a strong agricultural base, others a strong recreational base, still others have neither agriculture or recreation.

Development of the Community Typology Model

Recognizing community differences and the need for a systematic classification system, Bevins and Zwick completed a cluster analysis of Vermont communities in 1985-86 (Bevins 1988). Twenty-one variables describing the economics, demographics, and natural resource base of Vermont were tested. The list of variables was narrowed to 10 that could be used as surrogates for density, capacity, and growth. However, data collection with 10 variables can be a time-consuming task. A need was seen to develop a classification system that used fewer variables.

A typology model was developed based upon findings of the earlier cluster analysis model. The new model incorporated only two variables: (1) property values disaggregated into class of property and (2) density of population relative to land area.

Rather than using the SAS cluster analysis computer program that we had used in 1985, we simply entered property values and population density into a SuperCalc 5 spreadsheet and used the data management option to perform boolean extractions of data sets. The selection criteria used are shown in Table 1. This procedure was mutually exclusive—no community could fall into more than one category. Three percent of Vermont communities did not fit the model--unique local circumstances prevented them from falling into any of the eight predetermined types.

Table 1. Community typology selection criteria.

Community type	Population density	Value of property in class			
		Residential	Commercial	Vacation	Farm
Residential commercial center	Top 25	Top third	Top third	Not top third	NA
Residential limited commercial	Top third	Top third	Top third	Not top third	NA
Residential noncommercial	Top third	Top third	Not top third	Not top third	NA
Residential rural	Middle third	Not top third	NA	Not top third	Not top third
Recreation commercial	NA[a]	NA	Top third	Top third	NA
Recreation noncommercial	NA	NA	Not top third	Top third	NA
Agricultural	NA	Not top third	Not top third	Not top third	Top third
Lowest population density	Bottom third	Not top third	NA	Not top third	Not top third

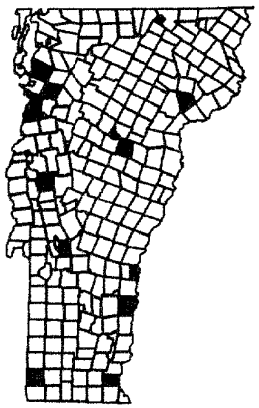
[a] NA = Not considered in the evaluation.

Using Atlas Graphics, the community typology results were plotted on a map in an attempt to identify geographic regional clusters. The eight maps are shown in Figure 1. From this graphic analysis, the following conclusions can be made. Residential commercial centers are primarily the cities and larger villages of the state. The greatest concentration is found in Chittenden County. Twenty towns fall into this classification--8% of all towns.

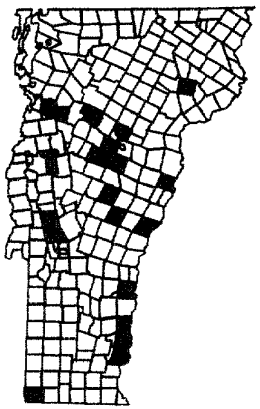
An equal number of communities fell into the residential limited commercial category. These communities had the same amenities as the residential commercial centers but were not quite as densely populated.

Figure 1.--Vermont's eight community types, 1987.

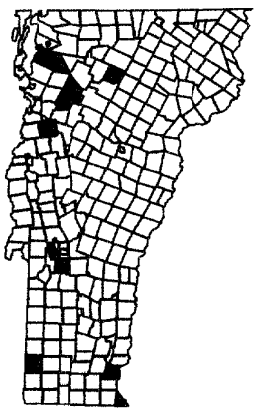
RESIDENTIAL COMMERCIAL CENTERS



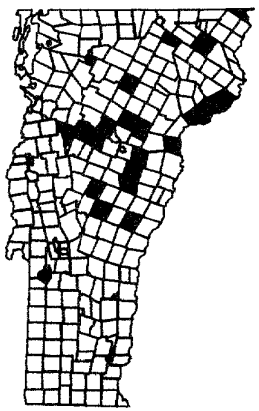
RESIDENTIAL LIMITED COMMERCIAL



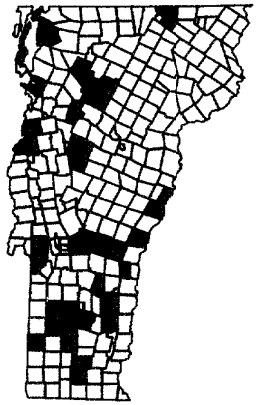
RESIDENTIAL NONCOMMERCIAL



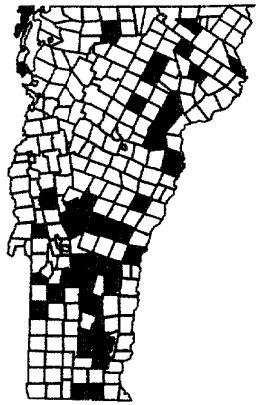
RESIDENTIAL RURAL



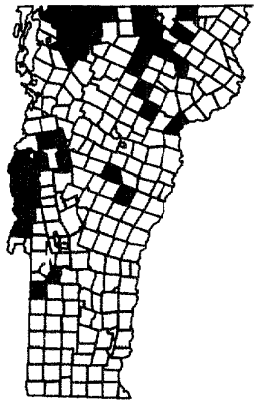
RECREATIONAL COMMERCIAL



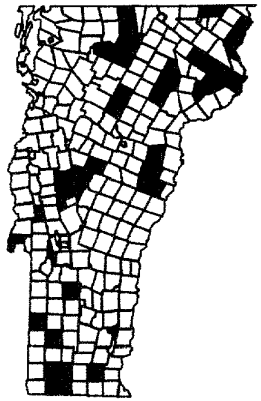
RECREATIONAL NONCOMMERCIAL



AGRICULTURAL



LOWEST POPULATION DENSITY



Eleven more towns fell into the residential category, but had very little commercial property—these were labeled residential noncommercial. For the most part, these communities were located adjacent to other residential towns with commercial development.

Twenty-five sparsely populated remote communities with relatively little development were classified as residential rural. Geographically, the communities were well dispersed, with minor concentrations in central and northeastern Vermont.

The recreational communities fell into two classes—those with commercial development and those without. The former group was labeled recreational commercial, the latter group recreational noncommercial. Combined, these two groups account for about one-third of all Vermont towns. The recreational commercial group were primarily located adjacent to the larger ski resorts, while the noncommercial group were located adjacent to larger water bodies or one or more towns removed from ski areas.

The seventh group represents farming communities and were labeled agricultural. As one would expect, these towns were primarily in Addison, Franklin, and Orleans Counties. Thirty-nine towns (16% of the state) fell into this classification.

The eighth group were simply called lowest population density communities—they were in the bottom third of the state in terms of population density, and had no other type of development. Many of these towns were primarily forested. Forty-two towns (17%) fell into this group. There were concentrations in northeastern Vermont and in the rugged mountainous areas of south and central Vermont.

In terms of residential property value, 36% of the state total is in residential commercial centers—yet these represent only 8% of Vermont communities (Table 2). In like manner, 53% of all commercial property value is found in these 20 communities. The second greatest concentration of commercial properties was in the recreational commercial group, where 29% of the value was found. These two groups, repreesenting 23% of Vermont communities, contain 82% of the value of all commercial property.

The two recreational groups, representing about one-third of Vermont towns, contain 85% of the value of all second home properties. The other six types of communities each had less than 5% of total second home value.

The agricultural communities (16% of the state) contain 38% of the total farm value in Vermont. Seventeen percent of total farm value is in the recreational commercial communities and 12% in the recreational noncommercial group.

Several measures of economic activity were related to community type (Table 3). More than three-fifths of all retail sales in Fiscal Year 1988 (July 1987-June 1988) were made in the residential commercial centers. An additional 19% of retail sales were made in communities classified as recreational commercial. These two community types were responsible for 84% of all meals and rooms revenue in the same state fiscal period.

In Vermont there has been a great deal of discussion about the impact that development has had on open land. About one-third of all open land sales that were made in the first 10 months of 1988 took place in recreational commercial communities (Table 3). Another 16% were made in recreational noncommercial towns.

Table 2. Percent of total state value represented by each community type.

Community type	Towns	Property classification			
		Residential	Commercial	Second home	Farm
	- - - - % of state total found in each community type, 1987 - - - -				
Residential commercial center	8	36	53	1	7
Residential limited commercial	8	12	9	2	9
Residential noncommercial	4	6	1	1	6
Residential rural	10	4	1	3	5
Recreational commercial	15	22	29	64	17
Recreational noncommercial	19	9	3	21	12
Agricultural	16	6	2	4	38
Lowest population density	17	3	1	4	4
Unclassified	3	2	1	0	2
Total state	100	100	100	100	100

Table 3. Comparison of community types on economic activity.

Community type	Towns	Economic activity measurement: Total retail sales FY 1988	Rooms/meals sales FY 1988	All open land sales (10 mos. 1988)	All open land sales (10 mos. 1988)
	- % of state total found in each community type, 1987 -				Price/acre
Residential commercial center	8	62	44	14	$6,210
Residential limited commercial	8	10	7	12	2,156
Residential noncommercial	4	2	1	5	2,754
Residential rural	10	1	1	6	801
Recreational commercial	15	19	40	32	4,035
Recreational noncommercial	19	3	4	16	1,247
Agricultural	16	2	2	10	784
Lowest population density	17	1	1	5	878
Total state	97[a]	100	100	100	$1,535

[a] Three percent did not fit model (unclassified).

The price per acre of open land sold in 1988 was highest in residential commercial centers—$6,210 per acre. Land prices were relatively high in all of the residential type communities—primarily because of small lot sizes. The second highest priced sales were in recreational commercial communities—$4,035 per acre. Open land sales in agricultural communities represented only 10% of the total and price per acre averaged just $784 per acre—about half of the state average of $1,535 per acre.

Personal income reported in 1986 was above average in all types of communities except agricultural and lowest population density communities (Table 4). Income was highest in the residential noncommercial communities (these areas tend to include high value housing and exclude many types of commercial activity, possibly by choice).

Table 4. Community types, personal income, and property taxes.

Community type	Towns	Income index, 1986	Residential property tax index, 1987	Residential tax burden
	%	- - - - Median = 100 - - - -		Tax ÷ income
Residential commercial center	8	110	126	115
Residential limited commercial	8	111	110	99
Residential noncommercial	4	126	109	87
Residential rural	10	105	107	102
Recreational commercial	15	108	77	71
Recreational noncommercial	19	101	85	84
Agricultural	16	92	106	115
Lowest population density	17	93	91	98
Total state	97[a]	100	100	100

[a] Three percent did not fit model (unclassified).

Residential property taxes were highest in residential commercial centers, a factor associated with higher community service demands. All residential community types had a higher tax index than all others except agricultural towns. The lowest population density communities had low residential property taxes—few people asking for few services. The two recreational community types had, by far, the lowest residential property taxes--this was related to the large amount of nonresident property ownership and little burden on the school system.

Residential tax burden is calculated by dividing the tax index by the income index and multiplying by loo. Residents of residential commercial centers and agricultural communities are feeling the burden of property taxation more than residents of other communities. Advocates of tax revenue sharing point to this disparity; however, tax

revenue sharing is not appropriate until service quality and delivery is the same for communities that would share such resources.

Community Typology Change Over Time

To measure how much change takes place in community type over time, the exact same procedures were applied to 1970 population density and property values. The change in the composition of the two recreational community types is shown in Figure 2. Each community that moved into, or out of, a recreational type is described on the map, along with the factors associated with the shift.

While there were some changes into and out of specific community types, there were no drastic shifts in the 17-year period. Permanent shifts take place gradually. This is fortunate, as it lets communities plan for a new economic or social environment gradually. When planning is done on a gradual basis, there are fewer errors made in the planning process.

Conclusions

Sound long-range planning for a community requires a clear understanding of where the community has been and where it is going. It has been the objective of this project to clarify that understanding. The development of a typology model that successfully employs only two variables (property values and population density) is a significant breakthrough in community analysis.

Communities with similar characteristics need guidelines appropriate for that community type. Communities with different characteristics need a different set of operating guidelines. A uniform state mandated policy for all communities may be appropriate for only a fraction of those communities. We have the tools to analytically classify communities in an objective manner. Let's use these tools to help plan for the future. By doing so, the individual towns, and the state as a whole, will be a better place to live.

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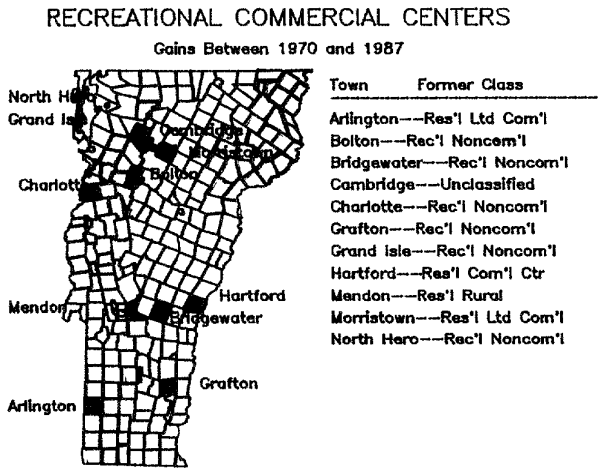
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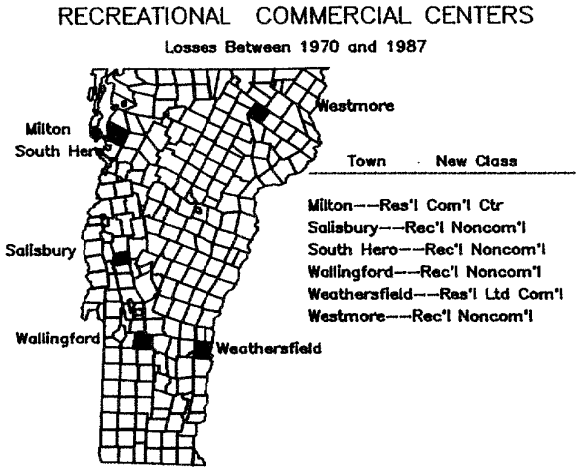
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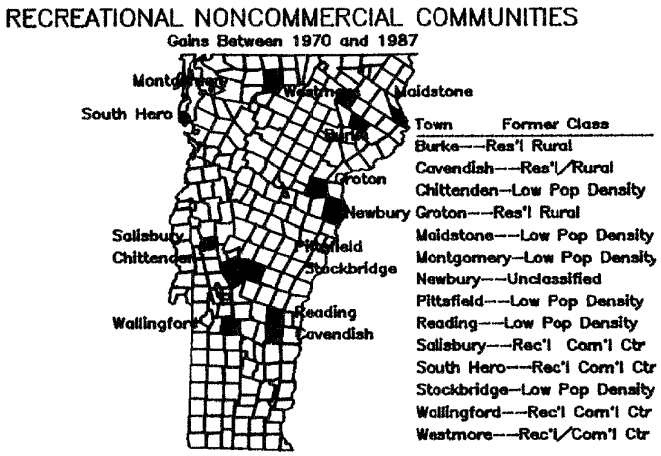
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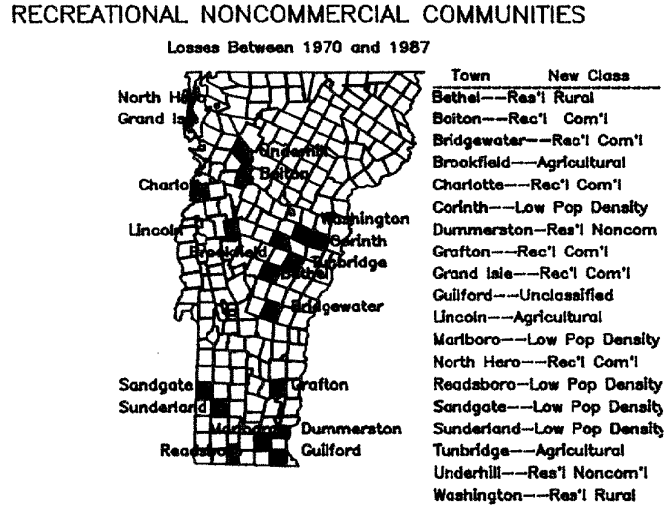
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Figure 2.--Recreational community gains and losses experienced between 1970 and 1987.









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Economic Impacts Associated With Whitewater Boating on the Upper Youghiogheny River

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This paper describes the economic impact of whitewater boaters using the Upper Youghiogheny River. Although the economic impact was not large when compared with other outdoor recreation activities, nearly all monies brought into the local area were new monies that would not have been generated otherwise.

Introduction

To date, little information exists to characterize the recreational use of the Upper Youghiogheny River and the impacts resulting from this use. The information reported in this paper was part of a larger study designed to generate data that would allow the Maryland Department of Natural Resources to create a management plan for the river corridor that encompasses the Upper Youghiogheny River. Study objectives, besides determining the economic impact of the river users, included 1) to identify hydrological characteristics of the river, 2) to examine existing and potential recreational uses of the river corridor, 3) to assess the resources available to respond to emergency situations, 4) to identify the optimum carrying capacity of the river section, and 5) to evaluate various management alternatives of the recreational activities within the river corridor.

The study section of the Upper Youghiogheny River is approximately 8.5 miles long and runs from the Sang Run Bridge to the town of Friendsville in Garrett County in Western Maryland. The river section is considered one of the premier whitewater rivers in the eastern United States and contains numerous closely-spaced class IV and class V rapids. During 1988, it was estimated that 6,400 rafters and 3,600 kayakers ran this river section which has been designated as a wild and scenic river under the Maryland Scenic and Wild Rivers Act. All the kayakers are advanced boaters and nearly all the rafters have had whitewater experience on other rivers.

Whitewater boaters using the Upper Youghiogheny River have an economic impact on both the local county and the state of Maryland. In addition to the dollars paid directly to the local rafting companies, boaters may spend money on lodging, food and beverages, entertainment, and auto-related items. While in the area, the boaters may also spend money in other local retail establishments for various items, such as souvenirs, boating equipment, and clothing. Money is also pumped into the local economy by the outfitters, who conduct trips down the Upper Yough. These expenditures may be for local labor (raft guides), meals for customers, supplies, or local services (insurance, legal fees, etc.).

This paper presents an assessment of the economic benefits associated with whitewater boating on the Upper Youghiogheny River during 1988.

Methodology

A sample of whitewater boaters were surveyed both before and after they had run the portion of the Upper Youghiogheny River between the Sang Run bridge and the town of Friendsville, Maryland. These individuals were then asked to take part in a more extensive questionnaire that would be sent to them. One section of this follow-up questionnaire dealt with the expenditures that these individuals had made during their trip to the Upper Youghiogheny River. Each respondent was asked how much he or she had spent on goods and services in various expenditure categories and where the expenditures had taken place, i.e., within Garrett County, somewhere else in Maryland, or outside of the state of Maryland. If the individual shared expenses with another individual, then the expenditures were to be divided by the number of individuals in that group. For example, if two individuals shared a room, the respondent was asked to list only half of the room expenses. A map was included in the questionnaire to help respondents decide where a particular expenditure was made.

After the initial survey, each individual received a follow-up postcard and two additional questionnaires were sent to those who had not responded. The response rate for rafters was 71 percent and the response rate for kayakers was 82 percent.

Estimates of the total number of boaters using the river were based on reports of the number of rafters served by the commercial outfitters operating on the river and patterns of boating use as identified through field observations by study personnel during the late summer and fall of 1988. An assumption had to be made that the use patterns observed in late summer and fall were representative of those for the entire boating season.

The Maryland Scenic and Wild Rivers Program had the names and addresses of the 76 property owners located in the study corridor. Each of these owners was sent a questionnaire which contained a series of questions seeking information on seven different areas of concern, one of which was their perception of the Scenic and Wild River designation on their property values. The response rate for this sample was 62 percent.

Economic Benefits Attributed Directly to the Whitewater Boaters

An important consideration in economic impact studies is whether or not the individual would have made the expenditure anyway. Approximately 93 percent of the rafters and 89 percent of the kayakers were not residents of Maryland. The results indicated that 84 percent of the kayakers and 91 percent of the rafters visited Garrett County for the primary reason of running the Upper Youghiogheny River. Other reasons that were mentioned for visiting Garrett County included visiting friends, wanting to get away, running a nearby river, the Gauley festival, and just passing through.

The results in Table 1 show the percentages of rafters and kayakers that made each type of expenditure. Nearly 9 out of every 10 rafters (88 percent) in the sample had eaten in a restaurant in Garrett County, and over three-fifths of these individuals (62 percent) had bought additional food and beverages and had made auto-related expenditures. Over half (53 percent) paid for some type of overnight accommodation in Garrett County. The rafters also had an impact on the local

retail market. One-fifth of the rafters bought clothing or equipment related to their trip in Garrett County and one-third purchased some other type of retail item. The majority of expenditures in each category were spent within Garrett County.

Table 1

Percentage of Rafters and Kayakers Making a Particular Type of Expenditure by location

Rafters (N=278)

	location of expenditure		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	88%	22%	46%
Food and Beverages	62%	16%	30%
Lodging expenses			
Hotel/motel	33%	4%	20%
Camping	17%	2%	12%
Other	3%	0%	3%
Night Clubs bars, etc.	28%	4%	18%
Other entertainment	8%	3%	5%
Clothing and equipment	20%	4%	15%
Other retail purchases	33%	7%	15%
Auto expenses	62%	21%	54%
Other expenses	11%	5%	8%

Kayakers (N=203)

	location of expenditure		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	81%	22%	39%
Food and Beverages	77%	10%	27%
Lodging expenses			
Hotel/motel	4%	<1%	4%
Camping	16%	3%	18%
Other	1%	0%	0%
Night Clubs bars, etc.	18%	<1%	8%
Other entertainment	4%	1%	5%
Clothing and equipment	10%	2%	15%
Other retail purchases	19%	4%	9%
Auto expenses	72%	22%	42%
Other expenses	6%	<1%	4%

The vast majority of kayakers (81 percent) also ate in Garrett County restaurants. Kayakers were more likely to purchase food and beverages (77 percent) and make an auto-related expenditure (72 percent) than their rafting counterparts. Kayakers were less likely to pay for overnight accommodations (21 percent) than rafters, and were less likely to make retail purchases of any kind.

The results in Table 2 show that within Garrett County, rafters and kayakers averaged spending the most money in restaurants ($21 and $17 respectively). The next largest expenditure for rafters in Garrett County was for hotel/motel accommodations, while the next largest expenditure for kayakers was auto expenses. Although fewer kayakers than rafters made a clothing or equipment related purchase, it is interesting to note that the average amount spent by kayakers was significantly higher. This is probably due to the specialized equipment that kayakers use and the fact that both high-quality kayaking paddles and kayaks can be purchased in Garrett County. Both rafters and kayakers spent a significant amount on food and beverages outside of restaurants.

Table 2

Average Expenditues by Type of Boater by location

Rafters (N=278)

	location of expenditure		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	$20.78	$7.03	$14.78
Food and Beverages	10.61	3.67	6.94
Lodging			
Hotel/motel	17.84	1.96	7.68
Camping	2.50	0.21	2.32
Other	0.52	0.00	.33
Night Clubs, bars, etc.	5.61	1.81	4.15
Other entertainment	1.39	0.80	2.06
Clothing andequipment	5.50	0.62	6.36
Other retail store purchases	5.36	1.36	3.44
Auto expenses	13.41	6.26	14.37
Other expenses	6.75	1.58	5.11
Total	90.27	25.30	67.54
Average spent on outfitter services = $80.83			
Total spent regardless of where *	$263.94		

Kayakers (N=203)

	location of expenditure		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	$16.77	$3.10	$12.73
Food and Beverages	12.27	1.08	7.91
Lodging			
Hotel/motel	1.85	0.34	3.25
Camping	1.94	0.27	2.38
Other	.21	0.00	0.00
Night Clubs, bars, etc.	2.98	0.05	1.59
Other entertainment	.47	0.15	0.70
Clothing andequipment	9.44	1.47	18.42
Other retail store purchases	2.06	0.52	4.13
Auto expenses	12.34	5.08	16.67
Other expenses	0.98	0.05	1.01
Total	61.31	12.11	68.79
Average spent on outfitter services = $4.19			
Total spent regardless of where *	$146.40		

* Includes outfitter services

Not including the amount spent on guide and raft services, the results in Table 2 indicate that, during their trip, rafters spent an average of $90 and kayakers spent an average of $61 within Garrett County. Rafters spent an additional $25 and kayakers spent an additional $12 within the state of Maryland. Approximately 78 percent of the rafters' average in-state expenditures and 84 percent of the kayakers' average in-state expenditures were made within Garrett County.

Overall, rafters spent an average of $264 during their entire trip (this includes the amount spent on raft and guide services) and kayakers spent an average of $146. A study of the Kennebec River in Maine in 1981 found that a river user there spent an average of $175 (White and Kezis, 1983). Based on the consumer price index, this would be equivalent to $220 in 1988 dollars. That study also found an average expenditure of $195 on the Penobscot River in 1981, which would be equivalent to $245 in 1988 dollars.

Table 3 shows the total expenditures made by each type of boater. The figures were derived by multiplying the average expenditure per category in Table 2 by the estimated number of users in 1988. The total direct impact on Garrett County, excluding the cost of the raft trip, was $578,000 for rafters and $221,000 for kayakers. The total direct impact on the state of Maryland was $740,000 for rafters and $264,000 for kayakers.

Table 3

Estimated Total Spending For All Rafters and Kayakers for 1988 Boating Season* (in thousands)

	Rafters N=6400 **		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	$133	$45	$95
Food and Beverages	68	23	44
Lodg expenses			
Hotel/motel	114	12	49
Camping	16	1	15
Other	3	0	2
Night Clubs,bars,etc.	36	12	27
Other entertainment	9	5	13
Clothing and equipment	35	4	41
Other retail purchases	34	9	22
Auto expenses	86	40	92
Other expenses	43	10	33
Total ***	$578	$162	$432
Total spent in Maryland	$740 for rafters		

Table 3 (continued)

	Kayakers N=3600 **		
Expenditure	**Garrett**	**MD**	**Out-of-State**
Restaurants	$60	$11	$46
Food and Beverages	44	4	28
Lodg expenses			
Hotel/motel	6	1	12
Camping	7	1	9
Other	< 1	0	0
Night Clubs,bars,etc.	11	< 1	6
Other entertainment	2	< 1	3
Clothing and equipment	34	5	66
Other retail purchases	7	2	15
Auto expenses	44	18	60
Other expenses	4	< 1	4
Total ***	$221	$44	$248
Total spent in Maryland	$265 for kayakers		

* Does not include money spent for guide and raft service, which was approximately $517,000.
** Total number of rafters and kayakers in 1988
*** Numbers may not add up to totals due to rounding

The direct expenditures made by rafters and kayakers (excluding money paid to outfitters) within Maryland during 1988 were estimated to have exceeded one million dollars. In addition, more than one-half million dollars was spent on commercial outfitting services. Three outfitters operate within the state of Maryland (all three are located within Garrett County). Based on figures provided by all outfitters operating on the Upper Yough in 1988, it is estimated that these three outfitters accounted for 42 percent of those paying for raft and guide services. Thus, an additional $229,000 were spent within Maryland (specifically Garrett County) for guide and raft services, increasing the total direct impact on the county to $1,028,000 and the overall impact on Maryland to $1,233,000.

It is noteworthy that the amount of money Upper Youghiogheny boaters spent outside of Maryland totaled almost another million dollars ($996,000. This total includes $680,000 in direct expenditures by rafters and kayakers plus $316,000 paid to out-of-state outfitters (or 58% of the total amount spent for outfitter services).

As mentioned previously, the vast majority of boaters indicated that they came to Garrett County for the primary reason of running this section of the river. This is one indication that the dollars would not have been spent in the area if the resource were not available. Another indication of whether or not the expenditure would have been made without the presence of the resource is the origin of the boater. It could be argued that expenditures made by someone from Garrett County who boated on the Yough would have been made regardless of whether or not that individual went boating. For example, the individual might have gone out to dinner anyway or purchased gasoline for his or her vehicle.

The results of the present study indicate that this is not the case for either Garrett County or the state of Maryland. For example, of the $250,000 spent by boaters within Maryland on restaurants, $225,000 were "new" monies brought in by out-of-state visitors. Of the $1,004,000 spent by rafters and kayakers in Maryland, $902,000 was contributed by people living outside of the state. This

expenditure pattern is even more pronounced in Garrett County. Nearly 98 percent of all boaters were not residents of Garrett County. Thus, nearly the entire local economic impact was caused by nonlocal residents.

In addition to this direct impact, there is also an additional economic impact due to what is called the multiplier effect. For example, part of each dollar paid by a boater or outfitter to a local restaurant is re-distributed to employees and other businesses. These employees and other businesses then buy additional goods and services within the local economy. The multiplier represents the number of times that an average dollar turns over within a specific area. Multipliers for the state of Maryland (according to the Department of Economic and Employment Development) range between 1.6 and 2.4 depending on a number of factors, such as the extent to which the local area is dependent on outside areas for goods, services, and its labor pool. Thus, a conservative estimate of the total direct and indirect economic impact for the state of Maryland from non-state residents was $1,443,000 (1.6 * $902,000).

Economic Impact of Rafting Companies

Each of the ten rafting companies officially operating on the river during 1988 was asked to estimate the amount of money the company spent during 1988 on goods and services in various categories within Garrett County and within the state of Maryland. Of the ten companies that provided reports to the Maryland Department of Natural Resources regarding the number of their customers during 1988, eight companies responded to our request for information. These eight companies accounted for approximately 80 percent of the customers that ran the river during 1988.

The estimates provided by the companies were used to get an average expenditure per customer for each of the expenditure categories. These averages were then used to get estimated expenditure totals for the two nonreporting companies. The results indicated that the outfitters spent an estimated $193,000 in Maryland during 1988. Nearly 92 percent of this amount was spent within Garrett County.

Three of the ten raft companies maintain operations within Garrett County. These three companies accounted for approximately 42 percent of the total number of individuals that ran this section of the Upper Youghiogheny River during 1988. Although these three outfitters accounted for less than 50 percent of the whitewater rafters, these companies accounted for the majority of the expenditures made in Garrett County, especially in the case of personnel.

The rafting companies spend their money on a wide range of services, from advertising to legal. The largest expenditure ($79,000) was for personnel, which represented nearly 41 percent. This is not surprising considering there is one raft guide for every three customers. The next highest amount was spent on food expenditures. All the reporting companies indicated they had purchased food locally, with the exception of one company that reported no expenditures within the state of Maryland. During 1988, these outfitters indicated that they paid over $17,000 in taxes. Local individuals and businesses benefited from put-in and take-out fees that totaled approximately $10,000.

Land Values

The property tax base of Garrett County has risen from $207 million in 1979 (Maryland Department of Economic Development) to $346 million in 1989 (Garrett County Office of Assessment). Although the increase in value reflects changes due to the impact of inflation, most of this increase can be attributed to the rapid rise in land values surrounding nearby Deep Creek Lake. According to local realtors, land in the Deep Creek area now sells for up to $125,000/quarter acre, if it can be found.

Land transactions occurring during the last ten years were examined. In 1979, two parcels located along the river corridor changed hands. The first, a 100 acre parcel, sold for $917 an acre and the second, a 34 acre parcel, sold for $2,177/acre. Records were found for three transactions which occurred between 1979 and 1987. These tracts sold for a low of $99/acre to a high of $1,619/acre.

Records were found for eight transactions made during 1988 and 1989. Only one parcel showed a significant increase in the cost per acre above the 1979 values. Although the records indicated an unimproved building on the land, the 2.71 acre tract sold for $61,500. Of the remaining six transactions, five were priced between $699/acre and $2,826/acre. The remaining property sold for $5,164/acre.

According to Garrett County Realtors, there were three properties located in the corridor area that were being offered for sale as of August 31, 1989. Two of these properties were located on the river but were not within the officially designated wild river corridor. The first was a 1.5 acre piece of land. The asking price for this tract was $8,000. The asking price for the second tract, 2.93 acre of land, was $28,000. The third tract consisted of 368 acres, 80 of which are located in the official river corridor. The asking price for this tract averaged $1,478/acre.

One tract, no longer on the market, but located in the river corridor, backed up to the river and had a mobile home located on the property. The asking price for this 5 acre piece of land was $35,000 or $7,000/acre. According to local realtors, the average selling price of rural land in the county ranges between $8,000 to $10,000/acre, depending on the suitability of the land for farming.

Although the corridor is considered to a be a slow market in terms of property sales, one local realtor attributed this more to the size of the acreage, rather than the presence of the river. Most of the tracts in this area are large, and the owners have seemed reluctant to break up holdings. This realtor did feel that having state land bordering a property would add to the perceived value of a piece of property, regardless of where it was located.

Land owners were asked in the land owner survey to indicate how they felt the value of their property had been affected by the wild river classification. Of the 70 percent of landowners who responded, 24 percent felt the land had increased in value, 43 percent felt there was no change, and 33 percent felt their land had decreased in value as a result of the wild river designation.

Further Economic Development Related to Whitewater Boating

As the economic impact information indicates, there are a number of existing businesses within Garrett County

that owe all , or at least a substantial part, of their existence to whitewater boating on the Upper Youghiogheny River. The three rafting companies operating within Garrett County are the most obvious businesses relying on the Upper Youghiogheny for their existence. However, as the previous information indicated, local restaurants, service stations, convenience stores, bars, the local motel, etc., also benefit from the whitewater boaters. One local equipment supplier provides rafts for at least three of the outfitters operating on the Upper Yough.

The potential for further expansion of these existing industries appears limited for a number of reasons. First, in 1989, the number of outfitters operating on the Upper Yough and the number of boaters each operator could serve on a given day were regulated by the Maryland Department of Natural Resources. The established use limits are below the current capacity levels of the outfitters presently operating on the river. On the other hand, the number of customers observed on the river during 1988, when no use limits were in effect, only rarely exceeded the maximum of 72 imposed by the 1989 regulations. Although the ultimate effect of these or future regulations on the economic viability of these rafting companies is not known, it would not appear economically feasible for new rafting companies to operate in this environment, even if the regulations were relaxed. Likewise, it appears that other existing businesses, such as restaurants, have excess capacity that could handle additional demand for their services. Even if they couldn't, facilities around Deep Creek Lake could meet the anticipated additional demands related to river recreation.

Even without any restrictions, there are several constraints which may act to limit growth in the numbers of boaters using the Upper Yough. Although interest in whitewater boating appears to be increasing , the Upper Yough is a dangerous river requiring advanced skill levels, even among rafters. Thus, the potential demand for the river is limited to those who pursue the sport on a serious level (for those seeking only a "whitewater experience," several other nearby rivers are available at a lower cost).

Another constraint is the unpredictable nature of the boating season, which usually runs from the beginning of April to the beginning of November. Varying climatic conditions can greatly influence the amount of opportunity to run whitewater trips on the Upper Yough. The boaters also rely on hydro-power water releases from the Deep Creek Dam. In the past, these releases have not always occurred on a regular basis, nor have the release levels been very predictable. Thus, operating a business that is dependent on the Upper Yough, at the very least, is a risky proposition.

One area that does look promising is the production of life jackets and raft paddles. At the present time, the nearest outlet for paddles is in Michigan, and life jackets come principally from Idaho and Alabama. Considering the amount of whitewater boating that occurs within a one hour drive of Friendsville, this could be a viable proposition. A campground might also be a viable economic alternative. There is a Corps of Engineers Campground located near Friendsville, but many of the boaters presently use a campground located in West Virginia.

Conclusions

The total number of whitewater users on the Upper Yough in 1988 was not large (10,000) compared to visitation levels on other whitewater rivers. These whitewater users had a combined estimated direct economic impact of about $1 million on Garrett County and $1.2 million on the state of Maryland. Nearly 100 percent of the expenditures made in Garrett County were made by nonlocal residents, and nearly 90 percent of the expenditures made in the state were made by nonMaryland residents.

It is important to note that approximately one million dollars was spent outside the borders of Maryland. Although it was beyond the scope of this study, further research could help to indicate what part of these expenditures could be captured by the state of Maryland and at what cost. For example, some of the users of the Upper Yough stay overnight at campgrounds in West Virginia. The question remains as to the economic viability of developing additional campgrounds within Garrett County. Also, it may be possible to increase clothing and equipment sales within Garrett County through additional efforts to make users aware of what is available in the county. This applies to other attractions as well.

It does not appear that the wild and scenic river classification has had much of an impact on the price of land located within the corridor. The price of property is determined by many factors, so it is dangerous to make generalizations based on a limited number of individual transactions. The transactions that were documented in this study, however, did not indicate any significant increase or decrease in the price of land within the designated corridor during the last 10 years.

Decisions made by the Maryland Department of Natural Resources will obviously impact the amount of economic benefits that will accrue from whitewater boating on the Upper Yough. For example, an upper limit on the number of rafters was established for the 1989 boating season. The information collected in this study provides a way of determining the economic impact that each rafter has on the local and state economy and thus can be used in figuring the potential economic impact of various projected use levels.

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CONDOMINIUM DEVELOPMENT IN THE WHITE MOUNTAINS - HOW WILL IT IMPACT RECREATION MANAGEMENT ON THE WHITE MOUNTAIN NATIONAL FOREST

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Nearly ten thousand condominiums occupy adjacent and intermingled private lands in the White Mountain National Forest. A close on-the-ground look at the situation, interviews with Town officials, and a mail questionnaire were used to study the situation. Alpine ski areas proved in many cases to be the nucleus for condominium development when conditions for economic growth are present. Nearly all the condominium owners sampled came from New England. Many of the owners proved to be family groups. They were well educated with correspondingly high income levels. It appeared the owners generally agreed with the concept of a working, multiple use forest although they had some important exceptions. The condominium owners rarely became involved with outdoor forest related activities. One exception was alpine skiing, an artifact of the attraction of ski areas for condominium development. The naturalness of the forest was extremely important to them.

Introduction

The White Mountain National Forest is a 763,000 acre block of public land in north-central New Hampshire and western Maine, about 130 miles north of Boston. Residents of the Boston Metropolitan area can travel by Interstate to the north end of the Forest in less than three hours.

Topography, scenic quality, location, and history have combined to make the White Mountains an important year-round recreation resource center for the New England and Mid Atlantic area. The area has been used for various outdoor pursuits for more than 100 years. The White Mountain National Forest now serves almost 6 million visitors a year.

Condominium development near the boundaries of the White Mountain National Forest is symbolic of a greater national concern of development spreading to and affecting public lands. It is changing the natural scene of the White Mountains to an urban setting. This concern is more than visual, there will also be impacts on managing these lands.

During the years 1980-85, New Hampshire began a period of rapid population growth - twice the national rate. The State is expected to grow an additional 26 percent by the year 2000. The number of dwellings in the State increased by 50 percent from 1979 to 1984. In 1985, nearly 18,000 building permits were issued (remember, New Hampshire is a small state). Although growth has slowed, the effects of past development have not diminished.

This phenomenal growth began in southern New Hampshire, but it has reached the edge of the White Mountain National Forest in the central part of the State. Thousands of new condominiums, both permanent and seasonal, now occupy adjacent and intermingled private lands of the White Mountain National Forest. Some of the construction (often with no local "setback" regulation) literally encroaches onto public land.

This surge of condominium development, in addition to changing the natural scene, has brought what is assumed to be a new public into the White Mountains. This public is viewed as affluent, well educated, and oftentimes influential. This new group has had little participation in the Forest Planning process. They may not understand the principles of balanced land management embodied in the Plan; they may not realize that recreation is only one part of this balanced use.

This situation must be fully defined and understood if high recreation outputs with a relevant, quality mix of activities and experience opportunities in an integrated resource management context are to be maintained.

Growth Areas

Although it is easy to see the areas of growth on the Forest, a systematic approach is useful for clarification. State Planning Office records on new housing starts were compared with National Forest land by Town to identify those Towns in the White Mountain National Forest where housing construction has radically changed from recent years and that are affecting, or could affect, National Forest lands. They are the Towns of Bartlett, Jackson, Carroll, Lincoln/Woodstock (combined), Waterville, and Thornton. Short descriptions of each follow.

The Town of Bartlett

Bartlett was incorporated as a Town in 1790. The population of full time residents grew from 1,013 in 1960 to 1,098 in 1970 and 1,566 in 1980. There are 1,810 approved condominium units with approximately 1,600 built now (1988). The valuation of the Town doubled from $53,598,800 in 1980 to $106,999,095 in 1984.

About 75% (41,438 acres) of the Town of Bartlett is National Forest administered land.

There are some important growth enhancing attractions in the Town; the Attitash Ski Area (a portion of which is under a Forest Service permit), Storyland and Heritage New Hampshire (commercial tourist facilities), and the nearness of the major "Factory Outlet" shopping centers in neighboring North Conway.

The Condominiums are centered around the Attitash Ski Area extending to Glen and including the West Side Road and long the west side of Route 16 in the vicinity of Lower Bartlett. Most of the other developments are residential of various ages. There are some other identified developments that are not "built out" yet.

The Town of Jackson

Jackson Village is very much a resort area although this is not so true for the Town as a whole. All the attractions are very closely related to the Village.

Jackson was incorporated in 1829. Historically the population has peaked (at almost the same levels, around 700 in the 1840's and 50's (because of agriculture), the 1870's and 1900's (a time of large inns and hotels), and the current growth in the 1980's. Jackson's growth in 1960-70 was 28.3% and in 1970-80, 58.9%.

Valuation in was 1980, $44,610,385 and in 1984, $47,498,165. A winter of 1987 analysis showed the average selling price of condominiums in Calendar Year 1986 was $174,500.

The Town of Jackson has a total of 43,776 acres. Of this total 11,400 acres are private lands, 31,625 (72%) are National Forest Lands, the rest are Town lands and roads.

There are three specific areas of condominium growth in the Town of Jackson: 1) around Black Mountain Ski Area, 2) in the village itself associated with the Golf course, and 3) on Route 16 near where it enters National Forest lands. Each of these three appear to be aimed at different clientele. The most highly developed is Wentwoth Resort (associated with the golf course), next come those around Black Mountain Ski Area, and the lowest level of development is found in those on route 16.

The Town of Carroll

The Town of Carroll includes the villages of Twin Mountain, Carroll, and Bretton Woods. It was incorporated in 1882. 1960 population was 295, 1970 population was 310 and 1980 population was 647. Valuation in 1980 was $18,190,900 and in 1984 $19,158,965. National Forest lands account for 15,165 acres, about half the land base in the Town. Condominium growth is occurring only in the Bretton Woods area.

The village of Bretton Woods has a downhill ski area, cross country skiing, motels, and several eating establishments. Condominium growth is just beginning in Bretton Woods. It has shown an increase of less than 100 housing units. There are two locations where condominium growth is occurring in the Bretton Woods area. Both are closely associated with the Bretton Woods Ski Area.

The Town is aware of some growth problems and are addressing them with building restrictions like a density control of one unit per acre or a 33 foot height limitation to the highest ridgepole. It appeared that here most of the condominiums were not intrusive on the mountain views, although in other locations on the Forest they were obvious. It appears this was a good restriction to protect visual quality.

It appeared that this is a "just developing" growth area. The other thing noticed was the necessity of a close group of recreation activities (not just outdoor resource related activities) for growth. The construction of the new recreation facility seems to bear this out. There needs to be a "draw" for the development to start but an increase of opportunities for development to continue.

The Towns of Lincoln/Woodstock

The Towns of Lincoln and Woodstock are combined in this description. They are treated as one unit because they are adjacent, they consist of one labor market, and they share many public facilities.

Lincoln was incorporated in 1764. 1960 population was 228, 1970 - 1341, and 1980 - 1313. Valuation grew from $32,316,703 in 1980 to $45,680,393 in 1984. Woodstock was incorporated in 1763. Population in 1960 was 827, in 1970 - 897 and in 1980 - 1008. Valuation in 1980 was $19,635,650 and in 1984 was $20,646,161.

Almost 90 percent of the land in the Towns of Lincoln/Woodstock (113,200 acres) are National Forest lands (101,400 acres).

The Village of Lincoln is at the intersection of Route 112 (the Kancamagus Highway) and Route 3/Interstate 93. Loon Mountain Ski Area, a Forest Service permitted area is the major winter recreational draw, although the heaviest recreation use is during the summer months. This is an area of very rapid growth as well as being very restricted by National Forest ownership.

There is heavy condominium development of a short section of Route 112 closely associated with the Ski Area development of Loon Mountain.

In Lincoln-Woodstock there are an estimated 2,500 year-round residents. But there are many seasonal employees in summer and winter recreation businesses, and there are roughly 13,400 overnight beds. While not all of these beds are available or occupied at any given time, they indicate the importance of the transient population to the economy and the demand for public services.

The Town of Waterville

Waterville Valley is an island of private ownership (about 500 acres) completely surrounded by National Forest lands. It has become a large ski/conference center with the construction of many hotels, eating establishments, and related condominiums. It doesn't have the draw of shopping in the immediate vicinity as other areas, like Conway has and Lincoln is developing. However, the recently opened Village Center provides grocery and clothing stores that were not previously available.

Waterville was incorporated in 1829. Population grew from 22 in 1960 to 109 in 1970 and 199 in 1980. Valuation grew from $34,378,425 in 1980 to $63, 271,650 in 1984. There are 1,328 living units in Waterville Valley. With about 60 of these being single family residences, there are 1,270 condominium units.

The Town Manager is personally concerned about growth in the entire White Mountain area, but as Waterville Town Manager feels that Waterville Valley growth is controlled enough to be acceptable. It is limited by the fact it's surrounded by National Forest lands, thereby preventing the "sprawl" so common in other areas. She says it is controlled by good zoning and forward looking planning so that the developments are very acceptable and there are sufficient centralized utilities available to handle the growth. On the other hand, there is no set-back for building next to National Forest lands in Waterville Valley's zoning ordinances.

Waterville Valley has long been a summer resort area but didn't grow rapidly until winter use became an attraction with the development of a Forest Service permitted ski area in the 1950's. One of the selling points is "an island in the National Forest". Even so, the Town manager considers the people are really unaware of the White Mountain National Forest and its activities. They are just aware of large blocks of "natural land".

Winter activities are mainly alpine and crosscountry skiing. In the summer there's a combination of tennis, golf, and hiking. More condominiums are filled in winter. Waterville Valley Company is trying to make it a all-season resort, mainly through selling it as a Convention Center (there is a expansive new lodge currently being constructed).

The Town of Thornton

Thornton is the least impacted by National Forest ownership. It is affected only on the East and West sides. The growth here is in some smaller less heavily developed areas. These are less intensive and more the traditional "summer home" concept or "expensive first home" rather than condominium type.

Much of the growth in condominiums is a result from overflow of the Lincoln area.

Methodology

A literature review showed that, with the exception of physical effects of development, there was little published information on the impacts of development on management of public lands.

A letter was sent to the Staff and Districts of the White Mountain National Forest requesting their concerns to condominium development. The response identified three, they were: 1) lack of knowledge about the physical and social aspects of development, 2) uncertainty as to the impacts of this group, and 3) no clear idea of the direction the Forest should take.

The close on-the-ground look at the situation identified a few general principles about development; a "major attractant" theory, a common growth path (there are several different stages represented on the Forest), and the concept of being "Forest locked".

Local town officials were also interviewed using a standard set of questions. Some observations were, 1) there was a wide range in the ability of towns to handle growth, 2) the Towns had various record keeping systems from card files to computer printouts, and 3) each had different perceptions about development. One common thread throughout all the Towns interviewed was the overwhelming workload this growth was putting on the Town officers.

Once it was determined there were eight to ten thousand units, it became obvious that a sampling process was needed. After review of personal interviews versus mail questionnaires it was decided a mail questionnaire would be most effective. Dr. Thomas More and Dr. H. Echelberger, Forest Service researchers in Forest recreation investment research at Burlington, Vermont helped develop a questionnaire that reflected the study objectives, kept away from superfluous questions, and was consistent with acceptable questionnaire format and design.

The Town interviews gave a source for names and addresses. A mailing list of 905 names was randomly selected from each of the growth areas. Almost all of the names were from New England, including Massachusetts, New Hampshire, Maine, Connecticut, and Rhode Island. There were 258 questionnaires returned, a 29 percent return. This return rate and the fact that 64 percent of these also returned the response card asking to be included on the general Forest mailing list shows this as an interested group.

Condominium Development on the Forest

Although each growth area is unique there is also a consistency to their growth. There was usually some previous development that attracted the condominium growth. In the White Mountains, ski areas seemed to be that attractant. It also appeared that subsequent growth paths were directed by the physical constraints of available land. Being "Forest locked", that is to say, limited by National Forest lands, was an important constraint.

The development of condominiums at almost every one of the study areas began in response to an alpine ski area. The ski areas were not the cause for a boom in construction, they served as the nuclei for this boom when regional economic conditions were right. For example, condominium development in the Town of Bartlett began near the Attitash Ski Area. Waterville Valley, Loon Mountain, and Bretton Woods Ski Areas were also centers for growth of condominiums in the Towns of Waterville, Lincoln/ Woodstock, and Carrol respectively.

The Town of Jackson was slightly more diversified in the beginning, an existing golf course and Black Mountain Ski Area were both growth nodes here. It appears condominium growth in the Town of Thornton had a greater package of opportunities available at the start, but nearby ski areas were important to a degree.

Earlier management decisions allowing ski area development on the White Mountain National Forest is partly responsible for this problem/growth/concern/opportunity (make your own choice). More recent decisions in the Forest Plan not to consider any new Ski Areas, only expansions to existing ones, and prohibiting alpine ski area development in the scenic easement purchased from the State of New Hampshire for the 50,000 acre Diamond Lands acquisition shows current recognition of this relationship.

There are also some important differences on how these areas grew, or are likely to grow. Generally there's a trend toward year-round use. The package of opportunities increases as a growth area matures. I believe the condominiums and package of opportunities grew in tandem once the process began. This trend toward year-round use was greatly impacted by the restriction of surrounding National Forest lands (Forest Locked). Where there is little "Forest locked" effect, the range of opportunities has grown widely and quickly. The year-round use already there increased rapidly. For example, in Bartlett condominium development has spread quickly to other areas of the Town and involves many other activities like the shopping at neighboring North Conway. At the other extreme, the range of opportunities at Waterville Valley is more limited because it's surrounded by National Forest lands. The condominium development, because it was closely tied to the ski area, was at first limited to winter use. In order to meet the motivation to provide year-round use, Waterville Valley has aimed at the conference center concept rather than increasing the activities available. In between these two, Loon Mountain Ski Area is expanding and the Town of Lincoln is increasing its package of opportunities along with condominium growth. Condominium development is just beginning in the Town of Carroll, all of it associated with the Bretton Woods Ski Area. Three stages of growth are represented in these examples. The beginning stage (Bretton Woods), the active growth stage (Towns of Bartlett and Lincoln/ Woodstock), and the mature stage (Waterville Valley).

It will be interesting to keep an eye on the growth at Bretton Woods in the Town of Carroll. They are in the early stages of growth and are constructing a Health and Fitness Center as an early step toward the year-round package of opportunities trend.

Although there was zoning and planning of some sort in all the towns, development wasn't controlled to any great degree. There were several kinds of building restrictions like height of buildings, lot sizes, etc. but they appeared to have minimal effect in controlling, directing, or limiting growth.

The Owners

From the Mailing List.

Even before the questionnaires were sent, some things about the condominium owners were obtained from the mailing list. Of the 905 on the mailing list, only five were already included on any Forest mailing lists. All five were in the Loon Mountain area and appeared to be on the mailing lists because of the current discussions over Loon Mountain Ski Area expansion. With this minor exception it seems this lack of presence on the White Mountain National Forest's mailing lists show they are not reaching the condominium owner "public".

Ninety five and one half percent (95 1/2%) were from New England, including Massachusetts, New Hampshire, Maine, Connecticut, and Rhode Island. Vermont was not represented. Historically, recreation users of the White Mountains have originated from the same states. In 1853-54, (that's right *1853*) 79%, and in 1980, 86% of the visitors to Mt. Washington were from this area. (Binkley, Clark, S. Forest Product Demands on the White Mountain National Forest: A Qualitative Assessment, 1982, Table 1.1).

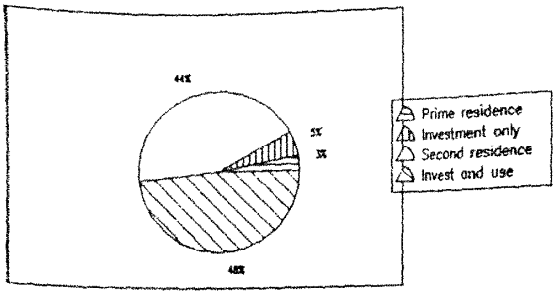
Most condominium owners are not residents. Only 5% (46) of the sample had mailing addresses in the Towns studied (it is assumed they resided there full time). It would be interesting to see if this residency rate changes.

From The Questionnaire

General. There were 258 returns (29%) from the 905 questionnaires mailed out. Compared with the usual 20% return for questionnaires of this sort this shows that condominium owners are interested in the White Mountains. The fact that 163 respondents (64% of the returned questionnaires) wanted to be on the Forest's general mailing list is consistent with this assumption. There were also 84 (33%) respondents who requested a summary of the results of this study. About 2 percent of the respondents indicated they didn't own their units. This may have been a result of changes in ownership/rental in the time between obtaining the names and sending the questionnaires.

Figure 1 illustrates the respondents reasons for purchasing the condominium units.

FIGURE 1
REASON FOR PURCHASE

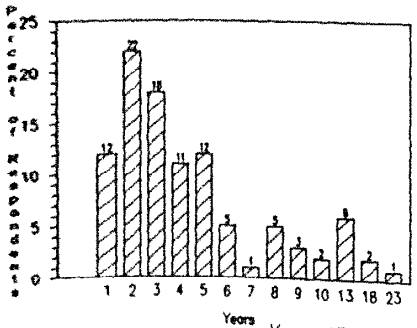


Of the 255 people that answered the question on ownership, about 3 percent said they bought for use as a primary residence. About 5 percent responded that they bought for investment purposes only (these may have been renting, or merely holding and re selling). By far the most respondents to this question owned the units for personal use as a secondary residence (about 44 %) or for a combination of investment and personal use (about 48 %). This supports the assumption, based on the mailing list that few of the owners are permanent residents in the area.

There were only 21% (53) of the responses that indicated they rented the condominium units. This indicates that three quarters or more of the owners considered the purchase of the unit, as opposed to renting the unit, an investment. Of those who rented the units, 26% rented for one week or less, 21 % for up to four weeks, and 53% for more than four weeks.

History. Figure 2, showing the years the units have been owned, verifies the growth in the last five years and the start of a slowdown.

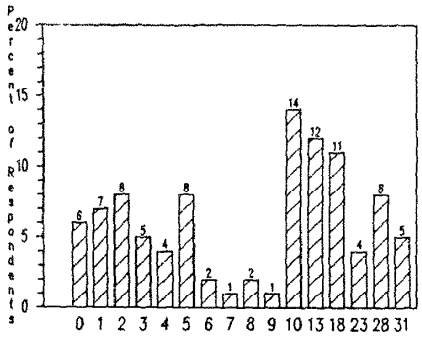
FIGURE 2
TIME OWNED



Years 13,18, and 23 represent five year increments

In order to get an idea of the owners familiarity with the White Mountains a question on the number of years they had visited here before purchasing was included. It was surprising to find that over 50 percent of the owners had been coming to the mountains for 10 or more years before purchasing (Fig. 3). It appears that there may be two groups of condominium owners, 1)the new owners who have visited the mountains for around 5 years and 2)those who have visited the Forest for more than ten years before they brought their condominium. If more time were available it might be interesting to see if there are differences between these two groups. It is suspected there would be some in the age groups and some differences in the activity interests.

FIGURE 3
TIME VISITING MOUNTAINS



Years 13,18,23,28,and 31 represent 5 year increments

Owner characteristics. Figure 4 shows the total number of individuals reported by age group. There were 976 people reported by the 258 returned questionnaires, representing an average group size of 3.8 people per household. The data for age groups by household are also interesting. As shown in Figure 5, the 0-19 age group was represented in 61 percent of the households and 68 percent had individuals in the 40-49 age group.

Together these data belie the generally accepted image of condominium owners as being dual income, no children owners; they are more family oriented than commonly perceived.

FIGURE 4
INDIVIDUALS BY AGE GROUP

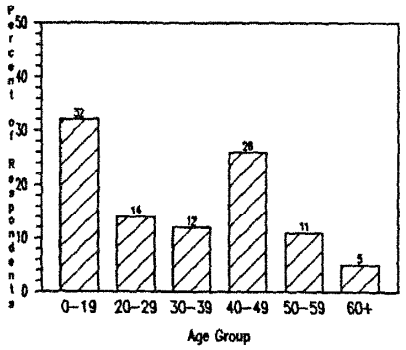
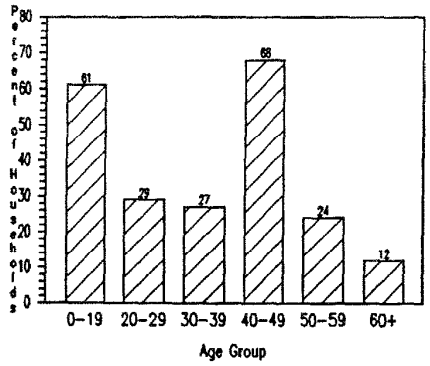


FIGURE 5

AGE GROUPS BY HOUSEHOLD



Knowledge of the Forest Service. Almost 94% of the respondents indicated they had heard about the United States Forest Service. Slightly more than 99% said they had heard about the White Mountain National Forest. Although this doesn't tell much about knowledge of the Forest Service it shows that almost all at least recognize the presence of a National Forest, an important first step.

One of the related, and more important, questions asked the owners their ideas on what activities they recognized in the forest and what activities they thought should occur on the forest. The results are shown in Table 1.

This table deserves some discussion. In the timber management category, the similarity of the figures between "current' and "should" indicates that "what they see is what they like". There is very little difference between what the respondents perceive in timber activities and what they believe should occur on the forest. It is significant that less than 25% of the condominium owners don't want any timber management but 75% consider "some" or "a lot" as acceptable. This tells only part of the story. Although in concept the respondents agree with timber management, in fact they might be adamantly against it if were to occur in their backyard.

In the area of camping, it looks like they want less than is now provided. This is an activity that is highly visible to the casual forest user so it would appear they have a good feeling on how much is currently available. Perhaps because this is an activity they wouldn't be involved in as condominium owners the need to this group is not important.

The respondents recognize that there's a lot of trail work done on the Forest but many think more should be done. This activity exhibited the highest percent (71.7%) of "should do a lot".

Wildlife habitat management is another activity the respondents think the Forest should be doing more of; just slightly less than trail maintenance. They indicate much more is wanted.

The response to fish habitat management activities was interesting. Sixty six percent of the owners perceive fish habitat work on the forest. With the exception of the last several years none has been done. Perhaps the recent emphasis, including the Atlantic Salmon work, has put this up front. About the same amount think the Forest should be doing more. Another explanation could be that they may not perceive fisheries management the same way the Forest Service does. Just having streams available and accessible may mean management to them.

More condominium owners indicate (53.6%) the Forest should be providing "some" alpine skiing opportunities than "a lot" (44%). Almost the reverse is true on what they perceive is now provided. Forty five percent believe the Forest provides "some" alpine skiing and 52% think the Forest provides a lot of alpine skiing opportunities.

Picnicking showed few changes between the "current" and "should" categories.

Snowmobiling was a surprise. Fifty percent of the respondents felt that the Forest should provide no snowmobiling. That's more than twice the percent that currently see no snowmobile use. Only 12% felt the Forest should be providing "a lot" of this activity. That's almost half the amount that currently perceives a lot of snowmobile use on the forest. This was the only activity with such a negative connotation.

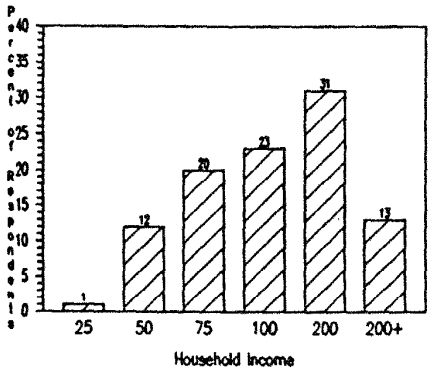
The most important message of this data is that condominium owners generally recognize the White Mountain National Forest as a working forest, that is to say, a land base to provide *multiple uses.*

TABLE 1: PERCEPTION OF CURRENT AND DESIRED ACTIVITIES

ACTIVITY	NONE		SOME		A LOT	
	CURRENT	SHOULD	CURRENT	SHOULD	CURRENT	SHOULD
Timber Harvesting	22.2%	23.4%	69.5%	66.5%	7.8%	10.1%
Camping	0%	.4%	25.3%	48.8%	74.7%	50.8%
Trail Maintenance	2.0%	0%	48.2%	28.3%	49.8%	71.7%
Wildlife Habitat Management	8.0%	1.2%	63.9%	28.0%	28.1%	70.8%
Fish Habitat Management	8.5%	1.2%	66.5%	34.4%	25.0%	64.4%
Alpine Skiing	2.8%	2.4%	45.1%	53.6%	52.2%	44.0%
Picnicking	.8%	0%	41.6%	48.2%	57.6%	51.8%
Snowmobiling	20.5%	50.2%	58.6%	37.5%	20.9%	12.4%

More than 44 percent of the respondents had graduate degrees, 34 percent were college graduates, 16 percent had some college, and less than 10 percent had high school or less than high school. Consistent with this high education level Figure 6 shows the generally high income levels for condominium owners.

FIGURE 6
INCOME CHARACTERISTICS



Household income in thousands

Activity involvement. Also asked was the question, what activities are you involved in, and how often? The activities for them to respond to included four groupings, 1) outdoor, forest related, 2) outdoor, not forest related, 3) sports related, and 4) social activities. The results are shown in Table 2.

TABLE 2: RESPONDENT ACTIVITY INVOLVEMENT

ACTIVITY	NEVER	SOME-TIMES	OFTEN
OUTDOOR FOREST RELATED (AVE.)	61.2%	27.6%	12.2%
Downhill Skiing	12.3%	20.6%	67.2%
Crosscountry (groomed)	34.1%	47.2%	18.7%
Crosscountry (ungroomed)	76.5%	20.6%	2.9%
Dayhiking	15.4%	64.8%	19.8%
Fishing	66.9%	30.2%	2.9%
Hunting	96.4%	2.8%	.8%
Snowmobiling	93.7%	6.3%	.0%
Picnicking	25.8%	66.3%	7.9%
Backpack Tent Camping	80.2%	18.6%	1.2%
Backcountry Huts	85.0%	14.6%	.4%
Bicycling (offroad)	86.6%	11.9%	1.6%
OUTDOOR NOT FOREST RELATED (AVE.)	33.0%	51.5%	14.8%
Driving for Pleasure	10.2%	64.3%	25.5%
Bicycling (road)	57.3%	38.7%	4.0%
SPORTS RELATED (AVE.)	29.1%	49.9%	30.0%
Jogging/exercise	25.1%	52.6%	22.3%
Pool Swimming	17.3%	49.8%	32.9%
Pond/river swimming	28.3%	53.1%	18.5%
Golfing	42.1%	44.1%	13.8%
Tennis	32.7%	50.0%	17.3%
SOCIAL (AVE.)	17.4%	54.4%	28.2%
Dining Out	.4%	43.3%	56.3%
Plays, concerts, lectures	44.8%	49.6%	5.6%
Shopping	7.9%	59.4%	32.7%
Visiting	16.3%	65.4%	18.3%

This data represents only one component of the White Mountain National Forest's recreation users. The high level o alpine skiing use validates the earlier statements on the close relationship of ski areas as a nucleus of growth for condominium development. It appears that only a few activities (groomed cross country skiing, dayhiking, and picnicking) are outdoor, forest re lated and done by condominium owners in large amounts. I general the high percentage (61%) that reported no involvemer with "Outdoor Forest Related Activities" shows that condominiun owners have little demand for traditional Forest recreation activ ties.

When asked where their best source of local informatio came from, more than 80% indicated it was from published infor mation and almost 30% said from "People I talk with". There wer some respondents that indicated both. There were only twelv respondents that identified the "other" category. They named local paper or location in the area for explanation.

General attitudes. There were three open ended ques tions that required individual analysis. Often there was more tha one comment for each question. This discussion combines re sponses from all the towns.

"What are your greatest concerns about the White Mountains in th next ten years?"

This question generated 354 responses. The response were easily categorized. It appears condominium owners ar aware of the potential impacts of increased growth (161 respon es) or overuse, crowding, and congestion, (92 responses). Co siderably fewer (47 respondents) were concerned about the lo of natural resources or the impact of growth on natural resource Thirty two respondents identified pollution and acid rain as t major problem in the next ten years. There were a dozen co ments about a lack of alpine ski areas. Few (10) were concern about the lack of recreation facilities or recreation support fac ties. Three commentors said ORV's would be the biggest proble in ten years, five said timber harvesting, one said overhunting, o said increasing theft, and one said "too conservative an outlo and too many restrictions."

These responses suggest condominium owners ha some of the same concerns as the general New Hampshire po lation; a worry about the rapid growth and its associated pr lems. The lack of concern about recreation facilities indicates respondents are satisfied with the amount of recreation facili (for their activities) in the White Mountains.

"What things do you like about the White Mountains?"

This question generated the most responses (511) of of the open ended questions. They fit easily into groups. By far most respondents (194) considered the naturalness of the W Mountains the greatest attraction. The variety of recreation ac ties in the area (123 responses) and the relaxing life style (responses) were about equally rated. Forty five people said t liked the accessibility from their homes or the easy availabilit activities once here. Thirty six liked the small town atmosp and the people associated with it.

It is obvious they like the natural, relaxing atmosphere the variety of year round recreation activities.

"What things do you dislike about the White Mountains?"

This had the fewest responses (148) of the three q tions. They were also more difficult to summarize. It appeare respondents were not so consistent in their thoughts as ir other questions, although the worry about overdevelopment commercialization of the White Mountains was still foremo their minds. In addition to the major categories 1)overdevelopment and commercialization (84 respon 2)overcrowding and congestion (52 responses), and 3)poo tude about nature (12 responses), there were r miscellaneous comments. Eight respondents thought there overuse on the forest resulting in poor maintenance of trails other facilities, and six (in the Lincoln area) stated there we enough alpine ski areas. Four didn't like timber harvesting were concerned about motorized vehicles in restricted a three thought there wasn't enough information about acti

two felt there weren't enough golf courses, two were concerned about transient visitors and related crimes, one respondent was concerned about private campgrounds, one was worried about low level aircraft flights, one about the cost of tickets (I assume lift tickets), three stated the weather (tongue in cheek), and seven were concerned about bugs, specifically black flies (not necessarily tongue in cheek).

There is a consistency of responses regarding a concern about overdevelopment, commercialization, congestion, and overcrowding.

What It Means

Findings from this report are discussed here in regards to recommended actions related to recreation management on the White Mountain National Forest.

Condominium Development on the Forest

The attractant theory. Some Forest developments, Ski Areas in the case of this study, are important as nuclei for condominium development when regional economic conditions are right.

The impacts of this has been well documented in this report. Consideration of the potential development effects of private investment concession operations on National Forest lands must be considered in future decisions. Although the effects can be either good or bad depending on ones viewpoint, it's important to know what could happen. This was considered in the Forest Plan decision not to allow new ski areas, only expansion of existing ones. A similar decision was made in developing the Scenic Easement for the Diamond Lands purchase. Alpine ski area development will not be allowed under the conditions of the easement which provided federal funding for purchase of lands for the State of New Hampshire. *Other forests that may not be so far along in development should observe and project what's happened here in evaluating private investment concession operation proposals.*

Current talk Service-wide about major partnership concessions of the "Disneyland" type make this even more important. Wise decisions on such attractants to development may also be helpful in steering cluster development to acceptable areas.

Currently the White Mountain National Forest has two non-operating ski areas. Both these should be evaluated to decide whether or not we want the potential development that may occur in times of economic growth and consider this in the analysis for reissuance.

"Forest Locked" theory. It appeared the subsequent growth paths of the developing areas were directed by the physical constraints of available land. Being "Forest locked", that is to say limited by National Forest lands was an important constraint.

This, of course, operates both ways. The private development restricts what we can do just as National Forest lands restrict what direction the private development takes. Although the effects of one neighbors action on another neighbor is commonly known, it seems that the examples in this paper didn't consider that. The Forest has usually let the development take its course and reacted when a problem occurred. There should be more interaction between the private sector and the public sector in these areas as the development expands; there are benefits to both. The Forest has been neutral in condominium development in these growth areas. They usually responded only to requests rather than becoming proactive as the development progressed.

The Forest has generally been interested only in its own "bailiwick", ski area permits, or timber operations for example, rather than considering what can provided in exchange for bettering the Forest position to provide public recreation opportunities.

If contact and planning efforts between the National Forest and the Town or the development group would occur, benefits would accrue to both. These kinds of efforts are generally frowned upon in the Forest Service because National Forest lands are not directly involved. Work of this type is also construed as becoming too involved with the private sector. Even if this attitude were changed there is not the money or the people (and maybe not even the skills) to become involved to the level needed. *A Forest level task team , or even a separate staff area responsibility, that would address related emerging problems and concerns as soon as development becomes apparent would be a good direction to take.*

The Owners

The market area. It is clear that these owners are from the same geographic market area as the historical users of the Mountains when this was heavily touted as a tourist area (called the carriage trade or the grand hotel days). Although it can't be clearly identified because of lack of early records these people may be from the same social strata as during the carriage trade days - fairly high up the scale. Past users of the White Mountains have had tremendous influence on land management decisions. It was this group that were of prime importance in designating the White Mountain National Forest itself. Their greatest influence was when they were organized for a particular cause - the saving of the White mountains from the "destructive" loggers. The Forest should be aware of this potential and become more active in working with it. Already this is being done, with partnerships and the marketing of the Forest Service in general, but perhaps it's time to look at the possibility of marketing the White Mountain National Forest specifically to this group. It needs to be made clear in working with these people that they are only group of National Forest users. There are others just as important, often with contradictory needs and interests. *With this warning in mind the Forest needs to work with this group of people so they are aware of what we do and which of those activities are beneficial to them so we can be allies not enemies.*

Non-interest versus interest and family orientation. There are conflicting messages regarding the interest or non-interest of the condominium owners and a difference in the perceptions of this group and reality.

This is essentially a nonresidential public and they most often buy for investment purposes. One would think that these factors would lead to a disinterested public. On the other hand, many of these people have been coming to the White Mountains for 10 or 25 years and the "investment purchase" objective is most often met as a purchase and second home residence. These last descriptors appear to outweigh the "disinterest factors", making the condominium owners an interested public. This is contrary to the generally accepted belief.

Also contrary to general perceptions is the family orientation of the group. About two thirds of the units surveyed represented the 40 - 49 and the 0 - 19 age groups.

The recommendation for this finding is more internal than external. The Forest needs to make its own people aware that this group is not just out there; they are familiar with the area and they have an interest. Many are family groups. This is consistent with one underlying concept of the White Mountain National Forest's recreation management principles - to provide family oriented recreation opportunities.

This report itself has heightened the awareness and the knowledge of the condominium owner public, but only to a limited number. *An effort should be made to provide the information from this report to other employees. A summary should be sent to all employees and the results should be brought up and discussed at the Ranger Staff and annual Forest recreation meetings.*

Income and education levels. These people generally have high education and income levels.

This data verifies the generally accepted opinion that this group is highly educated and highly salaried. The ramifications of this information is represented by the assumed political knowledge, influence, and ability to make changes that this group represents. The earlier discussion of the market area (historic recreation use and the condominium users) alludes to historical impacts from similarly positioned groups. The same objective discussed there applies here as well. *The Forest needs to work with this group so they are aware of what we do and which of those activities are beneficial to them so we can be allies.*

Knowledge and perception of the Forest Service and its activities. The condominium owners perceive the White Mountain National Forest as being used, and should be used, to provide a balance of resource outputs.

It was surprising and gratifying to see the balanced outlook these people had about the Forest. They seem to accept the concept of a "working forest". Because of this it should be easier to work with this group in telling them "our story". This is not just a fortunate accident but the results of years of integrated, scientific resource management using large components of public (not necessarily this particular public) involvement. *The Forest needs to maintain these efforts.* On the other hand the Forest needs to be aware of the important differences they perceive such as snowmobiling activities.

Activity involvement. The activities this group is involved in are weighed heavily toward the social and non forest related types but there is a component of forest related activities.

Although most of the identified recreation activities don't fit what can be provided there are some that fit the Forest mandate. Many of these we have already identified as an emerging need such as dayhiking and groomed crosscountry skiing. The connection between alpine skiing and the developments themselves is obvious. There are other activities like driving for pleasure that have always been known but about which very little has been done until recently. If the Forest is to reach these people through recreation activities it appears these are the ones to be worked through. *The Forest should be marketing its programs in Scenic Byways, crosscountry permit areas, and dayhiking trails to the condominium owner community.*

Obtaining local information. More than 80% replied that they received their local information from published information.

The management recommendation based on this data is straightforward. *The Forest should be getting help to put White Mountain National Forest information in local publications and marketing the Forest through these same publications.*

Their concerns and their likes. These people are here for the scenery and natural views and they are concerned about overdevelopment just as many others are.

The Forest is obviously aware of the need for scenic beauty. It's been a concern for years and it matches with the views of this group. It appears the Forest has been doing a good job in visual management because timber has been cut on the Forest for over 75 years and the visual quality of the mountains is still recognized. *Continuing with concern for the visual in Forest management practices is the recommended direction.*

The Forest is aware of the concern about overdevelopment. Many of these concerns are related to private land development and Forest effects are only secondary, but the potential impacts of White Mountain National Forest decisions on surrounding private lands holds our greatest potential for addressing this concern.

RESIDENTS' PERCEPTIONS OF RECREATION DEVELOPMENT AND LAND USE WITHIN THE ADIRONDACK PARK [1]

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During the summer of 1989, 330 Adirondack Park residents were interviewed using a mail questionnaire regarding their perceptions of recreation development and changing land use within the Adirondack Park. The results of the data collected indicate that park residents perceive negative environmental impact occurring from growing recreation development. This paper examines this finding as it relates to recreation, the forest products industry and the Forest Preserve within the Adirondack Park.

Introduction

The Adirondack Park is the prototype for multiple purpose land use areas in the United States. It combines private and public lands in a unique six million acre preserve (60% private and 40% public ownership) that is approximately the size of the entire state of Vermont, and is one million acres larger than Yellowstone, Yosemite, Grand Canyon, and Olympic National Parks combined (Liroff and Davis, 1981). Within the Park's boundaries are 2,300 lakes and ponds, 1,200 miles of river, 30,000 miles of brooks and streams, 43 state camp grounds, 2,000 miles of hiking trails, 42 peaks over 4,000 feet in elevation, a forest products industry that controls 1.1 million acres of private land, numerous theme parks, "upscale" shopping districts and other "tourist attractions," and, often overlooked amidst this physical inventory, nearly a quarter of a million permanent and seasonal residents. Several million visitors each year make the park one of the premier recreation areas in the nation.

Consumptive land use activities threatened to render the Adirondack region an ecological disaster area in the late 1800's. New Yorkers responded to this threat by protecting the region with a "forever wild" clause in State Constitution in 1892, and two years later by giving the region (park) status. The Forest Preserve (public lands) within the Adirondack Park remain the only state constitutionally protected wilderness in the United States. In the early 1970's, the park was strengthened by the creation of an administrative body, the Adirondack Park Agency (APA), which included in its powers the authority to approve all new private land uses of potential regional impact (Graham, 1978).

Despite these protections, the Adirondack Park faces challenges today that are perhaps as threatening as any in its history. Recent low energy costs and relatively inexpensive land prices have dramatically increased development pressures in the park. A few statistics illustrate the magnitude of the problem. Between 1985 and 1987 the average price per acre paid by New York State to acquire land within the park rose from $140 to $275 (Gallagher, 1987), and some privately owned lands have increased in value by 50 to 60 times during recent years (Witkin, 1987). In 1988 the number of permit applications for construction or subdivision increased 57% over the previous year, and the Adirondack Council (a regional citizen's watchdog group) reported that 11 large development projects, ranging from 32 to over 100 units, were in the planning stages throughout the park (Barth, 1988). These trends are especially alarming when seen in the context of estimates that the current Adirondack Park Agency (APA) zoning plan would allow for an additional 500,000 new homes and 1.5 million new residents (Barth, 1988).

These development pressures have altered economic and social relationships within the park. For example, forest products companies with substantial timberland holdings have been targeted by corporate speculators. "The full value of such land is often not reflected in the price of a forest product companies stock. Thus a buyer with little interest in forest products can purchase a company for the price of the company's stock, break it into its various components-such as processing plants and timberlands, and sell them separately for a substantial short-term gain" (Commission on the Adirondacks in the 21th Century, 1989). One such takeover, the Diamond International Corporation by English corporate raider Sir James Goldsmith, resulted in the sale of a large tract of Adirondack lands to land-speculator Henry A. Lassiter. This sale catalyzed environmental groups and the media to detail the threat posed by such transactions to the "open" character of the Adirondack Park (Kunstler, 1989, Barth, 1988, and Bauer, 1988).

[1] This work is the result of research sponsored by the State University of New York Research Foundation and the State University of New York College at Cortland Faculty Research Program

Responding to these concerns, New York State Governor Mario Cuomo constituted the Commission on the Adirondacks in the 21st Century: to study impacts related to tourism and commercial recreation development, changing land use of the forest products industry, environmental threats (i.e. acid rain), and the seemingly inability of state agencies to effectively protect the park from negative land use impacts. As part of its study, the commission held a series of public meetings throughout New York on the future of the Adirondack Park. The meetings held within park boundaries were often contentious, with residents complaining that they felt threatened by some proposed regulations. One commission member, Robert Flacke, has publicly threatened to release a minority report that addresses the needs of the park's permanent residents. Flacke stated that, "the commission should conclude a report that would give the people of the Adirondacks the same opportunities that the rest of the citizens have, opportunities for communication, for education, for sending their children to college, for making a decent wage and having good health care" (Edwardsen, 1990).

The perceptions of the nearly 1/4 million park residents are crucial to the future of the park. A systematic study of resident's perceptions of development and related changes to the park provides a valuable supplement to the anecdotal information collected through public meetings and the media. Residents' perceptions of the Adirondack Park and the agencies that govern it, are essential in developing park policies and procedures for the future. Finally, understanding park residents may be one of the keys to developing a "park feeling" in the Adirondacks, something which is often cited as lacking by park experts like George Davis, Executive Director of the Commission on the Adirondacks in the 21st Century (Barth, 1989).

Procedures

With guidance from the APA, the New York State Department of Environmental Conservation, the Adirondack Council, the Northeast Forest Lands Study, and drawing on an earlier survey of Adirondack landowners conducted by Cornell University's School of Rural Sociology, a survey instrument was designed to measure behaviors, beliefs, and characteristics of park residents. Specific questions were cast in five general dimensions: demographics, recreation, development and environment, park management, and the forest products industry.

A random sample of households residing within park boundaries was drawn by Survey Sample, Inc. of Norwalk, Connecticut, which advertises a comprehensive data base for mail samples accessing over 78 million homes and addresses, and representing over 88 percent of all U. S. households. After two mailings, 330 responses were gathered from deliverable addresses. A phone survey of a random sample of non-respondents which will estimate the degree of bias introduced by self-selection in the mail survey is planned for the summer of 1990.

Demographics

The typical respondents in the study were male, 55.5 years of age, and had lived in the park for all or most of their adult life. Respondents resided in the park for an average of 10 months each year, averaged 14.2 years of schooling, and had a median income of $30,000. Only 8 percent of the respondents rented their home. Of the 42 percent that owned property, 7.5 percent owned 25 acres or more and 3 percent owned 100 acres or more. Thirty-three percent of the respondents were retired or semi-retired.

Some of these characteristics, especially the relatively high income and education levels, do not fit the typical perception of Adirondack residents. There are two plausible explanations for this mismatch: the respondents are not representative of Adirondack residents, and the demographics of the region are changing. It is probable that both explanations contribute to some degree. Higher response rates for individuals with higher-than-average income and education is a well-documented occurrence in mail surveys (Dillman, 1978), but there is also evidence that the demographics of Park residents are moving towards the profile described above (Commission on the Adirondack Park in the 21st Century, 1989; Shaw, 1990). More conclusive evidence on this topic would emerge from the 1990 census and the survey of non-respondents outlined above.

Results and Discussion

The results from the Adirondack Park Resident questionnaire provide an interesting insight into resident perception. In reviewing the results, resident responses are discussed in relationship to four land use issue areas. These areas are: development, recreation, the Forest Preserve, and the forest products industry.

Development

Based on responses, residents perceive that development within the Adirondack Park is occurring too fast, having a negative impact on the park, and that people who live outside the Park are largely responsible for these changes. The data presented in Table 1 shows that by a wide margin, respondents felt the rate of development within the park was too fast (58.6% reported it is occurring too

fast). In comparison, only 7.7 percent of subjects felt that development was too slow. As a result of the increased rate of development, an overwhelming majority (72.7%) of those who responded perceived the character of the Adirondack Park is changing (see Table 2 for complete results for this question). Table 3 reports the effect Adirondack Park residents believe the change in character is having on the park. As can be seen, 63.9 percent of the respondents perceive environmental conditions within the Adirondack Park as declining. In comparison, 6.7 percent of subjects see environmental conditions improving. Interestingly, a similar percentage (7.7%) of respondents also thought the rate of development (Table 1) was too slow.

Table 1. Adirondack park residents' perceptions of the rate of development within the Adirondack Park n=324

Perception of Development	Frequency	Percent
Too Fast	190	58.6
About Right	86	26.5
Too Slow	25	7.7
Don't Know	23	7.1
Total	324	≈ 100.0

Table 2. Adirondack Park residents' perception toward whether increased development is changing the character of the Adirondack Park n=330

Development is Changing the Character	Frequency	Percent
Agree	240	72.7
Neutral	35	10.6
Disagree	43	13.1
Don't Know	12	3.6
Total	330	100.0

Table 3. Adirondack Park residents' perception of environment conditions within the Adirondack Park n=327

Perception of Conditions	Frequency	Percent
Improving	22	6.7
About Same	96	29.4
Declining	209	63.9
Total	327	100.0

When asked who is responsible for increased development within the park, 56.2 percent of the subjects believe people who live outside the park boundaries are responsible, while 43.8 percent of those responding felt development responsibility falls either on people who live in the park or equally on people who live inside; and people who live outside the park boundaries. However, the majority (64.9%) of residents sampled believe that New Yorkers who live outside the Adirondack Park have too much control over what happens in the park (complete response to both of these questions can be seen in Tables 4 and 5). One argument often used to offset concern over environmental and quality of life changes due to increased development is the economic benefit that will be gained by local residents primarily due to the creation of new jobs. When residents sampled were asked whether jobs created by development are worth the changes they cause in the Adirondack Park, almost three to one (64.9% to 26.4%) responded that they felt jobs were not worth the associated changes (see Table 6 for complete response to this question).

Table 4. Adirondack Park residents' perception of who is responsible for new development within the Adirondack Park n=324

Perception of Responsibility	Frequency	Percent
People Outside Park	182	56.2
People Inside Park	36	11.1
Inside/Outside=Equally	106	32.7
Total	324	100.0

Table 5. Adirondack park residents' perception of the amount of control New Yorkers who live outside the Adirondack Park have over what happens in the park n=328

Perception of Control	Frequency	Percent
Too Little	20	6.1
Too Much	213	64.9
Enough	62	18.9
No Opinion	33	10.1
Total	328	100.0

Table 6. Adirondack Park residents' perception of whether jobs created by development are worth the changes they cause to the Adirondack Park n=322

Table 6 continued

Perception Towards Jobs	Frequency	Percent
Jobs Worth Changes	85	26.4
Jobs Not Worth Changes	209	64.9
Don't Know	28	8.7
Total	322	100.0

As a result of the questions asked of Adirondack Residents regarding development, it seems apparent that those sampled perceive development as having a negative impact on the park. Residents also feel they do not have control over what is happening in the park from a developmental perspective. Finally, potential economic gains associated with development do not appear to overcome residents' desire to protect the environmental quality in the park and their associated present quality of life. These findings are seemingly contrary to popular belief about Adirondack Park residents. Recent media articles (Kunstler, 1989; Bart, 1989, 1988, Bauer, 1988 and Gallagher, 1987), and the results of public hearings (October 1989) for park residents concerning future development would suggest those living within park boundaries place a higher priority on personal economic gains than on protection of environmental quality. This idea, in light of the fact that park residents per capita income in 1985 was only 72 percent of the state average (Commission on the Adirondack Park in the 21st Century, 1989), makes sense. However, the results of this study would indicate that there are at least a large subgroup of Adirondack residents who believe protection of the park's environmental quality is more important than economic gains at the expense of degradating the natural environment of the park.

Recreation

Subject responses to questions regarding recreation opportunities within the Adirondack Park indicate park residents participate in a variety of outdoor recreation activities, mainly on private lands, and believe there are enough recreation opportunities within the Adirondack Park. Table 7 shows frequency of response data for activities participated in by subjects within the Adirondack Park. As would be expected of a rural natural resource-based area, outdoor recreation activities such as hiking (30%), fishing (23%), hunting (19%), and camping (14%) are predominant recreation pursuits. Subject responses indicate that most recreation activities take place on private lands (50.2%) with only 25.6 percent of respondents recreating on state Forest Preserve lands within the park (complete response to this question can be seen in Table 8). When questioned about the adequacy of recreation opportunities within the Adirondack Park, resident subjects overwhelmingly agreed that there are enough recreation opportunities within the park (see Table 9 for complete results for this question). The response to these questions regarding recreation within the Adirondack Park would seem to indicate that the quality and opportunity for diverse outdoor recreation activities continues to remain high even though park residents believe the environmental quality of the park is declining due to new development.

Table 7. Recreation activities participated in by Adirondack Park residents on Forest Preserve land n=333

Activity	Frequency	Percent
Hiking	101	30.0
Fishing	78	23.0
Hunting	82	19.0
Camping	48	14.0
Boating	34	10.0
Swimming	25	8.0
Skiing (Downhill)	25	8.0
Skiing (X-Country)	20	6.0
Canoeing	20	6.0
Other Activities	57	17.0

Table 8. Where Adirondack residents recreate in the Adirondack Park n=289

Location of Recreation	Frequency	Percent
On Private Lands	145	50.2
On Town/Village/ County Lands	70	24.2
On State Forest Preserve Lands	74	25.6
Total	289	100.0

Table 9. Adirondack Park residents' perception of the adequacy of recreation opportunities in the Adirondack Park n=332

Enough Recreation Opportunities	Frequency	Percent
Agree	223	67.2
Neutral	32	9.6
Disagree	59	17.8
Don't Know	18	5.4
Total	332	100.0

Forest Preserve

The unique protection of public lands (Forest Preserve) in the Adirondack Park by the New York State Constitution provides the precedence for comprehensive management and regulation of these lands by the New York State Department of Environmental Conservation (DEC). Similarly, activities on associated private lands within the Adirondack Park are planned for and regulated by the Adirondack Park Agency (APA). Park residents' understanding of the constitutional protection of the Forest Preserve is paramount to their understanding of how state agencies (DEC and APA) manage land use within the park. Surprisingly, when asked if the Forest Preserve was protected by the New York State Constitution, the majority of residents sampled (53.2%) did not know the answer or incorrectly answered this question (see Table 10 for complete results to this question). When specifically questioned about state management of the Forest Preserve within the Adirondack Park, the majority of those who responded (55.6%) believed there was adequate access to Forest Preserve lands, and 45.2 percent of those sampled perceived that Forest Preserve lands were not overused (see Tables 11 and 12 for complete results to these questions). However, when asked whether or not Forest Preserve lands are being properly managed, the modal response to this question show 36.9 percent of those who responded do not believe the Forest Preserve lands are being managed properly (complete response to this question can be seen in Table 13). Similarly, park residents, by a small majority (44.1% to 32.4%), believe that there are too many rules and regulations governing what residents can do in the Adirondack Park, although 76.9 percent feel that some rules are needed (see Tables 14 and 15 for complete results to these questions).

Table 10. Adirondack Park residents' knowledge of the protection of the Forest Preserve by the New York State Constitution n=329

Forest Preserve Protected By the Constitution	Frequency	Percent
Yes	154	46.8
No	16	4.9
Don't Know	159	48.3
Total	329	100.0

Table 11. Adirondack Park Residents' Perception of the adequacy of access to Forest Preserve lands in the Adirondack Park n=331

Enough Access	Frequency	Percent
Agree	184	55.6
Neutral	25	7.6
Disagree	90	27.2
Don't Know	32	9.7
Total	331	≈ 100.0

Table 12. Adirondack Park Residents' perception towards whether Forest Preserve lands in the Adirondack Park are overused n=330

Forest Preserve Lands Are Overused	Frequency	Percent
Agree	69	21.0
Neutral	63	19.1
Disagree	149	45.2
Don't Know	49	14.8
Total	330	≈ 100.0

Table 13. Adirondack Park Residents' Perception towards whether Forest Preserve lands in the Adirondack Park are properly managed n=331

Forest Preserve Lands Are Properly Managed	Frequency	Percent
Agree	80	24.2
Neutral	83	25.1
Disagree	86	36.9
Don't Know	82	13.9
Total	331	≈ 100.0

Table 14. Adirondack Park residents' perception towards whether there are too many rules and regulations governing what residents can do in the Adirondack Park n=331

There Are Too Many Rules and Regulations	Frequency	Percent
Agree	146	44.1
Neutral	68	20.5
Disagree	107	32.4
Don't Know	10	3.0
Total	331	100.0

Table 15. Adirondack Park residents' perception of the need for rules to regulate what people do in the Adirondack Park n=324

Residents' Perception	Frequency	Percent
Rules Are Needed	249	76.9
No Rules Needed	69	21.3
No Opinion	6	1.9
Total	324	≈100.0

Subject responses to these questions would suggest that residents do not understand the unique constitutional protection of the Forest Preserve and the impact that this protection has on the region where they live. Frustration with and lack of understanding about the bureaucracy that manages and regulates what happens in the park may be appearing in subject responses. This finding may help explain the seemingly contradictory results of residents' positive perception towards Forest Preserve lands (adequate access and not being overused) while not uniformly agreeing that Forest Preserve lands are being properly managed.

Forest Products Industry

The forest products industry is perceived by resident respondents as an important component of the Adirondack Park. When asked about the effect the forest products industry has on the Adirondack Park, 42.2 percent of those sampled believe the forest products industry has a positive effect on the park. In comparison, only 28.9 percent of respondents viewed the effect to be negative (see Table 16 for complete results for this question). Similarly, residents felt the forest products industry should "keep production levels the same" (55.2%) or "increase production levels" (15.5%). Only 23.6 percent of those who responded believe the production level should be decreased (see Table 17 for complete results for this question). Interestingly, park residents respondents felt so strongly about the valuable role that the forest products industry plays in the Adirondack Park that 73.6 percent believe New York State should provide the forest products industry with incentives (tax incentives, technical assistance, subsidies, etc.) to keep their land in production. Only 11.8 percent of the sample disagreed with the idea of incentives (see Table 18 for complete results for this question). Finally, when asked who should have the first opportunity to purchase forest products lands when they are put up for sale, over a two to one margin (61.2% to 29.4%) of park residents believe New York State should be given the first opportunity (see Table 19 for complete results for this question). This finding concurs with subject response to the general idea of New York State purchasing more public land in the Adirondack Park. Fifty-two percent of respondents believe the state should purchase more public land in the park. However, the residents are equally split (29.2% agree and 29.2% disagree) on their perception of how good a job New York State has done in the past in acquiring new public lands for the Adirondack Park (see Tables 20 and 21 for complete results for these questions).

Table 16. Adirondack Park residents' perceptions of the effect of the forest products industry on the Adirondack Park n=325

Residents' Perceptions	Frequency	Percent
Negative Effect	94	28.9
Positive Effect	137	42.2
No Effect	36	11.1
No Opinion	58	17.8
Total	325	100.0

Table 17. Adirondack Park residents' perception of the forest products industry production level in the Adirondack Park n=330

Residents' Perceptions	Frequency	Percent
Increase Production	51	15.5
Decrease Production	78	23.6
Keep Production Same	182	55.2
No Opinion	19	5.8
Total	330	≈ 100.0

Table 18. Adirondack Park residents' perceptions towards whether New York State should provide the forest products industry with incentives to keep their land in production n=330

Should Provide Incentives	Frequency	Percent
Agree	243	73.6
Neutral	35	10.6
Disagree	39	11.8
Don't Know	13	3.9
Total	330	≈ 100.0

Table 19. Adirondack Park residents' perception towards whether New York State should be given first opportunity to purchase forest products industry land when they are put up for sale n=333

Should Be Given First Opportunity	Frequency	Percent
Agree	204	61.2
Neutral	24	7.2
Disagree	98	29.4
Don't Know	7	2.1
Total	333	≈100.0

Table 20. Adirondack Park residents' perception towards whether New York State should purchase additional land in the Adirondack Park n=329

Should Purchase Additional Lands	Frequency	Percent
Agree	171	52.0
Neutral	23	7.0
Disagree	123	37.3
Don't Know	12	3.6
Total	329	≈100.0

Table 21. Adirondack Park residents' perception towards whether New York State has done a good job acquiring new land in the Adirondack Park n=329

Has Done A Good Job In Acquiring New Land	Frequency	Percent
Agree	96	29.2
Neutral	61	18.5
Disagree	96	29.2
Don't Know	76	23.1
Total	329	100.0

The forest products industry controls over one million acres; nearly a third of all private lands within the Adirondack Park. From the data collected, it seems apparent that park residents view the forest products industry as important in protecting the character of the park. Residents may believe that if forest products industry lands go out of production, these lands would then be sold for commercial development. As previous results have shown, residents believe increased development is changing the character of the Adirondack Park (Table 2). Consequently, park residents may equate the protection of the forest products industry through state incentives as a way of protecting the Adirondack Park by reducing th opportunity for new development. Logically, park residents believe that if forest product lands are going out of production, the State of New York should buy them so these lands could be added to the forest preserve, which would also protect them from development.

Conclusions and Recommendations

The results of this study would indicate that park residents perceive the development rate within the Adirondack Park as being too fast which is, in turn, changing the characte of the park primarily through declining environmental quality. Since most of the new development within the park is tourism and commercial recreation related, it can be speculated that much of residents' concern over development is related to changes in the visual and social environment as opposed to actual degradation of the physical environmer (air pollution, water contamination, etc.). This can partially be seen in the fact that the opportunities for outdoor activities as perceived by residents are adequate and that forest preserve lands are not perceived as being overused. Consequently, much of the change in character of the park as viewed by residents may be associated with increased crowding, changing landscapes (natural to vacation homes, tourism supported businesses, etc.) and changing community composition (rural/traditional to seasonal/recreation). Associated economic growth (i.e., jobs) does not appear to offset residents' negative view of increased development.

Increased interaction between New York State land use regulatory agencies and park residents may help alleviate residents' sense of loss of control to those who live outside park boundaries and to some degree help coordinate planning for future growth. However, as the results of this study point out, park residents are not knowledgeable concerning the constitutional protection of the Forest Preserve. Consequently, park residents may not understand the different management mandates under which the Departmer of Environmental Conservation and Adirondack Park Agency work. This misunderstanding may play a major part in the historical animosity between park residents and Adirondack Park management agencies. A public education program directed at park residents which wou explain the unique land management concept under which the Adirondack Park is based on, along with the specific roles of DEC and APA may allow for a more productive atmosphere i which residents and agency personnel can cooperate in working towards resolving problems related to development.

Finally, park residents perceive the forest products industry as being important in protecting the character of the Adirondack Park. This protection of the park is primarily related to keeping the forest products industry land in timber management and not letting these lands become available to be sold for commercial recreation and tourism development. Although simplistic in design, residents' perceptions of the importance of supporting the continuation of a strong forest products industry in the Adirondack Park needs to be pursued by appropriate New York State agencies and where feasible, new public lands should be acquired for the park when the forest products industry makes them available.

The Adirondack Park is at a crossroads. Understanding park residents' perceptions concerning changing land use is an important step to beginning the process of planning and managing for the Adirondack Park of the future.

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THE EFFECTS OF THE INDIVIDUAL, SPATIAL ACCESSIBILITY AND ACTIVITY ON RECREATIONAL TRAVEL DEMAND[1]

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Traditional recreation demand modeling fails to account for multiple destinations visited by recreators. This research investigated the individual travel choice of outdoor recreationists. The degree to which park diversification was influenced by the individual's socio-economic background, relative accessibility of resource opportunities and the purpose of the trip was identified. Participation in various outdoor recreation acitivities was found to be the best predictor of travel behavior.

Introduction

In order to manage park resources, planners and managers need to assess the demand for recreation. Traditionally, recreation participation has been thought to be a function of various factors, including socio-economic characteristics, site attractiveness and availability, and on-site experiences (i.e. the presence or absence of congestion). Socio-economic characteristics often dictate the extent of the opportunity for an individual to recreate (Smith and Munley 1978). Site attractiveness measures describe the observed or perceived attributes of the park. These resources will act to modify how much time the recreator actually allocates to an activity (Cicchetti et al. 1969). Finally, the on-site experience may influence future recreation demand. When incompatible activities come into contact with one another, conflict may occur (i.e., Jacob 1977) and change future park selection.

This research seeks to investigate these influences on the travel demand. First, a background literature review will be provided. Next, the data for analsyis and the model will be introduced. The results of the analysis are then given and the paper will conclude with a discussion of recreation travel demand estimation.

Literature

Travel occurs because people seek alternatives in space where participation in some activity takes place. Besides wishing to understand why people travel, a primary goal of travel research is to understand what factors might influence the decison making process (Burnett 1981). In this manner, planners can identify the determinants of patronage patterns in order to estimate the returns on investments. In particular, recreation travel is assumed to be a function of the individuals' socio-economic and demographic characteristics, the relative availability of alternative park resources and the activity chosen for participation. Each of these factors can influence the demand for recreation and will be addressed in the literature review.

Travel Behavior

Recreation travel behavior is considered to be an example of utility maximizing behavior (Hanson 1980). However, unlike travel to work, recreation choice behavior is voluntary. Early attempts at recreation demand modeling are best typified by aggregate gravity models. Because demand is estimated by an aggregate approach, Timmermans and Van der Heijden (1987) argue against using these techniques because the utility functions of individuals are "lumped" together. Dissagregate techniques (or behavorial models) allow for a much refined definition of the individual recreator's preferences (Young and Smith 1979).

Recreation travel behavior can be viewed in one of two ways; either people visit the same place repetitiously or they tend to exhibit diversified travel. For example, some people may elect to visit the same fishing hole time and time again while others seek variety in choosing places to hike. It has long been thought that much of travel was exemplified by repetitious patterns. Marble and Bowlby (1968) found people would repeat visits 75% of the time indiciating a degree of travel concentration. Recently, geographers have questioned this belief attributing these findings to poor research design (Hanson and Huff 1988).

Hanson (1980) reviewed the travel behavior literature and found several possible explanations of variety or diversified travel behavior. First, an individual may be motivated to diversify travel from the desire to reduce uncertainty by learning about the available options. Second, travel diversification may result from an interest to spread risk by developing a portfolio of regularly visited destinations.

A third possibility for travel diversification may come about because of temporal, spatial and modal constraints. In a recreation context, this could be the experience for the family who takes a weekend picnic at the local state park and goes to the Great Smoky Mountains for the family vacation. Another reason Hanson (1980) found, was the need to reduce boredom by adding variety. This serves to stimulate interest in the National Park Services' "Passport" program where visitors collect the passport stamp for each of the NPS properties. Fifthly, a recreator may seek different destinations for different reasons. Hanson (1980) concludes her review by identifying the unique nature of spatial diversification among several types of activities. Certain activities are shown to encourage diversification and an example would be going to restaurants. On the other hand, people tend to visit the same gas station or the same post office.

Socio-economic and Demographic Characteristics

The Outdoor Recreation Resource Review Commission (ORRRC) report in 1962 found that certain user characteristics were highly correlated with participation. A more recent review by Walsh (1986) identified factors significant in explaining recreation participation. Education is one and has been shown to vary systematically with participation. Income is a limiting factor on demand, since it constrains rather than produces the experience.

[1] This paper is based, in part, from the authors' Doctoral dissertation at the Department of Geography, Southern Illinois University at Carbondale.

Other socio-economic and demographic characteristics include race, place of residence, occupation and marital status. Race is an important issue in outdoor recreation provision, since the non-white population in the United States are projected to exceed the white population (Hartmann and Overdevest 1990).

Alternative Destinations and Spatial Structure

Spatial structure refers to the effects of alternative park destinations on travel. Cordell and others (1985) recognized the demand model is incomplete without considering the available market. Their findings stem from the earlier work of Rushton (1969) who suggested that because alternative destinations may be located differently with respect to individual visitors, one should expect visitors to exhibit different patronage patterns.

Consider Figure 1. A household facing a relative abundant supply of recreation opportunities in Figure 1a might be expected to participate more often and at more sites than those households in an inaccessible region (Fig. 1b). The question that remains is how to measure spatial structure. Pirie (1979) reviewed the accessibility literature and found four broad categories of measure that have been used to define accessibility, including cumulative opportunity. This approach provides an index for accessibility to sites according to the number of alternative destinations within each distance zones. Opportunity indices have been tested in recreation demand studies and has been shown to improve demand estimation (Lieber et al. 1989). Since this procedure is simple and maintains individual level data, it is chosen for this research.

Activity Choice

Another major problem in projecting recreation demand has been the failure to recognize that the chosen activity is undertaken at a specific park resource and is therefore intrinsically linked to the physical resource base. This relationship is important since it is the resource base that is managed for the provision of the recreation experience (Driver et al. 1987). In considering water based environments Ditton and others (1975) found the environmental variables were major determinants of travel behavior. For example, "Fishing in a stream is quite unlike trolling in Lake Michigan, and the activity at a beach is quite unlike that of a pool" (Ditton et al. 1975:292). Because of these differences, different travel strategies can be expected for different activities.

The Data

The analyses identified in this research is based on the Illinois Department of Conservation household data gathered for the 1979 Illinois State Comprehensive Outdoor Recreation Plan (SCORP). The project utilized a random telephone survey. The questionnaire included personal, socio-economic and demographic information about the household, levels of participation in 20 different outdoor recreation activities and the places where each activity took place. For each household the total number of activities participated in over the previous year were tallied as well as the total number of unique park resource destinations visited for those activities.

In order to identify the available market for each household, the spatial opportunity indices were calculated. The number of public recreation facilities were counted in 25 mile increments, up to 100 miles (measured in euclidean distance). The indices were standardized in order to measure the availability of recreation opportunities with respect to the maximum available within each travel zone. This procedure eliminates the bias of the increased areal size of travel zones as one travel further from the household origin.

The final sample size for this study is 6,474 households who participated in at least one activity and traveled to at least one destination.

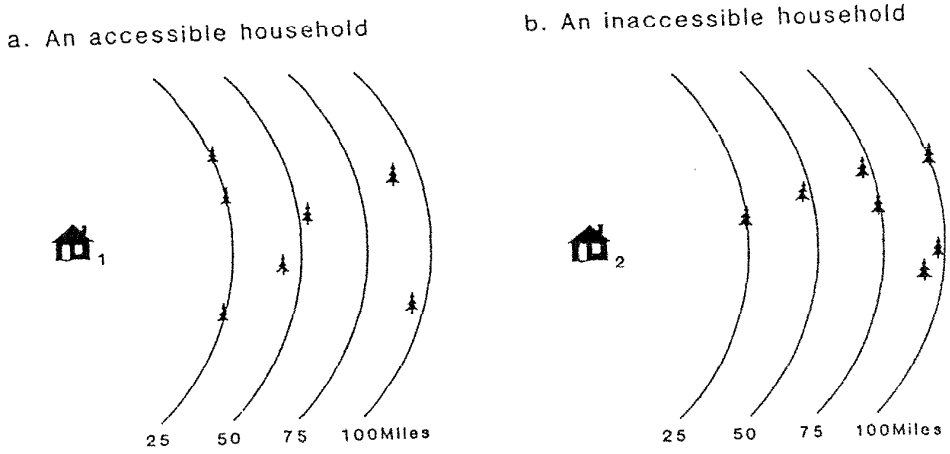


Figure 1. Relative Accessibility of Park Destinations.

The Model

Conceptually, one can illustrate the possible relationships between the number of park destinations visited and the number of activities selected by a household (see Fig. 2). A slope of unity (1) is found when each activity is totally destination-dependent and all other activities are not found at that resource. A waterslide may be an example of this. Any deviation from this line indicates a tendency of recreators to either visit several sites or concentrate visits at a single area.

Some activities should lead to a decrease in the number of alternative destinations chosen relative to the number of activities that are undertaken by recreators. A slope of less than one illustrates this relationship where people continue to visit the same park time and time again either for many activities or just a few. Alternatively, people may seek variety in the park setting and visit more parks. This travel diversification may be the result of conflict at a earlier visit or because of some function of the richness (availability) of alternative parks.

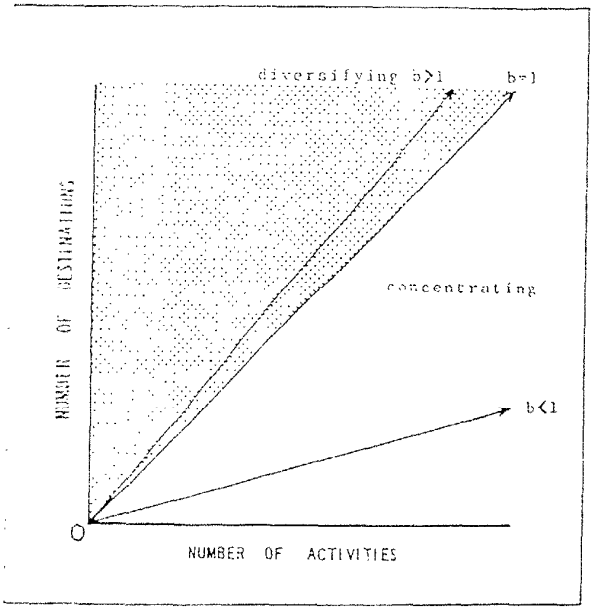


Figure 2. Hypothetical Relationship between number of park destinations and number of activities (Fesenmaier and Lieber 1988).

Results

This section specifies the procedure to test the model. To evaluate recreation demand as a function of the individual, spatial structure and activity, a multiple regression equation was calibrated incorporating an ordinary least squares (OLS) regression. The results of this analysis is provided in Table 1. Positive parameter estimates indicate the propensity of that factor to influence travel diversification whereas the negative estimates influence travel concentration. A strong correlation is found between the explanatory variables and travel diversification. Over 50% of the variance is explained in this model and is statistically significant at the 0.0001 level.

Table 1. Multiple Regression Analysis for Participation in Recreation Activities, Socio-economic Characteristics and Spatial Structure

Variable	Estimate	Significance
Intercept	0.8847	0.0001
Canoe/Rivers	0.7544	0.0001
Canoe/Lake	0.3393	0.0001
Sailing	0.4992	0.0001
Boat < 10hp	0.5566	0.0001
Boat > 10hp	0.6745	0.0001
Day Hiking	0.6806	0.0001
Backpacking	0.6781	0.0001
Group Camping	0.6142	0.0001
Camping enroute	0.9303	0.0001
Primitive Camping	0.5492	0.0001
Drive to Camp	0.7424	0.0001
Bicycling	0.7086	0.0001
Horseback Riding	0.6194	0.0001
Snowmobiling	0.4606	0.0001
OR Motorcycling	0.6745	0.0001
OR Driving	0.5190	0.0001
Beach Swimming	0.6668	0.0001
Pool Swimming	0.7332	0.0001
Lodging w/ Kitchen	0.5624	0.0001
Lodging w/out Kit	0.7957	0.0001
% of Max. Parks (0-25 miles)	-0.0030	0.0339
% of Max. Parks (26-50 miles)	-0.0030	0.0186
% of Max. Parks (51-75 miles)	0.0000	0.9806
% of Max. Parks (76-100 miles)	-0.0013	0.2078
Education (yrs.)	0.0213	0.0040
White/Non White	0.2286	0.1753
Student/Non-student	0.0924	0.1753
Own Home	0.0217	0.6438
Live in Suburb	0.2480	0.0138
Live in Large City (pop. = 250,000)	0.0770	0.2634
Live in Mod. Town (pop. = 50,000)	-0.1010	0.0390

R-Square = 0.5145; Adjusted R-Square=0.5126; F-Value= 213.26; Prob>F=0.0001; DF=6472.

The high positive estimates for activity participation indicate that all activities influence park visitation. All activities are statistically significant at the 0.0001 level. Simply knowing what activity a household may participate in dictates to a great extent how many parks they may visit. For example, the high parameter estimate for camping enroute is characteristic of a family vacation and staying at a KOA type campground. Several different campgrounds will be patronized as the family travels. On the othe hand, the low estimate for canoe trips on lakes may illustrate a tendency to visit a favorite lake over and over again. This form of "brand loyalty" is consistent with the consumer behavior literature.

The spatial structure variables yield negative parameter estimates. Recall, that these are measures of the available market of park resources in the state of Illinois and large values for the measure is an example of a poor opportunity set. Small measures represent a rich opportunity set. The results in this part of the multiple regression equation show that only opportunities within 50 miles of the household are statistically significant. These measures, however, indicate a slight degree of travel concentration as the number of nearby facilities decrease below the maximum available in the state. This is also characteristic of visitation to many sites (or travel diversification) as the number of potential sites increase close to home. Beyond 50 miles, the measure of spatial structure become insignificant.

Most of the socio-economic variables have a positive parameter estimate (the variables identified here are a statistically significant subset of a much larger group that describe Illinois' citizens obtained through a step wise regression). This implies a tendency to increase park diversification as the measure increases in value. Educational attainment, race (binary code white equal one, zero otherwise) and whether or not the household lives in the suburb all influence statistically the park travel. Living in a moderately sized town of 50,000 yields a negative parameter and can help explain travel concentration for Illinois' recreators.

The analyses presented in this paper were evaluated using various procedures and only one model is presented here. A complete study is found in Bristow (1989).

Discussion

The purpose of this paper was to investigate the park visitation patronage for Illinois' recreators. Traditional demand models for recreation had often assumed repetitive travel behavior. Geographic literature suggests that variety seeking motivations which underlie destination diversification in travel behavior invalidates the earlier assumption of a stable utility function for recreation demand. To what extent this travel behavior varies in Illinois, was investigated here. Recreational travel is assumed to be a function of the household's socio-economic and demographic charateristics, the relative availability of alternative park resources, and the activity chosen for participation.

It was found in this paper, that the individual characteristics of the household were significant in estimating recreational travel, but overall, left much variation unexplained. Increased education, being white and living in a suburb all influenced travel diversification. For those Illinoians living in a moderately sized town, one could expect travel concentration. Therefore, it is anticipated that other factors can explain this type of recreation behavior. Despite these findings, other studies confirm the failure of household characteristics in predicting recreation travel (eg. Hanson and Hanson 1981).

The second area discussed in this paper considered the available market from which the recreators may choose from. Opportunity indices as a measure of accessibility were evaluated. Like the socio-economic variables, only limited explanation was found. Travel concentration was predicted when fewer sites are available nearby. This makes sense, since the opportunity must be there for the travel to occur.

Household participation in any of twenty different outdoor recreation activities was tested. Over fifty percent of the variance was explained with these variables alone and this increase only modestly when the socio-economic and spatial structure measures are added. These findings are the most important of this study; since simply knowing what type of activity one might undertake, can identify the magnitude of travel diversification. For instance, recreation planners can extrapolate the results for future recreation provsion. If you know how many people may camp enroute or stay in a lodge without a kitchen, you know that thes people tend to visit several sites or diversify recreation travel.

On the other hand, persons who canoe on lakes or may snowmobile, lean toward travel concentration. These findings are particularly important for resource provision, since needless capital expenditures can result from the over provision of some facilities and some potential demandunmet for those facilities yet to be constructed.

This paper has shown that site diversification can be adequately explained by simply knowing what type of recreation activity is selected. Some activities will encourage travel diversification, while others do not. The implications of the behavioral model tested are important for several reasons. First, individual choice models are policy sensitive. At the disaggregate level, individual differences can be identified to the degree to which they may contribute to recreation travel. Second, the data needed for this model is easy to obtain since only two types of information is needed: what do you do and where do you go?

Future unresolved questions include a need to find a beter measure of spatial structure. Accessibility measures have been shown to be significant in other studies of recreation demand and it is expected the influence should be present here. Another area of further study involves a refinement of how to measure participation. In this study, participation was a dichotomous variable; either yes or no.

Earlier calibration of the model utilized cardinal measures of participation (i.e., frequency) but problems in interpretation arose. Any steps in refining what factors influence the recreation decision-making process wil aid managers in the mandate of resource provision.

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MARKET SHARE ANALYSIS OF SELECTED RECREATION ACTIVITIES IN THE NORTHEASTERN UNITED STATES: 1979-1987

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An analysis of nine years of data for two recreational activities -- golf and tennis were undertaken to analyze market share trends and the distribution of participation by participation days and volume rate by supplier type in the Northeastern United States. Data were drawn from the 1979 through 1987 Simmons Market Research Bureau's *Study of Media and Markets* . Keywords. Golf, tennis, market share. public, private, marketing, trends, Northeastern United States.

Introduction

Research has shown that municipal recreation and park agencies serve a narrow and very limited range of clients (Howard and Crompton, 1984; Howard, 1984). On the other hand, research has also indicated public agencies are the market share leaders for tennis and provide a significant proportion of the demand for golf played in the United States (Warnick and Howard, 1985, 1987 and 1990). However, the leading position in the provision of tennis has eroded over the decade of the 80s for the public sector. Additional insights into the market analysis of golf indicate a rapidly changing marketplace. Furthermore, research has indicated that many activities differ by participation rates and market size when examined within a regional context (Warnick and Vander Stoep, 1990). Intense competition among recreational activity providers has resulted during the last decade with more private and non-profit firms vying for customers' loyalty. To be effective in marketing and planning in a more competitive marketplace, agencies must monitor their market shares. However, to date no regional market share analysis has been conducted to determine if regional market shares for the provision of activities are similar to national market share trends. In this regard, the Northeastern United States was selected to determine if such patterns exist at the regional level.

Market share analysis of selected public leisure services was first reported by Warnick and Howard (1985). In their study, participation rate data for a variety of selected recreational activities were examined by participation rates and participant profiles (use segments), and by three specific market share comparisons for golf, tennis and racquetball for the years 1979 through 1982. The first study was then updated in 1987 and included market share data from 1979 through 1985 (Warnick and Howard, 1987) and again in 1990 with market share data from 1986 and 1987 (Warnick and Howard, 1990). Unlike these other studies, the purpose of this study is to examine market share analysis within the Northeastern United States for the nine-year period of 1979 through 1987 for two activities -- tennis and golf.

Market share data, when examined within the nine year context of 1979 to 1987, provide an opportunity to monitor both longitudinal and regional trends of the public and private sectors. They also serve to address a number of important marketing questions at a more refined level. What have these trends indicated in regard to public agency management performance over an extended period of time within a specific region? Is there a clear trend toward privatization of the delivery of these activities within the Northeast? What strategic market concepts should or could public and private agencies apply? These questions among others served as the focus for this study.

Purpose of the Study. The purposes of this study were two-fold: 1) to examine market share data by suppliers for two recreation activities -- golf and tennis; and 2) to examine the distribution of participation in these activities by: a) volume size (number of participation days) and b) volume rate (activity play rates or days played per year) within the Northeast.

Methods

To analyze the market share data and the recreational participation rates, data were compiled from the annual surveys conducted by Simmons Market Research Bureau, Inc. (1979 through 1987). This research firm annually measures participation rates, demographic composition, and media use patterns of a wide variety of leisure and sport activities. Each respondent received a self-administered questionnaire which was followed by a telephone interview. The national sample sizes ranged from approximately 15,000 individuals in 1979 to 21,000 adults in 1987. Results were then projected to the adult population, aged 18 years and over, living in the coterminus 48 states of the United States. Respondents were asked questions regarding their participation in golf and tennis during the previous 12 months for the year in which the survey was administered. The respondents indicated the frequency of play or participation, their demographic characteristics, and their media usage patterns. Simmons Market Research Bureau (1987) goes beyond reporting these national statistics by providing information on where the recreational activity occurred or the identification of supplier type. Data were not available for 1981.

Respondents who played golf and/or tennis were asked to indicate where their participation occurred -- whether it was at a municipal, country club, private facility, daily fee or other facility (e.g., resorts, corporate fitness center, condominium complexes, etc.). A "do not know" category was also provided for those who could not recall where they played the activity. Respondents could select more than one facility category. These responses provide the opportunity to examine the distribution of play among the various suppliers for the two selected activities or to determine each supplier's market share. This information is further refined by providing data on the distribution of play by region. Simmons (1987) provides information by region for four areas of the United States: Northeast, South, Midwest or North Central and West. The Northeast includes all states North of the Mason Dixon Line (Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine).

The variables examined in this study include market share, distribution of volume levels of all players for tennis and golf and distribution of volume levels by players by

region by two volume levels (frequent and light to moderate), and participation days. Market share is the proportion of all activity days played in the activity that is held by each type of provider or facility. Market share is reported as a percentage. For golf, provider or facility types are defined as country clubs, private clubs, daily fee, public or municipal and other, which includes other unidentified private facilities and a "do not recall" category. For tennis, facility types are defined as country clubs, private clubs, public or municipal and other, which includes other unidentified supplier types and a "do not recall" category. The distribution of volume levels of all players for golf and tennis is defined in "activity days played" categories (1 to 4 days played, 5 to 9 days played, 10 to 14 days played, 15 to 19 days played, 20 to 24 days played, 25 to 29 days played, 30 to 39 days played, 40 to 49 days played, 50 to 59 days played, and 60 or more days played). Simmons (1987) provides the distribution of all players who play at each of these rates. By knowing the number of players within each category and assuming the median or midpoint of each category for the days played, an estimate of the volume or participation days played for each category may be obtained (by multiplying the number of players within each "days played" category by the midpoint of "days played" category). An estimate of total activity volume (participation days or user days) may be obtained by totaling the estimates of each category. A example of these calculations for golf is provided in Table 1.

Simmons further provides information by region (Northeast, South, Midwest and West) for all participants by two broad volume categories -- "frequent/moderate" players and "light" players. These broad volume categories are defined for the "light" participants as the activity day categories of 1 to 4 and 5 to 9 days played and for the "frequent/moderate" participants all categories above 10 or more days played. By knowing the distribution of players by these broad participant categories and the distribution of players within each of the smaller subcategories (i.e., for example, "light" players include days played categories 1 to 4 and 5 to 9 days played,etc.), one may obtained an adjusted volume of participation days by region. This adjusted volume of participation days can be converted to a volume rate by dividing the total adjusted participation days by the total number of players. This adjustment can be made for each region. Finally, since Simmons provides the number of players by supplier type, one may then calculate the volume (participation days) by supplier by multiplying the number of players who played at the selected facility (supplier type) by the volume rate. This assumes that volume rates are constant across all facility types. (This assumption is a limitation and will be more fully discussed in the closing section.) An example of these adjustments for golf is presented in Table 2. Market share percentage may then be calculated for each supplier once the total number of participant or activity days for each supplier are estimated. Participation rate is not a variable examined within the context of this study, but is referred to in this study from time to time. It is defined as the percent of the total adult population that participates in the selected outdoor recreation activity.

Selected Findings

Market share findings are presented first at the national level followed by the Northeastern U.S. regional analysis. This is followed by a brief presentation of the participation volume or user days played at each type of facility.

Table 1. Adjustments to volume rates of golfers and distribution of golfers by use level for 1987.
N= 173,681 (in thousands, US adult population in 1987)

Distribution of All Players by Days Played

No. of Days in 12 Months	Participants '000	Percentage of Total US Population	Percentage of Participants by Use Level	Part. Days within Category	Total Estimate Participation Days ('000)
1-4	6,696	3.9%	35.4%	2.8	18,414
5-9	3,413	2.0%	18.1%	7.0	23,891
10-14	2,209	1.3%	11.7%	12.0	26,508
15-19	1,289	0.7%	6.8%	17.0	21,913
20-24	1,465	0.8%	7.7%	22.0	32,230
25-29	742	0.4%	3.9%	27.0	20,034
30-39	825	0.5%	4.4%	34.5	28,463
40-49	361	0.2%	1.9%	44.5	16,065
50-59	489	0.3%	2.6%	54.5	26,651
60 or More	1,415	0.8%	7.5%	60.0	84,900
Total	18,904	10.9%	100.0%	15.8	299,068

Distribution by Region of Light and Moderate/Frequent Players

Region	Total Players ('000)	Percent Total Players	Moderate & Heavy Players ('000)	Percent Moderate & Heavy Players	Light Players ('000)	Percent Light Players
Northeast	3,360	17.8%	1,914	57.0%	1,446	43.0%
Midwest	6,611	35.0%	3,045	46.1%	3,566	53.9%
South	4,830	25.6%	2,251	46.6%	2,579	53.4%
West	4,102	21.7%	1,585	38.6%	2,517	61.4%
Total	18,903	100.0%	8,795	46.5%	10,108	53.5%

(Source: Simmons Market Research Bureau, Inc. Study of Media and Markets, 1987)

Table 2. Example of adjustment to volume rates by distribution of players at facility types in the Northeast for 1987.

Days Played Level	Name of Play Level	Players within Category (a)	Part.Days in Category	Total Estimate Participation Days ('000)
1-4	Light	1307	2.8	3,594
5-9	Light	668	7.0	4,676
10-14	Moderate	658	12.0	7,896
15-19	Moderate	385	17.0	6,545
20-24	Moderate	438	22.0	9,636
25-29	Heavy	220	27.0	5,940
30-39	Heavy	246	34.5	8,487
40-49	Heavy	107	44.5	4,762
50-59	Heavy	147	54.5	8,012
60 or More	Heavy	422	60.0	25,320
Total All Facility Types		4,598	18.5 Adj. Vol. Rate	84,867

(a) Total number of players for all facilities does not correspond to total number of participants in the Northeast in Table 1. Simmons counts players who play at each facility more than once as players may use more than one facility type.
(Source: Simmons Market Research Bureau, 1987)

National market share analysis of golf and tennis. At the national level for golf, public providers were found to be providing a substantial share of the total participation. However, the public's market share peaked in 1983 at 27 percent and fell to 22 percent in 1984. It has held at between 22 and 23 percent through 1987. Market share provision of golf by country clubs has not changed drastically over the years. It has fluctuated and was at its highest rate in 1981 (26.4 percent). From 1982 through 1987, the country club share remained between 22 and 25 percent. The country club share was 24 percent for 1986 and 1987. Daily fee courses have also increased market share during the 80s. Daily fee share was highest in 1979 at 30.6 percent and dropped to approximately 23 percent in 1981. Their share did, however, grow from 23 percent to as high as 26 percent in 1983 and 1985. The daily fee market share fell to 20 percent in 1987. For the most part, market share growth in golf has been achieved by private clubs and other private providers (resorts, hotel complexes, etc.) at the national level. The private club share was 9.9 percent in 1982 and grew to nearly 15 percent by 1985. It dropped to 13.9 percent in 1986 and to 13.4 percent in 1987. Other providers held less than two percent of the market for golf in 1980 and by 1986 their share had grown to nearly seven percent. It appears that in this increasingly popular activity, municipalities or public agencies are losing market share to the private sector. (See Fig. 1.)

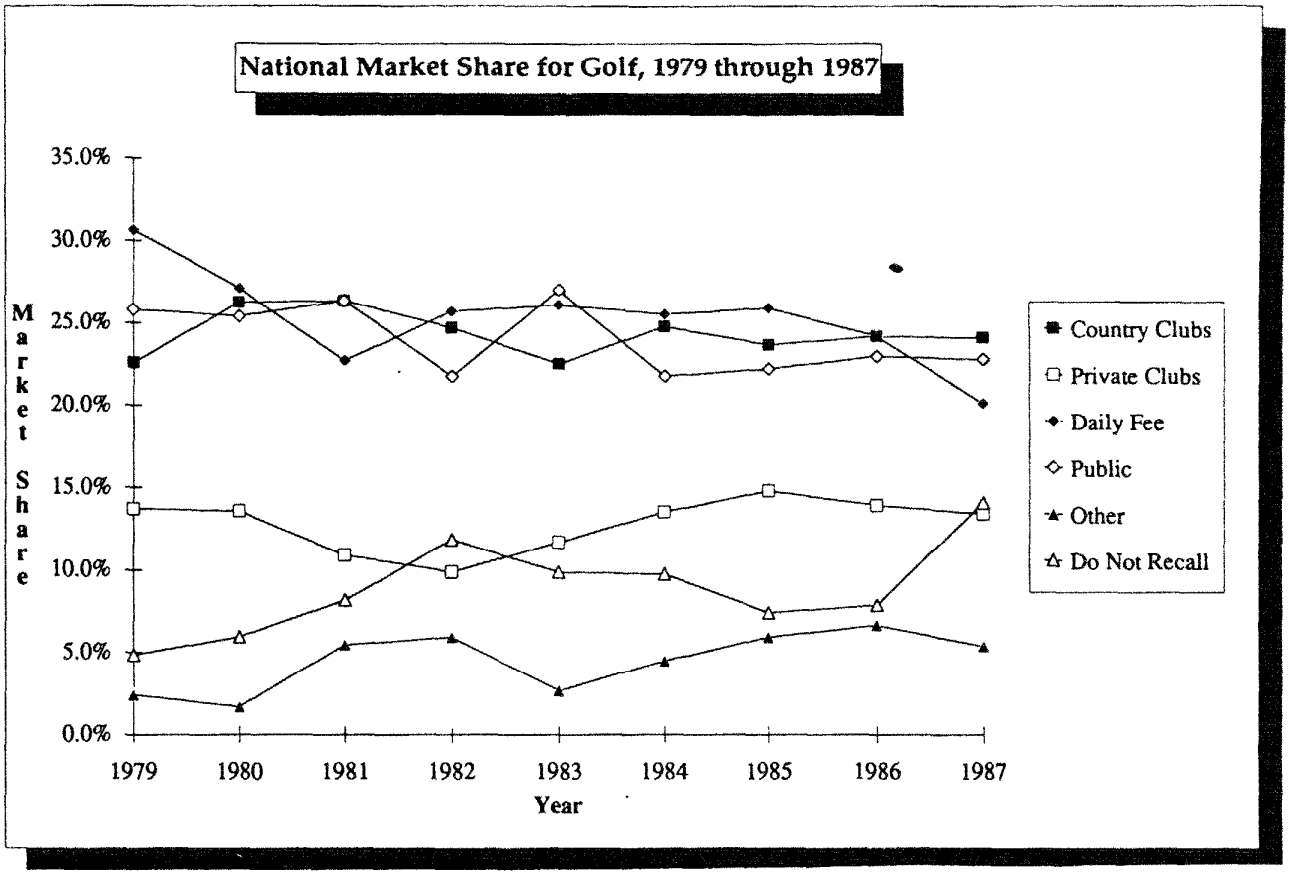
In the case of tennis, municipal or public suppliers still provide a major share of the market. Over 30 percent of all tennis played in 1987 was played at municipal or public courts; however, one must remember the amount of tennis played on an annual basis is declining dramatically (Warnick and Loomis, 1990). While public suppliers were the market share leaders in a declining tennis market, the share held by them also continued to decline. Public providers of tennis held approximately 44 percent of the market in 1979. Their share fell to 30 percent in 1987. There was a share spike in 1986 when the share jumped to 38 percent, but the overall trend pattern is one of decline for the public provision of tennis. (See Fig. 1.)

Although tennis was a less popular activity in the 80s, other suppliers, private clubs and miscellaneous providers (resorts, corporate fitness centers, etc.) have been gaining more of the available market since 1979. The share for private clubs went from 12 percent in 1982 to 17 percent in 1985 and has since returned to approximately 13 percent in 1986 and 1987. The share held by other providers (resorts, corporate fitness centers, etc.) fluctuated during the 80s. Their share was only 14 percent in 1980 and climbed to as high as 22 percent in 1981 and 1982 and was 21 percent in 1985. The share stood at 17 percent in 1987 for other providers. (See Fig. 1.)

Northeastern U.S. market share analysis for golf and tennis. In the Northeastern United States, daily fee providers of golf have been the market share leaders for six of the eight years examined here. However, the share held by daily fee courses has declined steadily from 1983 through 1987. In 1983, daily fee courses held 32.6 percent of the market. The share declined to 19.1 percent by 1987. Country clubs, for the most part, have held the number two position in market share for golf in the Northeast. Their share was 21 percent in 1979 and grew to 28.2 percent in 1982 when for one year, they held the lead. The country club share dropped to 18.7 percent in 1983, but since then increased steadily through 1986 when the share was 23.3 percent. Their share dropped slightly in 1987 to 21.1 percent. Public providers of golf held for the most part a stable market share position with the exception of 1984. In 1980, public agencies held 16.5 percent share. This share increased to 18.4 percent in 1983 and then fell to 12.5 percent in 1984. However, the share for public agencies returned to 19.7 percent level in 1985 and grew to 20.5 percent share by 1987. Although private clubs held the lowest share of all golf played for several years during this period, their share has increased steadily, nearly doubling from 1982 (9.8 percent) through 1986 (17.8 percent). Finally, the share provided by the "other" category revealed no consistent pattern, with exception of a moderate increase from 1985 through 1987. In fact, the data indicate that the highest share in 1987 was within the "other" category (25.4 percent). (See Fig. 2 and Table 3.)

In the case of tennis in the Northeast, municipal or public suppliers provided a major share of the market in the early 80s. Over 44.2 percent of all tennis played in the Northeast in 1980 was played at municipal or public courts. The public provision of tennis declined steadily from 1980 through 1982, but after 1982 the public's share was stable and actually increased very slightly through 1986 when it reached 38 percent and then declined in 1987 to 32.7 percent. The market share pattern for private clubs appears to have indicated an upward trend in the Northeast; however, decreases in share performance in 1983, 1985 and 1987 offset any such generalization. Country clubs, which are well behind the other providers in terms of market share, improved from nine percent in 1980 to 10.7 percent by 1983; however, since 1983 the market share pattern has been one of slow decline. The "other" category has also fluctuated over the time period examined here. It is difficult to generalize due to the types of facilities in this supplier category; however, it appears that more tennis was being played at these types of facilities in the Northeast by the end of the period examined here. Nearly 50 percent of all tennis played in 1987 was identified within this category of "other" provider. (See Fig. 2 and Table 3.)

Participation days for golf and tennis. While different agencies may find it valuable to know their relative position within the marketplace, a key variable for all agencies is business transactions. Business transactions for



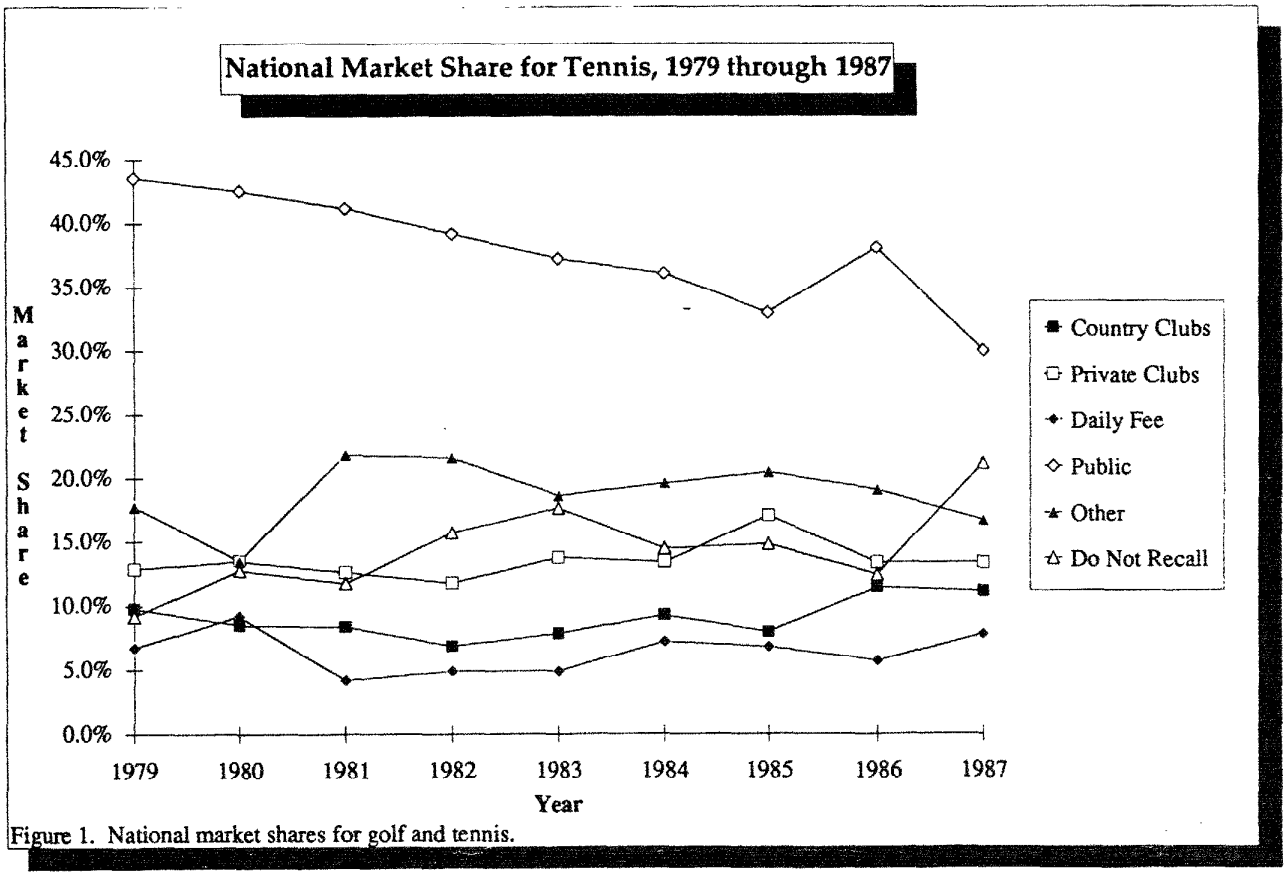


Figure 1. National market shares for golf and tennis.

Table 3. Market share and participation days for golf and tennis from 1979 through 1987 in the Northeastern U.S.

Year	Total NE Fac. Parts. ('000) (a)	Annual Volume Rate	Total Part. Volume (Days, '000)	Country Club Part. Days ('000)	Country Club Market Share %	Private Club Part. Days ('000)	Private Club Market Share %	Daily Fee Part. Days ('000)	Daily Fee Market Share %	Public/Municipal Part. Days ('000)	Public/Municipal Market Share %	Other Part. Days ('000)	Other Market Share %
Golf:													
1979	3,841	16.09	61,802	13,001	21.0%	10,475	16.9%	19,115	30.9%	10,185	16.5%	9,026	14.6%
1980	3,492	17.18	59,993	15,840	26.4%	8,934	14.9%	17,610	29.4%	9,432	15.7%	8,178	13.6%
1981	3,362	14.61	49,119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1982	3,347	19.04	63,727	17,974	28.2%	6,264	9.8%	14,470	22.7%	11,215	17.6%	13,804	21.7%
1983	4,355	18.92	82,397	15,439	18.7%	9,138	11.1%	26,885	32.6%	15,136	18.4%	15,798	19.2%
1984	4,870	17.47	85,079	17,313	20.3%	11,024	13.0%	27,445	32.3%	10,674	12.5%	18,623	21.9%
1985	4,614	14.38	66,349	14,509	21.9%	10,368	15.6%	20,031	30.2%	13,100	19.7%	8,340	12.6%
1986	5,555	16.25	90,269	21,076	23.3%	16,039	17.8%	22,311	24.7%	17,420	19.3%	13,423	14.9%
1987	4,598	18.50	85,063	17,982	21.1%	11,877	14.0%	16,225	19.1%	17,409	20.5%	21,571	25.4%
Tennis:													
1979	5,825	16.92	98,559	12,859	13.0%	10,186	10.3%	0	0.0%	10,626	10.8%	64,888	65.8%
1980	5,405	16.17	87,399	7,842	9.0%	14,359	16.4%	NA	NA	38,646	44.2%	26,551	30.4%
1981	3,738	17.23	64,406	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1982	3,698	16.38	60,573	4,406	7.3%	11,957	19.7%	NA	NA	20,278	33.5%	23,931	39.5%
1983	4,560	15.18	69,221	7,438	10.7%	11,446	16.5%	NA	NA	24,394	35.2%	25,943	37.5%
1984	3,785	14.84	56,169	5,298	9.4%	10,581	18.8%	NA	NA	20,375	36.3%	19,915	35.5%
1985	3,233	15.47	50,015	3,465	6.9%	6,683	13.4%	NA	NA	17,775	35.5%	22,091	44.2%
1986	3,956	18.05	71,406	8,267	11.6%	14,765	20.7%	NA	NA	27,147	38.0%	21,227	29.7%
1987	2,627	19.68	51,699	2,598	5.0%	6,494	12.6%	NA	NA	16,925	32.7%	25,682	49.7%

(a) Total number of facility participants, participants may play at more than one type of facility.
(Source: Simmons Market Research Bureau, Inc., 1979 through 1987)

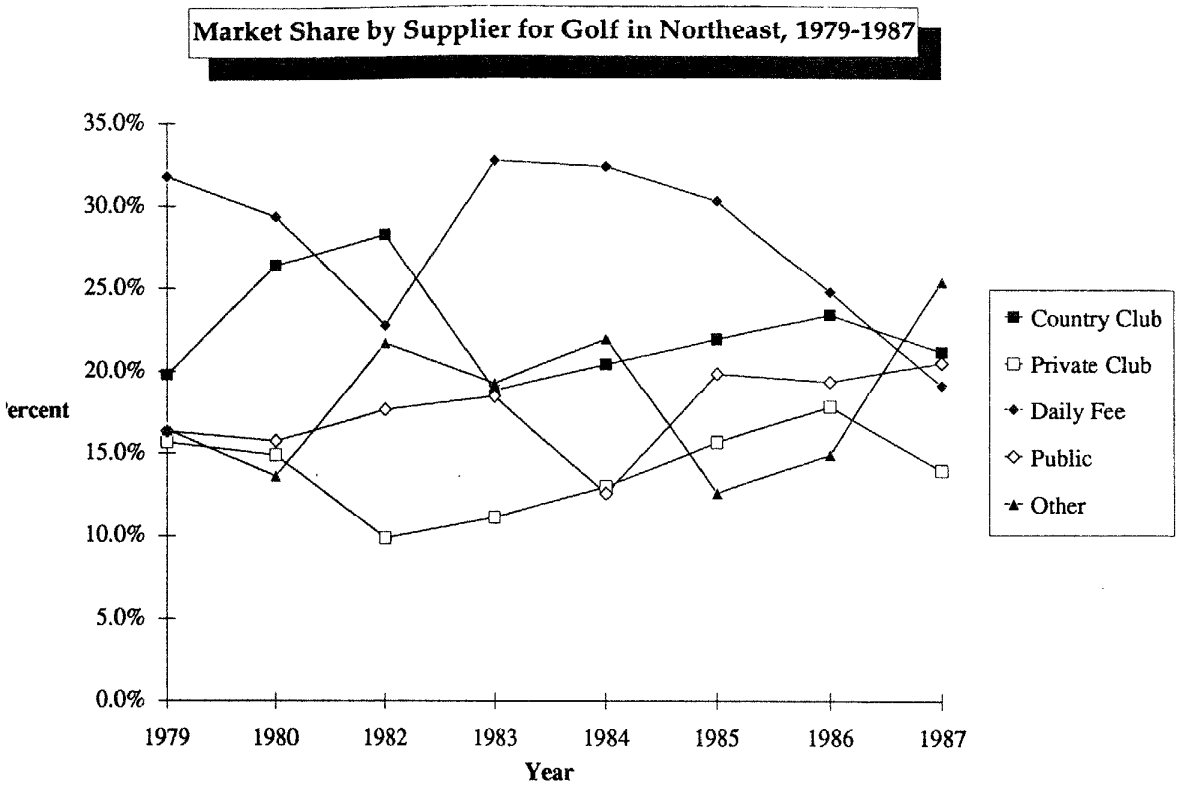
these activities would be best described as golfing days or tennis days -- the number of times the activity is played per year. The overall national market condition in terms of participation days (golfing or tennis days) for each of these activities portrays different life cycle conditions. For example, the amount of golf played in the United States has increased by 100 million days between 1981 and 1986. By 1987, the amount of golf played totalled nearly 300 million days. On the other hand, the amount of tennis played on an annual basis has declined from approximately 316 million days in 1979 to a low of approximately 189 million days in 1985. The amount of tennis played on an annual basis stood at 212 million days in 1987 (Warnick and Howard, 1990).

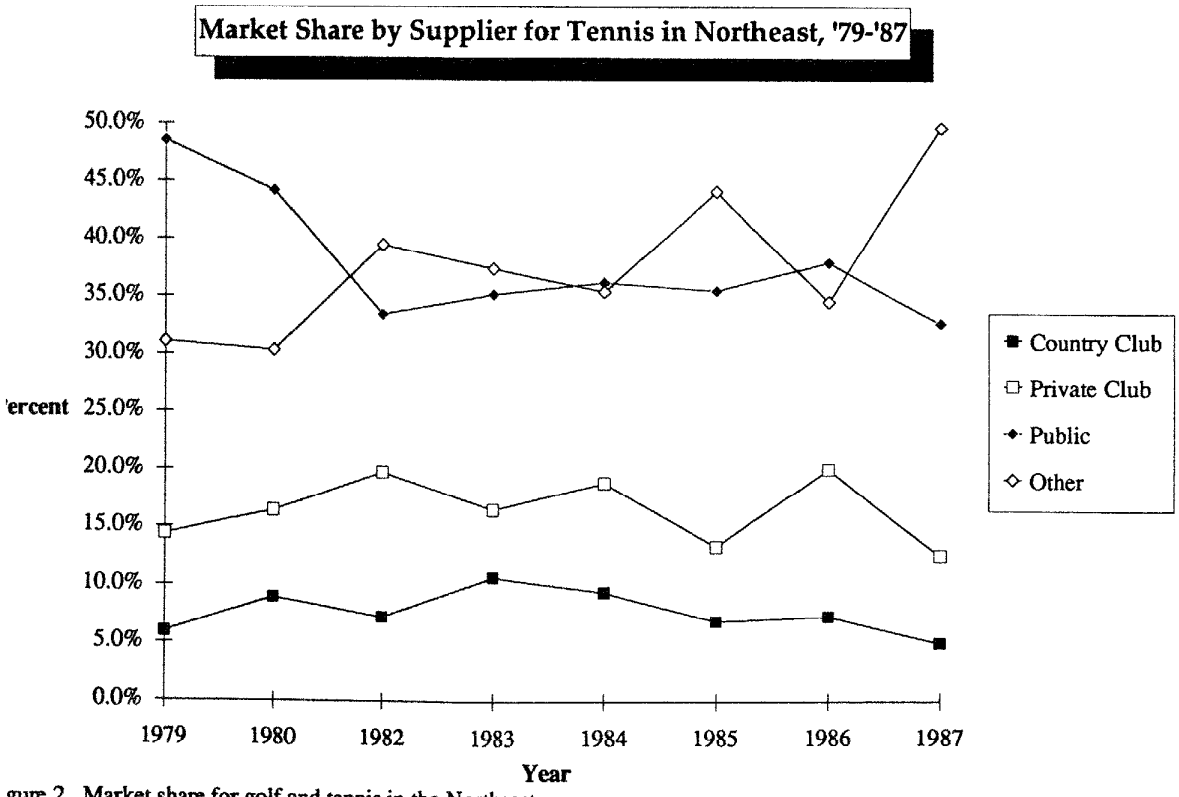
Within the game of golf at the national level, the number of days played at each type of facility indicated further differences. For example, the number of days played at private clubs dropped from 32 million days in 1979 to 22 million days in 1982. The number of days of golf played at private clubs then doubled by 1986. There were 44 million days played at private clubs in 1986. Perhaps more dramatic was the increase in days of golf played at other facilities (resorts, complexes, etc.). In 1980, less than 4 million days of golf were played at these facilities. By 1986, 21 million days of golf were played there. This was over a fivefold increase in participation volume. Also notable was the fact that the number of days of golf played by players who "did not know" or did not recall who the provider of the activity was jumped from 24 million days in 1986 to 42 million days in 1987 (Warnick and Howard, 1990).

The decline in the number of days of tennis played at the national level by facility provider was most dramatic for public agencies. Approximately 137.5 million days of tennis were played at public facilities in 1979. This fell to 62.4 million days by 1985. The number of days played at country clubs increased from 15.2 million days in 1982 to 25.2 million days in 1986 with the exception of a drop to 15 million in 1985 (Warnick and Howard, 1990). Further insights about activity or participation days may be gained by examining the within regional facility differences of the Northeast.

Golf days played by agency within the Northeast. In the Northeastern U.S., the number of golfing days grew from 49.1 million days in 1981 to 90.2 million days in 1986 and dropped off to 84.7 million days in 1987. The growth rate in number of days in this region has been significant -- an increase of over 50 million days played within a five year period. More insights are gained when the number of days played at different facilities are examined. Daily fee courses had the highest number of days played in 1984 -- 27.4 million days, but the number declined to 16.1 million days in 1987. Country clubs provided the highest number of golfing days in 1986 -- 21.1 million days. Golfing days at public courses grew from 9.4 million days in 1980 to 17.3 million days in 1987. Private clubs provided the highest number of golfing days in 1986, when 16 million days were played. However, the number of golfing days played at private clubs was only 11.8 million in 1987. The insights from the "other" category are somewhat misleading and should be reviewed with caution. The aggregation of "other private", miscellaneous other facility types and "do not recall", makes it difficult to identify any trends. One final observation from the data within region suggests that 1985 appeared to be a poor year for golf for private facilities. Participation days were down for all private and daily fee facilities. However, there was no decline for public facilities in 1985. (See Table 3.)

Tennis days played by agency within the Northeast. The number of tennis days declined dramatically within the Northeast region from 1979 to 1987. In 1979, 98.5 million days of tennis were played and by 1987 only 51.7 million days were played. There were two years, 1983 and 1986, when upward increases or spikes in the overall decline pattern were the exceptions. However, the general pattern in terms of participation days for tennis has been one of decline in the Northeast. Even within the public facilities which enjoyed an improving market share position for tennis in the Northeast from 1982 through 1986,





gure 2. Market share for golf and tennis in the Northeast.

the number of tennis days played did not follow a corresponding growth pattern. The pattern was more up and down for public suppliers of tennis. The number of tennis days played between 1982 and 1986 peaked at 24.3 million days in 1983, declined to 17.7 million days by 1985 and then peaked again at 27.1 million days in 1986. The number of days played at public facilities in 1987 was 16.9 million days. The number of days played at private clubs declined from a high in 1980 of 14.3 million days to 6.6 million days in 1985. The number of days increased to 14.7 million days in 1986, but then fell again to 6.5 million days in 1987. Finally, country clubs experienced a similar pattern of decline in tennis participation days. In 1983, 7.4 million days of tennis were played at country clubs and by 1985 the number had dropped to 3.5 million. A sharp increase also occurred in 1986 when 8.3 million days were played, but the number of days played at country clubs in the Northeast stood at 2.6 million in 1987. (See Table 3.)

Participation types and distribution by region. Market share analysis does provide insights into the distribution of play within each of the facility types for both golf and tennis. However, the distribution of player types should also be consider by region. Unfortunately, these data could not be further refined to examine them by the distribution of supplier type within the Northeast Region. Nevertheless, it is worthwhile to note that the distribution of player types does vary by region and has implications for managers and marketers of all types of facilities.

In the methods section, an example of the calculation of participation volume for golf for 1987 was presented. No analyses of these tables were presented, but it is important to present some of the additional regional differences by distribution of use levels and volume rate or days played per year for the time period of 1979 through 1987. For example, in 1987 when the distribution of use levels and volume rate for golf are compared to the national figures, the differences were substantial. At the national level, the distribution of light golfers (those who golf less than 10 times per year) comprise 53.5 percent of all golfers and moderate/heavy golfers (those who golf more than 10 times per year) comprise 46.5 percent of all golfers. In contrast, the Northeast golfers are distributed with 43 percent in the light category and 57 percent in the moderate/heavy category. The volume rate or average days played per year in 1987 were 15.8 at the national level and 18.4 in the Northeast. On the other hand, the West's golfers are comprised of 61.4 percent light players and 38.6 percent heavy players. The volume rate in the West in 1987 was 13.9 days played per year. Other comparisons between the regions for each of the years may be made by examining Table 4.

For tennis, substantial differences were also found. For example in 1987 at the national level, tennis players were distributed as 55.6 percent light players and 44.4 percent moderate/heavy players. In the Northeast, for the same year, tennis players were comprised of 38.2 light players and 61.8 percent moderate/heavy players. All other regions (the Midwest, South and West) were comprised of more than 50 percent light tennis players. The volume rate or average days played per year for tennis were 15.4 at the national level and 19.7 in the Northeast. All other regions volume rates in 1987 were below 16 days played per year. Other comparisons between the regions for each of the years may be made by examining Table 5.

Table 4. Use levels and adjusted volume rates for golf: 1979-1987 (a).

For Golf

Region	Year	Light Light/Mod. & Light (%)	Moderate & Mod. to Heavy (%)	Heavy (%) '79 to '81 only	Adjusted Vol. Rate (days/yr.)
Northeast	1979	43.9	26.9	29.2	16.09
	1980	69.1	***	30.9	17.18
	1981	75.6	***	24.4	14.61
	1982	42.5	57.5	***	19.04
	1983	40.0	60.0	***	18.92
	1984	50.0	50.0	***	17.47
	1985	57.3	42.7	***	14.38
	1986	52.5	47.5	***	16.25
	1987	43.0	57.0	***	18.43
Midwest	1979	28.2	45.5	26.3	16.14
	1980	68.3	***	31.7	17.44
	1981	72.8	***	27.2	15.47
	1982	50.1	49.9	***	17.04
	1983	51.9	48.1	***	15.96
	1984	55.3	44.7	***	16.04
	1985	52.2	47.8	***	15.60
	1986	49.4	50.6	***	17.04
	1987	53.9	46.1	***	15.70
South	1979	31.0	30.5	38.6	20.50
	1980	68.8	***	31.2	17.29
	1981	68.1	***	31.9	16.94
	1982	53.9	46.1	***	16.07
	1983	53.4	46.6	***	15.58
	1984	47.3	52.7	***	18.18
	1985	43.7	56.3	***	17.64
	1986	53.2	46.8	***	16.06
	1987	53.4	46.6	***	15.84
West	1979	39.2	27.1	33.7	17.91
	1980	67.2	***	32.8	17.82
	1981	68.6	***	31.4	16.77
	1982	53.9	46.1	***	16.06
	1983	55.9	44.1	***	14.92
	1984	53.0	47.0	***	16.66
	1985	53.8	46.2	***	15.22
	1986	60.5	39.5	***	14.19
	1987	61.4	38.6	***	13.85
US Totals	1979	34.3	34.1	31.7	17.55
	1980	68.3	***	31.7	17.44
	1981	71.3	***	28.7	15.94
	1982	50.2	49.8	***	17.02
	1983	50.2	49.8	***	16.37
	1984	51.8	48.2	***	16.97
	1985	51.7	48.3	***	15.71
	1986	53.3	46.7	***	16.03
	1987	53.5	46.5	***	15.82

(a) Simmons segmented golf use levels in 1979 by three groups ("light"- 1 to 4 days; "moderate" - 5 to 19 days; and "heavy" - 20 or more days). In 1980 and 1981, Simmons segmented golf use levels by two groups ("light/moderate" - 1 to 19 days and "heavy" - 20 or more days). From 1982 through 1987, Simmons segmented golf use levels by two groups ("light" - 1 to 9 days and "moderate/heavy" - 10 or more days). Source: Simmons Market Research Bureau, '79-'87.

Table 5. Use levels and adjusted volume rates for tennis: 1979-1987 (a

For Tennis

Region	Year	Light, Light/Mod. & Light (%)	Moderate & Mod. to Heavy (%)	Heavy (%) '79 to '81 only	Adjusted Vol. Rate (days/yr.)
Northeast	1979	29.0	41.3	29.8	16.92
	1980	65.4	***	34.6	16.17
	1981	58.8	***	41.2	17.23
	1982	50.0	50.0	***	16.38
	1983	53.1	46.9	***	15.18
	1984	54.3	45.7	***	14.84
	1985	53.7	46.3	***	15.47
	1986	39.7	60.3	***	18.05
	1987	38.2	61.8	***	19.68
South	1979	33.9	43.7	22.4	14.46
	1980	67.9	***	32.1	15.43
	1981	72.9	***	27.1	13.34
	1982	56.6	43.4	***	14.77
	1983	55.6	44.4	***	14.59
	1984	61.2	38.8	***	13.25
	1985	54.3	45.7	***	15.33
	1986	45.5	54.5	***	16.73
	1987	54.7	45.3	***	15.58
Midwest	1979	34.8	36.7	28.5	16.10
	1980	72.5	***	27.5	14.10
	1981	73.3	***	26.7	13.23
	1982	58.3	41.7	***	14.36
	1983	55.7	44.3	***	14.57
	1984	49.8	50.2	***	15.89
	1985	47.1	52.9	***	17.09
	1986	67.6	32.4	***	11.64
	1987	60.4	39.6	***	14.18
West	1979	29.8	42.4	27.9	16.33
	1980	66.4	***	33.6	15.87
	1981	63.9	***	36.1	15.82
	1982	56.0	44.0	***	14.92
	1983	51.2	48.8	***	15.61
	1984	47.6	52.4	***	16.39
	1985	52.5	47.5	***	15.77
	1986	76.6	23.4	***	9.57
	1987	61.7	38.3	***	13.86
US Totals	1979	32.0	40.7	27.3	15.99
	1980	68.2	***	31.8	15.36
	1981	68.3	***	31.7	14.62
	1982	55.6	44.4	***	15.03
	1983	54.1	45.9	***	14.95
	1984	53.2	46.8	***	15.10
	1985	51.6	48.4	***	15.99
	1986	58.3	41.7	***	13.78
	1987	55.6	44.4	***	15.37

(a) Simmons segmented tennis use levels in 1979 by three groups ("light"- 1 to 4 days; "moderate" - 5 to 19 days; and "heavy" - 20 or more days). In 1980 and 1981, Simmons segmented tennis use levels by two groups ("light/moderate" - 1 to 19 days and "heavy" - 20 or more days). From 1982 through 1987, Simmons segmented tennis use levels by two groups ("light" - 1 to 9 days and "moderate/heavy" - 10 or more days). Source: Simmons Market Research Bureau, '79-'87.

Discussion

An examination of the market share of different types of agencies within the Northeast revealed specific patterns and trends. While not all inclusive, some discussion points are raised here. They are grouped into the following areas: agency market share performance, marketing implications, limitations and recommendations for future study.

Agency market share performance. The findings of this study indicate how different agencies have performed over this time-frame. Some of the reasons, consequences and speculations to the cause of agency performance are presented here.

This study revealed that specific types of agencies were market share leaders in the Northeast. In golf, daily fee courses have held the largest proportion of all participation days played for the majority of years within the period of 1979 through 1987. However, the performance of the daily fee providers as the market share leader for golf has not been spectacular. The daily fee share has declined steadily since 1983. In tennis, the market share leaders are less obvious. Public agencies were the market share leaders for tennis for four of the years examined here, but the "other" category, a collection of different types of private facilities and "do not recall" somewhat clouds the picture. Since it is not possible to break out the "do not recall" number from the other category, no real pattern could be established for this group. The market share performance for tennis in the Northeast is different. After an initial decline early in this period, public agencies have generally held a rather stable market share position in the Northeast. This suggests that the marketplace for golf is more volatile and the marketplace environment for tennis is more stable although the activity is in a decline pattern.

The market environment for the provision of golf in the Northeast does not reflect the national trends. At the national level, the market share leader for golf has not been easy to identify. The market leader for golf for a number of the earlier years was the daily fee provider at the national level (Warnick and Howard, 1990). However, in some years, public agencies held the market share lead. By 1987, country clubs had clearly taken over the lead at the national level. In contrast, in the Northeast, country clubs have held the second largest share of all golf played for five of the years examined here. During the period of 1983 to 1987 in the Northeast when there was a steady decline in the proportion of play at daily fee courses, there was a corresponding increase in the proportion of golf played at country clubs, private clubs and even public facilities. There were exceptions in 1987 for private and country clubs when their share declined and in 1984 for public agencies when their share declined. This suggests that as the market for golf has grown during the 80s, many players have moved away from the daily fee courses (as is reflected in the national trends) but not necessarily away from the public facilities in the Northeast. Many of these golfers appear to be moving toward playing golf at country clubs, private clubs and "other" private facilities, but demand has remained stable and even increased at public facilities. One might speculate that some golfers have indeed "traded up" from daily fee facilities to more exclusive private facilities and perhaps many of the new golfers have elected to play at public facilities. However, it is not entirely clear if this is the case. The patterns at the national level indicated a movement away from both daily fee and public facilities. This pattern

is not totally reflected in the Northeast. Only the movement away from the daily fee courses is supported in this region. Other speculations to as the reasons for different market patterns in the Northeast must also be mentioned.

Public facilities in the Northeast may enjoy a unique position in the marketplace. The dense population in this region has made it somewhat more difficult to acquire the large tracts of land necessary to construct new facilities. In such cases, the public facilities, particularly in densely populated urban areas in the Northeast corridor, are more likely to be impacted by the increased popularity of the game. This would lead to the more stable and increasing market share pattern which is represented in the data here. On the other hand, it may be possible that more of the daily fee courses have been converted to private clubs. However, because supplier information on the number of different types of courses in the Northeast is not available, it is not possible to determine if this is indeed occurring.

The findings within the Northeast do support the national finding that the competitive offerings of the private clubs are appealing to more participants. More participation is occurring at private facilities. Although it may be debatable if the quality of these private facilities is better, participants may be attracted to private facilities because more amenities are provided.

The marketplace for tennis in the Northeast also differs from the national trends. At the national level, public agencies are the clear market share leaders, but their position has been one of decline throughout the 80s. The continued decline in position has not occurred in the Northeast for tennis. In fact, the market share provision for tennis by public agencies in the 80s has actually improved from 1982 though 1986 in this region. However, the increase in market share does not translate to more tennis play at public facilities. Tennis is in a declining market condition in the Northeast. Even though, public facilities are gaining market share in percentage terms, the actual number of tennis participation days was declining during this period. In other words, the public agencies were gaining more of the declining tennis market. The rapid growth of country clubs and private club provision of tennis did not occur in the Northeast as it did at the national level.

Finally, one additional market issue related to the distribution of players within the Northeast when compared to other regions and the national level must be mentioned. First, for a number of years the distribution of players by moderate/frequent and light categories has differed by region for golf and tennis. For example, the distribution of golf players in the Northeast has differed dramatically from the other regions. While it is difficult to understand why this is so, a number of reasons may be put forth. First, the rate of play is indeed higher in the Northeast than in the other regions for a number of reasons. One may be that the season for golf is shorter in the Northeast than in other regions. Penned up demand may lead to increased play rates. A second reason is that perhaps golf is a much older recreational activity in the Northeast than in other regions. A area that has older and perhaps more well established courses and perhaps an older player population may yield the higher volume rates and larger proportions of frequent players. Third, a more dense population and more compact geographic region may find larger portions of the golfing population within closer proximity to more golf courses. This in turn may lead to higher rates of play. Similar market conditions in the differences of the distribution of tennis players also exist in the Northeast.

Marketing implications. From these findings, several marketing implications are discussed. First, public agencies need to more aggressively position themselves in the public's mind as a market leader for tennis and for golf in the Northeast. It is not clear that public agencies have recognized or promoted their position within the market place well. Public agencies need to seize the opportunity to attract and keep first time consumers in both activities.

The market share decline experienced by daily fee facilities in golf also suggests that these agencies may have been reluctant to implement marketing strategies which serve to maintain or build market share. Agencies must move to monitor and identify these growth markets if they expect to maintain or build market share. The implementation of customer retention strategies is important for daily fee facilities. It is less costly to retain old customers by improving the quality of the activity services delivered and providing more options for the customer to select from than to try and constantly attempt to attract new customers.

Marketers of these recreational activities should also use these type of data to monitor product life cycles. The information presented here indicates that market size and or market share trends for a specific type of agency do not necessarily follow national trend patterns. When market share data were examined, market share and market size were found to peak and decline at different times between different suppliers. Managers may also want to use market share data with demand and supply analysis to identify agency needs.

Limitations. There are a number of limitations to this study which must be recognized. First, nine years is still a relatively short amount of time. While some patterns of change were easily identified by market share analysis, other patterns were more difficult to identify. This study, for the most part, is largely a descriptive study of past trends. The ability to project into the future was not undertaken here. Furthermore, the shortage of available data makes it difficult to undertake any projection techniques. However, this study has improved upon the examination of the data over shorter periods and provides one of the first descriptions of nearly a decade's worth of activity participation and agency performance trends within a specific region.

While Simmons' market data offers many opportunities for the review of data over time, the quality and the form of the data also limit how it may be examined. The data, where available, are only presented in tabular form. Individual respondent data are not available. This severely limits the types of statistical analyses which can be performed on the information. Unless individual case data becomes available, analyses will be limited to descriptive statistical procedures. However, by examining recreation participation and market share information on an annual basis such as Simmons provides, agencies should be able to be much more responsive than examining data on an infrequent basis or not at all. Simmons also indicates that some of the data when used to estimate the size of various markets is highly unstable. This is due to low response frequencies within some categories. It was not a critical problem in this study, but is recognized that the more the data are broken apart and the finer categories of information are examined, the less reliable the data become.

In previous studies market share analysis studies (Warnick and Howard , 1985 and Warnick and Howard 1987), no attempt was made to adjust market share data by user types and different volume rates. In this study, for the first time an adjustment to the rate of play was made by region. As noted earlier, rates of play to vary by region. In some cases, these rate variations are substantial. However, a major limitation to the analysis of Simmons' data is that the adjustments do not extend far enough. The analysis presented here assumes that golf and tennis players continue to play at the same rate within the region regardless of the type of the facility at which they play. It is very doubtful if this assumption holds true and is a severe limitation. Initial information, both in this study and within the national market share analysis study indicates that different types of users are likely to use different types of facilities. For example, it is highly likely that many first time users or "light" users visit public or daily fee facilities. It may be safe to speculate that a disproportionate share of the clientele of the public or daily fee facilities are "light" users. If this is so, then the use or volume rates for public or daily fee facilities would be expected to be very much different from those of the private or country club facilities. While, this assumption (the constant play rate across all types of facilities) is indeed a significant problem, the adjustment to the volume rates must be considered as noteworthy improvements over previous analyses. Furthermore, the problem of double counting participants (players who participate at more than one facility) can not yet be overcome. This has certainly yielded over-estimation of play at some facilities. Whether the pattern of play among participants is actually different than reported here with the appropriate adjustments is debatable. Unfortunately, this will not be known until improved data manipulation techniques are available.

Data were examined here at the national level and within the Northeast by supplier. Differences also exist at the subregional or state and local levels. Managers need to verify such trends at these levels. This analysis examined market shares by categorizing the type of providers into the broad categories. At the local and regional levels, individual corporate or agency market share analysis should and may occur.

Recommendations for further study. It is essential that annual market share analysis continue to occur in the future at both the national, regional and local levels. It is difficult to understand how agencies can survive in an increasingly more competitive environment for the provision of most recreational activities without market share analysis as part of an on-going market information system. Agencies must be committed to the collection of information in a more timely and systematic manner if this is to occur. More information is still needed to more adequately market, promote and provide appropriate quality opportunities for golf and tennis at all levels and by all types of agencies. Certainly much more analysis is needed to monitor the quality of play for both of these activities.

Conclusion

The findings reached by analyzing market share data do indicate patterns exist and market conditions are changing within the Northeast. There is also an indication that differences exist between agency types, when one examines market share and participation volume. Market share trends within the Northeast do not necessarily follow national trend patterns. While it is important to monitor these data over time, it may be misleading to heavily weigh one's marketing decisions strictly on national trends. The Northeast is a unique region for golf and tennis not only by the distribution of play at various facilities, but also by the volume of play when compared to other regions. A combination of the regional and local market share analysis and target market analysis is necessary to provide the better insights for marketing golf and tennis.

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EFFECTIVE MANAGEMENT OF PARKS AND RECREATION INFORMATION

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Based on a recognition of definitional deficiencies of data; and linkages and structures needed to use data, this paper presents advances made by the Canadian Parks Service towards more effective data management using Entity-Relation data modelling, Artificial Intelligence (AI), Computer Assisted Learning (CAL), and Object-Oriented Design thinking.

Introduction: General Context

The system presented here was built on the basis of problems and needs recognized over approximately the last twenty years in relation to the collection and use of parks and recreation information on operations, clients, regional infrastructure, and facilities. Individuals such as Martin (1976) have been key contributors to development of information management, administration, and education, resulting in much more effective work both by EDP professionals and by "involved" managers. Unfortunately, much professional EDP work provides very professional management of not very professional information.

This paper takes EDP "tools" and shows how they can be used effectively in a parks, recreation, and tourism context. In the Canadian Parks Service (CPS) experience, it has been recognized more and more that the development of the "Park Use Related Data System" (PURDS) has been an evolving "requirements definition" for information management, and even more, PURDS is an evolving professional tool!

To avoid any misconceptions, it should be noted that this is a paper about concepts and professional requirements, not about EDP. In that respect, this paper does not deal with database administration, particular equipment and/or languages used for implementing the system which is described. Still, the concepts presented, by and large, are operating on readily available "AT" (20286) based computing equipment using a UNIX type operating system. (The system is also operable on a DOS system with extended memory.)

Structure, Needs, And Modelling

The Park Use Related Data System, PURDS, is based on a data model. The model provides a description or analogy to help visualize the data which are to be organized. This model is one way that users can view the data relevant to them. For the Entity Relations (ER) Model (Chen 1976) used here, the basic building blocks are entity sets, relationships and attributes. Entity sets refer to groups of "things" (e.g. employees, services, projects). Each entity set contains entities or records with "fields" of information about the "things" in the entity set, such as information which describes facility/assets or geographic locations. The descriptive information in fields are also called attributes or variables. For example, attributes for an entity set called "park employees" could include "position held," "identification number," "job title," and "salary."

Martin (1976) draws a clear distinction between the picture which users have of their data and, (1) their ability to access and "process" them, and (2) concerns with operating systems, a particular database language, disks, printers, etc. The way users visualize data is not necessarily the best way for a computer to store or process them. In fact, if user information requirements, in terms of having requests met in a timely manner, do not involve hardware and software, then one has an ideal situation in certain respects.

The EDP professional's responsibility is to see that the user interface, that is, the way users interact with the data, remains stable and is transparent to users, even as more efficient computers, alternate input/output devices, etc., are used, and even as software products pass into and out of the users' environment. Those who put their cards, disks or files into SPSS or SAS or a database may realize that such products carry definitions of data with them, and users generally do not know how data are stored in files or how files are accessed. Furthermore, SAS, SPSS, and the whole variety of 3rd and 4th generational databases set up their own user interfaces of a sort and operate "identically" on many computers.

Some principles which have dictated the PURDS model being created are: (1) to have information defined "adequately," (2) to know who which information is for, (3) to know "how information is interrelated," (4) to allow experts to aid/guide novices, (5) to have an effective vehicle which can provide staff at different levels of the organization with the necessary training to store, manage and use the kind of information at the level of detail that they need, and (6) to have a way to convey a basic but general and clear picture of the information resources available to the managers and personnel who are expected to use information.

Figure 1

I. 100+ NATIONAL PARKS, SITES, ETC.
II. 100+ NATURAL OR CULTURAL AREAS
III. APPROXIMATELY 5,000 PERSON YEARS
IV. 12,000+ BUILT FACILITY/ASSETS
  A. 200+ DRIVE-IN CAMPGROUNDS
  B. STAFF HOUSING IN MANY AREAS
  C. VISITOR SERVICE/INTERPRETATION BUILDINGS (INCLUDING KIOSKS, GATES)
  D. HISTORIC BUILDINGS, STABILIZED RUINS, AND LOCKS
  E. TRAILS (HORSE, BICYCLE, HIKING)
  F. SEVERAL TOWNS (MUNICIPAL SERVICES)
  G. HIGHWAYS AND ROADS (TRANSCANADA HIGHWAY, SERVICE ROADS)
  H. WILDERNESS AND ISLAND CAMPING
V. 10,000+ SERVICES/PROGRAMS (INTERPRETATION TO VISITORS, ETC.)
VI. 5,000 LEASES TO BUSINESSES/INDIVIDUALS
VII. SALE AND ADMINISTRATION OF $10+ MILLION [1] IN PERMITS, ETC. (THE COST TO PRODUCE THESE IS OVER $800,000/YEAR)
VIII. HUNDREDS OF DAMS & LOCKS ON HISTORIC CANALS
IX. CPS HAS ABOUT 40 MILLION ENTRIES AND 18 MILLION VISITS PER YEAR (E.G. OVER 700,000 PARTY NIGHTS ARE SPENT IN CPS CAMPGROUNDS)

Background On CPS:
Scale Of Information To Be Managed

Figure 1 above demonstrates that CPS has an abundance of physical plant and buildings, services it offers, employees, etc. A practical matter is that of having reasonable links of data to coding used for finance/accounting, facility/asset management, etc. PURDS development has ensured that it maintains its own independent coding. The system also specifies linkages to other CPS systems, as shown along the left hand side of Figure 2A. At some point in the future, CPS will have user interfaces that are managed through a CPS data administrator. Linkages between different "user" systems, which may be part of one large system, will be managed to see that other systems do not fall apart every time individuals decide to make a change in "their" coding scheme. Each user group can continue to function and the linkages to other systems will be looked after. For example, if I want information on the dock in Terra Nova National Park, if I have "coded" it as 7,000, I can keep on using that code forever.

The preceding referred to "knowing" and "experts." Expert systems really refer to systems which integrate "expert" capabilities into a system so that "typical" users gain from those capabilities (Barr and Edwards 1981). Why keep a live expert when you can build one into your system? Experts can set rules, and Expert systems apply them. Expert systems can also use experts' criteria for making decisions. "Patterns" in decision-making criteria can be established by experts identifying the values of criteria related to decisions which the expert would make. Where no exact match to an expert's criteria exists, a "similar" situation can be found by the system (see "Expert Systems in Tourism: Emerging Possibilities" which is forthcoming in the Journal of Travel Research and which has abundant practical references.)

The ER data model in Figure 2A, which shows much of the basic PURDS structure, to a degree even implies information management needs. Nevertheless, while being useful to give managers and users a picture of data, the Figure does not portray much of the "expert" or logic built into the PURDS. PURDS uses logical rules in many matters and a key issue in the evolution of PURDS has been to incorporate expert capabilities to assist users operating the system. As discussed later, PURDS data are described by structures and logical linkages that are very "naturally" described in languages such as MUMPS (Lewkowicz 1989) and PROLOG (Malpas 1987).

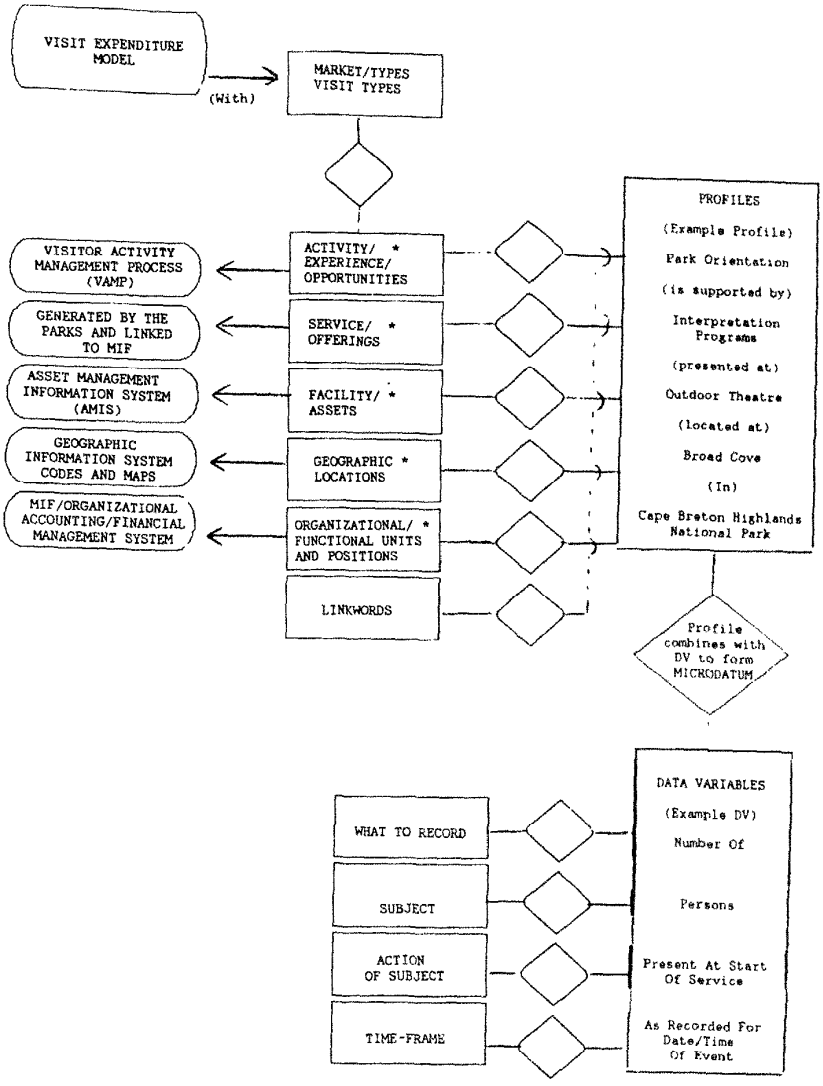
The PURDS Model, "The Theory": An Introduction

Analyses carried out in the 1980s, on how to achieve efficient management of park use related data for the CPS, led to the recognition that the foundation for data management had to be precisely defining data in such a manner that they could be consistently collected and relied upon. Defining things may not sound hard. It may not have ever been thought of as an evolving process. Beaman and Grimm (1988) reported on what, in 1988, seemed to be a fairly final status of PURDS. However, many more entity sets or lists are now linked together than were in the model in 1989. The definition of what is really needed in PURDS has been incremental, with new concepts depending on implementation and testing of predecessors. Much of what is in this paper was not discovered/understood one year before. And, what is presented just introduces many of the 1989 "discoveries" being exploited in 1990!

In the PURDS model (Fig. 2A), Profiles and Data Variables are the "key" Entity sets, at least for the socio-economic function of the CPS. They are only discussed briefly here, but the reader may refer to various documents (CPS 1989 and Cotter 1989) for details. As one sees in the top right of Figure 2A, the Profiles entity set combines information about the organizational infrastructure of the CPS. Profiles generally show what is being done and where (by a park, near a park, impacting on a park, impacted on by a park, etc.) In a Profile, information is combined on visitor markets or activities, services, facilities and assets,

[1] The hotels in our Alberta parks produce more room tax for Alberta than those in Calgary and Edmonton combined.

Figure 2A



* Attributes of Profiles which are entity sets themselves.

Basic PURDS Data Model And Its Linkages

geographic locations, and a responsible organizational unit. Data Variables (DVs) provide the companion to Profiles, offering systematic definition of what datum is to be recorded. The structure for Data Variables combines elements for "What to Record," the "Subject" which is being observed, the "Action of the Subject," and a "Time Frame" which states at which intervals (daily, hourly) or times the data are to be recorded (see Beaman and Grimm 1989). DVs were developed to overcome various problems recognized since 1972 or 1973 related to using "Units of Count."

Being able to describe "very precisely" what one is counting and why, to have a great deal of flexibility in doing this, and being able to prompt users with data definitions, may seem to have solved the major data management problems for the Park Use Related Data System. However,

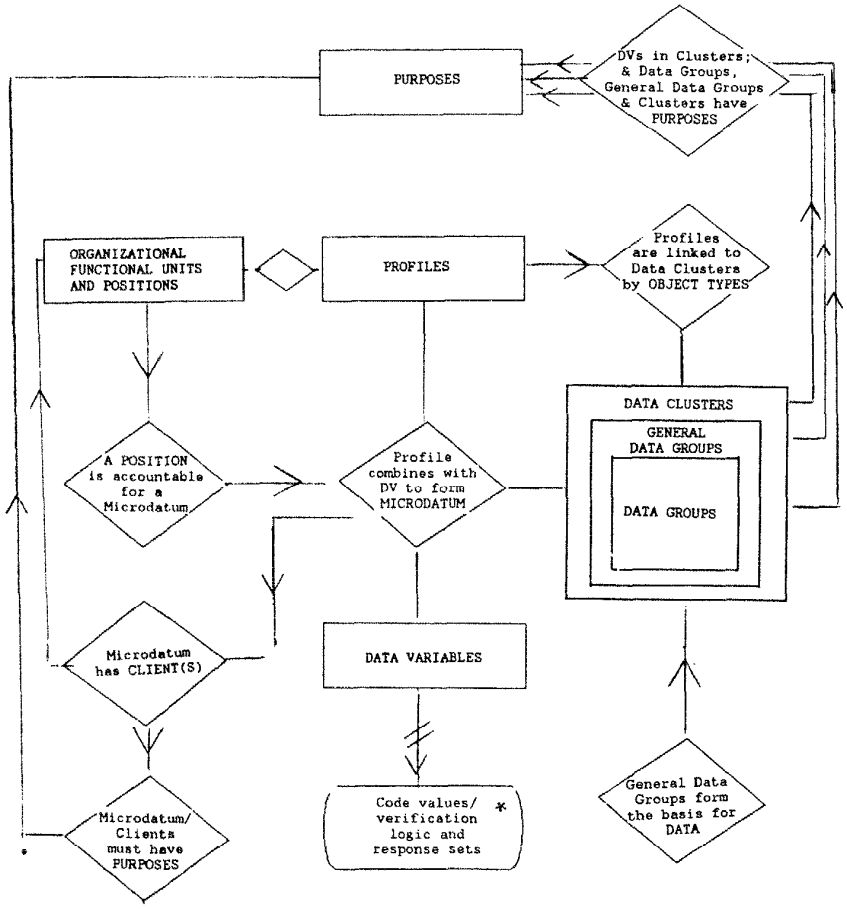
ıe Canadian Parks Service's market and park ;er survey data collection fell outside the ıitial conceptual framework. Visit Expenditure ›delling (see Whiting 1987, Beaman 1984, CPS)89) was not covered. There were also problems ;aling with forecasts. For example, while ;ating the relation of a forecast to what is ;esent, how, in a general manner, can different ›recasts be stored and, as necessary, along .th an identification of who made them and why? ›wever, the foundational structure of the PURDS ; evolved by 1989 enabled work to proceed on ›ncept development required to incorporate ırvey data, estimates of visit expenditures and ›recast data.

What Is A Datum In PURDS

Data Entry, Data Use And Data Clusters: Their "Logical Foundation"

The practical viability of both PURDS Profiles and DVs stem from the fact that they are defined using open-ended lists. Virtually any data which can be collected can be defined "rigorously" through PURDS. Initially, the tendency was to focus on "datum" as observed counts on park use that could be stored, accessed and manipulated. The Data Entry facility (Cotter 1989) of the computerized PURDS Data Model allows data, as specified by a DV, to be recorded for a Profile. Figure 2A (see Profiles, Data Variables, and the linkage between them) presents the text for a Profile as

Figure 2B



* Generalization of Codes Lists involves a variety of linkages.

PURDS Data Structure

"Park Orientation is supported by Interpretation Programs presented at the Outdoor Theatre located at Broad Cove in Cape Breton Highlands National Park" combined with a DV which reads as "Number of persons present at start of service as recorded for the date/time of event."

For "user direct data entry," Menus were created. These are lists of Profile/Data Variable combinations used by particular individuals for recording data. Based on a Menu, the computer presents "prompts" which describe a Profile for which the values of a DV, also described, are to be recorded, along with certain dates and times for which they are to be recorded. In 1990, DVs that can be used to define data are being "upgraded" to allow methods of recording/computation to be part of the definitional structure.

The concept of a "datum" and "data storage" just presented is a micro definition of data. By combining a Profile with a Data Variable, one can say this is something for which I want to record data, and this is the datum which I want to record. One can select a Profile Number and a Data Variable Number with a date/time as shown by the examples presented in Figure 2A. Values recorded for the data can then be stored and retrieved. But retrieved to what end? Which data are comparable? Which can be aggregated or otherwise manipulated? These questions bring us to the concept of Data Clusters.

Let us say that we have something which physically we recognize as an entry/exit gate. The CPS has a few hundred park entry/exit gates for vehicles, along with campground entry/exit gates for vehicles. Presumably, all such gates can have certain DVs in common. The idea is quite simple. There is a common set of data which is reasonable to record for a set of "objects" such as entry/exit gates. This does not mean that everybody has to record them all! Some people's management style dictates that they record certain Data Variables, some require others. (As is discussed later, PURDS allows the "Purposes" of collecting any data to be associated with them so that users have on-line assistance in selecting which data they want to record.) A collection of DVs which could be used for recording data for a Class, for example of entry/exit gates, has been called a Data Cluster. So we can set up a Data cluster for a certain class of objects [an object oriented definition (OOD), see Sheu et al. 1989 and Oldford 1987].

Now, the PURDS concept of Data Clusters has led to having a box sitting within a box. In Figure 2B, it is illustrated that a Data Cluster is made up of Data Groups. It can be recognized that, within the DVs which could be used to record data for a vehicle entry/exit gate or for some other class of objects, a group of DVs will fall under the same Time Frame (hourly, daily, etc.). The important thing about that recognition is that data which fall under the same Time Frame operationally, are the kinds of data that would be collected by someone, for example, sitting in a kiosk at a gate recording numbers of seasonal permits sold by hour, number of vehicles passing through the pass-through lane by hour, number of entry kiosks open that hour, and so on. So Data Cluster data in a given Time Frame is a Data Group. DVs in a Data Group are items that, in some sense fit together "logically," because they have both the same "type of Profiles" and the same Time Frame.

Figure 2B elaborates on the PURDS structure shown previously, using an ER data model augmented by directional "logic" and some object-orientation. The arrows showing directions of relations are not part of ER modelling. The "logic programming" behind such arrows is inherent in PROLOG. Actually, the logical links are complicated and fraught with "Artificial Intelligence" and "Expert System" potential which can only be covered in a more lengthy article. As one example, the logic being developed lets one look at how a "vehicle entry/exit gate with visitor service" can be seen to have its "Data Cluster" defined by the combination of other Clusters for the "discrete aspects of what goes on at the gate." An entry/exit gate may have fee booths and "pass through" for non-user traffic, reentry, or seasonal permits. As well, it may have a park information centre and a regional tourist information office. Data Clusters for each of these special aspects add (set unions) to give the set of DVs for the "actual entry/exit facility." Another aspect of the logic being developed is that of manipulation of data for DVs in a Data Group, whether this be adding values for a DV to get daily totals, taking a daily maximum of values for a DV because adding maximums is not valid, or combining different DVs.

General DV Groups: Applying DV Groups To Questionnaires and Forms

The definition of Data Groups also leads to a different line of thought than that just cited. By generalization, there is a way to view Questionnaire data in a manner consistent with how other data are viewed in the PURDS (here reference is to the box between the box for Data Clusters and the one for Data Groups). Questionnaires involve "branching" levels. Each level can be "repeating" and linked to other levels "logically." General Data Groups have been developed considering them both as lists [as in LISP (O'Shea 1984)], and as logical data structures (as in PROLOG). In PURDS terms, a number of Data Variable Groups are put together along with information on when/how branching occurs, resulting in a General Data Group, or in other words, resulting in the data from a questionnaire or reporting form reflecting the logic behind the form. General Data Groups allow for branches, and for DVs and associated questions within branches, to be defined in a way which provides a full context in which to interpret data. Significantly, data from responses to questionnaires or forms thus become part of a general structural pattern and vocabulary of data in PURDS so that users do not

have to "look at" these data any differently than, for example, observed counts.

Discussion: Some Key Matters To Address In PURDS

A critical recognition in the evolution of PURDS has been that data management should be part of an "expert" system. PURDS should be acting as a Computer Assisted Learning (CAL) device. The CAL objective is providing on-line expert assistance to users in their data collection/selection/analyses processes. It is partly accommodated by having data "Purposes," "Applications," and even "References" linked to DVs, Data Groups and General Data Groups. Analyses options for a form or questionnaire, or references to its application, are part of what PURDS is about!

Accountability, Client Positions, And Purposes For Data

In referring back to Figure 2B, it can be seen that Microdatum link to Positions. To achieve the objective of accountability for data within the organization, every discrete datum is identified as trackable to the "Position" which is responsible for ensuring that the particular datum is collected. Pre-coded Positions, based on the organization's personnel system, identify the name of the Position at the "local" level which is accountable for the datum, that is, which has direct authority to require that collection of that datum be carried out. From a practical point, the datum tracking system offers a point of accountability if data are not recorded as required.

The broader issue of accountability leads to its counterpart which is also accommodated through Positions, as seen in Figure 2B, and that is the tracking of clients for data. Because PURDS data are moved within the organization to PURDS and non-PURDS systems, in each PURDS database the clients for data are designated, so that, among other reasons, data transfer can be automated. Another aspect of accountability and clients relates to the "Purposes" of collecting any particular datum. Purposes and Positions are interrelated, since if a client has not been identified for a datum, there can be no purpose in collecting it! If there is a client, then the client should have a purpose for needing a datum. This is to justify spending resources to collect data, as well as to explain to the individual being held accountable, who needs the datum and why. The logic developed thus, in theory, prevents unnecessary data collection.

The Role Of Purposes And Data Clusters

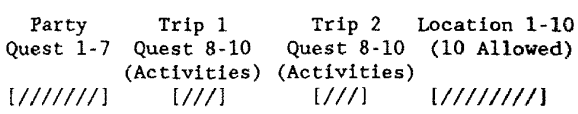
Yet another side of Purposes relates to the provision of on-line functional advice to users. As part of the Computer Assisted Learning (CAL) aspects of PURDS, experts state what can be measured, and possibly what can be achieved (and how) through using a Data Variable in a Data Cluster, that is, through collecting a particular datum. This is illustrated in Figure 2B by the diamond shape connecting Data Clusters and Purposes which reads in part "Data Variables in Clusters have Purposes." Appropriate analysis techniques for the datum can also be stated. Purposes thus provide operational guidance and a communication and education vehicle on how data can be used in decision-making for management and planning. An aspect of PURDS not covered here because of space, is the fact that Purposes are also named for Data Clusters as a whole, or for sub groups of Data Variables, offering broader guidance on the selection of Data Variables for an object type as some data should be used in combination. This is implied by the "triple" lines/arrows in Figure 2B going from Data Clusters, General Data Groups and Data Groups, to Purposes.

An Integrated Picture Of Data

Traditionally, it was typical to describe data on park use in relation to multiple trips, multiple locations, etc., as portrayed in Part A of Figure 3. Without elaborating on details, in the integrated approach to data being taken, the PURDS allows for multiple records to be related, for example, records on trips to be associated with a party, records on different trips and locations visited to be associated with a trip and thus back to a party, activities participated in by party members at different locations to be associated with each member of a party and thus back to a party, etc.

Figure 3

Part A

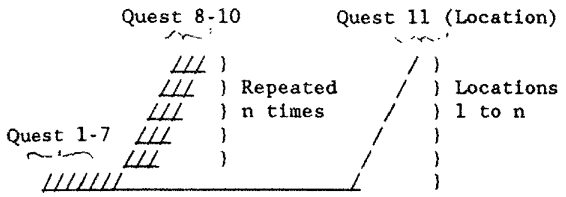


Conventional View Of Data

Figure 3A shows how conventional data might have party data with data for 2 trips and 10 activities on the same "card." PURDS data for the same situation is shown in Figure 3B with "computer directory" type structure where each trip is a "file" on a directory with "no" limit on the number of trips. Activities are

visualized similarly, with them also having a direct link to the "root directory" party.

Part B



How Data Are Viewed In PURDS

Storing, Accessing and Reporting: Generalized Queries

The question of storage of data and the efficient access to data is being approached in a radically different way than was envisaged in the first stages of PURDS development. While "Data Entry Stations" handle user direct data entry by storing microdata (by Profile, DV, and Date/Time) and offering listings of data by Menu, that is not a Data Cluster or Data Group approach! But why should it be? Well, in getting PURDS running for real, it was found that storage of large volumes of data on central databases for easy and timely access to the data, required thinking about data as has been portrayed in the foregoing discussion on General Data Groups. Not only should users see data for an entire questionnaire as a datum, the computer needed to see the data that way as well! All data recorded for a vehicle entry/exit gate for a given "Time Frame" can be a user interface datum, just as can data recorded in relation to observed counts on a beach for a given time or collection of "Time Frames."

The computer workings for actual storage, as cited earlier, should not be a user issue, and is not. Getting storage "problems solved" made it clear that users should view microdatum in terms of Groups which link them logically. Key links are Time Frames and the criterion that Data Variables belong to the same General Data Group. A crucial consideration in PURDS development in terms of data storage is the implementation of a query system which enables users to query data for a Data Cluster of a Profile to find out which data have been recorded over a certain time period. Alternately, users should be able to "ask about" certain types of Profiles and find out which Profiles (for gates, campground entries, etc.) qualify, in that they have data recorded for them, and, if desired, to "obtain" selected data so that analyses can be carried out using statistical analyses programs.

Object Oriented Design and Artificial Intelligence/Expert System

This paper has made a variety of references to the way that information about Data Variables o Profiles can be stored and used to analyze/ control the types of operations that are carrie out. Is the Data Variable such that it can be totalled? Can it be totalled over several specific Profiles? Can a collection of values reasonably be totalled over time for a given Profile? Analysis and support of the CPS Park Use Related Data System has discovered a number of "types of data," abstract data types, that are needed to do the organization's job effectively. So the concept of "special objects" comes into the picture.

This topic of special data objects for PURDS an even a start at an object oriented view of data (see Oldford 1987) requires more space than publication limits in this article provide. Suffice it to say that, as ER has solved many problems for PURDS, many major remaining problems will be solved by "Object Orientation. Object Orientation does not involve abandoning the progress made in the past, rather it offers the opportunity to build on it. Also by moving this way, the power and future flexibility of Object Oriented Languages (Ward 1989) and Databases will smooth the transition to the yea 2000.

Conclusion

This paper has discussed the PURDS Data Model and how it provides a formal data structure for the creation of systematic definitions which form the basis for data capture, storage, and reporting in relation to park use within the Canadian Parks Service. The needs and issues being pursued to make "The Model" more object-oriented and more explicitly defined by logic have been identified, as well as recent thrusts to incorporate elements of AI, expert systems and computer assisted learning as part of the database. These means are part of seeing that in practical terms, PURDS is not a system created to force data collection into a mold. It is a built on the concept that a good information management system can have CAL as a integral part, and as an expert system it can provide aid and assistance to users in a constructive context-sensitive sense.

This paper has presented PURDS and presented a feel for how non-EDP professionals should be starting to "relate" to their data. PURDS has progressed because non-EDP professionals have recognized that evolving methods in computer science are really new mathematical and logical tools for a much broader community (see Beaman 1985). It is as important to learn to use thes tools as it is to learn statistics or to learn to use a computer.

As documentation and papers come out during the next year or two, it will be seen clearly how the ideas of ER modelling, "sparse arrays" from

MUMPS, Logic Programming from PROLOG, list processing from LISP, and Object Oriented Design have played a critical role in PURDS evolution. These linkages are important since they enabled concept development in PURDS to be tied to work done by others, allowing PURDS to advance quickly and with confidence following paths which others have charted.

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MONITORING FOR QUALITY CONTROL IN NEW HAMPSHIRE STATE PARKS

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This paper reports the findings from a three year study (1987-1989) monitoring the quality of services at New Hampshire State Parks. Unlike most previous research which has concentrated on measures of overall satisfaction, the variables included on the 11-item visitor report card represent specific parameters which management can control. Regression analyses indicated that the specific indicators (e.g., cleanliness of the restrooms/grounds, helpfulness of the staff, etc.) influenced overall satisfaction and accounted for 50 percent of the variance. These findings suggest that satisfaction monitoring using parameters that can be directly manipulated by management is a useful tool for achieving a high degree of quality control in the services offered.

Introduction

All outdoor recreation agencies strive to provide quality recreation experiences. During the 60's and early 70's it was assumed that the increasing use of our nation's parks and forests indicated that the visitors were receiving satisfactory experiences. This trend toward increasing demand, however, has to some extent been reversed. Records maintained by the New Hampshire Division of Parks and Recreation, for example, show that while the number of camper days among residents has remained relatively constant, the number of non-resident visitors has declined substantially from 184,978 in 1973 to 112,855 in 1989.

Various explanations can be offered to account for this reduced demand. The trend may be indicative of a general societal shift away from camping/park related activities. Alternatively, reductions in visitor numbers could suggest a shift in the type and quality of services currently offered. Whatever the explanation, the trend toward decreasing participation highlights the need for monitoring visitors' expectations to gauge the extent to which these expectations are satisfied by the facilities and services offered.

Visitors to New Hampshire State Parks are asked each year to complete a brief *report card* evaluating the services and facilities at areas they visit. Results from these annual investigations provide a systematic method for monitoring the quality of services offered at State Parks and a management tool for indicating where improvements are needed. This paper summarizes the findings from three years of this monitoring effort (1987 - 1989).

The Concept of Satisfaction

Satisfaction is a common dependent variable in research on communities (Marans & Rodgers, 1975; Molnar, Purchit, Clouts, & Lee, 1979), marriage (Glen & Weaver, 1978; Snyder, 1979), jobs (Locke, 1976; Campbell, Converse, & Rodgers 1976) and recreation (Vaske, Donnelly, Heberlein, & Shelby, 1982). This research has both a theoretical and an applied focus. Discovering variables which explain or predict satisfaction can stimulate new theories of what makes people happy. From an applied focus, the concern is with identifying variables that not only affect satisfaction but which are also susceptible to management or manipulation. If such attributes can be identified and monitored, the potential for changing circumstances to create better living/recreation experiences is enhanced.

The concept of satisfaction is central to most discussions of recreation management. Researchers and managers have consistently argued that the "goal of recreation management is to maximize user satisfaction" (Lucas & Stankey, 1974; p. 1). If this objective is to be realized, two separate types of information are needed (Shelby & Heberlein, 1986; Kuss, Graefe & Vaske, 1990). The first involves a description of what is occurring at a given location. The second concerns an evaluation of the acceptability of various conditions.

The descriptive component is concerned with observable characteristics of a recreation system. Two types of descriptive data are important: management parameters and impact parameters (Shelby & Heberlein, 1986). Anything an agency can directly manipulate is a management parameter. Examples of management parameters include the cleanliness of the restrooms, attractiveness of the grounds, or helpfulness of the staff. Impact parameters describe what happens to visitors or the environment as a result of visitor use patterns and other management parameters (Shelby & Heberlein, 1986). Changes in the perceived quality of the experience, negative reactions to unfriendly staff, or dirty restrooms are examples of impact parameters.

The descriptive component identifies how the system works, but it does not determine what is acceptable or appropriate. This involves a value judgment or a personal evaluation. For successful implementation, it is important that this evaluation result in a set of standards specifying the type of experience to be provided in terms of appropriate impact parameters as well as the degree of environmental modification acceptable to management.

Problems with the Satisfaction Concept

Despite the importance typically associated with the concept, satisfaction measures have seldom proven to be a useful management tool. Explanations for this situation range from the type of relationships that have been examined to methodologies that have been used.

Most of the existing research has concentrated on the relationship between number of visitors in an area and visitor satisfaction. Twenty-five years of research indicates that recreationists report high levels of satisfaction regardless of the density levels they encounter (See Kuss, Graefe & Vaske, 1990, for a complete review). Efforts to account for this lack of statistical relationship suggest that it is not surprising to find many people reporting high satisfaction with their leisure activities because they have freely chosen these activities to provide satisfaction. Heberlein and Shelby (1977) argue that because recreation activities are self-selected, individuals who are sensitive to increasing use levels are likely to be displaced to other resources. Those who remain will either be more tolerant of higher densities or will have adjusted their expectations to compensate for the situation.

Schreyer (1979) elaborates on the psychological mechanisms that may yield reports of high satisfaction: (1) individuals may *shift their perceptions* of the experience away from original evaluations in order to maintain the desired experience, (2) individuals may *shift their priorities* of expectations to maintain satisfaction, or (3) individuals may *change their behavior* to achieve preferred outcomes that have not been attained during previous occasions. All of these potential explanations suggest that it is unrealistic to expect satisfaction to be determined by a single situational variable like use intensity. From an applied perspective, satisfaction indicators must vary with changes in conditions that managers can control if they are to be useful.

Second, estimates of visitor satisfaction are typically derived from surveys of a single area at a particular point in time. Such one-shot surveys provide no baseline data for identifying and monitoring unacceptable changes that may be occurring. Data from several years using identical measures is required if satisfaction is to be a useful management tool.

Third, most satisfaction measures have considered only aggregate satisfaction. While such an approach does permit general comparisons between areas, it is impossible to disaggregate the conditions which led to the overall evaluation. From an administrative perspective, knowledge of negative visitor reactions to the helpfulness of the staff is more readily translated into subsequent management actions than information on reduced overall satisfaction.

Fourth, satisfaction is usually measured with Likert type scales where the response categories range from Highly Satisfied to Highly Dissatisfied. Although methodologically appropriate, it is difficult for managers to interpret the importance of knowing that visitors are somewhat satisfied as opposed to moderately satisfied.

The New Hampshire State Parks' Report Card

The report card overcomes most, if not all, of the limitations common to satisfaction research. First, in many situations, managers are legally or administratively bound to provide the public with recreation opportunities. Given financial constraints and the amount of money generated from fees, park administrators are often reluctant to limit the number of visitors using an area. Under such circumstances, visitor numbers is not a management parameter that can be easily manipulated. Thus, rather than focusing on the relationship between satisfaction and visitor numbers (a relationship that does not appear to vary), the report card focuses on indicators of satisfaction which are under the control of management.

Second, data from the report card are collected annually at a range of units in the New Hampshire State Park system, thus permitting the opportunity to monitor changes that occur over time within as well as between parks. Third, the report card contains specific management oriented questions as well as more general items such as first impression and overall satisfaction. Fourth, the report card's response categories parallel education based grading systems (e.g., A = excellent, B = better than average, etc.); a format that is easily understood and familiar to both visitors and managers.

Methods

The report card used for tracking visitors' satisfaction was developed in the late 1970's (LaPage & Bevins, 1981). The instrument was initially tested in a number of state parks in Massachusetts, Vermont and New Hampshire. Subsequent verification was conducted in collaboration with private campground facilities nationwide. In New Hampshire, 5000 report cards are distributed each year by park employees to visitors at over 30 units managed by State Parks. These include campgrounds, day use areas, beaches and historic sites. During 1987, 1855 completed cards were returned, compared to 1464 in 1988 and 963 in 1989.

The report card asks respondents to rate the park they visited on 11 variables:

First impression
Helpfulness of staff
Cleanliness of restrooms
Information at park
Attractiveness of park
Safety and security
Cleanliness of grounds
Ease of access
Hours of operation
Control of pets
Overall satisfaction

Responses to each variable were coded on a 5 point scale:

4	A	(excellent)
3	B	(better than average)
2	C	(average)
1	D	(below average)
0	E	(poor).

Results

The visitors' overall satisfaction with their state park experience increased from a B+ in 1987 to an A- in 1988, and remained at that level for 1989 (Table 1). Similar improved grades were noted for the cleanliness of the grounds. Letter grades for the perceived helpfulness of the staff and attractiveness of the park went from B+ in 1987 to A- in 1988 and returned to a B+ in 1989. Statistical differences, however, were only noted for the 1987-1988 comparison of the helpfulness of staff. Reactions to controls on pets declined to a B+ in 1989 from a grade of A- for the previous two years, but the statistical test for these comparisons was not significant. Cleanliness of the restrooms received the lowest grade for 1987 and 1989 (B). The grade for this variable during 1988 was significantly higher (B+). Consistent grades of B+ were reported each year for the remaining five variables.

On a park by park basis, the overall grade point averages (GPA) *across all three years* ranged from 3.96 to 3.06 (Table 2). Seven units received an average grade of A across this three year period. Three of these areas were historic sites (Daniel Webster Historic Site, Weeks State Park and Wentworth Coolidge Historic Site), two were campgrounds (Coleman and Lake Francis State Park), one was a day use area (Rye Harbor State Park) and one was an attraction (Franconia Notch State Park Tram). Nine of the units in this sample rated an A- over the three years, while another 22 areas received an average grade of B+. The lowest overall grade point averages (B) were given at Crawford Notch State Park Campground, Hampton Beach State Park, and Echo Lake/Cathedral Ledge.

Examination of the grades received at *each park* during *each year* (Table 2), show some consistency. For example, of the seven units showing an overall grade point average of A, only Lake Francis State Park reported a grade lower than A on a year by year comparison. The grade for Lake Francis during 1988 was an A-. Among the units with a three year average of A-, the yearly grades range from A to B. Comparing 1989 against the other two years, four of the eight parks reporting 1989 data showed improvement, two reported similar grades and two parks reported lower grade point averages. Between 1987 and 1989, 53 grade point averages could be calculated for the 22 areas with an overall GPA of B+. Forty-one of the individual year GPA's were B+ (77%), seven (13%) were A-, three (6%) were B and two (4%) were A. Finally, the three parks with an overall GPA of B, had yearly scores ranging from B+ to B-.

The grade point averages can also be compared relative to the unit's classification in the system (i.e., historic site, day use area, campground, or beach). On average, the four historic sites in the sample (Daniel Webster Historic Site, Weeks State Park, Wentworth Coolidge Historic Site and Robert Frost State Park) consistently reported the highest grade point averages [A] (Table 3). Across all three years, parks in the remaining classifications received an overall GPA of B+. The 1988 & 1989 grade point averages for day use areas were A-, an improvement from the B+ in 1987. The grades for campgrounds and beaches were consistently B+ during each of the three years.

Table 1. Report card grades across all parks

Grades[1]				Mean[2]		
1987	1988	1989	Variable	1987	1988	1989
B+	A-	A-	Your overall satisfaction*	3.65^{a}	3.71^{b}	3.68^{ab}
B+	A-	A-	Cleanliness of grounds*	3.65^{a}	3.69^{ab}	3.72^{b}
B+	A-	B+	Helpfulness of staff*	3.64^{a}	3.72^{b}	3.66^{ab}
A-	A-		Control of pets	3.68	3.69	3.66
B+	A-		Attractiveness of park	3.65	3.69	3.65
B+	B+		Your first impression	3.59	3.62	3.64
B+	B+		Ease of access	3.55	3.61	3.58
B+	B+		Hours of operation	3.51	3.53	3.53
B+	B+		Safety and security*	3.50^{a}	3.57^{b}	3.51^{ab}
B+	B+		Information at park*	3.38^{a}	3.51^{b}	3.34^{a}
B	B+	B	Cleanliness of restrooms*	3.28^{a}	3.40^{b}	3.31^{a}

1. Grades were assigned based on the following ranges:

A	4.00 - 3.80	B	3.32 - 3.00
A-	3.79 - 3.67	B-	2.99 - 2.67
B+	3.66 - 3.33	C+	2.66 - 2.33

* An * following a variable indicates that the means for the three years vary significantly.

2. Means with different superscripts vary significantly at the $p < .05$ level.

Table 2. Overall grade point average (GPA) by park[1]

Park	Overall Grade Point Average 1987	1988	1989	All Years	Grade
Daniel Webster Historic Site	4.00	3.93	3.99	3.96	A
Weeks State Park	3.84	3.90	3.96	3.92	
Coleman State Park	3.90	3.80	3.84	3.87	
Rye Harbor State Park	3.84	3.87	3.92	3.87	
Wentworth Coolidge Historic Site	3.80	3.95	--	3.87	
Franconia Notch State Park Tram	3.83	--	--	3.83	
Lake Francis State Park	3.79	3.67	3.88	3.80	
Mt. Sunapee State Park	3.66	3.66	3.84	3.76	A-
Robert Frost State Park	3.71	3.53	3.94	3.73	
Rollins State Park	3.61	--	3.93	3.73	
Forest Lake State Park	3.57	3.10	3.96	3.72	
Milan Hill State Park	3.83	3.75	3.15	3.72	
Silver Lake State Park	3.68	3.69	3.76	3.72	
Wentworth State Park	3.61	3.79	3.75	3.72	
Kingston State Park	3.67	3.82	--	3.71	
Wadleigh State Park	3.67	3.81	3.58	3.71	
Greenfield State Park Day Use	3.71	--	3.66	3.69	B+
Odiorne Point State Park	3.61	3.66	--	3.66	
Moose Brook State Park Campground	3.64	3.54	3.56	3.63	
Monadnock State Park Day Use	3.60	--	3.64	3.62	
Wellington State Park	3.60	3.59	3.84	3.62	
White Lake State Park Campground	3.82	3.58	3.51	3.62	
Greenfield State Park Campground	3.62	3.58	3.72	3.61	
Monadnock State Park Campground	3.61	3.56	3.70	3.60	
Pawtuckaway State Park Campground	--	3.53	3.74	3.57	
Wallis Sands State Park	3.57	3.51	--	3.57	
Ellacoya State Beach	3.68	3.36	--	3.56	
Franconia Notch State Park Campground	3.45	3.66	3.46	3.56	
Winslow State Park	3.35	3.56	3.72	3.56	
Franconia Notch State Park Flume	3.54	--	--	3.54	
White Lake State Park Day Use	3.56	--	3.23	3.54	
Mt. Washington State Park	3.51	3.60	3.48	3.50	
Bear Brook State Park Campground	3.47	3.65	3.32	3.49	
Crawford Notch State Park Day Use	3.47	--	--	3.47	
Pawtuckaway State Park Day Use	3.51	--	3.34	3.47	
Miller State Park	3.35	3.54	3.55	3.46	
Bear Brook State Park Day Use	3.42	--	3.38	3.39	
Clough State Park	3.41	3.30	3.73	3.34	
Crawford Notch State Park Campground	3.16	3.35	--	3.29	B
Hampton Beach State Park	3.36	3.50	3.04	3.27	
Echo Lake & Cathedral Ledge	2.83	3.66	--	3.06	

1. The overall grade point average (GPA) represents each park's average grade across all variables on the report card.

Table 3. Overall grade point average (GPA) by type of park[1]

Type of Park	Overall Grade Point Average 1987	1988	1989	All Years	Grade
Historic Sites	3.84	3.90	3.96	3.90	A
Day Use Areas	3.56	3.74	3.70	3.65	B+
Campgrounds	3.59	3.60	3.58	3.59	B+
Beaches	3.55	3.58	3.40	3.53	B+

1. The overall grade point average (GPA) represents the average grade across all variables on the report card.

The distribution of visitors to New Hampshire State Parks varies considerably among the parks. Some campgrounds primarily attract New Hampshire residents (e.g., Coleman), while most visitors to Franconia Notch tend to be non-residents. Still other campgrounds show a more equal mix of resident and non-resident visitors (e.g., Greenfield). Of the 12 campgrounds in the State Park system, one can be classified as primarily resident visitors, seven attract a mix of resident and non-resident campers and four are visited mainly by non-residents.

Examination of the grade point average at Coleman, the resident visitor campground, shows a three year overall GPA of 3.87 or a letter grade of A (Table 4). Campgrounds attracting either a mix of resident/non-resident visitors or a predominance of non-residents received letter grades of B+ over the same period. Grade point averages were fairly consistent across the three year period for each of the visitor classifications.

One of the variables on the report card addressed the visitors' overall satisfaction with the experience while the remaining questions asked individuals to evaluate a specific component of their visit (e.g., cleanliness of grounds/restrooms, helpfulness of staff, attractiveness of the park, etc.). These ten specific variables were treated as predictors of the person's overall evaluation.

When the data from all three years were combined, nine of the ten predictor variables influenced overall satisfaction, and accounted for 50 percent of the variance in the dependent variable (Table 5). The visitor's first impression of the park was the strongest predictor of overall satisfaction ($B = .22$; $p < .001$). Cleanliness of the grounds and helpfulness of the staff ranked next in importance, respectively. Safety and security, cleanliness of the restrooms, and control of pets were least important among the significant indicators. The only variable to not enter the equation was the information received at the park.

Separate equations for each of the three years show a somewhat similar pattern of findings. The respondent's first impression was consistently the best predictor of satisfaction, while information at the park was not significant in any of the regressions. The size of the coefficients for the remaining predictors varied among the years, but each equation accounted for about half of the variation in overall satisfaction.

Because of the relative importance of the visitors' first impression, another set of regression equations were fitted. In these analyses, first impression was the dependent measure and the remaining eight questions were independent variables (Table 6). Results indicated that the attractiveness of the park and the helpfulness of the staff were consistently the strongest predictors of the person's first impression. For the combined sample, eight of the nine predictors had a significant and positive influence on the visitors' first impression. Control of pets did not effect first impression in any of the four equations. The amount of explained variance ranged from 35 percent to 39 percent. Because the variables on the report card can be manipulated by management actions (i.e., they are management parameters), these analyses suggest that most of the factors effecting an individual's overall evaluation of the experience and their first impression of the area can be influenced by the manager.

Table 4. Overall grade point average (GPA) by type of visitor[1]

	Overall Grade Point Average				
Type of Visitor	1987	1988	1989	All Years	Grade
Resident[2]	3.90	3.80	3.84	3.87	A
Mixed[3]	3.61	3.59	3.60	3.60	B+
Non-resident[4]	3.50	3.60	3.54	3.56	B+

1. The overall grade point average (GPA) represents the average grade across all variables on the report card.
2. Coleman State Park was classified as a *resident* campground.
3. Campgrounds in the *mixed* classification include: Bear Brook, Greenfield, Lake Francis, Milan, Pawtuckaway and Pillsbury.
4. Campgrounds in the *non-resident* classification include: Crawford, Lafayette-Franconia, Monadnock, and Moose Brook.

Table 5. Factors affecting overall satisfaction[1]

	Dependent Variable: Overall Satisfaction			
Independent Variables	1987	1988	1989	All Years
Your first impression	.18**	.21**	.27**	.22**
Cleanliness of grounds	.18**	.15**	.18**	.16**
Helpfulness of staff	.12**	.17**	.14**	.14**
Ease of access	.16**	.06*	.09*	.11**
Hours of operation	.11**	.07*	.11*	.10**
Attractiveness of park	.17**	.08*	--	.10**
Safety and security	--	.11**	.16**	.08**
Cleanliness of restrooms	.08**	.10**	--	.07**
Control of pets	.07**	.07*	--	.06**
Information at park	--	--	--	--
Explained Variance (R^2)	.52	.49	.48	.50

1. Cell entries are standardized regression coefficients
* $p < .05$; ** $p < .001$

Table 6. Factors affecting first impression[1]

	Dependent Variable: First Impression			
Independent Variables	1987	1988	1989	All Years
Attractiveness of park	.26**	.31**	.26**	.26**
Helpfulness of staff	.20**	.20**	.22**	.20**
Hours of operation	.12**	--	.16**	.08**
Information at park	.07*	.09*	10*	08**
Ease of access	.08*	.09*	--	.07**
Cleanliness of grounds	.10**	--	--	.06**
Safety and security	--	.07*	.09*	.05*
Cleanliness of restrooms	--	.07*	--	.04*
Control of pets	--	--	--	--
Explained Variance (R^2)	.36	.35	.39	.36

1. Cell entries are standardized regression coefficients
* $p < .05$; ** $p < .001$

Discussion

When used on an annual basis, the report card provides a viable management tool for monitoring not only aspects of the services which are meeting user expectations, but also those where improvements are needed. There are, however, some limitations/issues which would enhance the value of the instrument.

First, the report cards should be distributed during the same time period each year. The timing of the distribution period can influence not only the number of completed returns, but more importantly, the findings.

The number of completed returns for 1989 was substantially lower than for the previous two years. Reductions in visitor numbers and staff at the end of the 1989 season when the cards were distributed could have contributed to the relatively low response rate. Findings from the report card indicate that cleanliness of the restrooms was the only variable to decline significantly between 1988 and 1989. Because of limited female staff at the end of the 1989 season, it was sometimes impossible to maintain the women's washrooms. From a monitoring perspective, therefore, it is not possible to determine whether these findings are (a) representative of the 1989 season and indicate a true decline in the quality of this service, or (b) reflect a methodological artifact of when the surveys were distributed.

Second, procedures for distributing the report cards should be standardized across park units. Data from all three years show variation in the number of completed returns from each park. In some cases individual units in the system did not respond during a given year. The low return rate implies that care must be taken in interpreting park specific findings. With a small sample size, the average scores can be influenced substantially (positively or negatively) by the responses from a few individuals. The utility of report card monitoring efforts is thus reduced because changes in respondents' evaluations can be attributed to either actual shifts in the level of service or sample size effects.

Third, data from the report card describes the visitors' reactions to the services provided, but it does not indicate whether the level of service is acceptable to either the visitor or the manager. This determination requires a value judgment of the appropriateness of different conditions. For successful implementation, it is important that this evaluation result in a set of standards specifying the grade level for each variable at each park that is acceptable to management.

Fourth, monitoring the quality of services offered at a park may necessitate additional information beyond that obtained from the report card. Although the current instrument provides a useful management tool, not all questions of interest to managers can be addressed. Data from park attendance records, for example, indicate that the number of non-resident campers has steadily declined from 1973 to 1989. Since reductions in visitor numbers directly influence revenue production, it is important to identify indicators that have contributed to the existing situation. At the outset of this paper, we offered two alternative explanations. One hypothesis suggested that the kinds of services currently offered at State Parks is no longer consistent with the public's expectations. For example, does the visiting public now expect electrical hook-ups, hot showers, dumping stations, etc. A second explanation suggests that reductions in camper numbers reflects a general societal shift away from park related activities.

To examine these alternative explanations, the report card could be administered in other types of campgrounds (e.g., private and national) that offer a wider range of services. Tracking the attendance figures at these locations would place the visitation rates reported by State Parks in perspective. Finally, other surveys could be constructed to directly examine the reasons individuals have increased or decreased their camping activities. Each of these approaches would enhance our understanding of changes in camping participation patterns. Whatever methodology is employed, the point here is to simply highlight the need for additional survey/monitoring efforts to address the range of concerns of interest to managers.

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AUTOMATED MARKET INFORMATION GATHERING IN THE CANADIAN PARKS SERVICE

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The need for up to date information related to marketing initiatives is imperative. State of the art data collection techniques provide opportunity for one step data capture through pop up survey modules attached to computerized registration systems. Visitors are surveyed at predetermined sample ratios and collected data is accessible from remote locations where analysis occurs. Up to date information is the key in evaluating a major marketing initiative related to Parks Service resources on Cape Breton Island in 1990.

Marketing In The Canadian Parks Service - Atlantic Region

The Canadian Parks Service has begun to undertake major marketing related initiatives. Marketing in the Atlantic Region of The Parks Service is primarily concerned with increasing public understanding and awareness of both the resource and mission of the agency. In order to satisfy mandated responsibilities, it is desired to influence use of resources in accordance with service capacities and to ensure that programs and services continue to match evolving visitor needs and expectations. A major initiative implemented for the 1990/91 operating season is the Cape Breton Island - Parks Marketing Strategy pilot project. This tactical marketing communication plan includes a high quality lure brochure, a five park vacation planner, and individual park welcoming flyers, along with publicity and strategic advertising campaigns. This plan is a result of a market situation analysis and subsequent development of an integrated strategic plan for the five resources located on Cape Breton Island which seeks to present the parks in a single positioning statement.

Evaluation Of Marketing Initiatives

Evaluation of initiatives has been identified as an integral step of any marketing process (Kotler, McDougall, and Armstrong, 1988, Mahoney, 1987). The ability to monitor or evaluate on an ongoing basis is critical to the success of marketing projects (Kotler et al, 1988). Progression of a communication plan must be monitored and evaluated regularly. A recognized shortcoming of such ongoing and up to date monitoring of projects rests with the difficulty in which time efficient and effective collection and maintenance of pertinent data occurs.

Recent literature discusses state of the art data collection in terms of computer assisted telephone interviewing (CATI) and associated methodologies (Nicholls, 1988). Available technology has greatly increased the usefulness of telephone services for such procedures. The ability to electronically collect and store data in such a manner can provide both effectiveness and efficiency advantages (Catlin, Ingram and Hunter, 1988). However, such advantages can be negated and time delays incurred when survey populations must be collected through gathering of telephone numbers, from a specific universe, to initiate call back surveys for evaluative exercises. Time delays also are experienced with mail-back surveys. Opportunities exist where situations lend themselves to methods of data collection and maintenance which also should be considered state of the art. Such opportunity is evident where a captive audience is available to provide the necessary universe for study. A captive audience is able to provide immediate information pertinent to specific study objectives.

Computerized Automation in The Canadian Parks Service

The Canadian Parks Service, Atlantic Region, has been test piloting computerized, automated registration systems both at campground kiosks in National Parks and visitor reception centres in National Historic Sites. This project is referred to as the Automated Kiosk System. Visitors registering in such locations provide a captive audience as previously referred. Abilities and technologies are now available to survey these visitors immediately upon registration contact with park staff. One step data capture via a "pop-up survey" module connected to existing computerized registration systems provides this opportunity. This system is referred to as the Automated Market Information Gathering System (AMIGS). In addition to processing the visitor's registration information, specific information can be requested of and collected from a sample

of the registrants. Short questions, requiring minimal input by staff receptionists, provide up to date information on an ongoing basis.

The Fortress of Louisbourg National Historic Park has provided the Atlantic Region with opportunity to test this system. The automated registration system operated at the site during 1989. In demonstrating its flexibility, a visitor survey was administered with the aid of the automated registration system. Visitors' names and addresses were collected at a specified ratio of one in ten. This information was later removed from the database on site, transported to regional office and a system was developed to produce mailing labels for mail back survey distribution. In addition, all registering visitor party representatives were asked for their postal code and language of communication to be used as control variables with the survey. Although this situation resulted in reduced costs and associated increases in efficiency of administration of the survey, it would not provide the necessary ongoing and up to date information for accurate monitoring of a marketing communication plan. This is attributable to time delays in collection and subsequent analysis of data.

The Fortress of Louisbourg has further provided appropriate opportunity to test the automated monitoring system in that it is a key component of the Cape Breton Island - Parks pilot project. Having committed substantial financial and personnel support to this project, it is imperative every opportunity for evaluation is investigated.

The Automated Market Information Gathering System (AMIGS)

The following is a description of the Automated Market Information Gathering System (AMIGS). The AMIGS was developed using the Entity-Relationship approach to logical database design, as was the automated registration system. It is designed to provide automated information collection and data transfer. It supports both local entry of data returned on a questionnaire and direct collection of data from the user with responses being computerized. This automated system provides for questionnaire administration to park users and for interview and weighting information transfer to a computer system for further processing. AMIGS provides continuous, up to date information in a manner which does not interfere with the registration procedure or other park operations.

AMIGS augments existing data collection systems and data banks acquired in conjunction with the Park Use Related Database System (PURDS) and associated socio-economic assessment procedures currently operational within the Canadian Parks Service. Additionally, it is easily integrated into existing data collection systems such as the automated registration system and provides a means to monitor visitor awareness and response to marketing activities. The operation of the automated registration system and its data collection capabilities provides a valuable opportunity to simultaneously acquire marketing information. While collecting required visitor information, this additional data gathering is accomplished in a complimentary and automated manner.

AMIGS functions as a module of the automated registration system. It is invoked and controlled through a management setup module which also is an add-on to the registration system. As a component of the registration system's management setup module, a user friendly interface for input of questionnaire text and corresponding valid responses is available from tables.

In the management setup routine, the desire to have the automated information gathering system operational is identified. The system remains active until a desire for termination is identified. The information gathering module remains active from one operating session to the next without any requirement to access the management setup at each operational session initiation.

All screen messages, forms, displays... have flexibility to appear in either official language with the exception of actual question text and responses which accommodate any number of languages (1-n) based on what is supplied in the questions and responses setup. The questionnaires are able to appear on screen, to the user, at any of several specified points in the transaction sequence (ex. arrival, start of cash transaction, end cash transaction, end of regular kiosk transaction). Once a questionnaire is set to be invoked at a specified "point" the system continues to operate in this manner until changed in the management setup. The point of end of cash transaction, prior to printing of the ticket/permit has proven successful in the past and is most commonly used.

Operation of this automated information gathering system is efficient so that waiting for questions, finding

response codes and storing data does not delay the registration process. Help or coded valid responses for each questionnaire are available at the user's request.

The sampling rate for strata that the interviewed visitor belongs, that is, party representation (level 0), individual representation (level 1)... is included in the selected response records. Where it is a level 1 or higher response, the respondent is identified (i.e.: by any of: male, 20-35 years; english speaking; female from US..., dependant upon specified criteria.)

For each questionnaire, a series of criteria must be met in order to present the questionnaire to the computer screen or visitor. These criteria relate to the specified sampling rate, origin of visitor, official language of preference of visitor, date and time of visit, group composition, and ticket/permit type. Any number of these criteria can be selected in the management setup and interrogated for each visitor registration as to satisfaction of the specified requirements. If criteria is met for any of the questionnaires, the visitor is interviewed with the appropriate questionnaire(s). This provides opportunity for sampling of different strata and sub-strata from initial samples. The sampling rate in affect at the time of query is included in the stored collected response data.

Each registration transaction is interrogated for satisfaction of criteria. Thus, additional information is required for weighting purposes in the survey process. An additional record is maintained for each registration transaction interrogated. This details which questionnaires were interrogated for, and the successful or unsuccessful meeting of the associated criteria. This data is referred to as the survey weighting information. The weighting information records are maintained in an additional file. These data provide a record of the survey universe which is represented by the collection of screening questionnaires interrogated for each registration transaction.

Data storage before transfer does not place extensive hardware demands on the registration system but are safe and reliable. Transfer of data is self-documented and allows for flagging of data transferred, so that when questionnaire response data are safely stored outside the registration system database they can be erased from within the system.

Collected responses and survey weighting information, as referred above, are maintained within the registration system during regular, daily operation. Upon completion of the operating day, or weekly, based on user specifications, collected response information and survey weighting information is transferred from the database system to flat files in the operating system environment.

Collected response information is maintained in a fashion allowing movement of data to an external database. Information off loaded is maintained only until it is transferred, stored, verified and backed up at the regional office. Upon transfer, the data becomes the responsibility of the regional office staff and data files are managed in accord with Access to Information, confidentiality and other legal and policy constraints.

In order to satisfy easy verified movement of data to the regional office the system includes automated routines using communication software to obtain the files stored at the registration site. This consists of selecting the remote location from which data is sought, invoking the communication software and a routine to transfer the most recently created storage file. This routine moves the file to the calling computer and notifies the user of successful or unsuccessful completion of transfer. Flexibility is provided to specify numerous remote sites and have the computer access and transfer each with no interaction from the user.

Operational Advantages of AMIGS

The following operational advantages can be realized through use of the AMIGS:

i) Acquisition and availability of ongoing information;

ii) Occurence of one-step data capture resulting in increased effieiencies;

iii) Documented and maintained sample criteria, sample rates, and weighting information;

iv) Automated logic checking of collected data;

v) Storage of data on media accessible for documented and veriiable transfer;

vi) Minimal to no interruption of the visitor's experience.

Evaluation and Monitoring Opportunity Potential

In implementing this system, several advantageous opportunities in evaluation and monitoring of marketing and related projects will be accessed. In 1989, each visitors' postal code and official language of preference was recorded. This resulted in clearly defined markets based on origin and language. During 1990, collection of these data are vital for comparative purposes. However, collection of additional information can provide much more.

Specific information integral to the evaluation of the CBI - Parks Marketing Strategy project relates to the visitor's awareness or possession of the CBI - Parks printed promotional materials. With the additional knowledge of the visitor's association with these materials, ongoing evaluation can assist in determining the success of the brochure's distribution plan.

The following example demonstrates such evaluation. By way of a regular monitoring exercise, it is discovered that fewer visitors are originating from mainland Nova Scotia and that proportionately fewer, in comparison to New Brunswick visitors, have any awareness of the print materials. Thus, distribution in Nova Scotia can be adjusted accordingly. If a disproportionate number of the Nova Scotia visitors are from outside the Halifax area, in comparison to 1989, more materials can be distributed within this area or the distribution locations can be adjusted. Note that this type of evaluation is most effective in the early days and weeks of the operating season. This same scenario is valid for any origin base (i.e.: Quebec, Ontario, New England, other United States...). The collection of ongoing, up to date information is imperative in order to make such adjustments possible.

Another method of evaluation of the CBI parks pilot project is available on an ongoing basis in that the effect of the print materials is known continuously if visitors are queried as to its importance in a decision to visit or other related questions. Thus, from a broader, Parks Service perspective, such a system could be used to address several Park or Site related issues which are identified during the operating season.

A common complaint of park managers is the inability to access or even complete lack of collection of information pertinent to responsible, proactive management decisions required on an ongoing basis. An automated marketing monitoring system, therefore, can have a much broader affect and appeal. Field level analysis on an automated and time efficient (i.e.: immediate) basis also will be realized in the near future. Automated and user friendly, yet sophisticated analysis and reporting facilities will be attached to the automated registration systems through PURDS or other such systems. This situation will allow for immediate addressing of issues by park management with little burden on Regional Office staff.

Initiation of this survey process is dependant upon park management's consultation with regional office staff. If a more in depth visitor survey is required at a site, a similiar system can be used to gather names and addresses of potential survey respondents as was during 1989. However, this information should be available to regional staff on an ongoing basis with no effect upon the operation of the registration system as was the situation previously. The registration system had to be shut down and regional staff required to access the data in order to transfer that required information to a diskette which was then physically transported to the regional office. No difference exists between requesting visitors' names or more specific questionnaire response.

Summary

As a functioning module of an automated registration system, the AMIGS system provides for questionnaire administration to park users and for interview and weighting information transfer to a computer system for further processing. This one step data capture leads to increased effectiveness and efficiency and reduced financial costs in data collection exercises.

Use of automated systems such as AMIGS increases evaluation and monitoring potential for the Canadian Parks Service and researchers in general. Research technologies such as this must be explored for futhering the understanding of the recreation and leisure phenomena.

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THE ECONOMICS OF WILDLIFE REINTRODUCTION

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Economic values associated with wildlife include personal use value and such extramarket values as option value and several forms of existence values. In this paper, we examine these values for three species recently reintroduced into New England: the bald eagle, the wild turkey, and the Atlantic salmon. Results suggest that economic values (particularly existence values) are substantial for these species.

Over the past two centuries dramatic land-use changes, environmental degradation, population increases, and pressures from hunting and fishing have caused the extinction of some fish and wildlife species and great changes in the natural range of others. Periodically, we have attempted to counter these shifts and preserve endangered species or to reintroduce species into areas where they had once been plentiful. Restoration efforts (which can be quite costly and have a decidedly mixed success record) have usually occurred when public sentiment has enabled political action or when specific groups like hunters or fishers have financed the restoration of a game species through excise tax payments. Today's decision-making climate, however, often requires more sophisticated economic analysis, so economists have needed to extend the concepts of benefit/cost analysis to incorporate a broader spectrum of benefits produced by wildlife restoration programs. In this paper, we examine the economic values associated with three such restoration programs in New England: the bald eagle (*Haliaetus leucocephalus*), wild turkey (*Meleagris gallaparo*), and Atlantic salmon (*Salmo salar*).

Each of these species has suffered dramatic declines in the New England region. On land, habitat loss began with the first European settlers who cleared the almost contiguous forest to establish cropland and pasture. By 1850, nearly 70 percent of the original forest had been removed (Glass 1974). In the waters, dam construction and pollution eliminated the salmon from most of New England.

By the late nineteenth century, however, the situation had begun to shift. The textile industry moved south and many of the mills along rivers were shifted to other uses or were abandoned. Agriculture moved west to richer lands better suited to new technology. Abandoned farmland soon reverted to forest through natural succession, and by 1987 nearly 81 percent of the region again was forested (Haynes 1989). With the return of suitable habitat and new legal protections, species that had been extirpated or reduced to low population levels began to reestablish themselves. Others that have not repopulated naturally (such as those examined in this paper) have benefited from publicly-financed reintroduction programs, even though the reasons for these programs vary.

In the case of the bald eagle, restoration probably was undertaken because of the sentiment it engenders as the national symbol. Bald eagles have never been common in New England; early populations were persecuted and available habitat declined rapidly. It was not until the 1950's and 1960's, however, that pesticide use decimated remaining populations. In 1978, the U. S. Department of the Interior Fish and Wildlife Service classified the bald eagle as an endangered species in each of the New England states (Engel and Issacs 1982). Restoration programs in New England began with the placement of eagle eggs from Minnesota into eagle nests in Maine, the last state with a resident (although declining) eagle population. Although initial efforts achieved only limited success, restoration efforts were initiated in nearby states. New York placed nestling eagles into hacking towers and released them when they could fly. In New England, restoration programs have focused on Massachusetts and Maine. Success has been quite good and the programs are within reach of the recovery goals set for them (Nickerson 1988). The costs, however, have been high: New York State has spent an estimated $500,000 on its program; consequently, no further efforts are underway. Eventually, the populations established by the programs are expected to expand to the capacity of the available habitat.

By 1900, massive changes in land use had eliminated entirely the once plentiful eastern wild turkey from the New England/New York region; only a small population remained in south central Pennsylvania. Numerous expensive, and largely unsuccessful attempts to establish viable populations have been made by stocking game-farm-raised turkeys (Cardoza 1983). In the early 1940's, however, the Pennsylvania population began to expand, and by the end of the decade, the wild turkey was reestablished in southwestern New York (Nenno 1980). This naturally expanding population eventually provided the basis for a phenomenally successful trap-and-transfer program. In Vermont, for

example, an initial stocking in 1969 and 1970 of 31 live-trapped turkeys resulted in a 1979 population estimated at 8,000 (Bailey 1980); the total cost of this program over a 5-year period was less than $75,000. Wild turkeys now exist beyond their original range in some areas, and every New England state permits hunting.

The arrival of Europeans and their subsequent settlement of river basins marked the beginning of the end for New England's Atlantic salmon. Dam construction along river tributaries totally blocked the salmon from its breeding grounds, and by 1800 salmon was extinct virtually throughout the region. Restoration efforts were undertaken in 1865 and 1880 but failed due to pollution, overfishing, and lack of knowledge of the salmon's needs. In 1965, the Anadromous Fish Conservation Act gave new impetus to restoration efforts by providing federal funds. All New England states now participate along with public utilities groups and the U.S. Fish and Wildlife Service. Unfortunately, the restoration program has been expensive and the results have not been encouraging: program completion is estimated to cost four million dollars per year over the next 20 years. In the Connecticut River, the first returning salmon was spotted in 1974, and by 1981 over 500 were counted. By 1989, however, the count had dropped to just over 100 fish. Fortunately, the program has produced a variety of other benefits including greatly improved water quality which has enhanced populations of other valued fish like the American shad.

In sum, past efforts to restore wildlife have occurred when public sentiment for a project has prompted political action. Many of these projects have been expensive, however, and with tight budgets likely to continue for some time, we expect economic analyses--particularly benefit/cost analyses--to play an increasingly important role in decision making about these kinds of programs. Consequently, we must begin to examine the nature and value of benefits produced by these programs.

Economic Concepts

As noted above, wildlife restoration efforts usually have occurred in response to public sentiment or at the wish of specific groups like hunters or fishers. Since much of this activity has been publicly financed and lies outside the realm of traditional market-oriented economics, economists have needed to develop sophisticated methods of benefit/cost analysis in order to incorporate the diverse values involved. Today, two benefit categories are generally recognized for any wildlife species: personal use value and existence value. Personal use is perhaps the most widely studied source of value; it includes both current use of a species and options to preserve opportunities for future use (option value). Personal use values for the bald eagle reflect the value to the individual of observing the actual birds; for the wild turkey and the Atlantic salmon, it includes both the value of each as a game species and for observation, although observation value is presumably slight in the case of the salmon.

Most past attempts to value wildlife have focused on personal use value; only recently have economists recognized other extramarket values. Past valuation attempts that examined only the direct users of a species may have underestimated substantially the total value. Weisbrod (1964) and Krutilla (1967) were among the first to suggest that economic value might accrue to those not actually using a resource directly. Weisbrod suggested that, in an uncertain world, nonusers might be willing to pay an option price to preserve the possibility of future use (option value), while Krutilla argued that the simple "existence" of natural resources had value for people who had no desire ever to use them. Several motives since have been suggested for Krutilla's "existence value": some people want to insure that a resource or species is available for future generations (bequest value); some are pleased that other people have a chance to enjoy the resource even though they themselves do not care to (altruism); while still others argue that wildlife species and other resources have intrinsic value and should exist independent of any benefit or harm to humans (intrinsic value). While conceptual and definitional issues remain for many of these values (c.f., McConnell 1983, Loomis 1988), this study sought to make the values operational by using contingent valuation methods. Although imperfect for a variety of reasons, contingent valuation remains the only effective technique for quantifying many of the values. Option value was treated as a personal use value because, unlike the other forms of existence value, it reflects the desire for direct personal consumption.

The Surveys

Information on public attitudes and extramarket values was collected in two separate studies: the first surveyed 1,000 randomly selected Massachusetts residents during April, 1988 and concerned the Atlantic salmon. Twenty percent of the forms were returned, of which 181 were complete and useable. The second study was about the bald eagle and wild turkey and used a slightly revised version of the salmon questionnaire. Several variations (each particular to a species or combination of species) were mailed to a total of 1,497 randomly selected persons throughout New England in February, 1989. For the entire survey, 38 percent were returned yielding 452 complete, useable questionnaires. Of these, 88 dealt with the bald eagle and 104 dealt with the wild turkey; the remainder concerned other species or combinations of species. In both the salmon and the bald eagle/wild turkey studies, the samples were drawn from current telephone directories following procedures recommended by Dillman (1978). The questionnaires solicited information on attitudes about particular wildlife species, the monetary value placed on

the existence of those species, and the motives underlying the monetary values. Using contingent valuation techniques, the amount of money people were willing to spend to assure the continued existence of a given species was estimated. Here, respondents were asked if they would be willing to pay a predetermined amount ranging between $5 and $100 in 5-dollar increments. This amount was distributed randomly throughout the questionnaires. Those who agreed were asked if they would make any additional contribution. Those who refused were asked if they would contribute any amount. Finally, those refusing to contribute anything at all were asked their reasons. The mean willingness-to-pay was then computed for the sample and projected to the New England population over 18 years of age. In making these projections, nonrespondents were assumed to place a zero value on these species and the projections were adjusted accordingly.

Results

Although nearly 75 percent of respondents were aware of the existence of both the bald eagle and wild turkey in New England, only 28 percent had ever seen a bald eagle in the wild and only 25 percent had ever seen a wild turkey in the region. Fewer (43 percent) were aware of efforts to restore the Atlantic salmon, and only 12 percent reported ever having seen an Atlantic salmon in New England. Despite this lack of familiarity, however, the continued existence of these species was viewed as quite important: over 80 percent of respondents in both surveys attached at least some importance to the existence of each of these species (Table 1).

For the bald eagle and Atlantic salmon, the reasons for this importance (unfortunately, comparable questions were not asked on the wild turkey survey) were categorized. Twelve percent of the respondents to the bald eagle survey indicated personal use value (observation), while 80 percent indicated some kind of existence value: either giving others the chance to view eagles (16 percent), ensuring that eagles were available for future generations (23 percent), or the insisting that eagles have intrinsic value (41 percent) (Table 2). For the Atlantic salmon, 94 percent indicated existence values, particularly bequest value (55 percent), to be most important; only 6 percent indicated that preserving the option for future use was important (salmon fishing is currently illegal).

While attitudes provide some indication of importance, an individual's willingness to make a personal monetary donation to promote the welfare of these species may be a more powerful indicator of sentiment. When asked about their willingness to make an annual contribution to maintain populations of these species (Table 3), 48 percent indicated that they would contribute (average of $19.28) annually to benefit the bald eagle. The remainder refused to contribute. For the wild turkey, 30 percent were willing to contribute (average of $11.86) annually, while for the Atlantic salmon, 36 percent said they would contribute (average of $7.93) annually.

When expanded to the populations involved, the willingness-to-pay estimates are imposing (Table 4). For the New England population over age 18, bald eagle and wild turkey protection and enhancement received total annual commitments estimated at $69.6 million and $42.8 million, respectively. For the Atlantic salmon, Massachusetts residents indicated an total annual commitment estimated at $13.5 million. The vast majority of this willingness to pay for wildlife protection and enhancement was attributable to existence rather than personal use values.

The motives for contributing also indicated concern with the species' existence rather than personal use (Table 5). For each of the species, about 47 percent of the respondents indicated that the intrinsic worth of the species was their primary concern while between

Table 1.--Importance for existence of bald eagle, wild turkey, and Atlantic salmon.

Importance	Bald eagle (n = 447) (percent)	Wild turkey (n = 447) (percent)	Atlantic salmon (n = 181) (percent)
Very	53.2	41.4	31.0
Somewhat	35.6	40.5	56.0
Not very	5.4	13.9	*
Not very important at all	3.4	3.8	*
Not important	*	*	13.0
No answer	2.4	0.4	0.0
Totals	100.0	100.0	100.0

* The surveys differed in their response categories for this question. The bald eagle and wild turkey questionnaires included the first four response categories. The Atlantic salmon survey included only three: "very important," "somewhat important," and "not important."

Table 2.--Reasons why the existence of the bald eagle and Atlantic salmon was important.

Value	Bald eagle (percent)		Atlantic salmon (percent)	
Personal use				
Current use (observation)	3.2			
Option value (chance for future personal observation or use)	8.8		6.0	
Subtotal:		12.0		6.0
Existence value				
Altruism	16.0		*	
Bequest	23.0		55.0	
Intrinsic	41.0		39.0	
Subtotal:		80.0		94.0
No Answer		8.0	0.0	
Total:		100.0		100.0

* Questions about altruism values were not asked in the salmon survey.

Table 3.--Annual contribution over a 5-year period to maintain bald eagle, wild turkey, and Atlantic salmon populations in New England.

	Willingness to Pay			
Species	Would give (percent)	Would not give (percent)	Total amount	Mean willingness to pay and standard deviation
Bald eagle (n=79)	48	52	$1,523.50	$19.28 ($36.86)
Wild turkey (n=97)	30	70	$1,150.00	$11.86 ($28.53)
Atlantic salmon (n=181)	36	64	$1,436.00	$ 7.93 ($16.79)

Table 4.--Estimated annual option and existence values over a 5-year period for bald eagle, wild turkey, and Atlantic salmon. Inference to total New England population by species; estimated value in millions of dollars.

Value	Bald eagle[1]	Wild turkey[1]	Atlantic salmon[2]
Option	7.3	2.6	2.0
Existence	62.3	40.2	11.5
Total:	69.6	42.8	13.5

[1] For the New England region
[2] For Massachusetts only

Table 5.--Motives for donating to bald eagle, wild turkey, and Atlantic salmon programs.

Percent of Donation

	Option value	Existence Value				Grand total
Species		Altruism	Bequest	Intrinsic	Total	
Bald eagle	10.5	12.8	30.1	46.7	89.6	100.0
Wild turkey	6.1	7.6	37.6	48.7	93.9	100.0
Atlantic salmon	15.0	*	38.0	47.0	85.0	100.0

* Questions about altruism were not included in the Atlantic salmon survey.

30 and 40 percent cited the desire to ensure the availability of the species for future generations. Option values ranged from 15.0 percent for the salmon to 6.1 percent for the wild turkey, a surprisingly low figure considering that the turkey has value both as a game bird and for observation.

Despite the size of the willingness-to-pay estimates, a majority of the respondents in each survey refused to make any financial commitment to protecting or enhancing these species. For both the bald eagle and wild turkey, the most common reason for refusing was the sense that the money should come from taxes and license fees instead of donations (44 and 37 percent respectivly, Table 6). For the Atlantic salmon, 36 percent of the respondents felt that someone else, particularly industry, should pay the costs. Only 6 percent of respondents refused to contribute to the salmon or wild turkey because they felt these species had no value for them; no one indicated that the bald eagle had no value. It is also important to note that, for the bald eagle and wild turkey, 22 and 24 percent of the respondents, respectively, indicated that the species was important but they they refused to place a dollar value on it. This sort of protest indicates that many people do believe that wildlife is priceless, and that forcing it into a valuation context may be ethically wrong, a sentiment that warrants additional study.

Discussion and Conclusion

The efforts to restore bald eagles, wild turkeys, and Atlantic salmon to New England enjoy broad public support: from 30 to 48 percent of the respondents were willing to make a financial commitment to maintain or enhance these populations. Moreover, the magnitude of the estimated contributions was substantial: $69.6 million for the bald eagle and $42.8 million for the wild turkey from throughout New England, and $13.5 million for the Atlantic salmon from Massachusetts residents. Most who refused to contribute did not oppose the programs, but questioned the appropriateness of contributions to finance them and the validity of placing a monetary value on wildlife. Only a small percentage indicated that these species were of no value to them.

When the motives that underlie this strong expression of sentiment are examined, it is evident that only a small amount of it derives from the desire for either current or future personal use. Rather, 90 percent of respondents to the eagle survey, 94 percent of respondents to the wild turkey survey, and 85 percent of respondents to the salmon survey indicated they were motivated by some kind of existence value. These existence values are of various kinds. The most important was intrinsic value--the right of a species to exist on its own merits regardless of any benefit or harm to man; almost half of the respondents to each survey indicated this as the reason for their willingness to contribute. Bequest value--preserving a species for the benefit of future generations was the second most frequently cited reason for being willing to contribute, with between 30 and 38 percent of respondents indicating that this value was important to them. Altruism, the least frequent motive for existence values, still exceeded option values in both the bald eagle and wild turkey surveys.

These results require cautious interpretation. Willingness-to-pay assessments are hypothetical--there are questions about the quality of decision making under such artificial circumstances and about the extent to which respondents would follow through with actual contributions. However, while these questions are valid and there is much debate about them in the literature, the values estimated in this study fall within the range of those reported elsewhere and seem reasonable when compared to previous research results. For example, willingness-to-pay bids for bald eagle preservation have ranged, on average, between $10.62 and $75.31 (Boyle and Bishop 1987), while existence values for Atlantic salmon have been estimated at from $10 to $30 above the willingness to pay for fishing licenses (Kay, Brown and Allee 1987).

Possible sample bias is another concern: some evidence suggests that the respondents tended to be more affluent and better educated than the population

Table 6.--Reasons respondents would not contribute for bald eagle, wild turkey and Atlantic salmon protection.

Reason for not contributing	Bald eagle (n=79) (percent)	Wild turkey (n=97) (percent)	Atlantic salmon (n=181) (percent)
Money should come from taxes and license fees instead of donations[1]	44.0	37.0	--
Species is not worth anything to me	0.0	6.0	6.0
Species is important but I refuse to place a dollar value on it[1]	22.0	24.0	--
Population in Maine is sufficient [2]	---	---	5.0
Someone else[2]like industry should pay	---	---	36.0
Other	34.0	33.0	53.0
Total:	100.0	100.0	100.0

[1] Not included on the Atlantic salmon questionnaire.

[2] Not included on bald eagle or wild turkey questionnaires.

as a whole, particularly for the bald eagle and wild turkey surveys. If so, then the inferences to the general population made about total value and species importance could be overstated. Nevertheless, the overwhelming magnitude of responses that found the selected species important, the substantial funds respondents said they were willing to donate, and the reasons for not donating (which tend to be favorable to wildlife) all indicate tremendous public support even if somewhat overestimated because of possible sample bias.

In sum, restoring and maintaining viable wildlife populations is of great importance to the public. Their interest in these projects is reflected in their willingness to donate substantial personal funds to enhance the populations of these species. These donations (although hypothetical in the present case) are motivated primarily by concerns related to existence values rather than by the desire for current or future personal use. Expanding the context of valuation to include existence values enables a more accurate representation of the significance of wildlife to our population.

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Quelling Controversy Through Public Relations
Implementing a Controlled Moose Hunt

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Planning and carrying out a public relations strategy can significantly reduce the potential conflict between a natural resource agency and its publics. A strategy can be implemented, using minimal additional funds, that can deliver increased public awareness, understanding and support for an agency introducing a wildlife management plan, including a plan which supports a hunt.

In 1985, the New Hampshire Legislature mandated Fish and Game Department to implement a moose management program that would include public education about "biological status and management needs." It further outlined research and management measures, which could include a moose hunt. In 1986, the Department began planning a controlled hunt for 1988 under the multiple use objectives of the moose management program. The hunt would only be "proposed" until species research confirmed that the state's largest game animal could sustain a hunt.

THE PLAN

There were virtually no funds set aside to implement either a public relations strategy or any significant information dissemination program at Fish and Game Department in 1986. Beginning in 1987, however, roughly $25,000 would be made available, through Department funds, for specific use on the public relations aspect of this program. This provided a great opportunity to creatively use existing outreach programs and publications to their fullest potential. The decision was made to promote a Department message of: Trust your wildlife professionals to manage wildlife (in this case, moose).

Staffing was a major obstacle. There was minimal staff to carry-out existing programs, without the addition of a new one. These new responsibilities would later affect the mental and physical well-being of the leaders carrying out this effort.

Within a few days following the Fish and Game Commission's charge in early 1986 to implement a moose hunt in 1988, the Information and Education Division (I & E) staff of five and the Moose Project Leader came up with a preliminary plan, which met the approval of the Executive Director and Game Division Chief, to infuse information and education efforts into every possible existing outreach program and future department publication. The initial objectives were:

-Develop a natural history, educational brochure about moose.

-Build a series of clear and simple graphic images to visually communicate management information.

-Take the Department's message, through the use of displays, to every possible public event.

-Begin disseminating information about increased research activities and management strategies through existing Department publications.

-Make a concerted effort to bring the research component to the attention of the public through the use of radio, TV, newspapers and magazines.

-Work to secure a base of outdoor journalists sensitive to wildlife management activities.

-Build an educational component into the Hunter Education Course, and work to upgrade the instructors' knowledge base of management activities.

RESEARCH

It was assumed that this would be an emotional issue that would have the potential of dividing factions within consumptive and nonconsumptive user groups. We knew moose were very popular with residents and tourists alike. But we needed to know a profile of our publics, their perceptions and interactions with the animal. We believed we needed to target residents in the northern and southern regions of the state, rural and city dwellers, nonresident tourists and property owners.

Shortly after the announcement of the proposed moose hunt, a University of New Hampshire professor offered to work with the Department to measure public attitudes regarding moose, the proposed hunt, department performance and the effectiveness of our public relations efforts. A 10-page survey was mailed to 1,250 New Hampshire residents in six target groups using a stratified random sample. Two separate mailings were done with a reminder postcard after the first mailing. The response rate was 72 percent or 906 usable questionnaires.[1]

Game Management and Research Division staff, coordinated by the Moose Project Leader, continued existing research programs and began new ones. The new research work was visually appealing: radio collaring of animals and telemetry monitoring. It was a statement of professional wildlife management at work. We touted it.

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[1] *Public Attitudes Toward Moose Hunting in New Hampshire, July 1988, Maureen P. Donnelly, Lori Sommer and Jerry Vaske. Funding for the project was provided by USDA Forest Service Northeastern Forest Experiment Station, and the University of New Hampshire's Travel Research and Statistics Service, the Department of Leisure Management and Tourism and NH Fish & Game Dept. Many thanks are given to everyone who made this project a success.*

PERCEPTION VS. REALITY

Regardless of what the reality is with a situation involving wildlife management, it is the perceptions of the public that determines what the reality becomes. We set out to build a case on biological data rather than engage staff in emotional issues. Public concerns were addressed that lent themselves to management information (e.g., the availability of roadside moose for viewing), but the project leader would not engage in emotional-based arguments (e.g., whether or not it was sporting to kill a moose, etc.).

INFORMATION DISSEMINATION

Information was distributed through normal press channels using press releases, feature stories and summaries. It was also done through a grass-roots effort to bring the management issue to the public through the updated 20-minute slide presentation. Within the nearly two-year time period, approximately 150 of these presentations were given by the Moose Project Leader who addressed research, management and biological questions after the program. A pre-recorded slide presentation was available, but did not gain popularity until after the first hunt took place. People wanted to talk directly to someone who knew what was going on.

The two brochures used -- Moose Management 1988 and The Moose -- became the basis from which most press materials evolved. Research updates were given, then a rehash of the same information, in new form, followed. This allowed the public to be given consistent background information to build a knowledge base about the department's plans and findings.

PUBLICITY

Continuous contacts were made by an overwhelming number of journalists seeking coverage of the research that would be used to determine if the hunt would take place as proposed. Our objective was to provide as much information as possible, but not impede the research efforts of our biologists.

The Department supplied graphic illustrations, photographs, background information and road kill accident statistics, which were extremely useful in helping journalists tell the story in a fair, accurate manner. Press conferences proved difficult because only the Moose Project Leader was permitted to release new information as it evolved. Time dedicated to species research had priority over press relations, so time given to the press had to be maximized. It was much easier for the project leader to work with I & E staff to disseminate information through printed means because of the control it offered. Dealing with aggressive press members, some bordering hostility, was sometimes too stressful for the biological staff and had the potential to impede the pace of biological research work.

Early on, it became clear that we would have to limit journalists' access to biologists during their field research activities, in order to remain on schedule. A small, select group of trustworthy outdoor wildlife-oriented journalists evolved through trial and error. If a reporter didn't become obtrusive during the fieldwork activity, and presented a story accurately and fairly after the excursion, they were allowed to accompany the biologists later as the story evolved. This proved very valuable to reducing the stress level of biologists who worked many 20-hour days. It also gave the I & E staff some control over scheduling the release of information.

Some reporters were consistently reporting inaccuracies.[2] Some editors appeared caught up with the idea that a hunt was wrong and reported inaccurate information as a result of it. For example, one year *before* the hunt was to take place, an editorial comment after a neutral article on watching moose stated, "This fall <1987> the Fish and Game Department received approval from the state to issue 75 hunting permits...it is yet undetermined as to how many New Hampshire moose were killed."[3]

One newspaper continuously displayed moose as anthropomorphic in their cartoons and contended the Department would be bringing in exorbitant sums of money.[4] In actuality, costs of the research and management program (approximately $120,000) is twice the amount of the money generated from the hunt (about $60,000). As interest wanes in 1990, the hunt has begun to lose its position in the public eye. Funds generated by the lottery have started to decrease because many applicants applied as a show of support for the Department.

Press kits with comprehensive background and summarized pertinent information, including graphics, were sent to all members of the press one month before the legislative vote on whether or not to ban the hunt. The Department's graphic material was used by just about every newspaper, magazine and television station reporting the story.

BUILDING AN IMAGE

Early in the project it was decided that we would use one moose image that communicated a sense of historical presence. This simple, yet immense, figure demanded the attention of the viewer's eye. The moose would become the thread of our visual communications.

Between the period of 1955 and 1988 the state's moose

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[2]*It was difficult to move journalists to reporting the latest population estimate as the information became available. One major news reporting service continued to report an inaccurate population estimate nearly one year after support materials were sent announcing the change, and subsequent news releases continually referred to the updated information.*

[3]*This Week magazine, October 16, 1987, Moose Watch.*

[4]*Concord Monitor.*

herd had grown tremendously. We summarized the growth in a graphic by using the same moose image twice (one at approximately 1-3/4 inches and another at 19-3/4 inches) to visually communicate a burgeoning population growth rate.

The graphic illustrating growth was used in the Moose Management 1988 brochure and later in a full-page paid advertisement in the statewide newspaper.[5] The message used in these print items was the same, "The Resource Always Comes First-- New Hampshire's moose herd has grown a minimum of 33 times in 33 years. After 87 years of protection, Fish and Game Department has scheduled a limited hunt according to RSA 208:1-a." We wanted people to know that we were not implementing a hunt at the expense of the resource.

Professionalism is oftentimes merely a perception because of association. A uniform conveys this professional image. Understanding this concept, the executive director pursued gamering funds to purchase uniforms for Department biological staff to enhance their image. This was not possible. As a result a "professional image" was not portrayed by the use of clothing. The visual impact of this is clearly evident in photos where conservation officers in uniforms with department patches are next to biologists wearing casual clothing. While this has nothing to do with professional ability, it imparts a message as to the professional stature of the individual.

SPECIAL EVENTS

Table-top displays featuring moose range, distribution, interaction with deer/brainworm and brief facts about what was known about the species were sent to many agricultural fairs and outdoor shows across the state. Literature accompanied it, but no staff member was available to answer questions from the public. An attempt was made to have conservation officers service these booths, but cooperation was limited.

ELECTRONIC MEDIA

Radio was the selected electronic medium used to bring our message to a listening public because television couldn't offer the time needed for discussion of biological issues, and funds weren't available to produce television's more expensive public service announcements or paid advertisements.

Extensive effort was made to contact radio talk show hosts and schedule appearances to discuss the Department's management plans. More than 30 guest appearances were made on these shows.

As the antihunting movement gained momentum, more TV talk show hosts wanted to schedule debates. After one debate, however, the effort was discontinued because wildlife management doesn't lend itself to short, clear-cut explanations. The television forum proved least beneficial in getting the issues fully explained to the public.

Public service announcements, stating the Department had scheduled a hunt, were prepared and sent to radio stations to be read on-the-air. The announcements had a tag ending urging the listener to call or write the Department for information.

SECURING SUPPORT

Credibility was enhanced when other like-minded organizations agreed with the Department's position. The New Hampshire Wildlife Federation and National Wildlife Federation joined with Fish and Game to produce the Moose Management 1988 brochure.[6] Each agency was listed as supporting the management plan. New Hampshire Audubon also supported "wildlife management by professionals, not emotions" and had representatives testify to this during the House Fish and Game Committee hearing on legislation which would effectively stop the hunt.

The majority of the Department's hunting constituency supported the controlled hunt as proposed, but lacked the sophistication in use of the press and press agentry.[7] Most hunter's actions were reactive rather than proactive, however there were a group of press savvy outdoor writers who moved hunters to action.[8]

THE OPPOSITION

The Department's management plan and the professionalism of its biologists were challenged by a group called the "Save the Moose Coalition," which was primarily comprised of animal rights activists (they later joined forces with Friends of Animals). Public perception could be that this group was working to "save" the moose, simply by it name. This group worked diligently to undermine the efforts of the Department, and it continues to do so today. The tactics they use most are press agentry and manipulation of emotions.

Demonstrations with sign-carrying activists were done on several occasions, sometimes featuring a person dressed as the moose, "Bullwinkle."

The members of this particular animal rights group, appeared to be coached in press agentry and letter writing campaigns. Their efforts seemed to be well

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[5]A typographical error was made in the Moose Management 1988 brochure which changed "1955" to "1950." The error undoubtedly effected our statement to some members of our audience.

[6]Text was written in cooperation with the National Wildlife Federation. Over 175,000 six-panel brochures were produced and distributed.

[7]Public Attitudes Toward Moose Hunting in New Hampshire Donnelly et al., 1988

[8]Many thanks to John D. Harrigan, Warren "Mac" McGranahan Mike Garzillo and Tim Jones for their untiring efforts.

planned and coordinated, quite unlike the state prohunting groups which rarely became involved in the same magnitude of effort.

New Hampshire Humane Society's 19-year veteran executive director in a newspaper commentary stated, "here in the United States, and especially here in New Hampshire, we continue to hunt. Not for food and clothing, but for 'sport.' However, hunting is on the decline, and 'sportsmen' are now looking to new creatures such as...the moose."[9]

In a direct mail campaign, the NH Society for the Prevention of Cruelty to Animals called on its members and friends to, "help save these gentle and trusting animals from terror and pain."

A newspaper editorial declared, "The hunt, apparently, is more a service to blood lust than anything else."[10]

When the three-day hunt was carried-out in October of 1988, antihunt demonstrations were conducted at two of four check stations. Only four people showed up at each of the two check stations, and their stay only lasted until the TV camera crews left. This was normal activity for this group.

THE LEGISLATURE

Two bills were introduced in the House of Representatives in January of 1988, which would effectively stop the hunt. Testimony was taken by the House Fish and Game Committee.

A summary of public relations efforts and expenditures (to date) was prepared by Department staff for legislative review. This preparation proved valuable.

The Save the Moose Coalition brought in other antihunt activists to testify along with their members. Friends of Animals sent an ecologist (who formerly worked for a state agency), and the executive director of NH Humane Society testified against the hunt.

Early that day, the Department released initial results of the public attitude survey which indicated 62 percent of the respondents approved of the hunt; 70 percent felt that the agency was doing enough to research the moose herd's needs; and two-thirds rated the Department's wildlife management programs as good to excellent.[11]

The Committee determined the legislation inexpedient to legislate, but later it would be sent to the house floor for a vote.

On the day that legislators voted on the two antihunt bills, hunters dressed in blaze orange gathered outside Fish and Game Headquarters before marching to the state house. Unfortunately, the hunters weren't as adept in press agentry as the antihunters. No one had called members of the press to alert them of the march. Many disgruntled hunters stood outside Fish and Game and wondered where the press were. It was perceived by some of the hunters that it was Fish and Game's responsibility to call the press for them. This perception is probably because of the Department's reliance on hunting fees as its primary source of funding.

TIMING

Timing is critical when strategically vying for position. When this public relations project was started, it was believed that Fish & Game would have two-and-a-half years to implement the strategy. However, the legislative component forced conclusion to the 1988 hunt issue in under two years.

When the antihunt bills were introduced as legislation, the Department secured a full-page advertisement (which used the same copy as the moose management brochure) in a statewide newspaper that had the potential of reaching 88,000 households.[12]

The advertisement, detailing the management plan, appeared in the front section of the Sunday newspaper before the vote was taken the following Tuesday. Meanwhile, a political action group (P.A.C.) conducted a telephone poll the evening before the vote and answered last minute questions of legislators.[13] A second P.A.C. sent telegrams to each legislator voicing support for the hunt.[14]

The first bill was defeated with better than a two to one margin, the second bill was defeated in a voice vote.[15]

FINDINGS

--During and immediately following the limited hunt, press coverage became very positive. We can only attribute this to sticking with the same message and providing as much information as available on a regular basis.

The following findings are opinions of the author:

--Always use more than one person as a spokesperson for a controversial issue. The Moose Project Leader was personally connected to the project in the minds of the public through repetition. Numerous hate letters, threats

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[9] *Boston Sunday Globe, September 13, 1987.*

[10] *The Keene Sentinel, October 5, 1987.*

[11] *Moose Hunting in New Hampshire: The Resident's View, Maureen P. Donnelly, Leisure Management and Tourism Department, University of New Hampshire.*

[12] *New Hampshire Sunday News, January 10, 1988.*

[13] *New Hampshire Wildlife Federation. Many thanks are given for their efforts, particularly those of Ellen Rice, executive director.*

[14] *National Rifle Association, Washington, DC.*

[15] *The actual vote was 223 to 91, with 82 members not voting.*

on her life and those of her pets and livestock, obscene telephone calls and general harassment were received by the. If this project were to be undertaken again, a select group of wildlife biologists, with proven public speaking ability, would be responsible for rotating the responsibilities of communicating with the public and the press about research, management and biological issues.

--Wildlife agencies should commit significant funding to the education and promotion of professional natural resource management. It will prove invaluable when approaching an audience with a controversial issue. Building public confidence for a natural resource agency is an ongoing project that requires continuous attention if attitudes are to be molded favorably.

--A dedicated budget should be set aside to support the public relations efforts needed to carry out a management directive. Decisions that have public impact should only be made after consulting with senior management public relations specialists.

--Wildlife agencies in the Northeast must make a concerted effort to the education and promotion of professional wildlife research and management or the animal rights movement will eventually be successful in thwarting hunting components of management plans.

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PENNSYLVANIA TROUT FISHING:

A CONSIDERATION OF SPECIALIZATION AND SOCIAL INTERACTION

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Anglers are not solely interested in catching fish but rather in a variety of aspects of the fishing experience. Trout fishing is considered by many to be one of the most specialized forms of fishing and several researchers have suggested that individuals pursuing this activity seek the lowest levels of social interactions. While this may be the case when compared to other fishing activities, a variety of social interactions may exist within the trout fishing experience. This study focused on the social interactions of trout fishermen and the sub-specializations which exist within the trout fishing specialty. A dynamic relationship was discovered determining that actual and perceived social relationships change with level of specialization.

Why Do Fishermen Fish?

Why do fishermen fish? To catch fish of course! This would seem to be the main motivational reason for fishing. However, fishermen are not solely interested in catching fish, but rather in the fishing experience itself (Moeller and Engelken, 1972). There are many other factors that significantly influence the enjoyment and satisfactions of the fishing experience.

Behavioral Aspects of Outdoor Recreation

Recreation is a particular type of human experience that finds its source in intrinsically rewarding, voluntary engagements (mental or physical) during non-obligated time (Driver, 1975). These experiences result from participation in an activity (or from mental engagement only) and this participation is instrumental for realizing specific types of satisfactory experiences that make up overall satisfaction realized from that activity. The word "experience" is used to denote the totality of a person's physiological, psychological, spiritual or other response to a situation. A specific recreation experience then is a specific type of response. Some of these specific experiences will be pleasing or "good" and others will be displeasing or "bad". According to Driver (1975), the underlying assumption here is that specific satisfying experiences determine the attractiveness of a particular activity or environment to a particular user group and the type of satisfaction realized from an activity gives satisfaction simultaneously, but some give relatively higher amounts of satisfaction than others (Driver, 1975).

Viewing recreation as an experience emphasizes a behavioral approach in defining recreation, rather than the conventional approach of viewing recreation as activity, the process of participating. The behavioral approach is concerned with why a person participates, what they do while participating and what they experience from participation (Knopf et al., 1973). This participation in recreation is viewed as a response to some perceived consequences that are desired. Thus, satisfying experiences are the ultimate products of recreation participation.

Motivation/Determination of Recreation Choice in Fishing

The determination of recreation choice seems to be influenced strongly by events in the non-recreational domain. Knopf's et al. (1973) model of recreation behavior was based on the generic problem solving model of human behavior. The choice of recreation environments and/or activities is strongly influenced by problem states that either cannot be, or for some reasons are not, resolved in non-recreational environments. Choice might be based primarily on curiosity - exploratory preferences for variety or change, the desire to realize preferred levels of skills, to collect status symbols, to develop and maintain social affiliations, or to remove one's self temporarily from adverse work or home environmental conditions. The model proposed that, while recreating, people are relatively free to move in a variety of preferred environments that are chosen because of "problems" experienced prior to the time the choices are made. These problem states define relatively unmet needs that influence the direction, intensity and persistence of recreation behavior as these needs are adjusted by past learning and by personality, environmental and other static and dynamic influences.

Knopf et al. (1973) utilized scales in achievement, affiliation, exploration, dominance, status, experiencing nature, risk-taking, family togetherness, and stress mediation and applied these to samples of participants in several different recreational activities. The results suggested that different activities helped resolve different "packages" of unmet needs. In one study designed to determine why fishermen fish, the results suggested that fishermen are strongly motivated by four unmet needs: (1) temporary escape from stressful conditions in the non-leisure environment, (2) achievement, (3) exploration or seeking out new environments and experiences, and (4) experiencing natural settings - appreciating natural surroundings. However, motivations may vary by different types of fishermen. Types of fishing vary in degree to which they satisfy unmet needs for affiliation. Trout fishermen scored low in affiliation; they preferred not to engage in human interaction. Bank fishermen scored higher in affiliation; for them social interaction was more important. Thus, there are intra- and inter group dimensions to these unmet needs.

Moeller and Engelken (1972), in interviewing 100 fishermen, found that elements of the natural environment - water quality, natural beauty, and privacy while fishing - were consistently rated as the most important factors influencing fishing enjoyment. Size and number of fish caught, weather conditions and ease of access were of

moderate importance, and facilities available were rated as of low importance.

McCullough et al. (1984) studied winter fishing in Missouri's trout parks and noted 4,000 visits during the 1983-84 winter program versus 430,000 visits during the regular trout park season. The researchers pointed out that perhaps the very absence of large crowds was the major strength of the program in that winter fishermen found greater solitude and had more choices as to which stretches of stream to fish, both apparent benefits related to the winter fishing experience. They further suggested that a "special camaraderie" was shared among these participants in that they all had to use flies, and discussions of "what's working best" were of interest to all.

Social Context of Fishing Motivation

Sociological explanations of correlates of fishing behavior characteristics of the angler are important (Bryan, 1976). For example, different orientations occur by age groups - younger fishermen place greater emphasis on catching fish (but are less successful) while older fishermen place higher value on companionship as a key ingredient in the fishing experience. There are also rural - urban differences. Rural fishermen have an "harvesting attitude" towards nature. Often outdoor recreation values are supported by the homogeneous friendship networks characteristic of rural areas. Friendship group considerations may even be the prime motivator for some outdoor recreation activities.

The social factors pertaining to the motivation of fishermen can be viewed dichotomously. First, there is the need to escape the "stressors" in the home environment; to seek solitude, be alone, get away from people, get away from the family. Second, there is the need to be with others, to socialize through active participation in fishing; to be with family and/or friends, to be with other "like" recreationists with similar values and skills, to meet new people, to share knowledge and skill. A third need can be viewed as a motivation to escape with a small group of family or friends, thus emphasizing intra-group social interaction.

Driver and Knopf (1976) found that although the desire to escape and experience nature was very important to warm water lake fishermen, family togetherness and the opportunity to be with friends was also important. Mandell and Marans (1972) conducted a national survey of over 1,300 households and found with 198 fishermen respondents, 51% designated fishing as providing an escape from the pressures of work as being very important to them for engaging in the activity. However, 42% thought fishing was very important in order to spend more time with the family and 27% in order to be with friends and other people. Motives for leisure involvement are often based on the need for social interaction (Iso-Ahola, 1980).

If fishing satisfies so many motives, why don't most people fish? Available opportunities, time constraints, and what a person is taught on the way toward growing up all seem to affect an individual's motivations to fish (Bryan, 1976).

The Theory of Recreation Specialization

The theorizing of recreation specialization followed that of Kelly (1974) who viewed leisure as a lifelong process of socialization or "leisure careers". Bryan (1977) utilized this concept by suggesting that as one progresses through their leisure career they become more skilled and knowledgeable. In other words, a person becomes more specialized throughout their leisure career. Here, recreation specialization has been defined as a continuum of behavior from the general to the particular, reflected by the equipment and skills used in the sport (Bryan, 1979). At one end of the continuum is the person who has more general recreational interests, the generalist/novice. At the other end is the person who denotes or limits interest to some special branch of the sport, the specialist (Bryan, 1977).

Support for Bryan's theory can be seen in the study which examined specialization within and across activities (Donnelly, et al., 1986). The degree of specialization was used to compare within and across activities. The higher the degree of specialization (across or within activities) the more specialized of an activity it was. Here, sailboaters did have a higher degree of specialization than motorboaters. Furthermore, the three subgroups of sailboaters did follow the predicted increases in degree of specialization. Hence, specialization can be seen within the activity of sailing and across activities between sailing and motorized use.

It is important to note that recreationists differ at each level of specialization (Bryan, 1980). These differences are noted in values, motivations, benefits, satisfactions, preferences, etc. These differences within groups are very important to outdoor recreation managers. Historically, survey research has lent itself to determining the average. If only the average is managed for, conflict may result simply because everyone is not average (Shafer 1969). Thus, the objective of specialization research was to develop explanatory principles of recreational behavior based on leisure specialization.

Bryan (1977) studied the specialization of fishermen by grouping them into four categories:

(1) Occasional fishermen: ones who fish infrequently because they are new to the activity and have not yet established it as a regular part of their leisure repertoire - or perhaps it has not become a major interest. These fishermen prefer to use spinning equipment and emphasize the number of fish caught (the size of the fish does not matter). The places where members of this group fish is insignificant, just as long as it is somewhere that they can catch fish.

(2) Generalists: fishermen who use a variety of techniques and who fish on a regular basis. The generalists are very similar to the occasional fishermen. The key differences are that size of the fish caught is as important as the number of fish caught. Furthermore, the generalists fish more often.

(3) Technique specialists: anglers who specialized in a particular method of fishing (flyfishing) largely to the exclusion of other techniques. These fishermen do not place a great emphasis on catching a high number of fish, instead, they are after fewer larger ones.

(4) Technique-setting specialists: anglers who specialized in a particular method of fishing (flyfishing) largely to the exclusion of other techniques and are more highly committed anglers who prefer fishing a particular type of water.

Specialization and Socialization

When viewing this typology in light of what Kelly (1974) theorized, social interactions throughout fishing careers is evident. The social context is a major component of fishing as a leisure activity. Social settings range from family outings - the most frequent situation about 63% of occasional anglers - to fishing with peers/companions (54% of the technique-setting specialists) (Bryan, 1979). However, with occasional fishermen, angling is usually secondary to other activities, such as family picknicking/sightseeing. But, for their leisure time, the primary purpose of the trip is fishing, and the individual is more likely to engage in it with peers who have similar interests, values and skills. A fishermen peer group may serve as a reference group as well. Fishing specialists form ties which transcend traditional occupational and class barriers and mold these fishermen into a true leisure social world. Such social worlds are groups of fellow sportsmen that hold similar attitudes, beliefs, and ideologies, engage in similar behavior, and have a sense of group identification.

Measuring Specialization

Just how specialized is each level of specialization? When measuring specialization difficulties can arise. For example, Wellman, et al. (1982) found few, if any, differences in attitudes toward depreciative behavior between specialization levels of canoeists. One reason for this could have been the fact that the researchers were trying to subdivide a specialization level. Hence, there were no differences found.

Not only is it possible to be too specific, but, it is also possible to be too general. Schreyer and Beaulieu (1986) examined experience and commitment levels in relation to attribute preferences for wildland recreation settings. The results showed that persons at varying levels of experience and commitment do not appear to differ significantly in the types of attributes they identify as important in selecting wildland recreation environments. A reason for this may be that the ninety-eight attribute groups that were identified were consolidated into four categories. These broad categories were most likely to have been limited in their ability to capture the complexity of individual responses.

Precautions need to be taken when defining the specialization classes. As Schreyer and Lime (1984) pointed out; the group that is considered "novices" may not actually be novices. With regard to river floating the novice had typically been defined as anyone who had not floated the study river previously. But, what about people who had floated other rivers? The researchers found that those people who had previously floated other rivers responded more similarly to the experienced group than to the novice group with regard to motivations. When this group of persons with experience on other rivers was summed up with the novice group, the line between the novice and the experienced groups became ambiguous. If the criteria for classifying recreationists is not precise, true differences between groups may not be detected.

In a later study Schreyer, et al. (1984) examined the influence of Experience Use History (EUH) on recreational behavior. EUH represented the amount, type, and diversity of information available to the individual through previous participation. EUH is very similar to the previously tested concept. Thus, the results led to the same conclusions that previous experience plays a key role in how one should be classified.

Methodology

The principal investigators theorized that while earlier studies reflected a lack of sociability among trout anglers, the most specialized of anglers, that in fact a dynamic social atmosphere might exist within this activity just as it exists between different fishing specializations in general and that this sociability may change dependent upon changes in the anglers "leisure career."

Research design

The research framework of this study was a "One - Shot Unequivocal Group Comparison" design which was used to compare the responses of fishermen concerning several specific aspects of their recreational fishing experience (Campbell and Stanley 1966). This research was conducted to determine whether differences exist for fishermen in regard to their level of social interaction as effected by their level of specialization.

While this form of research is limited by its inabilities to show the changes which occur over time, it does provide the data necessary to adequately describe the actual expressed and perceived motivations and satisfactions of fishermen concerning various aspects of their recreational experience at a specific point in time.

Data collection methods

The sampling scheme. The study population considered in this research consisted of a sample of 96 Pennsylvania trout fishermen. A specific and very important limitation of this study is that the study was an exploratory study with a relatively small number of respondents. Because of this fact the statistical analysis of the data may not be completely reliable in predicting the responses of the total population. These statistics, should though, be indicative of trends and indicate need for further research in this topical area.

Additionally, the results are only representative of Pennsylvania trout fishermen and are not necessarily representative of other kinds of fishermen or fishermen in other areas. In addition, the results are only representative of the 1989 Pennsylvania trout season and these trout fishermen and may not be representative of other fishing seasons or specialties.

Survey instrument development. To develop an instrument to collect data which would adequately answer the research, data needs were first determined. Upon determining the context of the research, a set of questions which would adequately provide data for answers were developed. The following types of data were needed to adequately address the research objectives; (1) perceived importance of select motivational items to the decision to fish, (2) actual and preferred fishing companions, (3) perceived specialization level, and (4) indicators of actual specialization level. Data of these types provide both direct and indirect measures establishing a triangle approach to interpreting complex data.

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 possible inclusion into this survey instrument. Due to the fact that this survey instrument employed questions which have been well tested in previous studies it was determined that a pre-test would not be necessary.

Questionnaire administration. Questionnaires administered in face-to-face interviews with fishermen were conducted by the three principal researchers. Control of sample selection was maintained to avoid sampling bias.

The visitor sample was selected using a modified systematic/stratified random sampling design (Kerlinger 1973; Weisberg and Bowen 1977; Babbie 1982). The randomness of this design was achieved by interviewers systematically contacting each group or individual present on the site during the survey time, in subsequent order as encountered, and randomly selecting one individual from each group to interview. This randomness helped prevent the interview from being dominated by the "group leader" or a member of the group with strong feelings on a particular subject. While dominant individuals may be the most vocal in an interview situation, their perceptions are not necessarily the controlling factor in visitation decisions.

Treatment of the data

The first step in data analysis was to compute frequency distributions for the responses to each question (Weisberg and Bowen 1977). A one-way analysis of variance (ANOVA) was then performed on the response data which was gathered on the surveys. Data for all questions pertaining to the independent variable, social interaction,were analyzed using a contrast of responses to each individual question by the dependent specialization variables. The ANOVA determined whether there were statistically significant differences in response means for each dependent variable between the independent variable categories. Thus, the independent variable and degree of importance which measured the dependent variables, were expressed by fishermen through Likert-scale responses. Statistically significant differences for Likert-scale responses were tested in this study at the .05 alpha level (Ott 1980; Weisberg and Bowen 1977).

The specialization index was computed by summing tackle, skill and site. This specialization index was then used as the independent variable with the dependent social interaction variables in the regression analysis (Hammitt, Knauf and Noe 1989). The social interaction index was computed by recoding the social interaction variables so direction was the same and then taking the means of all of these variables.

Results

Frequencies for indirect measures of specialization, site selected (Table 1) and tackle used (Table 2), showed minimal differences within the study sample. Table 3 reflects the direct measure by the respondents perceivedand self reported skill level. This table is generally uniform in nature, but does, however, reflect the restricted N for the study with a low response rate for the second skill level.

TABLE 1
Frequencies for Respondent Selected Fishing Site

	N	STILL WATER	FAST WATER	TOTAL
SITE	96	55.2%	44.8%	100.0%

TABLE 2
Frequencies for Respondent Selected Tackle

	N	BAIT	SPIN	FLY	TOTAL
TACKLE	96	38.5%	24.0%	36.5%	100.0%

TABLE 3
Frequencies for Respondent Selected Tackle

	N	BASIC 1	MODERATE 2	3	ADVANCED 4	5	TOTAL
TACKLE	96	15.6	2.1	37.5	25.0	19.8	100.0%

Additionally, the frequencies showed specific and surprising differences in the social interactioncategories. These frequencies showed that 86.5% of all fishermen were fishing in some form of social group (Table 4) and that 92.8% preferred to fish in some form of social group (Table 5). This is contrary to reported popular belief that fishing is primarily an individual activity. Further research is indicated in this function, possibly to determine if fishermen travel to the site in groups but then separate to fish alone or if the social group function maintains throughout the fishing experience.

TABLE 4
Frequencies for Who the Respondent was Fishing With.

	N	TOGETHER	ALONE	TOTAL
WHO	96	86.5%	13.5%	100.0%

TABLE 5
Frequencies for
Whom the Respondent Preferred to Fish with.

	N	TOGETHER	ALONE	TOTAL
WHOM	96	92.8%	4.2%	100.0%

When the motivation field of questions (indirect) were considered by the type of site selected (indirect), five significant factors were found (Table 6). These tend to indicate that a stronger association of groups is present at the lake sites over the fast running streams. Lake sites return means which are in the upper end of the importance spectrum, while stream site are generally in the mid-range. These data indicate that social relationships are strongest for the lake sites and inconclusive for those fishing on streams. ANOVA for Type of tackle employed was also executed using the motivation variables. Five variables showed significant differences with fly fishermen indicating a preference in social motivation for fishing alone (Table 7)

TABLE 6

Mean Responses to Questionnaire Items Related to Fishing Motivation by Different Types of Sites.

Motivation	STILL WATER	FAST WATER	F-Probability for Differences in Mean Responses
So the family could do somethingtogether.	3.79	2.83	.008**
For the chance to think about who I am.	3.16	2.50	.040*
To be alone.	2.23	3.00	.017*
To get away from other people.	2.65	3.66	.003**
To be on my own.	2.26	3.33	.001**

*P≤.05
**P≤.01
***P≤.001
N=96

TABLE 7

Mean Responses to Questionnaire Items Related to Motivation by Different Types of Tackle Employed.

Motivation	BAIT	SPIN	FLY	F-Probability for Differences in Mean Responses
So the family could do somethingtogether.	3.35	3.72	2.65	.033**
To be alone.	2.52	2.16	3.32	.006**
To get away from other people.	2.74	2.95	3.86	.015*
To be on my own.	2.68	2.38	3.53	.008**

*P≤.05
**P≤.01
***P≤.001
N=96

Next, social motivations (indirect) as they effect social groups (direct) were recorded. Within this field nine significant motivation questions were discovered (Table 8). These data indicate that individuals who report that they are fishing with friends, family and/or family and friends showed a stronger preference for being with other people than did those individuals who were fishing alone. While the effects of the disproportionate sample group size may be effecting these data the fact that few individuals were found to be fishing alone is also of significance here.

TABLE 8

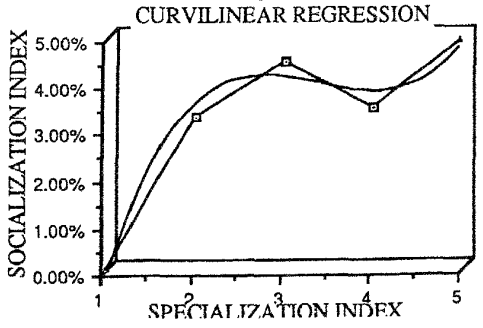
Mean Responses to Questionnaire Items Related to Fishing Motivation by Who the Respondent is Fishing With.

Motivation	ALONE	TOGETHER#	F-Probability for Differences in Mean Responses
So the family could do something together.	1.54	3.53	.000***
To be with and observe the other people using the area.	1.31	2.34	.020*
To be with others who enjoy the same things I do.	2.38	3.39	.025*
For the chance to think about who I am.	1.85	2.95	.017*
So I could do things with my companions.	2.08	3.89	.000***
It would be a chance to meet new people.	1.38	2.41	.016*
To be with people having similar values.	2.08	3.40	.002**
To share my skill and knowledge with others.	2.15	3.06	.047*
To be on my own.	3.69	2.72	.042*

Together signifies with friends, family or family and friends.
*P≤.05
**P≤.01
***P≤.001
N=96

When specialization was plotted with the social motivation index no direct linear relationship was found Figure 1). However, upon viewing the scatter plot for this data a startling and significant discovery was made. There appears to be a curvilinear relationship between the socialization index and the specialization index (Figure 1).

FIGURE 1
CURVILINEAR REGRESSION



The researchers interpreted this relationship to suggest that as specialization increases, social motivations increase, decrease and then increase again. This perhaps reflects a social process of learning a skill. While being taught to fish, one fishes with others. Then, while further developing one's skill, perhaps there is a need to be alone. Finally, when one comes full circle and is now a good angler, they begin to teach others. Hence, an increase in social motivation. The researchers found this relationship to be of considerable significance within the context of this study and believe that this curvilinear relationship may hold a key to social interaction as effected by specialization, one that needs considerable indepth study.

Summation

Original thoughts about fishing were that it is a recreational activity one practices by one's self, alone, a skill with greater intrinsic rewards than extrinsic. Popular belief, supported by the media by way of advertisement, has depicted the trout fisherman as a solitary individual, stalking the elusive trout in the wilds, relying upon individual skills in solitude. Some research has begun to question whether this depiction of the trout fisherman was true or whether a myth or popular misconception had been spawned, establishing myth as accepted fact.

This research suggests that perhaps a fallacy exists in this belief. Fishermen are social beings and even the most specialized, the trout fisherman, exhibits actual social behavior and expresses motivations to fish in a social environment. Additionally, there may be many additional variables which effect the fishing experience and that specialization and social interaction represent but a few factors of this multidimensional recreational experience of fishing.

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SPORTFISHING IN NEW YORK STATE:

TRENDS TOWARD THE YEAR 2010

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Recreational fishing participation in freshwater environments in New York State has steadily increased in the last 20 years. By 1985, 1.1 million anglers fished 21.7 million days and spent $427 million in trip-related expenditures in New York State. Eighty-five percent of those angler days of fishing were accounted for state residents. Resident participation was segmented by demographic and age groups to establish average rates of use per-capita for New York State residents. The participation rate per cohort (age group) was the basis for projecting the total demand for fishing to the year 2010. The implications of an aging New York State population and a subsequent decline in avidity and total demand are discussed.

Introduction

In New York State, the increased participation in sportfishing over the past 20 years is due in part to the successful rehabilitation of the Great Lakes and inland freshwater sportfishery resources. By 1985, 1.1 million anglers fished 21.7 million days and spent $427 million in trip-related expenditures in New York State (USDI 1989). Twenty-nine percent of the angler days of effort were in the Great Lakes waters of New York State and 71 percent of the angler days were spent in freshwater inland waters of the state (USDI 1989). Trip-related expenditures are important economic contributions for the recreation and tourism industry within the state and especially the waterfront communities.

In 1985, 85 percent of those angler days of fishing were accounted for by residents who fished in New York State (USDI 1989). The close proximity of the majority of 1985 anglers to the fishery resource is further illustrated by the fact that the average one-way distance traveled per trip for resident anglers was 30 miles for trips to Great Lakes waters and 20.7 miles for trips to inland freshwater locations (USDI 1989).

The aging of the population in the nation and the Great Lakes states has been predicted to produce a 16 percent increase in travel volume in the United States by the year 2000 (U.S. Travel Data Center 1989). However, participation in angling generally declines for the older age groups, which may decrease overall demand for fishing by the year 2000 (Kelly 1987). Similar trends may be experienced in tourism and sportfishing demand in New York State by the year 2000.

The implications of an aging New York State population and subsequent cnanges in avidity and total angler demand are assessed in this paper. The intent of this paper is to estimate future demand to the year 2010 based on age cohort analysis and to highlight the implications of declining resident angler demand and economic contributions to the waterfront communities in New York State.

Methods

The data used in this paper were collected in the 1985 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (USDI 1988 and 1989) and included information on the number of days fished in each state during 1985, and the distribution of anglers according to age, race, sex, and state of residence. The New York State area included fishing in inland waters and the New York State waters of the Great Lakes by boat, from shore, or in any connecting bodies of water or tributaries of the state. Only the freshwater fishing days by state residents were used for this analysis which represented 85 percent of the total effort.

The methodology used was age cohort analysis, illustrated recently by Loomis

and Ditton (1988) and the Sport Fishing Institute (1988). Anglers were characterized by three demographic categories of white males (77%), white females (19%), and all non-whites (4%) since these categories represented sufficient 1985 data for an analysis of angler days of effort and they conformed to the available census data from the Sport Fishing Institute (1988). The angler data were segmented into six age cohorts: 16-24, 25-34, 35-44, 45-54, 55-64, and 65 or more. These categories conform to the categories used by the USDI (1988), Loomis and Ditton (1988), and the Sport Fishing Institute (1988). The population forecasts were comparable except for the 16-24 age cohort that was expanded to 15-24 years old to allow for demand projections of that cohort.

The three steps to calculate the demand projections involve:

1) Calculation of the 1985 per-capita participation rates for each demographic category and age cohort in the state.

2) Determination of the resident population age structures for 1985, 1990, 1995, 2000, and 2010 segmented by each demographic category and age cohort.

3) Calculation of the total demand for each year by multiplying the per-capita participation rates by the population of each demographic category and age cohort and summing the results.

This methodology is based on two assumptions (Loomis and Ditton 1988, Sport Fishing Institute 1988):(1) the proportion of the population that fishes in New York State each year will remain approximately the same; and,(2) the age cohort and demographic category per-capita participation rates remain stable over time.

Results and Discussion

The New York State fishing demand projections for the year 2010 are based on the anglers who fished in and lived in the state. These resident anglers contributed 85 percent of the total New York State freshwater angler days in 1985.

The 1985 distribution of the 21.7 million days of fishing in New York State by state resident anglers varied considerably among the age cohorts (Table 1). The greatest participation was by age cohorts 25-34 and 35-44 and the smallest participation was from age cohorts 55-64 and 65 or more (Table 1). Similarly, the per-capita participation rates are smaller for the 55-64 and 65 or more age cohorts compared to the younger age cohorts with the greatest per-capita participation from the 35-44 age cohort (Table 2).

Table 1. The 1985 Distribution of Freshwater Fishing by New York State Residents by Age Cohort.

Age Cohort	Total Days	Percent Days
15-24	3,694,141	17.0%
25-34	5,305,445	24.4%
35-44	6,751,392	31.1%
45-54	2,444,424	11.3%
55-64	1,239,969	5.7%
65 +	2,271,529	10.5%
TOTAL	21,706,899	100.0%

Table 2. The 1985 Population Age Structure and Per-Capita Fishing Participation Rates for New York State Residents by Age Cohort.

Age Cohort	Population Age Structure	Per-Capita Fishing Days/Year
15-24	5,988,628	0.62
25-34	6,239,056	0.85
35-44	4,820,228	1.40
45-54	3,513,886	0.70
55-64	3,315,856	0.37
65 +	4,582,800	0.50
TOTAL	28,460,454	0.76

Total demand is a function of cohort size and per-capita participation. The projected demand structure for 1985 through 2010 shifts toward an increasing contribution by older age cohorts (Table 3). The demand structure is a function of an aging population and per-capita participation by each age cohort. The decreasing per-capita participation by older age cohorts tends to decrease their total fishing demand, even though they are increasing dramatically in population size as compared to younger age cohorts (Table 4). The population projections used in this age cohort analysis (Sport Fishing Institute 1988) were considered to be conservative estimates of the aging shifts; higher estimates have been produced by other studies (Schick 1986). Thus, the aging population structure may

actually produce a more dramatic effect on the contribution of each age cohort (i.e., older age cohorts may produce fewer total angler days of demand).

Table 3. The Projected Fishing Demand Structure for New York State Residents in 1985 and 2010 by Age Cohort.

	Projected Fishing Demand Structure	
Age Cohort	1985	2010
15-24	17.0%	14.2%
25-34	24.4%	18.5%
35-44	31.1%	30.2%
45-54	11.3%	17.9%
55-64	5.7%	7.6%
65 +	10.5%	11.7%
TOTAL	100.0%	100.0%

Table 4. The Population Age Structure for New York State Residents in 1985 and 2010 by Age Cohort.

	Resident Population Age Structure	
Age Cohort	1985	2010
15-24	21.0%	16.8%
25-34	21.9%	15.9%
35-44	16.9%	15.8%
45-54	12.3%	18.5%
55-64	11.7%	15.0%
65 +	16.1%	18.0%
TOTAL	100.0%	100.0%

The total annual demand is projected to gradually increase from 21.1 million days of freshwater fishing by New York State resident anglers in 1980 (USDI 1982) to 24.0 million days by 2000 and then decline to 23.9 million days by 2010 (Table 5). The same trend is projected for both New York's Great Lakes and inland waters. The average annual percent increase will decline over time due to the impact of the aging population (Table 5). This is a cautiously optimistic scenario since more recent demographic studies have reported the possibility that the Great Lakes coastal population may decrease in total numbers by 2010 (Edwards 1989). Although it is not clear how such changes would affect the population within each age cohort, it estimated that total demand would decrease to some extent for New York's Great Lakes demand.

Table 5. Projected Total Demand for Freshwater Fishing by New York State Residents and Percent Average Annual Demand Change for 1985 through 2010.

Year	Annual Total Demand (Millions)	Year Period	Percent Annual Demand Change
1980	21.1	N.A.	N.A.
1985	21.7	1980-85	0.53%
1990	22.8	1985-90	1.03%
1995	23.6	1990-95	0.65%
2000	24.0	1995-00	0.36%
2010	23.9	2000-10	-0.05%

Because the age structure of the population is often closely correlated with fishing and outdoor recreation participation (Charbonneau and Lyons 1980, Kelly 1987) and age data are readily available, age cohort analysis is a useful but limited tool for examining future recreation trends. Age is only one factor that influences recreation participation. The combination of income and the cost of participation, available leisure time, and the quality and quantity of the recreation resource base also affect participation and offer the potential for using more complex projection methods (Brown and Wilkins 1975, Cordell et al. 1985).

In 1985, 29 percent of New York's resident freshwater fishing was spent in Great Lakes waters. Because the production of salmonids is now at peak levels for most of the Great Lakes, any increased participation focused only on harvesting fish, or any setbacks in fish populations (e.g. sea lamprey increases, forage fish decline) and public perceptions of the fishery (e.g., toxic contaminants in fish) will be translated to a decline in the average individual catch rate. These factors could have a dampening effect on future growth in participation in New York's Great Lakes waters.

The projected decline in overall resident fishing license sales in New York State by Connelly and Brown (1989) is another indication that these demand projections for New York State freshwater fishing by residents may be overly optimistic. As Connelly and Brown

note: "since the major influencing factor for long term projections is the 18-44 age population segment, which is expected to decline through 1995, the [regression] model would predict a slight general decline (3 to 4%) in sales by 1995". The relationship between total state fishing license sales and freshwater angling participation is estimated to be closely related.

Conclusions

In summary, these projections suggest that because of an aging New York State population, resident demand for freshwater angling will increase only marginally through 2000 and then decline slightly by 2010. These angler demand projections are **relatively optimistic** and highlight the observation that an aging state population will result in changes in avidity and little growth, at best, in total demand.

The application of this methodology raises some questions about the need for changing marketing strategies to support continued sportfishery-related participation and economic contributions to waterfront communities. Changes in the age structure and subsequent changes in avidity and total angler demand in New York State suggest the need for expanding the target markets (e.g., women, families, non-white people), the geographic market area (e.g., out-of-state anglers), and the marketing strategies (e.g. emphasize recruiting urban and rural youth) for New York freshwater angling. Additional marketing information will be necessary to determine the angling opportunities sought by these markets and their motivations for participation.

The sportfishing industry makes important economic contributions to waterfront communities and regional economies within the state. Therefore, assessing socioeconomic trends such as changing age structures will help maintain economic stability by anticipating changes in angler demand and suggesting proactive modifications and improvements to the sportfishing marketing strategies and programs.

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NORM ACTIVATION AND THE ACCEPTANCE OF BEHAVIORAL RESTRICTIONS AMONG OVER SAND VEHICLE USERS

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This study examines the roles of ascription of responsibility (AR), awareness of consequences (AC), prior experience, motivations for visiting and beliefs about overuse on over sand vehicle (OSV) recreationists' willingness to accept restrictions on their behavior. Data for this paper come from a survey of 499 OSV users who visited two barrier beaches during the summer of 1988. Results confirmed the hypothesized relationships. Individuals who were aware of the negative environmental impacts resulting from OSV use and who personally ascribed some responsibility for the impacts were more likely to perceive overuse problems and accept restrictions on their behavior. People who made more visits to the barrier beaches and those who rated more highly the importance of their vehicle as a reason for visiting the area, were less willing to accept restrictions. The implications of these findings for theory and resource management are discussed.

Introduction

The presence of oversand vehicles (OSV) on barrier beaches can impact the stability of dune systems (Godfrey & Godfrey, 1981), adversely affect shorebird populations (Blodget, 1978), and may result in conflicts among recreationists (Noe, Hull, & Wellman, 1982). Efforts to prohibit OSV usage altogether or restrict such vehicles at certain times of the year (e.g., during critical nesting periods) have lead to conflicts between management agencies and the recreation public.

This paper examines the normative conditions which activate OSV users' willingness to accept restrictions on their vehicle usage at two barrier beaches -- Cape Poge Wildlife Refuge and Wasque Reservation. Both areas are located on Martha's Vineyard and are managed by The Trustees of Reservations. Cape Poge is 489 acres composed of 3 miles of barrier beach as well as salt marsh, fresh and brackish ponds and cedar thickets. Wasque is 200 acres and consists of heathland uplands, salt marsh, 2 fresh and brackish ponds and 2 miles of barrier beach. Cape Poge and Wasque are separated by 2 miles of privately owned barrier beach. In addition to providing opportunities for beach related recreational activities such as swimming, sunbathing, fishing, and 4-wheel drive usage, the two beaches contain populations of rare birds - piping plovers and least terns.

Norm Activation Theory

Efforts to understand the relationships between individuals' attitudes and behaviors have been a primary focus of social psychological research since LaPiere's classic 1934 study. Fifty years of research has shown that the relationship between attitudes and behavior are far from strong (Schuman & Johnson, 1976; Hill, 1981; Michener, DeLamater, & Schwartz, 1986); people often fail to act in accordance with the attitudes they hold. In response to the lack of attitude-behavior consistency in individuals, there has been considerable discussion of the intervening variables which suppress or enhance the attitude-behavior relationship.

In this tradition, Schwartz (1968, 1970, 1975) has hypothesized that there may be individual differences and situational factors which serve to activate a norm so that it influences behavior. The norm activation model proposed by Schwartz examined the influence of moral norms on prosocial or helping behaviors (e.g., donation of bone marrow). A moral norm was defined as culturally specified rules of what constitutes good and bad interpersonal interaction (1970; p. 128). Heberlein (1972) has argued that the growing concerns for environmental quality have made decisions regarding the environment a moral issue. For example, concern over the depletion of the ozone layer has stressed the consequences for both the natural environment (e.g., flooding of coastal resources due to rising sea levels), as well as the health and safety of individuals (e.g., increased skin disease). To the extent that concern for the well being of others is aroused, traditional moral norms which regulate interpersonal behavior are likely to influence environmental behaviors as well (Van Liere & Dunlap, 1978).

Norms are "activated" when certain conditions are met (Schwartz, 1970, 1975). First, individuals need to possess an awareness of the consequences their behavior has on the needs of others or on the physical environment. Second, individuals must accept some responsibility for their actions. The extent to which people are aware of the consequences (AC) and ascribe some personal responsibility (AR) influences how situations are evaluated. For example, acceptance of the rules and regulations regarding OSV use may depend to a significant degree on whether 4-wheel drive users are aware of the problems their actions may have on the environment as well as the experience of other recreationists, and whether they are willing to accept blame for those problems.

Previous Research

Although the norm activation model has been used primarily to explain norm-behavior consistency in helping behaviors (Schwartz, 1970, 1975), its usefulness in explaining environmental behavior has been suggested by several researchers. Heberlein (1975) shows norms, AR and AC are useful constructs in explaining variations in littering behavior, the purchase of lead-free gasoline and energy conserving behavior. The studies summarized by Heberlein (1975), however, are to some extent contrary to Schwartz's initial results. The influence of AR and AC varied depending on the strength of the norm and the type of behavior being studied. In situations where environmental norms were not widely held, evidence of high AC and AR sensitized individuals to the emergence of such norms, rather than activating existing norms.

Van Liere and Dunlap (1978) examined the influence of AR and AC on an established moral norm (i.e., respect for the health of others). At issue was the air pollution resulting from yard burning. Results indicated that AR was significantly related to burning behavior, however, AC was only weakly correlated with the activity. Similar to Schwartz's initial theoretical model, a significant interaction between AR, AC and yard burning was observed.

Noe and his associates (Noe, et al. 1982) tested the norm activation model on a sample of off road vehicles (ORV) users at Cape Hatteras National Seashore. Five indicators of ascription of responsibility were derived from a factor analysis of 12 Likert type variables. Factor 1, for example, was labelled *Unfairly Blame* and included statements that ORV users are unfairly blamed for litter, erosion and vandalism caused by other beach users. Awareness of consequences was operationalized in a similar manner. Six statements were factor analyzed to create 2 indicators of the concept. The primary dependent variables consisted of four normative options regarding regulating ORV usage. These options ranged from a complete closure norm to an elimination of regulations norm.

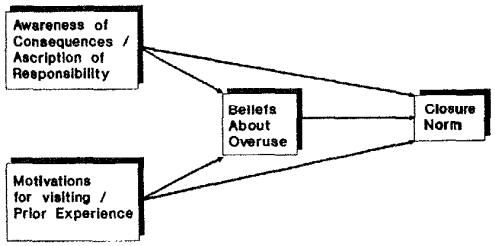
Separate regressions were run for each of the four seashore norms operationalized by Noe et al. (1982). The impact of the AR and AC indicators varied as a function of the type of norm under consideration. In general, the AR variables were significant when the ORV users sought to justify their participation through eliminating regulations or requiring a permitting system, however, the strength of the relationship was weak. When the normative situation referred to closing an area to ORV use or restricting ORV activity, the AC variables were better predictors than the AR indicators. Given the strength of the relationships, these authors conclude that the model may not be the most appropriate for predicting conformity to norms in a recreation situation, yet concede that a more rigorous test of the concepts may be needed.

Taken together, these findings suggest several general conclusions about norm activation. First, both AR and AC are important for norm activation, however, the strength of their impact varies considerably. In situations where a clearly defined norm exists (e.g., helping behavior, littering, air pollution), AR and AC serve to activate the established norm. In other situations where the norms for appropriate behavior are evolving (e.g., rules and regulations pertaining to recreation activities), AR and AC may sensitize individuals to the emergence of such norms. Awareness of negative consequences and/or acceptance of personal responsibility thus become prerequisites to initial awareness of a new norm rather than conditions necessary to activate existing norms.

Second, given the strength of the observed relationships, other individual difference variables may serve to activate or deactivate a person's norm in a recreation setting. Prior experience, for example, has been shown to directly influence visitor evaluations (Vaske, Donnelly, & Heberlein, 1980). Individuals who frequently visit an area are probably less willing to accept management actions that restrict their behavior than those who visit less often. Imposing use limitations represents a potentially greater impact for those with high visitation rates. Similarly, the motivations for visiting a recreation resource are equally important considerations. Individuals who consider their OSV to be an important reason for their visit are likely to be less supportive of restrictions on their use of the vehicle.

Third, awareness of consequences (AC), ascription of responsibility (AR), and the other individual difference variables (e.g., prior experience and the importance of the OSV) may not have the predicted influence on reactions to regulations if the visitors do not perceive that the resource is being overused or that the area is approaching the limit of the number of people the resource can tolerate. Such beliefs about overuse thus mediate the relationship between the individual difference variables and the activation of the norm (Figure 1).

Figure 1. Norm Activation Model



Hypotheses

Based on the norm activation research discussed above and the variable relationships outlined in Figure 1, the following hypotheses are offered to account for OSV users' willingness to accept behavioral restrictions on their activity. Acceptance of restrictions on OSV usage is:

H_1 positively correlated with awareness of the consequences (impacts) resulting from oversand vehicles

H_2 positively correlated with ascription of responsibility

H_3 negatively correlated with frequency of visiting the area

H_4 negatively correlated with the importance of four-wheel driving as a motivation for visiting

H_5 positively correlated with beliefs about overuse.

Beliefs about overuse are predicted to mediate the relationship between the individual difference variables and the respondents' willingness to accept constraints on their recreation behavior. Beliefs about overuse are hypothesized to be:

H_6 positively correlated with AC and AR

H_7 negatively correlated with the importance of four-wheel driving as a motivation for visiting

H_8 positively correlated with the frequency of visiting the area

As indicated earlier, hypothesis 6 is based on the assumption that awareness of consequences and ascription of responsibility sensitize visitors to overuse issues. Thus, people who report high AC and AR should also be more cognizant of impact conditions. Similarly, people who visit the area more frequently should be more aware of overuse. Hypothesis 8 is based on previous research that has shown that visitors perceptions of overuse are related to their own style of recreation (Lucas, 1979). The impacts associated with livestock use or motorized vehicles, for example, are more acceptable to horsemen and cyclists than to hikers (Kuss, Graefe, & Vaske, 1990). Thus, visitors who place a greater importance on 4-wheel driving are less likely to notice the impacts associated with 4-wheel driving.

Methods

A visitor use survey was conducted at Cape Poge Wildlife Refuge and Wasque Reservation during the summer of 1988 (Donnelly & Vaske, 1989). A total of 499 interviews were conducted with OSV visitors using a two page, self-administered questionnaire. Virtually all individuals contacted to participate in the study agreed to complete the survey.

Measures

Dependent Variable: The primary dependent variable refers to the visitors' willingness to accept restrictions on their usage of over sand vehicles at Cape Poge/Wasque. A scale was constructed from four variables, where each was coded on a four-point Likert scale ranging from strongly disagree (1) to strongly agree (4). The statements depicted increasing levels of restriction on OSVs ranging from prohibitions on use while shorebirds are nesting to a total ban of the vehicles. An item analysis including calculations of item-total correlations and Cronbach Alpha was conducted on the four variables to identify the best combination of scale items.

Independent Variables: The independent variables used in the analyses fall into two categories. The first category refers to a person's awareness of the consequences (AC) of using OSVs and his/her ascription of a personal responsibility (AR) for these impacts. The AC scale was constructed from two statements which evaluated the extent to which visitors believed that the number of four-wheel drive vehicles was harmful to the shorebirds and the dunes. The AR scale was created from four variables. Two of the statements read: I feel a strong personal obligation to protect the shorebirds (the dunes). The remaining two variables asked visitors if they would be willing to reduce the number of their visits if it meant protecting the shorebirds (the dunes). Responses to the individual AC and AR variables ranged from strongly disagree (1) to strongly agree (4). Item-analyses were again calculated for each scale.

The second set of predictor variables represented the other individual difference measures suggested by Figure 1. The perceived importance of the over sand vehicle to the individual as a motivation for visiting Cape Poge/Wasque was coded on a four-point scale ranging from not important (1) to very important (4). The respondents' number of annual visits was used as an indicator of prior experience.

Mediating Variable: As predicted by Figure 1, beliefs about overuse mediate the relationship between the individual difference / situational variables (AR, AC, prior experience and motivations) and the individual's acceptance of behavioral restrictions. An overuse scale was constructed from three Likert statements. Each of the separate items were again coded on a four-point scale from strongly disagree (1) to strongly agree (4). These statements were: Cape Poge/Wasque is approaching the limit of the number of people the area can tolerate; There are too many four-wheel drive vehicles using Wasque; and It would be more desirable if the number of visitors were reduced. Similar to the behavioral restrictions scale, an item-analysis was conducted on the belief scale to determine the best combination of variables.

Results

Responses to the four statements representing reactions to behavioral restrictions are shown in Table 1. The OSV users opposed a total ban on their activity but would tolerate some restrictions on their behavior. While only 8 percent accepted the idea of not allowing OSVs at Cape Poge and Wasque, 11 percent felt banning vehicles would be alright if a public shuttle were provided and 17 percent would accept restricting OSV use to Wasque. The highest support (42%) was given for restricting vehicles when the shorebirds are nesting. Reliability statistics (item-total correlations and Cronbach Alpha) calculated for the summated rating scale indicated that the four statements produced the best measure of the respondents willingness to accept constraints on their behavior. Deleting any item from the scale would lower the remaining scale's standardized alpha.

Table 1. Item Composition for Behavioral Restrictions Scale

Behavioral Restrictions	Percent Agreeing	Mean s.d.	Alpha if Item Deleted	Alpha
4-wheel drive vehicles should not be allowed at Cape Poge/Wasque	8%	1.32 .68	.71	.78
It would be OK to ban 4-wheel drive vehicles from the beach if a public shuttle were provided	11	1.37 .74	.68	
It would be OK to ban 4-wheel drive vehicles from Cape Poge, if they were allowed at Wasque	17	1.63 .86	.66	
4-wheel drive vehicles should not be allowed at Cape Poge when shorebirds are nesting	42	2.25 .96	.77	

Table 2 examines respondents' beliefs about overuse at Cape Poge and Wasque. A majority (51%) of the OSV users felt Cape Poge/Wasque is approaching the limit of the number of people the area can tolerate. About a third (34%) felt there were too many four-wheel drive vehicles using Wasque and a slightly higher percentage (41%) expressed a desire to reduce the current number of visitors. The standardized alpha for this scale was .71. Reliability analysis of these belief statements indicated that the three variables resulted in the highest Cronbach Alpha.

Table 2. Item Composition for Overuse Scale

Beliefs about Overuse	Percent Agreeing	Mean s.d.	Alpha if Item Deleted	Alpha
Cape Poge/Wasque is approaching the limit of the number of people the area can tolerate	51%	2.48 .97	.62	.71
There are too many 4-wheel drive vehicles using Wasque	34	2.10 .93	.63	
It would be more desirable if the number of visitors were reduced	41	2.26 .84	.59	

Many of the OSV users in this sample were aware of the consequences their vehicles can have on the environment. Sixty percent believe their vehicles are harmful to the dunes and half feel they harm the wildlife (Table 3). For analysis purposes, these two variables were combined into a single AC scale (Alpha = .91).

Table 3. Item Composition for Awareness of Consequences Scale

Awareness of Consequences	Percent Agreeing	Mean s.d.	Alpha if Item Deleted	Alpha
The number of 4-wheel drive vehicles is harmful to the *dunes*	60%	2.63 1.00	--	.91
The number of 4-wheel drive vehicles is harmful to *shorebirds*	51	2.46 .99	--	

The survey included four questions relating to the respondent's level of personal obligation to protect the area and their willingness to restrict their activities to achieve this goal (Table 4). The OSV users felt personally obligated to protect the birds (86%) and the dunes (89%), but were less willing to reduce their visitation to meet this end. Only about half of the respondents said they would be willing to personally reduce their visits if it meant protecting the birds (54%) and the dunes (55%). Taken together, these four variables constitute an indicator of the AR concept. The standardized alpha for this four item scale was .84.

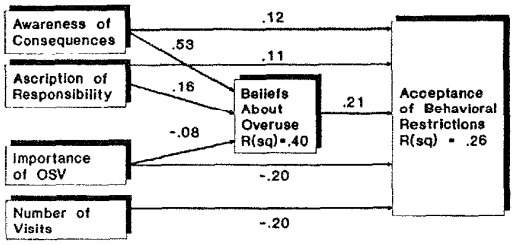
Table 4. Item Composition for Ascription of Responsibility Scale

Ascription of Responsibility	Percent Agreeing	Mean s.d.	Alpha if Item Deleted	Alpha
I feel a strong personal obligation to protect the *shorebirds*	86%	3.25 .78	.82	.84
I feel a strong personal obligation to protect the *dunes*	89	3.32 .77	.82	
I would be willing to reduce the number of my visits if it meant protecting the *shorebirds*	54	2.50 .99	.77	
I would be willing to reduce the number of my visits if it meant protecting the *dunes*	55	2.52 .99	.77	

Cape Poge and Wasque provide visitors with a variety of experiences. Over two thirds of the OSV users rated being near the ocean, seeing a unique area, sunning on the beach, fishing, swimming and four-wheel driving as a quite or very important reasons for visiting the area. The OSV users ranked four-wheel driving fourth in importance among the eight motivations listed as reasons for visiting, with 76 percent rating the vehicle as an important reason. Finally, many of the respondents in this sample visited Cape Poge/Wasque on a regular basis. The average number of yearly visits was 18.4 times per year and the standard deviation was 21.6 (range = 1 to 150).

The norm activation model proposed in this paper was examined using multiple regression techniques and the conventions of path analysis (Duncan, 1975; Heise, 1975). Figure 2 presents the standardized regression coefficients for the model. Acceptance of behavioral restrictions is the primary dependent variable. Independent variables include the scales for beliefs about overuse, AR and AC, as well as the two single item indicators of the perceived importance of the OSV and the frequency of yearly visitation. As predicted by hypotheses 1 through 5, each of the independent variables had a direct effect on the respondents' acceptance of behavioral restrictions. Beliefs about overuse, the importance of the OSV and the number of yearly visits had the strongest influence (B = .21, B = -.20, B = -.20, respectively). Individuals who believed that Cape Poge/Wasque was being overused were more likely to accept restrictions on their OSV use (Hypothesis 5). Conversely, visitors who placed a greater importance on using 4-wheel drive vehicles (Hypothesis 4) and who made more visits (Hypothesis 3) were less willing to have constraints placed on their use.

Figure 2. Norm Activation Path Model



Coefficients are standardized regression coefficients ($p < .05$)

As hypothesized by the norm activation model, AC and AR were also statistically significant and in the predicted direction. Individuals who were aware of the consequences of using OSVs (B = .12) and who ascribed a personal responsibility for protecting the environment (B = .11) were more accepting of use restrictions (Hypotheses 1 and 2, respectively). Taken together, the five independent variables explained 26 percent of the variance in the dependent variable.

Beliefs about overuse were predicted to mediate the relationship between the individual difference measures and the acceptance of behavioral restrictions (Hypotheses 6 through 8). For this set of analyses, beliefs about overuse was treated as the dependent variable, while AC, AR, perceived importance of the OSV as a motivation for visiting and frequency of visitation were independent variables.

Consistent with Hypothesis 6, awareness of consequences and ascription of responsibility were positively associated with beliefs about overuse. The influence of AC, however, was considerably stronger than AR (B = .53 versus B = .16, respectively). Similarly, the predicted inverse relationship between tl importance of the OSV as a reason for visiting and perceptions of overuse was supported by the data (Hypothesis 7; B = -.08). There was no relationship, however, between the number of annual visits and the overuse scale (Hypotheses 8). The three significant predictor variables in the equation accounted for 40 percent of the variation in the respondents' beliefs abo overuse.

Discussion

Seven of the eight hypotheses advanced by Figure were supported by the analyses. Individuals who were aware of the consequences of using OSVs, those who personally ascribed some responsibility for the impacts created by their vehicles and those who believed the area was being overused were more willing to accept at least some constraints on their OSV usage. In addition the importance of the vehicle as a reason for recreating and the frequency of annual visitation were, as predicted, negatively associated with the closure norm.

There was also support for the idea that beliefs about overuse mediate the relationship between the individual difference variables and the acceptance of behavioral restrictions. AC and AR had a positive influence on perceptions of overuse, suggesting that before individuals are willing to accept restrictions on their activity, they must perceive that an unacceptable impact condition exists. The importance of the OSV as a reason for visiting was negatively associated with overuse. This supports previous research (Lucas, 1979; Kuss et al. 1990) that shows the impacts associated with motorized activities are more acceptable to participant: in those activities. The impact of the number of annual visits on overuse was the only hypothesis that was not supported, a finding that will be addressed later.

Taken together, these findings suggest a number of considerations relative to norm activation and the management of barrier beaches. Consistent with the initial norm activation model proposed by Schwartz (1970, 1975), both AR and AC appear to be necessary t activate the norm. In this investigation, the relative contribution of AR and AC on the closure norm was approximately equal (B = .11 and B = .12, respectively) Previous environmental applications of the model have shown that the influence of these concepts varies depending on the strength of the norm and the type of behavior under consideration (Heberlein, 1975; Van Liere & Dunlap, 1978; Noe, et al. 1982).

Van Liere and Dunlap (1978), for example, found AR to be the strongest predictor of yard burning, while AC was only weakly correlated. Because the normative concern in their study was the health hazards associated with the activity, the moral norm is likely to have been

relatively strong. During the time of their investigation in Spokane, Washington, yard burning was a controversial issue in the community. Given that the topic had received considerable publicity in the local press, it may have been difficult for people to deny an awareness of the negative consequences associated with yard burning. Consistent with their findings, the easiest way to neutralize the moral norm under these circumstances would be to deny responsibility for those consequences. This conclusion is further supported by the lack of consensus that existed regarding an alternative to the activity and the unresolved debate over the contribution yard burning had on air pollution.

Similar to the research summarized by Heberlein (1975), the closure norm studied here represents more of an emerging norm rather than an established moral norm such as that reported by Van Liere and Dunlap (1978). Comparing Heberlein's lead-free gasoline findings to the present study leads to some interesting observations. The lead-free study was conducted at a time when individuals could choose between the purchase of lead-free and leaded gasoline. To the extent that a lead-free norm existed, it had only been adopted by a relatively small proportion of the population, had no formal legal support in 1973 when the data were collected and had received relatively little media coverage. This situation is similar to the conditions studied here. Other than the $45.00 yearly permit required for 4-wheel drive vehicles to use Cape Poge/Wasque, there are no formal constraints to using the property. In addition, there had been no media coverage to explain the possible ecological consequences of OSV use. Of the four variables included in our closure norm scale, only 42 percent of the respondents accepted the idea of restricting 4-wheel drive vehicles when shorebirds are nesting. The remaining variables in the scale were supported by even fewer individuals. Thus, to the extent that a closure norm exists, it might be considered relatively weak. In the lead-free study, both AR and AC influenced the emerging norm approximately equally and the size of the beta weights reported by Heberlein are consistent with those reported here.

The study reported by Noe et al. (1982) is most similar to the present investigation. The activity (4-wheel driving) and the setting (a barrier beach) were identical to our study. The closure norm in their investigation was an additive scale consisting of two items. Similar to the present investigation, one item represented a total ban of ORV use at Cape Hatteras National Seashore, while the second referred to a seasonal closure of the area to ORV activity during the summer months. Although the AR and AC factors employed by Noe et al. do not allow for a direct comparison between the two studies, two points are noteworthy. First, as with the investigation reported here, both AR and AC were significantly related to the closure norm at Cape Hatteras. Second, of the two AC scales -- detailed effects and general effects -- used by Noe and his associates, only the detail effects scale influenced the closure norm. This is consistent with the now well established social psychological finding that correlations between variables (e.g., attitudes and behavior, or in this case, awareness of consequences and a norm) increases when both variables are measured at the same level of specificity (Michener, et al. 1986).

In this study, the strongest predictor of the closure norm was a scale consisting of specific beliefs about overuse. In addition to supporting the general social psychological observation noted above, this also suggests that while AR and AC may be necessary conditions for norm activation, they may not be sufficient conditions. In addition to beliefs about overuse, other variables which should be considered include the person's prior experience with the area and their motivations for visiting.

Many of the OSV users at Cape Poge/Wasque expressed concern over protecting the environment. Eighty-nine percent felt personally obligated to protect the dunes and nearly as many (86%) reported an obligation to protect the shorebirds. This sensitivity to environmental / wildlife concerns can be partially explained by the OSV users' history of involvement with the area and their motivations for visiting Cape Poge and Wasque. The average number of yearly visits reported by the individuals in our sample was 18.4. Responses to other survey items indicated that over half had been visiting for more than five years and a quarter had more than 15 years of experience with the area. Seven percent owned property on the island and nearly 20 percent were members of The Trustees of Reservations, the agency responsible for managing the barrier beaches. This history of involvement is likely to have increased the visitors' commitment to protecting the resource. On the other hand, this level of prior experience may have accounted for visitors' reluctance to place restrictions on their behavior. Traditionally, the beach has been open to the public and many of the respondents may have felt that the status quo was appropriate. The observed negative relationship between number of annual visits and the closure norm, as well as the failure to find a relationship between frequency of visit and beliefs about overuse support this observation.

From a motivational perspective, only 11 percent of the OSV users considered 4-wheel driving as their *primary reason* for their visit. This means that although the OSV users accessed the area using a vehicle, driving along the beach was less important than other reasons for visiting. The vehicle served as a means to engage in a beach related activity such as fishing, rather than as a primary activity itself. However, because the distances between the access points and the favored fishing spots are considerable, and because the alternatives (e.g., a shuttle bus) suggested by the survey were largely unacceptable, the vehicle was still considered a necessary component of the recreation experience.

Data presented here suggests that although OSV users oppose a total ban on their activity, over 40 percent would tolerate restricting vehicles when shorebirds are nesting. Fencing, now in place at Wasque has effectively eliminated OSV traffic from selected wildlife management areas. By restricting use from nesting areas during critical seasons, as opposed to prohibiting use altogether, both the rare bird populations and humans can exist sympatrically. Support for these spatial and temporal restrictions is enhanced when beach closures are kept relatively small and recreationists understand the rationale for the closure.

Although ecologists continue to search for solutions to increase piping plover populations (Rimmer &

Deblinger, 1990), it is apparent that information regarding visitor norms and beliefs must be incorporated into that solution. 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 are not consistent with visitor attitudes may be deleterious to wildlife in the long run. Conversely, the combination of visitor education and management techniques that balance preservation with recreation can result in a situation where piping plovers nests can be protected from predators and recreationists, and the visiting public can still enjoy the area.

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DELAWARE BEACHES, A VALUABLE RESOURCE: PERSPECTIVES OF PROPERTY OWNERS, RESORT MERCHANTS AND REALTORS IN SUSSEX COUNTY, DELAWARE

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To document the importance of Delaware's beaches as a tourism resource, a survey of property owners, resort merchants and realtors in coastal Sussex County, Delaware was conducted during the summer of 1987. The study identified the effects of beach erosion on the targeted groups. Results indicated that erosion affects residents' future plans for their property. Merchants indicated that beaches were important for their continued economic success. A majority of residents and merchants expressed a willingness to help finance worthwhile beach preservation projects.

Introduction

Delaware like many coastal states, is faced with the problem of erosion, and scientists have studied the natural processes that affect the state's coastline (Kraft 1971, Kraft et al. 1978). The physical effects of erosion--the movement of sand, displacement of dunes, increased flooding, property destruction, and saltwater intrusion--are well known (Titus 1986). Numerous reports and publications document the severity of the problem (Jensen et al. 1978, Maurmeyer and Carey 1985). A variety of shoreline protection measures, such as bulkheads, groins, and sand replenishment, have been employed to combat the physical effects.

As coastal development continues to increase, and coastal population centers continue to grow, major decisions are being made on how to battle coastline erosion. To date many of the decisions have been made by government agencies and vocal community interest groups. Often individual property owners or resort merchants with an interest fail to voice their concerns about erosion and issues related to beach management.

To obtain additional viewpoints, the University of Delaware Sea Grant Marine Advisory Service, with the support of officials in the Beach Preservation Section of the Division of Soil and Water Conservation, Department of Natural Resources and Environmental Control (DNREC) surveyed a sample of coastal interest groups. The survey questionnaires were designed to obtain attitudinal information that could assist resource managers in making current decisions and in implementing future policies about beach management issues.

The interest groups surveyed (property owners; resort merchants; realtors) were chosen in order to obtain a cross-section of views from individuals with different interests in and uses of the Delaware coastline. Some of the survey recipients had a strong economic and business interest; others had a personal and more emotional interest in the issue of erosion.

Methods

Mail surveys were sent to property owners, resort merchants, and realtors during the summer of 1987. The study team randomly sampled 441 property owners in Delaware's Atlantic coastal area; 184 coastal merchants from Rehoboth Beach, Delaware southward to Fenwick Island, Delaware; and 80 realtors who were active in the Sussex County, Delaware coastal area.

Included in each questionnaire was a cover letter explaining the study and a self-addressed business reply envelope. Three weeks after the initial mailing, a follow-up cover letter, replacement questionnaire and business reply envelope were mailed out to those who had not yet responded.

The response rate was greater than 50% for each group (property owners--66%, realtors--63%, resort merchants--55%). The lowest response rate for merchants could be explained by the fact that the survey was distributed during the summer months, which is the height of the summer tourist season.

Results

Coastal property owners were asked to rank by importance, 11 reasons influencing their decision to purchase coastal property. A rank of 5 was assigned to "extremely important" 1 to "not at all important." Restful and relaxing beaches scored the highest with an average ranking of 4.4 on the scale of importance. In addition, scenic beaches (4.2) and well-maintained beaches (4.1) were also viewed as very important reasons by owners. The reasons viewed as least important for buying coastal property were the availability of local activities and beach activities, scoring means of 2.7 and 2.9 respectively (Table 1).

Realtors were also asked to rank the same 11 reasons why they think people would purchase coastal property. In contrast to property owners, realtors ranked that buyers see coastal property as a good financial investment as the most important reason, with a mean score of 4.4.

Following closely, restful and relaxing beaches scored 4.3 and scenic beaches scored 4.2, which are consistent with those reasons ranked highest by property owners. These responses from property owners and realtors emphasize the importance of the beach itself to individuals buying coastal property (Table 1).

Table 1. Property Owners and Realtors' Reasons for Purchasing Coastal Real Estate.

Reasons	Property Owners	Coastal Realtors
Rest and Relaxation	4.4	4.3
Scenic Beaches	4.2	4.2
Well-Maintained Beaches	4.1	3.9
Financial Investment	3.7	4.4
Secure Property	3.7	3.2
Lifelong Dream	3.6	3.5
Close to Family/Friends	3.6	3.4
Lifeguards	3.5	3.4
Minimum Regulations	3.0	2.7
Beach Activities	2.9	3.4
Local Activities	2.7	3.3

Values given are mean scores from a scale ranging from not important (1) to extremely important (5).

A variety of businesses were represented in the survey. Restaurants made up the largest group (20.2%), followed by hotel/motel establishments (19.1%) and gift shops (14.9%). Clothing stores (10.6%), food/liquor establishments (7.4%), convenience/drug stores (7.4%), and resort-type businesses such as arcades, bait and tackle shops and recreational equipment rental shops (3.2%) represented the remaining businesses. An additional 17 percent of responding businesses were included in a miscellaneous category. These included such businesses as hairstyle shops, hardware stores, and basic repair shops.

Of the responding merchants, almost 98 percent were aware that erosion is a problem along the Delaware shoreline. For the most part, respondents stated that all aspects of erosion (storm-related, long-term and short-term/seasonal) were concerns to them.

Business owners and managers were asked to estimate how much of their business revenue was dependent on the existence of a wide sandy beachfront. Overall, approximately 75 percent of the responding merchants indicated that between three-quarters and all of their business activity is a result of the wide sandy beaches (Fig. 1). When asked whether their sales would suffer if the sandy beaches were no longer a part of the natural environment, greater than 94% of all the merchants responded "yes." These responses, in part, may suggest the economic importance of Delaware's sandy beaches and that a healthy tourist economy is directly linked to the beaches.

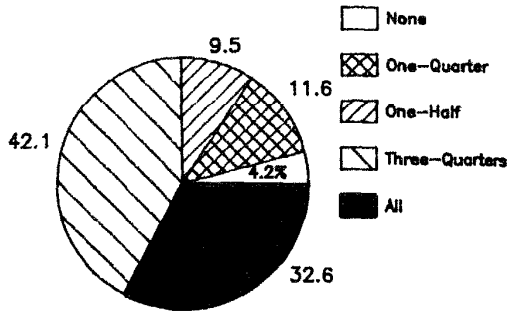


Figure 1. Percent of Merchants Responding How Much of their Business Activity Is Dependent on Sandy Beaches.

After establishing the importance of the beaches to interest groups and the economy, there was a need to find out how the groups felt about different beach erosion control measures. Interest groups were asked to rank various beach preservation measures as possible options for Delaware's Atlantic shoreline. A series of seven measures were listed. Respondents were asked to rate the variables from 1 "very much opposed" to 5 "very much in favor."

In nearly every case, the three interest groups favored measures that did not require major engineering efforts to accomplish the goal of preserving the beach. Dune stabilization (4.8), beach nourishment (4.5), zoning regulations, and setback lines (4.3) received higher mean ratings than structured methods such as building groins and jetties (4.1) or seawalls and bulkheads (3.2) (Fig. 2).

A two-part question asked all three interest groups who they felt receives benefits from Delaware's Atlantic beaches and who should help finance beach preservation efforts. Twelve distinct groups were listed on the survey questionnaire. The groups represented beach users, county residents, government units and various businesses.

Eighty-nine percent or more of all respondents mentioned that most of the groups listed benefitted by the presence of the Atlantic beaches. The federal government and large

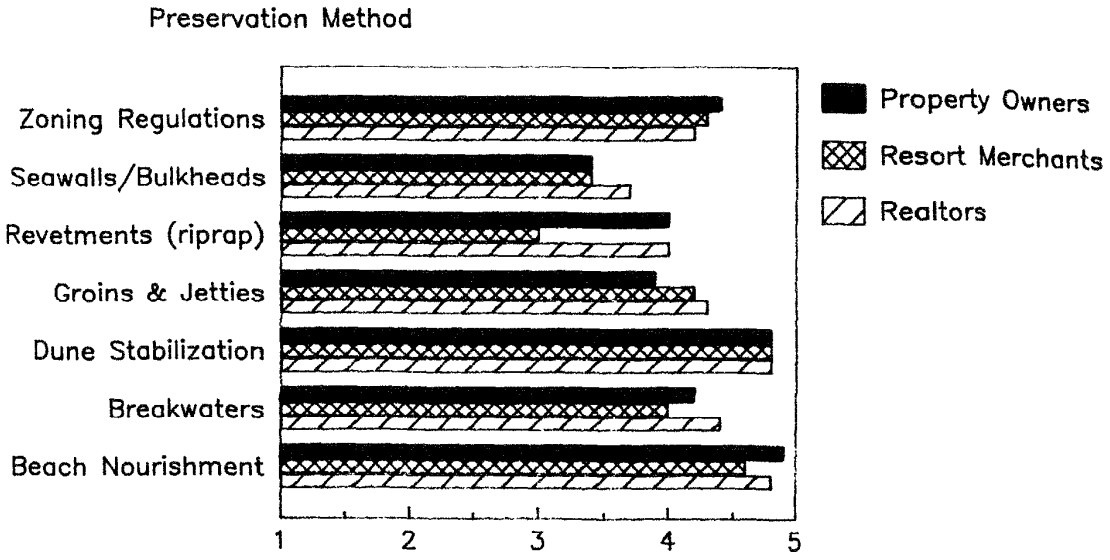


Figure 2. Property Owners, Merchants, and Realtors' Support for Beach Preservation Methods. Values are mean scores from a scale ranging from very much opposed (1) to very much in favor (5).

businesses and industries were the only groups to receive low support ratings from each of the responding groups.

When asked who should help finance beach preservation efforts, the following responses were provided. Property owners felt that state government (96%) and Sussex County government (96%) should be primarily responsible for financing beach preservation efforts. Property owners felt that large businesses and industries (69%) are least responsible (Table 2).

Resort merchants believed that Sussex County government (94%) should be primarily responsible for financing beach preservation efforts. Merchants least favored placing the responsibility on small resort businesses (76%) and large businesses and industries (68%) (Table 2).

Sussex County realtors supported state government (94%) for the primary responsibility of financing beach preservation efforts. Realtors felt that small resort businesses (65%), Sussex County residents (62%), the real estate industry (58%), and large businesses and industries (57%) should be least responsible for financing beach preservation efforts (Table 2).

After further analyzing the complete set of benefit/finance responses, another method of examining the responses was employed. The percentage response figure indicating "should finance" was subtracted from the percentage response figure indicating "receives benefits" from each group. The resulting differences lend themselves to further interpretation.

The closer the differences are to zero, after the subtractions, may provide a clearer indication of which groups should contribute financially to beach preservation efforts according to the interest groups. This is a clearer indication only if the percentage responses were high--in the 90 percent range (Table 3).

An important component of any proposed beach preservation plan is how it will be financed. Property owners and resort merchants were both asked whether they would personally be willing to contribute to funding worthwhile beach preservation measures. Eighty-seven percent of the property owners and approximately 85 percent of the resort merchants said that they would help finance worthwhile efforts.

When asked further as to the maximum amount they would be willing to pay annually, 36 percent of the property owners indicated greater than $500. The mean contribution for property owners lies between $200 and $250 (Table 4).

Table 2. Percentage of Property Owners, Resort Merchants, and Realtors' Responses to which Groups Benefit from the Atlantic Beaches and which Groups Should Help Finance Beach Preservation Efforts.

Group	Property Owners		Resort Merchants		Realtors	
	Benefit	Finance	Benefit	Finance	Benefit	Finance
Out-of-State Tourists	98	81	98	85	100	77
Delaware Tourists	98	83	97	84	100	80
Sussex Residents	92	80	91	79	88	62
Oceanfront Owners	92	84	99	90	98	77
County Government	98	96	95	94	94	91
Municipal Government	98	93	94	92	92	87
State Government	95	96	92	92	94	94
Federal Government	66	79	74	86	78	91
Hotels/Motels	98	92	100	87	98	71
Real Estate & Developers	99	93	98	88	96	58
Small Resort Businesses	97	88	98	76	94	65
Large Businesses/Industries	67	69	69	68	56	57

Table 3. Differences between Property Owners, Resort Merchants, and Realtors' "Receives Benefits" and "Should Finance" Responses.

Group	Property Owners	Resort Merchants	Realtors
Out-of-State Tourists	-17	-13	-23
Delaware Tourists	-15	-13	-20
Sussex Residents	-12	-12	-16
Oceanfront Owners	- 8	- 9	-12
County Government	- 2	- 1	- 3
Municipal Government	- 5	- 2	- 5
State Government	1	0	0
Federal Government	13	12	13
Hotels/Motels	- 6	-13	-27
Real Estate & Developers	- 6	-10	-38
Small Resort Businesses	- 9	-12	-29
Large Businesses/Industries	2	2	1

Zero value indicates benefits received and obligation to finance are equal.
Positive value indicates obligation to finance outweighs benefits received.
Negative value indicates benefits received outweigh obligation to finance.

Resort merchants expressed a somewhat lower interest in contributing to beach preservation efforts. Twenty-seven percent of the merchants said that they would contribute greater than $500. The mean contribution for resort merchants was between $100 and $150. It is understandable the higher amount that property owners are willing to pay to protect their property, since they have more of a personal investment than many of the merchants who may only lease the locations where their businesses are located (Table 4).

Table 4. Percentage of Property Owners and Resort Merchants Willing to Pay Annually for Beach Preservation Efforts.

$ Willing to Pay	Property Owners	Resort Merchants
0	2	4
1- 50	8	16
51- 100	14	17
101- 250	22	16
251- 500	18	19
501-1000	16	24
>1000	20	3

Each interest group was provided a listing of eight sources of revenue that could potentially be used to support beach preservation efforts. They were instructed to indicate which funding sources they could support. Property owners favored a "resort business tax" (68%) and "beach fees" (59%) as their most preferred financing methods. They least favored a "property tax increase" (31%) and increases in "municipal taxes" (31%).

Resort merchants lent their support to a "state tax increase" (51%) and "real estate transfer taxes" (45%). Merchants least favored a "resort business tax" (16%).

Sussex County realtors primarily supported "beach fees" (49%) and "municipal taxes" (41%). As would be expected, they least favored "real estate transfer taxes" (14%). Overall strong support was voiced, by all three groups for a "state tax increase" and "beach fees" to fund beach preservation efforts. Individually, each group supported the revenue source that had the least impact on them personally or as a group (Fig. 3).

Conclusions

The purpose of this study was to examine attitudes and opinions of coastal property owners, resort merchants and Sussex County realtors on various aspects of beach erosion and management issues. More specifically, the questionnaire responses characterized each interest group, provided information on practical management options, and suggested alternative funding strategies.

In general, survey respondents were well-informed, conscientious citizens with concerns about beach erosion and management issues. All three groups indicated they were aware of erosion as a problem along Delaware's Atlantic coast. The average resort merchant and property owner indicated that they had been working or living in coastal Delaware long enough to be aware of severe storm erosion and long-term erosional trends. In fact, many ranked the issue of erosion as important as any currently facing Delaware.

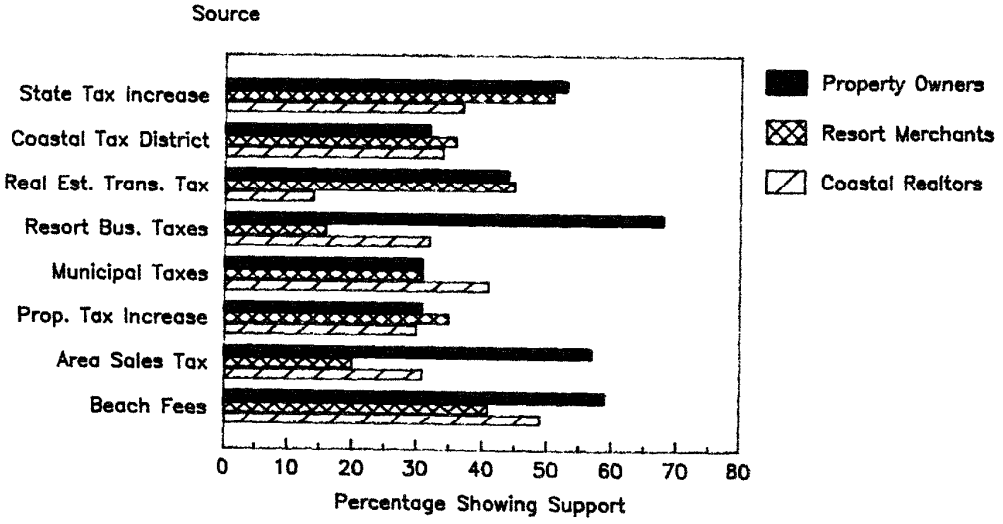


Figure 3. Percent of Property Owners, Resort Merchants, and Realtors Favoring Various Revenue Sources.

The survey results can be useful to resource managers at all levels of government as a valuable source of public opinion. Interest groups in the survey appeared amenable to new sources of revenue and innovative ideas to preserve what they consider a most important resource. Such results can be used as a foundation for identifying new funding sources. Also, the survey results help to establish the link between the coastal economy and a well-preserved beach. The information can be used by economists when assessing the cost and benefits of beach preservation efforts.

Much activity was occurring throughout the state of Delaware regarding beach preservation issues, at the time of this study. The study was not the catalyst for the movement; however it was viewed as an important report that documented the attitudes and opinions of groups that would be affected by management decisions made regarding beach preservation.

The Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Soil and Water Conservation made a decision to begin "pumping sand" on the beaches in the southern part of the coastal area that was experiencing the most severe erosion. The state, the county, and municipal governments all were required to share in the cost of this replenishment effort. In addition, some unincorporated communities were also required to contribute private funds to replace eroded sand.

To begin planning for a long-range strategy to fund beach replenishment efforts in the future, a 1989 bill was introduced and passed by the Delaware General Assembly. House Bill 423 provided for a 2% increase in the state's lodging tax. One percent of these revenues are earmarked for beach preservation. The revenues are expected to net $750,000 annually.

Acknowledgments

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FACTORS AFFECTING BOATING SATISFACTION:

A REPLICATION AND COMPARATIVE ANALYSIS/1

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Perception of boating quality is a multi-faceted and complex concept. Maintaining quality requires attention to the inter-related set of indicators that are most strongly associated with overall satisfaction. In Summer 1989, a study of 785 boaters was conducted at Berlin Lake, a Corps of Engineers reservoir located in eastern Ohio. A series of regression models were developed to identify the direct and indirect relationships between overall satisfaction and a pool of experiential impacts.

This work replicated a 1987 study of boaters at Raystown Lake, a comparable Corps of Engineers' facility located in central Pennsylvania. In an attempt to better understand and explain visitor satisfaction, the pool of independent variables was expanded in the 1989 study. Variables were added which dealt more specifically with certain types of impacts, as well as the frequency of occurrence and effect on enjoyment of selected types of boating encounters.

Although reported overall satisfaction was equivalent at Raystown and Berlin Lakes (i.e., an average score of 3.6 on a 5-point satisfaction scale), there was a general perception that conditions on Berlin Lake were less crowded. The contribution of the new model was the ability to more fully explain and better predict individual perceptions of crowding and the influence of others on the boating experience. The variables with the greatest influence on satisfaction, in both studies, included the perception that boating conditions were safe and various measures of visitor displacement. Although contributing relatively no more to the explanation of variance in satisfaction, the additional indicators do begin to address the more specific nature of impacts, boater interactions and quality of the boating experience.

Introduction

Satisfaction has often been identified as the principal product of the recreation experience and the major goal of recreation resource management (Driver and Tocher 1970). In fact, satisfaction is probably the most commonly used indicator of quality in the recreation experience. But determining what constitutes a quality experience has proven elusive to researchers and managers alike. Propst and Lime (1982) suggest that satisfaction is an intangible and difficult concept to define in general, not just in outdoor recreation.

Previous studies suggest that recreational satisfaction is influenced by a variety of objective and subjective factors. Graefe and Drogin (1989) integrated two lines of previous research to study satisfaction among boaters at Raystown Lake, a Corps of Engineers reservoir in Central Pennsylvania. These lines included studies focusing on the identification of determinants of satisfaction (e.g., Peterson 1974; Ditton, Graefe and Fedler 1981; Graefe and Fedler 1986) and studies focusing more specifically on the influence of crowding and other density-related impacts on satisfaction (Graefe, Vaske and Kuss 1984; Manning 1986; Shelby and Heberlein 1986). The Raystown Lake study found that 42 percent of the variance in boater satisfaction could be explained from a pool of independent variables that included measures of crowding, conflict, displacement, and safety-related considerations.

This paper reports a replication and extension of Graefe and Drogin's (1989) Raystown Lake study. Additional data were collected during Summer 1989 through interviews with boaters at Berlin Lake, another Corps of Engineers reservoir. Variables measured in the Berlin Lake study included the full range of experiential impacts from the earlier study at Raystown Lake as well as additional indicators dealing with certain types of encounters between boating parties. The objective of this paper is to compare and contrast the results of the two studies of boater satisfaction.

Methods

Study Setting

Raystown Lake is an 8,500 acre reservoir located in central Pennsylvania and managed by the U.S. Army Corps of Engineers. The reservoir was constructed primarily to provide recreation opportunities for residents in the region. Recreation use of the project increased from 475,000 recreation days in 1975 (the first year of operation) to 1,421,000 recreation days in 1986. This visitation includes a wide variety of recreation activities. Increases in boating activity over the years have led to concerns about congestion and the impacts of the numbers of boats on the quality of the boating experience. There are currently 950 marina slips and 150 dry storage slips available at the two marinas on the project. Ten boat ramps located at public recreation areas and three campgrounds provide additional access for boaters.

Berlin Lake is another Corps of Engineers reservoir, located near Youngstown, Ohio and about half of the size (3,590 acres) of Raystown Lake. Berlin Lake was created in 1943 for multiple purposes, including flood control, low flow augmentation, pollution abatement, recreation, conservation, and to enhance fish and wildlife habitat. As in the case of Raystown Lake, high levels of boating activity and localized congestion during peak use periods have historically been management concerns at Berlin Lake. Facilities at the lake include two commercial marinas, two campgrounds, two major public boat ramps and several additional unimproved ramps. Unlike Raystown Lake, there are also many private boat docks along the shores of Berlin Lake. These docks are allowed for adjacent land owners under permits issued by the Corps of Engineers. Some of these docks are maintained as boat clubs.

Data Collection

A combination of survey procedures was used to measure boating use patterns and visitor perceptions about the conditions they encountered. With a few exceptions, similar procedures were used at both study lakes. Peak use boat densities were identified through ground counts of vehicles at all major access points. Aerial photography of the lake's surface was also used at Raystown Lake. For both lakes, visitor perceptions were obtained through on-site personal interviews conducted at all major access points on selected weekend days. Sampling locations included public boat ramps, marinas, campgrounds, and for Berlin Lake, a sample of boat club properties.

Sampling of private docks required a different approach because these docks are widely dispersed around the lake's shoreline. A list of all private dock holders was obtained from the Berlin Lake project manager. All dock owners received a mail survey asking questions similar to those included in the on-site interviews conducted at major access points. Of the 295 surveys sent to dock owners, 224 were returned; a response rate of 76 percent. These procedures were used only at Berlin Lake, since there are no private boat docks on Raystown Lake.

Since the study focused on the assessment of peak use conditions, data collection was conducted on selected weekends. The sampling schedule was designed to represent the varying levels of weekend use. Data collection at Raystown Lake included a total of eight days during Summer, 1987, two of which fell during the Memorial Day and Fourth of July holiday weekends. Sampling at Berlin Lake involved six weekend days during the Summer of 1989.

/1 Support for this project was provided by the U.S. Army Corps of Engineers.

Description of Sample

Raystown Lake. The population of Raystown Lake boaters may be divided into three groups based upon their means of access to the lake: (1) boat ramp users who trailer their boats to the lake for the day (n=448), (2) those who store their boats for the season at one of the two marinas on the lake (n=334), and (3) campers who launch their boats at a boat ramp when they arrive at Raystown and keep their boats at or near the campsite until the end of their visit (n=368). Most boaters at Raystown Lake operate runabouts with an average length of 18 feet and an average of 128 horsepower. Ninety percent of those sampled had boats registered in the state of Pennsylvania. As well, 94 percent of the survey respondents reported that their primary home residence was in Pennsylvania. Boaters traveled an average of 90 miles from their homes to boat at Raystown. Raystown Lake boaters typically had ten years of boating experience and spent an average of 28 days per year boating, 19 of which were at Raystown Lake. Lake visitors participated in a variety of boating activities, the most popular of which was pleasure cruising (36%), followed by water skiing (23%), swimming (21%) and fishing (18%). Both trolling and swimming were mentioned more often as secondary activities than as primary ones, as were "other" activities such as jet skiing, sitting on the boat, skidooing, and picnicking. The majority of boaters at Raystown were in family groups with an average of 4.5 people.

Berlin Lake. Berlin lake boaters may be divided into five groups based upon their means of access to the lake: (1) boat ramp users (n=430), marina users (n=93), campers (n=84), members of boat clubs (n=35), and those that own private, individual docks on the lake (n=143). As was the case at Raystown lake, most Berlin Lake boaters use runabouts with an average length of 18 feet and an average horsepower of 137. Nearly all (98%) Berlin Lake boaters were Ohio residents living relatively close to the lake. The average distance between the lake and respondents' homes was 33 miles. Berlin Lake boaters reported that they participated in boating an average of 38 days per year, 25 of which were at Berlin Lake. The most popular boating activities on Berlin Lake were pleasure cruising (39%), fishing (22%), waterskiing (19%), and swimming (14%). The average party size was 3.7 people.

Independent Variables

Respondents were asked to reflect on their just-completed experiences to provide information about their boats, basic patterns of recreating on the lake and levels of past boating experience. In addition, perceptions of boating conditions on the lake and an evaluation of the boating experience were assessed in a variety of ways. Using a nine-point crowding scale, visitors were asked to describe the boating conditions at the launch area at the start and end of the trip and on the lake itself while boating. Boaters at Raystown were asked to assess conditions at stopping points on the lake, as well. Respondents were additionally asked to evaluate how the number of other boaters affected their experiences using a nine-point rating scale covering a range of three possible reactions: positive, neutral and negative. Additional statements dealing with various aspects of boating conditions, including safety, conflict with other boaters, and reasons for avoiding or not participating in boating activities were measured on a five-point Likert scale ranging from strongly disagree to strongly agree.

Berlin Lake boaters were asked an additional set of questions geared towards assessing their interaction with other users. While boating, how often were you within talking distance of jet skis, water skiiers and other moving boats? Also, how often was there a need to avoid physical contact and wakes from these user groups and how often were motors heard? These items were utilized to create a perceived frequency of contacts index. For each specific question, respondents also evaluated the effect of the contact on their enjoyment (i.e., added, detracted, neither added nor detracted). Based on these evaluations, three variables were calculated (i.e., experience-enhancing, experience-neutral, experience-disruptive). Computation of these scales is adapted from previous use and validation with canoers, kayakers and board sailers (Titre and Mills, 1981; Titre, 1983).

Dependent Variable

A scale comprised of six items probing the general degree of satisfaction with the boating experience was used to measure overall satisfaction. This satisfaction scale was adapted to boating from previous use and validation with fishermen (Graefe and Fedler 1986), hunters (Vaske, Fedler and Graefe 1986) and river users (Ditton et al. 1981).

Results

Overall Satisfaction

The satisfaction index used in this study was patterned after indices that have been used successfully in the studies cited above. The index includes six statements that are in essence different ways of measuring the extent of satisfaction with the overall boating experience. The index was computed as the mean of the responses to the six individual items.

All of the items in the satisfaction index were strongly intercorrelated, resulting in an overall reliability coefficient (Cronbach alpha) of .80 for Lake Raystown (Table 1). This level of reliability is consistent with that found in other studies using similar indices. The overall Cronbach alpha was .76 for data collected at Berlin Lake. This level was increased to .84 with the deletion of the item, "I cannot imagine a better boating trip." This item was therefore eliminated in subsequent analyses of Berlin Lake data.

Table 1. Reliability Statistics for Overall Satisfaction Index

Satisfaction Statement	Lake	Item Mean	Standard Deviation	Corrected Item-Total Correlation	Alpha If Item Deleted
I thoroughly enjoyed my boat trip today	Berlin	3.8	.89	.66	.65
	Raystown	3.9	.78	.65	.73
My boating experience was not as enjoyable as I expected it to be*	Berlin	2.5	1.04	.66	.64
	Raystown	3.8	.88	.61	.74
I cannot imagine a better boating trip	Berlin	2.6	1.10	-.04	.84**
	Raystown	2.6	.97	.41	.80
I do not want to go on any more boat trips like this one*	Berlin	2.1	.93	.56	.68
	Raystown	4.1	.70	.57	.76
My boat trip was well worth the money I spent to take it	Berlin	3.9	.80	.60	.67
	Raystown	4.0	.62	.56	.76
I was disappointed with some aspects of my boat trip*	Berlin	2.8	1.12	.58	.66
	Raystown	3.4	1.00	.54	.76
Overall Index	Berlin	3.6			.76
	Raystown	3.6			.80

* Scoring for these items was reversed in computation of statistics because agreement with these items indicated lower satisfaction.

** Item deleted from this index for further Berlin Lake calculations.

Both Berlin and Raystown boaters appear to be quite satisfied with their overall boating experiences. More than 80 percent agreed that they had "thoroughly enjoyed their trip today." An even greater proportion of the boaters felt their trip was well worth the money it cost them, and very few indicated they did not want to go on more trips like the one they had experienced that day. On the other hand, a majority of the respondents disagreed with the statement, "I cannot imagine a better boating trip." About one-third of the sample indicated that they were disappointed with some aspects of the experience. In

sum, boaters tended to report relatively high satisfaction, although for many the experience did not measure up to their ideal or best ever boating outing. The average score on the index comprised by all six statements was 3.6 on a scale ranging from one to five.

Experiential Impacts

Number of boats. Boating activity on Raystown Lake was measured using aerial photography and counts of vehicles parked at all major access points around the lake. Overall use levels, determined from aerial photos taken between 1:00 and 3:00 p.m., ranged from 794 to 1101 boats on the lake. The lowest boating densities were encountered on the last three sampling days. These lower use levels may reflect a normal tailing-off of boating activity toward the end of the season, coupled with unseasonably cold weather during August, 1987.

Aerial photography was not used in the Berlin Lake study, so no estimates of the total number of boats on the water at any one time are available. Ground counts of the peak number of vehicles and trailers parked at major access points on Berlin Lake ranged from 243 to 653 over the six sampling days. These counts represent a partial number of boats using the lake, as they do not include boaters coming from the campgrounds, boat clubs or private docks.

Crowding on lake. Several survey questions explored feelings of crowding among boaters (Table 2). Perceived crowding varied significantly at different points of the boating experience. At both lakes, boaters felt most crowded while actually out on the lake. On a scale of one to nine, with nine being "extremely crowded," 36 percent of Raystown and 30 percent of Berlin Lake boaters considered crowding on the lake to be a seven or greater. Respondents reported feeling least crowded at the access areas at the start of their trip. Only 13-15 percent reported crowding here as a seven or greater. These findings are consistent with previous research noting increased sensitivity to crowding at interior locations versus access points.

Table 2. Perceived Level of Crowding at Various Points during the Boating Experience (Values in Percent)

PERCEIVED DEGREE OF CROWDING

	Lake	Not at all Crowded 1	2	3	4	5	Extremely Crowded 6	7	8	9	N	$\bar{X}$
Crowding at the access area at the start of your trip.	B	31	14	18	6	6	11	3	4	6	706	3.4
	R	20	17	20	9	7	14	5	4	6	1145	3.8
Crowding on the lake while boating.	B	5	5	14	10	9	27	12	8	10	727	5.4
	R	4	5	10	10	12	23	14	13	9	1149	5.7
Crowding at the places where you stopped today while boating	B*											
	R	12	13	15	11	11	13	9	10	7	675	4.6
Crowding at the access area when you stopped boating	B	20	11	15	8	8	13	7	7	11	704	4.5
	R	17	17	15	8	10	13	8	6	7	1114	4.2

* This was not assessed in the case of Berlin Lake Boaters.

Influence of others. Another question related to crowding directly asked individuals how the number of boaters at the lake that day affected their overall boating experience. About half of the respondents reported that the number of boaters had no effect on their experience (Table 3). Consistent with the previous crowding data, those who did report an influence of others were more likely to indicate that the number of boaters reduced, rather than increased, their enjoyment. Forty percent of Raystown Lake respondents and 44 percent of Berlin Lake boaters indicated some reduction in their enjoyment, although relatively few of these reported a severe reduction.

Table 3. Responses to "How Did the Number of Boaters at the Lake Today Affect Your Overall Boating Experience"

ENJOYMENT

	Increased 1	2	3	4	No Effect 5	6	7	Reduced 8	9
Berlin Lake									
Number	20	27	24	22	309	78	120	61	59
Percent	3	4	3	3	43	11	17	8	8
Raystown Lake									
Number	13	18	29	29	581	131	208	79	39
Percent	1	2	3	3	52	12	18	7	3

Frequency of encounters and their effect on enjoyment. A perceived frequency of contacts index was computed for Berlin Lake boaters as the mean of responses to four, multi-part questions assessing the frequency of occurrence of various types of contacts with specific users (Table 4). The intercorrelation of the eleven items resulted in an overall reliability coefficient (Cronbach alpha) of .82.

Table 4. Frequency of Occurrence and Effects on Enjoyment of Selected Types of Boating Encounters (Values in Percent)

FREQUENCY OF OCCURRENCE

	Never	Occasionally	Often	Very Often
Being within talking distance of:				
Jet Skis	28	44	17	11
Water Skiiers	41	37	14	8
Other Boats	13	38	28	21
Avoiding contact with:				
Jet Skis	65	24	7	4
Water Skiiers	58	31	7	4
Other Boats	34	40	17	9
Avoiding wakes from:				
Jet Skis	50	30	12	8
Water Skiiers	41	35	16	8
Other Boats	10	28	33	29
Hearing motors from:				
Jet Skis	21	37	19	23
Other Boats	11	33	28	28

EFFECT ON ENJOYMENT

	Add	No Effect	Detract
Being within talking distance of:			
Jet Skis	13	59	28
Water Skiiers	12	69	19
Other Boats	8	60	31
Avoiding contact with:			
Jet Skis	14	66	20
Water Skiiers	11	74	14
Other Boats	8	66	26
Avoiding wakes from:			
Jet Skis	8	74	18
Water Skiiers	7	73	19
Other Boats	8	52	40
Hearing motors from:			
Jet Skis	6	74	20
Other Boats	6	78	16

The frequency of physical and visual contact with others (i.e., avoiding contact, avoiding wakes, being within talking distance of others) did not appear to be a significant issue, with between 50 and 89 percent of all respondents indicating occasional or no contact of this nature. Sixty-two percent did, however, report having to avoid wakes from other boats either often or very often. As previously noted, noise also appears to be a slight problem at Berlin Lake, where hearing motors from jet skis and other boats occurs frequently.

To assess the effect of the aforementioned contacts on enjoyment, three variables were calculated: experience-enhancing contacts as the sum of affirmative responses to "contacts added to my enjoyment," experience-disruptive contacts as the sum of responses to "contacts detracted from my enjoyment," and experience-neutral contacts as the sum of responses to "contacts neither added to nor detracted from my enjoyment." Although the majority of respondents indicated that specific interactions with other users had no effect on their enjoyment, there were a significant number (18 - 40%) reporting that certain types of contacts detracted from enjoyment (e.g., 52% of boaters noted that avoiding wakes from other boats had no effect on enjoyment, however 40 percent felt that such contacts were experience-disruptive).

Waiting time to get on the lake. Study respondents were also asked how they felt about the amount of time they had to wait to get on the water. Boaters at both lakes appear to be quite satisfied with the amount of waiting time they encountered, as less than ten percent of those sampled agreed or strongly agreed with the statement, "I did not like the amount of time I had to wait to get on the water today" (Table 5).

Displacement. Four statements were included in the survey to measure the types and extent of displacement experienced by boaters as a result of crowding. Some displacement does seem to be occurring, although few boaters indicate that they might stay away from the lake altogether due to crowding (Table 5). About one-fourth of the boaters at Raystown and one-third of those at Berlin reported being displaced from favorite parts of the lake (place displacement), displaced during peak time periods (time displacement), and had forgone some boating activity (activity displacement) because of crowding . There was little agreement, however, with the statement, "If I had known what it was going to be like here today, I would not have come on this visit." Overall, only five percent at Raystown and ten percent at Berlin agreed with this statement designed to measure the likelihood of complete displacement from the lake.

Noise. Noise appears to be a slight problem at Berlin Lake, with 18 percent reporting that noise from other boats reduced their enjoyment, in contrast to Raystown Lake where noise from other boats reduced the enjoyment of only five percent of the boaters interviewed (Table 5).

Behavior. More boaters expressed problems with the behavior of other boaters than with the noise from other boats (Table 5). Nearly one-fourth of the respondents at Raystown and one-third of those at Berlin indicated that the behavior of other boaters interfered with the quality of their boating experience. The most frequent types of behavior causing these reactions were boaters coming too close or going too fast, and boaters disobeying rules such as not observing speed limits in no-wake zones. Rude and careless behavior was also mentioned frequently as an interference with boating quality.

Safety. More than three-fourths of the boaters agreed with the statement, "Boating conditions on the lake today were safe" (Table 5). In support of the perception of safe conditions, less than 20 percent agreed or strongly agreed with the statement that "There was an unsafe number of boats on the water today." As well, boaters at Berlin Lake were queried as to the adequacy of patrols and assessment of near accidents (60 and seven percent agreement, respectively).

An additional question directly asked respondents whether other boats came too close to their boat. More than one-third of the sample felt that other boats had come closer than desirable (Table 5). This finding, coupled with the earlier observation that boats coming too close was one of the most frequently mentioned types of objectionable behavior, suggests that this may be the greatest safety concern among boaters at Berlin and Raystown.

Table 5. Summary of Responses to Indicators of Visitor Displacement, Conflicts and Perceptions of Safety (Values in Percent)

		RESPONSES						
	Lake	SD	D	U	A	SA	N	$\bar{X}$
I stayed off the lake during part of the day today because there were too many boats	B	8	52	4	18	18	739	2.8
	R	7	63	3	19	8	1141	2.6
I avoided my favorite parts of the lake today because there were too many boats there	B	10	54	8	20	8	730	2.6
	R	7	62	7	21	4	1142	2.5
I did not participate in some boating activities today because of crowded conditions on the lake	B	8	55	3	27	7	733	2.7
	R	5	70	2	20	3	1134	2.5
If I had known what it was going to be like here today, I would not have come on this visit	B	18	69	5	6	2	731	2.0
	R	16	77	2	4	1	968	2.0
I did not like the amount of time I had to wait to get on the water today	B	24	68	4	3	1	667	1.9
	R	12	81	2	5	1	1129	2.0
The noise of other boats reduced my enjoyment on the lake today	B	9	67	7	13	5	738	2.4
	R	10	82	3	5	0	1140	2.0
The behavior of other boaters interfered with the quality of my boating experience	B	9	51	5	26	8	736	2.7
	R	4	67	6	18	4	1140	2.5
Other boats came closer to my boat then I like	B	9	51	8	26	6	736	2.7
	R	2	60	4	27	7	1141	2.8
Boating conditions on the lake today were safe	B	4	12	11	66	7	733	3.6
	R	1	11	10	75	3	1135	3.7
There was an unsafe number of boats on the water today	B	10	61	9	15	4	737	2.4
	R	5	67	11	14	3	1144	2.4
I nearly had an accident on the lake today because of crowded conditions	B	24	67	2	5	2	738	1.9
	R*							
The number of boats on the lake reduced my enjoyment of the lake today	B	7	52	5	28	7	740	2.8
	R*							
There are adequate law enforcement patrols on this lake	B	11	15	12	53	9	738	3.3
	R*							

* This was not assessed in the case of Raystown Lake Boaters.

Regression Analysis

A series of regression models were developed to identify the direct and indirect relationships between overall satisfaction and the pool of experiential impacts. Standardized regression coefficients were used to assess the relative importance of each independent variable to the dependent variable. Zero order correlations were also reported to illustrate the bivariate relationships between key study variables. Results of the regression models and correlation analyses for Raystown and Berlin Lakes are shown in Tables 6 and 7, respectively.

In combination, the series of regressions form the basis for a model illustrating how people perceive satisfaction with the boating experience (Figures 1 and 2). Paths shown in these models represent

Table 6. Summary of Multiple Regressions of Boating Impact Variables on Overall Boating Satisfaction at Raystown Lake

INDEPENDENT VARIABLE	DEPENDENT VARIABLE: Perceived Crowding On Lake		Influence Of Others On Experience		Satisfaction Index	
	r	Beta	r	Beta	r	Beta
Enjoyment reduced by noise	.08		.15		-.23	-.09
Stayed off lake part of day because of too many boats	.35		.37	.11	-.41	-.13
Behavior of other boaters interfered with quality of boating experience	.29		.33	.09	-.39	
Boating conditions on lake perceived to be safe	-.37	-.14	-.38	-.14	.48	.23
Other boats came too close	.28	.08	.30		-.37	-.15
Perception of unsafe number of boats on the water today	.38	.14	.33		-.41	-.06
Avoided favorite parts of lake because of too many boats	.40	.20	.38	.13	-.39	-.07
Did not do some activities because of crowded conditions	.36	.15	.37	.12	-.40	-.10
Total number of boats on lake (from aerial photos)	.20	.14	.06		-.05	
Had to wait too long to get on the water today	.10	.06	ns		-.11	-.06
Perceived crowding on the lake			.46	.24	-.38	
Influence of number of boaters on overall boating experience					-.42	-.15
Percent of Variance Explained (R SQUARED)		.30		.33		.42

Table 7. Summary of Multiple Regressions of Boating Impact Variables on Overall Boating Satisfaction at Berlin Lake

INDEPENDENT VARIABLE	DEPENDENT VARIABLE: Perceived Crowding On Lake		Influence Of Others On Experience		Satisfaction Index	
	r	Beta	r	Beta	r	Beta
Enjoyment reduced by noise	.28		.39		-.48	-.14
Stayed off lake part of day because of too many boats	.34		.46		-.43	
Behavior of other boaters interfered with quality of boating experience	.37		.47		-.53	
Boating conditions on lake perceived to be safe	-.44	-.11	-.48	-.13	.55	.21
Other boats came too close	.33		.32		-.42	-.14
Perception of unsafe number of boats on the water today	.25	.09	.18		-.09	-.08
Avoided favorite parts of lake because of too many boats	.42	.12	.48	.08	-.52	-.14
Did not do some activities because of crowded conditions	.44	.11	.48		-.49	
Total number of boats on lake (Peak use counts)	.28	.20	.11		-.07	
Had to wait too long to get on the water today	.10		.08		-.17	
Nearly had an accident	.24		.26		-.37	-.10
Number of boats reduced my enjoyment of the lake	.49	.20	.60	.35	-.54	-.14
Adequate law enforcement patrols	-.09	.10	-.23		.29	
Experience-Enhancing	-.09		ns		.08	
Experience-Neutral	-.22	.10	-.37	-.09	.34	
Experience-Disruptive	.33		.46		-.47	
Perceived Frequency of Contacts	.41	.24	.44	.11	-.41	
Perceived crowding on the lake			.43	.12	-.37	
Influence of number of boaters on overall boating experience					-.49	-.12
Percent of Explained Variance (R SQUARED)		.39		.43		.44

only significant relationships between variables. Results showed that 42 percent of the variance in satisfaction could be explained by the pool of experiential impacts utilized at Raystown Lake. Similarly, 44 percent was explained by the expanded pool of impact variables utilized at Berlin Lake.

The satisfaction index tended to be highly associated with many of the impact variables. The variables most strongly related to satisfaction for both Berlin and Raystown boaters were the perception that conditions on the lake were safe ($r = .48_{Raystown}$, $r = .55_{Berlin}$), the influence of the number of boaters on the overall boating experience ($r = -.42_{Raystown}$, $r = -.49_{Berlin}$), and the various measures of visitor displacement (time: $r = -.41_{Raystown}$, $r = -.43_{Berlin}$; activity: $r = -.40_{Raystown}$, $-.49_{Berlin}$; place: $r = -.39_{Raystown}$, $r = -.52_{Berlin}$). Many of the impact indicators, however, had correlations with the satisfaction index that were nearly as high. The exceptions, or those variables most *weakly* associated with satisfaction, included waiting time to get on the lake and the actual number of boats on the lake.

The number of boats on the lake, as measured by aerial photos at Raystown Lake and ground counts at Berlin Lake showed a pattern of weak or insignificant relationships with the various impact indicators. Respondents were generally satisfied with conditions regardless of the number of boats at the lake. The number of boats did contribute, however, to the level of perceived crowding on the lake, although not as strongly as other indicators (i.e., displacement, safety). The number of boats, perceptions of safety and displacement accounted for 30 percent of the variance in crowding at Raystown (Table 6). Perceived crowding on the lake, in turn was relatively strongly associated (r=.46) with the reported influence of the number of others on the boater's experience. Results indicated that 33 percent of the variance in the influence of others at Raystown Lake could be explained by the perception of crowding, coupled with the direct impact of displacement and safety indicators.

In contrast, the frequency and evaluation of contacts with various user groups, along with perceptions of safety and displacement accounted for 39 percent of the variance in crowding at Berlin Lake (Table 7). The strongest predictor of both perceived crowding and the influence of others on the boating experience at Berlin Lake was the new item, "the number of boats reduced my enjoyment of the lake". This item, along with the frequency and evaluation of contacts measures which were added to the Berlin Lake study, largely accounted for the improved explanation of both perceived crowding and the influence of others at Berlin Lake.

Figure 1. Model of Boating Satisfaction at Raystown Lake

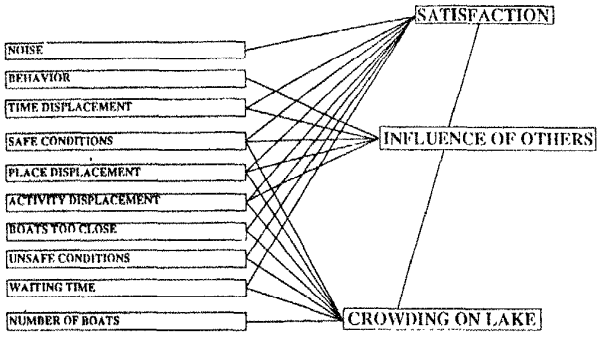
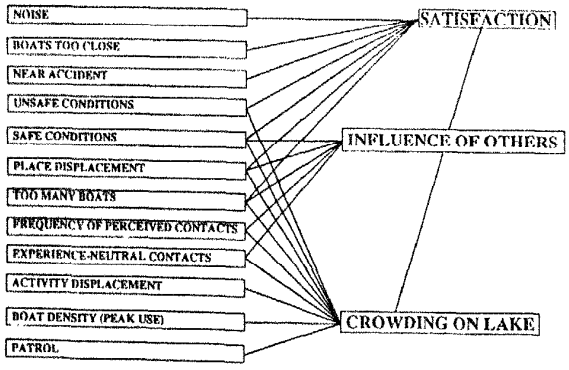


Figure 2. Model of Boating Satisfaction at Berlin Lake



Conclusions and Implications

This study focused on the relationships between a full set of experiential impacts and overall visitor satisfaction. Results of the visitor surveys suggest that both Raystown and Berlin Lake boaters were generally satisfied with their boating experiences regardless of the number of boats at the lake. However, boaters reported moderate levels of crowding on the lakes, and a significant proportion of those sampled reported experiencing inappropriate behaviors of other visitors, concerns over boating safety and having been displaced in some way.

Both studies resulted in relatively similar models of boating satisfaction (Figures 1 and 2). In both cases, satisfaction was directly affected by indicators of safety, displacement, and the influence of other boaters on this boating experience. Similarly, in both cases, density measures had no direct effect on satisfaction, but did play an indirect role through their influence on other variables that were directly related to satisfaction.

The biggest difference between the two models appears to be the roles played by the additional variables that were included in the Berlin Lake study. While these indicators added little to the explanation of overall satisfaction, they did contribute significantly to the explanation of perceptions of crowding and the influence of others on the boating experience.

Study results are consistent with several principles established in previous research. First, the regression models lend support to the notion that overall satisfaction can be understood in terms of user evaluations of specific elements of the recreation experience. Secondly, the results echo findings of other studies showing that relationships between visitor density and satisfaction are mediated by a variety of factors.

Management Implications

The results of these studies can be used to address a variety of management issues and decisions. An important result is the documentation of existing conditions on both lakes and the relationships between these conditions and peak use boat densities. This information provides a basis for: (1) evaluation of the acceptability of current conditions, (2) identification of management actions designed to improve current conditions, (3) evaluation of the probable impacts of various potential options for further facility development on Berlin and Raystown Lakes, and (4) development of procedures for monitoring the quality of boating at both lakes in the future.

Results suggest that current peak use conditions are acceptable to most boaters, however these conditions could be improved by focusing management on those indicators with the greatest influence on satisfaction (e.g., boats too close, behavior of others). Manipulating the number of boats on the lakes would have little effect since boater satisfaction is related more to the behavior rather than the number of boaters encountered. Expanding enforcement of existing regulations and offering educational programs aimed at making offending boaters aware of the impacts of their actions are more likely to bring about improvements in this situation.

In addition, the results of this study may be used as a basis for establishing quantitative standards of acceptability. Current management frameworks rely on standards to make the evaluation process objective and systematic. Standards provide a means of describing the type of experience that is to be provided in measurable terms. Problem identification then is based on the comparison of existing conditions and corresponding standards. Knowledge of the current level of various impact indicators provides a baseline upon which an initial set of standards can be determined, as well as a point against which future conditions can be compared.

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MODELING DAILY BOATING USE AT A NEW URBAN LAKE

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A multiple linear regression model was developed to predict daily on-site boat rentals during April-November on the basis of month, day, and weather. Rentals peak on sunny Sundays in June. The number of boats brought on site each day is closely correlated with daily boat rentals.

Introduction

We conducted a study to identify the amount and patterns of boating at a newly created lake in the Chicago suburbs. The research estimated the total amount of boating activity and developed a model for predicting the number of boat rentals on any given day. The pattern of boats brought into and out of the site, as well as the number of boats on site over the day, was also monitored. This information was gathered to document boaters' response to a new lake, as well as to guide the management of the lake and associated resources. The research is part of a larger study of the amount and patterns of use at Forest Preserve District facilities in the Chicago area.

Study Site

The research focused on Busse Lake, a 590-acre body of water opened to public use on September 1, 1980. The lake was created by a dam on Salt Creek, which flows through Chicago's western suburbs. To facilitate fishing, approximately 25 percent of the lake basin was deepened to more than 10 feet. To improve the habitat for fish, large areas were deepened to 4 to 6 feet. Stocking included largemouth bass, bluegill, redear, northern pike, brown bullhead, channel catfish, and crappie. Fishing is from the banks, fishing walls, and boats (electric trolling motors only). A boat rental is open from April through November, and there are two sets of boat launching ramps. The lake and adjacent recreation facilities were made possible through a cooperative program of the Forest Preserve District of Cook County, U.S.D.A. Soil Conservation Service, and Illinois Division of Waterways aimed at providing flood control and recreation opportunities. The Forest Preserve District manages the lake and associated resources.

Methods

On selected days during the summer of 1983, the number of boats entering and leaving the area was recorded at 15-minute intervals at the single access road leading to the two boat launching areas. In addition, numbers of daily boat rentals were obtained from the boat rental concession for the 1983 season (April through November). Our field observations indicated that most of the boats brought on site or rented from the concession were rowboats used for fishing, although there were some canoes, sailboats, and paddleboats used for general recreation.

Amount of Boating Use

During the season of April-November, there were more than 9,000 boat rentals and nearly 8,000 boats brought on site at Busse Lake -- a substantial amount of activity. If we assume two individuals per boat (a conservative estimate), this totals 34,000 individuals using boats during the boating season.

On a daily basis, boat rentals and number of boats brought on site are closely correlated ($r=0.90$), with up to 249 boats rented daily and up to 211 boats brought on site per day. Daily boating activity is highly variable, and we undertook an effort to develop a model that would enable managers and planners to predict daily boating under various circumstances. Because more complete data were available for boat rentals than for boats brought on site, we focused our attention on the development of a model to predict boat rentals. Given the close correlation between boat rentals and number of boats brought on site, a good estimate of total boating activity on a given day can be obtained by multiplying the estimate of boat rentals by 1.9.

Prediction of Daily Boat Rentals

We decided that the variation in daily boat rentals might be explained in terms of season, day of the week, and weather. We considered weather as influencing the desirability of boating experiences at the site, day of the week as influencing the availability of time to make a trip to the site, and of season as influencing general patterns of use over the year. Season includes a complex pattern of changes in weather,

day length, vacation, holiday, and outing schedules, and activities engaged in. More specifically, we hypothesized that there is a pattern of rentals over the season, with deviations about that pattern attributable to day of the week and deviations of weather from the seasonal average. We also expected that deviations from the seasonal pattern of rentals attributable to day of the week and departures from average monthly weather would vary by month over the boating season.

Developing the Model

Data on boat rentals were obtained from the concessionaire. Weather data were collected in the field and from official records for a nearby weather station (O'Hare Airport, Chicago, Illinois). Weather variables in the model included percent of the day that was sunny, cloudy, or raining; and temperature (Fahrenheit) at noon. These variables could be measured in the field or from official records, were predictable by managers and planners with acceptable certainty, and were useful in previous efforts to predict daily use of recreation facilities near the lake. Day of the week was categorized as weekday, Saturday, or Sunday/holiday because these groupings reflected the availability of time for trips to the site, as well as the framework for traditional outdoor excursions. Individual months were used in the model to represent seasonal change. Because there was essentially no change in site attributes or the availability of other sites in the general area during the period of study, these variables were not included in the analysis. Weather variables were entered in the model as deviations from the monthly averages to remove seasonal correlations between weather and month. The resulting model can estimate rentals under average weather conditions (i.e., no weather data entered into the model) or under special weather conditions (i.e., weather data entered). Because the effect of day of the week and weather on rentals might change over the season, interactions between these variables and month were built into the model.

The model was estimated with multiple linear regression techniques. The month and day-of-the-week variables were expressed in binary form (1 when applicable and 0 when not). The dependent variable (daily boat rentals) was transformed into its natural logarithm form, but there were no logarithmic transformations of the independent variables. This provided a better fit than the model with no logarithmic transformations. In this form the regression model minimizes the percent difference between actual and predicted rentals, and can be expressed in a "multiplicative" form. That is, the coefficients for the independent variables can be converted to "multipliers" that express the variable's association with rentals as a multiple of a base value. This seemed reasonable because over the year we would expect weather or day of the week to alter rentals by a multiple rather than by an added absolute amount. The model is summarized below:

$$U = MC_m DC_{m,d} TC_m^{(T-\bar{T}_m)} SC_m^{(S-\bar{S}_m)} RC_m^{(R-\bar{R}_m)}$$

Where U = Use (rentals)
MC_m = Constant for month m
DC_{md} = Day coefficient (Sat., Sun/Hol., or 1 for weekday)
TC_m = Temperature coefficient
SC_m = Percent sun coefficient
RC_m = Percent rain coefficient
$\bar{T}_m$ = Monthly mean temperature at noon
$\bar{S}_m$ = Monthly mean percent sun
$\bar{R}_m$ = Monthly mean percent rain
T = Actual temperature at noon
S = Actual percent sun
R = Actual percent rain

Results

The model will predict daily boat rentals on any day during the boating season, given data on month, day of the week, and weather. It assumes that site attributes and the availability of substitute sites remain constant. Consequently, the model cannot be used to predict changes in use that would accompany changes in the site or availability or character of substitute sites.

Coefficients for the daily boat rental prediction model are summarized in Table 1. To estimate rentals on a particular day, select the column that corresponds to the appropriate month. The constant represents estimated weekday rentals under average weather conditions. If estimates for a Saturday or Sunday are desired, multiply the weekday estimate by the appropriate coefficient. If weather deviates from the monthly average, raise the coefficient for weather (temperature, sun, or rain) to the power of the deviation and multiply the estimate of use by that number. For example, for May the constant is 19.511, indicating an estimate of 19 boat rentals on a weekday in May with average weather conditions (i.e., $\bar{T}$=64, $\bar{S}$=61, $\bar{R}$=10). To estimate Sunday use under average weather conditions would be (19.511 X 5.302) = 103. With a temperature of 74, or 10 degrees above the monthly average, use would increase by 79 percent (1.060^{10} = 1.79) to 185 rentals.

The coefficients of the model and the use patterns they imply are discussed below in an effort to identify important factors that influence use patterns and to provide insight into user behavior.

Seasonal Patterns

Under average weather conditions, daily boat rentals rapidly increase in the spring, peak in June, and decline slowly through November. This general pattern persists, with some important deviations, for weekdays, Saturdays, and Sunday/holidays (Table 4). The estimates of average daily use, by month, upon which Table 4 is based were developed from the coefficients in the first three rows of Table 1.

Weekend and Weekday Patterns

The model will predict higher levels of boat rentals on weekends (Saturday, Sunday/holiday) than on weekdays in all 8 months of the boating season provided that weather conditions are similar. Saturday use is slightly higher than Sunday/holiday use early in the season (April-May) as well as late in the season (November), but Sunday/holiday use exceeds Saturdays at other times. Weekday and weekend use are most similar in the middle of the summer (July) and most different late in the season. This pattern is attributable, in part, to restriction on weekday use in the spring and fall imposed by the limited availablity of leisure time.

Weather

The previous discussion of seasonal and day-of-the-week patterns in daily boat rentals assumed average weather conditions for each month. The following is an example of how weather influences predictions of rentals. If we assume average weather conditions, the model will predict 195 boat rentals on a Sunday in June (i.e., 45.879 X 4.242). If the temperature increases to 80, the percent sun to 85, and there is no rain, the estimate of use will increase to 257 rentals (i.e., 195 X 1.041 X 1.2098 X 1.046). But under poor weather conditions of 100% rain and 50°F there would be only 20 rentals (195 X .772 X .3138 X .4236). Thus ignoring weather variables can give predictions that are quite inappropriate for days when the weather conditions depart significantly from the monthly average.

Subsequent discussion focuses on the association between each weather variable and rentals, by month, given that all other weather, seasonal, and day-of-the-week variables are held constant. The variables are discussed in terms of decreasing contribution to the explanatory power of the model. Table 3 summarizes the percentage changes in rentals that are associated with specified deviations from average monthly weather. Table 2 presents the monthly averages used to calculate the deviations.

Temperature at noon. Deviations of the daily temperature at noon (Fahrenheit) from the monthly average contribute significantly to the explanatory power of our model, with the percentage change in daily rentals associated with a given deviation varying with month. The highest percentage increases in rentals with a given increment of temperature above the monthly average occur during the fall and spring; during the summer we find the smallest increases, and in July and August a decrease (Table 3). This suggests that temperature may be limiting use in the cooler months, but not necessarily in the warmer months. Hot weather in the summer may result in a shift to outdoor areas with more shade, or to air-conditioned environments.

Percentage of sun. Increases in the percentage of the day with sun above the monthly average are associated with increases in use during each month, but there is not a clear pattern in their magnitude over the season.

Percentage rain. An increase in the percentage of the day when it is raining above the monthly average tends to decrease use, particularly in the spring and fall.

Discussion

Boating activity at Busse Lake illustrates the increase in recreation activity that can accompany enhancements of urban water resources. The 17,000 boating occasions and 34,000 boaters over an 8-month period represent a significant amount of recreation activity, and it is only a portion of the recreation activity generated by this new 590-acre lake.

The model for predicting daily boat rentals explains 80 percent of the variance and provides good predictions. The coefficients for the seasonal, day-of-the-week, and weather variables are reasonable and offer some insight into boating behavior that seems consistent with analyses for other types of recreation behavior. The June peak in boat rentals appears consistent with the kind of fishing opportunities provided by the relatively shallow lake. It also conforms to the general pattern revealed by our monitoring of vehicles entering nearby areas and of bicycling on nearby trails. The seasonal peak in daily use is especially prominent with boat rentals, perhaps this is associated with the "seasonality" of fishing. A considerable amount of testing revealed one troublesome aspect of the model -- it tends to overestimate use on very warm and sunny days in June. This is the result of the unusual pattern of weather during June 1983 and the multiplicative form of the model. The problem is not viewed as serious because the model correctly identifies those days on which peak use occurs -- which is most critical to managers. The problem could be resolved with the addition of data from another year with slightly different weather patterns, but that information was not available. Analyses of other types of use with a similar model and multi-year data presented no such problems (Dwyer 1988).

The percentage difference between weekend and weekday use is more prominent for boat rentals than for other types of outdoor recreation use that we have monitored over time, such as bicycling on trails, use of swimming pools, and vehicles entering several kinds of sites. This is not surprising because renting a boat usually requires more time and effort than stopping to eat lunch, taking a short walk, using a swimming pool, or fishing from shore. Higher use on Saturdays than on weekdays and Sundays early and late in the season may reflect the popularity of Saturday outings for fishing. Bicycling also has a greater percentage difference between weekend and weekday use than is the case with general entry into nearby areas -- once again perhaps related to the commitment of a block of time, the use of equipment, etc.

Boat rentals are more responsive to weather, particularly temperature, than is overall use of the area. Warmer than average days in the spring and fall bring a large increase in boat rentals; warmer than average days in July and August decrease use. Rain in the spring and fall also brings large decreases in use. Responsiveness to temperature and rain conditions most likely occurs because boaters are exposed to the elements. Bicyclists are somewhat less sensitive to these conditions than are boaters, but swimmers at pools are more sensitive to temperature than boaters.

The number of boat rentals is highest on warm and sunny Sundays in June, with a general drop in activity through the remainder of the year. Activity is much higher on weekends than weekdays and is especially high on Sundays and holidays, as well as on Saturdays early and late in the season. With an overall understanding of use patterns and the ability to predict boat rentals on a particular day, managers can schedule their activities more effectively and concessionaires can adjust their staffing and other activities.

Documentation of urban boating activity, particularly its response to improvements in urban resources, would be useful in justifying additional expenditures to enhance urban opportunities. It is often very difficult to get counts of boating activity. However, in instances such as the one described here, much can be learned about the amount and patterns of use. This knowledge can support additional improvements in urban boating opportunities and guide resource management activities.

Additional studies at other areas are needed to identify variations in use patterns. Echelberger and Moeller (1973) explored the relationship between lake characteristics and variations in peak period boat-use intensity on Adirondack lakes. With sufficient studies across a wide range of lakes and associated environments, managers can begin to see how their policies and programs are likely to influence use. Other approaches to this same question would be to (1) ask boaters about the characteristics of sites that they use and do not use, or (2) describe different types of sites to boaters and ask them which they would prefer. Models developed from these efforts would enable managers to predict changes in the use of boating areas that can be expected to accompany changes in water resource characteristcs and management. This would make it possible for managers to fine-tune their efforts to understand user choices and perhaps influence those choices.

The needed research can build on previous studies of how site attributes influence satisfaction with choice of trout streams (Louviere 1974), trails (Allton and Lieber 1983; Lieber and Allton 1983; Lieber and Fesenmaier 1983), urban forest recreation areas (Peterson, Dwyer, and Darragh 1983), and parks (Curry, Louviere, Rauch, and Woodworth 1983; Louviere and Woodworth 1984; Louviere, Schroeder, Louviere, and Woodworth 1986; Schroeder and Louviere, 1986; Schroeder, Dwyer, Louviere, and Anderson 1990; Schroeder, Louviere, and Anderson 1989; and Dwyer, Schroeder, Louviere, and Anderson 1989). The basic task involves (1) identifying the attributes of urban lakes that influence people's choice of and satisfaction with those areas, and (2) building models that predict site choice or satisfaction from those site attributes. By including in the model characteristics of the fisheries resource (populations, species, sizes), water resources (size, type, quality), other site characteristics (terrain, ground cover, access), facilities (boat rentals, launching ramps), and rules and regulations (bag and length limits, use of boats and motors), it will be possible to evaluate the influence of water resource management options on user behavior. This will enable water resource managers to estimate user responses to various management options and to select a set of options that will provide for high levels of use, enjoyment, and user support.

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Table 1

Variable and coefficients for the daily boat rental prediction model

	April	May	June	July	August	Sept.	Oct.	Nov.
Constant[1]	7.838	19.511	45.879	38.978	22.897	5.703	3.452	.521
Saturday[2]	3.589	5.646	2.517	2.018	3.102	5.425	3.615	13.450
Sunday/holiday[2]	2.203	5.302	4.242	3.924	4.473	11.681	5.888	9.934
Temperature (noon) - $\overline{T}$	1.066	1.060	1.010	.983	.997	1.025	1.039	1.132
Percent sun - $\overline{S}$	1.007	1.002	1.016	1.002	1.011	1.014	1.005	1.003
Percent rain - $\overline{R}$	.986	.984	.991	.993	1.006	.998	.985	.978

[1] estimated weekday rentals
[2] 0=no; 1=yes

Table 2

Monthly average weather data used for the dai boat rental prediction model

	Temperature at noon (F) $\overline{T}$	Sun(%) $\overline{S}$	Rain(%) $\overline{R}$
April	53	42	11
May	64	61	10
June	76	73	5
July	81	72	6
August	81	69	6
September	71	58	7
October	59	45	12
November	43	32	2

Table 3

Percentage change in daily boat rentals associated with specified deviations from monthly average weather (assuming all other variables remain constant)

	+10 temperature at noon	+10% percentage sun	+10% percentage rain
April	90	7	-13
May	79	2	-15
June	11	17	- 9
July	-16	2	- 7
August	- 3	12	6
September	28	15	- 2
October	46	5	-14
November	45	3	-20

Table 4

Estimated boat rentals by month and day of the week under average weather conditions

	Boat rentals per day		
	Weekday	Saturday	Sunday/ holiday
April	8	28	17
May	20	110	103
June	46	115	195
July	39	79	153
August	23	71	102
September	6	31	67
October	3	12	20
November	1	7	5

RECREATION LAKE MANAGEMENT - AQUATIC PLANT REMOVAL STUDY

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ABSTRACT

Aquatic plant growth has become a serious problem in the recreational management of inland lakes of Ohio. Submerged and emergent plants have restricted swimming, boating, and fishing in sections of most lakes in the state. The Ohio Department of Natural Resources (ODNR) has responded to public pressure by initiating an aquatic weed harvesting program to control the plant's impact upon recreation. No information on the long term effectiveness of mechanical weed harvesting in Ohio was considered in the decision to implement the program. The Parks and Recreation Division of ODNR is interested in learning about the impact of its harvesting program. The School of Natural Resources is cooperating with ODNR in developing an economical air photo-based system for monitoring the aquatic weed control project.

Twelve test lakes and one control lake were selected throughout Ohio. Transects were established on each lake and the existing vegetation was inventoried by species. Nutrient levels and associated chemical and physical data have been collected for each lake to establish the baseline for measuring any impacts related to the weed harvesting. 35mm true color photography has been flown over each lake to test the effectiveness of film, filter, and scale in interpretation results. Photointerpretation of aquatic vegetation area spread by species will provide the ODNR with an accurate and efficient tool for evaluating the aquatic weed control program. Sufficient water penetration has been achieved to permit a real mapping of the submerged vegetation as well as the emergents.

Introduction

Ohio's Department of Natural Resources is engaged in a program to control aquatic macrophytes in its state park lakes by chemical treatment and by mechanical harvesting. The study described in this paper deals with monitoring the mechanical harvesting method being applied to lakes by ODNR's Division of Parks and Recreation. Decisions to control aquatic vegetation are politically based in response to demands from constituents. How the vegetation is controlled can have biological, social, economical, and political impacts. Knowing the long term effectiveness and the impacts of the control method used is important to proper management of the state park lakes and in supporting the political decisions.

Some inland lakes in Ohio are supporting colonies of aquatic macrophytes that are large and dense enough to cause major recreational problems. Dense and extensive growth of the macrophytes is choking out recreational use of some key areas of the lakes by blocking use of boat docks, fishing spots, and swimming beaches. The excessive plant growth can lead to fish kills through oxygen depletion, dangers to swimmers, and general degradation of the recreational experience.

The State purchased a weed harvester and embarked upon the effort of controlling aquatic plant growth through mechanical means in 1987. Mechanical harvesting is being tried as an alternative to chemical or biological controls of aquatic vegetation. Chemical controls can cause unwanted problems of oxygen depletion, uncontrolled kills, and environmental concerns.

Elimination of the plants is not the goal. Certain levels of macrophyte populations are desireable. Mechanical harvesting permits preselected harvesting levels without total kill and with no foreign substances being introduced into the water (Sassic 1982). Also, immediate relief from undesirable vegetation is obtained without closing the water to recreational use. Removing vegetation matter from the water might also remove enough nutrients to slow future growth and reduce the organic filling rate in the lake.

Sassic (1982) states that mechanical harvesting is cost ineffective, labor intensive, and an undesirable method for aquatic plant control. However, he lists the following three situations in which mechanical harvesting is an acceptable method of control:

1. In areas where water flow can disrupt the control needed with chemical herbicides.

2. In areas where fishing is the main use. Harvesting allows boat access but does not destroy the fish habitat.

3. In areas where water must flow immediately but where it has been restricted by vegetation.

Disadvantages and negative effects on the environment have been discussed at length in the literature (Cooke et al. 1986, Gangstad 1982, and Sassic 1982). The major disadvantages to mechanical harvesting of aquatic vegetation include the high costs involved, the possibility of plant parts spreading the infestations, shallow depth of harvest, limited area coverage, and dependence on favorable weather.

Several authors report that regrowth of cut aquatic plants occurs quickly but that there appears to be a significant lowering of growth in subsequent seasons (Mikol 1985, Kimbel and

Carpenter 1979). Differences in individual lake morphometry and harvesting techniques influences the impact of mechanical harvesting upon nutrient availability. Wile (1979) and Hutchinson (1957) found that phosphorus is the key nutrient and its removal can be maximized by timing of the harvest. However, the usefulness of harvesting as a nutrient removal technique is influenced by the size of the lake, the amount of plant biomass, external loading of nutrients, and the sediment nutrient supply (Wile 1979). Wile estimated that more than thirty years of harvesting would be needed to deplete the phosphorus content of Lake Chemung at the 1975 removal rate.

Purpose of the study

The Department of Natural Resources was interested in learning if and how effective the mechanical harvesting would be in controlling the aquatic plants in the state park lakes. The best way to determine that was to monitor the growth of the macrophytes over the years that the program was in operation. An effective and economical monitoring and mapping program was needed.

The Ohio State University's School of Natural Resources and the Ohio Agricultural Research and Development Center joined in a cooperative program with the Ohio Department of Natural Resources to look into the problem of developing a method for monitoring the effectiveness of the mechanical weed harvesting program.

An aerial photo based monitoring system would be needed to obtain the easiest to use and the most cost effective way of monitoring and mapping the aquatic vegetation areal spread in the harvested lakes. Resolution requirements and cost limits proscribed any satellite or other remote sensing systems. The seasonal requirements ruled out using standard photography from the High Altitude Photography Program or the county coverages of the Agriculture Stabilization and Conservation Service.

Study Design

Lake Analysis

Eleven Ohio State Park lakes were chosen as the test sites. Their selection was based upon the harvesting plans of the Division of State Parks and their locations throughout the state. A twelfth lake was selected as the control. The control Lake, Knox Lake, is managed by the Ohio Division of Wildlife and is not included in the aquatic weed control program. Most of the lakes were built in the early 1900s and average only ten feet or less in depth.

Water samples were collected in the area of harvesting each year. The samples, collected at a depth of 30 centimeters, were analyzed for pH, Nitrate-nitrogen, ammonium nitrogen, and phosphorus. A secci disk reading was used to measure transparency at each water sample collection. Also, the water temperature at 15 cm was measured. The sample areas were recorded so that future samples will be made at the same location. Plants growing in the areas to be harvested were identified and the areas were photographed for future reference. Table 1 lists the species of aquatic vegetation present in the study lakes.

Table 1. Aquatic vegetation found at each study lake

Vegetation type	Study lakes
Myriophyllum spicatum Eurasian milfoil	Alma, Burr Oak, Findley, Jefferson, Kiser, Logan
Nymphea odora Fragrant waterlily	Alma, Guilford, Jefferson, Kiser
Nuphar luteum Spatterdock	Alma, Indian, Loramie
Certophyllum demersum Coontail	Findley, Jefferson
Elodea canadensis Common eldodea	Findley, Jefferson
Nelumbo lutea American lotus	Burr Oak, Cowan
Potamogeton crispus Curly pondweed	Findley, Jefferson
Najas minor Prickley naiad	Pike

The ground level photography was accomplished using Ektachrome ASA 100 film. Kodachrome 64 film was tried. However, the Ektachrome film color saturation in the blue and green colors made it the more satisfactory film.

Aerial Photography

Near vertical 35mm photography was obtained of the lake areas in the harvesting program. Mid-September was selected for the season to photograph the lakes. That way harvesting would be over but the vegetation would still be growing. The camera was mounted in a through-the-floor configuration on a Cessna 172. Flight lines were planned to produce total coverage in one pass over the lake. Intentional 60 percent overlap was photographed along the flight line to assure coverage and to provide stereoscopic viewing if desired.

Ektachrome ASA 100 film with a haze filter was used and the photographs were underexposed by one f-stop to get better film density. Color

infrared film was considered for this project but rejected after inspection and because other studies did not recommend its use (Douglass 1973).

Each lake was flown at a predetermined scale. Two lakes were photographed at a representative fraction of 1:20,000, two at 1:30,000, and the rest at 1:40,000. To save money each lake was not flown at all scales. However, the different scales could be compared for effectiveness in locating, identifying, and mapping the aquatic vegetation over the entire project.

Base maps of the lakes were provided by ODNR. Selected frames of the 35mm photography that covered the areas harvested were projected onto the base maps. The interpretation and the mapping was done directly on the base maps thereby eliminating the step of transferring the interpretated data to a map.

Results

Introduction

As of this point, ground photography and water nutrient data have been collected for 1988 and 1989. Aerial photo coverage was taken in 1989. The results here represent the initial development phase of a longitudinal study and the effectiveness of the 35mm based aerial photo interpretation system in identifying and mapping the areal extent of the aquatic vegetation in the treated lakes.

Photo Interpretation

The photographs were projected onto the base maps and interpreted. The underexposing to achieve better density did not work out as an aid to interpretation. In the case of the darkest photos, interpretation of the submerged vegetation was very difficult. Most of the photos were close enough to the correct exposure to permit easy interpretation.

Emergent vegetation exhibited enough color differences among the species to allow species separation. Spatterdock shows up as dark green. Fragrant water lily is light green. And American lotus is blue-green. During the preliminary interpretation, a previously unknown infestation of American lotus was identified in a lake where the ground control had not recorded it.

The submerged vegetation could be located and mapped but it could not be separated by species. The submerged vegetation had begun to lose its color by the mid-September photo date. A mid-August photo mission might pick up more reflectance and help with species identification

The larger scale was the easiest scale photography to interpret. 1:20,000 scale photos provided the best pictures for interpretation and mapping. Most of the treated lake areas are upstream in the coves and narrow aras of the lakes where the access points are. Therefore, the smaller area covered by the 1:20,000 scale still permits complete coverage of the treated areas in one flight line if it is properly oriented.

Mapping

Vegetation information was transferred to base maps by matching the slides onto the base maps with a standard slide projector. Matching the shoreline on the slides with the shore line on the maps was easier and more exact than was anticipated. Photo displacements and distortions were not large enough to be noticeable. The state supplied maps were true enough to allow complete registration of them with the projected photographs.

Aquatic growth in the treated areas of the study and control lakes were mapped. Emergent vegetation was classified by species but submerged vegetation was not. Also, the dump sites for the harvested vegetation were mapped as they occurred around the edge of the lakes to track any influence that they might have on future aquatic weed infestations.

Costs

Based upon the costs incurred in the study to collect and to analysis the data, a projected annual cost for this project has been developed. In summary, the costs to complete this study in Ohio averages out to a cost of $307.00 per lake per year. Approximately two thirds of that cost is for obtaining the aerial photos. In a state the size and shape of Ohio, travel costs and employee salary per lake were a very low $45.50. Approximately one hour is needed on site to sample each lake. Travel time will depend upon the relative locations of the lakes being studied. In this study a total of five working days should cover all the lakes for sampling. Photointerpretation of each treated lake takes approximately one hour.

Conclusion

Mechanical harvesting may prove to be an effective means of aquatic vegetation control in problem areas of Ohio State Park lakes. However, several years of monitoring the affect of the program will be needed to ascertain if any measurable changes take place that can be attributed to the mechanical harvesting.

The results of this study indicate that the Division of State Parks could establish a longitudinal monitoring and mapping program to oversee the mechanical harvesting program for a reasonable cost per lake. When compared to the cost of running the $87,000 harvester for $37.50 throughout the growing season, a little over $300 per lake can be considered to be a reasonable cost.

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AESTHETICS OF THE NORTHEASTERN FOREST: THE INFLUENCE OF SEASON AND TIME SINCE HARVEST [1]

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Individuals owning small woodlots have different management objective than corporate owners. Important among these is the forest's aesthetic value. This study investigates the effects of season and the time since harvest on the scenic quality northern hardwood sites. The seven sites studied range from one to thirteen years since being partially cut. Two controlled non-overlapping plots were photographed at each site during each season. Scenic quality evaluations of these scenes indicate that there is a cycle of change in scenic value after a woodlot is harvested. In addition, scenic evaluations are effected by both the season represented in the scene and the season during which the evaluation is made.

Introduction

To own a piece of land has become a permanent part of the American dream. Private individuals own approximately 60 percent of the U. S. commercial timberland. A major portion of these owners hold small woodlots. These woodlot owners are likely to place a high value on the amenity resources their land provides them: scenic quality, wildlife recreation, nature study, and the like.

For several reasons, individuals owning small woodlots are also less likely to place a high value on timber potential. Their land may be too small to divide into compartments that could be commercially harvested in rotation. When faced with the commercial decision to harvest their total holding, small owners may reasonably become concerned about the retention of their amenity values. It can be expected that many small land owners lack accurate information about these effects. A very large percentage are businessmen or professionals without significant experiences with the effects of woodland management. This is particularly true in the urbanized Northeast. Their knowledge must necessarily be based on the cursory observation of sites they recognize as having been harvested; normally these would be recently harvested sites. Therefore, it is reasonable for them to take a cautious approach to protecting the amenity resources they feel are important to their well being. While it may be reasonable for government or corporate owners to accept 75 year rotations when managing their holdings, the typical adult woodlot owner has a much shorter personal life cycle during which she must reap whatever amenity values her land can provide. Page (1973) summarizes this perspective as follows:

> But for the small landowner, the biggest factor in the acceptance of harvesting and management involves a combination of his concept of good utilization and the maintenance of an aesthetic appearance.

It is worth noting that Page is not an academic, but a forester working in Western Massachusetts.

The significance of woodlot owners has been recognized for some time (Christenson 1956). However, research tends to focus on the characteristics of landowners that are most favorably disposed toward timber harvesting (Royer, et al. 1983). The policy implied by this research would direct outreach efforts to encourage more of these owners to harvest their timber. An alternative research approach seeks to understand the value of woodlots to their owners and investigates the effects of harvesting on the amenity resources owners value so highly. The policy implied by this alternative provides landowners who typically would not be candidates for timber harvesting with more accurate information about the probable effects on the amenity resources they value most. The research reported here contributes to this alternative approach. It focuses on the seasonal scenic quality effects after various lengths of time since harvesting.

Small landowners will be most concerned with the visual effects from within their harvested woodlot. However, most research investigates the effects of harvested areas as seen in the middle or far distance (Chenoweth & Gobster 1986; Yoemans 1986). In addition, most research has been conducted in coniferous forests of the West, while a significant proportion of small landowners are from

[1] I thank Jeffry E. Penneston and Robert M. Sanford for their assistance in conducting this research project. This research was sponsored in part by the McIntire–stennis Cooperative Forestry Research Program of the Forest Service, U.S. Department of Agriculture.

the urban Northeast. Rutherford and Shafer (1969) studied the scenic value of uncut and 10- to 12-year old selection cut areas in Adirondack hardwood and softwood stands. Respondents from several diverse groups consistently preferred the cut to the uncut softwood scenes, while the cut and uncut hardwood scenes were equally preferred. Nyland's (1976) study of northern hardwoods in Central New York had inconclusive results concerning scenic value. However, the general trend seemed to be toward a preference for partial cutting rather than clearcut patches or strips, and a general negative sensitivity to the messy appearance of slash. Brush (1979) evaluated the scenic value of forested sites having various spatial characteristics, ranging from an open four-acre clearing bounded by a wall of trees to a dense popular thicket. He found that thinned well stocked stands were preferred over stands with noticeable recent harvest activity or dense overstocked stands. Hamilton et al. (1973) had similar findings from a survey of Central New York landowners. Both Brush and Hamilton conclude that there is a significant potential to improve forest scenic quality through active forest management.

Finally, owners will also be concerned with the effects of harvesting throughout the year, while research has focused almost exclusively on full foliage summer scenes. Calvin (1972) reports using scenes from all four seasons, but seasonal effects were not systematically investigated. Buhyoff and Wellman (1979) in a reanalysis of fall and summer scenes tentatively found seasonal differences, as well as an evaluation bias related to the time of year in which the evaluations were made. However, seasonal effects are not usually reported in the literature. For instance, Hamilton (1973) failed to comment on the mix of seasonal scenes shown in the photographs of his report.

Methods

Seven northern hardwood sites are investigated. They were harvested with partial cuttings resulting in basal areas of between 50 to 90 square feet per acre. The sites range from one to thirteen years since harvest; a length of time within which an adult may reasonably expect full recuperation of any lost amenity resources. Two permanent plots were established on level areas of each site to allow the same views to be photographed during each season of the year. Photographs were taken on overcast days to minimize highly contrasting shadows. A single-lense reflex camera with a 35mm lense and Kodachrome film was used. The conditions represented by the four seasons are full-leaf summer, partial fall color, snow covered winter, and leafless spring.

A ten point rating scale was used to measure scenic value. College juniors majoring in landscape architecture or environmental studies evaluated the scenes twice during the calendar year; once each season they evaluated those 14 scenes photographed during that season, and in early spring they evaluated all 56 scenes from all four seasons concurrently.[1] Between 89 and 111 students evaluated these scenes during each session; of these 27 students were identifiable as having evaluated all the scenes in all five evaluation sessions. Raw scores are used in the analysis in keeping with Schroeder's (1984) finding that "simple mean ratings produced results almost identical to more complicated scaling methods."

These data are used to conduct a balanced design analysis of variance investigating the scenic value relationships among:

- 4 seasons;
- 7 sites representing different lengths of time since harvest;
- 2 plots for site;
- 27 evaluators of scenic quality; and
- 2 evaluating sessions per scene, once in-season and the other concurrently.

In addition to these main effects, the interactive effects among season, time since harvest, and evaluators are investigated. The classic analysis of variance model is used in which all the effects are treated as fixed.

Results and Discussion

The results of the analysis of variance are presented in Table 1.

Time since harvest and plot replication. Each of the seven sites represent a different length of time since harvest. While there is a highly significant difference among these sites, the lack of significance attributable to the plot replications indicate that evaluators are responding to site attributes rather than idiosyncratic characteristics in the photographs. The length of time since harvest and mean scenic value for each of the sites is

[1] Concern is frequently expressed by some about the use of students as evaluators. In forest scenic quality studies, students are normally found to have judgements similar to landowners or the general public (Brush 1979; Daniel & Boster 1976).

TABLE 1. An investigation of the effects of season and time since harvest on scenic value.

Source	Sums of Square	*df*	*F*	Signif.
Total	5802.9	757	3.6	.0001
Error	4866.7	2266		
Main Effects				
Time since harvest	411.7	6	32.0	.0001
Plot replication	1.3	1	0.6	.4428
Season	847.9	3	131.6	.0001
Evaluators	1670.6	26	29.9	.0001
Rep. of evaluation	25.6	1	11.9	.0006
Interactive Effects				
Season x Time	536.5	18	13.9	.0001
Season x Evaluator	869.5	78	5.2	.0001
Time x Evaluator	454.2	156	1.2	.0030
Sea. x Time x Eval.	985.6	468	1.0	.6016

presented in Table 2. A comparison of these means using the Scheffé test indicates that scenic value is low after harvest (1 to 3 years), but increases while the view remains open and slash degrades (4 to 6 years), and then slowly decreases as young growth becomes dense enough to obstruct the view (8 to 13 years). The mean scenic values in Figure 1 are from the in–season evaluations only. They show how well this general trend is summarized by a cubic curve.[1]

TABLE 2. Mean scenic value of various lengths of time since harvest.

Years since harvest	Mean scenic value	Scheffé test	
1	6.14	**	
3	5.91	**	
4	6.75		**
6	6.85		**
8	6.02	**	
12	5.88	**	
13	6.11	**	

Note. The Scheffé test provides a conservative indication that mean scenic values with an ** in the same column are not significantly different from each other at alpha = .05.

[1] The least–squares estimate for this cubic curve is $y = 5.11 + 0.78x - 0.12x^2 + 0.01x^3$, where y = scenic value and x = time since harvest; the multiple correlation coefficient R = 0.21. This analysis was made using Cricket Graph (Rafferty & Norling 1986).

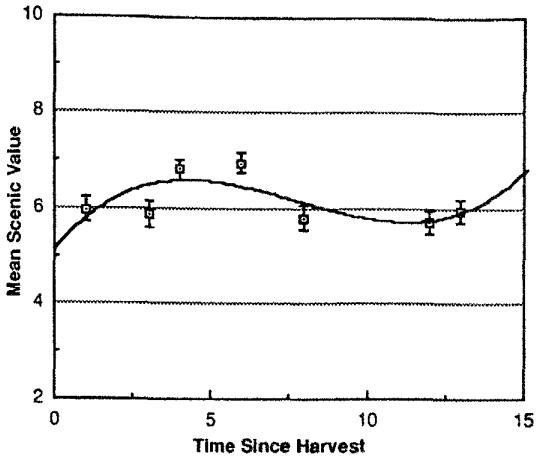


Figure 1. Mean scenic value bracketed by 95 percent confidence intervals for sampled times since harvest.

Season and evaluation replication. The scenic variations attributable to seasonal changes are highly significant, even though the view at each plot was carefully controlled to be the same each time it was photographed. The mean scenic values presented in Table 3 are both for the scenes as evaluated during the represented season and when evaluated concurrently during the spring. When scenes are evaluated during the same season in which they were photographed, winter views are thought to have the highest value. They are followed by summer and fall scenes, which do not have significantly different mean values. Finally, spring scenes have the lowest scenic value. It may be surmised from the general guidelines about woodland view preferences found in the literature (e.g. Hamilton et al. 1973; Nyland et al. 1976) that the snow covered scenes are preferred because of their clean, crisp appearance. The winter scenes are relatively open yet the trees give a sense of enclosure. While the full–leaf summer and fall color scenes are more cluttered, their lush and intense color makes them desirable. The leafless condition of the spring scenes causes them to be more cluttered and colorless; therefore least desirable.

The concurrent ratings of all the seasonal scenes was made on a sunny mid–March day. In this evaluation the summer scenes are given a significantly higher mean scenic value, followed by the fall and winter scenes which are not significantly different. This shift in evaluation issimilar to that

TABLE 3. Mean seasonal scenic values from in–season and concurrent evaluations.

Seasonal character	In–season mean	Scheffé test			Concurrent mean	Scheffé test		
Full–leaf summer	6.28		**		7.21	**		
Fall color	6.05		**		6.39		**	
Snow covered winter	6.60	**			6.61		**	
Leafless spring	5.66			**	5.11			**

Note. The Scheffé test provides a conservative indication that mean scenic values with an ** in the same column are not significantly different from each other at alpha = .05.

found by Buhyoff and Wellman (1979):

> If the photographs in a given test include scenes taken in different seasons of the year, expressed preferences may be biased toward one or another season, depending on the time of year in which the test is made.
>
> It is possible that the seasonality effect can be explained in terms of a novelty mechanism. People tired of winter are aroused by stimuli associated with the impending spring, . . .

It is clear that there are significant differences in the seasonal scenic value of scenes. However, it appears that viewer ratings are also affected by the season during which they make their evaluation as well.

Evaluators. There are also significant differences in the overall mean ratings for all scenes. Researchers normally focus on differences among groups of evaluators and rarely evaluate individual differences, probably because they typically are not explained by any simple patterns. One possible explanation for individual differences is that the evaluators used the 10–point rating scale quite differently. An investigation of the responses summarized in Table 4 shows that the mean of the evaluators' ratings was 6.24 with a standard deviation of 1.69, while the mean for each evaluator's ratings ranged from 4.90 to 7.74 with standard deviations between 0.96 and 2.28. Overall, the ratings are skewed toward the high value end of the scale. The measure of kurtosis is moderately flatter, or more even than a normal distribution. One individual had a very peaked distribution (kurtosis = 2.13), the result of concentrating over 90 percent of his ratings between 6 and 8. Each of the 27 evaluators assigned 112 ratings. Fifteen or 55 percent did not use the lowest rating, 41 percent did not use a rating of 2, 15 percent did not use 3, and 4 percent did not use 4 or 5. On the high end of the scale, a third failed to give a rating of 10 and 7 percent did not use the rating 9. These variations

TABLE 4. Summary of individual evaluator's ratings.

	Individuals		
Characteristic	Mean	Minimum	Maximum
Mean rating	6.24	4.90	7.74
Standard deviation	1.69	0.96	2.28
Skewness	–0.21	–0.90	0.63
Kurtosis	–0.22	–0.99	2.13

from the normal are generally not considered cause for concern in data analysis (Nunnally 1978; Sokal & Rohlf 1969).

It is possible to adjust the ratings of individuals to control for the different ways they use the rating scale (Daniel & Boster 1976). When an individual's 112 seasonal ratings are standardized they have a mean of 0.0 and a standard deviation of 1.0. If the analysis of variance model is recalculated, the variation attributable to the evaluators is controlled and the effects of plot and evaluation replication are insignificant. However, variation due to season ($F = 162.7$, $df = 3, 754$, $p = .0001$) and time since harvest ($F = 38.9$, $df = 6, 751$, $p = .0001$) remain significant. This result indicates that there are real differences among the scenic value attributed by each evaluator to these scenes.

Season and time since harvest interactions. While both season and time since harvest have a significant effect upon scenic value, the analysis of variance indicates that they also have a significant interactive effect. Figure 2 shows the mean scenic value of time since harvest for each season as calculated from the in–season evaluations. The general pattern summarized by the cubic curve in Figure 1 is also evident to varying degrees in these seasonal graphs: a low initial scenic value, rising in years after harvest, and then dropping off as revegetation obscures the view. This pattern is particularly evident in the fall and spring and is accentuated by the greater variation in scenic value

over time. The summer and winter have less variation in mean scenic value. Their correspondingly flatter patterns may result from the concealment of slash by herbaceous vegetation in the summer and snow in the winter.

Conclusions

The northern hardwood forest is a complex and varied environment that offers foresters an exciting management challenge, particularly when its structure is uneven aged. Previous research has indicated that the relation of scenic quality to harvesting in northern hardwood forests is also more complex than had been previously found in western coniferous forests. The results of this study clearly indicate that there is a cycle of change in scenic value after a woodlot is harvested.

Research implications. This study has several findings that reflect on the future conduct of forest aesthetics research.

1. The scenic value of a site may vary throughout the year. Researchers tend to investigate full-leaf summer scenes. In many, perhaps most, circumstances sites will be seen year round and viewers will be interested in the year round scenic value. If applied aesthetics research is to become more responsive to the forest as seen year around, then seasonal scenes must be represented.

2. When people evaluate scenic quality, they do so within their present seasonal context. Researchers tend not to consider the time of year they ask individuals to evaluate scenes, nor the interactive effects between the season of the evaluation and the season of the scene. It should become standard practice that scenes are evaluated during the season in which they were taken. If this is not possible, then the season of both the scenes and evaluations should be reported.

3. Researchers tend to investigate differences in the mean evaluations made by groups. This report reminds us that there may also be significant variation among individuals within a group. If this variation is large enough, the researcher should evaluate whether there is more than one group, or whether there is any meaningful group.

Management implications. If foresters are seriously interested in obtaining timber from and managing small woodlots, then they must address the aesthetic sensitivities of the owners. It will be a

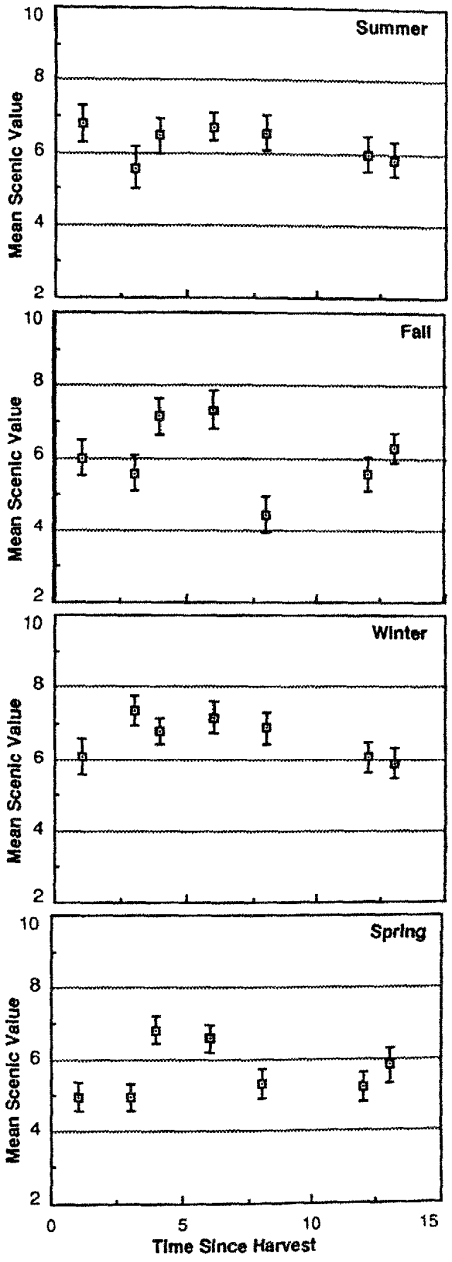


Figure 2. Seasonal mean scenic values with 95 percent confidence intervals for scenes of the same season.

significant task to communicate the potential benefits of forest management to these cautious clients. However, the results of this and other research suggest that timber harvesting need not devastate scenic quality (Brush 1979; Hamilton 1973; McGee 1970; and Rutherford & Shafer 1969). Quite the contrary, an opportunity exists for scenic quality to be enhanced through appropriate management. At a minimum, timber harvesting practices can be adjusted to mitigate negative visual effects.

The usefulness of color photography to record seasonal forest scenes has been demonstrated by this and other research. It now seems appropriate that this technique be transferred into practice as a communication tool for foresters. For instance, a photo series illustrating various management activities over time could be produced to help landowners visualize the effects to their woodlot. Each series could include seasonal scenes and a range of times after the activity. In addition, each scene could be accompanied with perceptual data such as reported here, and environmental data useful for forest management. A similar technique has proven effective in the evaluation of forest residues in the West (Maxwell, W.G. and F.R. Ward 1980).

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FACTORS INFLUENCING POSTING OF PRIVATE NONINDUSTRIAL FORESTS IN THE NORTHEAST

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This study analyzes the relationships between posting, and both, forest and ownership characteristics for 258 privately owned parcels in Vermont. The results suggest that, although much private forest is not currently posted, concern is warranted. Increases in forest fragmentation, residential construction, education levels and age of owners, and the percentage of professional landowners all point to additional posting of private lands.

Introduction

Recent trends in population, age structure, time available for leisure, and discretionary income indicate that the demand for outdoor recreation will continue to rise (USDA For. Serv. 1989). However, a steady decrease in the acreage of private lands open to the public has accompanied these trends. Unless this can be reversed, the availability and quality of outdoor recreational opportunities may deteriorate, particularly in the East.

Statistics on the per-capita availability of public land suggest that there is a great disparity in the availability of many kinds of outdoor recreation opportunities between eastern and western United States. The East supports approximately 80 percent of the nation's population but contains only 5 percent of federal recreation lands (USDA For. Serv. 1989). Even with the addition of state and other public lands, the disparity remains. Current demands are stretching the capacity of some public lands.

Use of the East's abundant private lands for outdoor recreation could ease this disparity. However, the portion of nonindustrial private land open for public recreation decreased from 29 percent in 1977 to less than 20 percent in 1986 (USDA For. Serv. 1989). Fears of property damage, liability, and loss of privacy are among the reasons given for posting to limit public access. Forest industry is also placing more control, and in some cases limits, on public access to lands that have been traditionally open for recreational use.

This study identified characteristics that influence whether forest land will be posted or not. Insight is provided by analyzing an empirical model that examines the relationship between posting and variables that measure characteristics of the land, owner, and surrounding community. The results are useful for assessing the implications of forest fragmentation and changes in the characteristics of the land-holding population on posting.

Data and Methods

Forest and ownership data were collected by the USDA Forest Service in its periodic survey of Vermont (Widmann and Birch 1988; Frieswyk and Malley 1985). Information on posting and landowner characteristics were obtained from a questionnaire sent to the owner of each plot sampled in the statewide forest inventory. Plots owned by organizations or businesses were excluded so that the effect of individual owner characteristics, such as education, could be analyzed. This left 258 observations of individually owned nonindustrial private ownerships in Vermont.

A binary choice model (probit) was used to analyze the owner's decision about posting. Judge et al. (1982) and Aldrich and Nelson (1984) provide detailed discussions of probit models. The model can be used to estimate the probability that land with a given set of characteristics will be posted and to estimate how changes in the selected explanatory variables will influence that probability.

Results

Table 1 provides definitions for each variable, Table 2 shows the regression results, and Table 3 shows the marginal responses and elasticities evaluated at the mean values for the explanatory variables.

It appears that additional posting will accompany fragmentation of the forest into smaller parcels. A negative relationship was obtained between the probability of posting and the natural logarithm of size of ownership. All else equal, larger parcels were less likely to be posted. However, it is important to remember that these analyses did not include forest industry. There has been a large increase in the amount of industrial lands that are closed to the public (USDA For. Serv. 1989). A preliminary regression of data that included industrial holdings supported that conclusion by yielding a positive correlation between industrial ownership and posting.

Public access may be further decreased as more residences are built in rural forested areas. Shorter distances between the owner's home and the forested parcel were correlated with an increased probability of posting. Perhaps concerns over privacy and personal safety motivate many landowners to post their land.

Table 1. Definition of Variables

Variable	Definition
POST	Dependent variable, coded 1 if landowner posts land and 0 otherwise
Log (SIZE)	Natural logarithm of the number of wooded acres owned
ED	Years of formal education
AGE	Age of landowner (years)
DIST	Distance from owner's residence to nearest portion of forestland (miles)
PRO	Variable, coded 1 if owner is employed in a white collar or professional occupation and 0, otherwise

Table 2. Probit Results

Explanatory variable	Coefficient	Standard error	Mean of variable Did post	Did not post
Constant	-2.3971***	0.6805	--	--
Log (SIZE)	-0.1466**	0.0684	4.67	5.03
ED	0.0791***	0.0295	15.61	14.12
AGE	0.0201	0.0081	58.03	56.29
DIST	-0.0013*	0.0074	39.08	99.58
PRO	0.3244	0.2036	0.52	0.38

N = 258

LIKELIHOOD RATIO STATISTIC = 23.24

***Significant at 2-percent level
**Significant at 5-percent level
*Significant at 10-percent level

Several landowner characteristics also appear to influence posting. Both the landowner's age and education level were strongly correlated with posting. Each correlation was positive and statistically significant at the 2-percent level. A positive but weaker (p=11%) was found between the probability that the parcel was posted and the owner's employment in a white collar or professional position.

Trends in these variables may have a significant effect on the future availability of private lands for recreation. The percentage of older landowners is expected to increase as the baby boom generation ages. Education levels are also increasing. Approximately two-thirds of Vermont's individually owned forest land is held by owners who have attended college and almost one-third is held by owners who are employed in professional or white collar occupations (Widmann and Birch 1988).

Other variables were examined but were not statistically correlated with posting. Land characteristics, such as timber volume, species composition, or proximity to a maintained road did not appear to effect the probability of posting. Similarly, no correlation was found between posting and many landowner characteristics, such as tenure of ownership, retirement status, or whether the owner was brought up on a farm or in a large city.

The estimated probability that a parcel was posted was 0.21, evaluated at the mean values of the explanatory variables. The marginal responses and elasticities, also evaluated at the sample means, are shown in Table 3. Elasticities measure the percentage change in the probability that a parcel is posted resulting from a 1-percent increase in an explanatory variable. Estimated elasticities of approximately 1.6 indicate that changes in the ages or education levels of landowners are likely to have a greater effect on posting than equivalent percentage changes in the other explanatory variables.

Conclusion

Increasing population and participation rates are stretching the capacity of some public recreation lands. Overuse can detract from the quality of the recreational experience for all users and may cause long-term site damage. This is particularly troublesome in the highly populated East, which has a lower per-capita availability of public land than does the West. Private lands may be the key to meeting future demands for some types of outdoor recreation.

Landowner surveys (e.g. Widmann and Birch 1988) and the empirical results of this study (estimated probability of posting equals 0.21) indicate that much individually owned private land is not currently posted. However, recent increases in posting of industrial ownerships and the estimated effects of a continuation in trends for the explanatory variables used in this study suggest that concern is warranted.

Increased fragmentation of the forest, residential construction, education levels and age of owners, and the percentage of white collar landowners, all point to additional posting of private lands. Programs that provide relief from property taxes for parcels that are open to the public may be effective in reversing the effect of these trends. Legislation that protects owners from liability suits may also discourage additional posting. The effectiveness of these programs will, to a large extent, depend on the respect that users show to the land and owners. Educational programs may be crucial in developing this respect.

Table 3. Marginal Responses and Elasticities Evaluated at the Mean

Variable X	Marginal Response	Elasticity
LOG (SIZE)	-0.0419	-1.000
ED	0.0226	1.579
AGE	0.0057	1.573
DIST	-0.0004	-0.156
PRO	0.0928	0.186

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PASSIVE TRAIL MANAGEMENT IN NORTHEASTERN ALPINE ZONES: A CASE STUDY

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Scree walls were constructed in 1977 to minimize hiker impact of alpine vegetation on Franconia Ridge, NH. The scree walls were effective in protecting alpine habitat from hiker trampling and in permitting natural revegetation. Haircap moss (*Polytricum juniperinum* var. *alpestre*) and mountain sandwort (*Minuartia groenlandica)* dominated revegetation of the disturbed areas. Scree walls create a protective microhabitat for alpine vegetation. Questionnaire results showed 87% of the hikers felt the scree walls effective and 80% felt them unobtrusive. Well maintained rock cairns, paint marks and educational signs complement the scree walls. The removal of rocks for scree wall construction must be done selectively. Scree walls offer excellent long term passive trail management with minimal annual cost.

Introduction

Recreational hiking and backpacking in the mountains and alpine areas of New York, Vermont, New Hampshire and Maine increased dramatically in the early 1970's. One mountain range in particular that received significant use during this time was the Franconia Ridge in the White Mountain National Forest, New Hampshire. Counts of 400 plus people were documented hiking the section of Appalachian Trail that traverses the ridge, on a single weekend day (Snyder, 1974). This use level has continued with minor fluctuations to date (Waterman pers. comm., 1989).

Prior to 1977, the trail located in the alpine zone of Franconia Ridge, had a poorly defined treadway. The many hikers and backpackers using the ridge trail generally did not follow a single path and tended to wander "off trail". This hiking pattern resulted in trampled alpine vegetation and extensive soil erosion. Several sections of multiple parallel trails developed 10 to 15 meters in width (Snyder, 1974).

In response to this impact, the USDA Forest Service and Appalachian Mountain Club Trail Crew constructed low rock walls (scree walls) bordering both sides of the entire ridge trail. The objective of this technique was to define the width and direction of the trail in order to prevent additional hiker impact and to promote revegetation in the heavily disturbed areas. Twelve years after construction, we studied the efficacy of the scree wall technique for protecting alpine habitat adjacent to the ridge trail.

The objective of this study was to quantify the effectiveness of scree walls in protecting and revegetating alpine habitat damaged by hiker trampling in the eastern United States. The study compares the vegetative cover of disturbed alpine habitat between the pre-scree wall condition in 1975 and the condition 12 yrs after scree wall construction, in 1989. Incorporated in the study was a hiker questionnaire developed to learn user opinions of scree wall effectiveness and degree of aesthetic obtrusion. Individuals that constructed and maintained the scree wall were interviewed for pertinent management information.

Description of Study Location

The trail and adjacent area under study was 2.7 km in length and ran along the spine of the steep sided, generally north - south

oriented Franconia Ridge, White Mountain National Forest, New Hampshire.

Located exclusively in the alpine zone, the ridge trail rises over the summits of Mt. Lafayette (1605 m), Mt. Lincoln (1553 m) and Little Haystack Mountain (1376 m). The ridge has many rock outcrops and a mixture of flat and sloped terrain. The ridge trail is part of a 13 km loop (approximately 6 - 8 hr hike) that is easily accessed by either the Old Bridle Path or Falling Waters trails. The trailhead for this hiking loop is located on Interstate 93 in Franconia Notch State Park.

The climate is characterized as subarctic; including high winds, low temperatures, frequent ground level clouds, heavy icing and dramatic weather changes. The most common vegetative community type of the Franconia Ridge alpine zone is the dwarf shrub heath-rush association, dominated by *Juncus trifidus*, *Potentilla tridentata*, *Vaccinium vitis-idaea*, and *V. uliginosum* (Marchand and Roach, 1980). Other common species are *Carex Bigelowii*, *Arenaria groenlandica*, and *Diapensia lapponica*. The latter two species along with a moss, *Polytricum juniperinum* var. *alpestre*, were frequently found on bare mineral soils. Various species of lichen within the genus *Cetraria*, were found in both barren and vegetated areas.

The narrow band of alpine vegetation along the Franconia Ridge is probably an artifact of strong winds that blow the protective snow cover from the ridge crest. Combined with mechanical ice damage, tree growth is inhibited, allowing for colonization by an alpine plant community.

Methods

Vegetation Transects

In 1975, 31 permanent transects were established with the purpose, in part, to measure the amount of vegetation adjacent to the Franconia Ridge trail before and after scree wall construction. The transects were located perpendicular to the ridge trail at approximately 25 m intervals from the summit of Mt.Lafayette to the summit of Little Haystack. The length of each transect varied between 6 and 14 meters as determined by the local topography. Each transect crossed a defined gradient of relatively low disturbance, adjacent to the main treadway (section C) through an area of high disturbance, the main treadway (sections A & B) returning to another area of low disturbance (section C) (Fig. 1).

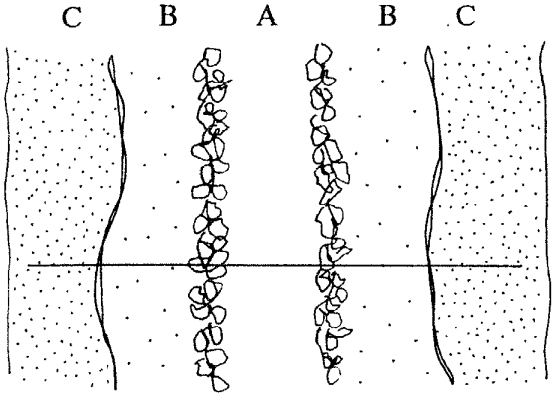


Figure 1. Aerial view illustration of Franconia Ridge Trail segment showing trail treadway with scree walls (section A), high hiker impact area (section B) and low hiker impact area (section C). Horizontal line represents a trail transect.

In 1975, vegetation and soil type cover were measured using the line intercept method for all 31 transects. In 1989, twelve years after scree wall construction, 13 of the 31 transects were relocated and vegetative and soil type cover measurements were repeated similar to the 1975 technique. Although only 13 transects were usable in 1989, they were representative of the different types of disturbed areas.

Quantitative comparisons of vegetative and soil type cover between 1975 and 1989 were based on the different levels of disturbance along each transect. Each transect was divided into three sections for analysis (Fig. 1):

Section A - area of high hiker impact that includes scree walls and present defined trail treadway.

Section B - area adjacent to section A where high hiker impact occurred before scree wall construction, but low hiker impact after scree wall construction.

Section C - outer area most distant from the trail treadway with low hiker impact both before and after scree wall construction.

Sections B and C, each had an east and west side for each transect. No differences in vegetative cover between the east-west gradient was apparent. Therefore, the data collected for both sides were pooled by section for analysis.

Some change in cover measurements from 1975 to 1989 is attributable to sampling error inherent to the line intercept method in a relatively diverse community type. Additional error is caused when measurements are collected by different people at different times. These may constitute a minor portion of the documented change in vegetative cover.

Hiker Questionnaire

Franconia Ridge Trail hiker opinions of scree wall effectiveness and its impact on their backcountry experience on Franconia Ridge was measured by a questionnaire. The questionnaire was administered at the AMC Greenleaf Hut located on the shoulder of Mt. Lafayette on a voluntary basis during June through August 1989. Hikers completing the questionnaire, as a prerequisite, must have hiked the Franconia Ridge Trail earlier that particular day. A total of 334 questionnaires were completed.

Interviews

We interviewed people involved in the actual design, construction and maintenance of the scree wall. Background information related to the consideration of management alternatives in controlling trail problems, and what steps and precautions were made to organize and implement scree wall construction was recorded. We addressed positive and negative aspects of the scree wall technique as related to cost effectiveness, user opinion and construction. Information was available relative to the maintenance and follow-up work required after actual construction.

Results and Discussion

Alpine vegetation is morphologically and physiologically adapted to survive the extreme climatic conditions of the alpine zone (Daubenmire, 1941; Billings, 1974), in addition to low soil nutrient concentrations, short growing seasons and ground frost heaving. However, alpine vegetation is not well adapted to trampling from great numbers of people (Billings, 1974; Brown et al., 1978).

The extensive disturbance to vegetation along the Franconia Ridge Trail in the early 1970's was due to a high level of hiker use and inadequate trail definition (Rajala pers. comm., 1989). Prior to 1977, existing trail markers, paint and rock cairns, were not promoting a single narrow treadway. Given this situation, the ridge trail was reconstructed.

Scree walls (low rock walls) were chosen as the primary trail marking technique with the objectives of establishing a narrower treadway, stabilizing the ridge trail and permitting alpine revegetation outside of the scree wall. In 1975, two years before scree wall construction, the average width of the ridge trail was 3.6 $\pm$ 1.2 (SD) meters. The average width of the ridge trail in 1989 was 2.1 $\pm$ 0.9 (SD) meters. This was a significant decrease in trail width of 1.5 $\pm$ 1.3 (SD) meters (paired t-test; $n = 13$; $p = 0.003$).

No surveys were conducted to estimate the number of hikers crossing over the scree walls and out of the Franconia Ridge trail treadway during the past twelve years. However, this passive technique contributed

in preventing 90% of hikers from entering the primary habitat of *Potentilla robbinsiana* during the summer 1980, on the Monroe Flats, Mt. Washington (Taylor, 1981).

Vegetation Recovery

Studies on the recovery of alpine vegetation on sites disturbed by trampling have concluded that natural revegetation is possible, however, it may be a slow process (Willard and Marr, 1970; Roach and Marchand, 1984). Most likely, revegetation in the areas adjacent to the ridge trail occurred over a twelve year period, beginning after the scree wall construction in 1977.

Section A - Trail Treadway. Not surprisingly, the trail treadway was relatively barren both before and after scree wall construction (Table I). Vegetative cover in 1975 was 3% and in 1989, the cover was 2%. The lack of change in vegetative cover is attributed to the concentration of hiker trampling in the treadway both before and after 1977.

Table I. Line intercept cover of vegetation (cm) for transect section A (treadway) with high hiker impact before and after 1977 for transects surveyed in 1975 and 1989.

Transect	Linear Distance of A in 1975 & 1989	Cover of Vegetation 1975 (cm)	1989	Change (+ or -)
T1A	180 cm	.	5	+ 5
T2A	210 cm	20	20	0
T3A	285 cm	5	25	+ 20
T4A	205 cm	5	.	- 5
T6A	175 cm	.	.	0
T14A	275 cm	.	.	0
T21A	45 cm	.	.	0
T22A	.	.	.	.
T24A	410 cm	.	.	0
T26A	225 cm	.	.	0
T28A	175 cm	30	.	- 30
T29A	.	.	.	.
T30A	180 cm	.	5	+ 5

Section B - Previously disturbed area. Following protection, natural revegetation occurred on areas disturbed by trampling (Table II). The heavily disturbed area adjacent to the scree wall, section B, increased from a relatively barren condition of 6% vegetative cover in 1975 to 26% in 1989. Based on the Wilcoxon paired rank test, the vegetative cover for section B in 1989 was significantly greater than in 1975 ($n=10$; $p=0.007$). This degree of revegetation indicates that hiker impact in the area adjacent to the ridge trail has significantly decreased and that eastern alpine vegetation has the ability to naturally recover disturbed sites.

Table II. Line intercept cover of vegetation (cm) for transect section B with high hiker impact before 1977 and low hiker impact after 1977 for transects surveyed in 1975 and 1989.

Transect	Linear Distance of B in 1975 & 1989	Cover of Vegetation 1975 (cm)	1989	Change (+ or -)
T1B	165 cm	20	80	+ 60
T2B	155 cm	10	95	+ 85
T3B	55 cm	5	5	0
T4B	285 cm	40	110	+ 70
T6B	380 cm	50	105	+ 55
T14B	.	.	.	.
T21B	850 cm	.	35	+ 35
T22B	375 cm	.	125	+ 125
T24B	40 cm	.	.	.
T26B	105 cm	.	45	+ 45
T28B	50 cm	30	.	- 30
T29B	250 cm	.	90	+ 90
T30B	330 cm	20	85	+ 65

Section C - Undisturbed area. Alpine plants have existed almost as long as plants and mountains have been together (Billings, 1974). Undisturbed alpine plant communities are relatively stable as documented in the alpine meadow on Mt. Marcy, NY over a 24 year period (Ketchledge and Leonard, 1984). Because section C received minimal disturbance before and after scree wall construction, insignificant changes in vegetative cover was expected. However,

vegetative cover increased from 21% in 1975 to 38% in 1989. Based on the Wilcoxon paired rank test, the vegetative cover for section C in 1989 was significantly greater than in 1975 ($n=13$; $p=0.005$) (Table III).

Table III. Line intercept cover of vegetation (cm) for transect section C with low hiker impact before and after 1975 for transects surveyed in 1975 and 1989.

Transect	Linear Distance of C in 1975 & 1989	Cover of Vegetation 1975 (cm)	1989	Change (+ or -)
T1C	280 cm	35	95	+ 60
T2C	275 cm	105	130	+ 25
T3C	1220 cm	210	439	+229
T4C	170 cm	40	30	- 30
T6C	730 cm	120	160	+ 40
T14C	725 cm	85	365	+280
T21C	298 cm	20	40	+ 20
T22C	380 cm	40	85	+ 45
T24C	360 cm	100	105	+ 5
T26C	340 cm	140	120	- 20
T28C	230 cm	140	180	+ 40
T29C	410 cm	105	275	+170
T30C	140 cm	10	75	+ 65

Not all alpine plant species are adapted to revegetate disturbed areas. Disturbances provide entirely new environmental conditions to which many natives are not adapted (Brown et al., 1978). Revegetation occurred in transect sections B and C. The two species dominating these areas of revegetation were haircap moss (*Polytricum juniperinum* var. *alpestre*) and mountain sandwort (*Arenaria groenlandica*).

Mountain sandwort is considered a pioneering species on disturbed sites (Roach and Marchand, 1984) with optimum reproductive potential. Haircap moss had the greatest cover of the species recolonizing the disturbed sites. Marchand and Roach (1980) also found bryophytes commonly recolonizing abandoned trail sites in the alpine zone. These same two species dominated the increase in vegetative cover of section C, where hiker trampling was minimal. The barren ground in section C was created by the removal of rock material for the scree wall. Hiker trampling was not the cause of disturbance in this section.

The pattern of revegetation is not uniform. The reasons for these spatial differences in recovery are the varying physical factors of topographic exposure and distribution of snow and meltwater, superimposed upon microhabitat (Billings and Mooney, 1968). Additional factors are the sexual and vegetative reproductive success of the recolonizing species and the proximity of populations able to act as seed sources. For example, revegetation occurred immediately outside and within the rock walls as a result of the protection from physical damage such as icing and high winds. The accumulated snow on the lee and to some extent the windward sides of the wall, acts as a protective cover for the vegetation. In effect, a microclimate was created with the scree wall construction, that benefits the recovery of alpine vegetation.

Soil compaction from hikers is probably not a serious long-term problem in eastern alpine habitat. Frequent freeze thaw cycles combined with wind removal of snow pack is a common occurrence (Roach and Marchand, 1984). Consequently, the soils are often disturbed and vertically uplifted due to natural physical processes. Soil movement may pose a threat to the establishment of colonizing plant species.

In summary, 20% of the area void of vegetation in transect section B and 17% of the area freed of rock in section C revegetated through natural processes within a 12 yr period. The revegetation was dominated by colonizing species, and at this time it is unclear as to how long and to what extent later successional species will become established.

Hiker Questionnaire

The objective of the questionnaire was to learn opinions of scree wall effectiveness

and degree of visual obtrusion along the ridge trail. Additionally, we collected information relative to the type, age and experience of the Franconia Ridge Trail hiker in 1989. In summary, the typical hiker on the ridge trail was 30 - 39 yrs of age, on a day hike and hiking the trail for the first time.

Although scree walls remain the first step in controlling traffic in the alpine zone, hikers were still leaving the ridge trail at particular locations (Waterman and Waterman, 1989). Rock cairns, paint marks and educational signs were constructed to complement the scree walls and to help alleviate the problems where the trail became unclear. When asked what the most obvious method used to define the ridge trail was, 47% of the hikers chose rock cairns. Paint marks were chosen by 24%, trail treadway by 20% and scree wall by 19%. The remaining methods were chosen by less than 3%. Rock cairns, paint marks and the treadway are more obvious than the scree walls. When asked if the methods were effective, 87% of the hikers said "yes" and 81% of the hikers felt the methods unobtrusive.

The three techniques criticized the most were paint marks, rock cairns and scree walls. Generally, hikers felt they had positive and negative attributes. The paint marks were "easily seen, but least attractive". The rock cairns were "effective and positive in bad weather", however, "people zig-zag in between them". Scree walls were "like a backyard sidewalk", however, "positive for keeping on trail". Some hikers felt the "trail obvious when you see vegetation".

Management Summary

The reconstruction of the Franconia Ridge Trail was an innovative step towards reaching a balance between controlling hiker disturbance and preserving the backcountry experience in the alpine zone.

When the scree walls were constructed in 1977, a small percentage of the public vociferously objected to the walls' visual obtrusion on the beauty of Franconia Ridge. Trail managers had anticipated the "new look" of the ridge trail and considered the public outcry a reason to possibly forgo scree wall construction. However, the damage to alpine flora was great and the current trail markers were not sufficient.

The reconstruction of the Franconia Ridge Trail was a major operation. Multiple trail crews worked over an 8 - 10 wk period for a total cost of $18,250.00 in 1977. The tally for work done was as follows: 9,600 ft of scree wall; 650 rock steps; 141 ft of water bars; 32 ft of ditches; and 15 step stones. Enough on-site materials in fairly accessible areas existed on Franconia Ridge to abandon expensive airlifting from another location.

Conclusions and Recommendations

We found 18% natural revegetation over 12 years in protected alpine habitats previously disturbed by trampling on Franconia Ridge. After 12 yrs, the revegetation is still dominated by early colonizing species such as haircap moss and mountain sandwort. Scree walls create microhabitats that favor establishment and survival of alpine plants.

Disturbance is inherent when searching for and collecting rock materials for trail work of this magnitude in the alpine zone. A plant and animal species inventory of the area before trail reconstruction is necessary to avoid disturbing rare and/or endangered species. The removal of rocks for scree wall construction must be done selectively. Where rocks provide physical cover for plants, they should not be removed. Rocks exposed in thick mats of vegetation can be removed with less impact to surrounding plant communities.

Incorporate the various scenic rock outcrops and vistas into the trail route, while keeping the challenge in the trail and traffic on solid ground, preferably bedrock. Limit the width of trail and size and placement of the scree walls based on the potential for hiker disturbance to the local area. Maintain the scree wall and trail markers on a regular basis.

Scree walls are effective, particularly when combined with rock cairns, paint marks and educational signs, in keeping hikers within a defined trail treadway. Over time, hikers generally accept scree walls as part of their backcountry experience. Education and information via displays, signs and/or personnel in the backcountry, encourages hikers to stay on the trail in the alpine zone. Scree walls can be expensive to construct, but offer excellent long term passive management with minimal annual cost.

Acknowledgements

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ATTITUDES AND RESOURCE USE: A STUDY OF NORTH COUNTRY CITIZENS

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Abstract

This paper reports on an analysis of attitudes and patterns of resource use of residents of Vermont and New Hampshire's northern counties. Solid waste disposal, population growth and the preservation of agricultural land, and the impacts of development upon lakeshores, wildlife, and rivers and streams were identified as the most serious community problems. This information is then used, along with sociodemographic data, in a multivariate analysis of differences in outdoor recreation use.

Introduction

New Hampshire and Vermont's northernmost counties are heavily reliant on natural resources for their economic base. Here, large land holders, represented by companies headquartered outside the region, have practiced consistent land use patterns, primarily timber extraction. For many decades the relationship between these landowners and the citizens of this region has remained relatively stable. Recently, however, we have seen the beginnings of a drastic change in ownership of these land holdings. For residents, this shift portends a change in traditional access to land-based economic and recreational opportunities.

As a result, the United States government has initiated a study of how best to protect the forest resource of the region. The U.S. Congress authorized $250,000 for this effort, a sum which was to be matched by the four state governments (Harper, 1989). The study's focus was to identify "alternative strategies to protect the long-term integrity and traditional uses of the lands".

However, the identification of strategies to protect land uses also involves the need to focus on the human dimensions of land management policies. Residents of the area may suffer diminished employment opportunities, environmental quality, and recreational access as a result of changes in land ownership or land use.

To understand better the potential human impacts of changes in land ownership and land use in the region, a random telephone survey of Vermont and New Hampshire North Country residents was conducted. The purpose of our study is to report on the attitudes and patterns of resource use of area residents -- their perceptions of community problems, frequency of participation in a variety of outdoor activities, and attitudes toward local and regional planning.

Site Description

By almost any definition, northern Vermont and New Hampshire have a significant, if not dominant, rural character. Lying well beyond the influence of several large metropolitan areas -- Boston, Massachusetts; Portland, Maine; and Montreal, Quebec, Canada -- the region contains some of the most sparsely settled land in New England. Because of its location, demographics, and reliance on land-based resources for both recreational and economic opportunities, this area is well suited to examine how a large scale restructuring of land ownerships may impact local residents.

As of July 1, 1986, the total population of this two-state region was 109,600, which represented an increase of about 2% from the 1980 census population of 107,475. Coos County in New Hampshire actually experienced a net loss of 3.2% during that time, while Lamoille County, Vermont, had the largest population gain, 7.9%. Within the 5 counties selected for the study, there are 114 minor civil divisions. The 1986 populations of these units ranged from a low of 50 in Victory, Vermont, to a high of 12,200 in Berlin, New Hampshire. In 1986, the average population size for communities in this five county area was 961 persons, and only 12 communities had populations exceeding 2,500.

Moreover, these counties are characterized by low per capita income averages. All reported smaller increases in per capita income for the period 1979 to 1985 than did their states, and only Lamoille County, Vermont, was within 10% of the state average. That this region failed to enjoy the kind of economic and demographic expansion experienced by the balance of New Hampshire and Vermont further supports the need for attention to the human impact of a major restructuring of resource allocation within the area.

Its natural resources afford abundant, year-round recreational opportunities. A major section of the White Mountain National Forest, several large state-owned forests, the highest peaks in both states (Mt. Washington, New Hampshire and Mt. Mansfield, Vermont), and the headwaters of many of the states' major rivers including the Black, the Connecticut, the Winooski, and the Lamoille all lie within the boundaries of the study area. The region's spectacular scenery bespeaks the image of quintessential Northern New England.

Residents of the area have enjoyed virtually unlimited access to the vast tracts of forest land owned by paper and logging corporations. The road network supplied by these owners provides egress for a variety of outdoor recreational activities. The importance of these activities cannot be over-emphasized in light of the sparsely populated, rural character of the region.

These recreational amenities have begun to attract increased numbers of vacationers and retirees from the large metropolitan areas within several hours commute. Numerous seasonal camps and settlements have undergone a protracted period of expansion and conversion to year-round homes. The area is increasingly becoming a location for time-sharing condominiums (Kacpzynski, 1989). As a result of these activities, real estate values are rising, especially for land with river, pond, and/or lake frontage.

Within the prevailing economic climate, timber holding companies are reevaluating their long-term land holding strategies. In an economy driven by short-term efforts to maximize return on investment, the traditional, long-term view associated with forest land holdings is no longer the norm. Instead, the short-term real estate value of the land supercedes its natural resource value. Diamond Occidental Forest land sales of more than 400,000 acres in 1988 in the Northern Forest Lands area confirmed the fears of timber industry observers.

Study Design

With the potential for change to large land-ownership, land utilization, and people-to-land relationship changes in the contiguous lands of northern Vermont and New Hampshire, increased impacts of growth and development proximate to one of New England's major recreational areas may occur. In order to assess these impacts, a survey of the indigenous population of the area was undertaken. Using a modified "Total Design" methodology (Dillman, 1978), a telephone survey was designed. Residents of Coos County (New Hampshire) and of Caledonia, Essex, Lamoille, and Orleans counties (Vermont), all part of the larger Northern Lands Study area site, were chosen in proportion to the size of the population of their town. In New Hampshire, 175 interviews were completed and in Vermont 271 interviews were completed.

Surveys were conducted in both states over a six-day period with randomly generated calls, so designed to include both weekdays and weekends. Surprisingly few (less than 3%) refusals were encountered. The margin of error associated with a sample of this size is +/- 5%, assuming 95% confidence intervals and 5% allowable error. In theory, 95 times out of 100 combined sample results should differ by no more than 5 percentage points from what would have been found by surveying the entire population in the northern counties. This sampling error may be larger for smaller subgroups in the survey.

The survey specifically asked individuals to identify the most important issues facing their communities; the frequency of their participation in a variety of recreational activities; and their attitudes towards growth and development in their community and in their surrounding communities, among other things. Demographic questions were included to establish sample characteristics.

Survey Results -- Vermont and New Hampshire

The purpose of this part of the study is to report opinions of North Country Vermont and New Hampshire residents regarding community problems, participation in outdoor recreation activities, and local planning efforts in the northern tier of the two-state region. Several types of statistical tests were selected to analyze study data. The chi-square statistic was used to test nominal data and the t-test was applied to Vermont versus New Hampshire scale data. Since a one-way analysis of variance (ANOVA) extends the applicability of the t-test to more than two categories, it was employed to analyze disparities between size of community (population) and the scaled data.

Respondent Characteristics

Table 1 shows some selected demographic characteristics of the New Hampshire and Vermont residents participating in the survey. In general, the two samples differed very little with respect to demographic characteristics. Only with respect to the level of educational attainment did the Vermont and New Hampshire samples differ significantly ($p=.04$). Approximately the same percentage of New Hampshire and Vermont respondents reported being high school graduates: 44.0% and 42.8%, respectively. More New Hampshire respondents reported having some college or vocational/technical training than did Vermont respondents (21.1% and 18.8%, respectively). However, New Hampshire respondents included a higher percentage of people with less than a high school degree (20.0%) than Vermont respondents (13.2%). Finally, more Vermonters (25.1%) reported having completed college and/or some post graduate work than did New Hampshire respondents (22.3%).

Table 1. Summary Demographic Characteristics

	New Hampshire	Vermont
Gender - % Female	62%	66%
Average Age	41 yrs	42 yrs
Marital Status - % Married	74%	69%
Education - % High School Graduates	44%	43%
% College/Post College	22%	25%
Employment - % Full or Part Time	54%	61%
Income - % $30,000 or more	43%	35%
Avg. Length State Residency	32 yrs	32 yrs
Avg. Length Community Residency	24 yrs	20 yrs

Demographic and economic characteristics of this sample were typical of what we might expect of North Country communities. More women than men responded to the phone survey. Just over 2 in 5 respondents were over age 50, 1 in 5 were over 30 and an additional 49% were middle aged, 30 to 50. Two in 3 respondents were from two-adult households and about

1 in 5 were from single person households. At 5.6%, unemployment was double the state rates for the period. An additional 58% worked full or part time, almost 1 in 4 were retired and the balance were homemakers or students. Household incomes for the area were relatively balanced, with one-third of those responding earning between $15,000 and $30,000 annually. An additional 38% exceeded incomes of $30,000 and about 1 in 4 reported incomes below $15,000. The majority (70%) of the respondents were married. Length of state residence showed a wide distribution, with 1 in 4 reporting residence in excess of 50 years, 1 in 5 with less than 10 years residence, and the balance distributed between these poles. Half reported native or near-native status, with 1 in 5 having spent less than 25% of their lives in New Hampshire or Vermont. These characteristics are used to help explain reported attitudes and perceptions below.

Community Problems

Survey participants were asked to rate the seriousness of a variety of community problems, such as solid waste disposal, population growth, the preservation of forested lands, and other issues. As shown in Table 2, respondents from both states indicated that getting rid of solid waste presented a serious problem. Access to forest lands, maintenance of an industrial wood supply, and opportunities to participate in outdoor recreation activities received scores which indicated that survey respondents did not consider the loss of these to be serious problems within their communities.

Table 2. Seriousness of Community Problems by State

COMMUNITY PROBLEM **	NEW HAMPSHIRE Mean	Std Dev		VERMONT Mean	Std Dev
Rid Solid Waste	2.33	.89		2.21	.92
Preservation of Forested Land	2.56	.80		2.50	.81
Dev Impacts - Wildlife	2.61	.75		2.51	.77
Preservation of Agr Land	2.63	.80	*	2.38	.84
Dev Impacts - Rivers/Streams	2.67	.74		2.54	.80
Dev Adequate Sewer & Water Services	2.69	.68		2.72	.68
Population Growth	2.74	.61		2.66	.59
Maintaining Ind Wood Supply	2.79	.79	*	2.96	.74
Oppor Participate in Outdoor Rec	2.81	.55	*	2.91	.39
Dev Impacts - Lakeshores	2.83	.79	*	2.59	.86
Access to Forest Lands - Your Area	2.94	.49		2.97	.49

*Represents a significant difference between New Hampshire and Vermont respondents at the .05 level

**Respondents rated the seriousness of community problems as follows: 1 = Very Serious; 2 = Serious; 3 = Not a Problem

Respondents from the two states differed significantly in assigning the level of seriousness to several of the problems. Vermont respondents were more concerned about preservation of agricultural land (t=3.15, p=.00) and impacts of development on lakeshores (t=3.05, p=.00). New Hampshire respondents voiced greater concern regarding the maintenance of an industrial wood supply (t=2.17, p=.03) and opportunities to participate in outdoor recreation (t=2.24, p=.03), although these problems were rated low in importance. These differences may be explained by the context: agriculture makes a greater direct economic contribution in Vermont than it does in New Hampshire. The dominance of wood industry interests in northern New Hampshire, when contrasted with the more diversified economy in Vermont's Northeast Kingdom, helps to explain the different perceptions of the importance of maintaining an industrial wood supply. Differences in the perceived importance of development impacts on lakeshores and opportunities to participate in outdoor recreation are not as clear, but may reflect the increased developmental activity occurring in Coos County.

Survey participants were asked to select the single most serious problem of those items they had selected as 'very serious.' Overall, solid waste issues captured the attention of North Country citizens, receiving more than twice the number of responses of any other problem. Similarly, expressed concern for population growth and the preservation of agriculture lands followed in a second "tier" of concerns. A third level of concern was expressed for the impacts of development upon lakeshores, wildlife, and rivers and streams. Also included in this third level of problems was development of adequate sewer and water services.

Outdoor Activities

In the survey, participants were asked to indicate how frequently they participated in various outdoor recreational activities. Walking and driving for pleasure were listed as frequent outdoor activities for respondents from both states. Respondents occasionally participated in fishing, berry picking, hiking, bird watching, gathering firewood, swimming, bicycling, star-gazing, and picnicking. The survey showed that relatively few North Country residents participated in all-terrain vehicle use, maple sugaring, and horseback riding. Respondents differed significantly by state for only 1 outdoor recreational activity, canoeing, with New Hampshire residents more likely to engage in it (t=-2.05, p=.04).

Local and Regional Planning Preferences

A series of survey questions ascertained respondents' attitudes toward growth and development, their evaluation of community planning efforts within their community as well as in other communities, and their preferences regarding regional planning groups. Almost half of the respondents from both states (49.4%) favored limitations to growth in their communities: 29.4% favored strong limitations and 20.0% moderate ones. On the other hand, almost one-third (32.3%) of the total felt that their communities should encourage development -- 12.8% strongly encourage and 19.5% moderately encourage. The chi-square statistic showed

that North Country respondents from New Hampshire and Vermont differed in their attitudes toward future growth (p=.02). The New Hampshire respondents tended to be divided in their attitudes toward growth: almost 32% indicated they felt growth should be limited, while 36% reported that growth should be encouraged. However, more than half of the Vermont respondents indicated that growth should be limited. Less than 30% of the Vermont participants supported the concept of encouraging future growth. About 10% of the Vermonters and 14.0% of the New Hampshire sample reported that growth was not much of a problem.

Local planning can provide a means for promoting or discouraging growth. Without raising specific local planning problems, respondents were asked to evaluate the performance of town planning. Two in 5 respondents, 41%, rated their town planning as "good" to "excellent." Another 30% found the local efforts to be "fair." Community planning was rated as "poor" by 16.1% of the total survey participants, and 13.5% did not have an opinion or declined to answer the question. Thus, 7 in 10 North Country respondents appeared positively inclined to local planning efforts.

The Vermont respondents were relatively more positive about their communities' planning efforts. Using the chi-square statistic, it was found that the attitudes differed signifi-cantly by state (p=.01). Approximately 10% of the Vermonters surveyed rated their community planning as "excellent," versus 4.0% of the New Hampshire respondents. Community planning efforts were rated "good" by 35.1% of the Vermont respondents compared to 29.7% of the New Hampshire respondents, suggesting greater support for planning in Vermont.

Respondents were then asked to rate the planning efforts of neighboring communities. Their responses showed that they placed such communities' current planning levels below their own. Other communities' planning efforts were rated "excellent" by only 3.6% of the survey participants. About 60% rated those efforts as "good" or "fair," and 14.6% of those surveyed rated the planning efforts "poor." Of the total respondents, 21.5% had no opinion or declined to answer the question. The distribution was not statistically different by state.

Study participants were also asked their preferences regarding whether local planners should work in a regional planning group or by themselves. A total of 42.8% of the respondents expressed a preference for regional planning cooperation. However, approximately 25% of all respondents favored local planners working by themselves. The responses for this question were significantly different by state (p=.00). The New Hampshire respondents (40.4%) were relatively less willing to express opinions than were Vermonters (25.8%). Vermont respondents were evenly split in their preferences for strongly regional versus strongly local planning efforts, with 19.6% of the group selecting each of the two categories. On the other hand, Vermont respondents were much more likely to prefer local-regional planning cooperation than encouraging local planners to work alone.

Participation in Outdoor Recreation Activities in a Multivariate Context

In an attempt to provide a more complete understanding of differences and similarities among the Vermont and New Hampshire residents, a series of multiple regression models were developed (one each for Vermont and New Hampshire residents and one combined model). Measures highlighted above, namely perceived seriousness of problems, attitudes towards local and regional planning efforts, and the various sociodemographic factors were used as the independent variables in the models (see Table 3).

Table 3: Comparative North Country Citizen Models Regression Parameters

	MODELS		
PREDICTORS	TOTAL	NH	VT
State of Residence	.15[1] (3.56)		
Age	-.39 (-9.68)	-.41 (-6.18)	-.40 (-7.76)
Income	.09 (2.24)	.16 (2.50)	
Education	.18 (4.24)	.18 (2.63)	.24 (4.54)
Agr Land Preser.	.09 (2.22)		.14 (2.50)
Lakeshore Dev.	.16 (3.62)	.23 (3.46)	.13 (2.36)
ADJUSTED R^2	.31	.31	.30

1/Standardized Regression Coefficients with standard errors in parentheses.

The dependent variable was an index of participation in outdoor recreation activity. In this index, participation was defined as occasional or frequent engagement of the various activities. This index ranged from 0 to 22 (either never participated in any activity or participated in 22 different activities) with a mean of 10 and a standard deviation of 5.

In general, all three models accounted for about the same amount of variance (roughly 30%). Each was also dominated by age (older people participate in fewer activities) and education (greater educational attainment is associated with greater recreational activity). However, some differences did emerge. The New Hampshire model was significantly impacted by income (the higher the income, the greater the activity) and by concern over lakeshore development (those with the greatest concern over development participated in more activities). The Vermont model, on the other hand, was impacted by concerns for agricultural land preservation and lakeshore development (where those with the greatest expressed concerns participated more frequently in outdoor recreational activities).

Summary and Conclusions

North Country residents of New Hampshire and Vermont utilize their forest lands for a variety of recreational and economic activities. Results from this survey of the five-county region indicates that, while they share many concerns about the North Country region, residents differ in opinion about particular community problems and planning issues.

Three development related issues are mentioned most often: solid waste issues, population growth, and the impacts of development upon lakeshores, wildlife, and rivers and streams. Concerns were also expressed about the development of adequate sewer and water services. Vermont residents viewed the preservation of agricultural lands as a very serious problem, while New Hampshirites voiced greater concern about the maintenance of an industrial wood supply and opportunities to participate in outdoor recreation.

State of residence had very limited effect upon types of recreational activities. Walking and driving for pleasure were listed as frequent outdoor activities for respondents from both states. Residents engaged, on average, at least 10 different outdoor recreation activities.

North Country respondents had strong opinions regarding growth and develop-ment and community planning efforts. Almost half of the respondents favored limitations to growth within their communities. However, Vermont and New Hampshire respondents differed in their attitudes. North Country Vermonters indicated a preference for controlled growth in much greater numbers than they did for encouraging growth. In contrast, New Hampshire respondents were more evenly divided with one-third favoring limits to growth and one-third encouraging growth.

In general, respondents were positive about their communities' planning efforts, although Vermonters were slightly more positive than New Hampshirites. Respondents from both states were more positive about planning efforts in their own communities than about activities in neighboring communities. Although a sizeable portion (almost one in three) had not considered the concept, more than 40% of the respondents from both states were favorable toward the idea of local-regional planning cooperation. In Vermont, where much debate exists about regional planning activities, an equal number of respondents favored local planning versus those preferring local-regional planning cooperation.

Implications for Policy Decisions

The results of this survey strongly support concern about issues of resource use and population growth. Policy makers can utilize a number of these findings in their planning activities:

Considerable concern in both states was expressed regarding solid waste issues. Problems of population growth and the impacts of development upon water resources and wildlife were also cited. Concern about local "infra-structure", in terms of providing water and sewer services, was also evident.

North Country Vermonters indicated a strong preference for controlled growth. New Hampshire respondents were more evenly divided between favoring limits to growth and encouraging growth. In general, respondents were positive about their communities' planning efforts. Although a sizeable portion of the respondents from both states were favorable towards the idea of local-regional planning cooperation, some skepticism for local- regional planning cooperation exists. Any effort to utilize local or regional planning mechanisms should be accompanied as well by public educational efforts.

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