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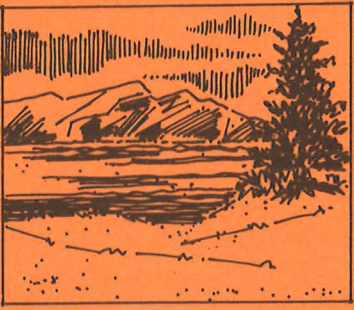
General Technical
Report NE-185



PROCEEDINGS of the 1993 NORTHEASTERN RECREATION RESEARCH SYMPOSIUM

April 18-20, 1993
Saratoga Springs, New York

Environmental Awareness
HUNTING
CAMPING
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Wildlife Management
MODELING
swimming
bicycling
FORESTS
Historic Places
Lakes
NATIONAL PARKS
observing Nature
ECONOMICS
Travel
Tourism



NORTHEASTERN RECREATION RESEARCH MEETING POLICY STATEMENT

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

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April 18-20, 1993

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

Compiled and Edited by:

Gail A. Vander Stoep
Michigan State University
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GREENWAYS

Scenic Roads: Access to an Educational Opportunity. Steven Brower, Burlington, IA.

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LANDSCAPE / VISUAL PERCEPTIONS

Landscape Perceptions: Understanding Viewer Needs and Desires. Steven Brower, Burlington, IA.

OUTDOOR RECREATION MANAGEMENT AND PLANNING

Testing an Evolutionary Model of Recreation Partnerships. Steve Selin, West Virginia University; Debbie Chavez, USDA Forest Service.

SOCIAL PSYCHOLOGY

Boating Identity and Behavioral Change: Self-referent Behavior or Discursive Outcome? Walter Kuentzel, University of Vermont.

Recreational Fishermen and Their Preferred Fish Species: An Exploratory Analysis of Angler Characteristics. David Loomis and Robert Muth, University of Massachusetts.

The Conscious Experience of Recreation. Tom More, USDA Forest Service; James Averill, University of Massachusetts.

ECONOMIC DEVELOPMENT ASPECTS OF TRAVEL AND TOURISM

Whitewater Rafting as a Tool for Economic Development. Sharon Hurt, West Virginia University.

OPENING SESSION:
Recreation Trends and
Where We're Headed

$$T_1 + T_2 = T_3 ?$$

TIME + TRANSPORTATION = TRAVEL ?

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In an attempt to set the stage for discussion of "Trends and Where We Are Headed", I have chosen to focus on two variables influencing recreation and travel participation--time and transportation. I have drawn extensively on the University of Michigan Project "Americans' Use of Time", directed by John P. Robinson.

Introduction

Total hours available for leisure increased nearly three fold for the U.S. population between 1900 and 1950 (Clawson and Knetsch 1966). A less phenomenal, but modest increase in leisure time was realized between 1965 and 1985 (Cornish, Fields, and Willard 1991). Even though two income families may work more hours, labor saving devices and innovative practices have increased individuals' total discretionary time. When time is valued more than money, air travel becomes the logical transportation choice for travel to the more distant destinations. The airlines have an opportunity to capitalize on this, and possibly improve overall profitability of operations.

"Americans' Use of Time Project"

The first "Americans' Use of Time Project" was conducted in 1965 by Converse and Robinson (Cornish, Willard, and Fields 1991), and sponsored by The National Science Foundation (NSF). Time diaries were obtained from 1,244 respondents aged 18-65 across the country. The study was repeated in 1975 by Juster, this time with 2,409 adults of all ages, again with the support of NSF. Robinson received another NSF grant in 1985 to extend the time-diary study to 5,000 Americans of all ages.

The time-diary kept by study participants was, essentially, a record of all activities in a 24-hour-period. If time spent in one activity went up, time in another activity had to go down. This "zero-sum" requirement gave sociologists, like Robinson, the information needed to measure "trade-offs" made by the public as new technologies were introduced over the 20 year period 1965 to 1985.

Discussion of Findings

T₁--The Time Variable

Robinson's analysis over the 20 year period shows that "free" time has increased from about 35 hours per week in 1965 to about 40 hours per week in 1985. This newly found "free" time was the result of a reduction in time spent in three other activities--(1) working at a job, (2) doing housework, and (3) caring for children (because of smaller families). While young women have joined the workforce, women over age 55 have not. Also, men over age 55 are working shorter hours and retiring younger.

Total time spent doing housework declined over the 20 year period, however homes were considered just as clean as they used to be. Labor-saving appliances and devices have made the job of housework a more efficient operation.

"The Americans' Use of Time Project" and its director, John Robinson, moved to the University of Maryland at College Park, Maryland, where work is continuing. Robinson asked diary keepers to indicate the degree to which they liked or disliked each of 200 activities, rating each on scale of 0 to 10. Few activities fell below 5, and the average for all 200 activities was 7 (Robinson 1993). The rating of a few selected leisure time activities and the time spent per year in the activity is shown in Figure 1 as a perceptual map. This map was generated from Robinson's data using multi-dimensional scaling, with enjoyment level plotted on the Y axis and time spent plotted on the X axis.

A perceptual map, like the one shown in Figure 1, is a useful tool in advising the recreation-tourism business community on consumer preferences. Such information is also important to public providers of recreation-tourism activities. Activities that fall in the upper right quadrant of the perceptual map can be called "solid gold" (the public really enjoys these activities and many hours are spent participating).

Activities plotted in the upper left quadrant are enjoyed as much as those in the upper right quadrant, however fewer hours are spent participating. Activities in the lower two quadrants are not really enjoyed by the public. Entrepreneurial opportunity is present in the lower right quadrant--many hours are spent by the public in these activities with very little associated enjoyment. The astute entrepreneur will find a way of making the activity easier or more enjoyable, creating a product desire on the part of the potential consumer.

The availability of time is one of the most important factors influencing family vacation plans (Mason 1990). Americans are innovative and will find time for family vacations, balancing work schedules and career development with a perceived need for family togetherness.

Suzanne Cook, Executive Director of the U.S. Travel Data Center, has developed a "travel intensity index" for American age cohorts (Cook 1992). Cook's index is shown in Figure 2. When combined with population trends, this index becomes a useful tool in predicting recreation and tourism activity. Children born between 1940 and 1945 (Age 48 to 53 today) are more likely to camp or vacation in an RV than any other age cohort. Those individuals born between 1946 and 1957 (Age 35 to 47 today) are much less interested in camping or RV travel. Park managers should study these findings carefully as they consider park development policy.

T₂--The Transportation Variable

David Swierenga, Assistant Vice President of the Air Transport Association, presented data at the 1991 Outlook for Travel and Tourism Conference, indicating that while air travel represents less than 20 percent of all travel nationally, it is the only mode of travel increasing its share of total travel (Swierenga 1990).

Two other points made by Swierenga are especially important: (1) seat occupancy on U.S. airlines has consistently stayed in the sixty percent range in the last decade, and (2) the net profit margin of U.S. airlines has consistently been lower than the profit margin of U.S. industry (Figure 3).

Perhaps the U.S. airline industry should extend "senior citizen pricing privileges" to the general public. This would undoubtedly increase the seat occupancy rate, which could, in turn, improve over-all profitability of airlines, bringing them more in line with profits of U.S. industry. If this were the case, the airline share of the travel industry might increase dramatically.

Summary

Available time and appropriate transportation are, without question, the key elements that will be linked with increased travel in the years ahead. Despite the increase in two income dependency and its associated time requirement, innovative Americans will find time to travel. To conserve time, the fastest mode of transportation (airplane) will be used, if prices are affordable. It is this researcher's feeling that air travel will be more affordable and used more extensively. Yes, $T_1 + T_2 = T_3$.

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THE ROLE OF THE SOCIAL SCIENCES IN NATURAL RESOURCE MANAGEMENT: RESTRUCTURING FOR THE NEXT CENTURY

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Historically, the social sciences have not been adequately utilized in the formation of policy and decision-making in natural resource management. Three trends are now impacting the role that science plays in natural resource management: the growing political power of science, the diversity of values people place on natural resources and the growing impact of humans upon the natural resources. Some examples are provided to illustrate how the social sciences can contribute to the management of natural resources.

Introduction

In 1968, Eric Forsman, a young biologist working for the Forest Service as a summer fire guard, could scarcely believe his eyes when a northern spotted owl landed in the front of his ranger cabin. Who could have foreseen that the perfect ecological representative had just landed in his yard. Just as assuredly, who could have forecast that this seemingly innocuous creature would bring the Pacific Northwest's biggest industry to its knees in less than 25 years.

It's almost as if the entire natural resource profession was blindsided by an insignificant little bird that few people even knew existed and fewer still that really cared. Besides the intense debate about ecosystems versus jobs are there other factors that need to be considered? Without a doubt, the message received will be influenced by an individual's area of responsibility and interest. The "where you stand is where you sit" phenomenon. Some timber people will see a significant reduction in harvest levels; professional ecologists will see a threat to the fabric of the ecosystem, environmentalists will perceive a worldwide loss of biodiversity, and the list goes on.

The emerging message is that there is another dimension to consider from the current debate, namely that the social sciences can and must play a more important role in the development of our natural resource management systems. Before discussing that role, however, a short digression regarding some of the current trends facing natural resource management may be instructive.

Current Trends

A number of trends now permeate the current situation surrounding science and natural resource management. First, there is the growing political power of science (Dietrich, 1992). There are good reasons for this increased political power, such as the relatively objective nature of the research endeavor. It should be noted, however, that the social sciences are as vulnerable to scientific myopia as the other disciplines. We trivialize science we do not like or understand and automatically assume validity and worth to the science we like (Buttel and Taylor, 1992).

Other reasons for the growing influence of science in the political process include: the increasing complexity of the problems, the different scales of effects (e.g., site, forest, landscape, ecosystem, and global), and the overall lack of comprehensive data bases. In the latter case, the lack of comprehensive data sets allows the manager and social

scientist to develop premature closure on specific issues. For example, believing that overharvesting is simply a result of leveraged buyouts and economic incentives among some of the timber companies tends to disregard other data and oversimplifies a complex phenomenon.

Relative to the complexity issue, the number of situations now confronting natural resource management far exceeds the capability of any one scientific group or governmental organization to adequately deal with these issues. A sampling of these issues would include the following:

- Global deforestation and environmental degradation
- Global climate change
- Loss of biological diversity
- Changing demands for forest products
- Wilderness preservation and the proper role of reserve areas
- Production and harvesting practices that are sustainable
- Forest health
- Conflicting demands from society for preservation, recreation and commodity production

Moreover, scientists increasingly are asked to make their "best guess" with complete and historic data often lacking. Accordingly, we can expect that natural resource management will insist that science do the following things:

- Provide a foundation for the development of policy by defining the various alternatives. This implies that research serves an "up-front" role in decision-making instead of merely providing "backfill." That is, research-generated information that is used to develop policy rather than support for a decision already made.
- Provide monitoring information about the outcomes and quality of the decisions and policies implemented.
- Maintain an air of impartiality despite the pressure from the political process.
- Develop multi-approach and multi-discipline predictions rather than uni-dimensional solutions.

A second trend is the growing diversity of values human beings place on natural resources. This diversity is not only situational but also a function of space and time. For example, to a person building a house, the wood products and price of those products is of critical importance. Most of us, however, only build one or two houses in our lifetime and in the interim, other values tend to take precedence in our value system. These other values might include wanting an intact forest in order to escape the noise and congestion of the urban environment or cherishing the recreational activities offered by the forest environment. Others would place a high-degree of value on large wilderness landscapes as a way to experience adventure and challenge.

Westman (1977) has previously distinguished between the goods and services produced by the natural environment. Goods include marketable products such as timber or forage or even the use of the environment for recreation. Services, on the other hand, are the functions of an ecosystem and how these various functions interact. These services include: the absorption and breakdown of pollutants, the cycling of nutrients, and the fixation of solar energy. One example of this is the buffering effect that coastal wetlands serve.

Juxtaposed to the issue of goods and services is the concept of values. A number of authors have identified a wide range of values associated with the natural environment (Roston, 1985). As shown in Table 1, these values include scientific, therapeutic and recreational entities (Ewert, 1990). Associated with all of these values are differing levels of potential conflict. For example, aesthetic values have a high potential for conflict because of the individual nature of aesthetics. One person's beautiful setting is another person's boring scene.

Table 1. Selected values associated with wildland areas. 1, 2

Values	Level of Potential Conflict	Comments
Scientific	Low	Not well advanced; Loss of wildlands is outstripping the ability to collect information.
Therapeutic	Low	Many acknowledge the cathartic and rehabilitation qualities of wildland environments.
Ecological/ Bio-Diversity	Low	Widely-recognized is the importance of saving gene pools for future generations.
Recreational	Medium	Can conflict with other values such as scientific; As a highly personal quality of life issue, these values often invoke high levels of emotion.
Symbolic/ Cultural Identity	Medium	Symbols from wildland areas such as the bald eagle or bison represent certain societal and national values (e.g., freedom, strength, "rugged individualism").
Aesthetic	High	The intangible and subjective nature of these values often lead to disagreement as to worth and value.
Inherent Worth	High	For many, wildlands have an intrinsic value just being there. Others feel that wildlands should be more "productive" for the good of society.
Market	High	Usually are extractive and compete with most other values. This exclusivity creates high levels of emotion and conflict.

1 Adapted from Roston (1985)

2 From Ewert (1990)

A third trend surrounding the interface of science and management is the growing omnipresence and omnipotence of human impact upon the earth's landscape. There can be little doubt that few landscapes or sites now exist free from the influence of man. Most scientists agree that the net loss of the world's forests due to human activity since preagricultural times is on the order of eight million square kilometers or an area about the size of the continental United States. Of this amount, more than three-quarters has been cleared since 1680. In addition, the annual human withdrawal of water from natural circulation is now about 3,600 cubic kilometers or an amount exceeding the volume of Lake Huron. In 1680, the annual withdrawal was less than 100 cubic kilometers. There are a number of other statistics that point to the decline of global and environmental health (Postel, 1992).

When considering these trends, one fact becomes increasingly clear: people need to be considered in any long-term management strategy. It would be a challenge for the research community to describe any major scientific advancement that ultimately did not involve a human dimension. Reidel (1992) poses the idea that in natural resource policy, perhaps management has been asking the wrong questions. We, in the research community, could also be asked the same question. What then would be the right questions and how can information be generated toward answering those questions?

The Role of the Social Sciences in Natural Resource Decision-Making

Bormann (1993) suggests that concepts of the environment such as sustainability, forest health, biodiversity, and ecosystem management are essentially human constructs that serve as expressions of human values. If we believe that natural resource management is one manifestation of the society in which we live, what type of scientific structure must be in place to provide the type of information necessary for effective natural resource decision-making? Machlis (1992) makes the observation that biologists, ecologists, and other natural science professionals are now faced with a hard reality: ultimate solutions to natural resource problems lie in social, cultural, economic and political systems; the very systems that are the focus of the social sciences. While, traditionally, the social science disciplines have included political science, geography, anthropology, sociology, psychology, economics, and philosophy, more recent areas of inquiry could include the recreation and leisure sciences, education, demography, and social ecology.

What role can the social science disciplines play in the formation of natural resource policy? Global climate change presents one scenario that is both timely and of profound importance. The irony in this example is that while the issue has primarily been defined in terms of meteorological and chemical processes, the causes are almost exclusively human. Indeed, Maloney and Ward (1973) suggest that most environmental crises facing our society and the world are really "crises of maladaptive "human behavior." Consider the following roles that the various social sciences could play in the development of a comprehensive solution to any emerging changes in the global climatological systems.

- **Anthropology**--What have been the patterns of human adaptation in response to historical changes in the climate? Did communities develop large scale adaptive methodologies, migrate, or simply die out? Knowing how our ancestors reacted may provide some insight into how the species generally behaves in this type of crisis.
- **Political Science**--What political and/or governmental institutional structures have been effective in producing global awareness, monitoring, and enforcement procedures? As a global community, we already have some examples of international discussion and action on far-reaching environmental issues such as nuclear weapons, regulating the use of the oceans, and international cooperation on issues such as illegal trade of threatened and endangered species (Feldman 1991).
- **Economics**--What mixes of economic incentives would be most effective in altering behaviors to produce a more environmentally-friendly set of actions?
- **Education**--What educational vehicles would be most influential in modifying the behaviors of individuals? What will be the most effective mechanisms whereby methods of education can be translated into behaviors and knowledge that are not detrimental to the global environment?
- **Psychology/Sociology**--How can the individual and collectively, the society, take more responsibility in modifying their behaviors to lessen the overall impact upon the natural resource base? What specific attentional cues "tell us" that there is a threat to global health?
- **Recreation and Leisure Sciences**--As outdoor recreation is often the primary avenue from which a large segment of the population experiences a direct contact with the natural environment, can the outdoor recreation experience be managed in such a way to increase the individual's sensitivity and willingness to act in an environmentally-conscious way (Ewert, 1991)?

These are a few of the potential types of information that would add to the overall mix of solutions to global climate change. The same concept could and should be applied to other issues in management and policy-making for our natural resources. Holden (1988) has argued that:

"The social sciences have lagged far behind in assessing the interactions between physical changes and human activities. Far more is known about the processes of global warming, deforestation, resource depletion, and pollution than about the processes of the human institutions that create these effects."

A growing body of literature now speaks to the need for integrating the social, physical, and biological sciences (Heberlein, 1988). The fact that our research community has failed to do so points to a message of inertia and lack of willingness on the part of the scientific institutions we have developed. Moreover, as scientists and managers we often overlook the "cultural cornerstones" that guide our behaviors and the way we collect and filter information.

However, merely rallying against the status-quo can ultimately be counterproductive. As we seek to bring about a greater awareness of the need for the social sciences in the context of natural resource research and decision-making there are a number of points to consider (Machlis, 1993).

- Include incentives for the integration of the biological and physical sciences. That is, competitive grants, research proposals and workshops could frame the questions in such a way as to be of interest to the other sciences. For example, identifying the inelasticity of entrance fees at a particular location could also include the anticipated physical and biological impacts upon the resource based on the different use levels.
- Social science research programs need to be multi-scale including individuals, groups, communities, landscape and counties (human-equivalent landscape level), ecosystems, biomes, and global systems.
- To the extent possible, recreation and similar disciplines should be linked with the mainstream social science literature. Failing to do so tends to marginalize the information and can ultimately downgrade the information our scientists generate in the eyes of other disciplines and the courts.
- From a funding agency perspective, design our cooperative agreements to bring the output more in line with natural resource management needs, both in terms of the actual science but also with respect to the overall visibility of the research. In addition, priority should be given to cooperative agreements that incorporate a consortia of universities and other research institutions in order to bring a variety of ideas and approaches to the issue under study.
- Increasing the sensitivity for the fact that many of our managers and public are not always cognizant of the human dimensions part of natural resource management. The social sciences need to pay more attention to defining what the human dimension in natural resource management is in addition to identifying the potential research questions.

While this list is incomplete, the emerging scientific challenge is to incorporate the social sciences into the policy and decision-making agenda because they bring a scientific focus on the human dimensions aspects of natural resource use. Disciplines such as recreation and leisure research need to redefine their role in this developing scenario. The issues now go far beyond visitor and experience characteristics and often include the very fabric of many of our social systems. In the case of global climate change, the spotted owl, old growth and any number of other issues previously mentioned, one is

reminded of the Yukon traveler in Jack London's "To Build a Fire." The man was wise in the ways of the world but not in their significance. He never "saw" the clump of snow hanging from the tree, directly over his fire. The clump of snow that eventually but surely killed him. Our failure to build in the human component to our environmental decision-making may doom us to a similar fate. People make the problems but they also create the solutions. At this point, however, we still have a choice about what the future holds for some of our natural resources and perhaps, even for us.

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UNIVERSITY RECREATION AND PARK PROGRAMS: TRENDS AND CHALLENGES FOR THE FUTURE

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Trends and challenges are discussed in regard to three aspects: (1) the status of educational curricula (programs/departments) in relation to three essential elements -- excellence, relevance, and identity; (2) productivity focusing on Faculty, and (3) preparation of students and accreditation, directed toward Students.

There are three aspects on which to reflect as to what the future may bring for higher education.

- I. The Status of Educational Curricula (Programs/Departments)
- II. Productivity (Faculty)
- III. Preparation of Students and Accreditation (Students)

All three aspects are directly related to society. Sometimes we forget we are "within" society and that we are only one element within a larger framework. We must keep in mind our environmental milieu. The context within which we must operate impacts upon us. We often act as if we are in our own "cocoon," oblivious to that around us. We don't practice what we preach/teach, especially in marketing and relevance to constituencies. While we are but a small entity within a large arena, we can either remain "snug in our cocoon" and be dug out when not germane or we can be like a pebble or rock when tossed into a pond, send ripples out. If we truly believe in the importance of parks and recreation to society and individual human beings, we will consider sending ripples; but, you know, no ripples can be sent unless a rock is tossed into the larger pool, often an unknown.

I. The Status of Educational Curricula (Programs/Departments)

The first aspect focuses on Programs/Departments. What is happening? Here we are tied directly to the economy. Budgetary support has been very important in all areas of the United States; but, California, the midwest, and the east seem to all have had the greatest state budget problems. Most of our state-supported universities, of course, are heavily dependent on state funding. The only area of the United States which seems to be thriving and has adequate budgetary support at this time is in the south — both southwest and southeast. So, what is the response to budget reductions? Two approaches to less financial resources need to be distinguished: 1) budget reduction through elimination or merging of departments and 2) budget reduction related to efficiencies. One can only be so efficient — there have to be adequate operating dollars. As regards elimination or merger, the question is "how does a department survive?" *There appear to be three essential elements — excellence, relevance, and identity.*

Excellence

To be excellent is not enough, but without excellence, one will get no where. A national reputation within our own field is not enough to save us at the institutional level. We must be making contribution to the wider arena of the institution and the state, e.g. community economic development, youth-at-risk, environmental quality.

Relevance

Dr. Phil Rea stated in the SPRE Newsletter (Spring 1993) that 11 programs have been eliminated in the last two years. The question is why and what can be done so as not to be such a victim. Rea's article, a survey done this past year, and my own perceptions would indicate relevance to the institution's mission and to the funding agency's perception of what it's getting for the dollars is critical. But, there is no literature that I have seen which has said what relevance is! Here are some possible considerations.

First, we tend to be self-centered and often individual professor-centered and not institution- or department-centered. Researchers, especially, lend to this point of view with such statements, as "Don't bother me, I'm doing important work (to whom?) and bringing in dollars." Really? We are self-centered in what we're doing topic-wise and in contribution to the larger institution and profession. Are we only "housekeeping" or really moving forward the objectives of the institution and profession. Research can provide a very valuable service to influential constituents and politicians, but we have to articulate our findings, as well as work in concert regarding important issues needing researching. Further, we should be researching to acquire data for decision-making.

What is relevance?

1. Identification of program/department as essential to the various tasks of the institution and tied to the mission of the institution. We must have strength in areas valued by the institution.
2. Involvement in the wider college/school and university.
3. Initiating program changes to lead in meeting challenges before the institution. We must be proactive, not reactive.

Identity

Merger of a department or program into another is not the answer, for we lose aspects of the program, lose identity and autonomy, and are low on the budget "totem pole" and in further cuts, we continue in jeopardy. We must be identified as an important, unique contributing factor enabling an institution to meet its mission — its mission focuses on educating students and servicing its constituency. We must be valued as a contributor.

We must have interdepartment and interdisciplinary cooperation, but beware you do not "shoot yourself in the foot," e.g., saying that it makes no difference who teaches something or does some task. Some people believe that recreation is not a science or discipline; however, each discipline, and I include recreation in this, should bring special perspectives germane and important to the goal. Again, recreation must be identified and valued as an important member of the team. What does your department bring to the "team"?

The foregoing attributes profile a nonthreatened program/department. So, the watch words regarding the status of departments are *excellence, relevance, and identity*. All three are essential and in that order; however, it must be noted that while excellence is critical, excellence without the other two will not be sufficient to "save" a program or department. What does it mean for the researcher? Excellence, of course, means quality. Relevance — relevant to whom? It must be relevant to the institution's objectives. Identity — not only identity to the outside, but also identity within the university.

II. Productivity (Faculty)

The second aspect focuses on Faculty. In society and the business world, the question is productivity. And within productivity, we are talking efficiencies, effectiveness, and accountability. If an agency gives you dollars for research, it wants a product. Similarly, the institutional funders (students and government legislators) want something for their dollars. At least five Big Ten institutions are in states where they already have legislation, or legislation is being considered,

regarding productivity mandates -- when one does not "clean up one's own house," then the legislature moves in!!

What is productivity? We too often have defined productivity in our terms, not that of the financing entities. Productivity means: 1) educating students, 2) service to constituency in solving their problems, and, then 3) research. We also have defined productivity as circumstances existed in the 60's and 70's, not as they are now in the 90's. Even though you may not have been in the profession then, the practices and attitudes have been handed down, especially in land grant colleges.

Productivity must be redefined in terms of "what do I get for my dollars toward the mission/tasks?" Specifically, what does this mean? The direction of all state mandates is teaching, especially undergraduate. Particularly "research institutions" and researchers have the reputation either of not wanting to be bothered with teaching, especially undergraduate teaching, or they are poor teachers and cannot relate to students.

1. We must become more "student friendly." Isn't this what we tell our students? "Consumer services."
2. We must generate more SCHs (student credit hours) per unit. This doesn't necessarily mean all classes must be larger, but there must be efficiencies by using technology or other strategies, depending how best the topic can be learned.

While research is not factored in to any extent, faculty are expected to produce scholarly activity for tenure and promotion. This gives a dilemma to faculty who are teaching heavy loads. Also, service is essential, but often not as highly valued for tenure and promotion — another dilemma. Do we have a two- or three-tier workload system, differentiating untenured and tenured but not assistant and full professors? Do we have "teaching" faculty and "research" faculty? Whatever is worked out, *it must be productivity valued by the institution and its funding agency.*

In terms of our watch words, efficiency, effectiveness, and accountability, more for less is the pessimist's view. The nature of the product is critical. I am concerned with the seeming overriding materialistic attitude of educators today and the seeming less vitality in scholarly inquisitiveness. "Why should I do it if I'm not paid extra?" is asked frequently by educators today. Why? — for what it can bring to the quality of your work, insights, and new understandings.

III. Preparation of Students and Accreditation (Students)

The third aspect's focus is on the student. This aspect ties closely to the profession and job market. Changes in student interest? Or is it changes in educator/professional perspective. A little history — in the 60's there were great increases in student numbers, primarily in public parks and recreation. Then, there was the growth in therapeutic recreation followed by a change in the attitudes of the educators towards "we are administrators/managers." The attitude seemed to be: 1) denigration of direct leadership; 2) position-wise, one does not have to work up from the bottom to an administrative position; 3) change the curriculum courses and titles to lure students; and 4) a feeling of inferiority and that changing titles of programs and departments to "leisure/leisure studies" will give status.

Then, in the 80's, and especially the mid-80's, there was a decline in public park and recreation positions. The young people who entered the profession in the 60's and 70's still headed the programs, and there were few new departments or additional positions. There were great decreases in some institutions in student enrollment because of this decline in public park and recreation positions. Therapeutic recreation retained its numbers and has even increased since then. Then, in came commercial recreation and tourism. There are

misperceptions in commercial recreation as many of the positions are low-level service positions with no career advancement.

And, what happened to outdoor recreation and natural resources? Natural resources land grant institutions had gone their merry way, ignoring Curriculum Accreditation. The job situation related to natural resources and public parks has changed considerably. There now seems to be two-tiers; and, the attitude and focus also have changed. Regarding the two-tiers, there now is very clearly a professional and a non-professional hierarchy. However, the professional parks and recreation curriculum major is not yet accepted as essential background for the professional management positions. The nonprofessional positions are heavily maintenance, and the attitude is that anyone can do these and are expendable. Today, students want the management positions, but the dilemma is that they are not always very qualified. Management in outdoor recreation has focused either on management of the natural resource or management of the people and their total experience. Further, there are two types of management as related to people -- visitor *management* and the participant *experience*. Some natural resource-management types have been trying to approach behavior, and some behaviorists (most nonrecreationists) are finding the outdoors as a human experience.

What is the future in natural resource-based recreation? For parks and recreation majors, it does not appear to be in natural resource management, for one cannot be forestry, wildlife, fisheries, etc. specialists and also a recreation specialist who understands human behavior in the outdoors. However, there must be basic understandings of both the ecosystem and human dimensions. There do seem to be indicators that both aspects of management of people are needed. Look what management is now being asked to do, specifically, the development of strategic planning, and this involves management of people on the resource. Recreation professionals should not try to be a specialist in forestry, wildlife, and fisheries, but specialists in the resource itself should be utilized. The park and recreation curriculum focus should be on the quality of the experience in the outdoors. This focus on setting, the natural resource, is to be distinguished from the focus on the outdoors as a modality, or a change agent. The outdoors is a modality to meet the needs of all people, to enhance individual development, and to enhance learning. It also is a therapeutic agent. Most of the topics at this research conference deal with management of the resource as a setting. While there is some research, we must have more human dimensions research concerned with a diversity of values and the impact on human activities. The values of the outdoors as both setting and modality are extensive.

Accreditation

How does the foregoing relate to Accreditation? There is no disparity between accreditation curriculum competencies and the management of people, but there definitely is as related to the management of natural resources. A brief review of the revised 1990 Accreditation Standards will evidence such. Before revision, the Council on Accreditation had as many as 27 different options being accredited! Careful study was made and two conclusion were reached by the Council.

1. There was a basic program of competencies which should be required of all majors, regardless of size of institution or career thrust.
2. There are only four areas of differentiation for options: a) administration and management, b) natural resources, c) behavior-leadership group organization, d) therapeutic recreation, i.e. therapeutic modality. Of course there is some overlap.

So, the revised Accreditation Standards provides for a strong basic program, a "stand-alone" program. It is not, as in the previous Standards, a core to which an option is attached for a

complete program. Under the revised Standards, an option becomes an in-depth specialization or focus, requiring additional course work and experiences. Where natural resource management educators say there is disparity is a matter of what is perceived important — more natural resource (fisheries, wildlife, forestry, et al) courses or more management and behavior-related courses or recreation/leisure concepts, history, and philosophy. However, of greater concern is or should be fitting the curriculum into the larger university/college requirements, particularly emphasizing interdisciplinary courses, global concerns, and free electives. In terms of curriculum and educational experiences, there must be more innovation, a greater relationship to practitioners, and more experiential experiences or field projects. Yet, the student must get the basics of education. *Obsolescence should be one of our fears. The curriculum must prepare students for the changes in professional tasks and the opportunities of the future.*

One thing is certain, we are in an era of change, and the question is, "Will we manage change or will change manage us?" We cannot sit back.

MANAGEMENT SESSIONS:
Roundtable and Panel Discussions

ALLEGANY STATE PARK MASTER

PLANNING PROCESS:

ISSUES AND EXPERIENCE

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Allegany State Park is the largest New York State Park encompassing approximately 100 square miles in the southwestern part of the state. The natural and recreational resources provide a wide range of year round passive and recreational, environmental, educational, and cultural opportunities. A contiguous mature hard wood forest covers the park interspersed with significant and unique resources. A master planning process was initiated to provide an overall direction for the park. During this process significant issues were addressed concerning unique resources, forest and wildlife management and oil, gas and mineral rights. Many of these are applicable to other park systems. This report will focus on these issues and public participation process and the experience gained through the planning process.

Key Words: Allegany State Park, master planning; public participation; unique natural resources; diversity; forest management; wildlife management; oil, gas, and mineral rights

Introduction

Allegany State Park is the largest New York State Park and has two major recreation areas. The natural and recreational resources provide a wide and diverse range of year round active and passive recreational, environmental, educational, and cultural opportunities ranging from overnight camping to swimming, hiking and hunting. Much of the infrastructure and developed recreation facilities are old and in need of rehabilitation. Allegany State Park is significant from both a regional and park perspective in terms of types and diversity of species and habitats. There is a need to provide a direction for the park to maximize and integrate the recreational, environmental educational, cultural and natural opportunities of the park without compromising the character and integrity of its natural resources. Without providing an overall direction for the park, the opportunities the park has to offer will not be fully utilized and some of the significance of the natural resources could be lost.

A master planning process has been underway since 1974. Although the final plan has not yet been adopted by the Commissioner of the Office of Parks, Recreation and Historic

Preservation, many of the issues addressed in the draft plan and the experience gained through the planning process are likely to be applicable to other national, state and local park systems. The preferred alternative identified in the draft plan (Fig. 1, next page) may be modified through information received and concerns expressed during the public input process.

This report will focus on five major issue areas:

- Planning process / public participation
- Significant and unique natural resources
- Forest management
- Wildlife management
- Oil, gas and mineral rights.

Setting

Allegany State Park occupies approximately 100 square miles of Cattaraugus County in southwestern New York. Approximately ninety-five percent (62,600 acres) of the park's 67,000+ acre is state owned. It is estimated that over forty percent of mineral rights beneath the public lands are held by private interests.

The park is bounded on the south by the Pennsylvania/New York State line (Allegheny National Forests northern border), on the west and north/northeast by the Seneca Nation of Indians Allegany Reservation (including the City of Salamanca and the Allegheny Reservoir), and on the east by the CSX Railroad right-of-way and the Village of Limestone.

The park's location is geologically unique since it was not covered by the last Continental Ice Sheet. Hence, the primary features of the park were not modified by ice erosion or morainal deposition. The regions valleys, wooded slopes and meandering streams create an area of striking beauty.

The character of the forest at Allegany State Park is primarily a result of logging activities which occurred up to the time of the park's creation in 1921. Since most of the forest was clear cut, today's forest is predominately second growth and a mixture of even age stands.

In addition to the expansive, contiguous forest there are numerous significant and unique resources located in the park. Among these are: the Big Basin (a portion of which contains the largest area of old growth forest remaining in the park and perhaps in western New York), Thunder Rocks (a unique geological area), several types of forest that possess regionally significant attributes, Science Lake area (site of work of the former School of Natural History), Old Baldy (potential historic district), the Wolf Run area (relatively undisturbed oak forest plus rare plants), and streams and associated habitat areas throughout the park.

Since the early 1920s, Allegany State Park has been providing a variety of recreational opportunities for the public. Throughout the years, recreational opportunities have been expanded and today the park is truly a four season recreation facility. There are two major recreation areas: Red House and Quaker; 382 cabins, 323 tent and trailer sites, 5 group camps, 2 beach areas, 4 picnic areas, 1 launch ramp, 78.6 miles of hiking/snowshoe trails, 8.5 miles of self-guided nature trails, 45 miles of horseback riding trails, 61 miles of snowmobile trails, 24 miles of cross-country trails and 5.7 miles of bicycle trails. Other activities and programs include environmental education, bird watching, hunting, fishing, and touring. These resources and facilities are utilized by over 1.2 million people annually.

Planning Process / Public Participation

The draft master plan represents the culmination of an extensive effort of information gathering, analysis and public input dating back to 1974. The actual initiation for the preparation of the master plan occurred in early 1985. The 1981 Preliminary Draft Forest Recreation Management Plan (FRMP) focused on the management of the forest resources.

ALLEGANY STATE PARK DRAFT MASTER PLAN

LEGEND

-  Natural Scenic Area
-  Natural Area
-  Special Natural Area
-  Wildlife Management Area
-  Representative Forest Management Area
-  Intensive or Area or Travel Corridor/Highway Area



Division of Forestry
Bureau of Forest Management

Figure 1. Allegany State Park Draft Master Plan.

Many viewed the draft plan as a commercial timber harvesting plan. Through the scoping process and extent of public input, the agency recognized the need to assess both the recreational, natural and cultural resource needs and potentials in a comprehensive manner. As a result, the Commissioner directed that a comprehensive master plan should be prepared. Public master planning workshops held in 1985 represented an initial step in the master planning process. Following the workshop, a Scoping Findings document was prepared that analyzed 73 issues and concerns. In 1985, an extensive public survey was conducted to obtain public input on various issues. Three user/interest groups were targeted: (1) a representative sample of the general public from the Buffalo, Jamestown, Salamanca and Olean regions of New York and Bradford and Erie, Pennsylvania; (2) campers and cabin park users; and (3) the Advisory Task Force.

As a further means of increasing public involvement within the planning process, representatives from 65 interest groups were invited to participate on an Advisory Task Force. Members of a wide variety of recreation, trail, environmental, sportsmen, forestry and oil and gas organizations as well as governmental and academic representatives participated on the task force. The task force was designed to provide a balanced representation among the various interests. However, some groups felt it was not balanced. This is a basic problem in the formation of any task force. Four workshops were held during the planning process with the Advisory Task Force.

For various Task Force representatives with opposing view points, it was an opportunity to work together in addressing issues and developing criteria that would be utilized in the planning process. As identified in Figure --, there was an increase level of coordination and cooperation among the representatives throughout the workshops. However, once the draft plan was released for review, polarization between task force members occurred. They were basically divided between opposing any actions that would require cutting (logging) of trees and promoting commercial logging in the park. It should be noted that the draft plan proposed implementation of management techniques that would be required to achieve a wildlife or representative forest objective and not commercial logging in the park. It appeared that the opposing groups were partially directing their opposition to each other rather than what was proposed in the draft plan. None of the opposing groups supported the plan.

The various environmental groups were generally opposed to any wildlife and forest management within the park. From their viewpoint this translated into commercial logging. Various campaigns were initiated primarily within the Buffalo metropolitan area to gain public support for their position. As a result hundreds of letters focusing on the logging issue were sent to the Agency and the Governor. The Agency acknowledged receipt of each letter and included a one page fact sheet of the draft plan in response.

The pro-resource management side was primarily composed of local government and tourism/economic representatives, logging interests, sportsmen groups and selected trail groups. A primary concern of these interest groups was the economy of the region which is depressed, increasing tourism and improving hunting and fishing opportunities. Some of the rationale for increased management focused on initial 1921 legislation creating the park which did not mandate timber management but provided for reforestation and propagation of fish and game.

This resulted in the basic conflicts between urban versus rural and environmental groups versus pro management / economic interests. As a public agency it was our role to listen to both groups and determine what is an appropriate direction for the park. Some of the opposition to the plan was the likely result from "baggage" from earlier actions, actions that have occurred elsewhere and the "who can you trust" syndrome. In terms of "baggage", there was considerable opposition to the

Draft Recreation Forest Resource Management Plan in 1981. As mentioned above, many view this as a timber management plan. It was and continues to be difficult to separate this from the draft master plan. Many feel that the draft master plan is just a cover for timber management. The draft plan is driven by a completely different set of policies and objectives that are not based on timber yield or the generation of funds.

It is likely that national issues concerning the Forest Service and National Park Service with their management of western lands has had an impact on how the public has viewed the draft plan. In some cases, what is proposed in the plan is different than what the public may perceive. For instance, the plan proposes as a potential management technique patch cuts of 3 to 5 acres to allow for regeneration of various forest types. Numerous letters received view this as clear cutting at least 22 to 50 percent of the park.

There may also be a credibility problem with all levels of government today. Will the agency propose one thing and do something else? This concern goes well beyond the draft plan.

Finally, there is a basic issue of what is a State Park, how does it differ from other public lands and how should it be managed. The draft plan states that the type and condition of the natural and cultural resources, the approach to acquisition, and the establishing legislation are unique and specific to Allegany State Park. Adoption of a plan for Allegany State Park does not have any bearing on the management of recreational or natural resources of any other facility within the New York State system of parks and sites. Again, not all the public believes that this will be the case and that the action will not be precedent setting for similar actions in other parks. In addition, some of the public feel state parks are unique and the natural resources should be allowed to go through natural succession processes. Likewise, there is another segment of the public that feels natural resources should be used and not wasted. Both of these are basic philosophical beliefs.

There has been a considerable opportunity for public input during the public review process. Over 500 people attended the 2 public hearings and nearly 2,000 letters have been received. There has been considerable media coverage and numerous newspaper articles. The agency will review all the letters and address all substantive comments. The issues, concerns and information will be considered in the development of the final master plan.

Significant and Unique Natural Resources

The park's geological and biological resources are a unique natural resource. The Park is located within a geologically unique area in New York State that was not affected by the last glacial era. As such, there are types of habitat different from areas to the immediate north. The park's geographic location between the Great Lakes and the Allegheny Mountains provides a relatively humid climate with higher than average precipitation which contributes to the enhanced growth of the forest and forest systems. Other characteristics which contribute to the park's uniqueness are the expansive areas of mature forest, and the considerable amount of research and information on the park's environment.

Also contributing to the significance of the park as a whole is the relative lack of timber management activities since its creation. The character of the Allegany State Park forest is very different from that of the surrounding region. Most of the forest within the park is between 70 and 100+ years old with the most notable example being the Big Tree Area which contains trees 220 years old and older. The relatively low acreage of early succession systems (and the low numbers of species associated with those systems) has lowered the park's overall diversity of species. The Park, however, contributes significantly to regional biodiversity. Early successional ecosystems and species are abundant in areas outside of the park while these same outside areas are lacking in old growth

systems similar to those within the park. While protection of the parks existing old growth areas will considerably enhance regional biodiversity, the Parks greatest value to the region may very well rest in its potential for providing additional old growth systems in the future (Anderson et. al., 1991).

In the Allegany draft master plan, a natural area is defined as one within which the character of vegetation and wildlife is to a large extent the result of natural events. The primary aim of natural area designation is the protection of forest succession processes rather than the maintenance of a particular forest type or age class.

Natural areas have many values. One important value is the contribution of natural areas to biodiversity. The identification of forest areas for limited or low management contributes substantially to the overall diversity of a region because of the relative scarcity of such areas.

Uninterrupted natural succession leads to old growth systems. These systems consist of more than just old trees. They include dead and down trees and an understory microclimate conducive to species preferring areas with reduced light. The numbers and types of insectivores using down trees for habitat contribute to biodiversity and serve as food sources for species of animals preferring older forest systems. Natural Areas that have reached old growth conditions contain important pathways for fixing nitrogen and retaining and recycling nutrients. Lichens, which are plentiful in older forests, take nitrogen from the air and release it to the soil when they decompose. Biomass decomposition also involves many different organisms such as bacteria, fungi, mites, and salamanders, all of which are connected to the overall forest ecosystem. It contributes to the humus, or organic component within the soil.

Old growth systems, however, are not devoid of early succession species. As clumps of trees fall either through death and/or storm events openings in the canopy are created allowing for growth of early succession types of species. This patchwork or mosaic of forest is itself unique and contributes even further to biodiversity. The early succession patches differ from similar systems in managed areas in that they include the dead and down component of the forest which provides greater diversity of food and cover opportunities.

There are several values of Natural Areas that are associated with people. These include the psychological well being and rejuvenation of the spirit, the potential for contributing to human health and research in the future, economic benefits associated with tourism, historic and scenic importance, and resources for environmental education.

A major rationale for providing natural areas within the park is the contribution of such areas to the diversity not only of the park but of the entire region. The character of the park forest is different than that of the surrounding region due to the relative lack of large scale timber harvesting since the park was created. There are at least 745,000 acres of public/private managed forest in the region surrounding the park including NY State Forest land, State Wildlife management areas, the Allegheny National Forest and Hammermill Paper Company Lands. While approximately 9,000 acres of the Allegheny National Forest was recently designated by Congress as wilderness and the ANF also contains approximately 6,000 acres which are designated as natural or scenic areas, this represents only about 3 percent of the ANF's acreage. There are no areas in western New York specifically designated for natural area management.

NYS Biological Survey in their 1984 report pointed out that the park harbors the largest publicly owned, contiguous block of forest in western New York and provides important habitat to species of mature forests and to those requiring large home ranges or isolation from human activities. Promotion of the increase of successional and open site species, which have

abundant habitat in the region surrounding the park, while reducing habitat of mature forest species could lead to a reduction in the regional diversity of wildlife.

They concluded, however, that diversity of the park could be increased through active management without adversely affecting regional diversity as long as certain guidelines are followed. These guidelines include:

- leaving all existing old growth forests undisturbed;
- allowing forests on slopes greater than 30% to develop into old growth;
- leaving sufficient buffer to prevent edge effects from degrading conditions in the interiors of the mature stands;
- allowing old growth stands to function as natural systems;
- elimination of exotic species;
- reduction of the deer herd; and
- designation of preserves in the following areas: The Big Basin area (entire), southwestern oak and mixed mesophytic forests and the area lying south of Quaker Run from Mt. Tuscarora to Bear Bog.

Designation of some areas of Allegany State Park as natural areas is consistent with the current management of most New York State Parks. Since these areas are not actively managed for wildlife or timber, they are, in effect, natural areas, although they may not be formally designated as such. The only forest management activities occurring on a regular basis in most state parks are fire control, hazardous tree removal, scenic vista maintenance, insect and disease control and mowing (e.g., along road shoulders). Thus, the forests within state parks are basically allowed to undergo natural succession.

Allegany State Park contains some forest that is considered to be old growth (e.g., the hemlock stand in the Big Basin). Because of the rarity of old growth in the Eastern United States, its retention should be given priority. As recommended by the Biological Survey (1984) all old growth in the park should be left undisturbed and allowed to function as natural systems. Map 15 illustrates areas of the park with high probability of possessing characteristics of older forests. The old growth areas map is based on a 1934 map showing areas identified as mature vegetation.

The primary issue is regional diversity versus park diversity and old growth. It is recognized that the park has some old growth areas but most of the park is mature forest. This mature forest will eventually develop into an old growth system and the character and associated wildlife of the existing forest will change. There is considerable public perception that the park is primarily old growth. In addition, the general public likes the existing park character and would like it kept that way. Likewise, they like viewing the existing wildlife. This in itself is conflicting. From one perspective the public favors old growth (many of which view this as old trees) and at the same time likes the diversity the park has to offer. Both concepts are complex and it may be uncertain whether the general public has a complete understanding of each. Since the agency recognizes the value of old growth and its importance in the park, the question is how much of the park should be designated as natural areas. If all the forested areas of the park are so designated, the existing character of the park will change and park diversity will occur but it will take many years. Similarly, from a biological viewpoint, does the importance of regional diversity takes precedence over park diversity. The Biological Survey feels that both can be achieved in the park. Others feel regional diversity is of primary importance which has been reinforced by the concern of lower populations of various neo-tropical insectivorous bird species.

Forest Management

As mentioned, the present character of Park forests are a direct result of the logging activities conducted in the region from 1820 to 1920. During that interval, intensive operation of the sawmill and chemical wood industries resulted in removal of

most of the original forest cover on lands which are now within the boundaries of the Park. These early cuts laid open the forest floor to the sun and fast-growing, light-demanding species such as Black Cherry, White Ash, Red Maple, and Aspen established themselves as the predominant tree species in most areas of the park. These species gradually became the older, dominant trees of the even-aged tracts in the park today, 70 to 170 plus years later. Some areas in the park, which were harvested earlier or were lightly thinned, are in a mature to old growth condition today. One such area is the Big Basin where Hemlock-Hardwood stands have reached ages of approximately 200 years. Since the different forest tracts of the region were cut clear during different episodes and over an interval of some 100 years, the forests within the Park today display a mixture of tracts of even-aged stands of different ages. These issues must be addressed and resolved within the Final Master Plan/FEIS. The draft plan calls for placing 70% of the park in some type of natural area designation. A forest inventory conducted in 1974 recognized five forest types. These consisted of the following categories:

Table 1. Vegetative categories.

1. Allegheny Hardwoods (AH)

This type is quite variable across the Park as relates to species composition. Composed primarily of Sugar Maple, Black Cherry, Red Maple and White Ash with American Beech, Hemlock, Black Birch, Yellow Poplar and Cucumber tree as common associates. Sugar Maple and White Ash with American Beech tend to dominate Park stands. Red Oak sporadically occurs on dryer upland sites within the type.

2. Hemlock-Hardwood (H-H)

Type composed of an association of Eastern Hemlock and various deciduous hardwoods form an association. Recognized where Hemlock constitutes 50% or more by volume, of stand composition.

3. Oak (oak)

Type composed of White, Red and/or Chestnut Oak. Oaks occur in association with other deciduous hardwoods or Hemlock. Recognized where Oak species constitute 50% or more by volume of stand composition.

4. Cherry (CH)

Type is a special type of the Allegheny Hardwoods in that Black Cherry constitutes 50% or more by volume of stand composition.

5. Plantations (PL)

Conifer species planted on open fields, or within forest openings, in either pure or mixed stands. Red Pine, Scotch Pine, Norway Spruce, Larch and mixed Conifer plantations are recognized.

6. Open/Brush (O)

Openings that range from small grassy clearings to larger complexes of grassy fields with patches and fingers of woody and/or shrubby cover interspersed.

7. Protection Forest (PF)

Forested or open lands owned by the U. S. Corps of Engineers and managed by the OPRHP - Allegany Region, under a cooperative agreement.

Only 6 percent of the forested area is in the immature tree class and, as mentioned above, there is no sapling class. Ninety-four percent of the forested land is in the mature or old growth tree size class. These figures are indicative of the distribution of the age classes on the Park. Of the total forested area it is estimated that on 15 percent the trees are over 100 years old, on 50 percent average tree age is 80-100 years old, on 35 percent between 60 and 80 years of age and on about 5% are immature.

The fact that almost 90 percent of the land area of Allegany State Park is forested underscores the fact that forest-dependent recreation and wildlife species will dominate the area. Consequently, the character of the forest as determined by plant species composition and physical structure as determined by age class composition, will exert the dominant role in determining not only wildlife abundance and diversity, but the future long term composition of the forest vegetation and the benefits recreationists derive from it. Due to natural succession and wildlife pressures on the forest, many forest areas previously in earlier stage forest have been eliminated. Continual shading of the forest floor, compounded with overbrowsing by wildlife, has resulted in virtually no advance vegetative reproduction being present in today's forest. In addition, Aspen stands valuable for wildlife, which once comprised a significant percentage of Allegany's forest have all but disappeared.

Currently, the Park forest is undergoing successional changes which have and will continue to displace vegetative species associated with high light conditions (sun-loving), resulting in a near climax forest composed of primarily shade tolerant species. The most obvious change in the forest at Allegany State Park is the loss through natural succession of early successional forest. Approximately 17 percent of the land evaluated in 1937 was Aspen type. Substantial stands of Aspen type species are not present in the Park today. Also, substantial numbers of intermediate types of trees such as Black Cherry, White Ash, Yellow Poplar and Oaks are being replaced by the very shade tolerant Maple/Beech type.

In some areas of the Park a grass sod or continuous cover of Hayscented and New York fern has formed. These complexes adversely affect forest regeneration through dense shading and inhibition of tree species. The presence of the fern complexes is believed to be related to high deer populations because deer browse the tree seedlings that would otherwise have inhibited the spread of ferns. The presence of ferns and high deer populations result in a change in vegetative species composition of reproduction from Black Cherry, Hemlock or Sugar Maples to Beech and Striped Maple because these species are not preferred by deer as browse and can grow through the fern cover. (Horsley, 1984, NYS Biological Survey 1984.)

The need to manage the forest resource at Allegany State Park is centered about two basic concerns, 1) wildlife habitat and management, and 2) long term perpetuation of the forest and its composition.

Allegany State Park contains forest types that are special, unique or important enough that steps should be taken to assure that representative areas of these types will be present for Park users to interpret, study and enjoy in perpetuity. Discussions concerning the character of the Park forest have pointed to the presence of forest types and conditions such as old growth hemlock, the absence of previously occurring aspen types and extensive tracts of hardwoods judged unique due to size, species composition, age or condition. If one goal of the master plan is to enhance and protect the regeneration and growth of native species of plants, then the need for the restoration, maintenance and preservation of certain unique forest types, requires consideration independently from justification solely as wildlife habitat to focus on what has been termed "representative forest types."

From this inventory various age/size classifications were developed. The classifications are defined as:

Seedling-Sapling	1-25 years	<6" diameter
Immature tree	25-70 years	6" - 11.9" diameter
Mature tree	70-199 years	12" - 23.9" diameter
Old Growth	200+ years	24" + diameter

The representative forest principle is based on the assumption that maintenance of existing forest character is a reasonable goal and begins to address which areas contain forest types of such importance to the character and recreational value of the Park, and regional diversity, that natural succession should be controlled through active management practices. The authors of the 1984 Biological Survey concluded that it should be possible in an area the size of Allegany State Park to maintain successional regimes while protecting the significant tracts of old growth forests and their important species.

The maintenance of this diversity of types is twofold in purpose. First, the greater the diversity of plant habitats, the greater the probability of providing a livelihood for all endemic species, and secondly, the maintenance of a diversity of tree species, types and plant communities is the most effective way to preserve a diversity of genotypes for future culture and human use.

Representative forest types serve as resource bases for educational and research purposes and can provide economic benefits through tourism and environmental benefits through diversification and aesthetic quality.

A forest stand can be defined as "a community of trees possessing sufficient uniformity of species composition, age and condition to be distinguishable from adjacent communities." Forest stands may be of an even age or uneven age type, depending on the age structure present within the stand. Criteria were developed to define each representative forest type. They were utilized by the GIS to identify areas that met the criteria.

Table 2 (adjacent column) of the Park forest types contains the criteria utilized to identify those areas that are best maintained as a representative forest type.

Through the public Scoping and Advisory Task Force meetings, two perspectives on forest values emerged:

1. The process of succession has value and eventually leads to a desirable level of biodiversity, and
2. The existing forest has value and is worth protecting by actively managing natural succession processes.

Representative forest management will help achieve the goal of maintaining certain types of exceptional forest as "representative" of those types over time. The decisions of locating and identifying the extent of various representative forest types necessary to help maintain current forest character was a step-wise process of alternative development consisting of data inventory, analysis including interpretation, criteria identification, overlaying and synthesis (i.e. combining and understanding the interaction of various systems affecting park land character). This process of identifying management options has been greatly aided by the use of overlays, produced by a geographic information system (G.I.S.). Utilizing the information produced through the G.I.S., it was possible to conduct an analysis of data supplied by the forest inventory such as forest types; major tree species; stand locations; tree density and size, and subsequently weighing these against other parameters included within the data base such as roads; trails; buildings; watershed boundaries; slope, and environmental and unique resources.

The minimum stand condition that will allow for perpetuation of the various forest stands and subsequently, types, to retain the present representative forest character was determined. For example, to perpetuate a cherry type so that mature cherry stands exist 100 years in the future requires us to make certain a stand of one year old cherry regeneration exists today, and that it survives over the next 100 years. To do so, requires that this forest type be composed of various conditions and ideally would contain stands that represent each of the conditions from 1 through 100 years in age. The minimum condition necessary to maintain the forest type centers around the minimum stand size.

Table 2. Representative forest type criteria.

ALLEGHENY HARDWOODS - (AH)

Distinguishing Criteria:

- Type contains at least 25% CAPS (Black Cherry, White Ash, Yellow Poplar) and 50% beech, Birch and Maple
- Northern aspects
- Minimum stand size 12.4 Ac (5 hec.)

CHERRY (CH)

Criteria:

- Type contains at least 50% Black Cherry
- Occurs on all aspects
- Minimum stand size is 12.4 Ac. (5 hec.)

OAK (OAK)

Criteria:

- Type contains 75% or more Oak composition
- Southern aspects, dry sites
- Minimum stand size 19.7 Ac. (8 hec.)

HEMLOCK-HARDWOOD (H-H)

Criteria:

- Type contains 50% or more Hemlock
- All aspects
- Minimum stand size is 12.4 Ac. (5 hec.)

PLANTATIONS (PL)

Criteria:

- Planted forest stands containing 90% or more of conifer species
- All aspect
- Minimum stand size of 12.4 Ac. (5 hec.)

OPEN/BRUSH (O)

Criteria:

- Openings that range from small grassy clearings to larger complexes of grassy fields with patches and fingers of woody and/or shrubby cover interspersed.

ASPEN (AS)

Criteria:

- Type contains 50% or more Aspen composition
- All aspects
- Minimum stand size is 12.4 Ac. (5 hec.)

The N.Y.S. Biological Survey (1984) contained biological criteria relative to stand size. The authors referenced to maintain natural forest conditions and species composition requires a minimum stand size. Light penetration and air movement at the edge of a forest stand permits the development of a different community than that of the interior of the forest stand. As stand size decreases the relative importance of the edge increases and of the interior decreases until, below some minimum area, the interior of the stand itself is affected by edge conditions and no longer supports conditions of continuous forest cover.

In addition to minimum stand size requirements to maintain a particular type the age of the stands constituting the type was considered. For this purpose, the physiological age of the dominant tree species constituting the type is used as the cycle age. For example, Aspen generally has a physiological life span of 40 years, therefore, to maintain an Aspen type in an old age condition, stands of Aspen between 1 and 40 years should be maintained. An Aspen type, dependent on sites, composed of 40 stands each constituting the different forest age condition, with a minimum size of 5 or 8 hectares (mesic vs. xeric) would account for a representative forest type parkwide of between 496 acres and 788 acres. The following Table 2 illustrates the various forest types and minimum acreages necessary for maintenance of representative types across the Park.

Table 3. Minimum stand size.

Forest Type	Stand Cycle Age	Stand Gen. Size (ACRES)	Repres. Type Site	Forest Acreage
AH	200 yrs	12.4	Mesic	2,480 acres
Cherry	125 yrs	12.4	Mesic	1,550 acres
Oak	125 yrs	19.7	Xeric	2,462 acres
Hemlock/Hdwd	220 yrs	12.4	Mesic	2,728 acres
Plantation	40 yrs	12.4 to 19.7	Variable	496 to 788 acres
Open/Brush	25 yrs	12.4 to 19.7	Variable	310 to 493 acres

While modification of the Parks woodlands is an important element in maintaining representative forest types and other values within the Park, so also is the Parks contribution to regional diversity and in providing those forest types contributing to regional diversity values, such as old growth Hemlock. One objective of the need to modify woodlands to preserve, maintain or enhance forest derived values, is to achieve a sensitive balance between use and protection of the biological, physical and cultural resources of the Park. Specific goals and objectives have already been identified for plant diversity but are repeated here; these are: (1) to protect critical environmental areas; (2) to enhance and protect the regeneration and growth of native species of plants, and (3) to provide and maintain a diversity of habitats.

The draft plan attempted to provide a balance between natural successional processes and the evolution of climax forest types with the maintenance and preservation of representative forest types. This will meet the goals and objectives mentioned above. Representative forest stands should be managed at or near a minimum level required to perpetuate a forest type. Wildlife habitat needs could be further enhanced through the management of a forest type. As such, a comprehensive and coordinated approach is recommended for the management of forest types and wildlife habitat. Aspen and Open/Brush forest types were not considered as "representative forest types" due to their existence outside the park, but are considered important for wildlife habitats.

In order to maintain representative forests will require implementing various forest management techniques to achieve a desired objective. Many of these techniques are similar to those utilized in commercial timber operations. However, the difference is the objective and how and to what extent the various techniques are utilized, managed or modified. For instance, the draft plan identified the potential use of patch cutting which is defined as the removal of the entire stand in one cutting with reproduction obtained artificially (planted) or by natural seeding from adjacent stands or from parent trees cut in the operation. These are usually small, less than 5 acres, irregularly shaped cuts located to preserve forest species, maintain or create diversity, and to provide wild life openings. A segment of the general public interpreted this as clear cutting hundreds of acres of the park.

This raises another problem in preparing a technical document that requires general public review. Although all the technical terms were defined in what was considered to be an easily understandable manner, there was criticism that the document was too technical and utilized complex terminology. Translating a management science into simple language is a difficult task for forest management strategies as well as with many other sciences. In some, cases we were asking the public

to understand concepts that took professionals years to learn. The end result can be detrimental to the planning process. The public may view the plan as purposely written in a technical manner to "hide" some action being proposed or just too technical for them to understand. The net result was a negative response. This was compounded by the length of the document. To define and assess the existing conditions and evaluate the alternatives in a comprehensive manner resulted in 400 + page draft plan and 28-page supporting GIS map atlas. To simplify the document could also increase its volume. This is not to criticize the intelligence of the public in understanding complex management strategies but more to determine how such information can be presented and understood by the public. There may be no easy answer.

There are also value judgments that had to be made by the public and the agency. The most basic of these, was do you cut trees in a state park to achieve a management objective. In this case, management techniques are being evaluated against the end result. This raises the question of which is more important, the objective or the means to achieve that objective. It is further difficult for the public to understand that the techniques may be similar to commercial operations but the implementation and controls within the park would be different. This is a perception, public trust and educational concern. There is also a generic problem for both pro-management and non-management sides of the issue. Such concerns are intensified by opposing viewpoints by the various segments of the public.

Wildlife Management

The park contains the largest block of contiguous forest in western New York and this is a significant feature in providing a variety of habitats for all wildlife common to the region. It is estimated that 361 species may occur on Allegany State Park. Information on their abundance and distribution is limited. The total number of species by major groups are as follows:

Table 4. Estimated number of species in Allegany State Park by major groups.

Mammals	49	
Birds	242	(107 residents, 135 migrants)
Reptiles	16	
Amphibians	24	
Fish	30	

It has not been determined that all of these species reside permanently in Allegany State Park. The NYS Breeding Bird Atlas project survey data for Allegany State Park (1980-84) indicates 99 confirmed species, 28 probable species and 22 possible species.

Since vegetation and wildlife resources are closely related, it is generally recognized that wildlife abundance and diversity is primarily a function of adequate types, location and amounts of habitats. The fact that more than 90% of the land area of the park is forested dictates that forest-dependent wildlife species will dominate the park. The forest character will dictate wildlife abundance and diversity.

The current mix of Allegany hardwoods, hemlock hardwood, oak and cherry forest types, as well as the combination of northern and southern forest types presents great potential for the park being highly productive in providing wildlife. There are certain recognized major characteristics of habitats on ASP which are regarded as being major limiting factors to a greater abundance and diversity of wildlife. Those factors are:

1. Limited amounts, concentration and distribution of (a) conifer stands, (b) grassy-herbaceous openings.
2. A complete lack or virtual absence of any early-stage forest growth.

3. Low level of interspersed and structural diversity of stands.
4. The absence of younger age classes of conifer cover over large areas of the park.
5. High populations of deer, raccoon and beaver.

The objective for wildlife management is to provide habitat that maintains wildlife population levels over the park area and to maintain the resultant populations in suitably balanced numbers so visitors have reasonable opportunities to view and interact with wildlife communities. The desire for and experience of seeing wildlife ranked very high in public opinion surveys and was a need brought out during the public scoping sessions. The ability to provide visitors the opportunity to encounter wildlife species that inhabit early stage, mature and old growth forest conditions will occur if the Master Plan provides for the creation and maintenance of habitats that support a large variety of species. In order to have all of the wildlife species which the public expects the park to provide, some forms of wildlife habitat management will have to be provided.

The key to planning the management of all wildlife species is to know their habitat requirements and to provide them in a variety of habitat combinations that meet the needs of as many species as possible. To this end, wildlife must be viewed as wildlife communities that respond over time to habitat changes. A decision to do no wildlife habitat management at Allegany could lead to a reduced number of wildlife species. The management decision to create and maintain all forest growth stages over the entire park may maximize wildlife abundance and diversity, but would significantly reduce the opportunity to provide large contiguous blocks of mature and old growth forest conditions which have regional significance and could also lead to a reduced number of wildlife species. Therefore, it is incumbent upon the agency to prepare a master plan which addresses not only the public's needs and desires, but to select appropriate management strategies and activities which best serve the wildlife, the habitat and the People of the State of New York.

The vegetative characteristics of most habitats undergo continual change as a result of growth and succession of the plants that comprise them, and natural and man caused disasters can dramatically alter growth and succession. The agency recognizes the need for providing park areas of no management treatments and areas where treatment must be conducted in order to maintain specific conditions. An example is the need for large remote areas for black bears, while at the same time areas must be provided which produce soft mast crops to sustain them. The designation of areas for long and short term wildlife management practices that periodically treat the vegetation in order to maintain and protect habitat complexes, assures that particular characteristics and conditions are ever present for wildlife within the park.

By designating use zones managers have the opportunity to establish management practices that will assure the park of continually containing a variety of forest and community habitats, as well as diversified stages of each. Certain areas can be zoned for the natural diversification process, while others can be diversified through wildlife habitat management treatments.

The needs of the vast number of wildlife species that inhabit the park vary greatly. Therefore, some species will benefit and some will not by any single event or management practice. No one practice or event will provide for the occurrence of viable populations of all wildlife species. Management of the resources must take on a holistic approach where each resource is considered in context with all other resources. It is only through the process of interdisciplinary consultation and careful planning that coordination becomes effective. In order to provide for abundant and diverse wildlife as a whole requires the agency to create and maintain forest acreages of each stage of forest growth from grassy herbaceous to seedling/sapling through large diameter, mast producing trees to old growth

areas with their cavity-prone trees and snags. However, recent evidence strongly indicates that management for high local diversity can be disastrous if applied to all areas across a landscape. Diversity becomes reduced due to the loss of habitat interiors and by fragmenting certain habitats to a point where wildlife species cannot locate them easily.

Therefore, the draft master plan only provides management on a portion of the park's habitats in order to complement other habitats and species that exist on the park. By so doing, the park as a whole, as well as total wildlife populations, will be benefited as wildlife species respond positively to the overall variation of forest conditions that will be present.

The selected approach to addressing the need for providing abundant and diverse wildlife and forest habitats on the park, identified during the scoping process and task force meetings, was through the analysis of the wildlife species and their habitats. The task of selecting which wildlife species were to be favored in the park was not easily accomplished due to diverse public interests. The task is further complicated because the agency has a stewardship responsibility to provide for the welfare of all native wildlife species. The challenge was met through research of other agency treatment methods, identifying the constraints and limitations of natural resources and recognizing methods which would be responsive to a majority of the wildlife and public interests. By analyzing all the species and their required habitats, it became evident that some species had preferred habitat requirements that if managed for could support a much greater number of species, thus meeting the goals for species diversity and abundance, as well as public recreation. The selection process for determining which species would be used to meet the goals required narrowing the number of species to those which provided habitats for the benefit of as many species as possible, thus increasing the opportunities for visitor interaction as well as improving the abundance and welfare of as many species as practical. There are various management approaches which could have been used by the agency in preparing the Master Plan. Research of the approaches found that the Management Indicator Species concept best fulfilled the wildlife management goals.

The selection process for determining which species were to be used as recovery, featured, habitat and ecological indicator species involved researching the habitat requirements of all species that could, did or do occur on the park as well as a review of the literature written about the park's previous and current habitat conditions. Several factors entered into the selection process which had to be given extra weight due to social expectations/requirements, habitat availability, species range, species that occupied or are currently occupying the park, species that have high recreational values, species that have legal protection status, species that are specific habitat users rather than general habitat users and species which have significant impacts on large numbers of other species.

The selection of indicator species indicates that planning and management with the Management Indicator Species concept offers maximum potential for meeting 1) legal requirements, 2) issues raised by the public and Advisory Task Force, 3) management concerns on the designated areas and 4) resource development potential on the designated area. The MIS concept essentially combined the concepts of featured species, key species and ecological indicator species management. This combined with a goal for maintaining diversity will provide the areas necessary to make Allegany State Park a showcase for wildlife viewing, research and enjoyment into the next century and for generations of future park users.

Through the use of inventory data and literature searches of habitat requirements, the GIS was successful in identifying habitat areas, and with knowledge of conditions produced by various management techniques it will be possible for managers to maintain and improve forest characteristics and

wildlife diversity. The planning, direction and implementation of the management techniques or stewardship tools for the establishment and maintenance of trees, shrubs, ground cover and habitat conditions, whether accomplished naturally or through management intervention, will be done by using responsible stewardship practices with environmental and cultural sensitivity. The use of responsible stewardship practices, to protect or develop wildlife habitats where appropriate, will be those which are only necessary to directly improve or maintain a specific habitat deficiency or condition.

Similar to representative forests, there was public concern expressed on the need of maintain wildlife habitats in state parks and the management required. At the same time the public expressed their desire to view wildlife. This in itself is conflict. There were also concern expressed that cutting of trees would "destroy the homes of animals". On the flip side of the issue, segment of the public felt that not enough habitat was being proposed for selected wildlife species. Again, some of the public seemed to have difficulty in understanding the various management concepts and indicator species concept. Many seemed to focus in on the particular species selected to represent a habitat condition and not all the species that would be provided by that species. Again, this might have been a public trust issue, in that, regardless of what the plan identifies, all the management will be directed toward a few species (primarily game species).

Oil, Gas And Mineral Rights

Oil and gas rights/ownership within the statutory boundaries of Allegany State Park is a complex issue. The State did not purchase mineral rights for many of the properties when it purchased the land to form Allegany State Park. In fact, by the time the Park was formed in the early 1920s, it was already very difficult to obtain subsurface rights on many of the parcels of land acquired by the State. Historically, these rights had been sold by the original land owners to other interests, who then sold them to others or contracted for their exploration and use.

At this time there are some parcels which are inholdings in Allegany State Park which are wholly in private ownership. There are other parcels where mineral rights are held by many private owners and the surface rights are held by OPRHP. Also there are yet more complex situations where several different owners retain rights to minerals within different strata under yet another surface landowner. The State Park ownership pattern includes all these combinations of ownership patterns.

There is no up-to-date comprehensive deed search of all parcels within Allegany State Park. In the past the NYS OGS as Administrator of OPRHP's O&G leasing program, conducted an informal deed search of selected parcels within the park, but this information is not comprehensive. Based on historic regional ownership records and the OGS deed search in sample areas, it is estimated that over 40% of the mineral rights beneath public lands within ASP are held by private interests. The inholdings in approximately 10% of the park, which remain wholly in private ownership include all private mineral rights. These rights can be exercised at any time. The tracts involved, although concentrated in the southeast quarter of Allegany, are spread almost like a crazy quilt throughout the entire park, with some sections showing several layers of ownership.

There are two forms of non-public rights in Allegany State Park.

1. Reserved rights which appear in the deed as part of the process which transferred the land to public ownership; these are usually easy to determine, and
2. Excepted rights which were separated from the ownership of the land prior to the existing deed; these are almost always a problem to unravel and authenticate.

As previously mentioned, it is estimated that approximately 40 of the subsurface rights in Allegany State Parks are privately owned. Oil and gas (mineral) rights issues will impact parts of the park to differing degrees. The density of private oil and gas rights ownership varies throughout the Park but is highest in the southeast. For example, an investigation of 42 contiguous parcels, which include some 20,661 acres of park lands, shows that the public has undisputed oil and gas rights to only 713 acres or about 3% of the area. This represents serious present and future problems for the Park, for the Agency and for the public. Accordingly, the known oil and gas rights ownership patterns has to be translated into criteria which can be used in the Plan to define various zones of use and management.

Since it is the Agency's present policy to discourage oil and gas operations on its lands, the Plan proposed for the 67,000 acres of Allegany State Park provides no accommodation to such activities. In its present form, the Plan does not advocate, or support the exercise of privately-held oil and gas rights within Allegany State Park, however these legitimate rights do impact on the probability of carrying out various options considered for the plan. The converse of this observation may also be appropriate; where the park plan dictates a high degree of preservation, intensive public use or the protection of scenic areas, the oil and gas permit review process will have to attempt to bring these plan components to fruition, within the limits provided by the proper exercise of environmental review and permitting requirements.

It is an accepted fact that mineral rights owners may file for permits to conduct the necessary operations to develop their mineral estates including access to the sites and to the extent their legal rights permit the disruption of the overlying surface lands. Consequently permit processes and environmental reviews must address the extent to which the state can impose land use regulations in the park without effecting a taking, including limiting access to surface lands and ingress and egress routes, proposals for pipelines, limiting the number of drilling sites, and imposing reclamation and restoration measures. The implementation of a program to address this issue is one of the most critical aspects of the Allegany State Park planning process.

The oil and gas industry in Allegany State Park is characterized by a vast array of conditions, impacts and relationships to the park and its master plan. It is hard to understand this without referring to examples from the range of experiences OPRHP staff has encountered. These include the following recent experiences: Negotiations with international firms who have excellent legal, geological, engineering and environmental staff resources. In contrast, State staff have also tried to trace operators who have no known mailing address, regarding the condition of their derelict site and equipment. Long abandoned wells with no known owner may present a safety and environmental hazard, while sophisticated high-tech monitoring and control mechanisms are also under the preview of the same limited State staff. Records of transactions come in telemetered, computerized format and on century old, disintegrating documents in County Courthouse cellars. The risks run from the abandoned and unknown to the over-documented paper-chase and unfamiliar space age equipment.

The conditions found in the Allegany State Park oil and gas development reflects this range of conditions. In the public park lands of central and western New York State, the Agency has discovered more than 250 abandoned drill holes, of which 4/5 are located in Allegany state Park. Such abandoned uncased well holes present a continuing hazard to people and animals and to the quality of surface water and shallow aquifers. Such open conduits also allow valuable subsurface hydrocarbons to escape to the surface, thus reducing reservoir pressures.

The Agency has developed the equipment and a low-cost method that is technically adequate to plug such abandoned and

uncased wells. As new sites were discovered, these methods have been used to plug abandoned wells found at the site. Although the program to plug abandoned wells currently is not funded, the clean-up effort must remain a high agency priority.

The clean-up responsibilities for derelict wells and equipment also has been advanced where NYS DEC can direct their programs toward these important public needs. DEC notes, regarding their exercise of oil, gas, and gas storage well plugging permits, that by law all wells drilled must be plugged before abandonment. Proper well plugging is a beneficial action with the sole purpose of environmental protection, and constitutes a routine agency action.

OGS also has helped trace and redress problems associated with permit holders who are negligent in the condition of their sites on park lands. PSC reviews pipeline conditions and safety and will act to protect the public and park resources. Under certain situations, the Departments of Labor and Health may also be involved in safety and water pollution issues. The Department of Transportation may have concerns regarding the use of public roads. Finally, the Attorney General's office has represented the state agencies involved, including Parks, when disputes with oil and gas rights require legal resolution.

The review of the condition, safety and performance of the existing oil, gas and gas storage and transmission companies in Allegany State Park is shared by all of the above agencies; however, it has been recognized the OPRHP will have to take the lead in the identification of problems and in the coordination of these efforts. New project proposals represent some of these problems; however, current permitting requirements and performance documentation allow more control and systematic review.

The fact that approximately half of Allegany State Park is constrained by the mineral rights which are held by private parties requires a careful consideration of what these rights entail. Since no other economically important mineral resources are known in this area, it will be assumed that the park plan will primarily address oil and gas development, exploration and management, and gas storage and transmission line systems. The rights which are being discussed include those areas where Parks owns only the surface or a combination of the surface and only a part of the sub-surface, comprising approximately 40% of the park, and the approximate 10% inholdings where private parties own both the surface and sub-surface.

In New York State, unless rights have been previously separated, the owner of a tract of land owns the oil and gas beneath that land just as he or she owns all the minerals and other resources in the sub-surface. The land owner may grant ownership of the resources beneath the land to another person or interest. The earth may be divided horizontally as well as vertically, as when title to the surface rests with one person while title to the sub-surface is held by another person.

Where sub-surface rights are held by other than the surface land owner, that owner must recognize those rights. When oil and gas rights are held, the owner of those rights has a just claim or privilege to move on to the surface land and operate a hydrocarbon exploration and development program. These rights apply to activities on specific tracts, but they are not exclusive rights to surface use nor do they provide any privileges on adjacent or proximal tracts where no rights are held. Because of this, any geological or geophysical studies, surveys, mapping, tests or other programs that are proposed by private entities to be conducted on public (surface rights) lands should have prior approval of the agency that manages the lands for the public. Such approval is now needed for any programs which would use state park lands or other resources. A DEC rights developer and the landowner have equal responsibility to consider and reasonably accommodate each other's interest and stewardship.

In western New York State, most of the lands which are now a part of the state park system, were tested by the wildcatter's drill for oil and gas resources prior to the acquisition of those lands into the system. This testing, and in some cases development, was financed by private interests. Those private interests either owned rights or else obtained a lease to explore for and remove any oil or gas from beneath the lands involved. Most likely these oil and gas rights were obtained initially from the surface landowner. In New York state, "an ownership state," a landowner may have obtained the oil and gas rights when the land was acquired. In some other states, sub-surface oil resources belong to the landowner only after they are possessed via pumping.

In such ownership states as New York and Pennsylvania, sub-surface oil and gas rights may be separated from the ownership and title of the surface. In cases as the lands of western New York, ownership changed over the years, or the sub-surface oil and gas rights were carried along with the title to the land. As some of those lands were acquired for the park system (except where the oil and gas rights were reserved by the owner), the public gained ownership of any sub-surface hydrocarbons. However, in those cases in which the drill bit had proven that the sub-surface rights had some value, those rights were excepted and separated from the title and, in many instances, sold, traded or leased independent of surface ownership and use.

Managers of public lands in ownership states will encounter two main forms of non-public rights: reserved and excepted. Reserved rights usually are easy to determine; they appear in the deed as part of the process which transferred the land to public ownership. Excepted rights were separated from the ownership of the land prior to the existing deed. Excepted oil and gas rights are almost always a problem to unravel and authenticate. One of the major efforts of the Office of General Services, as administrator for the agency's leasing program, has been to search the titles of all lands where oil and gas rights were excepted from public park lands prior to their acquisition. Such effort requires dedicated and professional "detective" work. The managers of public land generally will need such title search services.

Where oil and gas or other mineral rights have been granted or reserved to a party other than the surface owner, and nothing is expressly stated concerning the use of the surface by the owner of the mineral estate, the courts have generally held that the owner or lessee of the mineral estate is entitled to use so much of the surface as necessary for the reasonable exploitation of his mineral rights. Reasonable use of the mineral estate has been held to include all those activities required in order that the owner or lessee may locate, extract and remove the minerals and realize a proper return from their extraction and removal. The doctrine of reasonably necessary surface use is basic to the issue of whether or not the owner or lessee of the mineral estate may be liable for damage caused to the surface in connection with the oil and gas development. The owner or lessee of the mineral estate is entitled to use the surface of the premises without liability for surface damage caused by his operations, so long as such use and the manner of its exercise are reasonably necessary to effectuate the development of the oil and gas.

The number, manner and extent of the particular uses of the surface by the owner of the mineral estate may be limited or enumerated by the document creating the mineral estate. However, if such document is silent as to particular uses, the right of the owner or lessee to use as much of the surface as is reasonably necessary will be implied. Although there may be nothing in the mineral right document expressly giving the right to drill wells, erect derricks, construct tanks, in order to give effect to the reservation of the mineral estate, the grantor had the right to enter upon the surface of the estate with all the usual and necessary appliances and remove minerals. The right to enter and make reasonable use of the surface was implied from the nature of the mineral rights.

Conceptually, ownership of a mineral estate traditionally includes the right of access and the right to use that part of the surface which is reasonably necessary to explore for and develop the underlying minerals although there are variations in each individual deed. The sub-surface estate has traditionally been considered dominant in disputes over what is and is not considered reasonable. However, the owner of sub-surface rights also has responsibilities pertaining to protection of the surface.

There has been a recent trend for courts to rule against sub-surface owners for not giving "due regard" to the rights of the surface owner, unreasonable use of the surface, or not accepting reasonable or least destructive alternatives.

Legislation easing or clarifying those issues, guided by the experience of other states, had been discussed in the Allegheny State Park Master Plan scoping sessions. Options requiring special legislation include lapse statutes, adoption of a "least destructive alternative" doctrine, the adoption of formal rules and regulations governing oil and gas development in state parks, surface owner consent statutes, or strict liability statutes. No such legislation has been advanced.

It is clear, however, that the State must be concerned that mineral right owners will challenge the mining land use regulations as a taking of mineral rights if their exercise of these rights are unduly restricted. If there owners successfully seek compensation for a taking, the State could be responsible for condemnation costs in the hundreds of millions (this issue will be discussed in the next section of this report).

The potential for guiding the proper exercise of mineral rights while protecting the park's resources and users, lies in the powers of the surface landowners to manage the entry and surface use of property through permits designed to protect the public, resources and the environment as exercised under the State's police powers. The proper exercise of the police power by the State does not require compensation. The State's power to regulate for the purpose of protecting the health, safety or welfare of the public is extremely broad, particularly in its determination of what is public welfare. Limitations on the exercise of mineral rights requires the balancing of equities among the private mineral rights owners and public rights, including the park's surface rights.

Proper conditions guiding the access to the mineral estate will be of great importance in OPRHP's enforcement of its proper police powers. The location of the survey, drillings, access and well site management functions are the proper domain of the surface landowners, so long as access to the sub-surface is not denied. This issue is progressed through a special use permit request filed by the mineral estate owner with OPRHP. Other agencies also will have permit requirements, such as DEC's drilling permit. This proposal is reviewed and changes may be stipulated to improve the environmental, safety or other aspects of the proposed oil and gas project. Environmental review of these permits will be coordinated by OPRHP acting as a SEQRA lead agency, as specified in an MOU between OPRHP and DEC. While these activities are not denying access to oil and gas rights in Allegheny State Park, they will be most important in properly guiding the proposed project and protecting the resources and programs which will be managed in furtherance of the Allegheny Master Plan.

OPRHP's exercise of a coordinative role in the enforcement of its surface access permit may also be of incidental benefit to the owners of mineral rights. An attempt to coordinate the development of many individual access roads that may be proposed by several oil and gas rights owners can allow the proposed development to be advanced with less total road construction, less impact, and a system that is better suited for later surface uses for park trails. A clear understanding of the activities that are and are not permitted allows Park's staff to provide for the safety of park patrons and the security of those development sites, contributing to safety and reduced liability.

The expertise of State staff who review Park's surface access proposal and DEC's drilling permit stipulations can reduce erosion, preserve sensitive areas and protect the sub-surface resources which are of direct economic value to the mineral estate owner.

Acquisition via negotiation or eminent domain and additional lease proposals are unlikely solutions for the broader issue of mineral rights in Allegheny State Park. It is understandable that there is a tension between environmental groups who favor prohibiting the exercise of all mineral rights in the park and the mineral estate owners who believe they are entitled to fully exercise their rights. To date, OPRHP has negotiated surface land use and access plans with those owners planning to extract minerals. In anticipation of increased mineral development and possible litigation, the state is seeking a middle position, one that will preserve the park and provide a uniform policy of land use regulations which does not restrict the mineral holders' rights to the extent that the state must pay compensation for taking private lands for public use.

While acquisition of all rights is the most comprehensive means of controlling park lands, several issues impose sequential constraints on feasible programs of acquisition. The methods required to achieving this goal will be very costly or difficult. The first problem is to determine which rights are privately owned. The complex nature of mineral rights ownership discussed in the previous section complicates this issue. Acquisition could involve extensive deed searches or the enactment of a recording lapse statute.

Estimation of actual value of the mineral rights is also difficult since the entire matter is speculative. In order for OPRHP to negotiate a sale, the agency must know the value of the interest to be purchased and cannot exceed that value in a negotiated purchase. In order to arrive at that value, representative market sales in the immediate area of the purchase is needed and/or some other information (seismic data, proven well reserves, etc.) must be acquired to justify monetary conclusion. There are only limited sales of mineral rights and many of these would be difficult to verify.

The cost of the valuation process may exceed the value of the rights being acquired. In some cases, if the oil and gas are thought to be of value, exploratory drilling which is costly and involves surface disturbance may be necessary. Exploration activity to determine such a value may be inconsistent with the other plans for the park. In one case, the Forest Service conservatively estimated that one area on their property would cost \$5 million for exploratory drilling of one area. In addition, it was estimated that more than \$1 million would be required to evaluate each ore body discovered.

Even gifts of mineral rights have been problematic to the donor because of the difficulty of establishing a value which will serve to satisfy tax audits. As a minimum, a process should be established to allow for the valuation of a few strategic acquisitions and the acceptance of gifts of mineral estates.

The above described situation could be considerably exacerbated if the State were to appropriate the mineral rights as permitted in the enabling legislation. The valuation process must be as accurate and comprehensive as possible since it is likely that the appropriation will go to the Court of Claims for adjudication. If the state begins an appropriation, it must pay whatever the court awards. In prior experience the Court of Claims, the statewide average of awards is 115 percent over the final advance payment, while the Bay State awards (surface rights) in Allegheny State Park averaged 500 percent over the final advance payment.

The claims that may have to be defended in an appropriation may be extraordinarily high. The oil and gas industry has ample success stories where properties of great value were

discovered next to unproductive fields. These success cases will become the basis for most claims against the State. Disputes may involve the location, quantity and quality of the underground reserves, as well as the hypothetical business cost of their recovery. Analysis will probably involve the economics of future sales of the oil and gas or storage rights. Claims will be backed by economists who forecast scarcity and the escalation of the value of fuels and lubricants. Innovative recovery techniques will be argued, even for currently uneconomic fields.

Finally, special requirements accompany the exercise of eminent domain by OPRHP. Hearings demonstrating the specific need for the property would be costly and the results would be uncertain. Each property owner could require the analysis of different specific park needs. In some cases the decision to condemn could be disputed and perhaps reversed after significant State costs.

The only advantage that the use of eminent domain offers is a quick settlement resulting in State ownership. Once filed, a property taken by eminent domain is owned by the State; however, years of costly disputes and potentially extreme settlements in the Court of Claims would follow. New York State does not have the resources to risk such an effort on a scale which is significant enough to help resolve Allegany State Park's overall management and planning needs.

Pursuant to the energy policies of the 1970s, OPRHP started several programs to conserve and improve the Agency's energy situation. Most of these activities contributed significant savings and reduced energy consumption. One of the energy program elements that was attempted and later rejected was the careful selection of State Parks-owned gas and oil rights which could be considered for leasing.

The outcome of the 1970s leasing attempts is worth some discussion. On the positive side, OPRHP and OGS did develop property management and permit processes that continue to guide the agency to this date. The reality of working with real examples probably contributes greatly to the quality of the current permitting process. As a negative, it was discovered that the small parcels which fit into the management and ownership "crazy quilt" are very vulnerable to wild market changes. These operations are hard to control, especially when the speculation involves schemes to entice development on surrounding parcels. The state's small lease could trigger completely different projects involving several parcels. No-lease policies may, however, also contribute to speculation since the state's adjoining underground resources could also be vulnerable to loss to neighboring production fields.

It was concluded that only through a straight-forward "no lease" of state mineral rights policy could a rigorous and clearly understood permit management program be instituted and imposed by OPRHP. This program is proposed to continue as a part of the Allegany State Park Master Plan.

A comprehensive solution based on the exercise of the existing powers of the state as a surface landowner is the only viable alternative. This control and coordination will be administered through the issuance of permits in the legitimate exercise of the State's police power. The environmental review process associated with these actions presents the most tangible program for protecting the park and its resources and allowing for required public involvement. The MOU executed by OPRHP and DEC on August 20, 1992 provides for the coordination of these review functions by OPRHP in its role as SEQRA lead agency.

Additional coordination with PSC (Public Service Commission), FERC and other agencies should help to identify where review processes conducted by these other agencies as a basis for their permitting functions, provide the opportunity and obligation to carry out the legitimate public

policies of the Allegany State Park Master Plan. OPRHP, in its coordinative role specified in the MOU, will also provide input for these external programs which have jurisdiction in the park.

The OPRHP permit provides a method for the applicant and regional field staff to review aspects of the park and its plan that may be impacted. The MOU then calls for coordination with DEC and other involved agencies and a determination of significance within twenty days of receiving a complete application. Pursuant to the provisions of SEQRA, an environmental review will then identify impacts, determine where mitigation is appropriate and set up the needed project oversight process.

Conclusion

The issues addressed and experienced derived through the master planning process for Allegany State Park can be applied to other federal, state and local park systems. Although it is unlikely that an individual park will be faced with all the concerns, it is likely that one or several may be applicable. The report provided a brief analysis of five of the major issues areas identified within the draft plan. Although each issue area was described separately, there is an interrelationship among all of them. The alternative actions or solutions are as complex as the issue itself. In many cases, there is no right answer that will satisfy everybody. The agency will have to determine a set of actions that will be in the best interest to the park, its natural, cultural and recreation resources, and to the citizens of New York.

Due to the level of public input and controversy surrounding the draft plan a considerable amount of time and effort will be required to complete the plan. The issue areas will have to be fully analyzed and proposed actions well supported and documented. Even after adoption of the plan, there will likely be a level of controversy that will continue. However, the information derived, types of analysis utilized, application of the GIS and alternative actions proposed can be useful in addressing similar issues in other parks.

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LAKE CHAMPLAIN RECREATION MANAGEMENT PROGRAM RESULTS FROM THE RECREATION RESOURCES INVENTORY, BOAT STUDY, AND RECREATION USER SURVEYS

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The New York State Office of Parks, Recreation and Historic
Preservation and the Vermont Department of Forest, Parks and
Recreation, through cooperative agreements with the National
Park Service and the U.S. Coast Guard, have developed a
recreation management program for Lake Champlain as part of
the Lake Champlain Basin Program.

The states of New York and Vermont have formed a
cooperative recreation research and management team and
have conducted:

- a) an inventory of public and private recreational resources
in the Basin;
- b) a day of aerial overflights to determine the number, types
and sizes of boats using the lake; and
- c) a series of recreation user surveys to determine use
patterns, perceived problems, boating-related
expenditures, and user characteristics.

Inventory results suggest that there are 1,600 recreation
resource facilities in the Basin counties in Vermont, and
2,419 in New York. Overflight data confirm that powerboats
outnumber sailboats by 2.5 to 1 ratio, and that power boats
under 21 feet in length are most common. Comparisons with
1980 overflight data show that certain zones of the lake have
experienced dramatic increases in the number of boats docked
or moored. User surveys were targeted at public access site
users, canal lock users and lakeside residents. Public access
site users launch boats from 20 to 40 times per year, mostly
for fishing purposes. The most popular fish sought are bass,
walleye, salmon and lake trout. Site users may spend an
average of \$50 per trip, are quite concerned about pollution in
the lake but support a continuation of chemical control of the
sea lamprey. Canal lock users are in much larger boats, tend to
be older and are more likely to be from New York or Canada
than Vermont. They recognize the value of the locks; over

three-fourths of them would be willing to pay a lock user fee to
help offset operational and maintenance costs. Lake
Champlain residents said that bike trails, followed by beaches
and hiking trails were facilities they would like to see more
fully developed in the Basin. Data from this cooperative
research effort will be incorporated into the Lake Champlain
Recreation Management Program. For example, using GIS
technology, inventory data will be used to identify where, and
how much more recreation facility development is needed in
the Basin. Overflight data will continue to document the rate
of growth in boating use of the lake. Results from the user
surveys will be useful in planning and management of the
lake's resources. Implementation of the program will consist
of adopting strategies that address issues and problems
encountered by planners, managers and recreationists on Lake
Champlain.

Introduction

Lake Champlain is the sixth largest body of freshwater in the
United States. It is bounded on the west by the Adirondack
Mountains of New York and on the east by the Green
Mountains of Vermont. The lake is 120 miles long from south
to north and is 12 miles at its widest near Burlington,
Vermont. Unlike most water courses, Lake Champlain flows
northward, discharging into the Richelieu River in Quebec,
which then empties into the St. Lawrence River. The lake has
435 square miles of surface water, over 70 islands, 587 miles
of shoreline, and a depth reaching 400 feet (mean depth of the
lake is 64 feet). Lake Champlain's drainage basin is 8,234
square miles, of which only a small portion lies in Quebec
(Fig. 1). (Lake Champlain Recreation Management Plan -
Workplan and Implementation Strategy, 1992).

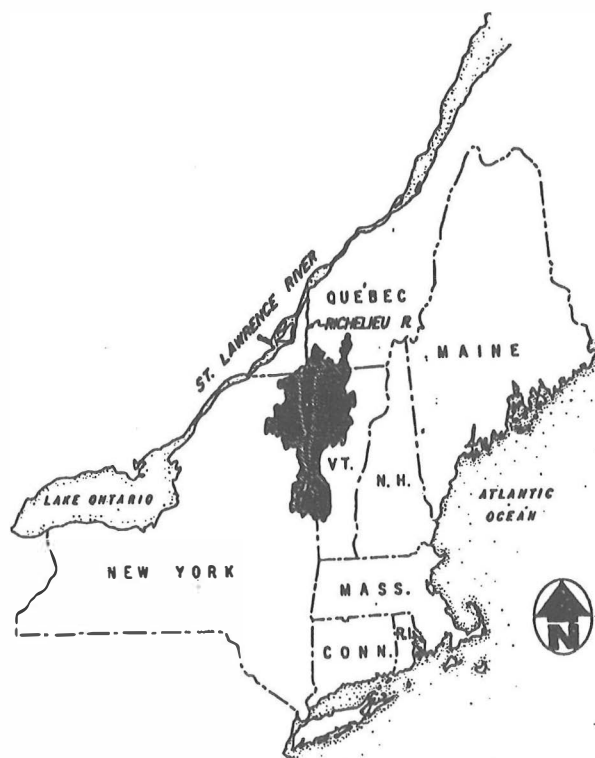


Figure 1. Lake Champlain drainage basin.

Lake Champlain is a unique and historically significant natural resource that attracts thousands of residents and visitors each year to participate in diverse recreational opportunities. Increased use and sometimes competing and conflicting uses, and development continues to pressure the Lake's natural and recreational resources. Whether it is user conflicts, overuse, lack of boat storage, or inadequate boating access, these issues and problems have been recognized for many years, but were not as pressing as they are today. No use is more vital and visible than recreation on Lake Champlain.

The Lake Champlain Special Designation Act of 1990 established the Lake Champlain Basin Program (LCBP) to develop a long-term, cooperative management plan and program to protect and enhance the lake and its drainage basin for future generations to enjoy its full benefits. Over the five-year planning process, research studies, planning, monitoring, demonstration and implementation projects, and educational activities are being conducted for the purpose of developing a plan for pollution abatement and restoration of the lake.

As part of the LCBP, the Lake Champlain Recreation Management Program is a cooperative effort between the New York State Office of Parks, Recreation and Historic Preservation, New York Department of Environmental Conservation, and the Vermont Department of Forests, Parks and Recreation. Funded by the National Park Service and the U.S. Coast Guard, the program is charged with developing a Recreation Management Plan (Lake Champlain Recreation Management Plan, Draft 1991) for Lake Champlain as part of the broader effort to develop a Comprehensive Pollution Prevention, Control and Restoration Plan, as required under the Lake Champlain Special Designation Act of 1990.

The Recreation Management Program has been guided by a workplan developed through consensus by recreation professionals, managers and user groups. The overall goal is to sustain the unique natural resources for future generations while continuing to meet the public need for recreational opportunities. Use levels and the types of recreation activities affect the quality of the recreation experience as well as the ability of the resource base to withstand use without being degraded. The absence of a resource management plan increases the risk of degradation to the resource due to frequent use beyond capacity limits.

The initial phase for developing the Recreation Management Plan included obtaining basic information on recreation use, supply, demand, issues and user characteristics. Previous studies and planning efforts either focused on certain sections of Lake Champlain or never collected comprehensive information on recreational users for the entire lake (Dunnington 1978; Lake Champlain Committee 1990; Vermont Agency of Natural Resources 1988 and Vermont Special Legislative Subcommittee 1989). The focus of this paper centers around the assessment phase of the planning process and includes the Recreation Resources Inventory, the Boat Study and a series of Recreation User Surveys. Other important components of the planning process include demonstration projects, public involvement and education. All information and data gathered throughout the planning process will be used to determine management strategies to address the issues and concerns of the recreationists.

The Lake Champlain Recreation Resources Inventory

The Recreation Resources Inventory is a compilation of information on all public, private and commercial recreation facilities available in the Lake Champlain Basin. Examples include: marinas, campgrounds, boat launches, state and municipal parks, and ski areas. It will enable planners, resource managers and the general public to access accurate data on the recreation resources in the Basin. The overall objective of the Recreation Resources Inventory is to provide

baseline information in determining where and what exists for public recreational use in the Lake Champlain Basin.

Collected separately within the two states of New York and Vermont, the end result will be to have one comprehensive basin-wide inventory. In addition to an attribute database, information will be transfigured, utilizing coordinates, onto Geographic Information Systems (GIS) to better access, query and analyze the data. Through the use of GIS, maps will be produced which will overlay recreation inventory information with other natural and cultural resource information.

Methodology

Within Vermont, attribute information on recreation facilities was inventoried and entered onto the PARADOX database system with codes and formats that are in accordance with the Lake Champlain Basin Program's GIS standards. PARADOX is compatible with various database programs allowing for information to be easily gathered and disseminated by computer disc.

The data collection process involved the following methodology;

- 1) Identify existing information sources from: Regional Planning Commissions, Health Department, Tax Department, Travel and Tourism, Historic Preservation Division, Forests and Parks, Trade Associations, and commercial publications.
- 2) Determine the quality of data from these sources and utilize it based on the following general criteria:
 - Information that is complete and verified is entered into the database.
 - Information that is incomplete, yet deemed verified is entered into the database and improved with a questionnaire completed by a site manager.
 - Information that is incomplete and unverified is rejected in favor of a questionnaire completed by a site manager. The questionnaire is used primarily to verify known information and to complete unknown information. It is a comprehensive form which addresses all aspects of a particular site. For easy data input, the questionnaire directly correlates to the database.
- 3) Determine the best methodology to digitize attribute information into the GIS system. Existing and ongoing GIS efforts and the quality and quantity of information regarding area facilities were reviewed and determined for inclusion into the data layer. Staff developed working relationships with agencies and organizations conducting similar inventories to exchange data and share workloads. A pilot study with the above factors taken into account was then implemented and the GIS workplan for the Basin developed based on the results of this pilot study.

New York maintains a statewide recreation inventory that is continually being updated. An intensive effort was directed for the Lake Champlain Basin which includes Clinton, Washington, and Essex Counties (Warren County, which is also part of the Basin, will be updated at a later date). Existing New York facilities inventory data was compared with New York State Department of Equalization and Assessment (E&A) data. E&A data includes a subcategory of information that identifies recreational facilities as well as mailing addresses for each of these sites. Utilizing this data, a facilities inventory form was sent to each site within the three counties. The data obtained from these two sources was then combined and sent to the county planning boards in Essex, Clinton and Washington Counties to verify the location of each site. Direct contact was then needed to identify any new recreation sites, verify the facility data, and update incomplete data. This direct contact was performed by a field person who verified the data by phone as well as directly visiting the sites. Any new sites found were added to the database. All data collection was completed by September 15, 1992. The data has been inputted and integrated into GIS data files.

Results

The following are some selected results from the Vermont and New York Recreation Resources Inventory that illustrate the ways in which the data can be displayed and utilized.

Approximately 1,600 recreation sites were identified within the eight counties on the Vermont side of the Lake Champlain Basin and 2,419 sites were identified within the four counties on the New York side of the Basin. The majority of the sites inventoried in Vermont are of state and federal jurisdiction (Fig. 2).

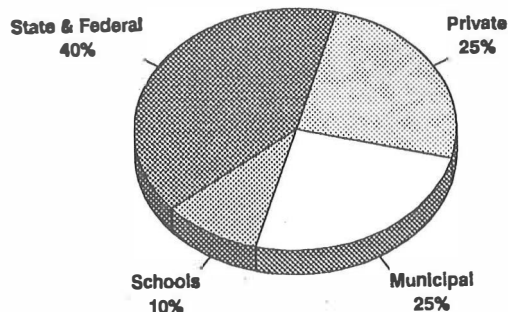


Figure 2. Ownership of Vermont recreation facilities in the Lake Champlain Basin.

Examples of recreation facilities within each group are:

- State facilities: state parks, forests, wildlife management areas, fish and wildlife access points and historic sites.
- Private facilities: golf courses, summer camps, ski areas, riding stables, marinas and campgrounds.
- Municipal facilities: town beaches, parks and picnic areas.
- School facilities: ball fields, playgrounds, tennis courts and recreation trails.

Eleven counties were inventoried with little variation in the distribution of facilities, however, higher concentrations are found in the more populated areas, such as Chittenden County (Fig. 3).

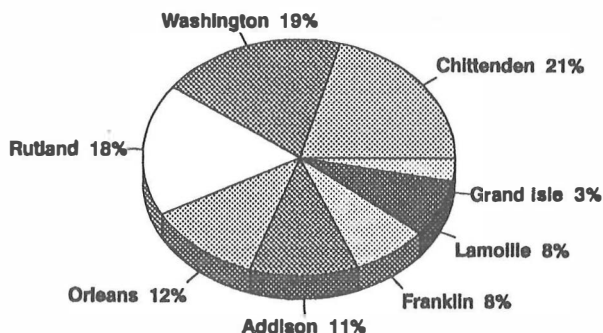


Figure 3. Percentage of Vermont recreation facilities by county in the Lake Champlain Basin.

Figure 4 illustrates the types of recreation facilities available in Clinton County, New York. Whereas figure 5 illustrates the breakdown of amenities available at the particular recreation facilities, for example there are 1,836 moorings available at boating facilities in Clinton County, New York.

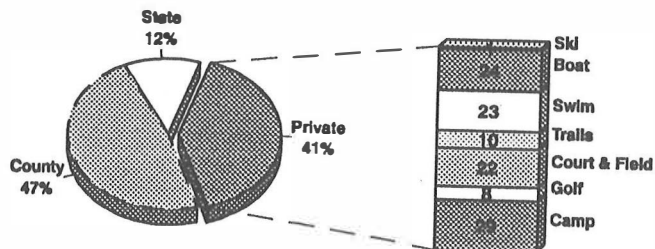
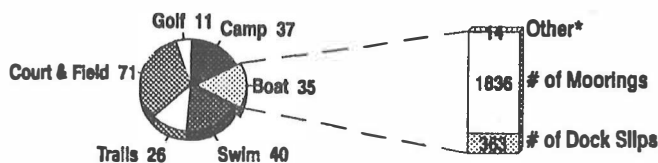


Figure 4. Type of recreation facilities available in Clinton County, New York.



* Other includes cartop launches, boat rentals, transient access

Figure 5. Amenities available at recreation facilities in Clinton County, New York.

Future efforts will focus on continuing analysis, the development of a series of technical documents which will outline specific issues or categories of information and a comprehensive report.

Conclusions

Based on preliminary results, the inventory has provided comprehensive baseline information in identifying recreational facilities in the Lake Champlain Basin. Initial results have revealed areas of facility and site concentrations, however, further analysis is needed to identify what types of sites are found in these particular areas. Synthesized with other components of the program such as the user surveys and the boat study, management strategies will be developed to identify where exactly sites need to be developed, managed and improved upon. Using GIS, resources will be easily visualized and related to other information. This will enable proficient determination of management implications.

This information will not only be valuable in assessing recreation supply and demand within the Basin but also assisting in open space and land use planning at all levels of government, project assessment and providing an easily usable means to more fully inform the public of recreation opportunities.

The Lake Champlain Boat Study

As part of developing the Lake Champlain Recreation Management Plan, lakewide information about boating and various other recreational uses was identified as a top priority. Funding was made available through the U.S. Coast Guard to undertake a "boating census for Lake Champlain.

The overall objective of the Lake Champlain Boat Study was to collect baseline information on boating use patterns on the lake by obtaining the following information:

- 1) the total number of boats on the lake in each management zone;
- 2) the type (power, sail, commercial, other, or unknown) and size of boat (0' to 21'; 22' to 32'; 33' to 55' and over);
- 3) the distance of the boat from the shoreline (closer or further than 1,000 feet from any shoreline);
- 4) the activity that the boat was engaged in (at dock or shore, moored, moving, fishing, waterskiing, anchored, or unknown);
- 5) the density of moorings in certain bays of the lake; and
- 6) comparison of similar information from 1980 to 1992 to determine boating trends for these areas.

Methodology

The study included black and white aerial photography at a scale of 1:8,000 covering Lake Champlain and its shoreline (including Canadian waters) for a total of approximately 800 flight miles. Photography was obtained on July 25, 1992 between 9:30 a.m. and 2:30 p.m. when the ground was not obscured by haze, smoke or dust, when clouds or shadows of clouds were not present, and when wind speed was not greater than 15 mph or 13 knots (the threshold on Lake Champlain where waves are still manageable for small craft and wind speed optimum for sailing). This "snapshot" of Lake Champlain during a hot, summer weekend day provided a good estimate of how many boats utilize the lake on a typical summer weekend day.

At the time that the aerial photographs were received, the photos were divided into the 34 lake management zones currently used by the Vermont Department of Fish and Wildlife and the New York Department of Environmental Conservation (Fig. 6). The photos in each management zone were laid out together in a mosaic to determine where overlap occurred (to assure that no boats were counted twice and to determine which photos had the best detail where overlap did occur).

The photos were interpreted using a 7x hand lens with a built in millimeter scale for determining boat length to an accuracy of +/- two feet. As a general technique, the shoreline was first scanned to determine the number of motorboats less than 21 feet at the dock or shore, then for motorboats 22 to 32 feet, and so on. The same shoreline was then scanned to determine the number of sailboats in the various size categories at dock. This process was repeated to cover each category of boat size, type and activity in the zone less than 1,000 feet from shore. Finally, boats in the zone further than 1,000 feet from shore were counted.

As a follow up to actual counting, the 1992 photos were compared with aerial photos taken in 1980 for Shelburne Bay and to Malletts Bay, Vermont (Lindsay 1980). The 1980 photos were recounted and analyzed according to the 1992 methodology to obtain comparable information. The 1980 photos were taken around mid-day on a Saturday in July, 1980. The weather in 1980 was comparable to the weather when the 1992 photos were taken on Saturday, July 25, 1992 around 10:30 a.m. The major difference between the two sets of aerial

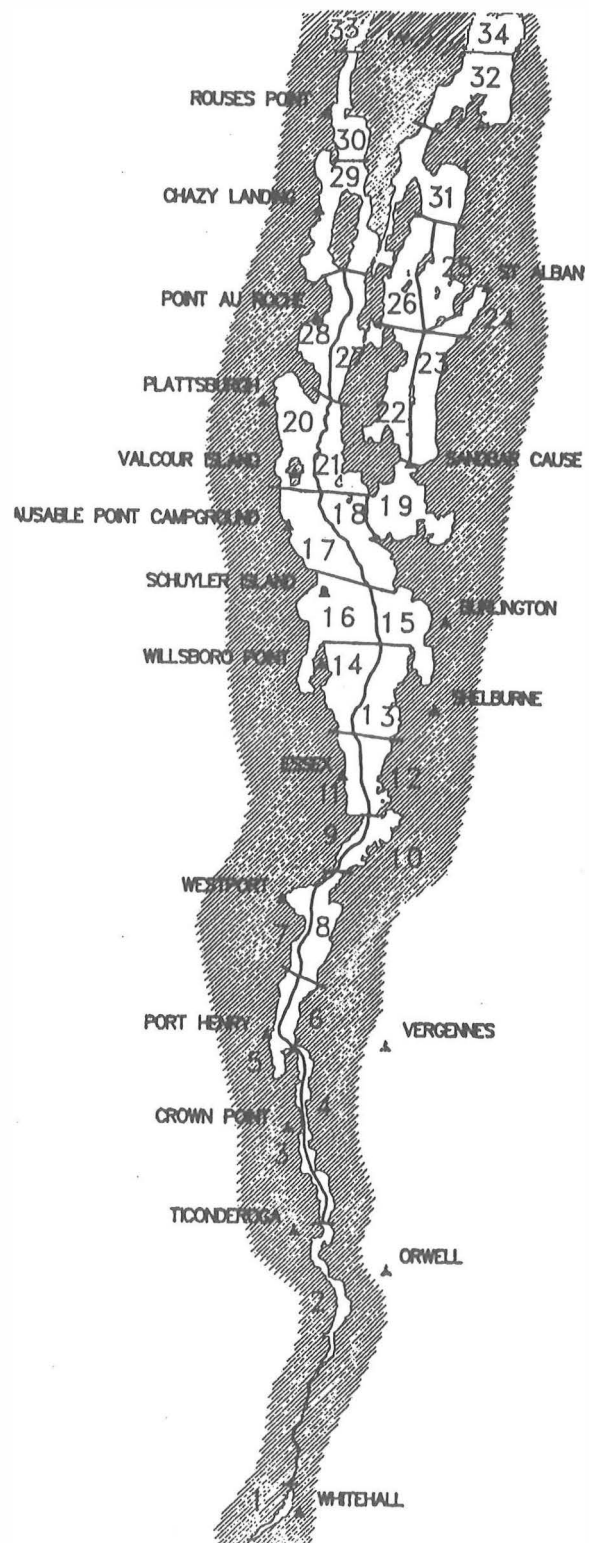


Figure 6. Thirty-four management zones as established by the New York Department of Environmental Conservation and the Vermont Fish and Wildlife Department.

photos was the scale of the photos (1:12,000 for 1980; 1:8,000 for 1992). This made the interpretation of the boat length a little more difficult and could account for a large error rate in the boat size categories.

The project was flown with three planes to capture maximum boat activity and to obtain the photography within the time constraints set forth for the project. Approximately 1,000 photos were interpreted and analyzed to collect the information necessary to meet the study objectives.

Lakewide Results

A total of 12,425 boats were counted from the aerial photographs, of which 62.0% (7,760) were motorboats, 25.4% (3,153) sailboats, and 10.4% (1,296) other boats including personal watercraft (jet skis), sailboards, dinghies, canoes, kayaks and airplanes. Less than 1% (16) of the boats were commercial vessels (Fig. 7).

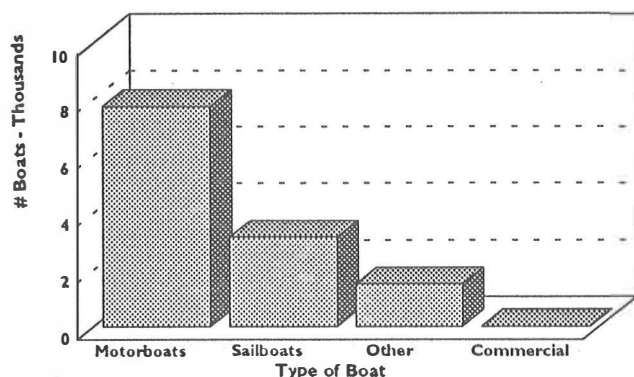


Figure 7. Total number of boats by type of boat during Lake Champlain Boat Count on July 25, 1992.

Of the total number of boats, 49.1% (6,099) of the vessels were motorboats 21 feet and smaller; 11.3% (1,409) were motorboats between 22 feet and 32 feet; 15.5% (1,929) were sailboats between 22 feet and 32 feet; 7.1% (888) were sailboats 21 feet and smaller; and 11.9% (1,484) were other boats less than 21 feet. Only 252 (2.1%) motorboats and 336 (2.7%) sailboats were greater than 33 feet in length when examining the data in aggregate [there were only 5 pleasure vessels over 54 feet in length and 15 commercial vessels over 54 feet in length] (Fig. 3).

In spite of the fact that the photos were timed to show maximum boat activity, 86.4% of the boats were not in use. They were either docked (6,805; 54.8%) or moored (3,481; 28.0%). There were 447 (3.6%) boats at anchor in protected bays and coves. No boats were engaged in waterskiing on the entire lake when the photos were taken. Sailboards, canoes, kayaks, and personal watercraft made up a small percentage of vessels utilizing the lake as did commercial vessels (i.e., barges, ferry boats). One reason that so few boats were in actual use (13.6%) could have been partially due to the weather. This day, July 25, 1992 was the first nice, summer weekend day in a string of eight rainy weekends and people may not have been ready for boating activities on this particular day.

The majority of boats (11,297; 92.2%) were located within 1,000 feet from the shoreline. This makes sense because this is where most boats were docked, moored or at anchor. Of the boats that were moving and engaged in fishing almost twice as many boats were greater than 1,000 feet from shore (1,029; 8.4%) than within 1,000 feet from shore (583; 4.7%).

Motorboats and Sailboats

Most of the motorboats found on Lake Champlain were 21 feet or less in length (6,099; 78.6%). There were 1,409 (18.2%) motorboats between 22 and 32 feet, 248 (3.2%) motorboats between 33 and 54 feet, and 4 (0.7%) motorboats over 54 feet counted on Lake Champlain (Fig. 8).

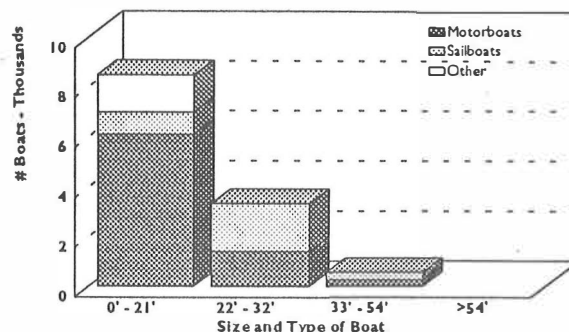


Figure 8. Motorboat and sailboat size during Lake Champlain Boat Count on July 25, 1992.

In contrast, most sailboats found on Lake Champlain were between 22 and 32 feet (1,929; 61.2%). There were 888 (28.2%) sailboats 21 feet and less in length, 335 (10.6%) sailboats between 33 and 54 feet, and one sailboat greater than 54 feet in length counted on Lake Champlain. The greater percentage of sailboats in the larger categories is indicative of the size of the lake and the availability of great sailing opportunities on Lake Champlain for these larger vessels (Fig. 8).

Management Zone Results

Lake Champlain was divided into 34 management zones (See fig. 6) to assist in determining recreational use patterns in various areas of the lake. At some point in the planning process it may be necessary to combine some of the zones together to develop implementable management strategies for certain areas of the lake.

Overall, the highest use areas were concentrated around population centers, such as Colchester, Burlington, Shelburne, Charlotte, Plattsburgh, Vergennes and St. Albans; near the U.S. and Canadian border (where most Canadians enter via the Richelieu River); and in Missisquoi Bay (Canadian waters) [See Table 1]. The southern area (Zones 1-7) of Lake Champlain received relatively little use in comparison to the northern zones.

Ratio of Motorboats to Sailboats

The ratio of the number of motorboats to sailboats for the entire lake was 2.5 motorboats for every sailboat. There were some areas of the lake where motorboats definitely outnumbered sailboats and these tended to be in the southern parts of Lake Champlain (Zones 1-6) where the lake is narrow and more river-like, and in the very northern zones (Zones 31-33). Other areas of Lake Champlain where there were more motorboats than sailboats were in the Inland Seas area (Zones 22, 23, and 25).

Sailboats congregated in protected bays and coves for safe moorings and anchorage. The management zones where there were an almost equal number of motorboats to sailboats were Converse Bay and McNeils Cove (Zone 12), Willsboro and Corlear Bay (Zone 16), Valcour Island and Cumberland Bay (Zone 20), and Shelburne Bay and Burlington Harbor (Zone 15). Zone 15 was the only area that actually had more sailboats than motorboats.

Table 1. Management zones with the highest total boat counts.

Management Zone	Total Boat Count
Zone 19 – Malletts Bay (VT)	1569
Zone 15 – Burlington Harbor and Shelburne Bay (VT)	1082
Zone 20 – Valcour Island and Cumberland Bay (NY)	968
Zone 29 – Monty Bay, Trombley Bay, King Bay, Chazy River (NY) and Isle La Motte Passage, Alburg Passage (VT)	961
Zone 34 – Missisquoi Bay	589
Zone 33 – Richelieu River	563

Comparison of 1980 and 1992 Photos for Shelburne Bay to Malletts Bay

Aerial photography taken on July, 1980 was analyzed using similar techniques for the 1992 photography for Shelburne Bay and Burlington Harbor (Zone 15) and Malletts Bay, Vermont (Zone 19). There was a dramatic increase in the number of boats either docked or moored in Shelburne and Malletts Bays when comparing boat usage primarily within 1,000 feet from the shore.

There were also many more boats on the water and away from their docks or moorings in 1980 than in 1992 (even though there were a lot more boats in the two bays in 1992). In Malletts Bay, 6% (64) of the boats in 1980 were moving and fishing compared to 4% (59) in 1992. For Shelburne Bay and Burlington Harbor, 10% (51) of the boats were moving and fishing while in 1992 only 3% (25) of the boats were moving and fishing. There was a significant increase in the number of boats anchored (in effect overnight camping on the water) between 1980 and 1992 for these two areas.

One of the major differences between the two zones was the fact that in Shelburne Bay the number of large sailboats increased dramatically from 1980, while Malletts Bay lost large sailboats. Both zones had increases in larger motorboats, but Malletts Bay saw a 253% increase in motorboats 22 to 32 feet in length.

In inner and outer Malletts Bay (Zone 19) there were 1,045 boats in 1980 and 1,534 boats in 1992, representing an increase of 47% (489 boats) over the 1980 count (See Table 2). Specific trends noted included: 1) an 83% increase in the number of motorboats; 2) an 109% increase in boats 22 to 32 feet in length; 3) an 101% increase in the number of boats docked; and 4) an 194% increase in the number of boats anchored.

Table 2. Comparison of boat counts between 1980 and 1992 for Malletts Bay and Shelburne Bay.

Type	Malletts Bay Boat Counts				Shelburne Bay Boat Counts			
	1980	1992	Diff.	% Change	1980	1992	Diff.	% Change
Motorboats	481	879	398	83	220	311	91	41
Sailboats	328	364	36	11	135	373	238	176
Commercial	0	0	0	0	2	4	2	100
Other	236	291	55	23	121	172	51	42
Size								
0' - 21'	682	893	211	31	323	460	137	42
22' - 32'	276	931	655	237	117	283	166	142
33' - 54'	87	65	22	-25	33	113	80	242
> 54'	0	0	0	0	5	4	1	-20
Activity								
Docked	393	790	397	101	238	396	158	66
Moored	570	630	60	11	172	419	247	144
Moving	56	54	2	-4	46	22	24	-52
Fishing	8	5	3	-38	3	3	0	0
Waterskiing	0	0	0	0	2	0	2	-2
Anchored	18	53	35	194	15	20	5	33
Unknown	0	0	0	0	0	0	0	0
Distance from Shore								
< 1,000'	965	1494	529	55	438	836	396	91
> 1,000'	80	38	42	-53	37	24	13	-35
Total	1045	1534	489	47	478	860	382	80

The total number of boats found in Shelburne Bay and Burlington Harbor (Zone 15) in 1980 was 478, and in 1992 the number of boats was 860; representing an increase of 80% (384 boats) over 1980. Sailboats increased 176% from 1980 (1980 - 135; 1992 - 373), as did the number of boats that were moored (an increase of 144%). The most dramatic increases were in the size categories with a 142% increase in the number of boats 22 to 32 feet in length (1980 - 117; 1992 - 283) and a whopping 240% of boats 33 to 54 feet in length (1980 - 33; 1992 - 113).

Conclusions

The use of aerial photography to document boat use on Lake Champlain proved to be a valuable technique for a lake this size. It is important to remember that the boat survey information was the result of photo "interpretation." The information will be used as baseline information since the lake was flown only once during the course of the summer.

Recreational boating and fishing on Lake Champlain have become popular as indicated by the number of boats counted on the lake during the 1992 summer. There is reason to believe that the number of boats counted may be low due to the recession. It was reported that boating was down in 1992 and that many marinas had space available. During the late 1980s most marinas had long waiting lists for dock and slip space.

If the total of 12,425 boats were spread out evenly over the entire 172,800 acres of Lake Champlain, the lake would seem almost empty. But, when examining use in each of the 34 management zones the numbers indicate otherwise. Even though there was not much use in the southern zones of Lake Champlain, the Broad Lake, the Inland Sea and Malletts Bay receive a tremendous amount of use. Boating was concentrated around population centers, protected bays, coves and islands, and where there are summer camps and marinas. The zones surrounding these high use zones will probably see increased boat traffic as these areas reach capacity thresholds.

Most of the boats were small motorboats less than 21 feet in length or sailboats between 22 and 32 feet in length. The actual percentage of boats in use was found to be relatively small and use was probably weather-dependent. Boating occurred both near the shore and out in the open water with sailboats generally using the expanses of the open water further from shore. The greatest increase in the number of boats in Malletts Bay and Shelburne Bay were in the larger watercraft sizes (22' - 54' in length).

Pleasure boating, sailing and fishing were the most popular activities. There were a number of other types of watercraft using Lake Champlain many of which were dinghies used to reach moored or anchored boats. There were no boats engaged in waterskiing on this particular day; however, waterskiing does occur near the shore and in many bays on the lake. Canoeing, kayaking, jetskiing and sailboarding were not significant widespread uses on this day. Their use does occur at specific locations on the lake that meet the needs of the user.

There were quite a few popular overnight anchoring areas, and this use has increased dramatically over the last ten years. In Vermont, the number of moorings have proliferated in some areas, while the number of marinas have stayed relatively the same. A few Vermont marinas have expanded to add more dock space and moorings. There have been few new marinas permitted along the New York shoreline, but individual moorings have not been as popular.

The Lake Champlain Recreation User Surveys

Another part of the initial phase for developing a recreation management plan for Lake Champlain was obtaining basic information on recreation supply, demand, issues and specific user characteristics. A series of recreation user surveys provided the baseline information necessary to assess the overall recreation demand for the Lake Champlain Basin.

The New York State Office of Parks, Recreation and Historic Preservation and the Vermont Department of Forests, Parks and Recreation conducted recreation user surveys during the summer of 1992. The surveys targeted public access site users, canal lock users and residents adjacent to the shoreline of Lake Champlain. The surveys were designed to identify important recreational issues and to determine management strategies to ensure sustainable recreational use of Lake Champlain. Specifically, the surveys assessed recreation user groups' needs, concerns and problems relating to use of Lake Champlain.

Many of the questions in the surveys were similar for all three recreation user groups, however, there were also specific questions targeted for each user group. The following were some of the broader issues addressed in the surveys:

- socio-economic characteristics of recreation user groups;
- boating-related expenditures;
- extent of recreational conflicts;
- type and size of boats utilizing Lake Champlain;
- types and amounts of recreational activities occurring on Lake Champlain;
- locations needing improved and/or additional public access to Lake Champlain;
- areas of the lake that are overused and congested;
- lake users' knowledge of boating safety and navigation.

Methodology

The following briefly describes the methodologies used for the three survey efforts:

Canal lock user survey methodology. This study was conducted between Lake Champlain Canal Locks #11 and #12 in the town of Whitehall, New York with the cooperation of the New York Department of Transportation Waterways Division (jurisdiction transferred to the NYS Thruway Authority). Survey forms were distributed by lock attendants at Lock #11 and picked up at Lock #12 and visa versa. Canal lock users were also given the option to return the survey through the mail.

The canal lock user surveys were distributed during the summer of 1992 (July 1 to Sept. 20). Distribution occurred on both weekdays and weekends during operating hours. Approximately 500 surveys were distributed and 114 were returned, representing a 23% response rate.

Public access site survey methodology. This study was conducted at eleven public access sites in New York and thirty-one in Vermont. These access sites are free of charge and are open twenty four hours a day. They have facility capacities that range from cartop sites with parking for 5-10 cars to large launch facilities that can accommodate over 100 cars and trailers. Surveys were distributed during the 1991 and 1992 boating seasons (from mid-May to mid-September). Surveys were distributed on weekdays as well as on weekend days and throughout the length of each day. Data was obtained from both sides of the lake using similar survey forms with slight variations to accommodate situations unique to either New York or Vermont. Boaters completed self-addressed, stamped surveys that had been left on windshields of parked vehicles or distributed at New York State campgrounds by entry gate personnel. If people were present at a site, survey forms were given to each person or group. Approximately 3,200 surveys were distributed (2,200 in Vermont and 1,000 in New York) and 900 were returned. Of these returns, 220 came from New York and 680 came from Vermont.

Resident survey methodology. This survey included distribution to both New York and Vermont residents within close proximity to the shoreline of Lake Champlain. A list of New York residents within one-half mile of the shoreline was obtained from the Office of Equalization and Assessment data. From this, a mailing list was developed based on a 5% sample of the total number of New York residents. The questionnaire

along with a postage-paid, self-addressed envelope was then mailed to residents living near Lake Champlain. In Vermont, questionnaires along with a postage-paid, self-addressed envelope were handed out at every tenth household with lake front property. This provided a 10% random sampling of Vermont residents adjacent to the lake.

Both surveys were distributed during the summer of 1992. A total of 947 surveys were distributed to New York residents and 465 surveys to residents of Vermont. Of the total questionnaires distributed, 412 were returned representing a 29% response rate. Of these returns, New York had a total of 255 returns while Vermont had a total of 157.

Initial Results

The survey data was coded and translated into a form appropriate for computer analysis utilizing the Statistical Package for Social Sciences (SPSS). The following are selected results from each of the Recreation User Surveys:

Canal lock user survey results. Boats powered by inboard motors (34%) were the most frequently used type of craft for traveling through the canal locks. Inboard/outboard motors (31%) were the next most commonly used type and only 6% were powered by outboard motors. The majority of boats traversing through the locks were greater than 23 feet in length (80%). More than half (58%) were 28 feet or longer in length (Fig. 9). Approximately three-fourths of the boats had greater than 200 horsepower engines and 43% of the boats had two or more engines.

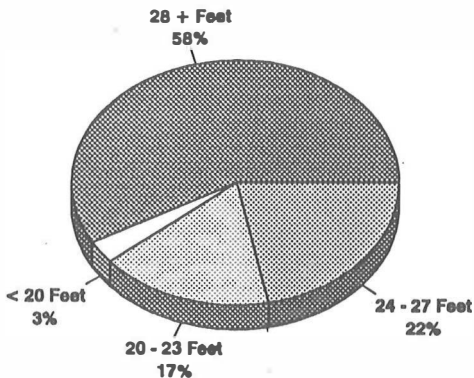


Figure 9. Length of boat utilized on the Lake Champlain Canal system during the summer of 1992.

The average age of respondents was 51, 82% of the respondents were older than 40. Most of the people per group fell in the 40-59 age group (43%) where the average number of people per group was 2.2. Over 71% of canal lock users have a total 1991 household income of over \$50,000, while 22% of these earn over \$100,000.

Thirteen percent of lock users resided in Canada, while 44% lived in New York and only 6% resided in Vermont. Significant percentages came from other states near New York, including New Jersey, Connecticut, and Massachusetts (Fig. 10).

More than three-fourths of canal lock users (76%) would be willing to pay a lock user fee to help off-set operational and maintenance costs. Of those who agreed to pay a user fee, over half (56%) stated that they would be willing to pay more than \$30 per season, while 60% indicated that they would be willing to pay more than \$10 per day for use of the Lake Champlain canal system.

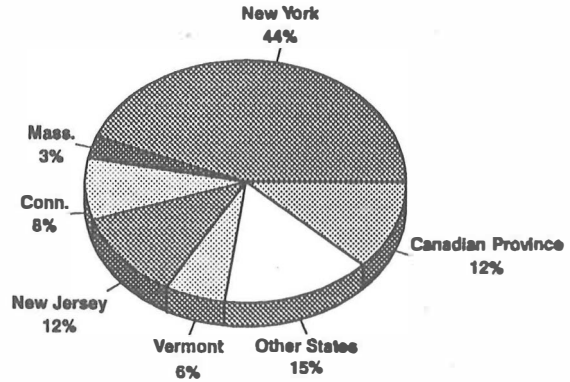


Figure 10. Permanent place of residence of the Lake Champlain canal lock users during the summer of 1992.

Boaters used the canal locks an average of 11 days during the 1992 boating season, with 49% of those using the locks more than one day per season. Twenty-three percent of lock users stated that if a user fee is charged it would impact the number of times that they would utilize the canal system. If fees were charged, users claimed that they would use the locks an average of only 7 days per boating season.

Public access site survey results. The primary purpose for visiting these sites is to launch boats, mostly to fish on the lake. Overall, 68% of boating trips were to fish, with the remainder delegated to pleasure powerboating, sailing, canoeing, kayaking, jetskiing, etc. (Fig. 11). Other nonboat-ing uses of the sites are passive activities such as just looking at the lake, picnicking or sunbathing. A few people were observed using the sites to swim, hike or on rare occasions, to drink. About one-quarter of site use occurred between 7:00 AM and noon, 56 percent between noon and 6:00 PM and less than 20 percent after 6:00 PM. Each weekend day contributed 22 percent of total use of the sites. Tuesdays were the least used days, contributing only 6 percent to total use and the other days each contributed 11 to 14 percent. The most popular fish sought by fishermen were bass, walleye, salmon and lake trout. However, 37 percent of fishermen were out for general fishing, with no specific species in mind.

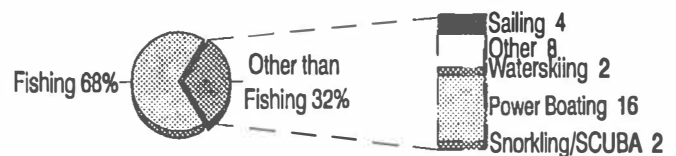


Figure 11. Primary purpose for launching boats at Lake Champlain public access sites.

Boaters were asked to comment on any delays they encountered while launching or retrieving boats at the launch sites. Take out delays were longer than launch delays; Sunday users were more likely to experience delays than users on any other day. Conflicts were seldom seen or reported and in many cases, boaters helped each other launch or retrieve boats from the water. It is not uncommon for site users to launch boats 20 to 40 times per year. The average was 21 times for site users on the New York side of the lake and 36 times for users on the Vermont side. Data from Vermont respondents indicated that spring users tend to visit the sites more per year than summer users.

Boaters were provided with a list of facilities/improvements that might be found at public access sites and asked to indicate those which they felt should be provided (if not available) or improved. Overall, restrooms were most often selected, followed by docks, launch ramps, parking capacity and lighting. Vermonters indicated that restrooms, docks and launch ramp improvements were the most needed, while New York boaters tended to be more concerned with site maintenance and supervision.

Site users were asked to indicate their boating-related expenditures on the day they received a survey. Total expenditures averaged \$51.52 with the most common expenses being for gas and oil for boats (\$16.00) and food and beverages brought along on the trip (\$17.00). Over 80 percent of all respondents reported these kinds of expenses. Fishing equipment expenses, reported by only one-third of the respondents, averaged \$22.50. Restaurant and bar expenditures were reported by even fewer respondents but averaged about \$30.00 per trip, followed by lodging expenses (\$217), entertainment (\$44) and boat repairs and parts (\$60). Restaurant expenses were reported much more often by New York public access site users (over 40 percent) than by their Vermont counterparts (15 percent). Furthermore, their expenses were nearly twice those of Vermonters. Entertainment and lodging expenses associated with the trip were also reported more often by New Yorkers than by Vermonters. These expenses were mostly made near the lake.

Public access users indicated the number of days they utilize each zone of the lake per year from a map of thirty-four management zones. Those areas receiving the highest percentage of use per year by New York public access site users were Zone 20 (Plattsburgh and Valcour Island) and Zone 28 (Point Au Roche). Zone 20 had an average of 10.9 days of use per year, while Zone 28 received an average of 13.9 days of use per year. Those areas that had the highest percentage of use per year by Vermont public access site users were Zone 19 (Malletts Bay) and Zone 15 (Burlington and Shelburne Bay).

Resident survey results. Residents were asked the number of days per year that they participated in specific activities on Lake Champlain (Table 3). The most popular activities were swimming, fishing and power boating. Only 15% of the respondents participated in camping. Twenty-two percent of residents spent more than 60 days swimming per year and 38% swam between five and twenty days per year. Forty-three percent of those who fished did so between five and twenty days per year. Twelve percent indicated that they fished for more than 60 days per year.

Over 84% of residents have not taken a boating safety course in the past five years. More than three-fourths of those residents surveyed indicated that they were familiar with the Standard Waterway Navigation Aids and the Navigation "Rules of the Road." Only 22% stated that they have had a courtesy boat inspection in the past year.

Table 3. Recreational activity participation by residents living adjacent to Lake Champlain during the summer of 1992.

Activity	Percent Participation
Swimming	72%
Fishing	56%
Power Boating	48%
Boat Touring	35%
Canoeing	34%
Waterskiing	33%
Rowboating	28%
Sailing	27%
Visiting Historic Sites	25%
Picnicking	24%
Snorkling/SCUBA	16%
Camping	15%
Other	8%

Residents were provided with a list of eight items and given the opportunity to indicate which of these activities/facilities were needed within the Lake Champlain Basin (Fig. 12). Of these, bike trails (30%) were identified the most followed by beaches (20%) and hiking trails (18%).

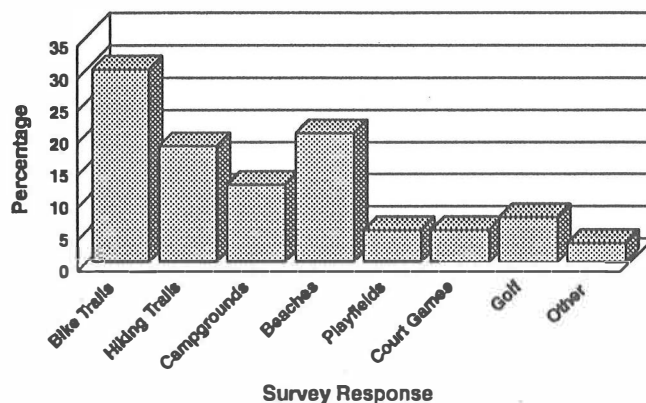


Figure 12. Non-boating activities and facilities needed within the Lake Champlain Basin identified by residents.

Residents were given the opportunity to write any additional comments they had regarding Lake Champlain. One of the largest concerns of the residents was water quality and pollution of the lake (16%). Another important issue was the need for control of aquatic nuisance plants (10%).

Discussion

The survey results presented here are only a sampling of the various types of information collected for each user group. Similar types of analysis can be conducted for each survey as well as cross relationships of questions by user groups and among user groups. For example, the marketing discussion (below) for canal lock users also can be developed for public access site users or combined for all survey groups. The following is a discussion of the selected results from each of the Recreation User Surveys:

Discussion of canal lock user survey results. From a marketing perspective, data from the canal lock user survey can be applied readily to the private as well as the public sector and utilized to promote the development of a tourism plan for the Lake Champlain region or to determine facility improvement needs. Some of the baseline data on canal usage is important to illustrate the type of market utilizing the canal system, such as the size and type of craft and specific user characteristics. This type of information can help direct the development of facilities along the canal system which that meet the users' needs such as restrooms, pumpouts, food and gasoline. While it was found that the majority of canal users fall within the above average income categories, there is a need to target lower income user groups.

Marketing strategies, specifically advertising, can be used to target specific user groups in an attempt to promote tourism within a particular region such as the Lake Champlain Basin. Survey results illustrate that the typical canal user is a transient on a multi-day trip from outside of the Basin. Of those lock users surveyed, 23% had a permanent place of residence within Albany, Saratoga and Rensselaer counties in New York State. Only a small percentage of Vermonters actually utilized the canal system. This type of information provides insight as to which specific areas can be targeted for advertising and which areas may have a potential for increased tourism.

Survey results also suggest considerable support for user fees to help off-set operational and maintenance costs. About three-quarters of lock users supported the idea of charging user fees at the locks and about the same percentage indicated that if a fee was imposed that it would not impact the number of times they utilize the canal system. One of the most frequent responses to the open-ended question indicated that user fees for public facilities should be administered.

Discussion of public access site survey results. One of the largest concerns indicated by public access site users was the need for improvements at public access sites. Restrooms and docks are lacking at many Vermont sites and launch ramps need improvement. Users also provided comments on which locations on Lake Champlain needed additional and/or improved access. These are in Shelburne Bay, Burlington Harbor, Malletts Bay, Southeast Inland Sea, Valcour Island, Plattsburgh, Ticonderoga and Point Au Roche. These needs directly correspond with users responses on lake utilization (locations where users concentrated boating activities). More specific comments on what amenities were needed or improved at particular sites provides resource managers with a good indication of how sites can be improved to better meet the needs of users.

Baseline data on boating-related expenditures is important for assessing the economic impacts associated with recreation as well as providing a foundation for promoting sustainable tourism development within the Lake Champlain Basin. For example, the differences reported between New York and Vermont site users for restaurant, entertainment and lodging expenses probably caused by the fact that, relative to Vermont, few people live close to the lake on the New York side. This information provides insight as to where money is being spent as well as indicating those areas where demonstration projects could be funded to further enhance tourism development.

Discussion of resident survey results. To better understand recreational behavior of residents the survey asked residents to select activities in which they participated within the Lake Champlain Basin. The top five activities included swimming, fishing, power boating, boat touring and canoeing. Based on this data it would be reasonable to assume that more public access to the lake for swimming may be needed. This assumption is further supported by other survey findings as beach and swimming areas were chosen as the

second most needed facility/activity within the Lake Champlain Basin. In addition, the Recreation Resources Inventory results indicate that swimming areas and beaches are lacking on Lake Champlain. About six percent of residents participating in the survey claim that they do not have access rights to Lake Champlain. Since fishing is a popular activity engaged in by residents, it may seem appropriate to increase public access for shore-based fishing.

The residents were asked a series of questions about boating safety and navigation rules. It was found that over three-quarters of residents have not taken a boating safety course in the past five years, while over 60% agreed that a boating safety course should be a requirement to operate a power boat on Lake Champlain. This survey data gives strong support to the idea that a comprehensive boater education program may be needed for Lake Champlain. An emphasis on education, particularly at access sites, such as safety booklets and on-site information bulletins, may be an alternative to a mandatory boating safety course.

Conclusion

Surveys are a useful way of soliciting public opinions from specific user groups, particularly recreationists on Lake Champlain. The recreation user surveys reported here are part of a larger survey effort occurring within the Basin. In 1993 surveys are being directed at snowmobilers, ice fishermen, marina users, Canadian canal lock users, park users and divers on Lake Champlain. Integration of the survey information from all recreation user groups will provide a comprehensive view of recreationists' needs and concerns relating to Lake Champlain.

Analysis of the survey results can lead to a determination of recreation management strategies and actions for specific areas of concern on Lake Champlain. Baseline information obtained from the surveys enable a determination of use capacities for particular management units of the lake; this includes the recommendation and development of normative standards for particular activities and use levels for certain areas of concern. Additionally, information on usage of the lake obtained directly from the surveys will help identify areas that are overused and will assist in identifying areas of the lake to relieve congestion. Survey results can also help identify any potential recreation opportunities.

Overall Management Implications

Results from this study (Recreation Facilities Inventory, Boat Study, Recreation User Surveys) will be integrated with other ongoing components of the Lake Champlain Recreation Management Program, including involvement with town and county planners and specific recreational organizations within the Lake Champlain Basin. Full analysis of all information will provide insight into necessary management strategies needed to sustain diverse high quality recreational experiences on Lake Champlain. The information collected thus far provides insight for a number of potential management implications, including:

- The need to address management of the areas of Lake Champlain that are experiencing high levels of boating use, moorings and anchoring to alleviate existing or potential use conflicts through congestion. Future access strategies should be explored to spread use to other less utilized areas of the lake.
- The management zones surrounding high use areas will likely see increased boat usage as these areas reach capacity thresholds.
- The tremendous amount of increase in boats in Shelburne Bay, Burlington Harbor and in Malletts Bay from 1980 indicates that boating will continue to be a popular activity and is likely to increase as the population of the basin increases and the economy recovers.

- The increase in moorings and boating use near designated navigation routes for the ferries indicates the need for better management in these areas and that boaters may need to be educated in the rules of the road.
- The proliferation of moorings and anchorage areas suggests that the states should address moorings through comprehensive management, towns developing mooring management zones (Vermont), and possibly regulating the placement of moorings. Moorings in some areas are conflicting with other uses and preventing safe navigation. Additional special anchorage areas may need to be designated on the charts for Lake Champlain to provide safe overnight anchorage.
- As most boat usage on the lake is generally small watercraft, the need for safe boating is extremely important on a lake this size. Boating education should be enhanced and include safe boat handling skills, rules of the road, navigation, and engine repair and maintenance.
- With the amount of use near the U.S./Canadian border it is important that information be bilingual in English and French and that Canadian boaters are provided with information on New York and Vermont boating and fishing laws and regulations.
- With the significant population increases in the Lake Champlain shoreland town populations (Holmes et. al. 1993) and the increasing demands and needs being placed upon recreational facilities and public access sites, there may be a need to improve public access near population centers, to improve maintenance of existing recreational facilities and to redistribute use on Lake Champlain.
- Demand for non-boating activities and facilities to access and enjoy the Lake indicates a need for bike trails, swimming areas and public fishing access.
- There is an expressed need for improvements in interstate/country information exchange on the recreation facilities and opportunities available within the Lake Champlain Basin.
- There is a demonstrated need for additional information, such as, on-site information bulletins, signage, brochures, and detailed maps of the Lake Champlain region.
- Additional research is needed on the recreation-related economic impacts to support sustainable tourism development that is compatible with the character and environmental resources within the Lake Champlain Basin. For example, there may be growth potential for restaurant, entertainment and lodging facilities on the New York side of the lake but not on the Vermont side.
- Funding mechanisms and demonstration projects need to be explored as well as continuing coordination on an interstate/country basis to sustain diverse high quality recreational experiences on Lake Champlain.
- There is an expressed need indicated from the recreation user groups for devising a reciprocal fishing license for Lake Champlain.
- There is a strong interest, particularly by those residing within close proximity to the shoreline of Lake Champlain for controlling shoreland development. Similar interest is expressed by recreationists in favor of the government purchasing lands for preserving open space and recreation within the Basin.

Other management implications of the study results include the incorporation of results with other Lake Champlain Basin Program activities. The data obtained can be utilized by other Basin committees to help direct and support implementation projects and aid in the decision making process for future planning within the Lake Champlain Basin.

Summary

The information gathered by this effort has broad implications and applications to all levels of government (federal, state, local) and the private sector. In order to facilitate informed decisions, it is important that the information gathered gets disseminated in a timely and concise manner and is broadly distributed. Fact sheets will be prepared as the information is being analyzed. This will be followed by more comprehensive technical reports. Likewise, it is important to get feedback from the users of the information to help direct analysis that will be most relevant.

The development of the Lake Champlain Recreation Management Plan further represents the close cooperation between two states to address a regional issue. In addition, each state recognizes the need for communities on each side of the lake to work together in addressing recreation needs and protecting its natural and cultural resources.

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THE ROLE OF FEES IN THE PROVISION OF OUTDOOR RECREATION OPPORTUNITIES

This session was composed of a panel of speakers, each of whom presented a few ideas and perspectives, then opened the session to group discussion. The following are summaries of some of the panel members' comments.

BACKGROUND

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Introduction

Widespread charging of fees for public outdoor recreation is a relatively new concept in the United States. With vast amounts of land open for settlement, the idea of use fees for Federal land was not considered appropriate. In a few cases (i.e. Hot Springs National Park in the 1890_s), a fee was charged to offset the costs of developing and operating facilities. However, until the 1950_s a tradition of rarely if ever charging for outdoor recreation seemed to many people a birthright of living in the United States. In order to understand these feelings today, it is important to look back to what led to the present situation.

History of Fees

Prior to World War II, fees for outdoor recreation on Federal land were charged in a somewhat haphazard manner, reflecting the lack of any overall multi-agency legislative guidance. The only two land management agencies with large land holdings and recreational developments were the National Park Service (NPS) and the US Forest Service (USNFS). Only the NPS had any significant fee activity in the first part of this century and that was mostly entrance fees.

Implementation of entrance fees into NPS areas predates the establishment of the agency by eight years. A product of the automotive age, and originally intended to cover the costs of the "damage" caused by the new invention, fees were collected at Mount Rainier National Park for auto permits in 1908. By 1915, fees were levied for entrance to seven other parks including Yosemite, Yellowstone, and Glacier National Parks. Seasonal rates ranged from \$10 at Yellowstone to \$2 at Glacier, with a lower fee charged for single entries (Mackintosh 1983). In 1917, the first year of operation of the NPS, enough fees were collected that 5 of the 16 newly established parks had a surplus over operation and maintenance costs (Mackintosh 1983).

The importance of fees was such that the first NPS Director testified before Congress in 1917 that park entrance fees and other revenues would eventually be "sufficient to cover all NPS operation and maintenance costs" (Mackintosh 1983). Congress would only be called upon for additional appropriations when NPS needed funds for capital development costs.

There was a strong motivation at that time for the NPS to collect these entrance fees. They were placed in a special treasury account and could be spent with no Congressional oversight. In 1918, Congress changed the legislation and required that all the monies collected go to the general fund of the United States Treasury (Mackintosh 1983).

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For the next twenty years there was little interest by the NPS in collecting fees. However, in 1939, President Franklin Roosevelt made fee collection an executive policy. In 1939 through 1942 the NPS specified forty parks where fees could be collected. In announcing this change, Secretary of Interior Ickes said that:

those who actually visit the national parks and monuments should make small contributions to their upkeep for the services those visitors receive which are not received by other citizens who do not visit the parks that are available to them, but who contribute to the support of these parks (National Park Service 1987).

Independent Office Appropriations Act of 1952

In 1951, Congress passed a bill of significant importance to this discussion. Title V of the Independent Office Appropriations Act of 1952 was the first national attempt to codify cost recovery for Government services. It required each agency head to develop and implement regulations that would set "fair and equitable fees" for "services or products provided to persons" (31 USC Sec. 9701). The bill included language that required consideration of four factors: 1) direct and indirect costs to government; 2) value to the recipient; 3) public policy or interest served; and 4) other pertinent factors. The act further stated that "It is the sense of the Congress that each service or thing of value provided by an agency (except a mixed-ownership government corporation) to a person (except a person on official business of the United States Government) is to be self-sustaining to extent possible" (31 USC Sec. 9701). These are the first guidelines that were codified in specifying some basic criteria for cost recovery that also applies to outdoor recreation fees.

Fees in the Fifties and Sixties

In the expanding economy of the fifties, there was little interest in fees as a revenue source and little interest in changes to the system. However, the Bureau of the Budget issued Circular A-25 in 1959 that applied to all Federal agencies. It stated "a reasonable charge...should be made to each identifiable recipient for a measurable unit or amount of Government service or property from which he derives a special benefit." Exploding recreational use on all Federal lands led to a call by recreation professionals and others to develop an overall recreational strategy for the country's public lands.

The result was the formation of a blue ribbon review commission called the Outdoor Recreation Resources Review Commission (ORRRC). Among the various recommendations concerning recreation and recreational facilities, the commission also addressed the issue of fees. It recommended to the President and Congress that:

[p]ublic agencies should adopt a system of user fees designed to recapture at least a significant portion of the operation and maintenance costs of providing outdoor recreation activities that involve the exclusive use of a facility, or require special facilities (ORRRC 1962).

Land and Water Conservation Fund Act

The ORRRC report laid the foundation for legislation that would increase funding for recreational opportunities at the Federal and State level. In 1964, the Land and Water Conservation Fund Act (LWCFA) was passed (P.L. 88-578). It authorized fees for both entrance to and use of facilities in all seven Federal land management agencies. In the act, the Cabinet-level official overseeing the agency was given authority to designate outdoor recreation areas at which entrance fees and user fees could be charged. Revenue from the fees went into a special Land and Water Conservation Fund for use in acquiring and developing recreation land.

As the LWCFA was amended over the years, several fee options were established for both entrance and campground use. Entrance to an area (only in NPS and some F&WS areas at present) may be by payment of a single-visit entrance fee, a

site-specific annual permit, an annual Golden Eagle Passport, lifetime Golden Age or lifetime Golden Access Passport. The single-visit entrance fee is good for one to fifteen days for a "more or less continuous stay within a designated area." The period of time of a "single visit" (usually five days) is recommended by the site administrator and reviewed and approved by the Agency head. The Golden Eagle Passport is an annual pass for admission to all "Designated Fee Areas" (presently only NPS and F&WS sites). Golden Age Passports are available free to all United States citizens 62 years of age and older. They provide for a waiver of entrance fees where charged, along with a 50 percent discount on certain user fees (i.e. camping, guided tours, parking). Golden Access Passports are free and are issued to blind or permanently disabled visitors. They also provide for a 50 percent discount on Federal user fees and a waiver of any entrance fees.

The attempt by Congress to set uniform standards and maintain one account for all fees collected was soon modified by numerous bills and amendments to the LWCFA. For the Corps of Engineers, the major problem was the issue of fees for entrance to Corps projects. In 1968, the Rivers and Harbors Act was amended to prohibit the collection of entrance fees, ending the collection of such fees at Corps projects. In addition, a 1972 amendment to the LWCFA allowed entrance fees to be collected only at NPS and USFS sites. Fees collected by the Corps for camping were to be placed in a separate account for appropriation only to the Corps, "without prejudice to appropriations from other sources for the same purposes, for any authorized outdoor recreation function of the agency by which the fees were collected" (United States Congress 1987).

With the country in the throes of "stagflation" in 1979, the NPS was faced with a cut of \$12 million in operating funds and was ordered by the Office of Management and Budget to make up the difference by raising fees (Mackintosh 1983). The agency proposed making up the deficit with increases averaging 74% over 1978 levels in entrance and other fees. Congress and the public reacted very negatively to the proposal, and a legislative moratorium was passed in Congress that froze fees for all agencies at their January 1, 1979, levels. In addition, in one of many modifications to the LWCFA, Congress accidentally suspended collection of all camping fees at all Federal agencies. This led to a summer of major problems for field personnel, as fees were an important method of controlling overcrowding and vandalism.

Fees for the Eighties

In 1982, the General Accounting Office (GAO) prepared a report titled "Increasing Entrance Fees - National Park Service" that recommended Congress: 1) repeal the statute which froze all NPS entrance fees and 2) amend the LWCFA to remove the \$10 limit on the price of a Golden Eagle Passport. At the same time, the Office of Management and Budget put pressure on NPS to obtain at least 25% of their operations and maintenance funds from user and entrance fees. Based on those two factors, the NPS proposed that the Congressional moratorium on fees be repealed, entrance fees be increased at areas where fees were presently collected, and additional parks be authorized to collect entrance fees. However, the bill that was introduced included a provision that would allow fees to be charged for hunting and fishing on Federal lands. Because of significant opposition from both the public and Congress, the bill was quickly withdrawn (United States Congress 1987). Also, because of the controversy surrounding that bill, fees were left unchanged from the previous level.

One amendment to the LWCFA (P.L. 93-303) in the 1970s included a provision that the Corps (and only that agency) provide one free campsite in every project that had Corps fee campgrounds. Other Federal and State agencies that lease Corps lands at a project and develop recreational facilities are exempt from this prohibition. The amendment also prohibited all agencies from collecting fees for "drinking water, wayside

exhibits, roads, overlook sites, visitor centers, scenic drives, toilet facilities, picnic tables, or boat ramps." For the past six years, the administration has proposed legislation to Congress that would allow the collection of fees at day use areas and remove the requirement for free campsites. The fees to be charged for day use areas are not entrance fees but rather are for use of beaches, picnic areas, and similar highly developed facilities. This requires yet another amendment to the LWCFA and the Rivers and Harbors Act. Congressional opposition to the proposal has stymied any of these efforts.

Fees or Free?

Behind all the arguments is a philosophical shift in the past ten years by public officials who feel that those who benefit the most should pay the most. While we all benefit from and pay for the existence of Yellowstone National Park, those actually using the facilities derive greater benefits than those who do not. Therefore, it is argued that they should pay more than those who only read about the park in *National Geographic*. Countering this line of reasoning are those who feel that charging fees closes recreation opportunities to certain socioeconomic classes and ethnic groups. They feel that by pricing outdoor recreation opportunities based on the user's ability or willingness to pay takes away from the quality of life for segments of the population. Further, it is argued that those in the middle class are being made to pay twice for their recreation; once as part of income taxes and then again at the fee booth.

The shift from totally free to partially subsidized outdoor recreation has not been a quick or easy one. Perhaps the most vocal persons have been those most immediately impacted. In 1988 the Congressionally mandated implementation of entrance fees for many more NPS areas and the increases in fees at existing fee areas led to some initial opposition by different groups in the travel and tourism sector. They were accustomed to use of public outdoor recreation areas without paying any direct fees. Yet the new fees are a small percentage of the average daily travel cost for most users (when adjusted for inflation) and less than some of the entrance fees that were established in the 1970s.

With the passage of the LWCFA in 1965, the Corps briefly charged entrance fees at some projects. Public and Congressional opposition were very strong concerning entrance fees at Corps project. Less than two years later, the LWCFA was amended to forbid the Corps to collect entrance fees. Presently, entrance fees are collected only by NPS and some US Fish and Wildlife Service refuges. For the past five years, as part of the President's legislative initiative, there has been a proposal to charge fees for some Corps recreation day use areas. During the same period of time there has been a Presidential legislative initiative for the USFS that would allow charging of entrance and day use fees at recreation areas under their jurisdiction. However, strong opposition from both special interest groups and Congress has blocked such passage. Any type of fees for day use and entrance fees would require an amendment to the LWCFA.

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Notes: A comprehensive bibliography on fees for outdoor recreation is awaiting publication as a WES Miscellaneous Publication. Copies are available from the author.

PRICES AND PRICING FOR OUTDOOR RECREATION OPPORTUNITIES

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Each speaker's time is limited in a roundtable discussion such as this, so I want to confine my remarks to selected issues surrounding the psychology of pricing leisure services. My comments are not intended to be comprehensive but rather to offer a few observations and to tell you about my own research as it applies to pricing public leisure services.

The issue of pricing for recreation opportunities continues to fluster public administrators. Pricing appeals to these decision makers because it fulfills a variety of important management priorities. Prices can be used to alter demand, to track public interest, or to generate additional revenues (Monroe, 1979).

Unfortunately, the application of prices may have potentially negative consequences. It is widely believed that prices are associated with public outcry, displacement of user groups, and political intervention (McCarville, Driver, and Crompton, 1992; Driver and Koch, 1986). It is little wonder that pricing initiatives are often viewed with considerable dread by those who institute them in the public sector.

The perspective taken in this paper is that prices need not be restrictive. They need not displace or outrage those we hope to serve. Imaginative and strategic application of prices can fulfill public management priorities without compromising service delivery. Insights gathered from the social psychological and recreation literature are used here to suggest how pricing might best be undertaken.

First, price strategies must offer choices to potential users. The phenomenon known as psychological reactance helps explain users' desire for choice. Any threat to users' sense of freedom or choice can result in psychological reactance. Response to such threats range from an increased desire for the lost behavioral option (in this case free access to an outdoor facility) to hostility and aggressive behavior (Iso-Ahola, 1980). Consequently, when prices are instituted and users have no choice but to pay them or lose access to valued resources, reactance is likely to occur. Complaint behavior, vandalism, and displacement are manifestations of this phenomenon.

Meaningful choices within a pricing strategy may eliminate much of the psychological reactance arising from new price levels. One classic strategy used to provide options for both the consumer and the service provider is that of differential pricing. This strategy recognizes that all programs and resources possess many characteristics and that price levels should be varied for different product mixes.

Differential pricing has unlimited potential and we should take full advantage of the flexibility it provides. We may smooth demand by charging higher fees during peak periods and by offering substantial discounts during slower periods. We may charge higher fees for consumptive activities and lower fees for those activities which are less consumptive. Our options are limited only by our own imaginations. The funds such strategies provide then offer the administrator added flexibility in making program decisions. Programs offered offer the administrator added flexibility in making program decisions. Programs offered at premium rates may be used to subsidize those offered at discount prices. In this way, the manager may fulfill a variety of goals and the user is offered personally relevant price options. The user is the final arbiter as to the price level he or she will pay. If time and convenience are

priorities, then the user may choose to pay higher fees for "prime-time" usage. If the user lacks financial resources but possesses large quantities of free time, then he or she may be more willing to use a resource during a slow period enjoying a financial discount in the process (Becker, 1975). Such choices reduce public rejection of fees and reduce displacement of those least able to pay rising prices.

Second, pricing strategies must recognize the importance of user expectations. Adaptation level theory (Helson, 1964) suggests that users will internalize past price levels. Past prices will therefore create internal standards against which all new prices are compared (Monroe and Petroschius, 1981). Prices which deviate from these expected price levels may be rejected by users. In other words, as objective price levels and outcry will result.

In a series of studies McCarville and Crompton (1987a,b) and McCarville, Crompton and Sell (1993) found that reference price levels may be altered through managerial initiatives. Consequently, administrators should take steps to elevate price expectations as objective price levels rise. In this way, unfavorable comparisons between old and new prices may be avoided. We found that information regarding the cost of providing a program or the consequences of paying a fee may alter price expectations by as much as a third. It seems that users expect to pay more for public services once they are told how much it costs to offer those same services. Users may also be willing to pay more if they are made aware that the fees will be returned to the site at which they were gathered (Miles and Fedler, 1986). Each of these studies suggests that any effort to alter prices should also include measures designed to justify the new price in terms of cost and to articulate the consequences of paying the fee (both for the user and for the site).

Third, and finally, pricing strategies must recognize that tolerance for price changes will vary from program to program (Howard and Selin, 1987). Social norms, program characteristics, and user idiosyncrasies may all influence this tolerance. For example, community notions of equity or fairness may demand that selected programs not be priced under any circumstances. Noble (1987) reported that plans to charge a nominal fee for visiting the Statue of Liberty had to be abandoned as a result of community outcry. In the case of Lady Liberty, it seems that any admission fee was too high a price to pay. There are similar cases in all our park settings. Users simply do not expect to pay, nor will they abide paying, for selected services. The nature of such services may vary from setting to setting but it is clear that any attempt to price them will result in considerable dissatisfaction for all. Administrators are advised to survey users to discover local views and opinions before prices are instituted. Pricing strategies can then be implemented accordingly.

I know that some of you may consider this to be an exercise of dubious value. You may feel that your users will be glad to report that they are unwilling to pay any price for any service at any time. Research suggests, however, that our users aren't as unreasonable or short-sighted as we have traditionally believed. Users typically expect and are willing to pay fees for access to many types of resources. Howard and Selin (1987) found that those who registered in several traditional leisure programs classes were quite tolerant of increased charges for those classes. Consequently, tolerance patterns should be established on a program by program basis before prices are actually instituted.

It is hoped that this short review offers some insight into the pricing of public leisure opportunities. The ultimate goal of any price in the public sector is to improve level of service for our user groups. In the past, we have tended to charge fees from a "take it or leave it" perspective. We often select arbitrary fee levels and hope that our users will be happy (or at least quiet) about paying them. This approach is doomed to

failure. It will indeed result in displaced users, vandalism, and inevitable political intervention. I suggest rather that we offer relevant choices for users while recognizing the standards they use to judge our efforts. All our pricing efforts must also include information campaigns which outline the need and benefit (for the consumer) of charging fees. Our pricing efforts are much more likely to succeed as a result.

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GREENWAYS

LIVING ADJACENT TO RAIL-TRAILS: CHANGES IN LANDOWNERS' EXPERIENCES AND ATTITUDES

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PA 16802

This study examined the issue of how landowners' experiences with and attitudes toward adjacent rail-trails change over time. Specifically, it examined how 349 adjacent landowners' experiences with 17 trail-related problems changed as a result of trail development. The data were gathered in 1991 along three rail-trails in Florida, Iowa, and California. The results supported the notion that landowners find rail-trails to be better neighbors than they originally expected them to be.

Introduction

Rail-trails are multiple use public recreation trails built on the rights-of-way of unused railroad corridors. They are one category of greenway that has been growing in popularity and importance in the years following the President's Commission on Americans Outdoors recommendation that communities establish greenways of public and private lands and waters to provide people with access to open space close to their homes (President's Commission on Americans Outdoors, 1987).

Rail-trails are typically flat, straight, hard-surfaced and managed to accommodate a variety of uses, particularly bicycling, walking, and running. Some have suggested that rail-trails might form the backbone of a national network of greenways since railroads, in their heyday, connected nearly every town and city in the United States and are currently being abandoned at a rapid rate (Burwell, 1990). By mid-1992 there were 450 rail-trails in existence in 42 states totaling 4,925 miles. They had an average length of eleven miles and ranged from less than a mile to two hundred miles (Rails-to-Trails Conservancy, 1992). There are currently numerous efforts underway to establish additional rail-trails across the country.

Many adjacent property owners do not share the enthusiasm for converting rails to trails that is often expressed by public recreation agencies and trail enthusiasts. Such landowners often fear trails will cause problems for them personally, such as loss of privacy, crime, and reduced property values. Some feel that ownership of the unused corridors adjacent to their properties should revert to them rather than being "taken" for public use. These "not in my backyard" sentiments and property ownership issues have caused many rail-trail proposals to be abandoned.

In response to concerns that the development of a trail may cause problems for private property owners living immediately adjacent to it, trail advocates are quick to point out that they expect problems to be minor and certainly less bothersome than an active or abandoned rail-road railroad line. Active lines, they argue, are loud, dirty and dangerous. Abandoned rail-road corridors are generally unpatrolled and can become attractive nuisances where motorcycles, litter, vagrancy, and weeds and brush can become serious problems.

They argue that developing a rail-trail on these sites can be a vast improvement. Maintenance and patrols by trail authorities and regular use by responsible trail users should alleviate the problems associated with living adjacent to active or unused rail-road lines.

Although there is some logic to this line of reasoning, few studies have looked at changes in landowner attitudes and experiences with rail-trails over time and even fewer have compared landowner experiences and attitudes prior to trail development with those after the trails have been established. Are fears of increased problems justified? Do such trails make bad neighbors? How do these landowners feel about the trails after they are in place? Do landowners who move adjacent to railroad rights-of-way after they have been converted to trails feel more positive about them than do the original owners who had the trails "forced on them?" Reliable information of this kind could prove valuable to recreation and land use planners as they contemplate proposing and developing recreation resources near private property. This study set out to explore these issues by answering three specific questions: Do problems increase or decrease for adjacent landowners when rail-road rights-of-way are converted to multi-use recreation trails. Do the attitudes and experiences of landowners who move adjacent to the trails after the trails are in place differ from those of landowners who lived adjacent to the railroad rights-of-way prior to their conversion to trails? And finally, do landowner attitudes and experiences differ along different trails?

Related Literature

The users and use of rail-trails have recently begun to receive research attention (Furuseth & Altman, 1991 and 1990; Gobster, 1990; and Schwecke, Sprehn & Hamilton, 1990). However, few studies have examined the attitudes and experiences of owners of property adjacent to these trails. The published findings indicate that there seem to be some negative aspects to living near these greenways, but they are not as serious as many landowners anticipate they will be. For example, in a study of two Minnesota rail-trails, landowner concerns prior to trail development were found to be greater than the problems actually experienced after the trails were established. Although the majority of landowners had not experienced problems with the trails, 25% to 33% reported that loss of privacy, trespass, litter, and access to their properties were of "some concern." New residents rated the trails as more desirable than continuing owners (87% to 63%). While no new owners considered the trails to be an undesirable feature, 23% of the continuing owners considered the trails to be undesirable (Mazour, 1988). Similarly, the Minnesota Department of Natural Resources (1980) conducted surveys of landowner attitudes along two proposed rail-trails and compared them to landowners' attitudes and experiences along two existing trails. They found that landowners along the existing trails were more positive and had experienced fewer problems than the landowners along the proposed trails were anticipating.

In a study of the Burke-Gilman Trail in Seattle (City of Seattle, 1987) no one surveyed felt current conditions were worse than prior to the trail being opened. New owners who bought their homes after the trail was opened were more likely to view the trail as a positive factor that increased the value of their home. A study of the Missouri State River Trail (Kaylen, et al., In press) found that landowners along the trail tended to have exaggerated fears of trail-related problems prior to the trail opening. The study examined the attitudes of 170 adjacent landowners along two pilot sections (9 and 27 miles long) about a year after the trails had been established. Before the trail opened, privacy, trespass and liability were the issues generating the most concern. These were still the issues generating the most concern after one year. However, concern with them as well as each of nine other issues investigated diminished once the trail had been established.

The effects of the suburban Lafayette/Moraga Trail near San Francisco on property owners adjacent to it were examined as part of a 1978 study (East Bay Regional Parks District, 1978). At that time the trail was four and one-half miles in length and adjacent to 219 private homes. Surveys asked owners to recall their initial reaction to the trail and report their current experiences and attitudes. Initially 66% of adjacent owners thought the idea of the trail was either "excellent" or "pretty good". At the time of the study (after the trail had been opened for about two years), 40% of those who had lived there prior to the trail opening reported that it was "better than they had expected" it to be and 53% felt it was "about what I expected." When asked about how the level of problems had changed as a result of the opening of the trail, 51% said that they had fewer problems with the trail than before there was a trail and another 31% reported that there were about the same number of problems as before. Of those who moved next to the trail after the trail opened, 41% said "I liked the idea of living next to the trail" and another 56% reported that "the presence of the trail did not affect my decision" to move there. The most commonly reported problems were found to be trespass (10.8%) and motor vehicle use of the trail (8.1%). However, over 60% percent reported having "not experienced the slightest problem" on account of the trail.

Methods

The data used in this study were gathered during the winter of 1990-91 from landowners living along three rail-trails. The trails were purposively selected in order to be diverse in terms of length, region of the country, setting through which the trail passed, and type of managing agency. The trails selected were the Heritage Trail near Dubuque, Iowa; the St. Marks Trail, near Tallahassee, Florida; and the Lafayette/Moraga Trail about 25 miles east of San Francisco.

The Heritage Trail, established in 1982, runs twenty-six miles due west from the outskirts of Dubuque. It is surfaced in crushed limestone and travels through extremely rural surroundings for nearly all of its length. The eastern two-thirds of the trail travels through a wooded river valley before emerging into open farmland for the remaining distance. Over 90% of the landowners along the Heritage Trail farm their properties. They also own significantly larger parcels than do the owners along the other two trails at an average of 149 acres.

The St. Marks Trail begins at the southern edge of Tallahassee and runs sixteen miles due south to the small town of St. Marks about five miles from the Gulf of Mexico. The trail is paved with asphalt and runs through a mix of settings including small towns, areas where home development is increasing, and long sections of undeveloped timber company land and national forest. All non-motorized uses are permitted including horseback riding which generally occurs on a separate narrow path near the pavement. It was officially dedicated in 1988, making it the youngest of the three study trails. Average property size is 9 acres.

The Lafayette/Moraga Trail, opened in 1976, is the oldest, shortest and most suburban of the study trails. It is 7.6 miles long and connects two cities that are about 40 minutes by car east of San Francisco. It passes through heavily developed, often affluent suburban areas for most of its length, crossing numerous roads and residential streets. Large sections are situated between the backyards of literally hundreds of private, single-family homes with an average lot size of .5 acres. All non-motorized uses are permitted including horseback riding. Bicycling and walking are the two most popular uses on each trail. However, the Lafayette/Moraga Trail is far more frequently used with an estimated 400,000 annual visits, compared to 135,000 for the Heritage and 170,000 for the St. Marks in spite of their greater lengths.

All residential property owners living immediately adjacent to the three trails were identified using property tax records and trail managers' records. All 79 adjacent landowners were

selected along the Heritage Trail, while 210 (78%) and 250 (63%) adjacent owners were systematically selected along the St. Marks and Lafayette/Moraga Trails, respectively. An eight-page, self-administered, mail questionnaire was sent to each household in the sample along with a postcard reminder and two follow-up mailings to nonrespondents as necessary. Response rates varied from a high of 71% on the Lafayette/Moraga Trail to a low of 59% on the St. Marks Trail. Sixty-eight percent of those contacted on the Heritage Trail responded for an overall response rate of 66%. For a more detailed discussion of methods and descriptive results see Moore, Graefe, Gitelson & Porter (1992).

The first objective of this study was to determine what changes in problems had occurred for adjacent landowners since the development of the trails. A list of 17 potential problems that might be associated with trails was prepared based on previous research (Mazour, 1988; East Bay Regional Park District, 1978) and discussions with trail managers. Respondents were asked to report changes by answering the following question, "This trail was created on the right-of-way (R.O.W.) of an abandoned railroad line. *Compared to before the trail was opened*, how has each of the following changed?" The seventeen problems were arranged in a matrix form and respondents were asked to indicate on a seven-point scale how their experience with each problem had changed as a result of the opening of the trail ("1" for "much less of a problem now" to "7" for "much more of a problem now"). This question was only asked of those owners who had also lived next to the trails prior to trail development. These owners were also asked, "Overall, would you say living near the trail is better or worse than living near the right-of-way before it was converted into a trail?"

The second objective was to determine if there were differences in attitudes and experiences of landowners who moved adjacent to the trails after the trails were in place (new owners) and those who lived adjacent to the rail-road rights-of-way prior to their conversion to trails ("continuing owners"). Responses for these groups were compared for the following questions:

1. Overall, how satisfied are you with having the trail as a neighbor?
2. How do you feel the trail has affected the quality of your neighborhood?
3. Compare your initial reaction to the idea of living near the trail to how you feel about living near the trail today. Would you say living near the trail is better or worse than you expected it to be?

Each of these questions were measured using a seven-point scale with "1" being the most negative and "7" the most positive. The third objective was to examine any possible differences among the three trails in terms of landowner attitudes and experiences.

A final dependent variable measured how beneficial the landowners felt the trails were to their communities. This variable was an additive index constructed from the importance ratings landowners reported for the following nine potential benefits: preserving undeveloped open space, aesthetic beauty, community pride, tourism and business development, traffic reduction/transportation alternatives, health and fitness, access for disabled persons, public recreation opportunities, and public education about nature/environment. Importance ratings were obtained for each, using the following question, "Here is a list of broader benefits the trail might have *for its surrounding community*. Please indicate the number that best indicates how important you feel the trail is in providing *each* benefit listed." A 7-point scale was employed where 1 indicated "not at all important" and 7 indicated "extremely important." One-way analyses of variance were used to test for significant differences among the three trails in the attitudes and experiences of landowners. T-tests were used to examine differences between continuing and new owners.

Results

Table 1 presents a descriptive summary of the adjacent landowners along each trail. Owners along the Heritage Trail owned larger properties, had owned them longer, were more likely to have their properties severed by the trail, and were far

more likely to have been engaged in farming than the owners along the other two trails. These results are consistent with the fact that the Heritage Trail travels through much more rural countryside than its two counterparts.

Table 1. Descriptive summary of adjacent landowners and their property.

	Heritage	St. Marks	Lafayette/Moraga	Differences
% Female (n=341)	49%	63%	42%	$\chi^2=13.2$ ***
Respondent's Age (n=333)	51	54	52	$F=1.0$
Acres Owned (n=338)	149	9	0.5	$F=211.9$ ***
Years Owned (n=335)	21	19	16	$F=4.7$ *
% With Trail Severing				
Their Property (n=341)	38%	4%	0%	$\chi^2=101.7$ ***
% Engaged in Farming (n=352)	81%	2%	0%	$\chi^2=254.8$ ***
Percent of Households That				
Used Trail in Last Year (n=307)	89%	82%	99%	$\chi^2=26.8$ ***

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

Overall, landowners along all three trails reported they experienced fewer problems after the trail had been developed than they had with the unused railroad right-of-ways prior to trail development. Table 2 presents the percent of adjacent landowners who reported that the levels of various problems had either decreased or increased since the opening of the trail. On the 7-point scale used, values of 1, 2, and 3 indicated various levels of improvement as a result of trail development (combined to form "less of a problem" in Table 2) and values of 5, 6, and 7 indicated that the problem had worsened since trail development (combined to form "more of a problem" in Table 2). Those answering 4 to this question were indicating that the level of the problem had not changed (these values can be derived by subtracting the "less of a problem" and "more of a problem" values from 100% for each problem). In the case of every potential problem along each of the three trails, the majority of owners reported that the problem had either lessened or not changed. The problems which landowners were most likely to report had grown worse were "loss of privacy" along the Heritage Trail (38%), "illegal motor vehicle use" along the St. Marks Trail (24%), and "noise from the trail" along the Lafayette/Moraga Trail (36%).

Table 3 summarizes these findings regarding how experiences with the various problems changed since the development of the trails by presenting the mean responses for each problem. In the case of every potential problem along all three trails, the average responses indicated that the adjacent owners considered the trails an improvement over the unused rail corridors. The average responses ranged from a low of 2.5 for "lack of trail maintenance" on the Heritage Trail (indicating the greatest improvement accompanying trail development) to 3.9 for "noise from the trail" along the Lafayette/Moraga Trail (indicating the least improvement). The only significant difference across the three trails occurred for "illegal motor vehicle use" where the problem had decreased significantly more along the Lafayette/Moraga trail than along the other two. A second problem, "dog manure on/near property," decreased much less dramatically along the Lafayette/Moraga Trail than along the other two, although not quite reaching significance ($p=.07$).

Landowners who owned their properties prior to trail development were asked directly how the trail compared to the railroad it replaced. They were asked, "Overall, would you say living near the trail is better or worse than living near the right-of-way before it was converted into a trail?" which was coded on a 7-point scale where 1 represented "much worse than

before" and 7 "much better than before." The mean responses of 4.5, 5.3, and 5.5 on the Heritage, St. Marks, and Lafayette/Moraga Trails, respectively indicated that, overall, the trail was considered an improvement over the railroad right-of-way. The Heritage owners were significantly less positive (.05 level) than either the St. Marks or Lafayette/Moraga owners.

The next analyses compared continuing owners (those who purchased their properties prior to trail development and still live there) to those who purchased their homes after the trails had been established. Over half the owners along the Lafayette/Moraga Trail were new owners while less than a quarter of those along the other two trails had purchased their properties after the trails had been developed (Table 4). This difference was statistically significant at the .001 level. This was due primarily to the fact that the Lafayette/Moraga Trail was considerably older than the other two and more turnover in property had resulted over the years.

Some differences were found between the new and continuing landowners' feelings towards the trails. In most instances, the new landowners were more positive about the trails than were the continuing owners. However, the differences were not always consistent among the three trails and few were significant (Table 5). The majority of adjacent owners reported being satisfied or very satisfied with having the trails as neighbors. Along the St. Marks and Lafayette/Moraga Trails, those who purchased their properties after the trails were in place were more satisfied than those owners who lived there before the trails were developed. This difference was only significant along the Lafayette/Moraga Trail and, in fact, the continuing owners were slightly more satisfied than the new owners along the Heritage Trail. The new owners along all three trails were most likely to feel the trails had improved the qualities of their neighborhoods.

Although many landowners were opposed to the idea of the trail initially, over 66% reported that the trail had turned out to be better or much better than they had expected it to be. On the Heritage and St. Marks Trails the new owners held this view more strongly than the continuing owners (significantly so on the St. Marks). However, on the Lafayette/Moraga Trail the continuing owners were significantly more pleasantly surprised than the new owners. On all three trails, the new owners rated the trails as being more beneficial to their communities than did the continuing owners. This difference was significant only along the St. Marks Trail, however.

Table 2. Percentage of adjacent owners reporting changes in the levels of various problems since the opening of the trail.

Problem	Heritage (n=34)		St. Marks (n=79)		Lafayette/Moraga (n=81)	
	Less of a Problem	More of a Problem	Less of a Problem	More of a Problem	Less of a Problem	More of a Problem
Cars parked on/near property	36% ^a	25% ^b	38%	11%	33%	17%
Dog manure on/near property	44	0	43	10	29	15
Noise from trail	32	24	37	21	25	36
Loss of privacy	38	38	40	23	25	25
Litter on/near property	44	18	39	19	39	10
Unleashed and roaming pets	47	19	40	14	27	16
Discourteous/rude users	52	9	44	6	35	13
Illegal motor vehicle use	45	32	36	24	54	5
Trespassing	43	19	39	13	34	5
Loitering on/near property	56	21	33	18	45	15
Animals harassed	48	6	41	9	37	4
Vandalism	47	9	47	5	40	6
Drainage problems	41	6	39	9	29	9
Fruit, vegetables, crops picked or damaged	44	9	45	9	29	10
Users ask to use phone, bathroom, etc.	45	6	43	7	35	4
Lack of trail maintenance	63	9	57	9	45	9
Burglary of property	48	6	45	5	32	4

a Percent responding either 1, 2 or 3 on the 7-point scale. b Percent responding either 5, 6 or 7 on the 7-point scale.

Table 3. Current level of each problem compared to before the trail was opened.^a

Problem	Heritage (n=34)	St. Marks (n=79)	Lafayette/Moraga (n=81)	<i>F</i> For Differences Among Trails
	Average Response	Average Response	Average Response	
Cars parked on/near property	3.6	3.3	3.5	0.53
Dog manure on/near property	2.9	3.1	3.6	2.59
Noise from trail	3.5	3.5	3.9	1.42
Loss of privacy	3.7	3.5	3.8	0.58
Litter on/near property	3.3	3.3	3.3	0.03
Unleashed and roaming pets	3.1	3.3	3.7	1.96
Discourteous/rude users	2.9	3.0	3.3	1.24
Illegal motor vehicle use	3.5	3.5	2.7	4.81 ***
Trespassing	3.5	3.2	3.2	0.36
Loitering on/near property	3.3	3.5	3.1	1.17
Animals harassed	3.0	3.1	3.1	0.14
Vandalism	3.0	3.0	3.1	0.08
Drainage problems	3.1	3.1	3.4	0.55
Fruit, vegetables, crops picked or damaged	3.0	3.0	3.4	1.56
Users ask to use phone, bathroom, etc.	3.0	3.0	3.1	0.11
Lack of trail maintenance	2.5	2.7	3.1	1.84
Burglary of property	2.8	3.0	3.2	0.95 ns

a Average based on 7-point scale with "1" being "much less of a problem now" to "7" for "much more of a problem now."

Table 4. Breakdown of new and continuing adjacent landowners by trail.

	Heritage		St. Marks		Lafayette/ Moraga		Combined	
New Owners	13	(24%)	15	(13%)	90	(52%)	118	(34%)
Continuing Owners	41	(76%)	105	(87%)	84	(48%)	230	(66%)
Totals	54	(100%)	120	(100%)	174	(100%)	348	(100%)

$\chi^2=51.5$; $p=0.00$

Table 5. Trail-related attitudes of continuing property owners compared to new property owners.

	Heritage		St. Marks		Lafayette/Moraga		Combined	
	New Owners(n)	Continuing Owners(n)	New Owners(n)	Continuing Owners(n)	New Owners(n)	Continuing Owners(n)	New Owners(n)	Continuing Owners(n)
Satisfaction With Trail ^a	4.3 (13)	4.4 (40)	5.9 (14)	5.0 (100)	6.0 (90)	5.4 (83)*	5.8 (117)	5.1 (223)***
Trail's Effect On Neighborhood ^b	5.0 (12)	4.5 (37)	5.8 (15)	5.1 (94)	5.6 (90)	5.4 (82)	5.5 (117)	5.1 (213)**
Trail Better Than Expected ^c ?	5.4 (12)	5.2 (39)	6.1 (13)	5.2 (97)*	5.1 (90)	5.6 (82)**	5.2 (115)	5.3 (218)
How Beneficial Is Trail? ^d	4.9 (12)	4.4 (27)	5.4 (9)	4.3 (74)**	5.0 (87)	4.7 (70)	5.0 (108)	4.5 (171)**

- a Overall, how satisfied are you with having the trail as a neighbor? (7-point scale with 1 "very unsatisfied" and 7 "very satisfied").
- b How do you feel the trail has affected the quality of your neighborhood? (7-point scale with 1 "worsened quality of neighborhood" and 7 "improved quality of neighborhood").
- c Compare your initial reaction to the idea of living near the trail to how you feel about living near the trail today. Would you say living near the trail is better or worse than you expected it to be? (7-point scale with 1 "much worse than I expected" and 7 "much better than I expected").
- d Index of importance of trail in providing 9 community benefits. (7-point scale with 1 "not at all important" and 7 "extremely important").

Discussion

It is not surprising that the characteristics of the landowners of the three trails differed in many respects since the sample trails were selected to be as different as possible. The characteristics of landowners and their properties along rail-trails are closely related to the type of environment through which the trail happens to pass. The findings were consistent with the fact that the Heritage Trail is in a very rural farming environment while the Lafayette/Moraga Trail is in a densely populated suburban area.

The results supported the notion that adjacent landowners find rail-trails to be better neighbors than they initially expected them to be and better than living next to an unused railroad right-of-way. The results also supported the contention that such trails turn out to cause fewer problems than landowners initially fear they might. Both of these findings are consistent with the results of previous research. It is important to note that these results were quite consistent for three very different trails. The change in only one of the 17 problems (illegal motor vehicle use) was significantly different among the three trails.

Regardless of whether the landowners had moved in prior to or after the trails had been developed, they were positive about having the trails as neighbors overall. This held true for their overall satisfaction, how they felt the trails affected their neighborhoods, whether the trails were better or worse than

expected, and how beneficial they felt the trails were to the communities. However, several differences were found between the new and continuing owners. In most cases, those who purchased their properties knowing that they would be moving in next to an existing trail (new owners) were more positive than those who already lived there when the trails were developed (continuing owners). This may be due to the fact that the new owners knowingly chose to live adjacent to the trails, whereas many continuing owners were initially opposed to the idea of living near a trail and had little choice in whether the trail would be built there.

Management Implications

Trail planners and managers, as well as landowners, should be encouraged by the results of this study. It supported and extended the previous evidence that initial landowner concerns about rail-trails may be exaggerated. It should be particularly encouraging that these findings were obtained using rigorous methods in three very different trail settings. This should give proponents more confidence in approaching neighbors along proposed trails and interacting with those along existing ones. Based on these results, planners and managers should consider putting these potential neighbors in touch with adjacent landowners along existing trails to talk about their actual trail experiences. This could help them develop a more realistic (and probably more positive) outlook regarding the proposed trail. They might do this through field trips to

existing trails, bringing neighbors of existing trails to meetings of affected landowners, or perhaps videotaping testimonials of experienced trail neighbors. However, planners and managers must keep in mind that even though problems decreased or did not change for most landowners in this study when the trails were developed, some problems did occur. Managers must be diligent in maintaining ongoing communications with trail neighbors to monitor such problems and address them.

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MANAGEMENT OPTIONS REGARDING THE PRESENCE OF *IXODES SCAPULARIS*, THE DEER TICK, ON THE APPALACHIAN TRAIL

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This paper reviews the ecology and biology of *Ixodes scapularis* (Acari: Ixodidae), the deer tick, and the ecology of the Appalachian Trail (AT) as suitable habitat for *I. scapularis*. Physical and ecological characteristics of the AT were recorded and surveys were conducted for *I. scapularis* on a 920 km segment of the AT during 1991. Suggestions for management of the Trail have been offered to the National Park Service and Appalachian Trail Conference in regard to the presence of *I. scapularis* on the AT.

Ixodes scapularis

The deer tick, *Ixodes scapularis* (Spielman et al. 1979), is the vector for the causative agent of Lyme disease, *Borrelia burgdorferi* (Johnson et al. 1984). *Ixodes scapularis* is a three-host tick with a two-year life cycle. During its three active stages (nymph, larva, adult), the tick alternates between host-seeking during favorable environmental conditions, and remaining in the leaf litter when unfavorable conditions occur (Lees & Milne 1951). Animal-trapping studies have shown that *I. scapularis* utilizes a variety of hosts (Anderson 1988) and that there is a tendency for each life stage to prefer a sequentially larger host for blood meals. Preferred hosts for *I. scapularis* include the white-footed mouse, *Peromyscus leucopus*, and the white-tailed deer, *Odocoileus virginianus* (Piesman & Spielman 1979). The deer tick will utilize other mammalian and avian hosts. Humans are most often parasitized by the adult or nymphal stages. When favorable conditions occur, the deer tick leaves the duff to host-seek by elevating itself on fallen leaves or on a blade or stem of vegetation. The tick waits for host signals such as the detection of shadows, carbon dioxide, body temperature and odor. When stimuli is received, the tick waves its first pair of legs to make contact with the host. Sustained body heat and host odor within 1 - 2 m from a tick may cause the tick to crawl actively towards the source (Balashov 1972). Desiccation is the main cause of mortality among ticks. If conditions become unfavorable for host-seeking, such as increasing mid-day heat, a tick will return to the duff where a favorable microclimate exists. Ticks unsuccessful in obtaining a blood meal prior to the onset of cold weather will overwinter. Engorged ticks will either molt immediately and overwinter or may overwinter in an engorged condition. *Ixodes scapularis* mate while on a host and the female drops off to lay eggs in the leaf litter. Eggs deposited

in the fall hatch during the spring. Eggs deposited in the spring hatch in the late summer (Yuval & Spielman 1990).

There is no data available for *I. scapularis* populations on the AT itself. However, *I. scapularis* is considered to populate many counties crossed by the AT throughout the study area (CDC 1992) and Lyme disease is endemic to each of the New York counties crossed by the AT: Orange, Rockland, Westchester, Putnam and Dutchess (personal communication, New York State Department of Health).

Several studies have focused on the habitat preference of *I. scapularis*. Siegel et al. (1991) studied the presence of *I. scapularis* in three habitat types within Illinois: wooded, meadow, and mixed. Larvae and nymphs were most prevalent in wooded areas. Nymphs, however, were also found in meadows. Adults were found within each habitat. Carroll et al. (1992) compared *I. scapularis* collections from maintained, residential lawns bordering other lawns versus lawns versus wooded tracts. More *I. scapularis* were collected from lawns bordering woods than from lawns bordering lawns. Additionally, there was a decline in relative abundance of ticks at increasing distances away from woods. Ginsberg & Ewing (1989) collected host-seeking ticks on and off trails on Fire Island, NY and designated habitats as "grass-shrub" with vegetation less than 1 m, "high shrub thickets" with vegetation ≥ 1 m, and "woods", sites with an enclosed tree canopy. Adult *I. scapularis* were more common on trails than in woods and were most often collected from high shrub thickets during the summer months but were collected from leaf litter in wooded habitats more often than from more open habitats. Overall, tick distribution was observed to be more concentrated on trails than off.

Methods for the control of *I. scapularis* are primarily experimental, however, three directives have been used in general for tick control: chemicals directed at the vegetation or hosts utilized by ticks, host eradication, and habitat modification. There are few practical or reliable biological control options for ticks.

The Appalachian Trail

The Appalachian Trail (AT) is a continuously marked footpath that extends 3,360 km through 14 eastern states. The southern terminus is on Springer Mountain, Georgia and the northern terminus is on Mount Katahdin, Maine. This popular recreational trail receives the most use during the spring, summer and fall months. The AT is best known for the hundreds of hikers who attempt to walk the entire length of the Trail within one calendar year, a feat requiring patience, discipline and persistence.

The AT is managed by the Appalachian Trail Conference (ATC) and the National Park Service (NPS). In 1979, the ATC Board of Managers adopted standards for trail design and maintenance to reflect the purposes of the AT: to route a passable and continuous footpath through protected lands, to promote public use and enjoyment of the footpath, and to manage the AT so that minimal disturbance occurs to the natural resources utilized by the footpath (Birchard & Proudman 1981).

To maintain the AT as a passable route, clearance standards were approved as a guide for trail maintainers. The ATC recommends that the vegetation of the treadway be cut back to allow a footpath measuring four feet (1.2 m) wide and eight feet (2.4 m) high to allow a user with a full backpack to pass unhindered. These standards are not applied when the AT traverses fragile ecosystems or when the terrain does not allow for the full width. Guidelines recommend that a canopy remain over the trail to slow the growth of path vegetation and that the trail be cleared twice per year during the spring and late fall. Vegetation should be cut back as close to the ground as possible but plants should not be uprooted (Birchard & Proudman 1981). Most maintenance of the AT is provided by volunteer members of AT sectional clubs. These individuals

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keep the AT passable by maintaining and relocating Trail segments, maintaining shelter areas and designated campsites, and monitoring the AT for signs of misuse. Maintenance of the footpath is time-consuming and labor intensive since most work must be done by hand. This is mostly done by volunteers assigned specific trail sections for maintenance, though some clubs schedule group work trips and maintenance hikes.

Methods

Within this study, the focus is on four components of the AT: central path, treadway, ecotone and corridor. The trail may contain a well-defined central path which is the area of the trail that receives the most direct foot traffic and appears to be the most impacted. The treadway is a wider, passable area that may be most apparent following trail maintenance. However, the treadway may exist alone as a cleared width within which no preferred path is discernible. A surveyed trail segment that contains both a central path and treadway is referred to as a combination site. The ecotone is the boundary between the treadway and the corridor. The AT corridor is the ecological community through which the trail passes.

This study was conducted along the mid-Atlantic section of the AT from the Massachusetts/Vermont border to the Maryland/West Virginia border, a segment spanning 920 km. The research was divided into four surveying trips conducted between May and October, 1991. The timing of each trip coincided with periods of host-seeking activity for larval, nymphal and adult deer ticks. The initial survey, conducted between May 06 and May 21, focused on the New York segment of the AT. This segment was hiked north from the NJ/NY border to the NY/CT border and then a return hike south to the NJ/NY border. The second survey was conducted between May 25 to July 13 over the entire 920 km of the study area. The third survey was conducted from the MA/CT border south to the NJ/PA border between August 29 to September 16. The final survey was a repeat of NY during October 4 to 11.

Each surveying trip included site evaluations consisting of two parts: tick collections and the recording of physical and ecological characteristics for each site. Drag-sampling (flagging) was the method used to collect host-seeking ticks. An 80 cm by 120 cm piece of unbleached muslin cloth attached to a dowel rod handle and weighted by a 30 cm length of dowel was swept across vegetation and leaf litter on and along the trail. At each 4.8 km interval, a 30.5 m stretch of trail and its edge (ecotone) was flagged. Each trail component, i.e., central path, treadway and ecotone, was flagged separately at each site. The ecotone along both sides of the trail was flagged separately and followed trail sampling. The cloth was examined for attached ticks after sampling each component. Ticks were placed in vials labeled according to site identification number and trail location (central path, treadway, ecotone) and were returned to SUNY CESF for identification to species and life stage. A site was designated as positive if one or more deer ticks were found. Immediately after tick sampling, ecological and physical characteristics of the 30.5 m AT segment and the corridor were recorded. These included elevation, air temperature, relative humidity, vegetation types and heights and trail widths. Vegetation types were classified as either grass, herbs (wildflowers), shrubs or seedlings. Ecotone vegetation could be described as one type dominating (i.e., shrubs) or a combination (i.e., herbs and seedlings) of up to four types.

The data set contained a total of 17 numeric and coded variables derived from the site evaluation checklist. Statistical analysis of physical and ecological data was conducted using Version 6 of the Statistical Analysis System (SAS Institute 1982) at Syracuse University. Student t-Tests were used to test for differences between the means of numeric variables (air temperature, relative humidity, elevation, width of central path, width of the treadway) of positive and negative sites. Discriminant analysis was used to classify the data into two equally weighted site classes, sites positive for ticks and sites negative for ticks (Carcy 1979, Schaals & Wilkinson 1985).

Results

A total of 489 site surveys were conducted within 1,827 km (1,142 mi) of AT over an 88 day period. An average of 5 site evaluations were conducted each day. The 21 sites positive for *I. scapularis* were within a 331 km segment of the AT from Salisbury, Connecticut to Delaware Water Gap, Pennsylvania. A total of 46 *I. scapularis* were collected: 67% (n=31) larvae, 11% (n=5) nymphs and 22% (n=10) adults. One to six *I. scapularis* were collected at each positive site. Larvae were collected in early May, early June and early to mid-September. Nymphal ticks were collected in early June and during September. Adults were collected in mid-May and early October.

Trail widths less than 80 cm were designated as central paths. Widths up to 80 cm allow contact between the trail user and the ecotone where ticks may be host-seeking. Trail widths greater than or equal to 80 cm were designated as treadway sites. An Average widths of trail components surveyed within the study area were: central paths, 54 cm (± 10) and treadways, 146 cm (± 49). The central path and treadway at combination sites averaged 47 cm (± 9) and 141 (± 41), respectively. Sixty-one percent (298) of the sites surveyed contained only a central path. Treadway sites comprised 105 of the sites. There were 95 combination sites. The dominant cover of central paths was leaf litter or bare soil-leaf litter, occurring 43% of the time. The dominant cover of treadways was leaf litter, bare soil-leaf litter and grass-rocks. The dominant vegetation of the ecotone was a mix of vegetation types (73%). Monocultures dominated the ecotone infrequently (20%) and ecotones relatively void of vegetation occurred at 7% of the sites.

Most *I. scapularis* were collected from the ecotone (72%). The dominant condition of the ecotone of positive sites was mixed vegetation at 19 sites (90%). An ecotone composed of mixed vegetation, i.e., grass-herbs-shrubs or other combination of the vegetation types designated in this study, may provide suitable habitat for *I. scapularis*. Ecotones dominated by one vegetation type, i.e., mostly shrubs or mostly herbs, or are sparsely vegetated appear to be less favorable for *I. scapularis*. The central path rarely served as a collecting origin for ticks (8%).

There were no significant differences between mean relative humidity and temperature in positive and negative sites. Elevations of all sites surveyed ranged from 300' to 3,300' with a mean elevation of 1,093'. The lowest and highest elevation at which *I. scapularis* was collected was 400' and 1,050', respectively. The mean elevation for all positive sites was 693' (± 182 '). The mean elevation of positive sites was significantly lower than the mean elevation of negative sites.

Discriminant analyses were performed on all sites and then on sites below the mean elevation, the latter to account for any potential contribution of lower altitude sites for *I. scapularis* habitat. Discriminant analysis using the variables that describe the vegetation type and height of the ecotone produced the highest percentage of properly classified sites (positive sites were designated as such) and were considered the most reliable indicators of a site's potential to support *I. scapularis*. To determine the number of sites having ecotone characteristics similar to positive sites, a discriminant analysis using the ecotone variables was performed. This resulted in 340 negative sites reclassified as positive sites. This suggests that these sites, though negative at the time of surveillance, contain suitable characteristics that may allow them to support *I. scapularis*. Since *I. scapularis* was collected at lower elevations, this data set was refined by selecting sites below the mean elevation (1093'). This resulted in 187 negative sites reclassified as positive sites. Of these, 84% occurred in Connecticut, New York and New Jersey. These sites were determined to provide an ideal questing habitat for *I. scapularis* because they contained an ecotone of mixed vegetation and were at elevations below 1,093'. A majority of these sites had a path width not exceeding 79 cm which allows contact between the trail user and the ecotone.

Appalachian Trail User Risk Assessment

The 163 km (102 mi) trail segment from Salisbury, CT to the AT crossing of the Palisades Interstate Parkway in New York from which most *I. scapularis* were collected is considered a high-risk area. The segments of the AT extending north to the MA/CT border and south to the NJ/PA border (170 km, 106 mi) are considered to have a moderate risk for deer ticks based on the ecology of the AT and the current distribution of *I. scapularis*. Considering the annual range expansion of *I. scapularis* and percentage of sites in this study with favorable habitat for *I. scapularis*, the AT in MA, PA and MD may eventually be subject to invasion by *I. scapularis*.

The activities of AT users may influence their risk of contact with *I. scapularis*. This study recognizes three groups of AT users: Long-distance (LD) hikers, short-term hikers and AT maintainers. The three groups have trail habits that influence their likelihood of encountering a tick questing on the ecotone. Long distance hikers gain experience in navigating around roots, rocks and other obstacles inherent to forest paths. These hikers develop a way of navigating along the trail to minimize contact with obstacles while on lengthy walks. This protects the legs and upper body while maintaining continuous motion. The ecotone serves as an obstacle because, by design, it defines the boundary of the cleared width. When the path is wide, vegetation of the ecotone can be avoided by choosing a central path route. If the Trail is narrow, contact with ecotone vegetation may be inevitable. However, a continuously moving hiker minimizes ecotone contact time which may decrease the success of *I. scapularis* grasping these AT users. Thus, this group has the overall lowest risk of encountering a questing tick. Short-term hikers (day users) plan a shorter distance and shorter length of

stay along the AT. Short-term hikers may maintain a more casual pace or engage in activities, such as bird-watching or wildflower identification, which requires stopping and are more likely to have sustained contact with the ecotone or path vegetation.

Trail maintainers are those who keep the AT passable. Trail maintainers may be at greatest risk for contact with *I. scapularis*. Trail maintenance tends to be a slow-moving, stop-and-go procedure and places maintainers in direct and extended contact with trail vegetation.

Added to the risk associated with each hiker group is the risk factor associated with seasonal use of the trail by these groups: spring (March 21 - June 21), summer (June 21 - September 21) and fall (September 21 - December 21). Thus, LD hikers are most likely to be traversing the study area and the 163 km high risk segment during the summer. Whereas, short-term users and maintainers are more likely to have the highest trail use during the spring and fall. Tick risk is associated with the seasonal periodicity of host-seeking nymphal and adult *I. scapularis*, the stages infected with *B. burgdorferi* and responsible for disease transmission. The cumulative risk of each hiker group based on user and tick risk by season is illustrated in Table 1. Based on this risk matrix, trail maintainers are at greater risk for contact with *I. scapularis* and potential exposure to *B. burgdorferi* and period of increased risk for this group occurs during spring and fall. Short-term users also are at risk during spring and fall. Both short-term users and maintainers are considered to have reduced risk of tick contact during the summer. Long distance hikers have low risk during all seasons.

Table 1. Seasonal exposure risk to *Ixodes scapularis* for AT hiker groups.

Hiker Group	Hiker Risk ^a	Spring				Summer				Fall			
		Use Risk ^b	Tick Risk ^c	Total Risk ^d		Use Risk	Tick Risk	Total Risk		Use Risk	Tick Risk	Total Risk	
LD	1 x	1 x	3	(3)		2 x	1	(2)		1 x	2	(2)	
DH	2 x	2 x	3	(12)		3 x	1	(6)		3 x	2	(12)	
TM	3 x	3 x	3	(27)		2 x	1	(6)		3 x	2	(18)	

^aHIKER RISK: Habits of trail user.

- 1 = Low: quick pace along the trail, brief contact with ecotone
- 2 = Medium: meandering, possible contact with ecotone
- 3 = High: prolonged contact with ecotone

- = Long Distance Hiker (LD)
- = Day Hiker (DH)
- = Trail Maintainer (TM)

^bUSE RISK: Use of trail in spring, summer and fall for hiker groups.

- 1 = Low Use
- 2 = Medium Use
- 3 = High Use

^cTICK RISK: Seasonal activity of host-seeking *I. scapularis*.

- 1 = Low: Summer, few nymphs and no adults questing.
- 2 = Medium: Fall, adults questing.
- 3 = High: Spring, nymphs and adults questing.

^dTOTAL RISK = Hiker risk x Use risk x Tick risk

Clearance standards suggest that the AT be cut back at least twice a year, ideally in the spring and late fall. However, the risk of maintainers coming into contact with questing *I. scapularis* during this time is greatest. Maintainers or long-distance trail users may have knowledge of *I. scapularis* and the risk of Lyme disease whereas short-term hikers may be unaware

of this risk. This study recommends that the NPS/ATC institute, or continue, the following management practices along the 163 km high risk area of the AT and that consideration be given to the expansion of these practices into other areas identified in this study as containing suitable *I. scapularis* habitats.

Management Considerations

Ixodes scapularis utilizes vegetation for questing along trails and edge situations. As a host brushes past the vegetation on and along a path, questing ticks grasp the host. This research has established that *I. scapularis* utilizes the vegetation of the AT ecotone for questing. This is particularly true when the following conditions were met:

- 1) Corridor dominated by deciduous trees.
- 2) Elevation of site is <1,093'.
- 3) Path bordered by an ecotone composed of mixed vegetation types.
- 4) Path width is <80 cm.

The most effective strategy for the management of *I. scapularis* focuses on the ecotone. Since most *I. scapularis* were collected from the ecotone and because of the encroachment of the ecotone on the path, it is recommended that the NPS/ATC emphasize the four foot width by eight foot high AT clearance standards to reduce hiker contact with the ecotone. The passable width should be maintained by keeping the ecotone and trail vegetation cut back at least twice per hiking season, depending on each segment's ecology. Since risk of contact with infected, host-seeking *I. scapularis* is greatest during spring and late fall, most maintenance should be conducted during late July through August. However, most segments of the AT will require cutting earlier in the season to allow unimpeded passage by AT users. In this event, maintainers should adopt personal precautions when in *I. scapularis* habitat. Habitat modification, as achieved by cutting the ecotone back from the path, reduces tick abundance by reducing tick habitats and harborage areas for smaller mammalian tick hosts. This management suggestion is multi-purposed since it:

- 1) Decreases the potential for hiker contact with *I. scapularis* thus reducing the transmission of *B. burgdorferi* and development of Lyme disease in AT users.
- 2) Decreases the availability of small animal hosts for *I. scapularis*.
- 3) The widened path allows additional light penetration which diminishes suitable habitat for *I. scapularis* on the AT.

Unless void of vegetation, the treadway flora must be cut back, perhaps more frequently than the ecotone, to minimize contact by hikers with ticks questing upon the treadway. Additionally, it is recommended that ATC-sectional clubs post flyers warning AT users that they are entering tick-infested portions of the Trail. Flyers may be posted at road crossings, shelters and information boards and convey a simple warning of the presence of *I. scapularis* or a summary of the tick's biology and ecology. Individuals working or recreating in tick populated areas should take personal precautions to minimize contact with ticks. These include learning to recognize a tick, basic knowledge of general habits of ticks, symptoms of tick-borne diseases and adopting appropriate dress and body checks when venturing into potential tick habitat. Standard procedures are suggested for personal protection against *I. scapularis* and should be followed by AT users. These are, to wear long, light-colored pants tucked into light colored socks and to wear long-sleeved, light-colored shirts. These precautions lessen the chance for a tick to contact the skin while light-colored clothing allow ticks to be seen and removed. For reasons related to ease of movement, heat and pack weight, many long-distance hikers forego wearing long pants when hiking. During mid-summer, some are content to wear and carry only shorts and t-shirts. Hikers concerned with tick contact may wish to modify their attire when walking through areas known to be tick-infested. This risk may be offset by checking their bodies for the presence of ticks or through use of repellents. Based on current study results, warnings should be posted on the 163 km AT segment from the vicinity of the Palisades Parkway crossing, NY to the Salisbury, CT area.

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"VALUING" LINEAR TRAIL DEVELOPMENT: THE CASE OF THE RACCOON RIVER VALLEY TRAIL

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This paper describes the various market and non-market "values" associated with the development of linear recreation trails. The value estimates were collected through a scientific survey (with personal interview and mail questionnaire components) of visitors to the Raccoon River Valley Trail (RRVT) in central Iowa. The research provides substantial justification for the development of linear recreation trails.

Introduction

There is a growing interest in the development of linear recreation trails. Linear trail systems provide direct access to many natural, social, cultural and economic values for people. These values range from the non-monetary values associated with open space and quality of life, to the economic benefits realized from commercial development and increased tourist activity. Despite the many values and benefits associated with linear recreation trail development, only limited empirical data is available on the market and non-market values associated with linear recreation trails. To address these information needs the Dallas County Conservation Commission conducted a study of visitors to the Raccoon River Valley Trail during the summer of 1991.

Study Objectives

The purpose of this research was to collect information that the Dallas and Guthrie County Conservation Boards, state agencies, not-for profit organizations, and local businesses need to justify trail development expenditures, and to support their budget submission through an often unfavorable decision making process. The data collect will also help trail managers plan for the wise use and development of the Raccoon River Valley Trail and the associated, natural, cultural, and economic resources. More specifically, the objectives of this paper were:

- to document the sample of trail users willingness-to-pay for one days' use of the Raccoon River Valley Trail;
- to determine the level of trail user support for various trail users fees and the allocation of fee monies;
- to document the economic impact of trail users on the economy of communities adjacent to the trail; and
- to document the trail users perceptions of the costs and benefits associated with the use and development of linear recreation trails.

Research Setting

The setting for this research is the Raccoon River Valley Trail located in central Iowa. The Raccoon River Valley Trail (RRVT) provides the opportunity for various types of trail-based recreation. Completed during the summer of 1990, the trail is built on a former Chicago Northwestern Railroad right-a-way now owned by Central Iowa Energy Cooperative (CICEO). CICEO made an agreement with the Guthrie and Dallas County Conservation Boards to manage the right-a-way as a recreational trail. The trail was developed with grants and

other support from the Iowa Department of Transportation, the Iowa Department of Natural Resources, Central Iowa Power Cooperative, the Iowa Trail Council, and Dallas County Brenton Bank. The trail is paved with 1%-2% grade and stretches 34 miles from Waukee, in Dallas County, Iowa to Yale in Guthrie County, Iowa. The cost of developing the trail was approximately \$950,000, and visitation to the trail in 1991 was estimated at 48,096.

Methodology

Data for this study were collected during the summer of 1991. The research design included both a personal interview and mail survey component. The personal interviews were conducted from July 3 to September 3 by uniformed Dallas County Conservation staff members and volunteers. Approximately 950 visitors were contacted as they arrived or departed at six locations on the 35 mile trail. Of those initially contacted, 931 agreed to participate in the personal interview, for an on-site interview response rate of ninety-eight percent. The on-site interviews consisted of 10 questions. On average the interviews were completed in less than 2 minutes. The final question of the on-site survey asked the visitor if they would be willing to participate in a more detailed mail survey regarding the social and economic benefits of the Raccoon River Valley Trail. Over ninety percent of the persons completing the on-site interview agreed to complete the mail survey (n=840).

The mail survey was distributed to all of the persons agreeing to complete the mail survey approximately 3-5 working days after the initial on-site interview. The initial mailing of the survey was sent first class and included a postage paid pre-addressed envelope. After three weeks, those not responding were sent a follow-up post card reminder. Each mailing was addressed to the individual who provided their name and address during the on-site interview. Of the 840 trail users initially agreeing to participate in the mail survey, 648 returned usable questionnaires, for a final response rate of 77 percent. The number of interviews completed at each locations reflect the current patterns of recreation use. Attempts were made to contact trail users across a variety of time and days.

In order to achieve objectives of this research is to document meaningful differences among the sample of trail users according to where they live and their level of experience on the RRVT. It reports the results from difference in mean comparisons (one-way analysis of variance test) across three categories of residence: (1) trail users from an urban population center--Polk County (n=395), trail users from the counties that include the RRVT--Dallas and Guthrie County (n=119), and trail users from all other locations (n=119). This paper also reports the results from difference in mean comparisons (one-way analysis of variance) of three categories of trail users based upon their level of experience with the RRVT: (1) first time RRVT trail users (n=133), infrequent trail users (i.e., has used the trail before, but visit three times a year or less, n=171), and frequent trail users (i.e., visit the trail four times or more a year, n=330).

Profile of Trail Users

Base upon previous surveys, the sample of trail users would appear to be representative of Raccoon river Valley Trail users and of recreation trail users in Iowa, in general (Table 1, next page).

Table 1. Profile of sample of RRVT trail users.

Summary of Demographic Information	
Age	41 years (mean, mode, median)
Gender	Male (63%)
Total family income	\$45,000 to \$54,999 (15%)
Education	4-year college degree (29%)
Home residence	Des Moines, IA (33%)
Occupation	Professional/Managerial (59%)
Size of party	2 persons (44%)
Transportation to trail	Motor vehicle (83%)
Miles traveled to trail	14 miles (23%)
Summary of Trail Use Information	
Used trail previously	Yes (75%)
Number of visits to RRVT	4-10 times/season (19%)
Miles traveled on trail	25 miles (23%)
Hours spent on trail	3 hours (26%)

(1) Findings: Willingness to Pay

The trail user survey included a measure of willingness-to-pay for a trail-based recreation opportunity on the RRVT. The open-ended format used was straightforward; respondents were asked to write in the maximum amount they would pay of a single days recreation use of the Raccoon River Valley Trail. The results of the willingness to pay question suggest that half (50%) of the sample indicated that the maximum they would have paid for a single days use of the RRVT was 2 dollars or less, while the other half was willing to pay three dollars or more. The current fee for a single day use permit for the trail is 2 dollars. Extrapolating the results from the samples response willingness-to-pay question to the population of trail users, supplies an estimate of \$146,762.. This figure represents the value of the recreation opportunities provided by the RRVT for the summer of 1991.

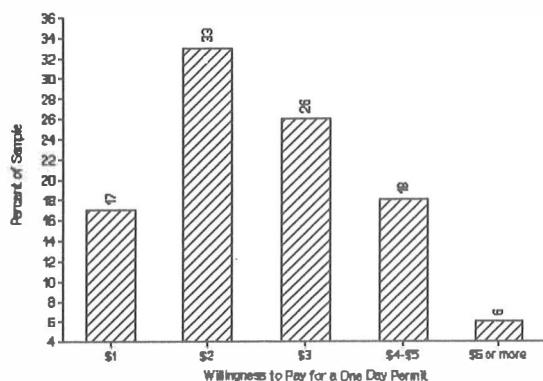


Figure 1. A measure of willingness to pay for a trail-based recreation experience.

There were not any significant differences in the amount the sample of trail users would pay for a permit across the three categories of residential locations or the three level of experience categories.

(2) Findings: Fee Structure

The sample of trail users were asked the extent that they agreed or disagreed with a number of statement related to current fees and the allocation of fee monies. A majority of respondents indicated the that they would be willing to pay increased user fees if the monies were dedicated to trail expansion and habitat protection programs (Table 2).

Table 2. Trail user attitudes towards fee structure and fee allocation process.

Statement	Disagree	Agree
I am willing to pay higher user fees if the money is dedicated to habitat protection programs.	16%	54%
I am willing to pay higher user fees to promote trail expansion.	14%	69%
I would like to make a contribution to the RRVT foundation	23%	26%
Visiting the RRVT was worth the money I spent to recreate there.	1%	97%
The recreational benefits provided by the RRVT outweigh the fiscal and developmental costs.	1%	90%
I sometimes use the trail without purchasing a use permit.	68%	23%

There were differences in the level of agreement across both residential location and level of experience. For example, respondents from an urban county (Polk) were more likely to support higher fees for habitat protection; respondents from the counties that include the trail (Dallas and Guthrie) were more likely to agree with that the RRVT was worth the money I spent to recreate there; respondents from the urban county (Polk) were more likely to use the trail without purchasing a permit that person from the "all other" residential location category; respondents who were classified as frequent visitors were more likely to support higher fee to support trail expansion programs and to make a contribution to RRVT Foundation; and respondents who were classified as frequent visitors were less use the trail without purchasing a permit than infrequent trail users.

(3) Findings: Economic Impacts of Trail Users On Adjacent Communities

This section reports the results from a set of questions that asked the sample of trail uses to estimate their total expenditures in each of the six adjacent communities across four categories of products or services during their visit to the Raccoon Rover Valley Trail (Figure 2, next page).

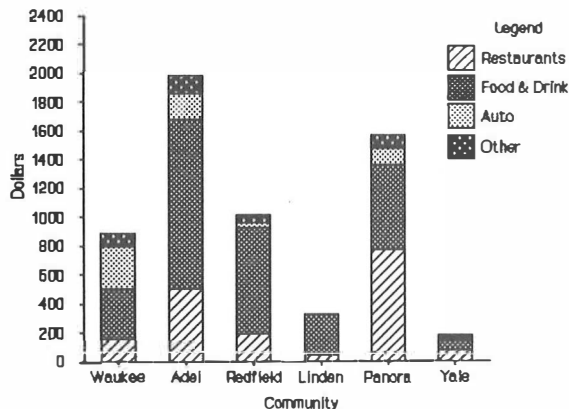


Figure 2. Expenditures in communities adjacent to RRVT for sample of trail users.

The results indicate that the sample of trail users spent the most money in Adel, Iowa. A majority of trail users spent the greatest sum of money in the food and drink category, followed by restaurants, auto services, and the "other" expenses (the other expenses categories include lodging, retail purchases and miscellaneous expenses category). The majority of respondents spent \$7-\$10 dollars during their visit to the trail (as indicated by the average score when all expenditures are totaled across all communities and all categories of expenditures). Extrapolating the average expenditures from the sample to the population estimates total trail users expenditures in adjacent communities within the \$286,272 to \$480,960 range for the 1991 trail use season.

There were differences in expenditure across both residential location and level of experience. For example, trail users from all other location spent significantly more money while visiting the RRVT. There were also significant differences across the specific expenditure categories and community categories (i.e., "all other location" spent more money in restaurants than other residential location types, and respondents from Polk county spent more money in Redfield restaurants than respondents from Dallas and Guthrie county). There were not any significant difference in total expenditures across the three level of experience categories. However there were a number of differences across the specific expenditure and location categories. For example, frequent users of the trail were more likely to spend money on food and drink in Waukeee than infrequent trail users and first time users; and first time users were more likely to spend money in and Adel and Pandora restaurants than the other categories.

Additional analyses were conducted to see if trail user expenditure varies across access sites (i.e., where the respondents parked their car and entered the RRVT). For example, respondents entering the trail in Adel were more likely to spend money on food and drink in Adel than person entering the trail at Redfield or Pandora; and respondents entering the trail in Redfield were more likely to spend money in Pandora at restaurants than person entering the trail in Waukeee and Adel.

(4) Findings: Effect of the RRVT on Adjacent Communities and Resources

The sample of trail users were provided a list of the many issues or topics that may or may not be effected by the operation of the Raccoon River Valley Trail. The trail users were asked if, in their opinion, the RRVT had a "negative",

"no effect" or "positive" effect on each of these issues or concerns. The results of to this questionnaire interpreted through an examination of issues or concerns that received the greatest proportion of responses in the negative and positive categories (Table 3).

Table 3. Trail users' evaluation of the effects of RRVT on local resources and communities.

Effects of the RRVT	Percent
Top five NEGATIVE effects	
• Traffic congestion	16%
• Impacts on wildlife	13%
• Increased soil erosion	6%
• Destruction of prairie	6%
• Increased property taxes	5%
Top five POSITIVE effects	
• Increased recreation opportunities	96%
• Improved image to non-residents	96%
• Increased number of visitors to area	96%
• Improved local pride in community	94%
• Improved local economy	94%

There were no significant differences in expenditure across the level of experience category. There were however differences in across the three residential location types. For example, trail users living adjacent to the trail were less likely to identify the positive effect of the trail on local employment rates, the local economy, the quality of life in adjacent communities, wetland preservation, regional trail opportunities and local community pride than "all other" locations. In addition, trail users living adjacent to the trail were less likely to identify the positive effect of the RRVT on property taxes and property values than resident of Polk county.

Summary and Recommendations

This research provides substantial support for the development of linear recreation trails. For example, the measures of willingness-to-pay estimate the value of the opportunities provided by the trail at \$146,762. With current levels of use the recreation opportunities provided by the trail would offset the developmental cost of the trail in approximately six years. The results also show considerable support for increased fees if the money is designated for specific programs. Trail users expenditures in local communities was estimated between \$286,272 and \$480,960 for the summer of 1991. Trail user expenditures represent an important addition to the sagging local economies of many rural communities. The following represents a collection of highlights from the research and the associated recommendations:

Finding:

Considerable support for increased fees if money is dedicated to for specific trail development and resource protection programs.

Recommendation:

Provide the opportunity for trail users to purchase a "habitat protection stamp" or a "trail expansion stamp" to be affixed to their trail permit.

Finding:

A number of trail users associated a reduction in wildlife habitat with the development of the RRVT.

Recommendation:

Develop habitat demonstration projects (i.e., bluebird and barn owl houses) with signage stressing the importance of linear corridors to viable wildlife populations.

Finding:

The communities of Adel and Pandora realized the greatest economic benefits from the development of the RRVt.

Recommendation:

Need to develop signage (and brochures) that inform trail users what amenities are available in the community.

Further research is needed that will help each community identify its unique role within the RRVt system. The role of each community can be determined through a detailed examination of its internal social and community structure, its relationships to the RRVt, other natural resources and other communities adjacent to RRVt.

Finding:

Trail users from communities adjacent to the trail are less likely to identify positive effects of the trail on local employment rates economy, and quality of life.

Recommendation:

Need to demonstrate the value of the trail to residents of adjacent communities. This could be accomplished through the joint sponsorship of facilities and program for local residents and trail users with local governments, community groups and businesses (e.g., picnic shelters, comfort station, special events).



URBAN RECREATION

CUSTOMER DIVERSITY AND THE FUTURE DEMAND FOR OUTDOOR RECREATION

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Population projections for the U.S. call for reduced growth and increased aging, racial/ethnic diversity, and urban residence. If percent participating by age and racial/ethnic group remains at present levels for the years ahead, cohort-component projection models suggest that, given projected changes in the age and racial/ethnic structure of the population, participants in a number of outdoor recreation activities will increase at slower rates than in the past.

Demographic Trends

In the years ahead the U.S. population will grow more slowly than in the past, age significantly, have larger minority components, and be more urban (Spencer 1989). The U.S. population, which grew at 2 percent per year in the 1950's and 1 percent per year in the 1980's, is expected to grow at about 0.5 percent per year over the next several decades.

Accompanying slower population growth and longer life spans will be increased aging. In 1900 the median age was 23, it increased to 30 in 1980, and is expected to reach 36 by the year 2000 and 41 by the year 2025. There will be increased racial/ethnic diversity in the years ahead as well. Between 1990 and 2025 the U.S. population is expected to increase by 50 million, of whom 17 million will be Hispanic Americans, 14 million African Americans, and 10 million will be from "other" groups. Thus 81 percent of the increase in population will be in minority groups. There are prospects for increased urban residence as well (Luloff and Krannich 1990). The 1980's witnessed a return to the long term trend of greater growth in metropolitan areas than in non-metro areas. The nation's non-metro areas grew at only half the rate of their metro counterparts, with many of the Nation's largest standard metropolitan areas (SMSA's) attaining increases of 20% or more.

Variation in Participation

The next three sections look at variation in recreation participation at the national level in terms of racial/ethnic background, age, and urban/rural residence. The analysis is based on responses from 18,450 individuals from the U.S. Pleasure Travel Market Study conducted in 1989 by Longwoods Research Group Ltd. While only simple breakdowns by the three demographic categories are presented here, multivariate analyses indicate that most of the significant differences remain when other individual, household, and locational variables are taken into account as well (Dwyer 1993). Comparisons of participation by racial/ethnic groups for six major U.S. cities are provided by Dwyer (1993) as well as breakdowns by all three demographic categories for Illinois and at the national level from the National Survey of Fishing, Hunting, and Wildlife Associated Recreation.

Racial/Ethnic

Table 1 presents the percent of a large nationwide sample of African Americans, Hispanic Americans, whites, and "other" groups who reported participation in a wide range of recreation activities (Nadkarni and O'Leary 1992). There are statistically significant differences across racial/ethnic groups for each of the twenty-nine activities. The most distinct pattern is that African Americans are significantly less likely than the three other groups to participate in a large portion of the outdoor recreation activities studied, particularly those that take place

in a wildland setting or involve water/snow/ice. It is in some athletic activities in which African Americans are significantly more likely than whites to participate. There is a tendency for one or more of the three "minority groups" to have significantly higher participation than whites in sports and athletic activities. Patterns of similarities and differences between whites, Hispanics, and "other" groups are not as clear, but in many instances Hispanics or "others" are the group most likely to participate in a particular activity. Perhaps the lack of a clear pattern of participation for Hispanic and "other" groups in comparison to whites and African Americans is because of the recent immigration of a number of individuals in these groups from a wide range of countries with diverse outdoor recreation patterns and traditions. What we are most likely observing here under groupings such as "Hispanic" or "other" is composites of a number of distinct patterns for specific ethnic groups. African Americans and whites are also composites of a number of ethnic groups; but they have an almost unanimous shared recent background in the United States. We also have relatively fewer observations with Hispanics and "other" groups, which may have hampered our efforts to identify a pattern with these groups or to compare them to others.

Age

Table 2 presents percent participating by age class for a wide range of recreation activities (Nadkarni and O'Leary 1992). There are significant differences in participation across the six age categories for every activity. The general trend is a decrease in participation with increasing age, with the difference between activities being when that decrease begins. With nearly half of the activities (and particularly sports and athletics) there is a fairly steady decline in percent participating with each age class after the first (18-24 years), with nearly all of the other activities starting decline after the second age class (25-34). A notable exception is birdwatching where percent participating increases with age class until age 55-64, and then decreases slowly.

Urban/Rural Residence

Differences in percent participating in outdoor recreation activities by urban/rural residence appear to be a reflection of different lifestyles and the availability of opportunities to participate in these activities in fairly close proximity to home. Table 3 indicates percent of the U.S. adult population participating in a wide range of recreation activities according to the size of the area where they lived (Nadkarni and O'Leary 1992). There are significant differences in percent participating by size of area for 25 out of 29 activities. Activities generally associated with substantial wildland areas are more likely to be participated in by individuals living in an area with a population of less than 50,000 than in areas with a larger population. Activities requiring the development of specialized facilities or programs are more likely to be participated in by individuals living in large urban areas where there are usually substantial recreation facilities and programs.

Some Projections for the Future

Murdock et. al. (1991) developed a cohort-component projection model that uses projections of the population by age and race/ethnicity, together with activity-specific rates of participation by age and race/ethnicity to project number of participants in recreation activities in the years ahead. They project the likely effects of demographic changes (age and race/ethnicity) on the number of persons who will participate in seven selected recreation activities in the U.S. through the year 2025 (backpacking, birdwatching, hunting, dayhiking, camping in a tent, walking for pleasure, and picnicking). Activity participation rates for combinations of age and race/ethnicity in each of the seven activities were derived from the survey conducted for the President's Commission on Americans Outdoors by Market Opinion Research Survey Organization. Projections of population characteristics were provided by the U.S. Bureau of the Census for three racial groups (white, Black, and "other") and one ethnic group

Table 1. Percent of U.S. adults participating in recreation activities by racial/ethnic group - 1989.

Activity	White (14,787)	Black (2,024)	Hispanic (1,184)	Other (455)
Swimming	36.6 ⁺⁻	15.1 ⁻⁻⁻	37.3 ⁺⁻	45.9 ⁺⁺⁺
Bicycling	27.7 ⁺⁻	17.3 ⁻⁻⁻	36.3 ⁺⁺	40.7 ⁺⁺
Freshwater fishing	21.3 ⁺	10.3 ⁻⁻⁻	21.4 ⁺	20.8 ⁺
Camping	20.6 ⁺⁺	2.7 ⁻⁻⁻	15.5 ⁺⁻	19.5 ⁺⁺
Aerobics	15.0 ⁻⁻⁻	19.6 ⁺	20.0 ⁺	22.8 ⁺
Jogging/running	10.5 ⁻⁻⁻	12.9 ⁺⁻	23.3 ⁺⁺	22.4 ⁺⁻
Golf	13.1 ⁺⁺	2.3 ⁻⁻⁻	6.3 ⁺⁻	10.8 ⁺⁺
Weight lifting	10.2 ⁻⁻	11.2 ⁻⁻	21.0 ⁺⁺	22.4 ⁺⁺
Hiking/backpacking	12.3 ⁺	1.3 ⁻⁻⁻	13.8 ⁺	13.3 ⁺
Tennis	8.7 ⁻⁻	8.0 ⁻⁻	12.1 ⁺⁻	25.0 ⁺⁺⁺
Power boating	9.5 ⁺⁺⁺	1.7 ⁻⁻⁻	3.8 ⁺⁻	5.6 ⁺⁻
Hunting	8.3 ⁺⁺⁺	2.4 ⁻⁻	6.0 ⁺⁺	2.3 ⁻⁻
Saltwater fishing	7.2 ⁺⁻	3.1 ⁻⁻⁻	12.7 ⁺⁺	11.5 ⁺⁺
Birdwatching	7.9 ⁺⁺	2.2 ⁻⁻⁻	7.0 ⁺	5.3 ⁺⁻
Downhill skiing	6.3 ⁺⁻	1.3 ⁻⁻⁻	8.1 ⁺⁺	10.9 ⁺⁺
Waterskiing	6.8 ⁺⁺	0.3 ⁻⁻⁻	7.0 ⁺⁺	4.3 ⁺⁻
Horseback riding	5.9 ⁺⁻	3.8 ⁻⁻⁻	7.1 ⁺	8.4 ⁺⁺
Canoeing	6.4 ⁺⁺	1.1 ⁻⁻⁻	2.4 ⁺⁻	4.7 ⁺⁺
Racquetball	4.9 ⁺⁻	2.7 ⁻⁻⁻	11.0 ⁺⁺	12.3 ⁺
Sailing	4.4 ⁺	0.8 ⁻⁻⁻	5.1 ⁺	4.3 ⁺
Cross-country skiing	3.5 ⁺	0.5 ⁻⁻⁻	3.8 ⁺	2.0 ⁺
Mountain climbing	3.1 ⁺⁺	0.---	1.6 ⁺⁻	3.8 ⁺⁺
Snowmobiling	2.3 ⁺⁺	0.4 ⁻⁻	2.7 ⁺⁺	0.8 ⁻⁻
Whitewater rafting	2.1 ⁺⁺	0.3 ⁻⁻⁻	1.1 ⁺⁻	1.3 ⁺
Scuba diving	2.0 ⁺⁻	0.2 ⁻⁻⁻	2.7 ⁺⁻	5.8 ⁺⁺⁺
Wind surfing	0.9 ⁺⁺	0.---	1.0 ⁺⁺	0.---
Hot air ballooning	0.8 ⁺	0.2 ⁻	0.5	0.4
Squash	0.3 ⁺⁻	0.---	0.3 ⁺	1.0 ⁺⁺
Hang gliding	0.1 ⁻	0.---	0.4 ⁺⁻	1.3 ⁺⁺⁺

NOTES: Differences between racial/ethnic groups are significant at the $p < .05$ level for each activity.

+ Percent participating is significantly higher than another group.

- Percent participating is significantly lower than another group.

Table derived from the Travel USA Data for 1989 (See Nadkarni and O'Leary 1992).

(Spanish origin). The single set of activity-specific participation rates for age and racial/ethnic groups was used for all years in the projection period. The general pattern in these activity-specific participation rates is for the proportion participating in an activity to decrease with increasing age and racial/ethnic minority background. This is consistent with earlier discussions of participation patterns of racial/ethnic and age class groups.

The projections of future participation suggest that, given U.S. Bureau of the Census assumptions concerning future growth of the population and changes in its age and racial/ethnic structure, as well as constant activity participation rates for particular age and racial/ethnic groups, growth in number of U.S. participants in six of the seven outdoor recreation activities during the period 1990-2025 will be lower than expected growth in the U.S. population. The number of participants in backpacking is projected to decrease slightly. Birdwatching participants are projected to grow in numbers at a slightly faster rate than the U.S. population (Table 4).

Given that Murdock et. al.'s (1991) cohort-component projection model uses the same activity-specific participation rates for age and racial/ethnic groups for all time periods, projected rates of change in participants at a different rate than

the U.S. population are due to changing age structure and changing racial/ethnic composition of the population over time. The projected changes in number of participants in selected activities were attributed primarily to changing age structure, and to a much lesser extent to population growth and changing race/ethnicity (Table 5). In essence, growth in participation in an activity at a rate lower than population growth is attributable to shifts of the population into age and racial/ethnic groups with lower rates of participation. Birdwatching participants increased at a higher rate than population growth largely because the activity has relatively high popularity with older individuals. Birdwatching stood out among 29 activities (Table 2) for its relatively high popularity with older Americans. Relatively high rates of increase in pleasure walking and picnicking are also attributable to their popularity with older Americans. The projected drop in backpacking participation is largely attributable to its relatively high popularity with young adults. With backpacking and camping in a tent there is a projected decrease in the number of white participants. This is due, in part, to slow growth in the number of young whites (15-19 years of age) and an absolute decline in whites age 20-24 years. Activities in which participation is higher among younger population groups are projected to experience slow rates of increase in the future, particularly among whites.

Table 2. Percent of U.S. adults participating in recreation activities by age class - 1989.

Activity	18-24 (2,667)	25-34 (4,652)	36-44 (3,663)	45-54 (2,408)	55-64 (2,258)	65+ (2,782)	All (18,450)
Swimming	44.8	45.0	39.0	31.0	23.5	13.3	34.5
Bicycling	36.2	36.7	32.7	23.7	16.5	8.8	27.5
Freshwater fishing	23.3	26.6	21.9	19.9	13.6	9.1	20.1
Camping	21.6	25.5	21.8	16.7	10.8	5.9	18.3
Aerobics	22.7	23.6	18.0	12.4	7.9	4.1	16.0
Jogging/running	20.4	16.3	12.9	9.3	5.6	2.4	11.9
Golf	14.2	12.8	12.3	10.2	9.4	7.7	11.4
Weight lifting	24.5	17.8	11.1	4.8	3.0	.6	11.3
Hiking/backpacking	13.2	15.7	15.2	9.8	5.2	2.6	11.2
Tennis	17.9	12.7	9.2	7.0	3.8	1.4	9.2
Power boating	10.6	11.0	8.1	8.2	5.9	2.9	8.2
Hunting	9.4	9.9	8.0	7.5	4.9	2.1	7.3
Saltwater fishing	8.7	7.8	7.7	9.0	6.0	3.4	7.2
Birdwatching	2.7	6.6	7.3	9.1	9.9	8.1	7.1
Downhill skiing	12.1	8.9	6.1	4.8	1.2	.3	6.0
Water skiing	12.8	9.9	5.9	2.9	1.1	.2	6.1
Horseback riding	8.0	9.3	7.2	3.9	2.0	.8	5.8
Canoeing	6.7	7.9	7.5	4.6	2.5	1.0	5.5
Racquetball	12.6	8.0	4.5	3.0	.6	.1	5.2
Sailing	5.4	5.0	4.2	4.6	2.5	1.5	4.0
Cross country skiing	4.1	4.1	3.9	3.8	1.8	.4	3.2
Mountain climbing	3.2	3.3	3.6	2.6	1.8	.8	2.7
Snowmobiling	4.1	3.2	1.9	1.4	.9	.4	2.1
Whitewater rafting	2.0	3.0	2.5	1.1	.5	.4	1.8
Scuba diving	3.6	3.4	2.0	1.0	.4	.2	2.0
Wind surfing	1.3	1.2	.8	.5	.3	.0	.8
Hot air ballooning	1.0	.8	.8	1.3	.5	.2	.7
Squash	.4	.5	.3	.1	.0	.0	.3
Hang gliding	.2	.3	.2	.1	.1	.0	.2

NOTES: Differences significant at $p < .05$ Level for all activities.

Table derived from Travel USA Data for 1989 (See Nadkarni and O'Leary 1992).

Table 3. Percent of U.S. adults participating in recreation activities by size of area where they reside - 1989.

Activities	Less than 50,000 (4,812)	50,000- 499,999 (3,689)	500,000- 1,999,999 (2,952)	2,000,000 and over (6,997)
Swimming*	31.4	34.6	35.0	36.5
Bicycling*	24.3	26.6	29.0	29.5
Freshwater fishing*	26.2	21.7	19.7	15.2
Camping*	19.8	19.5	18.5	16.6
Aerobics*	13.3	14.6	16.8	18.3
Jogging/running*	9.0	10.9	13.5	13.8
Golf*	9.8	12.9	13.7	10.7
Weight lifting*	9.1	10.2	11.5	13.4
Hiking/backpacking*	10.1	10.9	11.2	12.1
Tennis*	6.3	10.0	10.2	10.4
Power boating*	7.6	8.5	9.3	7.9
Hunting*	12.9	8.2	5.1	4.0
Saltwater fishing*	6.1	7.1	6.6	8.3
Birdwatching*	8.4	7.6	7.2	6.0
Downhill skiing*	3.4	5.7	5.8	8.1
Waterskiing*	5.8	6.0	6.6	6.1
Horseback riding*	6.3	4.5	6.0	6.1
Canoeing	5.5	5.4	6.0	5.3
Racquetball*	3.2	5.7	4.7	6.5
Sailing*	2.0	3.8	4.9	5.2
Cross-country skiing*	3.1	3.9	2.7	3.1
Mountain climbing	3.0	2.7	2.8	2.4
Snowmobiling*	2.9	1.8	1.5	2.0
Whitewater rafting	1.3	2.2	1.4	2.0
Scuba diving*	1.6	1.7	1.4	2.6
Wind surfing*	0.3	0.9	0.8	1.0
Hot air ballooning*	0.5	0.6	1.2	0.8
Squash	0.3	0.2	0.3	0.3
Hang gliding*	0.1	0	0	0.3

NOTES: *Differences significant at $p < .05$ level across areas. Table derived from Travel USA Data for 1989 (Nadkarni & O'Leary 1992).

Table 4. Percent change in total number of additional persons projected to be involved in selected outdoor recreation activities in the United States from 1990 - 2025, by race/ethnicity.

	Total Population	Race			Ethnic Spanish Origin
		White	Black	Other	
		--- percent ---			
Backpacking	-0.3	-6.1	16.2	46.5	43.0
Birdwatching	23.4	13.7	31.1	54.9	50.7
Hunting	11.4	4.8	24.4	49.9	46.5
Day Hiking	10.0	3.8	22.4	50.2	46.6
Camping in a tent	3.2	-4.0	22.6	47.1	45.0
Walking for pleasure	18.3	9.9	27.6	53.0	48.5
Picnicking	16.0	8.0	26.2	52.2	47.6

NOTES: Source- Murdock et. al. (1991).
During the period 1990 - 2025 the U.S. population is projected to increase by 19.7 percent.

Table 5. A decomposition of the projected differences in the rate of participation in selected outdoor recreation activities among residents of the United States, by activity, 1990 - 2025.

	--- Percent of absolute change in total effect due to ---		
	Population	Age	Race
Backpacking	1.7	91.2	7.1
Birdwatching	4.5	94.9	0.7
Camping in a Tent	2.5	95.0	2.6
Day Hiking	5.1	84.1	10.8
Hunting	14.2	77.5	0.3
Picnicking	22.8	76.8	0.4
Walking for pleasure	25.3	65.3	9.4

NOTE: Source -- Murdock et. al. (1991)

Projections provided by the cohort-component projection model also suggest changes in the demographic characteristics of participants, with higher ages and larger proportions of minorities among participants in each of the seven activities.

Murdock et. al. (1990) also developed a cohort-component projection model for Texas. With a large and rapidly growing minority component of the Texas population, race/ethnicity plays a more significant role in changing participation in the years ahead than at the national level.

The projections developed by Murdock et. al. (1990, 1991) must be evaluated in light of two key assumptions of their model: (1) Participation rates by age group and racial/ethnic groups will not change over time, and (2) Variables other than age group and race/ethnicity that influence participation are not explicitly considered. For a discussion of these assumptions and their implications for predicting the number of participants in selected activities in the years ahead see Dwyer (1993) who also provides suggestions for improved predictions, including changing participation rates over time for demographic groups.

Implications for Management

If participation rates by age and racial/ethnic groups remain constant over time, projected demographic changes are likely to bring significant changes in recreation participation patterns. While changes will vary significantly across activities, outdoor recreation customers are likely to increase in numbers at a slower rate than in the past, and will be increasingly older, urban, and from racial/ethnic minority groups. Change will be the hallmark of recreation resource management programs even more than in the past, and it will be increasingly important to maintain flexibility and responsiveness.

The projected changes in customers and participation patterns will have wide - ranging implications for recreation resource management programs. These implications will be especially significant for the management and use of resources in or near urban centers which tend to be heavily used by racial/ethnic minorities, urbanites, and older Americans. Particularly significant changes can be expected in areas of the U.S. where there is substantial growth in racial/ethnic minority populations.

The implications of demographic changes and associated changes in use and users may be wide-ranging and include design and management of recreation settings, the focus of visitor programs, information and marketing efforts, and the selection and training of those who work with visitors. It may be necessary to review fee structures in the years ahead, given the increasing proportion of participants that will qualify for "senior citizen rates." The selection of staff and the development of training programs will need to address the needs of increasingly diverse customers. Increased attention will need to be given to communication between managers and planners and the increasingly diverse populations that they will serve.

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MANAGING URBAN OPEN SPACES FOR NATURALNESS: PREFERENCES OF CHICAGO HOUSING AUTHORITY CHILDREN

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This study examines the preferences of inner city children for urban open spaces that are managed at different levels of naturalness. Six-to-nine-year-olds ($N=62$) from Chicago Housing Authority residences viewed and rated their preferences for color slides of various urban ecosystems. The slides were selected and scaled by a panel of natural resource professionals to represent varying degrees of naturalness. Analyses in general showed that low levels of naturalness were most preferred, but that for some ecosystem types higher levels of naturalness could be maintained without significantly decreasing preferences. The study results have implications for managing urban open spaces for children who may not be familiar with or feel comfortable in wild landscapes, to encourage enjoyment and learning from nature experiences.

Introduction

Natural landscapes provide habitat for plants and animals, and offer beauty, recreation, and educational experiences for people. In the Chicago region, these common natural landscape types included prairie, savanna, woodland, and wetland ecosystems. But in an evolution typical of most cities, as Chicago became urbanized many of the natural landscapes that once existed were lost to development. Today, the natural ecosystems that remain are greatly reduced in size and biological diversity, and are simplified in ecological structure and function. This is especially true in areas of the central city where development is densest.

An unfortunate consequence of this pattern of development is that shortages in urban nature opportunities disproportionately affect low income groups. Unlike other city dwellers, these groups often lack the time, transportation, and financial resources to reach areas where natural landscapes are more prevalent. Young children (5-to-12 years) are especially affected, for at it is at this stage of development where they begin to learn the meaning and significance of their environment, and the natural environments they experience during this period can shape their perceptions and behavior as adults (Moore 1977; Tanner 1980). If most nature experiences at this stage are limited to school and family visits to the zoo or museums, or if natural environments are experienced only indirectly through books and television, children may not see what relevance or benefits nature has in their lives.

To provide all urbanites with the valued experiences that nature affords, we must make natural landscapes more accessible, not something "out there" and separate from the everyday environment. One important way to increase access is to bring it closer to where urbanites live. "Nearby nature" (Kaplan 1985) can be provided in many places in cities-- in parks, nature centers, along utility and transportation corridors, and in vacant lots. To maximize its values to people, however, natural areas must also be designed so that their intended users find them attractive and comfortable places to be in. In this respect, young children are a critical use group to plan for. Lack of previous experience may cause some

children to feel discomfort or fear in natural areas (Metro, Dwyer, & Dreschler 1981). The degree of naturalness or wildness of a place has been shown to be a significant determinant of children's preferences for urban woodland landscapes (Gobster 1992), but little information is available for managing naturalness in urban open spaces. The objectives of this paper are two-fold: (a) to examine inner city children's preferences for different natural ecosystems; and (b) to identify levels of naturalness that are most preferred. It is hoped that the information from this study will aid the managers of urban parks and nature centers to better understand the perception and needs of their visitors, so that they can better target landscape design efforts and environmental education programs to different groups.

Method

Subjects

The children who participated in the study were Chicago Housing Authority residents attending a program at the North Park Village Nature Center, which is operated by the City of Chicago. The program, "A Day with Mother Nature," provides environmental education and nature experiences for young children, many of whom come from low income families and have had little previous interaction with natural landscapes. The 62 boys and girls who participated in the summer, 1991 program ranged in age from 5 to 12 years and were of African-American heritage.

Design and Procedure

As part of the program, the children took part in an "environmental preference assessment" prior to their tour of the nature center. A photo-rating approach (Shuttleworth 1980) commonly used in environmental preference research was adapted for use with young children. In the assessment, the children rated their preferences for color slides of savanna, prairie, woodland, and wetland ecosystems. Each of the four landscape types were shown to the children under five different levels of naturalness. Representative examples of these slides are shown in Figure 1.

Because of the young age of the group, we limited the number of slides to 20, with each slide representing one landscape type under one level of naturalness. We also restricted the preference rating scale to three choices, again to simplify the task for the children. We feel these limitations are justified given the unique information this kind of study can provide, and find that the photo-rating approach as applied here is easy for most young children to understand and is a fun way for them to participate in a research study.

Naturalness Scaling and Reliability. We carefully selected a set of slides so that scenes within each landscape type were similar in composition, photographic quality, and other factors, but varied with respect to the level of naturalness present. We defined five levels of naturalness: At the lowest level, landscapes appeared highly manicured, small in scale and extent, and showed prominent pathways and other signs of human habitation or development such as buildings, fences, or concrete edges (e.g., Figure 1a). At higher levels of naturalness, the landscapes looked less managed, larger in scale and extent, and human influences were less apparent (e.g., Figure 1b and c). The highest level of naturalness depicted a pristine natural landscape, but one at a scale and extent possible within an urban context (e.g., Figure 1d). A preliminary set of slides was judged on a 5-point scale of naturalness by a panel of 6 experts in natural areas design, research, and education. Agreement among the experts was high, with ratings showing a mean observer-to-group correlation of $r = .89$. The mean scores for the slides, however, showed that for two of the landscape types there was an inadequate distribution of scenes across the five levels of naturalness. New slides were substituted in these cases, and the entire set was re-rated, this time by a panel of 10 experts. The revised set had good rating distribution for each landscape type, and group agreement remained high ($r = .90$).



a



b



c



d

Figure 1. Representative photos used in the study: (a) savanna landscape low in naturalness, rated high in preference; (b) prairie landscape of moderate naturalness, rated low in preference; (c) woodland landscape of moderate naturalness, rated high in preference; (d) wetland landscape high in naturalness, rated low in preference.

Preference Scaling and Reliability. The final slide set was randomized, and the 20 scenes were shown to children in groups of around 20 in size. The children rated the slides according to the question: "How much would you enjoy being in the places pictured?" Ratings were made on a three-point "smiley face" scale like the one shown in Figure 2.



Figure 2. The "smiley face" rating scale.

The children's ratings were examined for internal and group consistency using options available in the RMRATE statistical program (Brown, Daniel, Schroeder, & Brink 1990). This program flags observers whose ratings have excessive missing values, show a poor range in values, or are poorly correlated with the rest of the group. Of the 62 raters, 3 were removed from the analysis because all of their ratings were the same number, and 8 others were removed because their ratings correlated less than $r = .20$ with the rest of the group. For the 51 remaining children, the average observer-to-group correlation was an acceptable $r = .57$.

Results

The children's mean preference ratings were correlated with mean naturalness values across all scenes. The Pearson correlation coefficient was $r(20) = -.70$ ($p = .001$), indicating a moderately strong, negative relationship between preference and level of naturalness. That is to say, as landscapes became more natural or wild appearing, the children found them less preferred.

This generalized relationship is illustrated in Figure 3, where preference scores for all four landscape types are plotted against their respective naturalness scores. The curve fitted to these points¹ is generally downsloping, but two important aspects should be noted. The first is that the curve does not immediately drop with increased levels of naturalness; this indicates that the children in a few cases found scenes with moderate and high levels of naturalness highly preferable. The second point is that the preference ratings rarely dropped below a 2 on the 3-point scale, indicating that at the very least the children felt indifferent about high levels of naturalness.

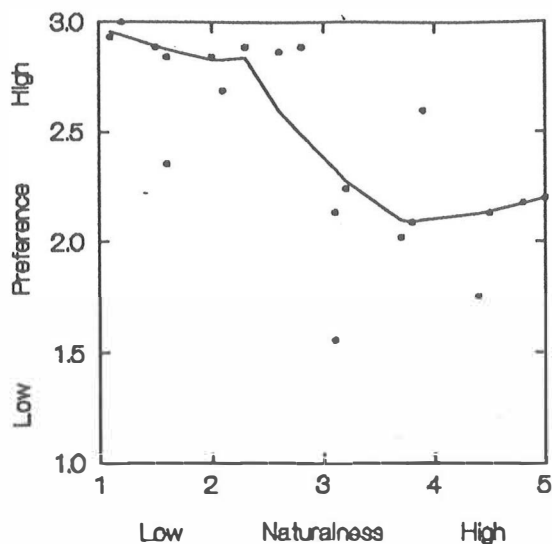


Figure 3. Mean preference ratings as a function of naturalness, all landscape scenes.

The preceding analysis treated all landscape scenes as if they were one generic type, but in examining ratings of the individual photos it looked as if preferences differed depending on the type of landscape viewed. It also looked that for some ecosystems higher levels of naturalness were more acceptable to the children. To answer these questions, we examined preference rating differences in a repeated measures analysis of variance (ANOVA); ecosystem type and naturalness were included in the design as trial factors. For the latter factor, rated mean scores were converted to discrete values to represent five degrees of naturalness.

Figure 4 shows mean preference ratings as a function of landscape naturalness for the savanna, prairie, woodland, and wetland scenes. The ANOVA showed that the main effects for ecosystem type ($F(3, 132) = 15.94, p < .001$) and naturalness ($F(4, 176) = 48.79, p < .001$) were significant. Visual examination of the graphs, however, failed to reveal a definite pattern that one landscape type was liked over another. Rather, preference for ecosystem type seemed to depend on the level of naturalness in which it was viewed. This was supported by the significant interaction effect between ecosystem type and naturalness level in the ANOVA ($F(12, 528) = 15.07, p < .001$).

Figure 4 shows how in some cases preference ratings stayed high or rose with high levels of naturalness. This was

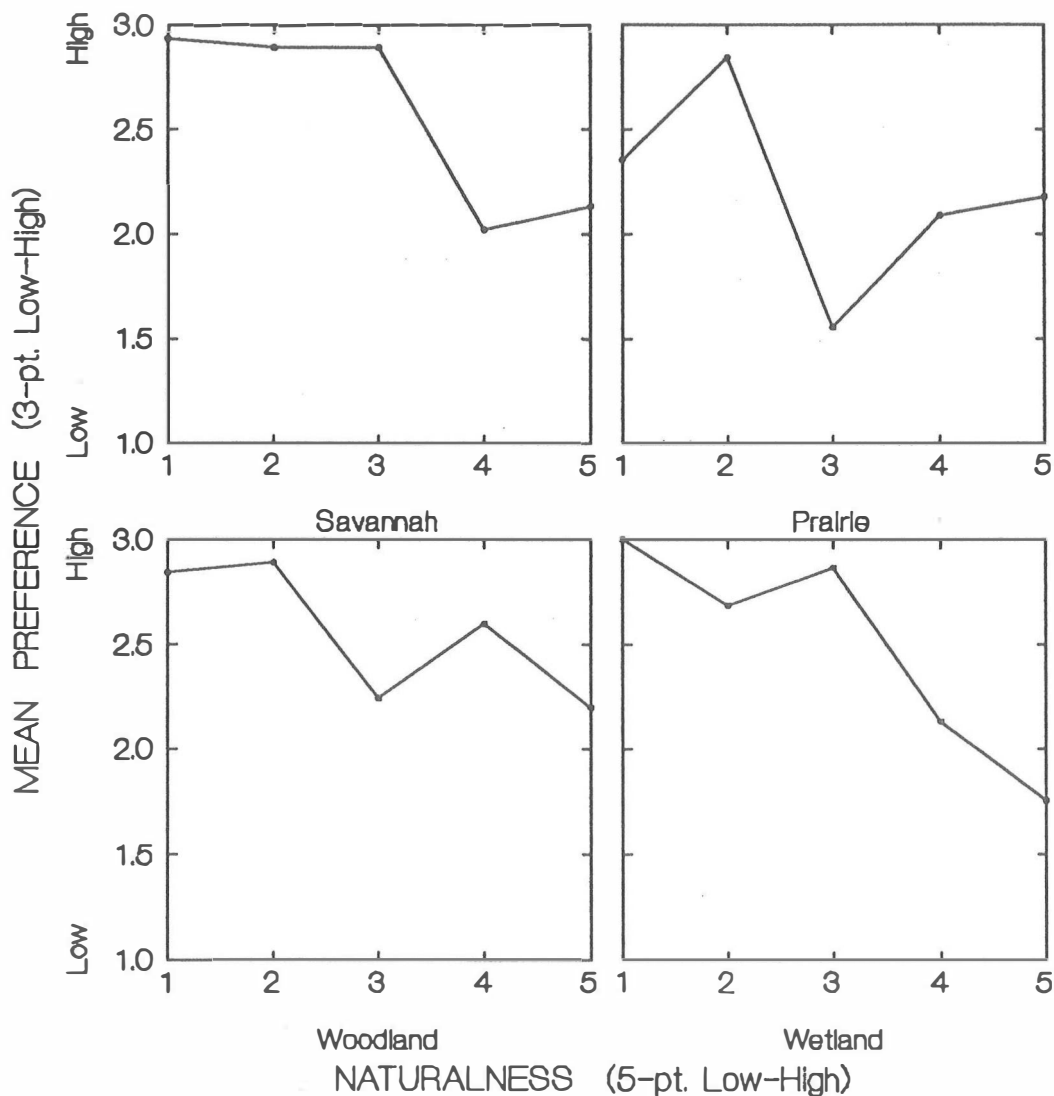


Figure 4. Mean preference ratings as a function of naturalness, by landscape type.

particularly the case for savanna and woodland scenes that had naturalness ratings of around 4 on a 5-point scale. In other cases preference ratings dropped steadily with increases in naturalness (wetland scenes), or dropped significantly at a moderate level (prairie scenes). Because of the small number of scenes these relationships should be interpreted cautiously, but they do give some indications that desired levels of naturalness may depend on the type of landscape under consideration.

In a final test we examined preferences between different subgroups of children in the sample. We divided the children's ratings by sex ($N = 23$ girls, 28 boys) and by age ($N = 23$ 5-to-7-year-olds, 28 8-to-12-year-olds) but found no significant differences in ratings between the subgroups.

Summary and Implications

The major findings of this research can be summarized as follows:

1. The children found natural landscapes enjoyable to view, but generally preferred those for which the naturalness or wildness of the scene was of a low to moderate level. This finding agrees with the results of a previous study that inner city children enjoy natural landscapes as long as the places are not too wild in character so that they convey unfamiliarity or fear (Gobster 1992). The level of naturalness should be taken into account in the design and management of parks and natural areas for children. Providing settings with moderate levels of naturalness where children feel comfortable might foster greater appreciation and learning, and encourage children to explore wilder settings without trepidation.
2. Based on the small set of landscape views shown to the children, it appears that even the highest levels of landscape naturalness are not strongly disfavored. This finding is encouraging for natural areas managers who may be trying to maximize natural diversity on lands they manage. One management scenario might be to make some areas more or less developed with wide trails, signs, and other elements that make children feel more comfortable, while leaving other areas as wild as possible. In this case children might be encouraged to use the less wild area but would not feel too fearful if wilder areas are also present.
3. All types of natural landscapes are liked by children, but there is some indication that higher levels of naturalness may be more acceptable for some types than for others. Further information is needed before specific recommendations can be made here, but there is some indication that children would find some kinds of highly natural environments enjoyable places to see and visit. Future research should look in more detail at the design and management of particular urban ecosystems, to see how preferences are influenced by specific factors that relate to the perceived naturalness of the setting.

Although this study focuses on a special user group type, namely young children from the inner city, the findings and recommendations may have wider applicability for the design of natural areas and environmental education programs. For example, studies of perceived safety (e.g., Schroeder & Anderson 1984) show that adults feel safer in areas where vegetation is partially cleared and buildings and other people are present. And studies comparing park preferences of black and white adults (e.g., Kaplan & Talbot 1988) have found that though both groups like natural areas, blacks tend to prefer parks that are more formally designed and have higher levels of development and maintenance. The results of this present study tend to complement these related efforts by showing that urban natural areas can be designed so that they are safe and educational as well as enjoyable, and can serve human needs along with others who share this planet.

Acknowledgment

I would like to thank Ms Laurel Ross and the staff of the North Park Village Nature Center, City of Chicago Department of General Services, for assisting in the development and implementation of this study. Thanks also go to the children, parents, and supervisors from Rockwell Gardens, Ickes, and Henry Horner Homes for their participation.

Note

The curve in Figure 2 was fit to the scatterplot data using the LOWESS smoothing option available in SYGRAPH (Wilkinson 1990). This smoothing method produces a curve by connecting values of the independent variable x with predicted values of the dependent variable y based on a weighted average of nearby observed y values. For further information, see Cleveland (1981).

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THE INFLUENCE OF RURAL EXPERIENCE ON URBANITES' DEFINITION OF RURALITY¹

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A cognitive mapping experiment revealed that urban residents of Pennsylvania identified rural areas of the Commonwealth in every region of the state. Contextual variables, derived from the maps, indicated that differing thought processes occurred among these respondents. Implications of the findings are advanced with respect to rural tourism marketing.

Introduction

Rural tourism promotion can be enhanced by an understanding of the role of a sense of place in destination selection. According to Downs and Stea (1977), a sense of place is based upon a broad based awareness of an area and its attributes. Since this sense of place is widely held by a local population, it is possible to examine it for group similarities. One procedure for identifying a sense of place is cognitive mapping.

Cognitive maps are representations of the spatial environment (Downs and Stea 1977). They serve as coat hangers for assorted memories, are used for wayfinding activities, and most importantly for tourism research, they store reference information related to an environment (Lloyd and Steinke 1986). Cognitive maps are considered accurate to the extent that they serve as aids - in giving directions to others, navigating trips between places, and finding things that are needed or wanted (Wall et al. 1986). They also are a vehicle for recall, providing an image of *where* to bring back a recollection of who, what, and when.

Cognitive maps develop in two ways. The direct method is associated with existential experience. As people travel through an area, they are exposed to information which is then associated with specific locations. People also gain information indirectly through others or the media, even when not specifically seeking such knowledge (Lloyd and Hooper 1991). Cognitive maps represent a configuration of routes and objects that form a gestalt. Thus, they include knowledge of distances and areas that may have never actually been traversed, and perceptions of these areas even when explicit knowledge is minimal (Moesser 1988).

Peoples cognition of space and spatial relations has a significant effect on their behavior, beliefs, and attitudes regarding places (Gilmartin 1985). This is perhaps best illustrated by considering Lancaster County, Pennsylvania. Lancaster in 1990 was home to almost 423,000 people and had

been classified as a major metropolitan area of southeastern Pennsylvania for nearly thirty years (U.S. Bureau of the Census 1990). Despite its size and status, however, Lancaster has been successfully portrayed as a rural Eden and home to the Plain people -- the Amish. This image is further buttressed by the often cited fact that Lancaster produces the greatest net value of agricultural commodities in a nonirrigated county in the entire United States. It is not surprising, then, that most of the typical state, regional, and local promotional literature describes the county as "an area full of traditional farms, still tilled by hand and horse" (Barash Group Inc. 1993:4). The effectiveness of this promotion is reflected in the fact that it ranks third in tourist earnings for all Pennsylvania counties, trailing only Philadelphia and Allegheny counties, home to the two largest cities in the Commonwealth.

Through the efforts of Kevin Lynch, an urban planner, and his seminal work *The Image of the City* (1960), and his students, a set of comprehensive cognitive maps of urban residents' perceptions of cities and towns has been generated. Much less is known about rural areas, although Shortridge (1985) found that rural images dominated his cognitive mapping survey. This void is addressed here by examining *urban residents' cognitive maps of rural areas*, and determining how their attitudes about these areas, their personal characteristics, and rural experiences influence that definition.

The Survey

During the Fall of 1991 a mail survey following the total design method of Dillman (1978) was conducted seeking information on the perceptions and attitudes about rural people and places held by urban residents of Pennsylvania. The survey form asked respondents for their definition of rural, where they thought such rural areas were in the state, their general perceptions of rural areas and people, and selected personal, social, and demographic characteristics. A total of 3,611 residents of the nine cities in Pennsylvania with a population of 50,000 or more in 1990 were contacted. Completed questionnaires were returned by 1,524 respondents, representing a 42 percent response rate (Willits et al. 1992).

Purposes

One purpose of this study is to determine if urban residents of Pennsylvania can readily identify rural areas on a blank map of the Commonwealth. It is hypothesized that the amount of space indicated on the map can be used to classify respondents into two broad categories - those with loose definitions and those with stringent definitions of rurality. Those with loose definitions are thought to hold anti-rural attitudes and opinions. Such opinions arise from the advantages which accrue in urban life including greater economic activity, numerous and better services, and more social and cultural activity (Willits et al. 1992). Those holding such values are thought to be more likely to indicate greater amounts of rural areas because they view such areas as being homogenous and undifferentiated. Such a response reflects an urban provincialism that suggests all areas outside their city (and experience) are rural. Willits et al. (1992) asserts that this group is small, representing a hard core of urbanites.

On the other hand, those with stringent definitions are expected to hold pro-rural values. Much previous research suggests that the overwhelming majority of people hold positive images of rural life. These images are expected to be reflected in greater knowledge of rural areas. Those espousing stringent definitions are expected to be more precise, and to indicate a higher absolute number of rural areas on the maps. Despite the number of areas, however, the total rural space is expected to be smaller, since they use a more specific definition of rural. For both the loose and stringent response, the respondents' definition of rurality has no a priori meaning imposed by the researchers; it is a true reflection of the respondents' own beliefs about rural space in the Commonwealth (Luloff et al. 1993).

¹/ The support for this research was provided by a grant from the intercollege research competitive grant program of the college of agricultural sciences, Penn state university (project 3208). For complete information on this study, contact either author.

Following the research of Shortridge (1985), a spectrum of factors including characteristics, traits, and beliefs related to both a loose and stringent definition of rural space will be determined. Finally, the implications of varying definitions of rurality for rural tourism promotion in Pennsylvania will be discussed.

Methods

One means for studying cognitive maps is to ask people to sketch an area. This sketch is then analyzed for content, locational accuracy, and size and shape distortions (Gilmartin 1985). A criticism of this methodology is that respondents have a broad range of drawing skills and the sketch may be a better indicator of artistic ability than a representation of a cognitive map. Despite these faults, this method is widely used, and usually reveals group similarities in spatial concepts (Gilmartin 1985).

An alternative is the use of the cued spatial response map. Here, a base map containing minimal spatial references is used. This base map reduces the effect of artistic ability while providing a structured framework for a subject's response, thus making the results more comparable for purpose of summary analysis (Gilmartin 1985). Comparability allows for a determination of whether groups sharing knowledge, experiences, and beliefs about places also share similar cognitive maps (Raitz and Ulak 1981). In this study, respondents were given a cued spatial response map which contained an outline of Pennsylvania and were asked to indicate on the map where they expected to find rural areas.

In order to determine the percentage of the state that was indicated as being rural, a Bruning dot grid overlay was used (Avery and Berlin 1985:85-86). This percentage is obtained by simply dividing total indicated area by the total map area. The resulting information was then used as the dependent variable.

As indicated above, two types of respondents were conceptualized - those with a loose definition of rurality; and those with a more stringent definition. Those who indicated more total rural area than that defined by the Census (60.3 percent) were classified as having a loose definition (U.S. Bureau of the Census 1990).

It was hypothesized that those who maintain loose definitions tend to residualize, that is, they considered rural areas as all spaces external to urban centers. Such residualization reflects both the lack of knowledge of rural areas, and the belief that all rural areas are pretty much the same. Those with a more stringent definition display a more discrete response, which reflects both concrete knowledge of rural areas, and the fact that they can identify them (Downs and Stea 1977; Lloyd 1982; 1989; Driever 1983; Gilmartin 1985; Kostinskiy 1990).

Independent variables from four domains (attitudinal, personal/demographic, rural experience and contextual factors) were examined to test this idea. Following Raitz and Ulak (1981), Lloyd (1982), and Shortridge (1985) a broad range of attitudinal items were asked. Responses were scored 1 (strongly disagree) to 4 (strongly agree). These items were factor analyzed and separated into positive and negative domains. The positive items explained 44.3 percent of the variation while the negative items explained 54.8 percent in the factor analysis. The reliability scores for these scales were modest (Armor 1974; .58 and .73 for the positive and negative indices respectively). Two additional items were included which asked the respondents their level of agreement with whether rural areas are pretty much the same and if all rural areas are farm areas. It was hypothesized that agreement with positive connotations of rural life were related to a more stringent definition of rurality. Alternatively, those that agree with items portraying rural areas negatively or homogeneously were hypothesized as having a loose definition of rurality.

Also included in the attitudinal domain was an opened-ended question asking "What phrases or words come to mind when you think of Pennsylvania's rural areas?" A broad variety of responses were given. In this analysis, all those who responded by providing recreational or vacation imagery were coded as one (16 percent), and other responses were coded as zero. Those respondents using either a recreation or vacation imagery were expected to indicate *specific* areas related to such activities, and a stringent definition of rurality.

Following the work of Driever (1983), Gilmartin (1985), and Gärling et al. (1991), the personal/demographic factors of age, income, gender, education, and size of residence were included. These variables assess whether those with similar characteristics produce similar cognitive maps. Age and income were treated as interval level variables. Gender was coded so males were zero and females were one. Education was coded as follows: 1) less than high school graduate, 2) high school graduate, 3) some college, 4) college graduate or more. Size of residence was rank ordered to reflect the city's relative size from smallest to largest: 1) Altoona, 2) Lancaster, 3) Reading, 4) Harrisburg, 5) Erie, 6) Allentown/Bethlehem, 7) Wilkes-Barre/Scranton, 8) Pittsburgh, and 9) Philadelphia.

Rural experience was measured by determining the childhood residence of both the respondent and the respondent's parents. Even if the respondent is an urban resident, rural perceptions may flourish if the parents have a rural background (Willits et al. 1992). Responses reflected whether one parent, both parents, or neither parent spent most of their childhood in rural areas (defined in this case as small towns under 10,000 in population or open country). Respondents were also asked where they had spent most of their childhood. Both variables were used in the analysis.

A contextual domain was developed from the initial analysis of the maps. The tourism region that the respondent resides in was known. By determining what tourism regions the respondent indicated as containing rural areas, it was possible to establish whether this knowledge was based on adjacency status. The hypothesis here was that those indicating regions close to their own residence would exhibit a more stringent definition, while those indicating nonadjacent regions would have a looser definition. It was also hypothesized that respondents are most familiar with their own region of residence and would be able to indicate rural areas therein. The number of discrete rural areas indicated on each map was also utilized as a contextual factor. More circles indicated more specific rural areas, and a more stringent definition of rurality.

Early analysis revealed that a majority of respondents could indicate rural areas, although a sizable minority only indicated urban areas. Since these two response patterns are distinct, a contextual variable indicating response type was created, with those indicating urban areas coded as zero and everyone else coded as one.

Frequency analysis is used to describe the nature of the responses to the cognitive mapping question. Then, to determine the regional distribution of the designated rural areas, a map with the mean percent of rural area indicated is discussed and compared with a census map containing the tourist regions. First the variables in each domain are examined using one-way analysis of variance and t-test statistics. This procedure determines the mean amount of rural area indicated for categories of an individual variable. Finally, a linear regression model is used to examine all domains collectively.

Results

Initial analysis of the cognitive maps revealed five distinct response types: 1) The respondent followed instructions and indicated rural areas on the map (57.3 percent); 2) The respondent, despite the instructions, indicated urban areas on the map (12.6 percent); 3) The respondent wrote location

names or images on or near the map, but did not indicate rural areas on it (8.0 percent); 4) The respondents did not answer the map, but offered a reason (7.0 percent); 5) The respondent omitted the cognitive map question entirely (15.1 percent).

Respondents who wrote name locations or images on or near the map, or only offered reasons for not answering the map, did not yield spatial information data. Similarly, those who skipped the question provided no useful information for analytic purposes. These individuals were excluded from further analysis. As a result, this study focuses upon those

who actually indicated rural or urban areas on the map. Those indicating urban areas specified that the remainder of the map was rural. In such maps, rural areas were derived by subtracting the urban areas from the total map area.

A mean area of 46.3 percent of the Commonwealth was considered rural (Figure 1) by these respondents. A total of 60.3 percent of Pennsylvania is defined as rural using the census definition.

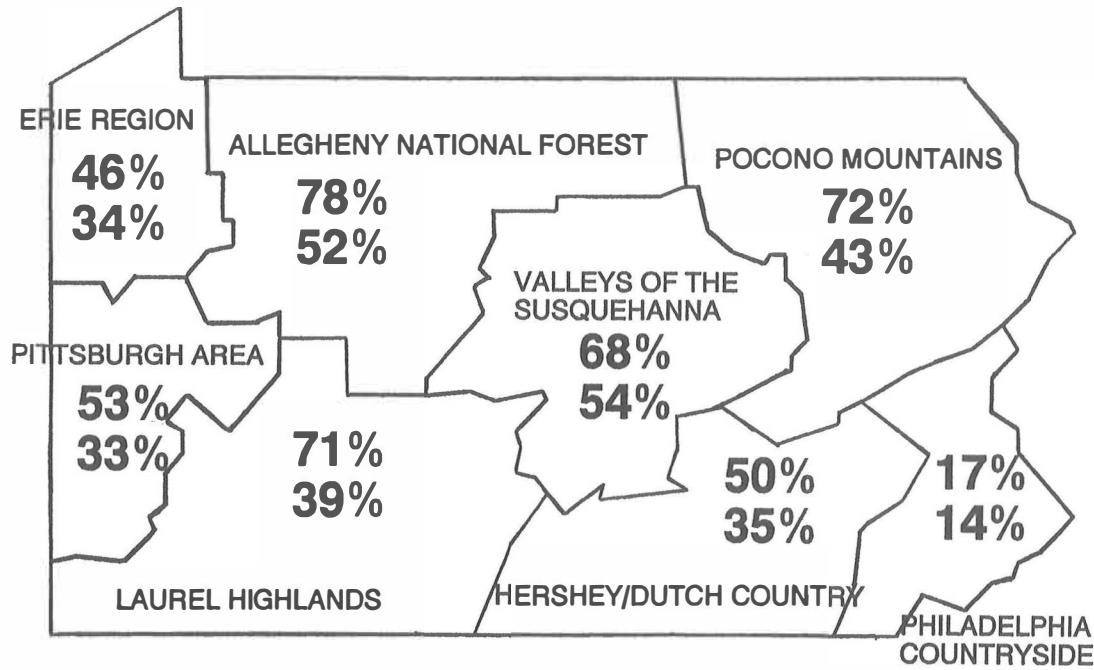


Figure 1. Differences in rural definitions for the eight tourism regions of Pennsylvania (1990 Census figures on top, 1992 Survey figure on bottom).

For all tourism regions, except Philadelphia, there is a substantial underestimation of rural areas. The maps are most congruent for the Commonwealth's major urban tourism regions (Philadelphia and Pittsburgh). Particularly large discrepancies are seen in the Poconos, Allegheny, and Laurel Highland tourism regions. This suggests that most respondents were particularly selective in indicating rural areas.

Bivariate analysis (data not shown) revealed that neither the negative or positive index was significantly related to the amount of rural area indicated. Statistically significant relationships existed for those indicating more rural area and agreement with the statements that rural areas are pretty much the same, and that all rural areas are farm areas. Similarly, those who indicated recreational or vacation imagery were significantly more likely to identify more area as being rural.

All factors in the personal/demographic domain were significantly related to the amount of rural area indicated. In general, older, less educated, higher income people indicated larger amounts of rural areas. Males and residents of the larger cities also were more likely to indicate more area as being rural.

For the domain of rural experience, having two parents who were raised in a rural environment was significantly related to indicating less rural area. Those with only one parent raised in a rural area were the most likely to indicate more area as being rural.

A series of one way analysis of variance procedures (data not shown) were used to examine the bivariate relationships for

the contextual variables. These results indicated that those who responded by circling urban areas on the map identified more area of the state as being rural. Similarly, those who indicated their own residential region as being rural indicated more rural area overall. No significant difference for the amount of area indicated as being rural and indicating nonadjacent areas was seen. However, those circling fewer circles on the map tended to indicate more area as being rural.

Multiple regression analysis was used to determine how these domains were related to the amount of area the respondents identified (Table 1). The complete model is presented first. All variables in the contextual domain are statistically significant, and the nature of the bivariate relationships are preserved. Among the personal/demographic characteristics, sex, education, and city size achieved significance as did the negative index from the attitudinal domain. Neither variable in the rural experience domain factor achieved significance. The adjusted R^2 for this model was .53.

To determine the relative strength of each domain, the model was restricted by removing each domain while controlling for the others in four separate models. Model I and Model III excludes the attitudinal and rural experience domains respectively. Exclusion of these domains shows virtually no change from the complete model's effect. Model II excludes the personal/ demographic domain. The effect of this domain is weak as indicated in the small change in the adjusted R^2 . Model IV excludes the contextual items, and reveals the dominance of this domain, which accounts for roughly 80 percent of the explained variation.

Table 1. The multivariate relationships of area predicted as rural and the attitudinal, personal/demographic, rural experience, and contextual variables.

	Complete Model	Model I	Model II	Model III	Model IV
Variable	B	B	B	B	B
Attitudinal domain:					
Positive index	-.010		-.012	-.008	-.031
Negative index	.036b		.023	.036a	.014
All rural areas are the same	.010		.016	.013	.025
All rural areas are farms	.010		.018	.010	.013
Recreation or vacation	.029		.035a	.031a	.053a
Personal/demographic domain:					
Age	.000	.001		.001	.001
Sex	-.069c	-.069c		-.070c	-.120c
Income	-.001	.000		.000	-.011
Education	-.035c	-.038c		-.034c	-.035c
City size	.014c	.013c		.014c	.014c
Rural experience domain:					
Parents' childhood residence	-.016	-.017	-.021a		-.027a
Childhood residence	-.032	-.038a	-.020		-.023
Contextual domain:					
Indicated region of residence	.112c	.111c	.102c	.112c	
Indicated nonadjacent region	.392a	.419a	.424a	.382	
Circles	-.033c	-.033c	-.032c	-.033c	
Response type	-.306c	-.308c	-.335c	-.307c	
Constant	.190	-.003	.180	.169	.714
Adjusted R square	.53	.53	.49	.53	.12

a significant at the .05 level

b significant at the .01 level

c significant at the .001 level

Discussion

Responses to a cognitive mapping question about rural areas in Pennsylvania revealed that a majority of respondents (almost 7 of 10) could indicate rural areas on an outline map of Pennsylvania. The results also indicated that the Commonwealth's urban areas are best known and imaged. Among the various domains of variables hypothesized to be related to the identification of rural areas on a cued spatial response map, only the contextual factors are found to support the loose and stringent definition hypothesis. Those residualizing rural areas tend to indicate more area as rural, displaying the loose definition. On the other hand, those who circled more areas on the map, indicated less total areas and had a more stringent definition. The variables dealing with the proximity of the respondent to the location of rural areas indicated on the map did not offer any clear evidence for or against this hypothesis.

There is only weak evidence that the loose definition is related to anti-rural attitudes and opinions. Those harboring negative attitudes towards rural areas were found to be more likely to indicate larger areas as being rural. Other anticipated relationships that would have bolstered this hypothesis were not found. There was a tendency for the respondents who mentioned vacation or recreation imagery to indicate more area as rural. This was unexpected, and did not support the stringent definition hypothesis. What it does suggest, however, is that such images are not related to actual recreation or vacation experiences. Rather, their employment as a response may reflect a vague reaction used when concrete images are not available to the respondent.

These results suggest that childhood residence has little effect on respondents' definition of rurality. Further, it appears that secondary knowledge is not enough to leave a spatial cue. For a concrete response, direct real-time experiences may well be needed. Other variables should be explored for inclusion in this domain. Behavioral items could be of particular use, as rural visitation is clearly related to rural experience. Analysis of the personal/demographic items suggests that there are a number of lower educated, male respondents from larger cities who exhibit a loose definition of rurality.

The contextual variables indicated that a differing thought process occurred among those utilizing loose and stringent definitions. Further research in cognitive mapping should try to clearly establish the factors related to these differing thought processes among both urban and rural residents. When groups with these thought processes are known, more effective marketing strategies can be designed.

The cognitive maps yielded potentially useful marketing information about Pennsylvania's rural areas. Tourism is a growth industry in rural Pennsylvania. The fact that urban Pennsylvanians indicated rural areas in every tourism region, especially their own regions of residence, is important for state, county, and local tourism agencies. As vacation travelers stay closer to home, those rural areas proximate to neighboring cities stand to benefit most. Information from this study indicates that current marketing efforts can be targeted at increasing *the desire* to visit rural areas, as Pennsylvania's urbanites displayed an awareness of and appreciation for the diversity of rural areas within the Commonwealth.

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UPDATING COMMUNITY OPEN SPACE

PLANS: LESSONS LEARNED FROM

THE FIELD

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This paper identifies the methods required to update community open space and recreation plans, and the problems encountered in the field. Findings of the study show increased loss of farmland and the need for more recreational areas. Specific recommendations to solve the open space problems are presented.

Introduction

Due to budget constraints, many communities are seeking technical assistance from planning departments at local colleges. In this way students learn practical applications to solve planning problems, while the community benefits from volunteer technical assistance. Under the direction of Dr. Stephanie B. Kelly, Coordinator of Regional Planning, Westfield State College, Westfield, MA, students in a Special Topics class in the fall semester of 1992 revised the 1986 Agawam Open Space & Recreation Plan. This paper describes the planning process that was involved in developing the open space plan.

Specifically, the first step involves the updating of land use, zoning and natural resource inventory maps. Data gathering to identify changes in zoning, Agricultural Preservation Restriction Program parcels, city-owned and conservation lands was accomplished by reviewing current assessor's maps. The second step involves conducting a survey of town residents in order to measure the attitudes about recreational use and acquisition of lands for open space preservation. The third step involves the development of an analysis of needs and five-year action plan in order to accomplish the objectives of increasing recreational needs and preserving specific prioritized parcels.

Several problems developed during the process of creating this open space plan. One problem that developed was the lack of time and data to complete the required map overlays for the open space plan. In this case the professor bartered with the Mass GIS state program to receive maps in return for data. The updated data was compiled by reviewing town assessor's maps. Another problem involved the amount of time it would take to survey a scientifically sound sample size. This problem was solved by using senior volunteers from the Agawam Senior Volunteer program. Several students trained the seniors to conduct a telephone survey. The seniors gathered data from a sample of 352 residents. Two students worked with the professor to design the program, type in the data and analyze the survey results.

The final problem involved the accessibility of graphics and landscape drawings to supplement recommendations made by the students. One student, who had worked in a printing firm, reviewed and created the graphics for the plan. Another student created a site plan to illustrate a playscape recommendation.

Community Overview

Agawam, Massachusetts is located on the southern edge of the Pioneer Valley region in southern New England. Agawam is approximately 16,000 acres (24 square miles) and lies just north of the Connecticut and Massachusetts state line. Provin Mountain, which is located along the western edge of town, is the highest point in Agawam at 640 feet. Agawam is a residential community for those who commute to Springfield, as well as neighboring Connecticut. It is also at the hub of major transportation corridors, including important north-south and east-west routes.

The Westfield River flows along the northern border of Agawam, while the Connecticut River flows along the eastern boundary. A total of 1600 acres of floodplain lies along the Westfield and Connecticut Rivers (Dachos 1992). Of this floodplain, what is left undeveloped must be kept as valuable flood prevention, and a natural storage area for flood waters.

Agawam purchases 98% of its drinking water supply from the Springfield Regional Supply System. This supply system consists of water from Cobble Mountain Reservoir and Ludlow Reservoir. On site wells provide the remaining 2% of the town's need for drinking water. There are no contract limitations on the amount of water Agawam may draw from the Springfield systems. However, the town's distribution system is presently inadequate to meet peak pressure demands in the Feeding Hills section of town. This situation may worsen with continual population growth in this particular area (Dachos 1986).

Agawam's population grew by 4% between 1980 and 1990, and is projected to decrease slightly for the next ten years, according to the Massachusetts Municipal Profile 1991-92. The current population of the town is approximately 28,000, with a population density of 1200 persons per square mile.

Agawam's population characteristics have changed during the last decade, including an increase in the number of older residents. Among persons 65 years of age and older there has been an increase from 2993 in 1980 to 4133 in 1990, an increase from 12-18% of the population. This increase in Agawam is indicative of the current national trend of an aging population. Since the highest percent of the population is between ages 22-24 years, it is conceivable that the birth rate may increase. This could create a greater need for recreational facilities for children. In those areas where the population is most concentrated, tot lots could be designed in nearby available open space (Regional Data Center 1992).

Agawam thrived as a farming community even after the diffusion of the Industrial Revolution in the mid 1800s. Numerous grist mills peppered the landscape, where the Connecticut and Agawam (now Westfield) Rivers separate the land into three areas. Residents who lived on one side of the Connecticut or Westfield Rivers, and owned land on the other side, needed access to their farm property. One of the ways that the farmers gained access was via a ferry system that crossed both rivers. This system was used until the South End Bridge was opened in 1979. Agawam was established during this period of increased development in the surrounding lands in the mid 1800s (Dunn 1955).

The changes that occurred between 1902 and 1936 were only a hint of what was to come. The emergence of the suburban life style and the flight of the middle classes from Springfield during the mid-twentieth century irrevocably changed both the landscape appearance and the economic character of Agawam (Brown 1976).

Methodological Issues

The methodology involved in this open space study included data gathering in several primary areas. The areas emphasized are land classification mapping, farmland preservation, tot lot recommendations, recreational/sports needs, regional park and the survey. In each case current data was collected and analyzed in terms of population trends and land ownership changes in Agawam.

Land Classification Mapping

The first step involved reviewing and updating the required maps as listed in the 1990 Open Space and Recreation Plan Requirements, administered by the Executive Office of Environmental Affairs, Division of Conservation Services. The inventory revealed that the geology, soils, topography, landscape character, water resources, vegetation, fisheries and wildlife, scenic resources, and unique environments maps all met the criteria for the Open Space Plan. It was determined that the agricultural, open space, tot lots, and a regional park should be the focus of the update of the revised Agawam Open Space Plan. In the process of planning how to map the agricultural and open space parcels in the most efficient way, Dr. Kelly contacted the Mass GIS in Boston to investigate the availability of GIS data overlays for Agawam. It was discovered that Mass GIS lacked the updated data for Agawam. Mass GIS agreed to digitize the open space map for Agawam, if the students provided updated parcel information.

Farmland Preservation

Urban encroachment on the agricultural landscape has been cited in the literature as an increasing threat (Fishel 1985). The decline in farming activity brought about by high urban taxes, the anticipation of urbanization, and other urban related factors has become so widespread that it is now possible to see ring-like zonation of agricultural uses around a city. The sprawl of cities over agricultural land has generated a wealth of proposals for the holding of the choicest acreage for farming (American Farmland Trust 1991). Restrictive zoning is thought to be the best solution to this problem. The problem with this type of zoning regulation is how to decide whether a piece of land should remain agricultural or be zoned urban. Economists have devised a cost-benefit analysis plan in which alternative areas available for development are evaluated on the basis of which would be the least costly to the community (Sergeant 1976). The costs would include the net agricultural zoning values versus cost of essential improvements.

According to Muller (1976), agricultural zoning is no longer strong enough to protect farmlands and he suggests that the need for national efforts is imperative. He recommends that the federal government acquire title to agricultural land and reserve it for that use. It would then be sold or leased to operators, and the restrictions on its use would be stipulated in the deeds. This would create exclusive agricultural land preservation.

Farmland acreage in Agawam has declined from approximately 7,500 acres in 1950, to 3,800 acres in 1970, to 2,500 acres in 1982. By 1994, another slight decline of farmland is predicted. Significant acreage of farmland has been lost to residential and commercial development, and much farmland has been lost simply because of the poor economic setting for farming in the Commonwealth (American Farmland Trust 1992). Of note, also, is that the current figures do not include losses that will be incurred due to the expansion of Route 57.

Farmland decline generally began in eastern Agawam, and there is evidence that it was a factor even in the 1930s. Declines continued along established transportation accesses through the south and west boundaries of Agawam. Central Agawam is no longer an agricultural entity, only western areas of Agawam and adjacent areas of Southwick and Suffield have significant areas for viable farming.

The methodology for creating a matrix of farmland, conservation, and forestry lands for Agawam included reviewing district valuation reports. These reports were obtained for the tax break programs of Chapters 61, 61A, and 61B, along with a list of properties falling under the Agawam's Agricultural Preservation Restriction Program. These lists were verified or corrected using town maps of each lot. This information was then transferred into map and matrix form for addition to Agawam's revised Open Space and Recreation Plan.

In sum, zoning has not been effective in keeping productive agricultural land in active farming, as zoning is subject to change when economic forces are sufficiently strong. Those who would profit by zoning changes from agriculture to development usually succeed in obtaining zone changes. To solve this problem, we must look for methods which satisfy the conditions of being acceptable to the voters, taxpayers, and farmland owners. Agricultural land must be protected from the threat of development on as permanent a basis as possible under our land control institutions.

Tot Lot Recommendations

The methodology followed to determine the number of tot lots for Agawam involved the Department of Interior standards for playfields. This standard recommends 2.5 acres of playfield for every 1,000 population. The list of areas which lacked adequate playfields from the 1976 Agawam Master Plan was updated. The process involved superimposing the subdivisions which have been developed in Agawam since 1976 onto a neighborhood map of Agawam. Based on the 2.5 acres criteria, it was determined which neighborhoods lacked a playfield. It was found that Agawam has a deficiency in the amount of playfields, or tot lots, for its youth.

Tot lots are defined as play areas that are designed and built for use by elementary school aged children. The data show where the addition of several new tot lots should be developed throughout Agawam. These tot lots would provide safe areas for children to play. The data also indicate that another idea that should be considered for recreational use is playscapes. Basically, playscapes are very elaborate tot lots on a large scale. These playscapes can be built in a weekend without cost to the taxpayer. This concept is becoming a very popular and widespread idea in many communities in the Commonwealth. Playscapes are usually built on public land such as an elementary school. The supplies are sometimes donated or paid for through fund-raisers.

The labor to build playscapes consists of volunteers from the community, who are supervised by volunteer construction professionals. It is cost effective because it only takes a weekend to build, which is why people usually don't mind volunteering their time. It takes about a year of planning and fundraising for the work weekend. This is a benefit to the community because all the preparation that goes into the project tends to bring the community together. Also the children help out in the whole process, supporting the theory that if you build something yourself and take pride in it, the less likely you are to vandalize it. All in all, the playscapes are an excellent community development project that should be considered for Agawam.

Recreational/Sports Needs

Several interviews were conducted with officials from the recreational programs in Agawam. Findings from these interviews indicate that there is a great need for fields for various sports. The greatest amount of need is within the Soccer Association. The director of the Soccer Association expects that about 1,000 players will be involved in the soccer program next season. This means approximately 84 teams will need access to the current 20 soccer fields for practice and games. The use of the soccer fields is also limited due to the fact that three of these fields overlap baseball fields. There is also a soccer tournament that takes place in Agawam every

year and more available fields are needed to accommodate the growing numbers of players and teams.

Sport officials also indicate a deficiency in the number of available basketball courts to accommodate the numbers of players involved. Between all of the different age groups there are a total of 50 basketball teams this year. The Basketball Association has access to only 4 basketball courts. This limits each team to only one practice a week.

There are eleven areas of recreation across Agawam. Of the eleven areas, only one area has soccer fields that do not overlap baseball fields. Due to the growing interest in the sport of soccer there is a need to acquire more land for soccer fields. The Soccer Association has recommended possible locations for soccer fields. After examining open space parcels across Agawam, several site analysis and access problems arose. These problems include: (1) these parcels are heavily forested, making them costly to develop; (2) in some cases development of the land could cause drainage problems; (3) ownership of parcels could restrict park development; and (4) buffers are often necessary to protect residences from noise and other nuisance problems related to nearness to active playfields.

Regional Park

Perry Lane Park should be considered as a separate recreational site. This 33 acre park is located in central Agawam and has a tremendous amount of potential for providing town residents with enjoyable active recreational activities, and passive recreational trails. This park already has a preschool on its premises, as well as; two basketball courts, a pavilion, a pool, three tennis courts, a volleyball pit, a new jungle gym, a tot lot, and parking. However, approximately one third of the park is in use at this time. The town would benefit greatly from the use of its existing acreage.

Minimal construction projects would be needed to improve Perry Lane Park. Widening the existing entrance on Perry Lane with the addition of separate exits and entrances would enhance traffic flow. The addition of at least 50 new parking spaces on the western end of the park is also necessary. The entrance from Leland Avenue, on the eastern edge of the park, would also need an additional 50 parking spaces. The main objective is to preserve the natural beauty of the park, but at the same time provide the public with a desirable place to recreate. In order to meet these objectives, several types of trails could be constructed throughout the park, such as: mountain (pedal) bike paths, pedestrian paths for summer use, as well as cross-country ski paths for winter use. A stocked stream could provide the popular pastime of fishing in the area. A pedal bike path is another consideration. A remote control outdoor track could also be built. This sport could be professionally organized. Charging fees to use this track would help bring in money for park upkeep and at the same time provide the town with some exciting entertainment which could make Agawam unique.

Agawam Open Space and Recreation Survey

The purpose of the Open Space and Recreation Survey is to measure the attitudes of residents in Agawam about recreational use and acquisition of lands for open space preservation. The analysis of the results of the survey help to determine the needs of the community and the parcels that should be recommended for acquisition. The Agawam telephone directory was used to achieve a representative sample from the Agawam population. Working through phone directory listings of residential numbers, every ninth name listed was selected for the survey. Senior volunteers were then trained by students to conduct the survey. Due to time constraints their service was necessary to gather the data needed to qualify the survey as representing a significant percentage of the population. After the initial period of interviewing by the volunteers in the fall of 1992, the Town Planner of Agawam supervised other survey sessions. The data from these

interviews will later be compiled in the computer program. The first step in analyzing the survey data involves encoding the responses into the Statistical Package for Social Scientists (SPSS). After initial data entry, the next step is to organize the survey data by running frequencies on SPSS. Frequencies were run for demographics, issue preferences, recreational needs, and willingness to support open space preservation measures. The following overall findings were compiled from the primary analysis of frequencies.

Fifty percent of the people responding to this survey have lived in Agawam 20 years or less. Out of the 183 survey respondents, 53 of the respondents (29%) had at least one member of their household between the ages of 5-17. One hundred and eighteen households indicated members in the 18-44 year range (64.5%). These population statistics help to determine what type of recreational needs the Town will have in the future. The needs, in turn, are the basis for the recommendations of the study.

Very few respondents rated Agawam's residential services and conditions as poor. Because more respondents were satisfied with the current status of the Town's services, allocation of funds for open space preservation would be a favorable measure to the citizens of Agawam. To support this statement, 83% of respondents favored open space and conservation areas as important to them. Ninety-five percent of those interviewed believe that farmland preservation is of importance. Also, 80% of the respondents rated recreation areas of importance. Due to the fact that respondents rate services as adequate, the support for acquisition of lands for public uses should be high.

Approximately a little more than half of the respondents (53%) have used facilities in neighboring communities. The majority of respondents stated that it is equally important to maintain current recreation areas and facilities as it is to acquire more conservation land. According to the majority of respondents, Agawam needs to expand or develop its nature trails, bike trails, and teen centers. Almost half of the respondents (46%) stated that Agawam needs to develop more children's playgrounds (tot lots). The most popular recreational facilities in Agawam among residents who responded to the survey are Westfield River Island, Robinson State Park, Pynchon Point, and Ridgeview Park. Because of the fact that current residents of Agawam travel to other communities for recreation, it is clear that improving Agawam's recreational areas would be supported by the community.

At least 80% of the respondents believe that the preservation of open space and conservation areas, farmland, and recreation areas are of importance to them. Eighty-one percent of the respondents would vote for city-supported land acquisition, 88% would vote to place restrictions on wetlands and floodplains, and 90% would preserve open spaces in Agawam by voting to strengthen zoning versus development. This trend of support for preservation shows that protection techniques should be recommended and implemented.

The next step in analyzing the survey involved cross-tabulation of questions. For example, cross-tabulations were run for the members of household with the type of recreation they prefer. Another example involved the members of household with the type of facilities they feel should be expanded. Finally, a cross-tabulation was run for respondents who reported they have teenage children in the home with the type of sports that the teenagers participate in. Areas of recreation, concerns over development, preservation of open space, and appraisals of the current facilities were all cross-tabulated to find areas of the most concern to the respondents. The results emphasized the need for recreational areas for children oriented households, the importance of preserving the community's character through open space preservation, and the support for projects which would accomplish these goals.

In sum, the survey conclusions represent the attitudes of the community in prioritizing open space parcels in Agawam. Since the results show that residents support acquisition of lands for open space preservation, it can be interpreted that expansion of recreational areas is important to the community. Of note, here, is the fact that historically the residents of Agawam support Town acquisitions, if federal or state monies are allocated. They do not support higher taxes to purchase properties. Therefore, land preservation techniques would be supported overall, if funding was granted. After completion of the revised Open Space and Recreation Plan, Agawam will be eligible for state and federal funds which could accomplish these goals. Since Agawam residents responded favorably to land preservation measures, it seems that protection measures would win a majority of support from the community.

Recommendations for Five Year Action Plan

Based on the results of the research the following recommendations for the five year action plan were submitted to the Town Planner of Agawam:

- Several specified parcels for open space conservation should be acquired.
- Playfield improvements and expansion are advocated for several areas.
- Perry Lane development should begin in the first year of the action plan.
- APR proposals should be encouraged and followed up by a Farmland Advisory Committee.
- Farmland district zoning bylaws should be drafted.
- The Town should purchase sensitive wetlands & floodplain areas.
- The Town should implement a comprehensive program to design a greenbelt adjacent to water bodies.

The Town of Agawam is currently developing the five-year action plan based on the data analysis and findings from the Special Topics class project.

Conclusions

According to demographic statistics, which show growth in Agawam's elderly, as well as child-bearing age residents, Agawam should increase recreational facilities and acquire specified open space parcels. These improvements would serve both sectors of the population. If development pressures continue as they have over the past ten years, Agawam will not be able to meet the recommended recreational needs of its residents. Therefore zoning changes, agricultural preservation, and acquisition of open space are imperative.

Tot lots are one way of meeting the community's needs. They are designed and built for the use of children and they would create safe havens for children to play. Playfields for organized sports should be expanded to meet the needs of older children in the community. Finally, the development of the regional Perry Lane Park would provide comprehensive recreational services for the public.

The farmland in Agawam is being subdivided at an alarming rate. Farms are being isolated by current development trends. One way to slow this development would be to establish a farmland district through the town's bylaws. A new expansion of the current Agricultural Preservation Restriction programs could also slow development and encourage the owners of such lands to resist selling. The Town of Agawam could also begin acquisition of parcels for open space conservation either through public participation or private donation.

With the Westfield and Connecticut Rivers comprising a high percentage of its borders, Agawam should implement a comprehensive program to preserve a greenbelt adjacent to these rivers. This greenbelt plan would epitomize the concerns of this study by offering environmental and recreational planning solutions.

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*LANDSCAPE AND
VISUAL PERCEPTIONS*

NATURAL RESOURCE INVENTORY AND MANAGEMENT: FOREST FIRE MANAGEMENT AND THE STEAMTOWN NATIONAL HISTORIC SITE

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A fire management plan was developed for the National Park Service at Steamtown National Historic Site in accordance with National Park Service requirements. A Geographic Information System (GIS) was used to identify areas at risk from fires resulting from the use of steam locomotives along the 32 mile mainline excursion route associated with Steamtown. The GIS allowed for identification of areas at high risk of fire and allowed for the production of detailed maps for use by fire control organizations. Further implications of GIS in tourism and recreation management is discussed.

Introduction

Recreation and tourism planning often involves identifying potential threats to the environment. Impacts of tourism to the physical environment have been discussed by several authors (Cohen 1978; Pearce, 1985). One way to meet potential threats is to monitor the physical environment during the course of the activity or event. Another way to address potential impacts is to develop planning strategies that identify resources that are at risk from the activity as well as contingency plans that serve as response strategies should environmental damage occur.

Planning and development of tourist attractions often requires detailed information concerning the surrounding physical environment. Such information is often of a spatial nature and available in different scales of measurement. The different scales of the information may prove problematic in terms of developing a composite form of the total data base. Use of Geographic Information Systems (GIS) allow for the inclusion of spatial data at different levels of scale and provide for the compilation of different visual compositions of the data.

Project Description

Steamtown National Historic Site is a restoration of an historic steam engine railroad. The site consists of 25 steam locomotives, a rail yard with roundhouse and visitor center, and a 32 mile mainline excursion rail line over which visitors will be able to ride on an excursion train powered by a steam locomotive. The use of the steam locomotives involves a risk of fires resulting from hot cinders from the locomotive's stack and from sparks from the train's wheels.

The purpose of this project was to provide the Steamtown National Historic Site with a fire plan that would detail those sections of the mainline excursion rail line at risk from fires resulting from the use of the steam locomotives. In order to assess the risk of fire to the surrounding area, it was determined that a Geographic Information System (GIS) would best serve the need to assimilate multiple sources of information into a usable composite. A Geographic Information System is a

computer management tool that treats spatial information as a series of lines (vectors) or cells (rasters). There are essentially two types of GIS, a vector-based system consisting of a series of lines, polygons or points, and a raster-based system consisting of a composite of homogeneous cells (Burroughs 1987).

The Geographic Information System chosen for this project was ARC/INFO 3.0. ARC/INFO is a vector-based GIS and allows for accurate representation of linear features. As many of the physical features in this project were of a linear nature (e.g. rail line, streams, roads), the use of this vector-based GIS was desired.

To develop the GIS, data from different sources had to be digitized and incorporated into the ARC/INFO data base. Infrastructure data were obtained from 7.5 minute topographic maps from the U.S. Geologic Survey. Vegetation cover types were discerned from aerial photographs at 1:12,000 scale. Understory vegetation and emergent grasses adjacent to the rail line were delineated through the use of a video film taken from a helicopter flown approximately 400 feet above the rail line. All data were field checked for accuracy.

Data were digitized according to coverage layer. A coverage layer refers to those features that will be examined as a complete unit. For example, the rail line was treated as one coverage layer. A total of eleven coverages were used for this project. These coverages included three linear coverages: rail line, roads, streams; six polygonal coverages: lakes and wetlands, residential developments, municipal boundaries, forest cover, areas of steep terrain, and natural fire breaks; and two point coverages: stations for volunteer fire companies, and access points along the rail line.

As this project was concerned with delineating fire hazards, special attention was directed to areas having high fuel loads and steep terrain. Oaks and conifers are especially vulnerable to fire. The dry, curled nature of oak leaves and the dry, resinous characteristics of conifer needles and branches make these trees particularly hazardous when considering fire threats. Steep terrain is another feature to consider, as fire will tend to travel more rapidly uphill than downhill (Albini 1976). Both forest vegetation type and terrain were predominant factors when determining areas at high risk to fire.

Consideration was also given to response from fire fighting crews. The point location of volunteer fire companies and their radius of jurisdiction was included in the assessment of overall fire fighting response. Available surface water (streams and lakes) were also analyzed as these waters serve as sources of water for fire fighting efforts.

Description of Project Site

This project was undertaken on the rail line from Scranton to Pocono Summit in the Pocono Mountain region of Pennsylvania. The rail line runs in a general southeasterly direction from Scranton to Pocono Summit. The Pocono Mountains are characterized by rolling mountains and plateaus that were covered during the Wisconsin glacial period. As a result of the glacial action, this region contains many wetlands and small lakes.

The forests in the project site are predominantly mixed mesophytic, with maples, hemlock and beech the dominant species. Mixed oaks and white pines occur on the slopes and plateau portions of the area. Birch and aspen are common near the rail line, as are large areas of emergent grasses of various species.

Results

The radius of response for each volunteer fire company was used to create six different fire zones along the mainline excursion route (figure 1). Areas of high fire risk were then determined for each fire zone based on vegetation, steep terrain

and proximity to developed areas. After determining the high risk areas, nearest water sources and access points were then identified. The final composite allows the local fire company to note the areas of high risk within their district, the closest access points and availability of water.

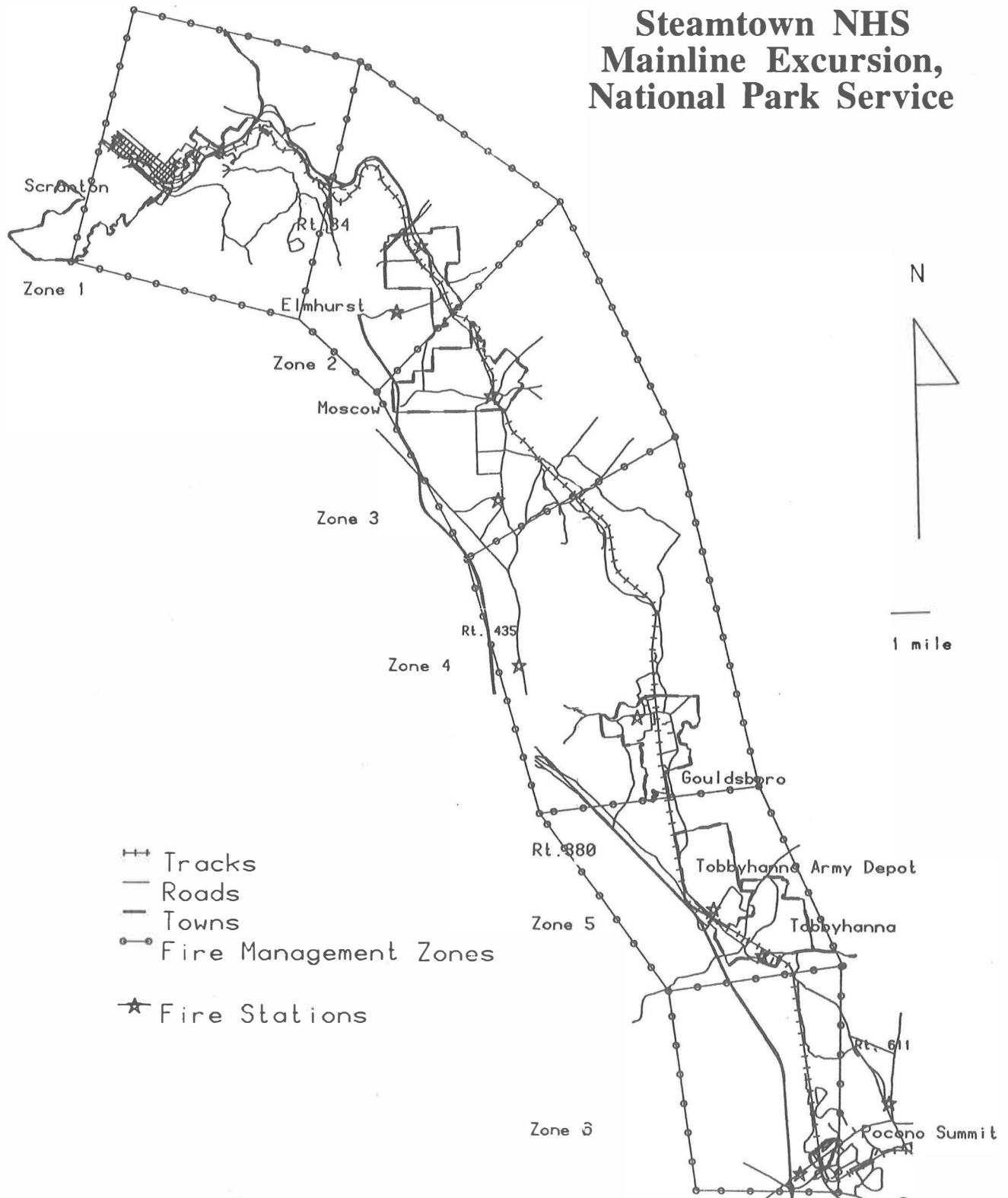


Figure 1. Six fire risk zones for Steamtown National Historic Site.

Discussion

Development of tourist attractions requires planning to reduce or eliminate potential environmental impacts. Special consideration must be given to develop response strategies to address potential catastrophic events such as forest fire, flooding or land subsidence. Geographic Information Systems can be a useful tool in delineating areas of potential hazard. Geographic Information Systems allow for comparisons of multiple layers of spatial information that would be difficult to represent in any other manner. The use of GIS also permits the production of composite maps depicting coverages in any combinations required of the resource manager.

Future resource management planning involving spatially referenced data necessitate data systems able to utilize spatial information, store and retrieve the information and provide visual reproductions without losing the spatial context of the data. Geographic Information Systems able to meet the demands of local managers are now available for personal computers. These systems allow for smaller data sets originating with easily obtained data, and are designed for users having little training in GIS. Individuals involved in recreation and tourism planning are becoming more aware of the advances in planning tools available and make use of these devices. Geographic Information Systems are among the advanced instruments available to the planner. It was the intent of this project to highlight the versatility of GIS for recreation and tourism planning so that more managers and planners will seek to use GIS in planning for recreation and tourism.

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LONG TERM VISUAL EFFECTS OF ALTERNATIVE CLEARCUTTING INTENSITIES AND PATTERNS¹

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This study evaluates the scenic impacts of simulated
alternative clearcutting management systems for the White
Mountain National Forest. Alternatives represented removal
of 1, 2, 3, 4 and 5 percent of the timber in two viewsheds every
12 years using either scattered or concentrated clearcut units of
5, 15 and 30 acres. Significant differences in scenic value
exists among these alternatives.

Introduction

Since the politically charged controversy at the Monongahela
National Forest in the 1960s and 1970s, the practice of clear-
cutting has changed significantly. While the public still
thinks of whole mountain-sides denuded of trees, significant
regulations control the use of clearcutting on Federal lands.
For instance, the current practice in the White Mountain
National Forest is to limit individual clearcut units to under 30
acres. However, there is still significant concern about clear-
cutting among the public, and much of it can be attributed to
its appearance.

Political pressures to restrict cutting in parts of the Pacific
Northwest and Southeast may increase pressure to maintain
cutting activity in Eastern National Forests, such as the White
Mountains, at the limits of sustainable yield. However, the
White Mountain National Forest is also a very popular
recreation area for the northeastern megalopolis. Forest
managers in the White Mountains are therefore concerned
about the potential cumulative impacts of clearcutting activity
on the viewing and recreation experience of forest visitors.
Scenic impacts are particularly sensitive since they are
apparent from such great distances.

A common solution proposed by many is the reduction in size
of clearcut units. The forest landscape architects and other
managers became concerned that reductions below the current
10 to 15 acre average size might create a checker board or
moth-eaten appearance across forested slopes. As a result of

their concern, a study was developed to visually simulate a
series of realistic forest management scenarios in order to
assess their scenic value.

Methods

Viewpoint Selection

The viewpoints selected for this study are from Middle
Sugarloaf Mountain and Welch Ledge, in the White Mountain
National Forest. Both are vistas accessible from popular and
high use hiking trails. Both views are predominately in the
middleground, a zone 1 to 3 miles from the viewer, and lack a
visible foreground. Each view was photographed with
Kodachrome 35 mm film on a clear August day. A 50 mm lens
was used to replicate the viewer's normal cone of vision and to
keep optical distortion to a minimum. Additional
middleground photographs were taken of other areas
representing the types of regeneration described by the
alternative management scenarios. These would provide
information about the patterns and textures necessary to create
accurate visual simulations.

Management Scenarios

While many forest studies simulating environmental factors
are reasonably based on checkerboard patterns (e.g. Li, et al.
1993), this simplification is inappropriate for a visual study.
It was decided that the most realistic approach would imitate
the way cutting areas were actually allocated and designed by
the forest landscape architect. Cutting periods are normally
between 10 and 12 years apart on the White Mountain National
Forest. Therefore, it was decided to simulate three entries
showing clearcut opening representing approximately 1 year,
12 years and 24 years of regeneration growth. It was decided
that showing more than three entries was not necessary, since
at this distance the visual effect of the original clearcut readily
disappeared after 30 to 35 years. Three additional variables
were identified as being important to consider in creating the
alternative scenarios: cutting intensity, cutting pattern, and
cutting unit size.

Cutting intensity is the *percent* of a viewshed to be clearcut
each entry. The guidelines in the Forest Plan (White Mountain
National Forest, 1986) for the current 10-year planning period
allow for up to 7 percent of a viewshed to be in new openings.
However, when the forest landscape architect actually began to
layout and design the scenarios over three cutting cycles, it
was determined that cutting 7 percent of a viewshed per decade
would exceed a comfortable level of disturbance, and could
therefore not be sustained. After some trial and error, the team
from the White Mountain National Forest felt that cutting 5
percent of the viewshed per decade represented a reasonable
upper limit of activity. The other simulated cutting intensities
were for 0, 1, 2, 3 and 4 percent.

Two design concepts or *patterns* were used. The first scattered
the cutting units through out the viewshed; the second
concentrated the units for each entry into a different third of
the viewshed. The Forest Plan assumes that cutting would be
scattered randomly throughout a view. However, to implement
projects it is common for sale units to be concentrated into a
smaller portion of a viewshed. When this occurs, the percent
of the view effected around the sale is substantially higher, but
it will be lower in other parts of the viewshed.

The *size* of the cutting units is based on the current guideline
in the Forest Plan (White Mountain National Forest, 1986),
which provides for 10 or fewer observable acres per unit. Since
some portion of a unit may not be seen, this translates to an
average unit size between 10 and 14 acres. The maximum unit
size allowed in the Forest Plan is 30 acres. This establishes an
upper range in size for units from 20 to 30 acres. The
minimum unit size for the simulations was set at 4 to 5 acres.

Several appropriate units were designed and located for each
possible combination of viewpoint, pattern and size. These
units were then digitized as a line file and combined with a

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digital elevation model using New Perspective software. For each simulated alternative, the appropriate units were selected that would produce the required acreage for each entry period and that would present an acceptable design, both for that individual entry and for the cumulative effect. In designing the concentrated pattern scenarios for the Sugarloaf view the oldest entries were nearest the viewer and the most recent entries were farthest from the viewer. The design for the Welch Ledge scenarios' concentrated pattern proceeded in the opposite direction, with the most recent entries closest to the viewer.

A master overlay of the units for both viewpoints was created for each pattern and size variation. These were plotted in perspective to match the camera view of the original two photographs. The drawings included outlines of each unit, with a ring of trees to show the scale of the surrounding vegetation, and control points for registering the drawings. Using these drawings, the areas to be cut at each entry for each alternative can be located within the view.

Visual Simulations

Original 3.5-by-5 inch photographs from the two viewpoints were scanned at 400 dots per inch to create full color (24-bit) digital images. The scanner was a Microtek ScanMaker 600ZS that had been color calibrated to the computer monitor using Savitar ScanMatch software. These digital images were edited using Adobe Photoshop version 2.0.1 software running on a Macintosh IIfx computer with 20 megabytes of RAM, a Macintosh Display Card 8*24, and a 400 megabyte hard disk.

The existing scenes were first edited to simulate mature revegetation in areas where harvesting was apparent. Natural openings were left unchanged. This process is relatively simple using the rubberstamp tool to sample nearby areas of mature forest in the photograph and use their texture to paint over the clearings. The color balance, hue, and saturation of the images were further adjusted in Photoshop to create the control images on which the other simulations are based.

The New Perspective overlays locating the harvest units for each alternative were also scanned. Several control points were used to register these drawings with the control image or the appropriate viewpoint. The cutting units were isolated and cut from a drawing, and then pasted into the digital image to serve as guides for locating the clearcut areas. The appropriate regrowth was digitally painted into the clearcut areas using image material scanned from additional photographs. Care was taken to match the appropriate tones and textures that highlight the visual contrast between the old and new vegetation. Particular attention was paid to light and shadow patterns. A site visit to the White Mountain National Forest was made at the time that the first simulations were being created to field check the quality of the simulation techniques. The final images were therefore of a consistent high quality.

The resulting 64 scenes, [2 views x 2 patterns x 5 percents x 3 sizes = 60 scenarios, plus the 2 revegetated and 2 original scenes], ranged in size between 2.5 and 4 megabytes. The Sugarloaf images measured 1185-by-767 pixels, and the Welch Ledge images measured 1378-by-969. They were all printed to 35 mm slide film with a resolution of 4,000 dots per inch and 24-bit color using a Montague FR1 film recorder.

Scenic Evaluation

The series of slides for each viewpoint were randomized, and then placed in a slide tray alternating between viewpoints. Students were recruited from two junior level classes at the College of Environmental Science and Forestry to evaluate the scenic quality of the scenes. They were told:

You are going to be shown, one at a time, some color slides of forest vistas. These slides represent actual forest scenes and you are asked to evaluate these forest scenes rather than the quality of the slides themselves.

You are to evaluate the scenic quality of each forest vista by assigning it a rating number between one and ten. Those forest scenes judged very low in scenic quality are assigned a rating of one, while those judged very high in scenic quality are assigned a rating of ten. Please use the full range of numbers if you possibly can and please respond to each slide.

They were then shown the last 10 slides in the series to familiarize them with the variety in scenic quality represented by the slides. The researcher indicated the first slide to be evaluated, and identified each subsequent slide. Each slide was shown for 10 seconds, or as long as was necessary for everyone to finish their evaluation. Respondents also provided some basic information about themselves.

Results

The 87 evaluators of these scenes were students majoring in landscape architecture (55%), environmental studies (24%), or natural resource management (21%). Nearly every one was in their early 20's, 75 percent are male and 81 percent have lived in a rural area or small town with a rural setting.

The mean scenic values and their standard errors are shown in Table 1 for the attributes that determined the management scenarios and their visual simulations: viewpoint, pattern of cutting units, percent of viewshed cut, and size of cutting units. The 95 percent confidence intervals defined by the standard errors indicate that within each of the four attributes, the mean scenic values are significantly different from each other. The Sugarloaf simulations are more scenic overall than the Welch Ledge simulations. This does not seem to be due to landform characteristics, since the revegetated scenes are not significantly different from each other. It is likely that the difference is because the most recent entries are nearer the viewer in the Welch Ledge simulations.

Scattering the units randomly throughout the view produced more scenic views than concentrating them. While a scattered random design pattern may be more scenically desirable, it is also thought to causes greater forest fragmentation over time and may be less desirable from a biological perspective (Li, et al. 1993).

The public has lobbied for smaller and smaller sized cutting units, anticipating that they would have less of a scenic impact. This study was initiated, in part, because forest landscape architect was concerned that the large number of smaller units would create a checker board pattern, making the forest appear moth-eaten. The results suggest that the smaller unit size is less scenic than the unit size typically used on the White Mountain National Forest. However, the results indicate that larger units are also less scenic. This may place visual objectives in conflict with biological objectives, since Li et al. (1993) found larger units to reduce forest fragmentation.

There is a consistently linear decrease in scenic value as the percent of the viewshed being cut increases. The 95 percent confidence intervals indicate that this change is significant at every level, though the actual difference in scenic value between 4 and 5 percent is relatively small.

The results of the analysis of variance shown in Table 2 indicates that there are significant differences among the means for all of the attributes that were used to define the alternative scenarios. The ANOVA further shows that all the second order interactions are also significant. These relationships are shown graphically in Figure 2.

Table 1. Mean scenic value and standard error of the mean for management scenario variables.

	Mean	Std. Error
Viewpoint		
Sugarloaf	6.28	.039
Welsh Ledge	5.60	.042
Pattern of cutting units		
scattered	6.07	.040
concentrated	5.81	.042
Size of cutting units		
4 to 5 acres	5.78	.052
10 to 14 acres	6.14	.049
20 to 30 acres	5.90	.048
Percent viewshed cut		
0	8.09	.058 †
1	6.64	.059
2	6.11	.059
3	5.34	.059
4	4.83	.061
5	4.64	.065
existing scene *	5.51	.066 †

* The ratings for the existing view are not included elsewhere in this table.

† The sample size used to calculate these standard error of the means was 1044, the same as for the other percent levels.

The three graphs to the left compare the two viewpoints. The first shows that there is little difference between the view-

points when the scattered pattern is used to locate cutting units. However, the difference between the concentrated pattern scenarios is quite large. It is thought that this reflects rater reactions to the more recently cut areas being farther from the viewer at Sugarloaf and nearer at Welch Ledge.

The next graph clearly shows the scenic impact of increasing the amount of the forest cut. The most severe change is from no cutting to 1 percent removal, while the least severe impact is the difference between 4 and 5 percent. The views where the most recently cut areas were closest to the viewer (Welch Ledge) had nearly the same scenic value as the Sugarloaf views that sustained a 1 percent greater removal. The scenic value for the existing viewpoints is also shown on this graph.

The last graph on the left indicates that the current practice of making cutting units between 10 and 14 acres has less of a scenic impact than would either smaller (4 to 5 acre) or larger (20 to 30 acre) cutting units. This tendency is much more pronounced in the Sugarloaf view, where the most recently cut areas were farthest from the viewer.

The top graph in the right column indicates that initially scattered cutting units have less scenic impact than concentrated ones. However, as the cutting intensity increases the difference between the two patterns seems to disappear. The next graph shows a similar tendency. Smaller scattered cutting units have less scenic impact than smaller concentrated units. However, the difference between the two patterns seems to disappear as cutting intensity increases.

The final graph indicates that the cutting units of 10 to 14 acres have higher scenic value at all intensities of removal than if either smaller or larger sized cutting units are used.

Table 2. Analysis of variance for the effects of viewpoint, cutting pattern, percent of area cut, cutting guidelines, and their second order interactions on scenic value.

Source	df	Sum of Squares	Mean Square	F-ratio	Prob
Constant	1	221086.0	221086.0	62365.0	≤0.0001
viewpoint	1	641.2	641.2	180.9	≤0.0001
pattern	1	136.9	136.9	38.6	≤0.0001
percent	5	9048.5	1809.7	510.5	≤0.0001
size	2	78.8	39.4	11.1	≤0.0001
view*pattern	1	318.8	318.8	89.9	≤0.0001
view*percent	5	132.4	26.5	7.5	≤0.0001
view*size	2	107.3	53.6	15.1	≤0.0001
pattern*percent	5	54.8	11.0	3.1	0.0086
pattern*size	2	38.5	19.2	5.4	0.0044
percent*size	10	144.7	14.5	4.1	≤0.0001
Error	6229	22082.2	3.5		
Total	6263	32550.1			

Conclusions

Considerable care was taken to make the design of these scenarios as realistic as possible. Forest landscape architects used the same procedures to specify and locate cutting areas for these scenarios that they normally use on the forest. These procedures included the use of a geographic information computer program to draw the cutting units in accurate perspective. The research landscape architects creating the simulations made several site visits to photographically document the scenes and to validate the colors and textures being used to simulate the clearcut and revegetated areas. Again, the computer techniques provided the control necessary for consistently high quality across the creation of 62 simulations. These computer assisted techniques used both on the forest and in the digital darkroom seem to provide effective tools to assessing the scenic affects of alternative forest management scenarios.

The results of this study suggest several implications for the visual management of forest areas.

1. The optimal unit size for clearcut areas seen in the middleground is 10 to 14 acres. Both larger and smaller units had lower scenic value when seen at this distance.
2. Increased cutting intensity is associated with increased scenic impacts. Vistas of the middleground without any cutting areas are more scenic than those with cutting areas.
3. Recently clearcut areas in the middleground are less scenic than clearcuts with substantial young regeneration. The researchers could not simulate visual differences between mature forest and 35 year-old regeneration.
4. Recently clearcut areas in the middleground have less scenic impact the farther they are from the viewer.

5. The strategy of scattering cutting units throughout a middleground viewshed has substantially less scenic impact than concentrating the units nearer the viewer. Concentrating the units has approximately the same scenic value as scattering the units only when the most recently cut areas are farthest from the viewer.

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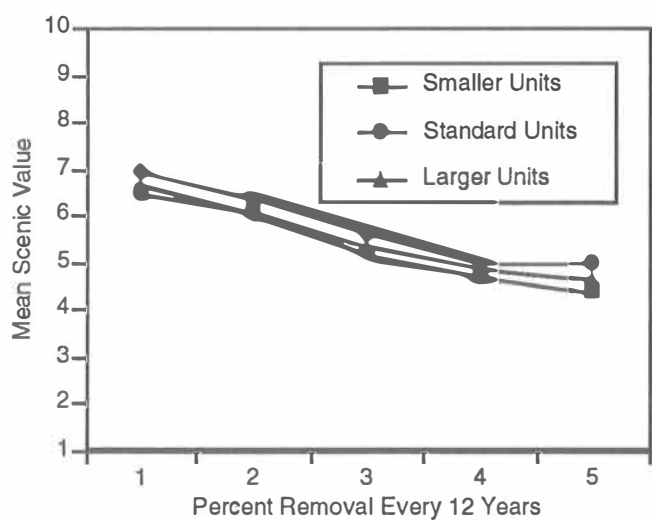
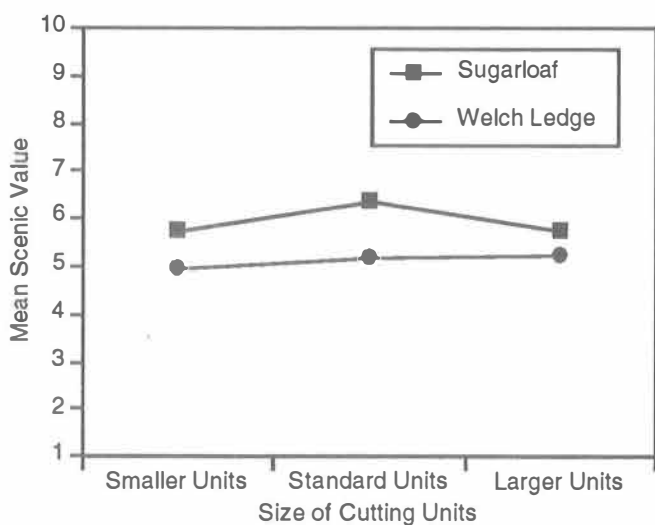
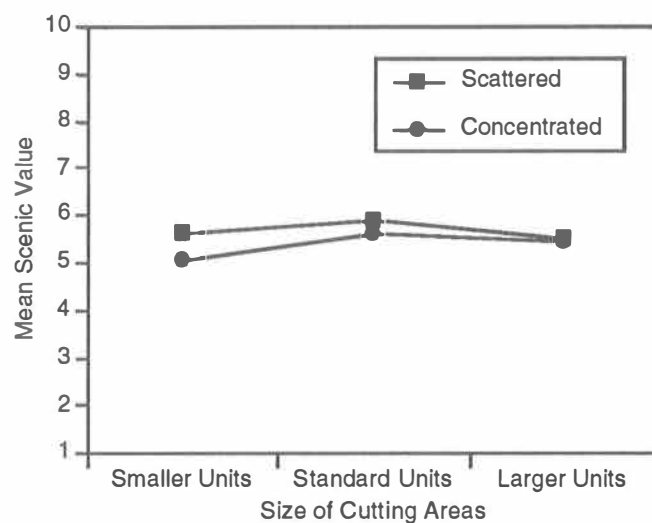
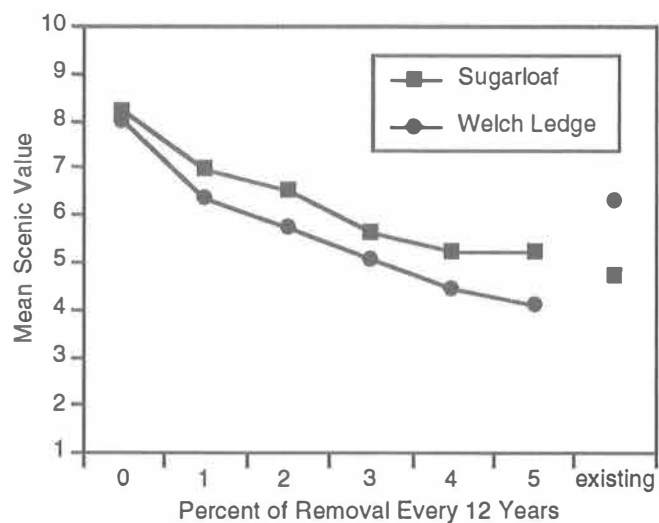
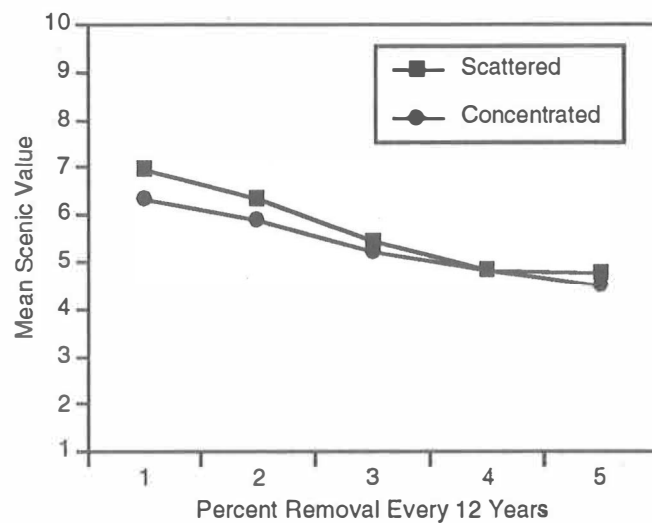
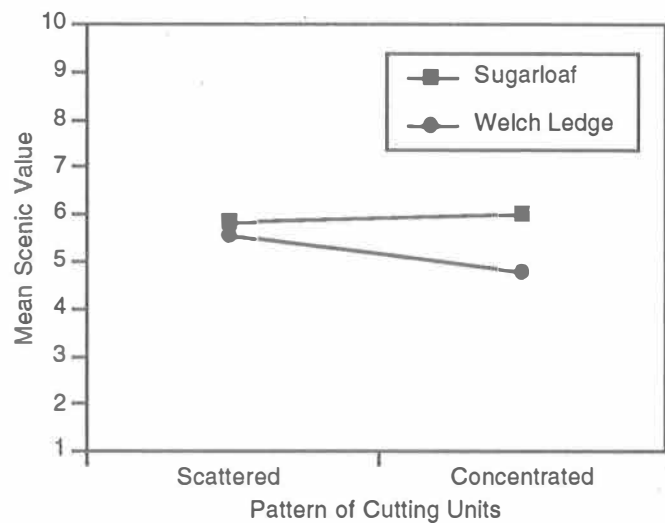


Figure 1. Plots of the relation between mean scenic value and the two-way interactions among viewpoint, pattern of cutting units, percent of viewshed removed, and size of cutting units.

MANAGING EASTERN HARDWOOD

FORESTS FOR VISUAL QUALITY

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Respondents (n=503) rated the visual quality of seven silviculture systems as the forest regenerates over approximately 25 years. Of the sites rated, the non-managed mature forest is most visually pleasing, with crop tree release second. Clearcutting, on the average, has the lowest visual quality. A scenic beauty prediction model is presented. Although the twenty-five year regeneration time is not an effective visual management tool, other efforts such as retaining over 50% residual overstory or controlling the amount of slash that remains on the site may help.

Introduction

The need to integrate recreation and aesthetics values into multiple-use land management planning in the Forest Service became evident with the passage of the Multiple Use Sustained Yield Act of 1960, the National Environmental Policy Act of 1969, the Renewable Resources Planning Act of 1974, and the National Forest Management Act of 1976. The Visual Management System (VMS) and the Scenic Beauty Estimation Method (SBE) have since emerged as methods to quantify visual quality.

The VMS was developed in the 1970's by the Forest Service, using the expert opinion of landscape architects to describe the visual quality, sensitive areas, and appropriate site specific management prescriptions (USDA Forest Service 1974). Currently, all 190 million acres of Forest Service lands have been assessed using the VMS approach (Tlusty and Bacon 1989). About the same time, psychophysics (the study of relationships between the physical characteristics of an environment and human perceptions/judgments of that environment) was used to scientifically measure the perception of the general public to determine scenic beauty. This goal was attained through the development of the SBE by Daniel and Boster (1976).

However, to produce results that can be applied by forest resource managers, aesthetic perception must be modeled with standard forest mensuration data. To accomplish this, the SBE method is emerging as the most useful scenic beauty management method. Most past aesthetics research has been conducted in the west (Benson and Ullrich 1981) the arid southwest (Brown and Daniel 1984), the north central region (Ribe 1991), or in the southeast loblolly pine stands (Hull and Buhyoff 1986), and cannot be assumed to generalize to northeast hardwood stands. In the eastern hardwoods, Brush (1979) looked at landowner perceptions but did not link those with mensuration data. Vodak and others (1985) limited the planning horizon to six years since a cut in eastern hardwoods. Long term effects of alternative management methods began to be studied by Hull and Buhyoff (1986), who pioneered the "Scenic Beauty Temporal Distribution" (SBTD), focusing on pine stands. Palmer (1990) assessed the effects of time since harvest in the northeastern forests, but controlled the cutting level to leave a residual 70 sf/acre basal area.

The North East Decision Model (NED) is currently being developed by the U.S. Forest Service to respond to these needs of understanding future consequences of management decisions. Given the goals of the landowner/manager (timber, watershed, recreation/aesthetics, wildlife, ecology, or a combination of these), this "expert system" will make recommendations of the appropriate management systems and produce a prediction of the resulting property or forest stand in terms of timber production, visual quality, etc. (Marquis 1991). NED is to be accessible to all landowners. This study is a portion of the research and development process for the aesthetic module of NED, and will determine and predict the visual impacts of various silviculture systems as the northeast hardwood forest regenerates over time.

Silviculture Systems

This study explores the visual quality of various silviculture systems as they regenerate. Therefore, it is necessary to understand basic forest management terminology.

Silviculture is the art of producing and tending a forest to create and maintain the kind of forest that will fulfill the objectives of the owner. These objectives may include any combination of the following: timber, wildlife, water, ecological considerations, recreation and aesthetics (Smith 1986). There are a number of different silviculture systems. This study looked at seven systems, which are very briefly defined below, and are listed in the order of the amount of overstory (residual trees) left standing after a cut.

A Clearcut involves removal of the entire stand in one cutting. A Deferment Cut leaves up to 30% residual trees, with the cut of the residuals deferred at least 15 years up to two rotations later. The Crop Tree Release is a thinning to select certain "crop" trees, such as those that meet the timber, wildlife, and/or aesthetic goals. Openings are made around those trees to allow their efficient growth and to allow for regeneration. A Shelterwood is used to regenerate seedlings of shade tolerant species by removing the old stand in a series of cuttings, providing shade under the seed trees. Area-wide Thinning involves removing any trees necessary to open up the forest canopy enough to accelerate growth of the overall forest. A Single Tree Selection is a removal of scattered mature trees to meet the stand structure goal. However, no openings greater than 0.1 acre are normally allowed. Finally, a No Cut system allows only natural change of the stand structure. It is basically an undisturbed, mature forest.

Objectives of the Study

The objectives of this study are to:

- 1) determine the relationship between the quantitative characteristics of eastern hardwood forests and scenic beauty,
- 2) develop a prediction model for scenic beauty using forest stand variables that can be manipulated by managers, and
- 3) compare the visual quality ratings of the various silviculture systems.

Methods

Site Selection

Within-stand color slides were collected according to a matrix of residual overstory densities (or stocking level) by height of regeneration. The 20 cells in the matrix represent seven silviculture systems and up to 25 years of regeneration since cut (Table 1).

Table 1. Silviculture systems within the slide collection matrix.

Height of Regeneration OR Years Since Cut	Stocking Level				
	0-9%	10-25%	26-50%	51-80%	81-100%
0'-3' OR 0-2 years	Clearcut	Crop Tree Deferment	Crop Tree	Crop Tree Selection Thinning Shelterwood	Selection No Cut
3'-10' OR 2-7 years	Clearcut	Crop Tree Deferment	Crop Tree Shelterwood- 2nd cut	Crop Tree Selection Thinning	Selection No Cut
10'-20' OR 7-15 years	Clearcut	Crop Tree Deferment	Crop Tree Shelterwood	Crop Tree Selection Thinning	Selection No Cut
20'-30' OR 15-25 years	Clearcut Shelterwood- final cut	Crop Tree Deferment	Crop Tree	Crop Tree Selection Thinning	Selection No Cut

Four slides representing each cell in the matrix were collected during the summer months of 1991 and 1992 from 34 forested sites in the Allegheny Plateau, for a total of 80 slides. Slides were rated by 503 college students on a "scenic beauty" Likert scale of one (low) to ten (high) during the fall of 1992.

Subjects

While 66% of the respondents were United States citizens, 34% were international students, with 25% of those from Asia. There were 69% males and 32% females surveyed. Only 7% of the sample were forest management students. The average age was 22. Most (78%) had permanent residence in small to medium communities of under 150,000 population. While there may be some significance between this demographic data and scenic beauty perceptions, the sample was instead treated as a whole in the analysis for this paper.

Stand Variables

For each site, or stand, forest managers provided mensurational data, adjusted to the date of the photograph. Stand data is commonly used, easily measured, and controllable by forest managers, making it useful for prediction modeling. These variables shall be referred to here as "stand variables" (Table 2).

Basal area is a commonly used measure of stand "density" and is the total diameter breast height (dbh) cross-sectional area of the trees in the stand, measured in square feet per acre. It is indicative of the volume of wood on the stand. The stocking level is another commonly used measure of density. It is the ratio of the amount of timber currently on the land in relation to what the land could carry according to timber production norms, and is based on site quality, tree species, trees per acre, and basal area. There are a number of obvious interrelationships that occur between these stand variables. For example, as basal area increases, stocking increases. As trees per acre increases, seedlings per acre decrease.

Years since cut may represent the stand age in cases of clearcuts. Otherwise, for partial cuts, it represents the age of the regenerating forest growth, and is closely related to the height of the understory regeneration. Silviculture system is a class variable that includes seven systems, arranged on a continuum of ascending levels of residual overstory, as listed above.

Slide Variables

It was hypothesized that respondents' ratings may be affected by within-slide variability. We were interested in looking at the possible correlations between these variables and scenic beauty. Each slide was assessed for the following visual factors, referred to here as "slide variables."

The number of large trees visible were simply counted in each slide. Slash was estimated from the slides by imagining a 6' diameter circle in the center of the slide and estimating the percent coverage, by tens, of slash. Height of slash was under 18 inches in all 17 of the 80 slides in which slash was present except for three slides, where slash was under 36 inches. Sites were specifically chosen that had little or no slash present (21% of the slides had an average of 50% slash visible). The large tree effect and slash has been shown to be significantly correlated with scenic beauty in past research (Schroeder and Daniel 1981).

The percent, by tens, of sky visible in the slide was estimated, as was the percent of ground cover, or herbaceous plants below 18 inches. It was noted whether there were large, decaying, old logs visible in the slides, and if the vantage point of the photo was from within the stand or adjacent to the stand. The depth of visual penetration into the slide at eye level was estimated to the nearest 25' to the longest distance of >150'. Conversely, the percent of screening, by tens, of foliage and stems at eye level was estimated. Additional slide variables such as the length of a grass or fern foreground visible in the slide, and the presence of light shadows were assessed, but correlations were not significant.

Analysis

Correlations and scatter plots assisted in initial model development. A prediction model was developed through the use of stepwise regression and general linear modeling. Finally, silviculture systems were compared using the pairwise t-test.

Results and Discussion

Correlations

Correlations were calculated between the mean SB rating for each slide and all stand and slide variables to determine the most significant scenic beauty predictors. The scatter plots revealed a nonlinear relationship between scenic beauty and the variables basal area, trees per acre, and visual penetration. Thus, the quadratic terms (variable²) were created as additional potential predictor variables (Table 2).

Table 2. Potential scenic beauty predictors and correlations with mean scenic beauty rating^a.

Predictor Variable	Correlation ^b	p
Stand		
Basal area (>1" dbh)	0.689	.0001
Basal area ²	0.576	.0001
Stocking level	0.672	.0001
Silviculture system	0.675	.0001
Years since cut	0.579	.0001
Trees per acre (>1" dbh)	0.235	.036
Trees per acre ²	0.404	.0002
Seedlings per acre (<1" dbh)	-0.235	.069
Slide		
Large trees	0.584	.0001
Slash	-0.544	.0001
Sky visibility	-0.460	.0001
Old logs	0.432	.0001
Ground cover	0.266	.017
Vantage point	0.167	.139
Visual penetration	-0.134	.236
Visual penetration ²	-0.279	.012
Screening	0.077	.497

a/ N=80

b/ Pearson Correlation Coefficients

In discussing the stand variables, it was expected, and found, that as the density variables (basal area, stocking, and trees per acre) and time since cut increased, so would the scenic beauty ratings, as evidenced by the positive correlations. The negative correlation of seedlings per acre indicates less appreciation of a regenerating stand in its early years.

Positive correlations were expected, and found, between scenic beauty and the number of large trees pictured in the slide, as well as the presence of old logs. It was also no surprise that an increase in the amount of slash visible detracted from the visual quality of the slide. People preferred to see green herbaceous growth rather than leaf litter, which is consistent with past research (Echelberger 1979, Brown and Daniel 1984). From the perspective of vantage point, ratings were higher when people felt they were within the stand rather than viewing from just outside the stand. Perhaps a sense of being immersed in the scene contributed to the rating.

Not significant were visual penetration and screening. It was hypothesized that responses would be greatly affected by the amount of screening of the view. The scatter plot for visual penetration revealed a symmetrical curve. The high scenic beauty ratings were those that allowed visual penetration of approximately 75-100' into the site. This finding concurs with Brush (1979) in that generally an open park-like setting under a tree overstory is preferred.

Regression Model

Further analysis to determine the impact of potential scenic beauty predictor variables on visual quality included stepwise regression and general linear modeling. Only those variables that could be manipulated by managers were included in the modeling process. Basal area was a better fit than stocking level. Both stocking level and trees per acre dropped out as insignificant when run along with basal area. It was surprising that even with a lack of emphasis on slash in site selection, its effect was still a significant part of the model. Notably, basal area and slash alone accounted for 64% of the variability in scenic beauty responses (Table 3).

Table 3. Scenic beauty prediction model for silviculture systems in eastern hardwood forests^a.

Independent Variable	Estimate	T-value	Partial R ²	Model R ²	C(p)	F-value
Basal area	0.024	5.69 ^b	0.4744	0.4744	39.22	70.40 ^b
Slash	-0.013	-4.56 ^b	0.1234	0.5978	14.17	23.63 ^b
Basal area ²	-0.0001	-3.72 ^b	0.0405	0.6383	7.29	8.51 ^c
Years since cut	0.01	2.24 ^c	0.0226	0.6610	4.33	5.01 ^c
Intercept	5.166	31.79 ^b				

a/ R²=.66, P<.0001

b/ P<.001

c/ P<.05

The final model explained 66% of the variation in mean scenic beauty and was statistically significant at 0.0001. All terms were significant at <.03. The model is presented as follows:

$$\text{Scenic Beauty} = 5.1664 + 0.024 \text{ BA} - 0.0001 \text{ BA}^2 + 0.0097 \text{ Years} - 0.0133 \text{ Slash}$$

Using this prediction model, the visual quality of silviculture systems as they regenerate can be predicted. To calculate the equation, slash is held at a constant level of 0, with the assumption that managers will remove slash to lessen the visual effects of harvesting. Mean basal area and mean years since cut for each silviculture system represented in the slides were computed and plugged into the equation. The results in matrix form are displayed in Table 4.

Table 4. Scenic beauty predictions for regenerating silviculture systems^a.

Height of Regeneration	Silviculture System						
	Clearcut	Deferment	Crop Tree	Shelterwood	Thinning	Selection	No Cut
0'-3'	5.176	5.811	6.167	6.358	NA	NA	7.170
3'-10'	5.203	5.784	6.222	6.654	6.450	6.556	7.344
10'-20'	5.456	5.813	NA	6.494	6.394	6.404	7.306
20'-30'	5.862	5.867	NA	6.525	6.316	6.661	7.128

a/ Predictions are based on average scenic beauty ratings using a scale of 1 (low) - 10 (high).

Silviculture Systems Compared

Each of the seven silviculture systems was compared for similarities by performing Fisher's least-significant-difference (LSD) statistic on the mean scenic beauty ratings (Table 5). On the average, the Clearcut had the lowest visual quality, while the No Cut mature forests were rated highest, concurring with findings by Hull and Buhyoff (1986). Surprisingly, the Crop Tree Release, a newly developed forestry system currently being researched, was given the second highest scenic beauty rating. This may come as good news to forest managers, but should also be looked at cautiously as the full range of their aesthetic impact over years of regeneration has not been explored in this study.

Table 5. Comparison of silviculture systems by mean scenic beauty rating^a.

Variable	Rating
No Cut	7.17
Crop Tree	6.35 *
Thinning	6.28 *
Selection	6.26 *
Shelterwood	6.22 *
Deferment	5.55
Clearcut	5.12

a/ Fisher's least-significant-difference. Mean ratings not significantly different at the 0.05 level are indicated by *.

Crop Tree Release, Thinning, Selection, and Shelterwood showed no significant difference in their scenic beauty ratings. It might be suggested that these systems would be considered visually acceptable to the public, for the average regeneration period. All remaining systems (No Cut, Deferment, and Clearcut) were distinctive in their scenic beauty ratings, and should be considered to have separate visual effects on the forest.

The density of residual trees seems to have more of an effect on scenic beauty than does the time factor. This is evidenced by the high F-statistic in Table 3 for basal area, compared to the low value for years since cut. Years is the least significant variable, suggesting that the twenty-five year time frame used in the study has little effect on visual recovery. The parameter estimate indicates that for every year since the cut, scenic beauty (SB) will increase by only 0.01 units on the 1-10 Likert scale. At this rate, referring to Table 5, for a clearcut to recover to the average shelterwood cut will take 110 years [(6.22 Shelterwood SB - 5.12 Clearcut SB) / .01 SB units/year].

Implications and Recommendations

As evidenced by the comparison of the silviculture systems, all timber harvesting activity in hardwood forests will have a negative impact on visual quality. Each system that involved a timber cut resulted in a significant loss of aesthetic quality, averaged out over approximately 25 years. However, these impacts on recreation values can be minimized with silviculture and site manipulation. Some silviculture systems are more

visually pleasing than others. These include the traditional Area-wide Thinnings, Selection Cuts, Shelterwood, and the innovative Crop Tree Release methods.

Visual recovery after harvest is extremely slow, and beyond normal planning time frames. Foresters often manage their hardwood forests for timber on a long-term 60-80 year planning horizon, with intermediate thinnings in the interim. In this case, forest efficiency, not visual quality, might be the priority. However, the private woodlot owner may have goals other than timber production. Recreation, aesthetics, and wildlife are all common goals to be met in their lifetime, or within 10-20 years. Recreation managers may have the additional public pressure to maintain visual quality, and must prioritize the short term goals of visitor satisfaction and aesthetics.

Because time has been shown to be an ineffective method of achieving desired visual conditions, emphasis should be placed on the silviculture methods used and short-term conditions created. Clearcuts and other heavy cuts should only occur where recreation and aesthetic values are not a concern. While the No Cut method is best, acceptable visual conditions may be achieved with partial cuts, without reducing the stocking below 50%. This level of cutting has also been previously confirmed by Echelberger (1979) and Vodak and others (1985).

If these cuts must be made, management should focus on mitigating the short-term visual effects of forest disturbances through such measures as retaining some large (>17" dbh) trees and some dead logs, slash removal, and road re-seeding. The site should be assisted in returning to a "natural" appearance as quickly as possible.

There are some unanswered questions to be raised. What is a visually acceptable recovery? How long after a cut before the recovery looks good and is generally accepted by the public? How does the recreationist's knowledge of timbering practices affect their level of acceptance of forest disturbance? How does the pursuit of various recreational activities affect the perception of aesthetics? Are certain types of recreation users more tolerant of forest disturbance than others?

General philosophical questions also arise. What portion of the forests should be managed for aesthetics? Conversely, how much should forest managers rely on educating visitors about timbering methods as a tool to improve aesthetic appreciation and acceptance of forest disturbances? How can a land manager be sure an aesthetic experience is being provided to the visitor? Will our concern to please the average person result in a boring, monotonous landscape? These are all concerns that a professional must consider in the decision-making process.

In conclusion, a quality recreational experience is dependent upon the environmental condition of the setting, combined with the social context and personal cognition brought with the participant. This research responds to the one variable most controllable by the land manager: the quality of the natural setting. In this day of public participation and involvement in land planning, intelligent decisions based on solid scientific

research rather than intuition may be the best defense for forest managers. This paper recommends appropriate decisions in managing a forest for aesthetic goals.

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***OUTDOOR RECREATION
PLANNING AND MANAGEMENT***

FOSTERING ENVIRONMENTAL STEWARDSHIP OF THE NEW YORK STATE PARK SYSTEM

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During the decade of the 1980s, state and national park administrations in the United States have become increasingly aware of problems and threats to the natural and cultural resources of their respective park systems. This paper summarizes key findings and recommendations of the most recent study of these concerns that pertain to the management and protection of state parks and historic sites in New York State.

Background and Statement of the Problem

The mission of the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) is to provide safe and enjoyable recreational and interpretive opportunities for all New York State residents and visitors, and to be responsible stewards of the valuable natural, historic and cultural resources of the New York State Park System. One of the guiding principles fundamental to the successful achievement of this mission is a commitment to preservation. Indeed, New York's 150 state parks and 34 historic sites are recognized as unique and irreplaceable public assets.

The early and great development of interest in parks throughout the state in the early part of the 20th Century has been attributed to the inadequacy of city parks, the increased interest in conservation and recreation generally, the enormous increase in use of the automobile, and at least in part, to the remarkable success of the Palisades Interstate Park System.

While the State of New York remains today one of the foremost states of the U.S. in the number and character of its state park developments, the initial assumption of most of these activities did not come about as the result of any actual plan or policy. Prior to 1924, the year of the establishment of the NYS Council of Parks, over 40 parks and places of scenic and historic interest had been established, partly upon the initiative of the state, but largely on account of private initiatives and gifts supplemented by state aid.

Since the acquisition of the Niagara State Reservation in 1885, and the establishment of the New York State Forest Preserve in the Adirondack and Catskill Mountains that same year, New York State manages the oldest, and one of the largest and most diverse state park systems in the United States.

Due, in part, to the nature of this early history, the New York State Park System has evolved to include units known by, or classified by varying names. These include parks, preserves, scenic areas, reservations, historic sites, refuges and memorials. To simplify, they are generally referred in this paper as "parks", or components of a comprehensive system of state parks.

In recent years, OPRHP has become increasingly concerned about the condition of the park and recreation estate under its administrative jurisdiction. Much like state and national parklands throughout the United States, it is a park system that is experiencing a deterioration of its natural and cultural

resource base as well as the recreational infrastructure that supports public use.

In order to address concerns of resource degradation, OPRHP initiated a systematic study of the problem in response to Governor Mario Cuomo's directive for a ten-year stewardship action plan that would do more today to assure proper preservation and maintenance of our State Park System (Cuomo 1990).

The study was also undertaken as part of the process for periodically updating the New York Statewide Comprehensive Outdoor Recreation Plan (SCORP) required under statutory provisions of the Land and Water Conservation Act of 1965 (PL 88-578, as amended).

The two major purposes of this study -- "Fostering Environmental Stewardship: A First Report on Managing and Protecting the Natural and Cultural Resources of the New York State Park System" (OPRHP 1993) -- were: (1) to provide a preliminary evaluation of the condition of the state parks; and, (2) to provide management with a comprehensive set of recommendations and action strategies for advancing stewardship ideals.

It was further intended that the study establish a framework for additional dialogue and appropriate follow-up action on a regional and park-specific basis.

The study defines environmental stewardship as those policies, programs and resource management functions which serve to inventory, assess, protect or enhance the natural, cultural, scenic and recreational resources of New York's system of state parks and historic sites.

Implicit to this definition is the recognition of outdoor recreation as a beneficiary of clean water, clean air, pleasing landscapes and healthy ecosystems; that the state parks themselves are perceived as benchmarks and standards for environmental quality.

Importance and Uniqueness of Park Resources

The New York State park and recreation estate encompasses nearly 260 thousand acres of land and water resources generally characterized as "natural" open space (Figure 1, next page). This variously includes upland forest, mountain, riverine, marine and coastal environments which allow for hiking, camping, fishing, picnicking, golfing, and a broad spectrum of other active and passive recreational opportunities to a large and growing number of visitors each year (Figure 2, next page).

The New York State Park System has traditionally served the general welfare of people for purposes of health and recreation as well as other benefits generally associated with the enjoyment of scenery, nature, history and outdoor education. There are, however, a number of other related and important benefits of public parklands. Over 160 lakes and ponds, and about ten thousand acres of freshwater and tidal wetlands, for example, add to the diversity of ecosystems of state parks. These provide a range of ecological and recreational benefits, including boating, swimming and maintaining habitat for fish and wildlife.

In addition, the New York Natural Heritage Survey has documented some 400 locations within or near state park boundaries that contain rare plant and animal species, or exemplary natural communities. These constitute an important, though poorly recognized part of the biodiversity of eastern North America.

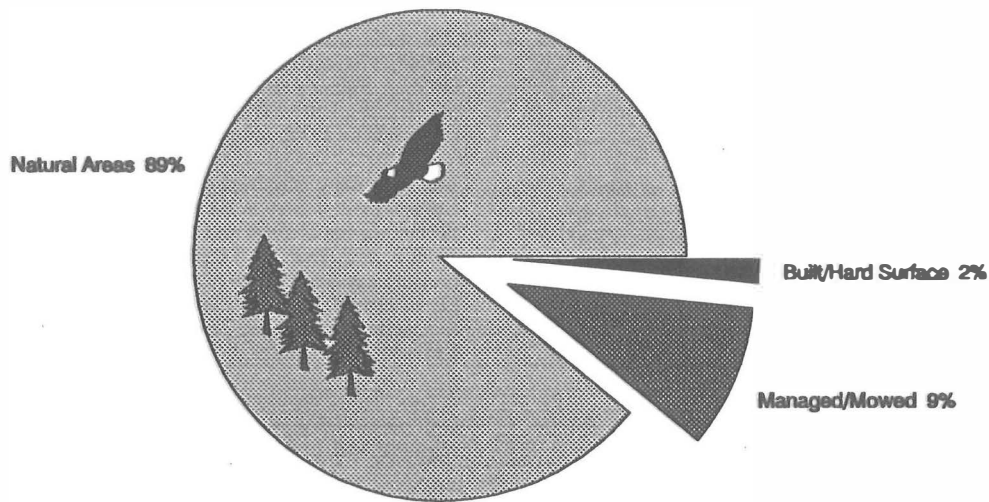


Figure 1. Most state park lands remain as open space resources.

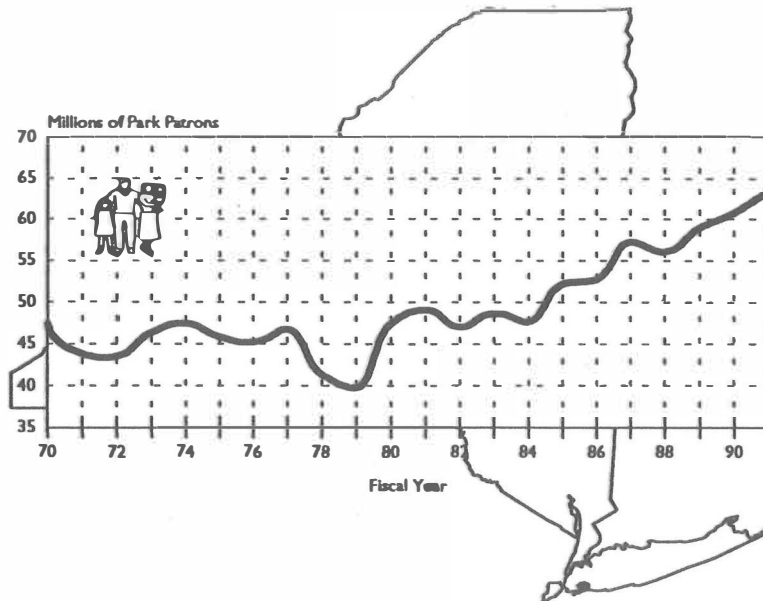


Figure 2. Annual attendance at state parks & historic sites (1970 -1991).

Similarly, the New York State Geological Survey has identified 67 unique geologic features associated with Niagara Falls, Chimney Bluffs, Minnewaska and a number of other units of the State Park System (Rogers, et al. 1990). Those features located in Bear Mountain, Green Lakes, Orient Point and Nyack Beach State Parks have been designated National Natural Landmarks. Scientific studies conducted in Letchworth State Park, commonly known as the Grand Canyon of the East,

have resulted in important contributions to the earth sciences as well as botany and ornithology. The high percentage of breeding bird species in Letchworth is cited as one measure of the parks great diversity of natural habitats. This includes 25 species of nesting wood warblers, claimed to be among the best concentrations in the world (OPRHP Birdlife Advisory Committee 1991).

Together, these biological resources and geologic features offer expanded opportunities for outdoor education, including the development of appropriate interpretive materials.

Parks and historic sites also contribute to the enrichment of the American culture. All or portions of 56 units of the New York State Park System are listed on State and National Registers which formally document important resources of cultural significance. This includes several worthy of designation as National Historic Landmarks. One of these, Washington's Headquarters in Newburgh, resulted from the States pioneering efforts in historic preservation that culminated in the acquisition of this site in the year 1849. Over 100 park units are known also to contain important archeological resources.

In addition to extensive economic activities of private concession operations in state parks, the park system itself generates about \$35 million annually from vehicle entrance fees, golf courses, camping and similar revenue sources. OPRHP employs about 1,600 permanent staff, and hires approximately 4,700 additional people each year as part of a temporary and seasonal work force that helps sustain local and regional economies.

Other benefits of parks and recreation include helping prevent crime, contributing to civic pride and social unity, and providing a stimulus for tourism (Godfrey, Graefe and James 1993; PCAO 1987).

Methodology

This investigation on the state of the New York State Park System was conducted, in part, as a synthesis of OPRHP technical documentation that included the New York State Open Space Conservation Plan (DEC and OPRHP 1992) and the State Park Infrastructure Fund, or SPIF (OPRHP 1992).

The Open Space Plan identified specific properties of statewide significance that should be protected as state parks and historic sites, and was largely a product of recommendations of regional advisory committees as well as public information meetings and workshops held throughout New York State.

SPIF and other fiscal management data provided a basis for assessing the problem of rehabilitating and maintaining park and recreation facilities associated with an aging infrastructure and conditions of high user demand.

The study also incorporated environmental audit data for a three-year period (1989-1991) to assess compliance of park facilities and operations with the regulatory provisions of the New York State Environmental Conservation Law. These audits were based on responses to questionnaires made available to each of OPRHP's 11 administrative regions (Table 1). A separate problems-and-threats questionnaire provided more comprehensive information on pollution, visitor impacts, non-conforming land uses and other types of internal and external problems associated with environmental stewardship. Workshops were held with OPRHP facility managers to enhance their understanding of potential issues and concerns.

Table 1. Identification of high priority areas of environmental concern in New York state parks and historic sites.

Park Region	Problem or Threat Category						
	Water Quality	Lack of Biological Surveys	Critical Habitat	Adjacent Land Uses	Scenic Resources	Lack of Training	Overuse
Allegany	X	X	-	X	X	X	X
Central	X	X	X	X	X	X	X
Finger Lakes	X	X	-	X	X	X	X
Genesee	X	-	X	X	X	X	X
Long Island	X	-	-	X	-	-	X
New York City	-	-	-	X	-	-	-
Niagara	-	X	-	X	X	X	X
Palisades	X	-	-	X	-	-	X
Saratoga-Capital	X	X	-	X	-	-	X
Taconic	X	-	-	X	-	-	-
Thousand Island	X	-	-	X	X	X	X

Other technical reports and literature sources established the rationale for protecting wetlands (U.S. Fish and Wildlife Service 1991) and biodiversity (Salwasser 1991), the role of environmental education and interpretation in protecting natural and cultural resources (Sharpe 1983); and, the integration of ecology, history and cultural values in the management of protected areas (Feller 1992; McBain 1992; Mitchell 1992).

Following the lead of the U.S. National Park Service in documenting and mitigating threats to the National Parks (U.S. GAO 1987; U.S. NPS 1981; Wauer 1983), three states -- California (DPR 1983), Pennsylvania (DER 1989) and Missouri (DNR 1992) -- have conducted parallel studies on the condition of their respective park systems. The State of Florida provides a case model for resource management and

protection of the state parks and other lands administered by its Department of Natural Resources (MacLaren 1992).

A preliminary survey of international parks (Lucas 1992; Machlis and Neuman 1987) suggests shared concerns of park and protected area management on a more global scale.

The information and findings of these studies and reports have allowed for an important comparative analysis of resource management issues and problems. They have strengthened also the rationale for suggesting possible action strategies for advancing environmental stewardship in the New York State Park System, including cooperative park studies and the associated need for basic and applied recreation research.

Summary of Findings

Table 1 identifies seven areas of environmental concern evidenced in OPRHP's respective regions. In relative order of significance, these are:

1. encroachment of residential and commercial development on park boundaries;
2. high levels of visitation and overuse;
3. degradation of water quality;
4. deficiencies in staff development and training in natural and cultural resources management;
5. impairment of visual qualities;
6. incomplete survey data on biological resources; and,
7. loss of critical wildlife habitat areas.

The situation of large numbers of people putting increased stress on an aging infrastructure is an inadvertent, but characteristic challenge to environmental stewardship. Since 1970, annual attendance at state parks and historic sites has increased about 35 percent, with a record number of 63 million visitors experienced in 1991 (Figure 2). Typical problems of overuse are soil compaction, vegetation loss and erosion of trails, picnic areas, campgrounds and other intensive use or ecologically fragile areas. Conditions of crowding can also degrade the quality of the outdoor recreation experience

In addition to identifying important priorities of properties that should be added to the state park system, the NYS Open Space Conservation Plan reaffirmed the importance of perpetual stewardship of existing holdings to ensure that important characteristics or resource values are not diminished over time. Lack of a stable and permanent source of funds to acquire critical natural, historic and recreational resources was identified as the major impediment to conserving open space.

A further finding was the need to strengthen environmental education and interpretive programs in state parks and historic sites as a means of not only enriching the visitor experience, but also to instill a greater understanding and appreciation of such resources as unique and irreplaceable public assets. New York States Governor Mario Cuomo has given strong support to environmental education as the key to protecting New Yorks natural resources for future generations (Cuomo 1990).

Ecological restoration of landfills, upgrading wastewater treatment plants, code compliance and historic structure renovations were among key priorities of environmental remediation of park and recreation infrastructure. The average state park facility is over 50 years old, and about \$300 million is required over the course of the next decade to address needs of restoration and rehabilitation.

Camping in the Palisades Interstate Park, for example, began in 1913 with the majority of the camp buildings built from 1910 to 1929. The Harriman State Park Group Camp Program is the U.S. pioneer for this type of recreation, and is closely allied to social well being of under privileged children. Many of the children who participate in this camp program gain relief from adverse urban conditions, while learning the value of the natural environment and gaining respect for it.

Today there are 35 group camps in Harriman State Park, which have an instant capacity of 6,200 campers. This physical plant, however, is in poor condition and very large, with 1,300 buildings, four water treatment plants, four sewage treatment plants, a network of roads and powerlines, swimming cribs, boat docks, beaches, court games and play fields.

Significance of the Problem

The state parks of the United States, like the national parks, have never been free from threats of adverse uses that could destroy, or at least impair the very qualities which led to their preservation for recreation uses. Except in rare instances, the state parks are considered more vulnerable to environmental incursions (Tilden 1962).

The number of such threats variously distributed across the state park systems of California and Missouri suggest the contemporary significance of the problem. About 8,700 known or suspected threats were identified as adversely affecting the 267 units of the California System. Similarly, more than 1,500 threats were found to be impacting the 77 state parks and historic sites of Missouri, a system characterized as "... the very heart of our land, our people, and the events that shaped them...."

In general, these threats related to high levels of visitation; physical, chemical and biological intrusions; multiple, and often conflicting demands for use of park resources; incompatible adjacent land uses; the isolation of park ecosystems; and, the debasement of park scenery.

A survey of state park directors conducted by The Conservation Foundation (Meyers and Reid 1986) found that beyond serious funding deficiencies, the greatest resource issue of concern to the directors was the need to identify and extend greater protection to sensitive ecological areas. About half of the state park directors identified degradation of resources caused by heavy visitor use as a significant problem, with rehabilitation of neglected facilities also a major concern.

On a broader scale, the President's Commission on Americans Outdoors (PCAO), in its 1987 report, sounded a serious warning about the condition of the nations parklands. After meeting with park and recreation officials throughout the country, the PCAO concluded that the nation faces a deterioration of the natural resource base of parklands and its supporting recreation infrastructure. The PCAO challenged American institutions to implement policies that would ensure long-term conservation of recreational resources and also to confront pervasive long-term environmental threats such as toxic chemicals, water pollution from non-point sources, groundwater contamination and acid precipitation.

Similarly, in a study of major issues identified in recent SCORPs (Caneday 1991), protection and management of natural resources and inadequate funding were the most frequently cited issues identified by the policy and planning sectors of state park administrations in the United States.

A review of the findings and concerns identified in this OPRHP environmental stewardship study shows consistency with problems and threats being experienced by other local, state as well as national park administrations.

Key Recommendations and Conclusion

This study on the condition of the New York State Park System, though preliminary in nature, suggests that problems and threats to the integrity of the system are real; that they are manifest, and will continue to pose challenges for effective stewardship. These challenges appear to be shared by park systems throughout the country, and are likely to become increasingly apparent in the course of the next decade. The scope of the problem further suggests the desirability of cooperative action among and between the states, possibly in partnership with the U.S. National Park Service that shares similar concerns.

New York State initiatives to protect unique or significant components of its natural and cultural heritage, however, are not new. The first State Park Plan for New York prepared for the 1924 bond issue, for example, noted that The movement for the rescue of Niagara Falls from the hands of those who were spoiling its natural beauties began over 40 years ago. The same plan explained how the Palisades Interstate Park was created in 1900 by the States of New York and New Jersey to stop the destruction of the Palisades of the Hudson and preserve them for a park.

Since this time, the New York State Park System has grown in scale and diversity, and is called upon to have an expanded role in meeting the varying needs of many more millions of people. Riverbank State Park, a 28 - acre recreation area on the roof of the North River Sewage Treatment Plant in Manhattan, adds a unique new dimension to this system (Holloway 1993).

To address the challenges associated with protecting the unique and irreplaceable public assets entrusted to the care of the New York State Office of Parks, Recreation and Historic Preservation, a comprehensive set of 50 recommendations and action strategies has been proposed for upholding OPRHP mandates and mission statements, as well as for strengthening the policy and long-range planning framework of SCORP. Key recommendations include:

1. Amend the Parks, Recreation and Historic Preservation Law (Article 3) to provide a declaration of the value of natural, historic, cultural and recreational resources contained within the state park, recreation and historic site system to the quality of life, and a declaration that the stewardship of these resources is a primary responsibility of the state.
2. Establish an environmental and natural resource conservation assistance fund at the State level, and a similar dedicated trust fund at the national level, to provide a permanent source of funding for environmental stewardship and open space conservation.
3. Provide facility managers and other OPRHP staff with natural and cultural resource management training on a continuing basis, while recognizing that the environmental resources of certain parks may be of such sensitivity and significance that regional park administrations should employ staff and encourage volunteers with backgrounds and expertise in ecological park management.
4. Develop or expand, as needed, a basic information system for natural and cultural resources, including minimum baseline inventories and monitoring systems in designated state parks and historic sites.
5. Prepare a statement for management for each state park and historic site that identifies their respective goals and objectives, as well as specific laws, unique features, classification and other considerations that guide protection and management, and ultimately master plans and the environmental review process.
6. Encourage cooperative partnership ties between park management and local government and landowners; facility managers should be more informed about, and involved in local land-use planning and zoning decisions that directly or indirectly affect stewardship ideals.
7. Incorporate resource management and environmental stewardship responsibilities into job descriptions of facility managers, and upgrade park ranger positions to require skills and training in resource management and interpretation.
8. Expand the number of environmental education programs and interpretive positions in state parks and historic sites to help instill an understanding and appreciation of the value of parks and their resources; to develop public support for protecting park resources; and, to encourage appropriate, safe and minimum impact use of these assets.
9. Assess on a park-by-park basis the opportunities that exist for environmental education and interpretation, and develop a statewide interpretive plan for the state park system.

10. Establish an interdisciplinary advisory task force to address specialized or significant resource management problems associated with natural disasters, pollution abatement and control, insect and disease infestations, habitat protection and management, vandalism, ecological restoration of landfills, conserving biological diversity, poor management practices on adjacent lands, beach sand erosion, nuisance wildlife, fire ecology, conducting resource inventories, protecting viewsheds, restoring historic landscapes, demarcating park boundaries and ecosystems, et al.
11. Complete or update master plans, with resource management and interpretive components, for all state parks and historic sites on a prioritized basis.
12. Expand the scope of OPRHP's environmental audit process to include a more comprehensive, and more participative assessment of problems and threats to specific units of the New York State Park System, and that these be monitored accordingly on an annual, or at least biennial basis.

A number of the recommendations and action strategies for fostering stewardship of the State Park System have been, or are in the process of being advanced. This includes legislation establishing a New York natural heritage program for identification, research, and conservation of the state's biodiversity. As proposed, park preservation areas would be designated within qualified units of the state park system to help protect outstanding ecological values (LBDC 1993).

Other legislation -- A. 7008 (Pillittere 1993) and S. 4552 (Sheffer and Johnson 1993) -- introduced at the request of the Office of Parks, Recreation and Historic Preservation, would amend the parks, recreation and historic preservation law in relation to the conservation of natural, cultural and recreational resources. This stewardship bill reaffirms, as a guiding principle, that; "The office shall operate and maintain the state park, recreation and historic site system to conserve, protect and enhance the natural, historic, cultural and recreational resources contained therein, and to provide for the public enjoyment of, and access to these resources in a manner which will leave them unimpaired for future generations."

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PUBLIC / PRIVATE PARTNERSHIPS IN NATURAL RESOURCES

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This paper evaluates partnerships between natural resource agencies and private businesses / other organizations, identifying characteristics and processes which underlie successful partnerships. Characteristics included types of participating partners, nature of administrative structures, funding structures, time span of operation, and types of projects. Processes included evidence of vision / mission statements, goal statements, written plans of operation, long range plans, economic statements, stated alternatives to the partnerships, stated roles of the partners, impact statements, and public support. The data were obtained from a content analysis of 25 chronicled case studies. Findings suggested that even with a wide variety of characteristics among the partnerships studied, there are processes that management can utilize to generate the development of more successful partnerships. Recommendations for future research are included.

Introduction

Many of this country's most significant cultural and natural resources have been preserved for perpetuity by federal agencies such as the National Park Service, the USDA Forest Service, the Bureau of Land Management, and the US Fish and Wildlife Service. Areas of local, regional, or even national significance, however, remain unprotected. These resources often have not been incorporated into existing programs because they have not lent themselves to the use restrictions which preclude the existence of living, working communities within the resource boundaries. Partnerships between natural resource agencies and private business have emerged as an innovative method to preserve natural and cultural resources, while providing recreational opportunities.

Given the financial constraints faced by public land management agencies, alternatives to traditional management processes have come under consideration. It has become incumbent upon management to expand programs and increase personnel, while reducing administrative costs and eliminating duplication. Natural resource agencies in partnerships with businesses and other organizations offer a potential solution.

Public-private partnerships involving natural resources have a long history with all of the national land management agencies. The National Park Service, for example, has over 400 partnership agreements including programs such as recycling in the parks, historical preservation, and environmental education. Most of these public-private partnerships have not been chronicled. Without written evidence, it is difficult to identify the criteria needed to create and maintain a successful partnership. Moreover, because unsuccessful partnerships are rarely discussed, much less chronicled, it is difficult to identify techniques and strategies to be avoided.

The limited number of natural resource investigations examining the characteristics (LaPage, 1992) and processes (Selin and Chavez 1992, 1993) of public-private partnerships report findings similar to the studies in the business management literature. This literature is largely limited to individual case studies without a comparison between partnerships (Waddock 1989). While this information is useful, applying the outcomes to newly developing partnerships is complex. The study reported here compares the characteristics and processes between partnerships to identify common elements.

Twenty-six characteristics and 9 processes were identified from the business management and natural resource literature. Partnership characteristics were grouped according to 5 criteria: types of participating partners, administrative structures, funding structures, time span of operation, and types of projects.

Process elements included evidence of a written mission or vision statement which helps to guide the overall direction of the partnership (Lynch 1989; Kitchell and Kraayenbrink 1992; Kent and Hellriegel 1991; Dent 1990; Selin and Chavez 1992). Vision statements lay the groundwork for formulating goals or objectives which serve as concrete directional statements for the partnership (Crossley 1986; Lewis 1990; Lorange and Roos 1992; Badarocco 1991). To create a map for reaching determined goals, successful partnerships also establish operational plans (Collins 1991; Kent and Hellriegel 1991). The development of a business plan provides a "litmus test" for judging potential success (Lynch 1989). In addition to this operational plan, strategic long range plans help to stabilize the partnership through a period of time working together (Lorange and Roos 1992; Lynch 1989; Selin and Chavez 1993). These plans should include a realistic economic statement which matches resources to goal achievement (Lynch 1989; Geringer 1988; Lorange and Roos 1992; Crossley 1986), and alternative operational plans (Collins 1991; Selin and Chavez 1992), including a plan for termination of the partnership (Slowinski 1992). To avoid confusion, successful partnerships clarify the role each partner will play in the alliance (Collins 1991; Lewis 1992).

Because the business management literature focuses on private business joint ventures and strategic alliances, public support is not recognized as a success factor. Given that the public is a customer in natural resource management, public involvement becomes crucial to successful public-private partnerships (Selin and Chavez 1993). Finally, an impact statement was identified as a critical process element of partnerships because of the role of environmental and social impacts in natural resource management.

Methodology

The data were obtained from a content analysis of 25 chronicled case studies from the National Park Service in Denver, Colorado. The sample included those that reported partnership characteristics, as well as the processes involved in the partnership. Two independent raters evaluated each case study. Judgments regarding the presence / absence of a characteristic or process were largely consistent between the raters. If an inconsistency was noted, the final judgment was

based on a review by a third individual. Each partnership was analyzed on 26 characteristics and 9 processes. Matrices were developed to summarize partnership characteristics (Table 1) and the process elements evident in each partnership (Table 2).

Characteristics were divided into 5 parameters: types of participating partners, administrative structures, funding structures, time span of operation and types of projects. Types of participating partners included private citizens, private industry, local government, state government, federal government, and conservation groups. Administrative structures concerned non-profit groups, federal commissions, state commissions, citizens' advisory councils, boards of directors, task forces, and regional coalitions. Funding structures included local bonds and/or taxes, government grants, private grants, partner investments, matching funds, and government appropriations. Time span of operation describes the dates through which the partnerships operated. The types of projects included cultural resources, natural resources, natural disaster projects, local recreation projects, urban renewal, and scientific research.

Nine processes were examined: a mission/vision statement, a goals statement, an operational plan, a long range plan, a documented economic statement, stated alternatives to the main plan, stated roles of the partners involved, written impact statements, and public support / involvement.

Results

Partnership Characteristics

Participating partners included government agencies, private businesses, and other organizations (Table 1). Partners ranged from philanthropic individuals to large corporations to small volunteer community groups. Broad-based participation appeared to be associated with successful partnerships. With only one exception (Charles River, MA), all of the case studies involved at least three partners. Nine of the 25 had four contributing partners, and 12 partnerships reported more than four types of partners.

The leadership role was generally assumed by a government agency (6 - local, 6 - state, and 5 - federal). Private citizens took the lead in 4 cases. The involvement of several levels of government helps to secure diverse sources of funding such as government grants and appropriations. Support from private industry and conservation groups opens other sources of funding. Groups that profit from a successful partnership often invest their own funds, creating a feeling of "ownership" in the partnership.

A task force was the most often used administrative structure (13 of 25 case studies). Similar to the types of partners, a combination of administrative structures was evident (Table 1). Eight case studies reported 2 different types of administrative structures, 4 had 3, and 2 had 4. Because each partnership was somewhat unique, the structure was tailored to achieve the partnership's goals. It should be noted that the descriptions of function and composition of the administrative body was often not well defined. Two organizational structures may actually have had similar administrative structures, but be labeled differently (e.g., board of directors versus task force).

It was also possible that the same organizational structure (e.g., task force) may not have had the same meaning or function. More study is needed to determine the role administrative structure plays in partnerships.

Government appropriation was the most common source of funds (Table 1). Nineteen case studies reported at least partial government funding. With decreased funding on the part of government, however, alternative funding methods are becoming more popular. Nine of the studies received partial funding from private grants and 7 from partner investments. In some cases, government funds provided "start-up" moneys, with the expectation that the park or resource would assume funding responsibilities once established.

The earliest partnership began in 1968 (Table 1). Eight of the 25 partnerships are still in existence. The time span of operation, when it was reported, varied between 2 and 5 years per partnership project. This is consistent with operational time spans reported in the business management literature.

The most common purpose for establishing a partnership was natural resource protection (15 of 25). Cultural resources and local recreation projects were each noted by 9 of the partnerships. Once established, the park often served a variety of functions. For example, a park developed to minimize natural disaster by removing structures from a flood plain and restoring the area to natural conditions, can then be used for local recreation. The removal of structures and restoration of the area can also serve to protect the riparian zone and provide opportunities for scientific research. Parks established to revitalize an urban environment can provide economic benefits through the remodeling of historic structures. Cultural and natural resource protection can serve to facilitate one another. The preservation of an historic structure can result in the protection of the surrounding landscape.

Partnership Processes

Although all of the partnerships had written goal statements (Table 2), just over half (14 of 25) reported a vision or mission statement from which goals are developed. Fifteen indicated a long range plan for achieving these goals. Seventeen of the partnerships demonstrated evidence of alternative operational plans. Sixteen of the partnerships outlined the roles of each of the partners. The more recent case studies were more likely to identify these processes.

Economic statements which identified costs and benefits of the partnership were noted in 13 of the 25 case studies. The remaining partnerships may have chosen not to report financial statements in the material analyzed for this paper.

Public support and involvement was prevalent (21 of 25). This grassroots support was found in the number of citizens advisory councils involved in partnership management and the number of partnerships that received some funding through local bonds or taxes. Allowing private citizens to have more direct input into the activities of their communities may have increased their willingness to pay for partnership efforts. The importance of grassroots support should not be underestimated when creating a partnership.

Table 1. Partnership characteristics.

Partnerships	Types of Participating Partners						Administrative Structures						
	Private Citizens	Private Industry	Local Gov't	State Gov't	Federal Gov't	Conservation Groups	Nonprofit Group	Federal Comm.	State Comm.	Citizens Advisory Council	Board of Directors	Task Force	Regional Group
Bay Area Trail, CA	XX	X	X	X	X	X	X			X	X		X
Boulder Creek, CO	X	X	XX			X						X	
Charles River, MA	X				XX					X			X
Chattahoochee River, GA	X	X	X	XX	X				X				
Delaware Lehigh Canal, PA	X		X	X	X	XX		X		X		X	
Erie Canal, NY	X	X	X	XX								X	
Falls of the Ohio, IN			X	XX	X	X						X	
Genesee River Corridor, NY	X		XX	X						X			
Hinton, WV	X	X	X		XX							X	X
Hudson River Valley, NY			X	XX	X	X			X	X		X	X
Kickapoo River, WI	XX	X			X					X			
Kissimmee River, FL	X	X	X	XX	X	X			X				
Lackawanna Heritage, PA	X	X	XX	X	X				X			X	X
Lowell Heritage, MA	X	X	XX	X	X			X					
Matewan, WV	X	XX	X	X	X		X				X	X	
Maurice River, NJ	X		X	X	XX							X	X
Mingo Creek, OK	X		XX		X	X						X	
Rincon Institute, AZ	X	X	X	X	X	XX	X				X		
Salem Project, MA	X	X	X	X	XX	X	X						X
Sonoran Institute, AZ	X	X	X		X	XX	X						X
South Platte River, CO	XX	X	X		X	X						X	
Thousand Islands, NY	X		X	XX	X		X			X			
Upper Delaware, NY	X		X	X	XX					X		X	
Wheeling Heritage Project, WV	XX	X	X	X	X							X	
Wildcat & San Pablo Creeks, CA	X		XX		X		X			X	X		

XX = Lead Partner

Table 1. continued

Partnerships	Funding Structures						Time Span	Types of Projects					
	Local Bond/Tax	Gov't Grant	Private Grant	Partner Investment	Matching Funds	Gov't Appropriations		Cultural	Natural Resources	Minimize Disaster	Local Recreation	Urban Renewal	Scientific Research
Bay Area Trail, CA			X			X	Began 1987				X		
Boulder Creek, CO			X	X		X	1977-1987		X	X	X		X
Charles River, MA						X	1968-1984		X	X			
Chattahoochee River, GA						X	Began 1979		X	X	X		
Delaware Lehigh Canal, PA				X	X	X	Began 1988	X	X				X
Erie Canal, NY				X		X		X	X				
Falls of the Ohio, IN			X	X		X			X				
Genesee River Corridor, NY			X	X			1983-1991				X	X	
Hinton, WV	X		X			X	1987-1989					X	
Hudson River Valley, NY	X					X		X	X				
Kickapoo River, WI	X	X	X				1969-1978			X	X	X	
Kissimmee River, FL						X	1976-1990		X				
Lackawanna Heritage, PA		X				X	1989-1991	X					
Lowell Heritage, MA		X	X	X		X	1978-1979	X				X	
Matewan, WV	X	X	X				1987-1990	X				X	
Maurice River, NJ						X	1987-1991		X		X	X	
Mingo Creek, OK	X					X	Began 1985			X			
Rincon Institute, AZ	X								X				X
Salem Project, MA				X		X	1987-1991	X				X	
Sonoran Institute, AZ									X				X
South Platte River, CO	X					X	1971-1985		X	X	X		
Thousand Islands, NY							Began 1981		X				
Upper Delaware, NY						X	Began 1978	X	X				
Wheeling Heritage Project, WV						X	Began 1990	X	X		X		
Wildcat & San Pablo Creeks, CA		X	X		X	X	Began 1985			X	X	X	

Table 2. Partnership process elements.

Partnerships	Mission/ Vision Statement	Goals Statement	Written Plan	Long Range Plan	Economic Statement (Costs & Benefits)	Stated Alternatives	Stated Roles of Partners	Impact Statements	Public Support/ Involvement
Bay Area Trail, CA	X	X	X	X			X	X	X
Boulder Creek, CO	X	X	X		X	X	X	X	X
Charles River, MA		X	X		X	X		X	X
Chattahoochee River, GA		X	X	X				X	X
Delaware Lehigh Canal, PA	X	X	X	X		X	X	X	X
Erie Canal, NY		X					X		X
Falls of the Ohio, IN	X	X					X		
Genesee River Corridor, NY	X	X	X	X	X	X	X	X	X
Hinton, WV		X	X	X		X	X		X
Hudson River Valley, NY	X	X							X
Kickapoo River, WI		X	X		X	X		X	X
Kissimmee River, FL	X	X	X	X	X	X	X	X	
Lackawanna Heritage, PA	X	X	X	X	X	X	X	X	X
Lowell Heritage, MA	X	X	X	X	X	X	X	X	X
Matewan, WV	X	X	X	X		X	X	X	X
Maurice River, NJ		X	X	X		X	X	X	X
Mingo Creek, OK	X	X	X			X		X	X
Rincon Institute, AZ	X	X	X	X	X			X	
Salem Project, MA	X	X	X	X	X	X	X	X	X
Sonoran Institute, AZ		X							
South Platte River, CO		X	X		X	X		X	X
Thousand Islands, NY		X	X	X	X	X	X		X
Upper Delaware, NY		X	X	X	X	X	X	X	X
Wheeling Heritage Project, WV	X	X	X	X		X	X	X	X
Wildcat & San Pablo Creeks, CA		X	X		X			X	X

Conclusions

Results from this study should be interpreted cautiously due to 2 limitations of the data. First, most of the case studies had National Park Service involvement. The extent to which these findings can be generalized to other natural resource agencies remains an empirical question. Second, identifying strategies and techniques to avoid in forming partnerships cannot be reliably determined from this sample of successful partnerships. Additional research including both successful and unsuccessful partnerships is necessary to address this issue.

With these limitations in mind, the data suggest some interesting observations. Successful partnerships typically include a range of contributing members and funding structures. The administrative structure appears to be partnership specific. A task facing participating members is the development of an administrative structure appropriate for the situational constraints. Although all partnership projects involved cultural and/or natural resources, spin off benefits such as local recreation opportunities or urban renewal are likely to occur.

Analysis of the process elements suggested that successful partnerships include: a mission or vision statement, goal statements, written operational plans, long range plans including strategies for terminating the partnership, a delineation of the roles of contributing members, and a description of the potential impacts. In addition, involving the public in the decision making processes associated with public-private partnerships appears to be a key element.

The findings also highlight the need for a theory based approach to partnership evaluations. At present, the natural resource partnership literature is devoid of theory. Existing theories in social psychology such as exchange theory or equity theory may provide the structure necessary for a more systematic evaluation of partnerships. The business management literature focusing on the formation of joint ventures and strategic alliances may also provide direction. The testing of these and other organizational theories within the management structure of natural resource agencies could highlight the similarities / differences between successful and unsuccessful partnerships.

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LAND USE AND PUBLIC ACCESS TO

LAKE CHAMPLAIN

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Study of a portion of Lake Champlain's shoreline confirmed that public recreation access is limited. Ninety percent of the shoreline was found to be in private land uses having physical, legal and economic constraints that result in public use restrictions. A few remaining, undeveloped sites should be protected in the public interest.

The Problem

A Vermont lakes management study (Gilbert et al 1982) found that an intensive recreation use zone existed along a portion of the Lake Champlain shoreline.¹ Water sport activities were most abundant within 400 yards of shore and decreased rapidly as distance from the shoreline increased. Recreation use of the shoreline also extended only a few hundred yards inland but this narrow strip of land and water was an extremely valuable resource for both public and private outdoor recreation. Gilbert also examined this same section of shoreline in 1986 for potential, commercial marina sites. He concluded that of the 60 miles of shoreline studied, there were only 10 feasible development sites and all but one of these would result in serious environmental impacts during construction. He concluded that "...it becomes intuitively clear that the few remaining potential marina sites should be given careful consideration in the Lake Champlain planning process. If these sites are lost to alternative uses, additional marina development on Lake Champlain will require extraordinary effort and high social costs". Even though Lake Champlain is listed in the 1989 World Almanac as the 7th largest natural freshwater lake in the continental United States and has a 587-mile shoreline, (Table 1), existing and potential recreation access to its shoreline is limited (Vermont Agency of Natural Resources 1990).

The objective of this study was to assess existing and potential public recreation access to a section of Lake Champlain's shoreline. The segment studied included the contiguous shorelines of four Vermont towns located in Chittenden County (See footnote, Table 2). This segment was chosen for assessment because it was located along the shoreline of the only major metropolitan region in the Champlain basin where public demand for lake access is known to be the highest (State of Vermont 1988).

Table 1. Lake Champlain size statistics.

Statistic	Measurement	
	(Miles)	(Percent)
Shoreline length	587	100
Vermont	381	65
New York	182	31
Quebec	23	4
Length	109	
Maximum width	11	
Area	495 sq.mi.	

Source: Lake Champlain Basin Study 1978.

Method

A 60 mile long, 2000-foot-wide² segment of Vermont's Lake Champlain shoreline (Fig. 1) was studied using remote sensing techniques. Land uses were identified on 1981 black and white, 1"=1000' scale aerial photographs. The photographs were annotated with land use symbols and the resulting classifications field verified. Land use data were transferred onto 1:5000 orthophoto base maps, digitized and processed using Arc Info³ geographic information software. The data files produced study zone maps, land use acreages and the shoreline composition figures shown in Table 2.

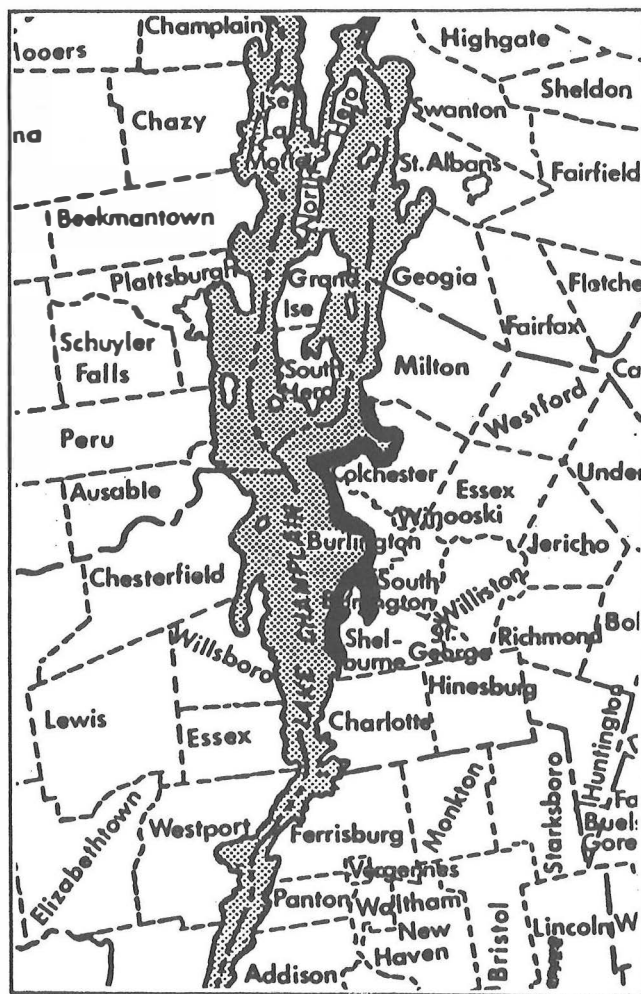


Figure 1. Study shoreline.

1/ The portion of Lake Champlain studied included the shorelines of Colchester, Burlington, South Burlington and Shelburne, Vermont.

2/ Shoreline zoning districts proposed by Vermont's Department of Environmental Conservation call for shore land districts to be between 500 and 1000 feet wide.

3/ Arc Info software, ESRI, Inc., Redlands, California.

Table 2. Per capita park and recreation space standard comparisons in the study zone.

Study Zone Town	Population (1990)	Recreation Acreage in Study Zone (Acres)	NRPA Space Standard (50 ac./ 1000 pop).	Comparison to Standard (%)
Burlington	37130	183	1850	10
Colchester	14731	91	735	12
Shelburne	5871	996	290	334 ^a
S. Burlington	12240	108	610	18

^a Shelburne's abnormally high percentage of park and recreation space is due to the inclusion of a long segment of private estate shoreline that is partially accessible to the public and the town's relatively small population.

Existing Public Access

Most land uses, in the shoreline zone studied, precluded public recreation access except for the obvious public parks, beaches and a few public fishing access points. Public park and recreation acreage comprised 10 percent of all the land uses mapped. That figure when compared to national park and recreation space standards (NRPA 1983) was, on the average, 65 percent below national guidelines recommended for recreation lands serving regional populations. Individual shoreline towns varied from 90 percent below to 234 percent above standard. Three of the four town shorelines studied were significantly below national park and recreation space standards while the fourth was found to be well above NRPA guidelines (Table 2).

Potential Public Access

Potential public recreation access was determined by discounting land use acreages that precluded recreation and shore frontages that presented natural barriers to public recreation access.⁴ Permanent and seasonal housing represented over half (54%) of land uses in the shoreline study zone. Under Vermont private land and public waters statutes, private property boundaries extend to Lake Champlain's mean low water line thus prohibiting public access to recreation resources above that point. Industrial and commercial shoreline uses, including private marinas, consume 9 percent of the shore also excluding public access to the Lake in those locations. Agricultural lands are a noticeable component of the shoreline (6 percent) and represent privately owned open space that could possibly be converted to public recreation access and use. Marinas (1%) provide valuable boating access to thousands of customers but the demand for commercial boat mooring space is high which places cost constraints on most potential users (Gilbert 1986). Commercial marinas, therefore, are not usually considered as public recreation access facilities to the Lake.

Finally, the land use classification "Forest", which comprised 14 percent of the study zone, was more difficult to assess for its public recreation access potential. Even though the land, in this category, was tree covered and free from development, it was mostly privately owned and located predominately on steep soils and rock outcrops perched high above the study shoreline. Even though some of it would provide quality scenic views of Lake Champlain, direct access to the water was severely limited primarily due to the nature of its topography (Table 3).

⁴ Physical barriers to recreation access were defined as wetland edges and rock bluffs and ledges over six feet in height.

Table 3. Land use in the study zone.^a

Use	Frontage (ft)	%	Acres	%
Residential	103,923	40	2,126	42
Forest	39,416	14	819	16
Vacation Homes	32,531	13	357	7
Parks	28,315	10	486	10
Wetlands	20,596	8	439	9
Agricultural	14,707	6	310	6
Industrial	9,599	4	201	4
Commercial	9,261	4	191	4
Marinas	4,146	1	56	1
Totals	262,494	100	4,985	100

^a The study zone is defined as a 2000' wide and 60 mile long strip of land and water extending along the Lake Champlain shoreline located in the towns of Colchester, Burlington, South Burlington and Shelburne, Vermont.

Conclusion

Not unlike other Vermont land, the section of the shoreline studied is 90 percent privately owned. As a result, public access to this major water body is restricted by private property rights. While some municipal governments have done a reasonable job in meeting national public access standards, others have had economic and political problems providing public access to the Lake. While the State of Vermont has protected wetlands, provided public fishing access sites and has assisted local governments attempting to protect Lake Champlain's shoreline, the effort to provide additional public access remains a difficult and expensive one. Even with what seems to be prohibitive barriers to creating additional public access, the limited remaining opportunities should be secured in the public interest. As time advances, increasing pressure for private development of the shoreline will intensify thus raising public acquisition costs and eventually eroding the public interest.

Some limited land uses like agriculture and forest hold potential for public recreation access to the Lake although physical barriers are common in these land use types. Shoreline reclamation and renewal programs could present other opportunities but private land values and reclamation costs are all but prohibitive. Lake Champlain's long shoreline and its vast surface acreage are deceptive indicators of its public recreation availability. While its waters are public its shoreline is predominately private thereby creating a public access dilemma. The only way this dilemma can be solved is by taking every opportunity to create and protect public access to Vermont's most important outdoor recreation resource, Lake Champlain.

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PUBLIC ACCESS TO PRIVATE LAND FOR HUNTING IN NEW YORK: 1991

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We surveyed a sample of private landowners to measure incidence of land posting and compare posting and non-posting landowners. In 1991, 63% of private owners posted (up 13% since 1980). Public access restriction was associated with perceived personal safety risks, personal liability for hunting accidents, and desire for exclusive recreational use of one's property.

Introduction

Wildlife management agencies across the U.S. have long recognized the critical role that private landowners play in both wildlife conservation and provision of hunting access (Berryman 1981, Wright et al. 1988a, Jahn 1989, Wright 1989). Many agency administrators have come to regard hunter access to private lands as a subject of major concern (Wright and Kaiser 1986). Wildlife management agencies must understand landowner decisions about public access in order to predict or influence the total availability of hunting opportunity. The New York State Department of Environmental Conservation (DEC) has demonstrated its concern about access problems through support for periodic monitoring of landowner attitudes toward hunting, landowner-recreationist conflicts, and access to private lands for hunting. Between 1962 and 1980, DEC sponsored 3 access-related studies in New York (Waldbauer 1966, Brown and Thompson 1976, Brown et al. 1983). In 1991, DEC contracted with Cornell's Human Dimensions Research Unit (HDRU) to provide a 1991 update on landowner access policies.

The purpose of the 1991 private landowner study was to provide current indices of hunting access on private lands and to further refine understanding about the determinants of landowner access decisions. In this manuscript, we report findings from the 1991 private landowner survey and compare 1991 findings to those obtained in previous studies of access to private lands in New York.

We express our appreciation to the New York State landowners who participated in this study. We gratefully acknowledge Wayne Jones, Kathy O'Brien, Gary Parsons, and Pat Vissering (Division of Fish and Wildlife, DEC) for their contributions to instrument review. This project was funded by New York State through Federal Aid in Wildlife Restoration Project W-146-R.

Methods

The target population for this study was private, non-industrial owners of 10 or more acres of rural land in upstate New York. Rural land was defined as land in townships having a density less than 150 people per square mile. The land area and population of incorporated villages were subtracted from township figures in calculating population densities. Upstate New York was defined as all of the state except the New York City Standard Metropolitan Area (i.e., New York City, and Nassau, Putnam, Rockland, Suffolk, and Westchester Counties).

DEC partitions New York State into 9 administrative regions (Siemer and Brown 1993). For purposes of program planning and implementation, it also divides the state into 26 wildlife management units (WMU's), based on similarities in biotic, physical, and land use patterns. To ensure obtaining a sample that was representative of upstate New York, we stratified our sample by DEC region and aggregated WMU's. We grouped landowners into the 7 upstate DEC regions and 11 aggregated WMU's (Siemer and Brown 1993) to provide regional information within the limits of our sample size.

We identified a landowner sample using a two-stage cluster sampling approach (Scheaffer et al. 1979:201). New York State townships served as sampling clusters; individual landowners represented elements within each cluster. We randomly selected 37 eligible townships in 30 counties (4-8 townships were sampled in each DEC administrative region). With one exception, 50 landowners were randomly chosen from each township using county tax assessment rolls. Only owners of 10 acres or more with land-use classification of residential, agricultural, forest, or vacant lands were considered eligible. Owners of commercial, municipal, industrial, recreation and entertainment, and public service lands were excluded. The number of eligible owners in the 37 sample townships ranged from 46 to 706, with a mean of 273. This resulted in sampling rates per township ranging from 7 to 100%, with a mean of 18%.

Data were collected through the use of a 10-page self-administered mail-back questionnaire containing 143 variables. Items were developed to address 4 topic areas: (1) posting behavior, (2) personal access policies, (3) determinants of access decisions, and (4) landowner behavior and attitudes related to provision of fee access opportunities to hunters. In each topic area items were designed to provide information comparable to that obtained from 1980 landowners by Brown et al. (1983). Items were also developed to explore the 3 categories of access decision determinants (i.e., landowner attributes, user behavior, and resource attributes) proposed by Wright et al. (1988a). The survey was implemented in the fall of 1992, using the four mailing approach suggested by Dillman (1978). An original sample of 1,846 landowners resulted in 79 undeliverable questionnaires and 25 contacts with ineligible landowners. An adjusted sample of 1,742 yielded 1,056 usable returns (61% response). Follow-up telephone interviews were conducted with 100 nonrespondents to estimate nonresponse bias on key items.

Landowners who reported that the property specified in their questionnaire had been posted during the 1991-92 hunting license year (October 1, 1991 - September 30, 1992) were defined as posting landowners. Data on access policies were weighted to adjust for variability in landowner sampling rates by town (Siemer and Brown 1993). Nonresponse data was used to provide adjusted estimates of the proportion of posting landowners, the proportion of landowners who allowed access to friends and neighbors or strangers, and the proportion of posting landowners who posted due to hunter-related problems. Chi-square and Student's *t* statistics were used to test for differences between landowner subgroups. Statistical differences were measured at the $P < 0.05$ level. Findings pertaining to individual WMU's are reported elsewhere (Siemer and Brown 1993).

Results

Incidence of Posting

Of 1,033 responding landowners, 65% posted some part of their property in 1991. This yielded a 63% statewide posting rate after the data were weighted and adjusted for nonresponse. Posting landowners held title to 71% of the land in the sample and posted 86% of their total acreage. Thus, 61% of the private acreage in the sample was posted. In every region more than half of all landowners posted. More than 70% of landowners posted in heavily populated southeastern New York (i.e., DEC

Regions 3 and 4). Posting was lowest (<60%) in more sparsely populated areas of northern New York (i.e., Regions 5 and 6).

The proportion of posting landowners increased between 1980 and 1991 at an annual average rate of 1.2%. The proportion of posting landowners increased 5-30% by region and 13% statewide (Table 1). The average annual rate of increase in posting rose 60% over the last measurement period (i.e., for 1972 to 1980 the average annual increase was 0.75% [Brown et al. 1983]). The rate of increase in posting slowed somewhat during the 1970's, but accelerated during the 1980's.

Table 1. Change in the percentage of landowners who posted in 1980 and 1991, according to New York State Department of Environmental Conservation administrative region.^a

Region	Posting Landowners		Percent Change	
	1980	1991	Absolute	Proportional ^b
3	---	73	---	---
4	53	72	19	36
5	28	58	30	107
6	51	56	5	2
7	47	66	19	40
8	55	69	14	25
9	43	58	15	35
Statewide	48	63	15	31

^aData for 1980 from Brown et al. (1983).

^bRepresents: absolute change ÷ 1980 value x 100.

^cSample size too small in 1980 study to allow comparison.

^dData for Region 3 included in computing statewide figures.

Hunting on Private Land

Some hunting occurred on the majority of private lands during the 1991-92 hunting license year. In 1991, about 75% of posting landowners (after adjustment for nonresponse) allowed friends and neighbors to hunt. There was no difference in the proportion of posted and unposted lands closed to all hunting ($X^2 = 0.517$, 1 df, $P > 0.97$).

The proportion of landowners who allow strangers to hunt on their land provides one index of access availability across the state. Statewide, about 22% of respondents (35% of all landowners after adjustment for nonresponse) said they would allow strangers to hunt on their lands. Public access was most available to strangers who asked permission in northern and western New York (Regions 6 and 9). Access was least available to strangers who asked permission to hunt in southeastern New York and the Adirondacks (i.e., Regions 3, 4, and 5).

Reasons for Posting

We replicated an effort by Brown and Thompson (1976) to estimate the influence that interactions with recreationists had on landowners' decisions to post. Each landowner was asked if particular experiences or concerns about hunters, anglers, snowmobilers, or "other" recreationists caused them to post. Of these recreationist groups, hunters were most likely to have influenced posting decisions.

A majority of landowners (69% after adjustment for nonresponse) had posted, at least in part, because they felt unsafe when hunters used their land and because they wanted to control access by hunters. Nearly half of all posting landowners (47% after nonresponse adjustment) noted that a previous bad experience with hunters contributed to their decision to post. About 18% (after nonresponse adjustment) posted because a friend or neighbor had experienced a negative interaction with a hunter.

A desire to control land use by snowmobilers also contributed to posting by some landowners. About 1 in 5 landowners posted due to a bad personal experience with snowmobilers and

concerns about associated risks to the landowners' personal safety or property. About 1 in 5 landowners also posted due to bad experiences with recreationists other than hunters, snowmobilers, or anglers. Past problems with anglers were relatively uncommon (64% of all respondents reported no use of their land for fishing).

Fifty-one percent of all posting landowners ($n=346$) reported "other" reasons for posting. Their responses covered a range of concerns, which we placed in 67 categories. Most concerns could be aggregated into a few broad topic areas: problems with hunters/hunting (27%); liability (16%); property damage (14%); exclusive use of the land (14%); control of access (8%); landowner privacy (7%); and protection of wildlife (6%).

Reasons Why Land Was Left Unposted

We asked nonposting landowners why they left their lands unposted in 1992. Responses were as follows: "people who use the land have always been cooperative and careful not to damage the property" (45%); "I appreciated using other private lands for recreation, and therefore feel I should not post my lands" (33%); "no one has ever asked to use this land for recreation" (33%); "there is nothing on this property that anyone could damage" (14%); "I am cooperating with state efforts to keep lands open for hunting and fishing" (13%); or "other reasons" (20%). The only "other" reasons cited by more than 4% of respondents were: posting takes too much time and effort (19%); posting is ineffective (14%); and posting is too expensive (5%).

About 1 landowner in 8 (12%) had posted at some time in the past, but did not post in 1991-92. Most (60%) of these landowners had stopped posting because they perceived it as ineffective in controlling access. Seventeen percent had stopped posting because recreationist demand to use their land had decreased. One in three cited other reasons for posting discontinuation, the most frequent being: posted signs were stolen (21%); posting was ineffective (10%); posting took too much time and effort (7%); posting was too expensive (7%); the landowner wanted to encourage higher deer harvest (7%); and the landowner was physically unable to post the land (7%).

Comparison of Posting and Nonposting Landowners

Posting and nonposting landowners were compared with regard to both their property characteristics and their own attitudinal, socio-economic, demographic, and recreational characteristics in order to better understand determinants of posting and access restriction.

Property characteristics. The percentage of open land, brushland, woodland, and wetland was similar on posted and unposted lands. Posting landowners were no more likely to use their land for production of agriculture ($X^2 = 0.64$, 1 df, $P > 0.97$) or forest products ($X^2 = 0.97$, 1 df, $P > 0.97$). However, posting landowners were more likely to own large parcels (122 acres vs. 96 acres; $t = -2.51$, 1012 df, $P = 0.012$). The ratio of the mean acreage held by posting and nonposting landowners was greatest for Regions 3, 6, and 7, and lowest for Region 4. On average, posting landowners also reported more hunting access requests (4.1 requests vs. 2.3 requests; $t = -2.51$, 1012 df, $P = 0.012$) and more incidents of hunting-related trespass (4.2 incidents vs. 2.7 incidents; $t = -2.51$, 1012 df, $P = 0.012$).

Landowner attitudes. Most landowners (84%) agreed that hunting was appropriate if done lawfully and with respect for landowners' rights. Over 50% also believed most hunters are responsible people. However, posting landowners differed from nonposting landowners with respect to several attitudes and perceptions related to hunters, hunting, and liability. Posting landowners were more likely to disagree that hunting is appropriate ($X^2 = 5.94$, 2 df, $P = 0.051$) or that hunters are responsible people ($X^2 = 18.39$, 2 df, $P < 0.001$). Posting landowners also were more likely to perceive that posting was necessary to control access ($X^2 = 214.57$, 2 df, $P < 0.001$).

Finally, posting landowners were less aware of (or more skeptical of) laws that limit landowner liability to recreationists and permit legal public access to private lands that are not surrounded by a substantial fence ($X^2 = 22.65$, 2 df, $P < 0.001$). Perhaps related to these perceptions, posting landowners were more likely to perceive a high potential for personal liability if a hunter was injured on their land ($X^2 = 41.6$, 2 df, $P < 0.001$).

Landowner recreation. For 9 out of 10 outdoor recreation activities explored, posting landowners were more likely to have a participating adult family member. This finding is consistent with the fact that 65% of posting landowners maintained exclusive hunting access for family and neighbors, and that posting landowners were more likely to report such exclusive use of their land for hunting ($X^2 = 60.62$, 1 df, $P < 0.001$).

Landowner socio-economic characteristics. Posting landowners were more likely to have grown up in a suburban or urban area ($X^2 = 18.84$, 4 df, $P < 0.001$). However, no differences were found between posting and nonposting landowners with respect to age ($X^2 = 7.33$, 5 df, $P = 0.19$), gender ($X^2 = 0.30$, 1 df, $P = 0.57$), education ($X^2 = 8.37$, 5 df, $P = 0.13$), or income ($X^2 = 2.93$, 7 df, $P = 0.89$).

Absentee ownership (i.e., ownership by persons living outside the county in which their rural property was located) was 12% higher statewide in 1991 than in 1980. Absentee ownership was least common in western New York (Regions 8-9). The percentage of resident and absentee landowners who posted differed by region, but we found no pattern of posting rate and residency status across regions. The statewide rate of posting was not different between resident and absentee landowners ($X^2 = 0.169$, 1 df, $P = 0.68$). On the other hand, access policies were different between resident and absentee owners ($X^2 = 14.19$, 3 df, $P = 0.002$). Absentee owners were less likely to permit access to strangers. Moreover, the regions with the highest rate of absentee land ownership (i.e., Regions 3 and 4) also were the regions where landowners were least likely to grant hunting access to strangers.

Conclusions and Implications

This study shows that the proportion of private landowners who posted their land continued to climb between 1980 and 1991. Over 60% of all private lands in upstate New York are now posted. Posting continues to be most pervasive in the heavily populated areas of southeastern New York and least common in the sparsely populated border areas of northwestern and northeastern New York. Increasingly, private landowners are posting their lands to control access by hunters, avoid perceived liability, protect their personal safety, and provide exclusive recreational privileges to family and friends. Statewide, nearly a quarter of all private lands are essentially closed to hunting and an additional 56% are maintained for the exclusive use of relatively few people. In some regions, hunters seeking access are likely to be turned away by 9 out of 10 private landowners.

These data hold important implications for both wildlife managers and hunters. The fact that we documented some determinants of access restriction that were recognized more than 50 years ago (Leopold 1991), shows both the persistence of access-related problems and the limited progress hunters and natural resource managers have made toward resolving those problems.

(1) The majority of landowners believed hunting was appropriate, that most hunters were responsible people, and that hunting was necessary to keep deer populations from growing too large. Yet, previous experience with hunters led many to become apprehensive about allowing hunter access in

the future. Posting landowners perceive hunters as a threat to personal safety, recreation, and property. A strong relationship between access restriction and concerns about hunter-related problems has emerged consistently in studies of hunter-access in New York (Waldbauer 1966; Brown and Thompson 1976; Brown et al. 1983, 1984) and elsewhere (Kelley 1981, Kirby et al. 1981, Guynn and Schmidt 1984, Wright et al. 1988b). As a key determinant of access restriction, hunter behavior should be accorded more attention by both hunters and natural resource managers. Hunter behavior that is consistently legal, ethical, and respectful of landowners is essential if hunters and natural resource agencies hope to stem the increasing restriction of public hunting access. Natural resource managers may be able to address this need through expanded or revised hunter education opportunities. Hunters must also take collective and individual actions to address landowner concerns about hunter behavior.

(2) This study indicated that posting landowners are unaware of, or lack confidence in, the New York State laws that exist to protect them from legal action by recreationists. While the actual risk of litigation by an injured hunter is very low, landowners appear to perceive that allowing hunting access is likely to expose them to a costly and disruptive lawsuit. These concerns have persisted despite legislation that affords substantial protection to private landowners who allow public access for recreation. For the majority of private landowners, financial remuneration alone is not sufficient to override interests in personal and family safety, property, and recreational pursuits. Thus, any effort to increase public access to private lands should include a package of landowner incentives that are both monetary and nonmonetary (e.g., landowner services, tax incentives, increased hunter education, etc.).

(3) Past landowner studies have produced recommendations for efforts to inform landowners of the positive values of hunting and the need for public access to private land to control wildlife populations. Our findings that over 80% of posting landowners approved of hunting, and over 50% believed hunting was necessary to control deer populations call into question the need to convince landowners that hunting is appropriate and necessary to control particular wildlife species (i.e., white-tailed deer). More importantly, persuading landowners of the value of hunting may do little to convince them that they are in any way obligated to provide the public with recreational opportunities, even at risk to their own financial and personal interests.

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SOCIAL PSYCHOLOGY

EFFECTS OF SEASONALITY AND TIME OF WEEK ON HIKER MOTIVATIONS AND SATISFACTIONS IN THE HIGH PEAKS WILDERNESS AREA

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A study of wilderness hikers was conducted to evaluate the effects of season and time of week on visitor motivations and degree of satisfaction with their experience while hiking in the High Peaks Wilderness Area of the Adirondack Forest Preserve in New York. A questionnaire mailed to 653 wilderness users measured ideal, expected, and actual conditions, and level of satisfaction with the wilderness experience based on 9 sociological indicators. Results of the study indicate that, while there are some statistical significance temporal differences between the indicators measured, there does not appear to be a manageable difference between the temporal distribution of users in the High Peaks Wilderness Area.

Introduction

The 196,685 acre High Peaks Wilderness Area (HPWA), largest of the Adirondack Forest Preserve Wilderness Units, encompasses parts of Essex, Franklin, and Harrison Counties in northern New York. The topography ranges from low lying swampland to high alpine summits. This wilderness area includes Mt. Marcy (5344 ft. elev.) and some of the most rugged terrain in the eastern United States (New York State, 1989) and as such attracts a large and diverse user group.

Existing unit management plans of Forest Preserve Wilderness Areas suggest that there is little information available regarding sociological aspects of recreational users in the Forest Preserve in New York State (New York State, 1985; New York State, 1987a; New York State, 1987b). Virtually all wilderness management plans on Forest Preserve lands have focused on either the biological or physical impacts of recreation. Similarly, there have been very few sociological studies of eastern wilderness area users. Hendee et al. (1990) discusses, at great length, the necessity of incorporating the sociological aspects of recreational use in planning for wilderness management.

The proximity of the six million acre Forest Preserve to large metropolitan areas allows access for a very diverse range of users. The HPWA lies within a single days travel of 70 million people. The unique character of the HPWA attracted over 110,000 users in 1991; many of whom may be seeking an experience that could better be provided in an equally scenic but less primitive Recreation Opportunity Spectrum (ROS) class area (e.g., non-wilderness).

Few studies of users in Adirondack wilderness areas exist (ORRRC, 1962; Snowden, 1976). The proximity to large urban populations suggests that user motivations to visit and expectations for wilderness areas may be significantly different from their more remote western United States counterparts. This study explores the satisfaction of users as

measured by several sociological indicators, based on the season and time when the visit to the HPWA occurred.

One goal of wilderness management is to manage the resource to promote wilderness dependent activities (Hendee et al., 1990). Solitude and undisturbed environment are two important traits commonly attributed to wilderness (Hendee et al., 1990; Public Law 88-577; Nash, 1967). As one extreme in the ROS, wilderness areas are managed for uses that require these wilderness dependent characteristics. User activities that can achieve user satisfaction in a more intensively managed or modified environment (e.g., a wild forest in the Adirondack Forest Preserve) should be directed to use these areas.

The crowding model advanced by Manning (1986) suggests that perceived crowding is affected by contacts between users as well as various situational variables. Contacts are evaluated in the context of the characteristics of the individual and the parties contacted. The level to which these contacts were perceived as favorable, or unfavorable, is based on many variables including weather, quality of the resource, and others.

Various theories have been advanced to describe behavior change to maintain satisfaction when crowding has occurred. Users may change their behavior by altering the length of time or time periods during which they visit the area. Examples of this behavior could be taking longer trips to get into more remote parts of the wilderness area, or altering the time of year in which they visit the area. In both these instances, the user has changed his/her visit temporally based on personal beliefs about when and where the conditions of the wilderness will provide a more satisfying experience. An example of this displacement behavior is evidenced by the users choosing other areas. Users who can not mitigate their dissatisfaction by temporal modification of their visits will find other areas which will better suit their needs.

The motivations of recreationists who visit the HPWA are based, in part, on the social benefits that are derived from the outdoor experience. Snowden (1976) observed that satisfaction of winter users of the HPWA could be measured by the congruence of pre-trip expectations and on-site experiences. This paper applies this theory to "warm season" users of the HPWA. Use of the HPWA during the months of May through October fluctuates greatly based on season and time of week. The premise of this study was that HPWA users were temporally self-selecting in response to their expected level of various sociological conditions in the HPWA.

Ideally a wilderness area, such as the HPWA, will be self-selecting for user groups over time. Experience in the area should allow the user the ability to select his/her time of visit based on the sociological conditions present in the area. If Snowden's (1976) thesis is accurate during higher use periods, users who return to an area would expect a given set of conditions to exist, and then would be satisfied if the expected level of these conditions were met. Users who visit during the summer or on weekends would expect to experience a higher level of congestion based on more users being in the HPWA during these times than would be experienced during the spring or during the week. User displacement theory (Manning, 1986) suggests that if an area was self regulating, then users requiring more solitude during their wilderness experience would be expected to visit the area during periods when use is low; whereas, users seeking a less solitary experience would be expected to visit the area during heavier use days.

Hikers may anticipate differing levels of sociological conditions based on the time (weekday versus weekend), and season (spring, summer, or fall) of their visit. If user satisfaction can be estimated by congruency of pre-trip expectations and on-site experiences, managers may be able to better direct users to areas that could provide a more satisfying experience for the individual recreationist. By knowing the

expectations of potential users and the attributes and opportunities of the unit, management techniques may be used to redirect some use to other ROS areas that will better meet the users' sociological expectations and potentially reduce the degradation to areas located in fragile ecosystems or those currently receiving an excess of users, such as the HPWA. Trailhead registrations in the HPWA prior to the study indicated that use levels were quite variable both by season and by time of the week. User density was considered to be higher: (1) during the summer season (June 15th through September 7th), than during the Spring or Fall, and (2) during the weekend (Friday through Sunday) rather than during the week.

Methods

The study area consisted of the eastern half of the High Peaks Wilderness Area. This zone, bordered on the west by the Indian Pass trail, receives the majority of use in the HPWA. Due to the few trails and difficulty of access to the western area, it was excluded from this study. Sampling of users occurred at the three major trailheads (Adirondack Loj, The Garden, and Upper Works) of the eight trailheads in the eastern HPWA. These three trailheads receive over 80% of the present use in the HPWA (New York State, 1992). Sites were systematically selected so that two out of the three sites were sampled every six days throughout the three sampling periods of spring, summer, and fall from May 15th through October 7th, 1992.

Each sampling day consisted of two four-hour sessions. Hikers were interviewed at trailheads where data was collected regarding type of trip, length of stay, trailhead registration compliance, and home address. A questionnaire was mailed to each individual, with the target delivery date of one week from interview date. The questionnaire collected data on their trip in the context of the following sociological indicators:

1. the beauty of the mountains and forests;
2. amount of undisturbed nature in the area;
3. level of solitude, getting away from others;
4. challenge and adventure;
5. number of other parties encountered on trails;
6. number of other parties encountered at overlooks;
7. number of other parties encountered on summits;
8. number of other parties encountered at campsites; and
9. litter and garbage.

The respondents were asked to describe their ideal wilderness setting, the level expected to be observed during this trip, the actual level experienced, and the level of satisfaction for each of these indicators on a 5-point Likert type scale. Data was collected regarding experience in hiking and camping, experience in wilderness and primitive areas, and respondent reaction to a series of potential future management restrictions.

The three trailheads were sampled on 25 days over the 150-day survey period. Interviews were conducted with and questionnaires were mailed to 643 individuals. The initial mailing and two follow-up reminders resulted in a response rate of 76%.

Hiker Characteristics

Survey respondents represented 20 states in the United States and 2 foreign countries. Approximately half of respondents were New York residents (Figure 1). The other 19 states accounted for 32% of the respondents, with 15% from New England states, and 11% from Mid-Atlantic states other than New York. Canadian residents represented 17% of respondents, mostly from the provinces of Ontario and Quebec. Approximately 0.5% were from foreign countries other than Canada.

A majority of respondents (62%) were interviewed during a summer trip to the HPWA, with 16% interviewed during a spring trip and 22% in the fall. The typical hiking party averaged 3.6 people, but ranged in size from 1 to 19. These

groups spent an average of 2.4 days in the HPWA, ranging from 1 to 12 days. Males accounted for 74% of the total respondents. Individuals who complied with voluntary trailhead registration accounted for 89% of the respondents (measured by direct observation).

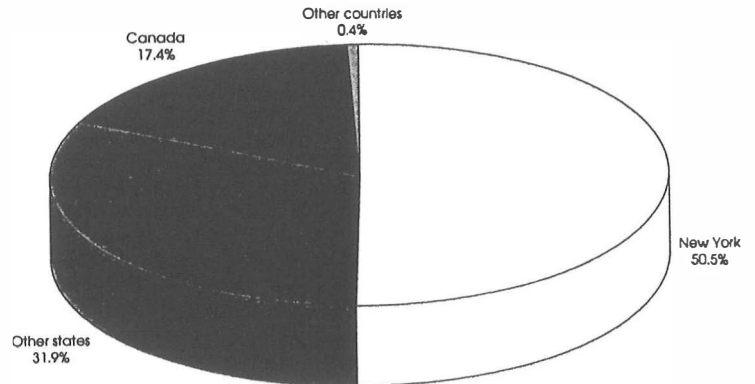


Figure 1. Residence of Respondents, HPWA, 1992.

The type of activity that hikers and campers took part in tend to become of a more primitive and independent nature over time, based on their experience camping or hiking (Table 1). Respondents tend to have nearly equal general camping and hiking experience, but tend to have more experience hiking in primitive/wilderness areas or the HPWA than camping in these areas. In both hiking and camping, respondents had more experience in the activity in general than experience in the activity in a wilderness/primitive environment. These findings suggest that as a hiker/camper's experience increases, they may tend to seek out more independent or dispersed activities.

Table 1. Experience of respondents, HPWA, 1992.

Type of Experience	Experience (Years)	Range (Years)
Hiking - general	14.7	0 -- 60
Camping - general	15.0	0 -- 60
Hiking - wilderness / primitive areas	11.3	0 -- 50
Camping - wilderness / primitive areas	9.8	0 -- 50
Hiking - HPWA	6.3	0 -- 50
Camping - HPWA	4.8	0 -- 40

Sociological Characteristics

The summer season was considered to be the highest use period in the HPWA. During this period as many as several hundred hikers may pass through a trailhead during a given day. This is contrasted with the spring and fall periods where use levels were measured at 0 to 3 persons using the trailhead per day. Use of the area during these times is discouraged by environmental and other factors, such as weather, trail

conditions and an abundance of biting flies. A Chi-square analysis (Table 2) of variation of the sociological variables measured indicated that there was a statistically significant difference between season or day for some variables. In only one variable, the actual level of other parties encountered on trails, did both season and day of week indicate a statistical difference at the $p < 0.10$ significance level. Several other variables had a statistically significant ($p < 0.10$) difference in either season or day of week, but not both. A review of the Chi-square statistics (Table 2) suggests that although a statistical significance was evident in some instances, no trends could be established that would indicate manageable

sub-populations based on either the season or day of week that individuals visited the HPWA. For example, although the actual level of the variable 'others encountered on trails' was statistically significant across both season ($p = 0.02$) and day of week ($p = 0.04$), there was not a observable trend that would suggest that users during spring or fall experienced a lower level of encounters than their summer counterparts. Similarly, weekend users did not indicate more encounters than their weekday counterparts. Since no temporal trends could be established by either day of week or season, the variables have been treated as homogenous groups within the context of this study.

Table 2. Statistically Significant sociological indicators by season and time of the week visited (Chi-square, $p < 0.10$), HPWA, 1992.

Sociological Condition	Ideal Wilderness		Expected in HPWA		Actual in HPWA		Satisfaction	
	Season	Day	Season	Day	Season	Day	Season	Day
Natural beauty ^a	--	--	--	--	--	--	--	--
Others on trails ^a	--	--	--	--	0.020	0.040	0.060	--
Others at overlooks ^a	--	--	--	--	--	--	0.022	--
Others at summits ^a	--	--	--	0.067	--	0.092	0.003	--
Others at campsites ^a	--	--	0.020	--	--	0.007	--	0.029
Get away / solitude ^a	--	0.039	--	--	--	--	--	--
Garbage ^b	0.097	--	--	--	--	0.017	--	--
Nature ^a	--	0.020	0.005	--	0.020	--	--	--
Challenge ^c	--	0.009	--	--	--	0.096	--	0.093

a: d.f. = 8 $\chi^2 = 13.36$

b: d.f. = 2 $\chi^2 = 4.61$

c: d.f. = 6 $\chi^2 = 10.64$

The sociological conditions measured were sub-divided into two groups, positive and negative attributes, determined by whether an increase in the variable would increase (positive attribute) or decrease (negative attribute) the quality of the wilderness experience. Respondents reported lower levels of all positive attributes were expected during their trips to the HPWA than would be found in an ideal wilderness setting (Table 3). The respondents accurately reported the level of natural beauty and the challenge that the area offered. The levels of undisturbed nature and solitude were slightly over

estimated by respondents. The level of satisfaction for each condition varied in proportion to variation in the expected and actual levels of positive attributes. Respondents reported higher levels of all negative attributes were expected and experienced than would be found in an ideal wilderness setting (Table 3). Expected and actual levels of sociological conditions were similar for all negative attributes except that slightly more other groups were encountered on trails and at overlooks than were expected.

Table 3. Level of sociological conditions in ideal wilderness, expected in HPWA, actually experienced, and level of satisfaction (mean Likert scores), HPWA, 1992.

Sociological Condition	Ideal Wilderness ^a	Expected in HPWA ^a	Actually Experienced ^a	Level of Satisfaction ^b
Positive Attributes				
Natural Beauty	3.88	3.75	3.71	1.76
Challenge	3.21	3.06	3.03	1.41
Undisturbed Nature	3.29	2.70	2.52	0.88
Solitude	3.14	2.48	2.24	0.59
Negative Attributes				
Others - summits	1.52	2.33	2.32	0.32
Others - campsites	1.56	2.31	2.43	0.09
Others - trails	1.55	2.29	2.46	0.38
Others - overlooks	1.15	2.23	2.11	0.48
Garbage	0.10	1.18	1.19	0.81

Likert scales:

a: 0 to 4, where 0 = "none" and 4 = "very much".

b: Satisfaction -2 to +2, where -2 = "very dissatisfied" and +2 = "very satisfied".

Differences in levels of ideal, expected and actually experienced conditions were analyzed for each of the sociological conditions (Table 4). A disparity index value was determined for each variable by subtracting the Likert value for the actual level of each sociological condition from the ideal level (Table 4, Column 2) and expected level (Table 4, Column 3). Distribution of ideal and expected disparity indices for positive conditions were similar. Disparity indices for all

positive attributes were positive, indicating that the actual levels of attributes was less than the level expected and the level occurring in an ideal wilderness area. Satisfaction levels were positive despite a disparity between expectations and actual levels, although satisfaction did increase as disparity decreased.

Table 4. Level of disparity between ideal, expected and actual conditions and level of satisfaction (mean Likert scores), HPWA, 1992.

Sociological Condition	DISPARITY INDEX		Level of Satisfaction
	Ideal vs. Actual ^a	Expected vs. Actual ^b	
Positive Attributes			
Solitude	0.90	0.24	0.59
Undisturbed Nature	0.76	0.19	0.88
Natural Beauty	0.18	0.04	1.76
Challenge	0.18	0.03	1.41
Negative Attributes			
Others - overlooks	-0.61	0.11	0.48
Others - summits	-0.80	0.01	0.32
Garbage	-0.92	-0.02	0.81
Others - campsites	-0.87	-0.10	0.09
Others - trails	-0.91	-0.17	0.38

a: Disparity Index (DI) = (level of Ideal) - (level of Actual)

b: Disparity Index (DI) = (level of Expected) - (level of Actual)

Respondents slightly over estimated three of the five negative attributes of wilderness: (1) Amount of garbage, (2) Others at campsites, and (3) Others at trails (Table 4). Respondents underestimated the amount of (1) Others at overlooks, and (2) Others at summits. Satisfaction was expected to be inversely related to the Disparity Index (DI) for negative attributes; as DI decreased individuals would experience less of the negative attribute than was expected and a more satisfying experience would result. This relationship was congruent with three of the five negative attributes measured. The two exceptions, 'amount of garbage' and 'number of others on trails' were conditions primarily experienced en route to a destination (campsite or summit) and may not have as great an impact on satisfaction than attributes which primarily occur at destination areas.

In both positive and negative attributes, satisfaction was elastic with respect to DI. Activities were reported to contribute positively to satisfaction despite the observation that a higher or lower level of a condition was experienced than was expected for negative and positive attributes, respectively.

Discussion

The results of this study have implications for wilderness management in the Adirondack Forest Preserve. The sociological conditions that were used as indicators of solitude in the HPWA indicate that "warm season" HPWA users are not self-selecting the times of their visit based on the expected levels of these indicators. Hikers and campers also continue to have an satisfying experience even though the levels of use are greater than expected. The results of this study indicates at least four possible observations why temporal displacement is not evident in the HPWA:

1. Solitude may not be a driving factor in choice of activity. Drury (1990) indicates that existing information available to recreationists tends to concentrate on those areas of the Forest Preserve that are designated wilderness areas. The results of this study indicate that many users may be seeking an activity not dependent on the wilderness setting.
2. Traditional displacement theories may not adequately describe distribution of users in the HPWA. While similar data is non-existent for other units in the Forest Preserve, users seeking an experience with a high degree of solitude may be avoiding the HPWA, in favor of other areas in the Preserve which provide a greater wilderness experience.
3. Present behavior of users may be a result of adaptation to present conditions. Users may rationalize that their experiences are producing satisfaction even though expectations are not being met. Over time users may adapt their definition of wilderness, through rationalization or cognitive dissonance, based on their experiences in the HPWA.

4. The experience that some users are seeking in the HPWA might be better met in another, less primitive ROS class, area. By educating potential users of other areas and opportunities in wild forest areas, managers might redistribute use in a manner that both increases user satisfaction and protects the natural resource from overuse.

Further research is needed on other Forest Preserve units to determine to what degree geographic displacement exists within the Adirondack Park and how managers can best redistribute use in the Forest Preserve to better protect the resource while maintaining user satisfaction and providing a true wilderness experience.

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GENERAL RESPONSIBLE ENVIRONMENTAL BEHAVIOR AMONG BOATERS ON THE CHESAPEAKE BAY

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The purpose of this study was to determine the degree of environmental concern among boater's on the Chesapeake Bay and to investigate the relationship of representative indicators of the three components of McGuire's (1969) attitudinal model to positive environmental action among boaters. The findings show that there is a relationship between the cognitive, represented by perceived knowledge of ecology, the affective, represented by environmental concern, and the conative, represented by verbal commitment, components of an attitude construct with pro-environmental behavior among boaters on the Chesapeake Bay.

Introduction

Since the early to mid-1970's, the concern for the environmental quality of our planet has grown rapidly, thereby generating a tremendous body of research in the environmental and social sciences. "Social and behavioral scientists have been actively involved in developing techniques for measuring environmental concern" (Scott and Willits, 1991, p. 4). Recent research efforts have focused more on the use of multiple-item measures of environmental behavior versus single-items, thereby improving the reliability of those measures and increasing the application of advanced statistical methods (Van Liere & Dunlap, 1981; Graefe et al., 1988).

According to Ajzen & Fishbein (1973), several studies (e.g. Allport, 1935; Campbell, 1963) have focused on attitudes as an explanatory device for a change in human behavior when subjected to external stimuli or control measures in quasi-experimental research. Unfortunately, the premise that a strong relationship exists between attitudes and overt behavior has not been supported in a number of studies (e.g. Berg, 1966; Bray, 1950; Kutner, Wilkins, & Yarrow, 1952) reviewed by Ajzen & Fishbein (1973). Recently, McGuire and Walsh (1992, p. 1) state that, "the results of the research regarding attitudinal relationships have varied and have been inconclusive." Of primary concern has been the question of whether or not attitudes, positively or negatively, influence overt behavior (Manfredo, Yuan, and McGuire, 1992). In support, Manfredo et al. (1992, p. 158) wrote that, "research in the late 1960s and early 1970s showed weak attitude-behavior relationships, and psychologists debated the utility of the attitude concept." Attitudes are multidimensional, consisting of a number of interrelated constructs, i.e., cognitive (knowledge), affective, and conative (intentions) components (McGuire, 1969; Rosenberg & Hovland, 1960). Human behavior is difficult to predict and single constructs such as attitudes cannot accurately forecast behavior (Ajzen & Fishbein, 1973; Heberlein and Black, 1976; Hines, 1985). Nevertheless, Manfredo et al. (1992) argue that improvements

have been made in both theory and methodology that have led to improved predictions of behaviors from attitudes, and a further acceptance of the attitude-causes-behavior relationship. Research efforts, now, are apt to focus more on the question of *when* do attitudes predict behavior rather than questioning *if* attitudes predict behavior.

In review of the multidimensional aspects of the attitude construct (McGuire, 1969; Rosenberg & Hovland, 1960), the cognitive component of this concept consists of the knowledge facet of an attitude. Personal thoughts and ideas also contribute to this entity. The affective component includes those variables that measure feelings and beliefs about certain issues. In support, Fishbein and Ajzen, (1975) claim that an attitude consists of *belief strength*, denoting that objects may have certain attributes and that individuals *generally evaluate* each of these attributes. McGuire (1992, p. 15) states that "a person's attitude toward any object is a function of belief (belief strength) in regard to the object's attributes, as well as a personal evaluation of these attributes." Thus, information about an object influences the formation of a belief about that object which, in turn, is based upon the object's attributes, thereby resulting in the formulation of an attitude about it (McGuire, 1992; Fishbein and Ajzen, 1975; McGuire, 1969). Finally, the conative component "refers to the action or behavioral tendencies of an individual regarding an object" (McGuire, 1992, p. 15).

Recently, an examination of environmental attitudes among college students at the Pennsylvania State University was completed (McGuire, 1992). This study investigated two entities, affective and conative, of an attitudinal construct in order to measure the strength of a third entity, the cognitive component. The findings indicated that environmental concern was a reasonable predictor of environmental behavioral intention and that socio-demographics have relatively little or no influence on environmental attitudes (p. 1). This study builds on McGuire's (1992) investigation by focusing on the examination of all three components of McGuire's (1969) attitudinal model (cognitive, affective, and conative) to measure the relationship of those variables representing each of these components to actual responsible environmental behavior.

Purpose

The purpose of this study was to determine the degree of environmental concern among boaters on the Chesapeake Bay and to investigate the relationship of representative indicators of the three entities of McGuire's (1969) attitude construct to positive environmental action among boaters. Several sociodemographic variables such as income, age, education, and stand on political issues were also tested against environmental concern, verbal commitment, perceived knowledge of ecology, and general responsible environmental behavior among boaters.

Methodology

A mail survey using multiple mailings was sent to a sample of 751 boat owners in Maryland with vessels 22 feet or larger used on the Chesapeake Bay following the 1992 boating season. The sample was stratified and drawn at random from state boat registration records provided by the Maryland Marine Trades Association. With nine refusals and twenty-nine survey returns because of an insufficient address, the total sample was reduced to 713. A total of 291 usable surveys were returned representing a 41 percent response rate. In order to assess nonresponse bias, a phone interview was made to a random sample of nonrespondents (N=30). Of those phone survey respondents who recalled receiving a mail survey last fall (54%; N=19), 63 percent were classified as *nonusers* based on their reason for not completing the survey, i.e., they did not go boating in 1992.

Instrumentation

An eight-page, self-administered, mail-back questionnaire was comprised of several items that have been tested in previous research (Dunlap and Van Liere, 1978; Maloney, Ward, and Braucht, 1975; Price Waterhouse, 1991). The structure and format of the instrument was developed for dissertation research at Pennsylvania State University by the author to test a conceptual framework of responsible environmental behavior (adapted from Hines, Hungerford, & Tomera, 1987; Sivek & Hungerford, 1989/90; Hungerford & Volk, 1990).

The dependent variable, general responsible environmental behavior (GREB), is defined as any individual or group action aimed to do what is environmentally right to help protect the environment (Sivek & Hungerford, 1989/90). A true/false ten-item actual behavior scale, developed by Maloney, Ward and Braucht (1975) was used to measure boater actions towards protecting the environment (Table 1).

Several independent variables, which represent the three components of McGuire's (1969) attitude construct, were used in this examination. First, a true/false ten-item verbal commitment scale, developed by Maloney, Ward and Braucht (1975) was used to measure boaters' willingness to participate in certain environmental protection activities as a measure of the conative component (Table 2). Secondly, environmental concern, a compassionate perspective or concern for the natural environment, was measured by twelve items (i.e., one = "strongly disagree" and five = "strongly agree") devised by Dunlap and Van Liere (1978) (Table 3). Considered to be a multidimensional measure of the affective component, this scale attempts to assess the acceptance of the ideas of the need to preserve the balance of nature, the belief that growth should be limited, and the notion that humans are a part of, rather than the ruler of nature. Thirdly, a one-item statement was used to measure respondent perceived knowledge of ecology (Table 4). This variable, measured on a five-point scale (i.e., to what extent are you knowledgeable) with one being "not at all" and five "to a great extent," represents one measure of the cognitive component.

Treatment of Data

Following a descriptive profile of the respondents, several indices were created to represent each of the variables subject to examination. The dependent variable (GREB) and the verbal commitment scale, each consisting of ten true-false items, were created as the sum of the items divided by ten to compute an overall score. The environmental concern scale was computed as the mean of twelve items to calculate a concern score. Cronbach's alpha was used to check the internal consistency of each index. Although modest, the reliability for both the GREB (Cronbach alpha=.68) and verbal commitment (Cronbach alpha=.63) scales were acceptable and consistent with prior research. For the environmental concern index, the reliability coefficient (.82) was relatively higher than reported in other studies using this scale. The sub-scales of environmental concern had the following alpha coefficients: balance of nature, .72; humans-over-nature, .65; and limits to growth, .62. Finally, each of these variables were entered into a stepwise multiple regression model to determine the strongest predictor of GREB. From the multiple regression procedure, zero order correlations, standardized beta coefficients and a model to graphically illustrate the relationships between the variables are presented.

Analysis and Findings

Tables 1 through 4 show the frequency distribution of each item used to create indices used in the regression analysis. As expected, the mean score for pro-environmental behavior (mean=4.9; Table 1) was lower than the mean for verbal commitment (mean=5.4; Table 2). This finding indicates that boater willingness to participate in pro-environmental activities was greater than their actual behavior. The mean score for level of environmental concern among boaters was

3.9. Boaters' perceived knowledge about ecology was moderate (mean=3.4; Table 4).

Table 1. Frequency of responses to general responsible Environmental behavior (values in percent).

	N	RESPONSE	
		True	False
I have switched products for ecological reasons	285	89.1	10.9
I subscribe to ecological publications	285	21.8	78.2
I have never joined a clean-up drive ^a	285	45.6	54.4
I have never attended a meeting ^a related to ecology	285	52.3	47.7
I have never written a congressman ^a concerning pollution problems	283	74.6	25.4
I keep track of my congressmen's and senators' voting records on environmental issues	284	41.5	58.5
I have attended a meeting of an organization specifically concerned with bettering the environment	285	32.3	67.7
I have contacted a community agency to find out what I can do about pollution	284	15.8	84.2
I have never actually bought a ^a product because it had a lower polluting effect	284	12.3	87.7
I do not make a special effort to ^a buy products in recyclable containers	284	26.4	73.6

^a Item reverse coded prior to further analysis.
Scale Mean = 4.9 Std=2.18

To better understand the ways the independent variables relate to general responsible environmental behavior (GREB), a series of multiple regression equations were conducted. This was necessary to control for possible interrelationships among the independent variables and to identify those variables that contribute most to the total variance explained for GREB. All possible two-way interactions involving the GREB variable were tested for statistical significance as well. Three regression models examined the relationship between sociodemographics and three general environmental dependent variables: environmental concern, verbal commitment, and knowledge of ecology. A fourth regression model examined the influence of sociodemographics on GREB. The fifth model included sociodemographics, three general environmental variables and the dependent variable (GREB). The results of the regression analysis are shown in Table 5.

Pertinent to the multiple regression analysis, stand on political issues ($B=.146$), age ($B=-.161$), and income ($B=-.185$) are significant predictors of environmental concern ($R^2=.091$; $p<.000$). In addition, all four independent sociodemographic variables were significant correlates of environmental concern. Income ($r=-.208$) was the strongest followed by age ($r=-.175$), stand on political issues ($r=.166$) and education ($r=-.161$). These findings indicate that as income, age and education increase environmental concern decreases; meanwhile, liberals have greater concern for the environment than do conservatives.

Table 2. Frequency of Responses to Verbal Commitment
(Values in Percent)

	N	RESPONSE	
		True	False
I'd be willing to ride a bicycle to work in order to reduce air pollution	284	26.4	73.6
I would probably never join a ^a group or club which is concerned solely with ecological issues	285	52.3	47.7
I would be willing to use a rapid transit system to help reduce air pollution	285	74.0	26.0
I'm not willing to give up driving ^a on a weekend due to a smog alert	285	38.2	61.8
I'm not really willing to go out ^a of my way to do much about ecology since that's the government's job	284	3.5	96.5
I would donate a day's pay to a foundation to help improve the environment	282	44.0	56.0
I would be willing to stop buying products from companies guilty of polluting the environment, even though it might be inconvenient	283	87.3	12.7
I'd be willing to write my congressman weekly concerning ecological problems	283	19.8	80.2
I probably wouldn't go house ^a to house to distribute literature on the environment	285	81.8	18.2
I would not be willing to pay ^a a pollution tax even if it would considerably decrease the smog problem	284	37.0	63.0

^a Item reverse coded prior to further analysis.
Scale Mean = 5.4 Std=2.11

The relationship between these four variables and verbal commitment was weaker than with environmental concern. Stand on political issues ($B=.264$), based on a conservatism-liberalism continuum, was the only significant indicator of verbal commitment in the multiple regression ($R^2=.070$; $p<.000$). Liberals expressed more commitment to proactive behavior than conservatives. Also, two correlates of verbal commitment were identified, income ($r=-.143$) and stand on political issues ($r=.264$). The regression equation including perceived knowledge of ecology as the dependent variable shows education as a predictor variable ($R^2=.030$; $p<.05$). To explore the relationship between sociodemographic variables and GREB, a separate regression was performed. As expected there was no direct relationship between these variables.

Next, a regression model to include the relationship of the three general environmental variables to GREB was conducted. Verbal commitment ($B=.386$) and perceived knowledge of ecology ($B=.238$) were predictors of GREB ($R^2=.218$; $p<.001$). All of the bivariate relationships examined between environmental concern, verbal commitment, perceived knowledge of ecology, and GREB were positive, linear, and significant at the .05 level or greater. For these items the

findings imply that as the concern for the environment, perceived knowledge of ecology, and willingness to take pro-environmental action of boaters increases, there is a simultaneous increase in their actual environmental behavior. For instance, the relationship between verbal commitment and GREB was strongest ($r=.40$; $p<.001$). This indicates that as verbal commitment towards pro-environmental behavior increases, actual pro-environmental behavior is likely to increase (i.e., one more is likely to switch products for ecological reasons).

When the sociodemographic variables were added to the regression model, once again, all three general environmental variables were shown to be significantly related to GREB by the bivariate analyses. When the interrelationships among these variables were controlled using multiple regression, two of the three general environmental variables were significantly related to GREB at the .001 level. Verbal commitment was again the best predictor indicating that intentions/willingness to act in a pro-environmental manner are predictors of overt behavior. Perceived knowledge of ecology was also significantly related to GREB. In addition, one sociodemographic variable, stand on political issues contributed to the regression model. This was the weakest of the three predictors and added only .5 to the percentage of variance explained in GREB ($R^2=.223$; $p<.001$). Figure 1 was developed to graphically depict the results of this analysis.

Discussion

To date, researchers have examined the relationship of several variables (e.g., environmental attitudes, intention to act, knowledge of issues) to responsible environmental behavior. In this study, verbal commitment (intentions) was noted as the strongest indicator of behavior. Ajzen and Fishbein (1973) depict behavioral intention as the strongest predictor of overt behavior. They argue that the predictive strength of the intention construct of overt behavior is dependent upon the strength of the interaction between its component variables (i.e., attitude and normative beliefs) and the impact of other external/situational variables (e.g., personality traits, locus of control, etc.). In this study, the predictive strength of verbal commitment increased when sociodemographic variables were added to the regression model.

Many studies of environmental behavior have found very little evidence that knowledge influences actual behavior. Conversely, perceived knowledge of ecology was noted to predict behavior in this study. As self-perceived knowledge of ecology increased, there was a subsequent increase in proactive behavior. These results echo findings of other studies showing that relationships between various indicators of the cognitive, affective, and conative aspects of attitudes provide a better understanding of why people do what they do. The attitude-behavior relationship is, indeed, complex and a more sophisticated operationalization of indicator variables is necessary. Attitudinal research should follow Manfredo et al.'s (1992) contention that research efforts should focus on the question of "when do attitudes predict behavior" rather than "if attitudes predict behavior."

In summary, this study has shown that there is a bivariate relationship between each of the scales representing the three components of McGuire's (1969) attitudinal model. As the level of environmental concern among boaters in Maryland increases, so does the overall score for general responsible environmental behavior. This relationship is true for the other two scales (i.e., perceived knowledge of ecology and verbal commitment) examined as well. The strongest of the bivariate relationships was between verbal commitment and GREB. Verbal commitment was, also, the strongest predictor of GREB followed by the perceived knowledge of ecology. These findings support Fishbein and Ajzen's (1975) conclusion that intentions to comply is the strongest predictor of actual behavior.

Table 3. Frequency of responses to items of environmental concern (values in percent).

	Strongly Disagree 1	Dis- agree 2	Un- decided 3	Agree 4	Strongly Agree 5	Mean
<i><u>Balance of Nature</u></i>						
The balance of nature is very delicate and easily upset.	0.0	11.1	13.5	43.9	31.5	4.0
Mankind is severely abusing the environment.	0.0	6.6	11.8	40.1	41.5	4.2
When humans interfere with nature, it often produces disastrous consequences.	2.1	13.5	11.8	47.1	25.6	3.8
Humans must live in harmony with nature in order to survive.	0.7	1.4	4.5	48.1	45.3	4.4
<i><u>Humans Over Nature</u></i>						
Plants and animals exist primarily to ^a be used by humans.	40.5	37.7	8.3	9.7	3.8	4.0
Mankind was created to rule over the ^a rest of nature.	31.8	36.4	12.2	12.6	7.0	3.7
Humans have the right to modify the ^a natural environment to suit their needs.	29.1	40.5	10.7	17.3	2.4	3.8
Humans need not adapt to the natural ^a environment because they can remake it to suit their needs.	57.4	35.3	5.2	1.0	1.0	4.5
<i><u>Limits to Growth</u></i>						
There are limits to growth beyond which our industrialized society can't expand	6.9	17.6	22.5	28.0	24.9	3.5
The earth is like a spaceship with only limited room and resources.	2.4	6.2	6.2	42.2	42.9	4.2
To maintain a healthy economy, we will have to develop a steady-state economy where industrial growth is controlled.	5.9	15.2	19.4	35.6	23.9	3.6
We are approaching the limit of the number of people the earth can support.	6.3	31.8	27.3	23.1	11.5	3.0

^a Item reverse coded prior to further analysis (i.e., mean scores represent the data after a recode).
N=289 Scale Mean = 3.9

Table 4. Frequency of responses to perceived knowledge of ecology (values in percent).

	N	Not at all 1	2	3	4	To a Great Extent 5
To what extent do you believe that you are knowledgeable about ecology?	288	3.8	12.8	36.5	31.9	14.9
Scale Mean = 3.4	Std=1.02					

Environmental matters remain a grave concern and may constitute a serious threat to human survival. If policy makers are to adequately deal with environmental problems they will benefit from up to date information on public opinion as well as on factors that tend to influence responsible environmental behavior in a number of different recreational settings.

The environmental quality of our planet depends on a continual effort to protect our natural resources. To do so, a better understanding of human behavior and the influences that contribute to or deter pro-environmental behavior are necessary.

Table 5. The effect of socio-demographics and general environmental variables on general responsible environmental behavior.

Independent Variables	Dependent Variables									
	Environmental Concern (N=202)		Verbal Commitment (N=200)		Knowledge of Ecology (N=201)		General Responsible Environmental Behavior			
	r	Beta	r	Beta	r	Beta	Reduced Model (N=200)		Total Model (N=199)	
							r	Beta	r	Beta
<u>Sociodemographics</u>										
Income	-.208**	-.185**	-.143*	-.119	.009	-.030	-.008	ns	-.007	.039
Age	-.175*	-.161*	-.066	-.057	.012	-.008	.036	ns	.039	.059
Stand on Political Issues	.166*	.146*	.264***	.264***	.058	.046	-.027	ns	-.024	-.146*
Education	-.161*	-.122	.057	.038	.174**	.174*	.083	ns	.087	.035
<i>R² Sociodemographic Model</i>		.091***		.070***		.030*		ns		
<u>General Environmental Variables (N=225)</u>										
Verbal Commitment							.402***	.386***	.396***	.421***
Knowledge of Ecology						.264***	.238***	.240***	.221***	
Environmental Concern						.182**	.029	.191**	.050	
<i>R² General Environmental Variables Model</i>								.218***		
<i>R² Entire Model</i>										.223***

*** Significant at .001
 ** Significant at .01
 * Significant at .05

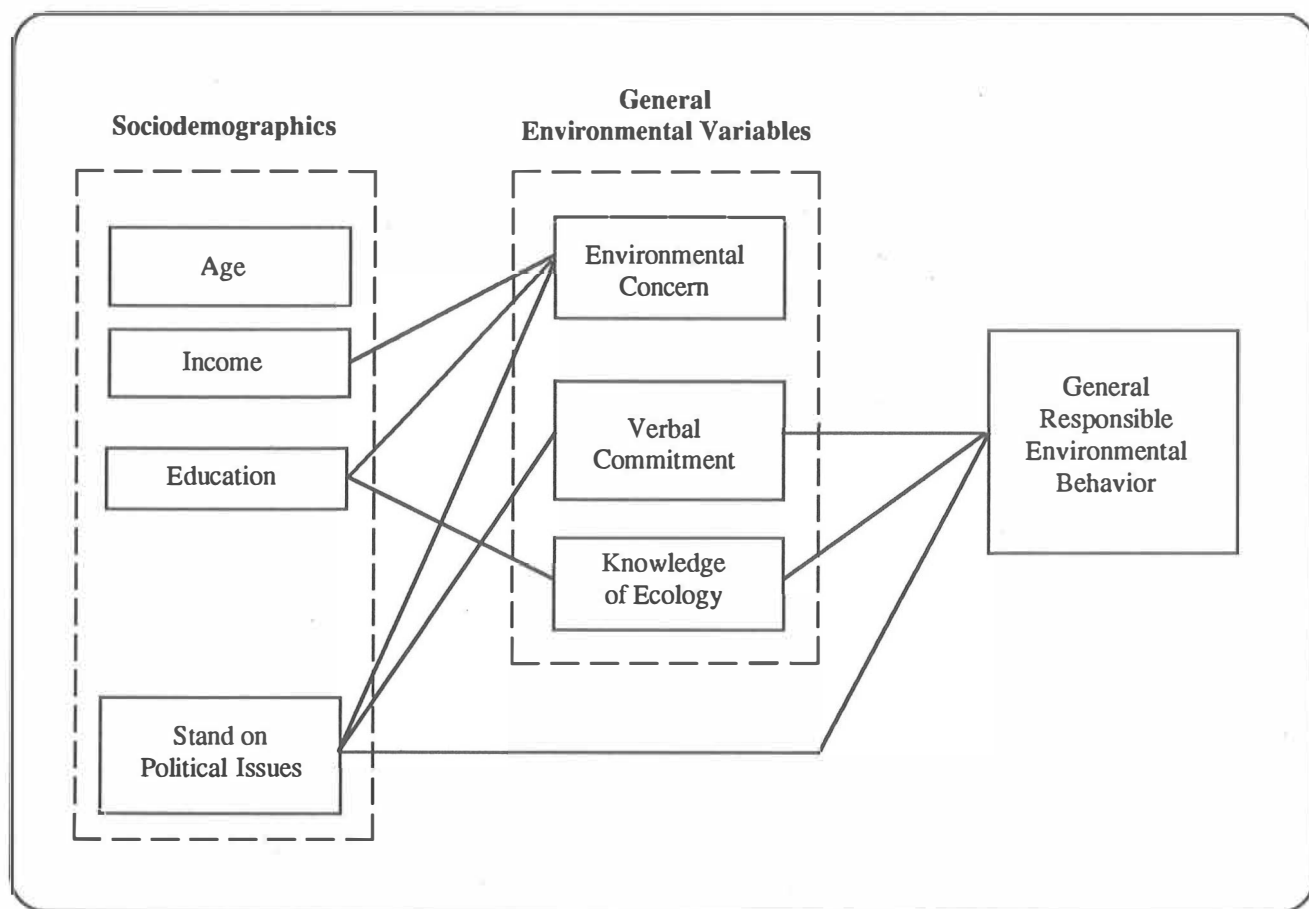


Figure 1. Model of general responsible environmental behavior.

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THE IMPACTS OF MARINE DEBRIS, WEATHER CONDITIONS, AND UNEXPECTED EVENTS ON RECREATIONAL BOATER SATISFACTION ON THE DELAWARE INLAND BAYS

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Maintaining boating quality requires attention to the inter-related set of indicators that are most strongly associated with overall visitor satisfaction. This study of boaters was conducted on the Delaware Inland Bays during the summer of 1991 as an extension of satisfaction studies done at Lake Raystown in 1987 and Berlin Lake in 1990. In an attempt to better understand and explain satisfaction, the pool of experiential impact factors was expanded to include marine debris, weather conditions and unexpected events. Though the overall explanatory power of this study was slightly less than that in previous studies, the variables of wind and weather conditions and unexpected events were shown to add directly to overall satisfaction.

Introduction

More than one-half the population of America (53%) lives within 50 miles of the coast, crowding people into less than ten percent of the nation's land. The percentage is expected to continue to grow, with some demographers predicting that, 80% of the population will crowd into coastal communities by the year 2000 (Lewis 1989). As the shorelines become more crowded, recreation usage can be expected to continue growing accompanied by multiple demands on the resource (e.g., industrial development, residential development, recreation, and preservation). Between the mid-1950s and mid-1980s nearly 5,000,000 acres of tidal wetlands were lost to development (Delaney and Wiggen 1989). This propensity of humanity to live near the water has great implications for the recreation manager who will have to balance conflicting demands and maximize appropriate use.

Satisfaction has often been identified as the principle product of the recreation experience, the major goal of recreation resource management (Driver and Tocher 1970), and the most commonly used indicator of quality in the recreation experience. Though little research directly ties coastal impacts to recreation satisfaction, there is considerable research linking various types of social and environmental impacts to recreation satisfaction (Cheek and Field 1977; Dorfman 1979; Titre and Mills 1982; Cole 1981; Graefe and Fedler 1986; Williams 1988).

Graefe and Drogin (1989) integrated two lines of previous research to study satisfaction among boaters at Raystown Lake. These included studies focusing on the identification of determinants of satisfaction (e.g., Peterson 1973; 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). In the Raystown study, it was 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. A replication and extension was performed at Berlin Lake incorporating the full range of experiential impacts from the Raystown study as well as additional indicators dealing with certain types of encounters between boating parties (Drogin, Graefe and Titre 1990).

From a practical and theoretical standpoint, other factors appear to potentially impact coastal ecosystems and boater satisfaction. Dire predictions have been made about the impact of debris on marine life (both fish and marine mammals), and the predicted negative impacts of debris on the economies of coastal communities - particularly as related to tourism. Weather conditions may have differing impacts upon boater satisfaction depending upon the particular boating activity (e.g., calm air benefits the water skiers, yet has a negative impact on sailors). During the course of a boating activity one is likely to experience unexpected events, positive and negative. An engine problem could be seen as an unexpected negative event that would block the participant from completing other expected activities therefore confirming expectancy theory. But what are the potential impacts of an unexpected positive event (a serendipitous event) (e.g., viewing dolphins, catching a new species of fish etc.)?

The intent of this study was, therefore, to investigate the role marine debris, wind and wave conditions and unexpected events, in addition to previously utilized experiential impacts, play in determining the satisfaction of recreational boaters. This study was based, in part, on the Expectancy Theory which postulates that the recreationist enters into an activity with certain expected experiences and outcomes. The level of congruence between the expected experiences and outcomes and the perception of the actual experiences and outcomes determines the level of satisfaction.

Project Background

This study took place on the Delaware Inland Bays; an estuarine area in coastal Sussex County, Delaware. The bays are located in southeastern Delaware and are separated from the Atlantic Ocean by narrow land masses (essentially barrier islands). There is one pass to the ocean, but for purposes of this study, only Inland Bay boaters were considered.

This research was part of an overall boating assessment of the Delaware Inland Bays system conducted during the summer boating season of 1991. The assessment was administered through the University of Delaware, College of Marine Studies with the support of the Delaware Department of Natural Resources and Environmental Control and the United States Environmental Protection Agency. The purpose of the overall study was multifaceted, combining an assessment of those factors that affect the bays' recreational carrying capacity, a study of environmental impacts on the bays as perceived by the boaters and a survey of attitudes toward potential environmental protection actions. Particular focus was given to social considerations such as crowding, conflict between users and boater safety. Environmental impacts studied included marine debris, perceived water quality, and perceived impacts on living resources (fish, crabs, clams etc.). In addition to making capacity related recommendations, users' perception of the environmental condition of the bays and the impacts those perceptions have on recreation satisfaction were determined.

Data Collection

Data were collected in several ways. First, personal surveys of 442 boaters were conducted at marina, boat ramp and shoreline communities around the bays from 11:00 a.m. to dusk on three weekends during July and August, 1991. Each weekend survey was conducted by trained interviewers stationed at selected spots around the Inland Bay area. Boaters were contacted as they left the boat ramp or dock area at the end of their trip. To obtain a representative sample of the boating population, interviewers attempted to interview as many boaters as possible at each location during the study period. A randomly chosen person from each boat was asked to answer the survey questions. Boaters who went out multiple days were interviewed only once during each weekend survey period. In order to account for varying crowding and density levels, on-site surveys and boater counts were additionally conducted during selected weekdays.

An additional twenty-nine sailboarders were contacted and administered a similar survey. This procedure was implemented because sailboarders generally did not use ramps and marinas, but rather launched from shore in a designated sailboarding area located within the Delaware Seashore State Park.

Additionally, selected dock holders and residents owning land adjacent to the Inland Bays and their tributaries were contacted by mail immediately after weekends in which on-site surveys took place. This technique accounted for the many boaters who do not use boat ramps and marinas. Names and addresses taken from dock, pier and bulkhead permits and county tax roles were organized by bay system. Two hundred names were selected from Rehoboth Bay and its tributaries, two hundred were selected from Indian River Bay and its tributaries, and 200 were selected from Little Assawoman Bay and its tributaries. A total of 290 usable responses were received.

Description of Sample

Data for this study were collected using three survey methods: Mail (39% of respondents), on-site interviews of boaters (57%), and on-site interviews of sailboarders (4%). Respondents were asked to identify themselves as permanent residents (i.e. those residing in the Inland Bays area on a year-round basis); seasonal residents (i.e. persons who lived in the area on a seasonal basis, whose primary residence was not in the Inland Bays area); and seasonal visitors (i.e. persons visiting the area on a short term basis - tourists). Of those who responded, 42% were permanent residents, 37% were seasonal residents, 15% were seasonal visitors and 6% did not indicate their user group.

Results

Boating Use Patterns

Boaters reported an average of slightly over 20 years of boating experience per person and indicated a moderate skill level (2.7 on a scale with 1 = novice and 4 = expert). Boaters reported an average of 41 days total boating during the 1990 boating season with most of those days (34) spent on the Inland Bays. The most common boating group reported was family followed by family and friends. The boaters surveyed reported operating runabouts (53%) followed by pontoon boats (19%) and cabin cruisers (11%). There were also a variety of boating activities taking place on the Inland Bays. Fishing was the most popular activity, reported by 37% of those surveyed, followed by powerboating (20%) and crabbing (14%).

Measures of Marine Debris

Marine debris was reported to exist, though not in great amounts, by boaters on the Delaware Inland Bays. The most often reported debris observed at least occasionally was plant material (47%), followed by plastic (35%) and paper material (35%). It should be noted that both plastic and paper materials are high on the list of the Center for Marine Conservation's "Dirty Dozen" list of marine debris types (O'Hara and Younger 1990).

Most respondents indicated that the observation of debris had little impacts on their enjoyment. Fifty-nine percent indicated that there was no debris-influenced impact on satisfaction. It is interesting to note that for some boaters the amount of debris seen (or not seen) actually increased their enjoyment. Those who reported seeing no debris further noted an increase in satisfaction. While boaters who reported low levels of satisfaction essentially felt no impact from debris, those who reported moderate levels of debris did report decreased satisfaction.

Measures of Weather

Impacts of weather on boater satisfaction were measured in two ways. First, specific weather conditions were collected from the U.S. Coast Guard Station located on the Inland Bays for those days of on-site interviewing. This allowed for the study of how specific weather conditions impacted boater satisfaction. Secondly, boaters were asked "How did the wind and waves on the bay impact your enjoyment of the day's trip?" This permitted the investigation of individual boater's perceptions of the days' weather. Due to wide variability in weather conditions from day to day, as well as variability within the perceived quality of weather conditions it was not possible to develop an objective scale of good to bad weather days.

With reference to weather variables, sunny days increased satisfaction, partly cloudy and cloudy days were more neutral in their impact. Light winds (0-7 mph) had positive impacts on satisfaction. Gentle breezes (8-12 mph) had essentially neutral impacts while moderate winds (13-24 mph) had negative impacts. Calm wave conditions tended to have positive impacts on satisfaction, light chop had neutral impacts and heavy chop had negative impacts. There appeared to be no pattern in the relationship between temperature and satisfaction. Generally, 75° was considered cold and decreased enjoyment, while 80° tended to give the highest reported satisfaction.

Slightly more than 50% of the respondents indicated that wind and waves impacted their enjoyment. Twenty two percent indicated that the weather had some positive impact on their enjoyment while 30% indicated that wind and wave conditions had negative impacts on their overall satisfaction.

Measures of Unexpected Events

Boaters were asked if they had experienced any unexpected events. The existence of unexpected events during a trip was reported by 12% of the boaters surveyed. Of those describing their unexpected events, slightly over 1/3 of the respondents noted that these events enhanced their enjoyment. These events were seen as consumptive based (e.g., catching more fish than expected); new experiences (e.g., first time up on jet ski); or humorous events (e.g., falling off a dock). Nearly 2/3 of the boaters describing their unexpected events as decreasing enjoyment. These events were primarily related to boat maintenance (e.g., engine broke down), boater behavior (e.g., confrontation with other boaters) and consumptive activities (e.g., not catching fish).

Experiential Impacts

Survey respondents were asked a series of questions about the quality of their boating experience and the various types of impacts that might interfere with a satisfactory boating experience. These questions were based on previous boating capacity and related studies. Perceptions of crowded conditions were assessed through two 9-point scales. Responses to these items showed that boaters tended to feel the bays were moderately crowded, but the number of boats on the bays had no effect on most people's enjoyment levels.

Displacement refers to various behavioral adjustments in response to unacceptably high density levels. In this study, boaters were asked if they avoided certain places, stayed off the bays during certain times, or gave up any planned activities in response to crowded conditions. The majority boaters indicated that they had not experienced these types of displacement, although they were more likely to have avoided certain places or times than to have forgone any planned activities.

Several questions probed boaters perceptions of safety on the Inland Bays. Most respondents agreed that conditions on the bays on the day they boated were safe, and less than a majority of boaters said that they had observed any unsafe boating situations. A few boaters acknowledged that they nearly had an accident, while most felt there were adequate law enforcement patrols on the bays. Respondents were more evenly split relative to an item asking whether other boats had come too close to them.

Finally, two items focusing on boating noise and inappropriate boater behavior were included to assess possible conflicts between types of boaters. Over one third of the sampled boaters indicated that the behavior of others (e.g., boats too close, rudeness, disobeying boating rules) interfered with the quality of their experience. Noise was also a problem, reducing the enjoyment of nearly one-third of those surveyed.

Satisfaction

The satisfaction index used in this study was patterned after indices that have been used successfully in other studies. The index includes five statements that are in essence different ways of measuring the the extent of satisfaction with the overall boating experience. The index was computed as the mean of response to the individual items. All of the items in the satisfaction index were strongly inter-correlated resulting in an overall reliability coefficient (Cronbach alpha) of .74. This level of reliability was consistent with that found in other studies using similar indices.

The multiple item satisfaction index was shown to correlate significantly with single item measures of satisfaction based on specific boater impacts such as impacts of debris on enjoyment, impacts of wind and waves on enjoyment and impacts of unexpected events on enjoyment. Overall satisfaction was seen to be positively correlated with a single item measure of perceived overall satisfaction ($r = .53$) and negatively correlated with questions concerning the individual impacts on enjoyment of the number of boaters ($r = -.30$), the amount and types of marine debris observed ($r = .13$), wind and waves conditions ($r = -.34$) and the existence of unexpected events ($r = -.27$). Boaters on the Inland Bays were generally satisfied with their overall experience (3.4 on the five point satisfaction scale, 1=low and 5=high), although for many the sampled trip did not measure up to their ideal or best ever boating outing.

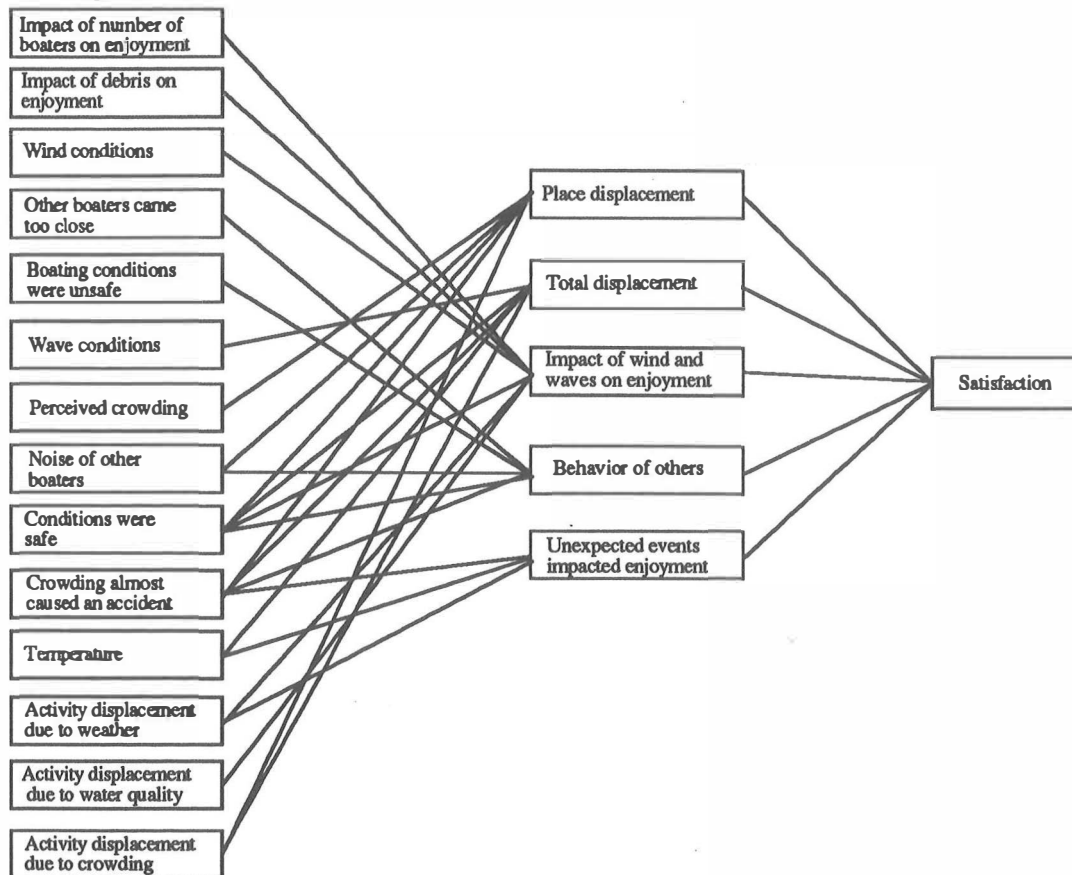
Regression Analysis

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. Zero order correlations were also reported to illustrate the bivariate relationship between key study variables. Results of the regression are shown in Table 1.

Table 1. Summary of multiple regressions of selected boating impact variables on primary boating impacts and satisfaction on the Delaware Inland Bays.

INDEPENDENT VARIABLE	DEPENDENT VARIABLE											
	Place Displacement		Total Displacement		Impact of wind and waves on enjoyment		Behavior of others		Unexpected events impacted enjoyment		Satisfaction Index	
	r	Beta	r	Beta	r	Beta	r	Beta	r	Beta	r	Beta
Impact of number of boaters on enjoyment	.33		.27		.19	.18	.37		.02			
Impact of debris on enjoyment	.16		.15		.26	.24	.17		-.02			
Wind conditions	.03		.15		.42	.33	.04		.01			
Other boaters came too close	.38		.28		.14		.64	.37	.15			
Boating conditions were unsafe	.25		.11		.03		.53	.24	.05			
Wave conditions	-.06		.09	.27	.32		.01		-.07			
Perceived crowding	.34	.13	.21		.05		.33		.10			
Noise of other boaters	.43	.18	.32		.08		.44	.12	.17			
Conditions were safe	-.33	-.10	-.38	-.19	-.01	.13	-.43	-.16	-.09			
Crowding almost caused an accident	.29	.10	.44	.32	.07		.37	.16	.29	.27		
Temperature	.13		.09	.22	-.16		-.02		.11	.13		
Activity displacement due to weather	.10		.22		.36	.30	.17		.13	.11		
Activity displacement due to water quality	.25		.22		.04	-.10	.24		.08			
Activity displacement due to crowding	.56	.37	.42	.29	.02		.39		.16			
Place displacement											-.36	-.14
Total displacement											-.50	-.29
Impact of wind and waves on enjoyment											-.34	-.27
Behavior of others											-.36	-.13
Unexpected events impacted enjoyment											-.23	-.10
Percent of Variance Explained (R SQUARED)		.39		.38		.34		.55		.11		.40

In combination, the series of regressions form a basis for the model illustrating how people perceive satisfaction with the boating experience (Figure 1). The paths shown indicate the significant relationships found between the variables.



Results showed that 40% of the variation in satisfaction could be explained by the pool of variables used in this study. These findings compare with explained variances of 42% at Lake Raystown and 44% at Berlin Lake.

Figure 1. A model of boater impact variables on overall boater satisfaction on the Delaware Inland Bays

The low levels of marine debris reported seemed to have positive impacts on overall satisfaction (as the amount of debris reported increased, satisfaction declined.) Persons experiencing unexpected events tended to report subsequent negative impacts on satisfaction. The impact of weather conditions on overall satisfaction varied depending upon the primary activity chosen. Fishermen, sunbathers, crabbers, and swimmers reported more negative impacts of weather than powerboaters and clambers. Sailboaters reported the most positive impacts of weather conditions while waterskiers reported the most negative impacts.

The primary impacts on boater satisfaction included total displacement, the impacts of wind and waves, place displacement, impacts of others and unexpected events. In each of these cases, the variables were shown to have a negative impact on overall satisfaction.

Management Implications

A primary implication for managing a multiple use resource is understanding that many of the variables that impact boater satisfaction are out of the control of the manager. In this study, weather was shown to be an important factor influencing overall boater satisfaction, yet it is most certainly beyond the control of the resource manager. What could be controlled, however is an understanding of how various user groups relate to certain conditions which in turn impact participation patterns, crowding, and user conflict in certain areas, (e.g., strong winds might force waterskiers and fishers into a confined area while at the same time encourage sailor and sailboarders to enter new, unexplored areas).

By its very nature, managing for unexpected events would seem to be impossible. While many types of events (e.g., boat breakdowns and boating accidents) may be unexpected to the individual boater, they should be expected by the resource manager. Management plans and procedures for common events such as boat breakdowns should be developed and updated. An additional factor to be considered is that the manager understand the impacts of these events on the boaters' overall satisfaction. A better information system to make boaters aware of the conditions before they go out could allow them to better prepare for the situations of the day and thus improve their level of satisfaction. An example of this might be to develop a boating report somewhat similar to traffic reports on the local radio station.

Management implications for marine debris may seem to be quite straight forward. No one likes it - so restrict it.. There are, however, other factors to consider. While negative impacts of debris on tourism are cited in the debris literature, there is evidence that the tourist is actually less sensitive to debris than other users. This could be due to cognitive dissonance, unfamiliarity with the waters, or the bays could be cleaner than other comparable bodies of water. Conversely, permanent residents tended to be the most sensitive to the existence of debris, perhaps due to their familiarity with the waterways, so perhaps they might be the better indicators of problems. Perhaps the creation of a "Residents' Advisory Group" to help monitor debris and water quality issues would be more appropriate than waiting for tourists to report impacts.

Additionally, resource managers must manage for a wide variety of boating activities. Each group examined (i.e., activity groups, resident groups) perceived impacts differently. Situations that may decrease satisfaction for one group may actually increase the satisfaction of other groups, thus requiring the manager to be aware of specific needs of all users. Implicit in this is the knowledge that there is more to boater satisfaction than just boater density, crowding and user conflict. This information can be helpful both in planning and operational management. For instance, if zone management were necessary, waterskiers should be zoned into more protected waters as they prefer calm, flat water conditions while sailors and sailboarders should be zoned into more open areas. In day to day operations, it would seem necessary to understand how certain conditions impact each group. Wind speed and direction could force all participants of a particular activity into tightly confined areas. In this case, though density may be low on a particular day, the level of crowding could be unacceptably high for a specific activity group leading to displacement and dissatisfaction.

Recommendations for Further Study

Very little research has been done on the impacts of marine debris on the behavior of outdoor recreationists. As coastal growth continues, debris will become a greater problem. Further study of marine debris and its impacts on satisfaction should be replicated in both estuarine and coastal environments. Though the Inland Bays were relatively clean and clear of debris, boaters still reported its impact on satisfaction. Additional study is warranted in areas where greater amounts of debris have been documented.

While satisfaction was impacted in part by weather conditions and unexpected events, these variables should be further studied. Additionally, the role of weather conditions in displacement and activity substitution should be investigated. Do boaters keep their location constant but change their activity preference based on weather conditions or do they keep their preferred activity and change location? More detailed analysis of these varied impacts on satisfaction should also be conducted taking into account variation by user or activity group.

This study has highlighted some of the additional factors which impact a recreationist's satisfaction. Continued attempts to better understand and model factors affecting satisfaction are important both from a theoretical and resource management perspective. It is essential, not only to re-examine and validate variables shown to impact satisfaction, but to identify other potential impacts on the visitor experience.

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INFLUENCES OF LEADERSHIP DEVELOPMENT AMONG WILDERNESS EDUCATION PARTICIPANTS

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The purpose of this research was to identify factors on a wilderness course that contribute to leadership development in wilderness education. The theory of self-efficacy was selected to assess the relationship it has with leadership development. Self-efficacy has provided a conceptual framework for which to understand behavior and provide explanation to one's success and future involvement in an activity. 86 students from the National Outdoor Leadership School were given pre and posttest surveys to identify the impacts a wilderness leadership experience has on their self-efficacy. Results indicated that posttest self-efficacy scores were significantly higher from pretest scores after a student completed their wilderness course. Males were found to have significantly higher self-efficacy scores than females in the pretest survey but the posttest surveys revealed that overall self-efficacy scores between females and males were very similar. The wilderness leadership experience had a significant impact on a student's level of self-efficacy. These preliminary results help to begin the process to better understanding the components that lead to leadership development outcomes.

Introduction

Given the significant length of field time, there are a multitude of factors that influence an individual's outcomes on a wilderness course. These outcomes include interacting with the environment with comfort, the establishment of a philosophy for making choices and decisions, development of a consciousness for self-responsibility, respect for others and the environment, and attainment of leadership skills. Although there are a variety of leadership training settings from which to select, many wilderness education programs instrumentally use the natural environment to develop leadership skills. The length of time in the wilderness, the physical and emotional challenges (i.e., carrying heavy packs over rough terrain, stress due to the change in a student's everyday civilized and comfortable routine, etc.) and the interpersonal relationships encountered during a wilderness experience allow students to develop behaviors and skills that are representative of leadership qualities (i.e., physical fitness and skills, emotional maturity, patience, tolerance, concern for others, and self-confidence) (Ford & Blanchard, 1985).

Statement of the Problem

To date, research on leadership has been sparse and inconclusive. According to Phipps and Swiderski (1990), there has been little use of quasi-experimental designs in outdoor leadership research. There is little assessment of the degree to which graduates continue their involvement in wilderness education, either as a career or as a voluntary activity.

Wilderness education programs want people to continue their involvement in wilderness education. Often times this continued involvement reflects the development of leadership in wilderness skills and experiences. Uncertainty exists as to whether or not desired long range leadership development outcomes have been achieved. Furthermore, the literature identifies the need to investigate the "process" by which certain outcomes are achieved rather than focusing attention

on solely the outcomes of an extended wilderness experience (Klint, 1990). In other words, what specific elements of the adventure experience produces which results? Subsequently, how do these results influence future behaviors and outcomes separate from the adventure experience?

Purpose

The purpose of this research was to identify those factors on a wilderness course that contribute to leadership development in wilderness education. Leadership development was defined in terms of continued involvement in wilderness education activities. Furthermore, this research explored the relationships among feedback (amount and type), goal attainment and mentoring on a wilderness course. Since feedback and goal attainment are contributing factors to one's level of self-efficacy and integral components in the mentoring process, these factors may begin to specify the process that leads to leadership, such as continued involvement in outdoor education activities.

Literature Review

The literature suggests that there are a variety of elements in a wilderness/adventure experience that contribute to effective leadership (i.e., skill performance, motivation, physical fitness, healthy self-concept, personality traits, concern for others, ability to inspire others, and understand participants' needs) (Priest, 1991; Ford & Blanchard, 1985).

Although much of the literature discusses theories of leadership and characteristics of a leader (i.e., personality traits, situational factors, behavioral traits), there are many authors who believe that leadership is a continual process of experiences (March, 1987; Swiderski, 1981; Raiola, 1990; Green, 1990; Rosenbach & Taylor, 1984). In other words, leadership is developmental. The key factor that appears most critical in the development of quality outdoor leadership is judgment (Cain, 1985; Green, 1981; McAvoy, 1980; Petzoldt, 1984; Swiderski, 1981). They operationalize judgment as skills, knowledge and experience and agree that development of leadership comes from these three components. These authors agree that the development of leadership comes from acquiring the skills, knowledge, and experience necessary for leading a safe and enjoyable outdoor trip (see Figure 1).

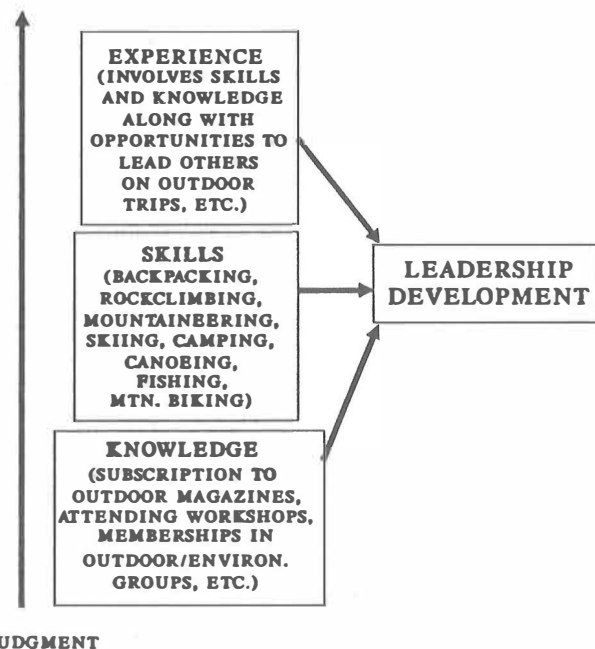


Figure 1. Key components of leadership development.

In essence, the literature supports the idea that leadership is not an end in itself. Specifically, there are no concrete measures or absolute certainties that an individual has achieved leadership (Miles, 1987). Rather, leadership development is considered an ongoing process that continually evolves through "involvement" in a variety of outdoor related experiences (e.g., classes, workshops, personal experiences, reading, leadership responsibilities, past outdoor related jobs, etc.).

Self-Efficacy

Self-efficacy refers to personal judgments of one's capability to function in specific situations (Bandura, 1977). In other words, how confident does a person perceive themselves to be

in performing a task/skill of varying difficulty? Since this assessment may provide the opportunity to determine future performance, self-efficacy is a highly recommended theory for assessing performance and human behavior in outdoor adventure pursuits (Ewert, 1989). Research (Bandura, 1977, 1986) indicates that factors such as feedback and goal attainment have an impact on a person's level of self-efficacy. In addition, mentoring, which involves the elements of feedback and goal attainment, is suggested as having a strong impact on one's self-efficacy.

Figure 2 provides an example of the self-efficacy scale used for this study.

- 19. INSTRUCTIONS:** Please indicate how certain you are in your present (TODAY) ability to perform the following tasks. If you have no certainty about the tasks place an "X" in the 0% box. Otherwise, place an "X" in the box that reflects the most appropriate percentage of certainty.

TASKS	VERY UNCERTAIN				SOMEWHAT CERTAIN				VERY CERTAIN			
	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %	
a. CASTING A FISHING LINE												
b. RAPPELLING OFF OF A ROCK FACE												
c. STREAM CROSSING OVER FAST MOVING WATER												
d. USING AN ICE AXE TO PROTECT YOURSELF FROM FALLING ON SNOW/ICE												
e. CLIMBING A BEGINNER LEVEL CLIMB												
f. BACKPACK 3 MILES WITH 60lbs ON YOUR BACK												
g. CLIMBING AN INTERMEDIATE LEVEL CLIMB												
h. BACKPACK 6 MILES WITH 60lbs ON YOUR BACK												
i. CLIMB A PEAK THAT IS OVER 12,000 FT. IN ELEVATION												
j. CLIMB A PEAK THAT IS OVER 18,000 FT. IN ELEVATION												
k. IDENTIFYING FLORA AND FAUNA IN A WILDERNESS AREA												
l. OUTDOOR COOKING												
m. IDENTIFYING WEATHER PATTERNS												
n. ADMINISTERING BASIC FIRST AID												
o. PRACTICING MINIMUM IMPACT CAMPING AND RESOURCE/ ENVIRONMENTAL PROTECTION												
p. READING AND INTERPRETING A TOPOGRAPHICAL MAP												
q. JUDGE THE TIME AND DISTANCE IT MAY TAKE TO HIKE FROM POINT A TO POINT B IN A WILDERNESS SETTING												
r. ROUTE FINDING OFF TRAIL IN A WILDERNESS SETTING												
s. LEADING A SMALL (3-5) GROUP IN A WILDERNESS SETTING												
t. ORGANIZING AN EMERGENCY EVACUATION PROCEDURE												

Figure 2. Wilderness education self-efficacy scale.

Methods

A quasi-experimental, pretest-posttest with control group design was used for this study. 116 students from the National Outdoor Leadership School, located in Lander, Wyoming, participated in this study during the summer of 1992. 30 of those students represented the control group sample. The purpose of the control group was to control for any extraneous variables that are likely to impact the pre-measured scores. Research reports that just before the start of a course, students experience a high anxiety level which may create biases in the pretest measures (Koepke, 1973). To increase validity and account for this bias, the pretest instrument only will be administered to the control group by mail before the student arrives in Wyoming.

Students were given the pretest instrument the first day of their course and the posttest instrument the last day of their course. A 20-item self-efficacy scale was included in all three groups (i.e., control, pretest and posttest group) to assess levels of self-efficacy as well as investigate changes in self-efficacy resulting from participation in a wilderness course. The pretest questionnaires pertained to questions concerning socio-demographic information and the identification of goals they would like to accomplish on their course. The posttest questionnaires included questions about the amount and type of feedback students received on their courses, goal achievement and the extent and type of mentoring relationships on their courses.

Results

The pretest-posttest sample consisted of 41 females and 45 males (n=86). The control group sample consisted of 15 females and 15 males (n=30). Ages ranged from 15 to 51 and a total of 85 participants out of 116 had some previous outdoor experience before the start of their course. T-test results indicate that posttest self-efficacy scores were significantly higher from pretest scores across 19 out of 20 wilderness tasks. (See Figure 2 for example of the self-efficacy scale). Fishing was the only wilderness task that did not indicate a significantly higher self-efficacy score. Findings also indicate that self-efficacy mean scores in the control group were higher than in the pretest group, although not significantly higher. (See Table 1 and Figure 3). This result suggests that directly before going on a course, students may tend to have lower self-efficacy scores due to the anxiety experienced at that time.

Table 1. Self-efficacy scores for control, pretest and posttest groups.

Self-Efficacy					
Control Group (n=30)		Pretest Group (n=86)		Posttest Group (n=85)	
M	SD	M	SD	M	SD
55.48	16.10	46.78	19.86***	80.87	8.94

*** T-test for difference between pretest and posttest self-efficacy scores significant at .001 level.

Although female self-efficacy scores were significantly lower than male self-efficacy scores before the start of their course, there were no significant differences between overall female and male scores after their course. (See Table 2 and Figure 4).

Females had significantly higher posttest self-efficacy scores in outdoor cooking and minimum impact camping techniques at .05. Males had significantly higher posttest self-efficacy scores in fishing and reading a topographical map at .05. Results reveal that there is a positive correlation between age (.34) and experience level (.45) with self-efficacy. Both were found to have a significant relationship with self-efficacy

SELF-EFFICACY MEAN SCORES

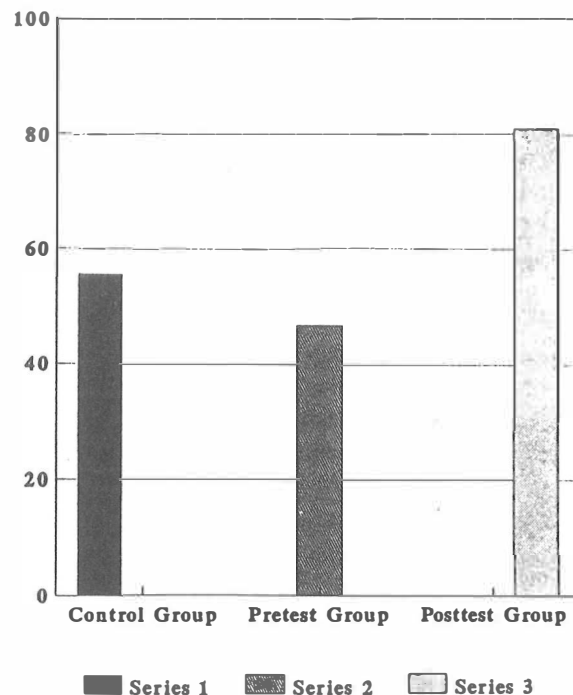


Figure 3. Self-efficacy mean scores.

Table 2. Self-efficacy scores between females and males in control, pretest and posttest groups.

Gender	Self-Efficacy					
	Control Group (n=30)		Pretest Group (n=86)		Posttest Group (n=85)	
	M	SD	M	SD	M	SD
Female	55.18	11.63	42.01	18.87	79.14	8.97
Male	55.80	20.37	*51.31	19.52	80.94	9.53

* T-test for difference between female and male pretest self-efficacy scores significant at .05 level.

(.001). There is evidence that having some experience (developmental level) opposed to little or no experience (introductory level) indicates a significant difference in one's self-efficacy level in the following wilderness tasks; minimum impact camping techniques, route finding, reading a topographical map and judging distances from point A to point B. Results also reveal that those students who have a great deal of experience (commitment level) opposed to some experience reflect significantly higher self-efficacy scores in the following wilderness tasks; backpacking 3 and 6 miles with 60lbs on your back, climbing 12,000 and 18,000 foot peaks, minimum impact camping techniques, reading a topographical map, judging distances from point A to point B, route finding, leading a small group, and evacuation procedures.

SELF-EFFICACY MEANS BY GENDER

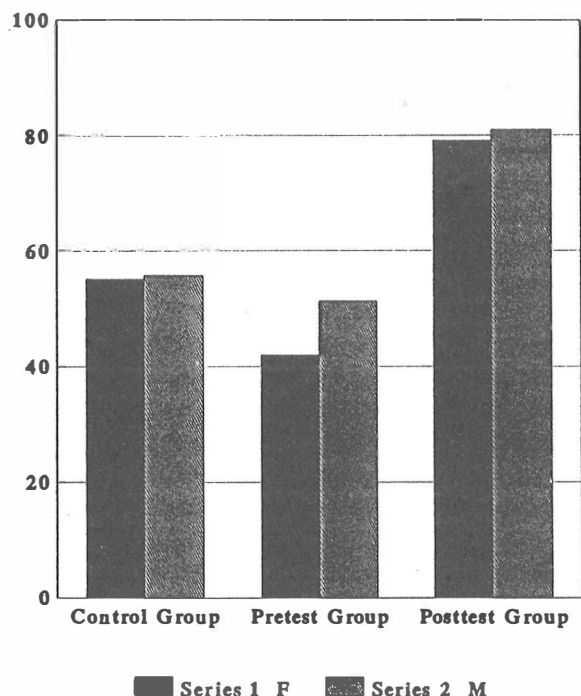


Figure 4. Mean scores by gender groups.

Although the literature indicates strong relationships between feedback, goal attainment, and mentoring with self-efficacy, the correlations in this study were weak. There is a positive yet weak relationship between goal achievement and self-efficacy (.13), feedback and self-efficacy (.05) and a positive relationship between feedback and mentoring (.21).

Discussion and Implications

Self-efficacy is a theory used widely across many disciplines to determine the effects it has on success and future development. The significant increases in self-efficacy after participation in a wilderness course provide some support that the initial "process" toward leadership development has been initiated. Thus, there is some potential for future involvement in wilderness education.

To determine the effects of self-efficacy on future involvement in wilderness education, a follow-up survey will be sent to students who participated in the pretest-posttest questionnaire. This survey will be sent to them approximately 1 year (summer of 1993) after the completion of their course. The intent of this survey is to assess the long term effects of self-efficacy and to investigate the amount and type of outdoor involvement the student's have participated in after their course. The degree of involvement will determine the strength of a student's development toward outdoor leadership. The objective of this process is to measure the relationship between self-efficacy and leadership development in wilderness education. Figure 5 outlines the key variables toward the leadership development process. The arrows point in the direction of influence. It is hypothesized that self-efficacy will have a positive correlation with leadership development in wilderness education.

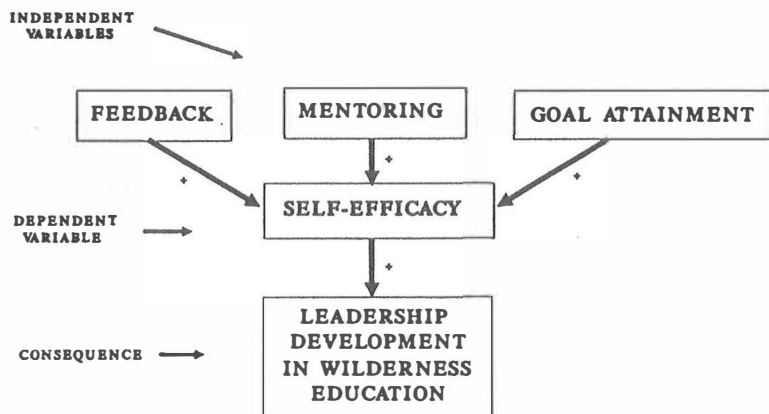


Figure 5. Hypothetical path model of the leadership development process.

The results of this completed study is intended to provide staff and instructors of wilderness/outdoor leadership programs insights into the factors that influence leadership development. Having some awareness between female and male differences in self-efficacy may help staff become more cognizant of and sensitive to the needs, strengths and weaknesses of both genders in wilderness activities. This sensitivity can provide a better experience for developing competent leaders. Traditionally and historically, outdoor adventure experiences have been male-dominated. The significant difference found between female and male pretest self-efficacy scores may indicate that women tend to underestimate their abilities in wilderness tasks and/or men tend to overestimate their abilities. Men may feel the role of rating themselves strongly in a male-dominated field whereas women may feel the role of underestimating their abilities.

Physical skills alone, knowledge alone or experience alone do not measure outdoor leadership competency. A balance of all three over time develop the judgment necessary toward the development of a successful leader. Although the variables of feedback, goal attainment and mentoring showed weak relationships with self-efficacy it cannot be concluded that they are insignificant. These preliminary results provide some support toward the role of self-efficacy in leadership development. The first year results revealed the need to change how certain variables will be measured and these changes along with increased sample size may yield a better assessment of hypothesized relationships.

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EXPLORING THE SIXTH DIGIT: AN ANALYSIS OF FLY FISHING PARTICIPATION IN THE UNITED STATES¹

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Introduction

With the release this year of Norman Maclean's *A River Runs Through It* more people than ever are interested in fly fishing. Even before the movie was released fly anglers were portrayed as having a Zen like quality that sets them apart from other fishermen (Time August 7, 1989). Although Robert Redford's movie of Maclean's book is true to the art of fly fishing and in particular fly fishing in Montana, it has helped to further perpetuate the myth of the fly fisherman. The myth almost became believable for us when we recently overheard one angler say: "My fly rod is the sixth digit, an extension of my hand."

Are fly fishermen really the fishing gurus that myth would suggest? To examine the myth we examined the participation patterns of fly fishermen throughout the United States. We wanted to find out if the participation of fly fishermen differed so much from other anglers that they might warrant different management considerations. Work by Bryan (1977) and Katz (1981) suggests that fly fishermen are different from other anglers and each other. Katz (1981) stated when the term 'trout fishermen' is used as a synonym for those who fly fish, the resulting image then is a somewhat misleading stereotype. The fishing literature has provided us with a better understanding of the trout angler, but what do we really know about fly fishermen? The purpose of this paper is to begin to explore the stereotype.

Literature Review

Bryan (1977, 1979) classified trout fishermen based on a continuum of behavior which would vary predictably with increasing levels of specialization. The continuum was defined by equipment, skill and preferences for resource. Each level was considered a further development in the specialization of an angler. As the angler progressed through the stages of trout fishing he moved from general techniques and tackle to techniques and tackle distinct to fly fishing. As he moved from one form of fishing to another his social groups, vacations and life begin to center around fly fishing. As fishing methods moved from the general to the specific, management preference of fishermen moved from the desire for easy access to the resource then to preservation of the natural settings. Those using fly tackle preferred catch-and-release policies that favored maintaining the quality of wild trout populations.

Katz (1981) defined trout activity involvement by an individual's score on a multi-variable scale or index based on participation patterns and preferences for conditions and

techniques. His profile of fly fishermen who were members of Trout Unlimited represents comprehensive data which focuses on fly fishermen, their frequency of participation and equipment usage.

Bryan's (1977) typology emphasized techniques, resource conditions, motivations, and social context of the trout experience. Occasional anglers most often participated with family and technique setting specialists (fly fishermen) most often participated with peers. Chipman and Helfrich (1988) set out to determine the relative dimensions and components to an overall fishing specialization framework. Their study found that when social context was used as one of the components of the centrality of life dimension it was not correlated with the other components. Other studies produced similar results. In general, the results suggest that fly anglers placed more emphasis on getting away from people, less emphasis on being with friends and family (Manfredo and Anderson 1982; Hick et al. 1988), and that family togetherness was more important to female anglers than male (Hick et al. 1988). These inconsistencies with Bryan's findings (that friendship networks are an important part of the fly fishing experience) may be due to several factors. First the studies of Bryan (1977), Manfredo and Anderson (1982), Hick et al. (1988), and Chipman and Helfrich (1988) are not directly comparable. Bryan used interview techniques and observation. The other studies used interview techniques which included questions about the social context of the angling experience yet each question was worded, organized and analyzed differently.

Secondly, in the Chipman and Helfrich (1988) study, small mouth bass was the dominate sportfish and only two percent of the study population were fly anglers. Other studies have focused on the social context in which trout was sought or the focus was on all anglers where fly fishermen had a greater representation. Different social groups may revolve around different species of fish and/or as Bryan suggest, around different techniques of fishing. Ditton, Loomis and Choi (1992) have recently discussed the existence of such angling social worlds at great lengths. In addition to the above, social setting may not have been correlated with the other dimensions because it may be an inappropriate component of the centrality of life dimension.

To date, our understanding of fly fishermen is centered on 1) Bryan's (1977) work on trout fishermen; 2) Katz's (1981) work on fly fishermen involved in Trout Unlimited; and 3) other trout studies (Manfredo and Anderson 1982; Hick et al. 1988). Angler specialization has been the focus of many of these studies. Although the literature provides information about fly fishermen seeking trout, we can not assume that this information is correct for all fly fishermen. Many areas of the country can not support wild trout populations, yet fly fishermen still persist throughout the United States. In addition, little is known about the basic demographics of fly fishermen, their spending patterns, their distribution across the United States, and their travel patterns. The objectives of our analysis was to 1) describe basic demographic, participation, and spending patterns of fly fishermen; 2) to compare them to national patterns of fishing behavior; and 3) to explore how the results fit into the present conceptual angling frame work.

Methods and Procedures

The source of data for this study was the 1985 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (FHWAR), conducted by the U.S. Bureau of Census (USBC), for the U.S. Fish and Wildlife Service (USFWS). The end product of this survey was an extensive compilation of estimates of angler, hunter, and nonconsumptive wildlife resource user populations, their sociodemographic characteristics, participation, and expenditures. See the 1985 FHWAR report for further details concerning survey design.

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The Data File

The 1985 Fish and Wildlife Survey is divided into several files that contain information about sociodemographics, hunting, fishing and nonconsumptive wildlife activities.

The FH3 portion of the survey is divided into sections of hunting and fishing. Fishing is further divided into categories of Great Lakes fishing, freshwater fishing and saltwater fishing. Respondents were asked if they participated in each of the fishing categories. Respondents answered questions under all three, two or one fishing categories. Fishermen could participate in any number of fishing activities, which include (but not exclusive to) freshwater fly fishing, saltwater fishing, saltwater fly fishing, Great Lakes fishing, and/or freshwater fishing with baits and lures. To insure an uncomplicated sample of fly fishermen only fishermen who indicated fly fishing in freshwater were included in the study.

Results

The National Survey of Fishing, Hunting and Wildlife Associated Recreation (FHWAR) reports 6,413,000 fly fishermen in the U.S. This study compares demographic, participation and expenditure data of freshwater fishermen²

²/ Excludes Great Lakes fishermen.

and freshwater fly fishermen from the 1985 FHWAR survey.

Data on freshwater fly fishermen were compared to data in Tables 22 and 16 of the FHWAR 1985 report (USDI). To compare data the unique weighting scheme applied to the FHWAR data was used in the analysis of fly fishing data.

Demographic Comparisons

Table 1 presents comparisons of the select demographic characteristics of the freshwater fishing population from the FHWAR report and results of this study. Demographic characteristics of fly fishermen were more similar to freshwater fisherman than anticipated. Differences in age, income and race did not appear. The age distribution of fly fishermen is similar to that of the national distribution of freshwater fishermen, with 48% of the participants ranging from 25 to 44 years old. Income distributions indicate that fly fishermen and freshwater fishermen are not different in yearly earnings. The majority of fly fishermen reported an income ranging from \$10,000 to \$30,000. Fewer women participate in fly fishing than women who participate in freshwater fishing. Seventy-eight percent of all fly fishermen are male. Education differences were more significant. Fly fishermen appear to be slightly better educated than the national distribution of freshwater fishermen. Forty-six percent of fly fishermen attended college as compared to 37% of freshwater fishermen.

Table 1. Select characteristics of freshwater and fly fishermen.

	Freshwater Fishermen (%)	Fly Fishermen (%)
Age		
16-17	5	6
18-24	15	4
25-34	27	25
35-44	2	23
45-54	13	13
55-64	10	10
65+	8	8
Income		
under \$10,000	10	4
\$10,000-\$19,999	21	21
\$20,000-\$24,999	11	10
\$25,000-\$29,999	14	16
\$30,000-\$49,999	27	27
\$50,000-\$74,999		
\$75,000 or more	5	4
Education		
8 years or less	7	5
9-11 years	16	12
12 years	39	37
college	37	46
Gender		
Male	68	78
Female	32	22
Race		
White	93	93
Black	5	5
Other	2	2
Urban/Rural		
Urban	57	63
Rural	43	37
Census Regions		
North East	4	4
Middle Atlantic	8	7
East North Central	21	18
South Atlantic	16	10
East South Central	8	8
West North Central	12	11
West South Central	13	12
Mountain	7	17
Pacific	12	12
Average Number of Days Fished Per Day	20	27
Average Number of Hours Fished Per Day	7	8

Regional Comparisons

The 1985 FHWR survey reports urban and rural participation in addition to the percent of participants in the U.S. census regions. Table 1 contains regional comparisons.

Sixty-seven percent of fly fishermen indicate urban residences as compared to the national sample of freshwater fishermen where 57% indicate an urban residence. Approximately forty percent of all fly fishermen reside west of the Mississippi. The Mountain, West South Central and Pacific regions comprise the bulk of western fly fishermen. The East North Central region contains 21% of all freshwater fishermen the most of any census region and likewise of all the regions contains the majority of fly fishermen. It is important to

consider the number of fly fishermen in each census region. The East North Central Region contains 17% of the U.S. population and 18% of all fly fishermen. Only 5 percent of the U.S. population 16 years old or older lives in the Mountain Region, but 17% of all fly fishermen reside in the Mountain Region. Of eastern fly fishermen, 18% residing east of the Mississippi reside in the East North Central states and 8% in the South Atlantic states. See Figure 1 for regional comparisons.

Participation Comparisons

Fly anglers appear to fish 3 hours more than the national freshwater fishing average. The number of days fly fishermen participated in fishing was greater than the number days that are reported in table 16 for national freshwater fishermen. Freshwater fishermen participated an average of 20 days in 1985, while the sample of fly fishermen participated an average of 34 days. Fly anglers took an average 30 fishing (all types) trips in 1985.

Table 2. Total dollars spent on trips and other items.

	Freshwater Total 1985 (%)	Fly Fishing Total (%) (thousands of dollars)	Percent of Total (%)
Food and Lodging	3,878,514	983,765	25
Transportation	2,727,369	707,769	26
Other Trip Expenses	2,057,191	433,476	21
Total Trip Cost	17,795,427	2,125,622	12
Fishing Equipment	1,759,795	505,799	28
Auxiliary Equipment	310,838	227,203	73
Fishing Licenses	293,444	83,112	28

Table 3. Average dollars spent per fisherman.

	Mean Dollars/ Freshwater Fishermen (\$)		Mean Dollars/ Fly Fishermen (\$)
Food and Lodging	101	153	
Transportation	71	110	
Other Cost	54	67	
Total Trip	463	331	
Fishing Equipment	46	78	
Auxiliary Equipment	8	35	
Fishing Licenses	8	12	

Expenditure Comparisons

Expenditures on fishing trips made by fly fishermen in 1985 amounted to \$2.1 billion. This accounted for 12 percent of the total trip cost of freshwater fishing spent in 1985. Fly fishermen spent approximately \$331 dollars on a fishing trip, \$132 dollars less than the national average for freshwater fishermen. Fly fishermen spent, on the average, \$20 on food, lodging and transportation for a fishing trip.

Fly fishermen spent more than the national average on fishing equipment, auxiliary equipment and fishing licenses. Average expenditure for auxiliary equipment by fly fishermen was \$35 as compared to the eight dollar national average for freshwater fishermen in 1985. Fly fishermen spent more than the national average on fishing equipment, auxiliary equipment and fishing licenses. Fly fishermen purchased an average of \$78 in fishing equipment. See Table 3 for expenses on 'other' items which included licenses, stamps and tags, as well as dues

and contributions and subscriptions or cost for magazines. Fly fishermen spent \$12 on licenses, tags and stamps, four dollars more than the national freshwater average.

Conclusion

Who is the fly fisherman? Our data suggest that the fly fisherman differ from bait and lure freshwater anglers somewhat based on demographics and significantly based on expenditures. They reside all over the United States with a large percentage of them living in the East North Central or the Mountain Census Region. Compared to the U.S. population, a larger proportion of fly fishermen reside in the mountain states. Fly fishermen have a high school education or above. Many fly anglers are college graduates. Their incomes are the same as their freshwater bait and lure peers but they appear to spend a greater amount of it on fishing equipment and fishing travel expenditures. They spend a significant amount more on auxiliary equipment.

Income, which usually increases as education increases, is not a variable where differences are found between the two groups. This is surprising due to the expense of fly fishing equipment. When comparisons are made concerning means dollars spent on food and lodging, transportation, other trip cost, fishing equipment, auxiliary equipment and fishing licenses it appears as if in fact a higher percentage of the fly anglers' income is devoted to the sport. Bryan's (1977) typology would suggest that as the angler becomes more and more involved in fishing the sport becomes a central life interest. If fly angling has become a central life interest for these anglers then a majority of their discretionary income may be devoted to the sport regardless of their total income. Futures studies need to include ways to determine fly fishing as a central life interest. Improved economic measures need to be added to fly fishing research. Future analysis of FHWAR fly fishing data might include economic models that would allow an indication of how much of a respondent's income is spent on fly fishing activities and equipment during a year.

Participation differences are as dramatic as expenditures. Fishing days and hours reported suggest that fly anglers fish longer hours and more days. These data should be viewed cautiously because the 1985 FHWAR data has several idiosyncratic features which may cloud results. Data reported here on days are for all types of fishing regardless of water type fished or equipment used. It is not possible to separate out bait and lure fishing days and fly fishing days for any angler in the FHWAR study. Unknown then is actually how many hours, days and trips fly fishermen participated in the sport of fly fishing. In addition, it is suspected that the number of fishing days reported by anglers is the 1985 data may be inflated by respondents due to recall errors.

Our search for information on fly fishing led us to articles in the popular press which only offered advice to the angler or elaborated on the mystical joys of fly fishing. Limited information existed in journals. We have no idea whether state fish and wildlife managers, fly fishing equipment manufacturers and fly fishing outfitters are aware of their clientele's spending patterns, demographics, and travel behavior. As fly fishing participation continues to grow as a sport we encourage state fish and wildlife departments, manufacturers and outfitters and university professionals to increase or initiate communications, to compare information and share data.

We have only begun to explore the notion of the sixth digit: the uniqueness of fly fishermen. Our data is limited in its scope and its population. Future studies focusing on fly fishing should be specific about the type of fishing, the number of days, hours and trips that are unique to fly fishing, and should include social and psychological factors.

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MOTIVATION/IMPORTANCE TYPOLOGY OF NATURAL RESOURCE HARVESTERS

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The purpose of this study was to develop a taxonomy of motivations related to three natural resource harvesting activities and to investigate the ability of the taxonomy to differentiate participation rates and specialization among harvester types. A factor analysis of attribute and motive scores collected from 392 residents from a rural county in Vermont revealed four separate factors/scales of harvesting motives for respondents engaged in hunting and fishing. Three motivational factors were discovered in the reduction of motivation and importance scores for berrying/mushrooming. Factor scores were used in a subsequent K-means cluster analysis for each of the three harvesting activities. Five clusters or types of motivational dimensions emerged for each activity. The motivational clusters (types) were found to be significantly different in participation rates across all three activities. Hunting clusters were significantly different in the numbers of specialized equipment used. Understanding the motivations of resource harvesters and the construction of a taxonomy of harvesters based on motivations could provide resource managers with a more efficient means for segmentation in future marketing decisions and for distinguishing among the constituency groups they must serve.

Harvesting natural resources provides rural Vermonters with both consumptive and non-consumptive benefits ranging from material goods like firewood and food to recreation participation. Participation in consumptive activities also often reinforces a variety of psychological, sociocultural, and heritage values that maintain individual stasis, interrelationships, and other components of social structure. Understanding the meanings and motivations for participation in resource harvesting will provide managers and policy makers useful information to enhance the quality of rural life.

Numerous studies of harvesting activities (i.e., fishing and hunting) have indicated that there are multiple motives for engaging in consumptive recreation activities and have focused on identifying and measuring the non-consumptive experience outcomes (Knopf et al., 1992). Most of these studies have attempted to find meaningful ways to distinguish recreational segments of such activities and to identify the diversity sought by participants, including such varied experiences as relaxation, experiencing nature, and companionship, as well as catching or bagging game (Knopf et al., 1973; Loomis and Ditton, 1987; Decker and Connelly 1989; Hammitt et al., 1990; Steele et al., 1990). Much of this research has had practical significance for partitioning hunters and anglers into groups or constituencies in order to provide more effective management (Knopf et al., 1992).

Other studies have focused on the consumptive benefits of harvesting activities, focusing on the contribution to household and individual well-being (Glass et al., 1990). Implicit in these studies have been assumptions that participants are motivated by food procurement (e.g., hunting and fishing), BTU output (e.g., personal firewood cutting), and monetary income (e.g., cutting Christmas trees to sell), as well as participation for "recreational values". Few of these "subsistence" studies, however, have actually identified the underlying motivations and importance dimensions for people engaged in such consumptive activities and even fewer have gone beyond exploring a single motivation variable. A comparison of motivations across harvesting activities is also needed to determine if motivational patterns exist among harvesting activities.

Exploring the multiple dimensions of motivation of those participating in traditional subsistence or consumptive resource harvesting activities, including food procurement, may help explain why individuals participate in these activities even when monetary income is available. Moreover, various motives could be used to develop a "motivational/meaning" typology of harvesters. Such a typological construct could subsequently be used to explore differences in specialization constructs (e.g., recreation activity specialization) or for examining the non-consumptive sociocultural aspects of the experience. By comparing partitioned motivations across harvesting activities common patterns may be discerned that could help managers of resources better understand and predict behavior, and harvester reaction to management policy.

The purpose of this research was to determine the underlying dimensions of motivation and activity importance statements in three traditional subsistence harvesting activities—hunting, fishing, and berrying/mushrooming, and to develop a typology of individuals based on those motivational/ importance dimensions.

Methods

This study used data collected from 392 respondents to a subsistence questionnaire mailed to a random sample of 1172 residents of a rural county in Vermont's Northeast Kingdom (the three most northeastern counties). Approximately 10.5 percent (i.e., 123) of the questionnaires were undeliverable (37% response rate using a modified Dillman [1978] method). Measurements of hunting motivations were based on twenty three Likert type scales on which respondents rated the relative importance of various hunting attributes and level of agreement with motives for participating. Twenty one scaled statements were used to assess fishing motives and seventeen were used for berrying/mushrooming. Respondents were queried about the types and variation of equipment used in harvesting and the extent to which they shared their harvest. A series of demographic questions and questions about days of participation in activities also were collected.

Exploratory factor analysis (Principle Axis Factor Analysis) was initially used to reduce the motivation attributes of each of the three harvesting activities to smaller, more manageable, underlying dimensions. Because the factor scores from such analysis cannot be saved, a principle components approach was then used. The factor scores from the reduced scales in the principal components analysis were subsequently used in nonhierarchical cluster analysis to classify and categorize the respondents into groups for each of the three harvesting activities. Clusters of individuals that emerged from the cluster analytic procedure can be characterized as holding common motivational profiles. This commonality (or homogeneity) can then be used for comparison with other "types".

Non-parametric statistical procedures then were used to differentiate clusters for each of the three harvesting activities on the basis of their mean participation rates in the harvesting

activities and the magnitude of their use of specialized equipment. A comparison of clusters of motivations among the harvesting activities also was attained as a descriptive component of the study.

Analysis and Results

The rural resident respondents participated in a variety of harvesting activities (see Table 1). They indicated extensive days of participation in lake and pond fishing ($\bar{x}=25.3$ days), as well as cutting firewood for personal use ($\bar{x}=21.0$ days). While such participation exceeds national and state averages, the extensive access to natural resources (both public and private) may explain some of the respondent's participation. What was surprising was the percent of respondents participating in harvesting activities, particularly berrying (68.6%) and fishing (47%). Respondents also distribute and receive harvested resources extensively. Table 2 indicates that a greater percentage of households reported receiving than giving each of the harvested resources, except for mushrooms/berries. Home garden products were reported as being given and received by the greatest percentage of households.

Table 1. Participation in non-marketed harvesting/gathering activities in a rural Northeast Kingdom county of Vermont, 1992.

Activity	Percent Participating (n = 347)	Average Number of Days Participating (Participants Only)
Lake or pond fishing	47.0	25.3
Stream fishing	49.9	17.5
Small game hunting	36.9	15.9
Large game hunting	39.8	15.2
Waterfowl hunting	3.7	9.1
Berry picking	68.6	10.3
Mushrooming	4.9	6.6
Wood cutting for personal use	38.0	21.0
Sugaring	12.6	19.6

Table 3. Motivation/Importance factors for hunting.

Motivation /Importance	Factor I Food Procurers (11.4%) ^a	Factor II Outdoor Life (13.5%)	Factor III Trophy Harvest (11.7%)	Factor IV Social Harvest (7.5%)
Hunt for food supply	.774			
Hunt for food*	-.710			
Hunting is over regulated	.578			
Shoot only the game I'll eat	.508			
Hunt to relax		.796		
Hunt to enjoy nature		.746		
Enjoy hunting w/o harvesting		.649		
Hunting important to my life		.616		
Hunt to obtain trophy animal			.792	
Bag trophy is biggest reward			.677	
Hunt to experience kill			.595	
Hunt only specific types game			.559	
Hunt because of challenge			.529	
Hunt to be with friends				.654
Rarely go hunting alone				.650
Hunt to be with family				.548

a/ Proportion of post-rotation variance explained

* Reversed scale

Table 2. Sharing and distribution of fish, wildlife, and other harvested resources.

Resources harvested	Gave to other households (n = 331)	Received from other households (n = 392)
Fish	18.7	21.2
Small game	3.6	9.4
Large game	6.0	18.6
Waterfowl	1.0	NA
Mushrooms/berries	22.3	16.8
Fuel wood	8.1	20.9
Home garden products	32.5	45.1
Maple products	8.2	37.0
Other	NA	4.3

Exploratory factor analysis (principal axis factor analysis) was initially used to reduce the motivation/importance attributes to underlying dimensions. In this stage of the factor analysis an eight factors solution emerged for both hunting and fishing motivation scores; a six factor solution emerged for berrying motivations. After several specified iterations, the exploratory principal components analyses suggested a four factor solution for rotation for both hunting and fishing motivations and a three factor solution for berrying. The decision about the numbers of factors to be extracted for the final solutions were based on the convergence of eigenvalues (≥ 1.00); explained variance ($\geq 7.5\%$); and scree tests (Hawes 1988), and preservation of original dimensions found in the principal axis approach. The results of the four factor Varimax (orthogonal) rotation for hunting motivations/importance dimensions are shown in Table 3. Factor labeling was based on the criteria of a minimal significant loading ($\geq .450$) of variables on the factor. Factor 1 suggests motivations related to *food procurement*, epitomized by motivations related to hunting for food supply and the importance of hunting for food. This dimension is also characterized by the statements "I shoot only the wild game I'm going to eat" (.508) and "Hunting is over regulated" (.578). The second dimension

indicates an *outdoor life* orientation. Motivations attributed to this dimension appear to be hunting to relax (.796), hunting to enjoy nature (.746), enjoyment of hunting without bagging game (.649), and importance of hunting to their life (.616). The third factor reflects an orientation toward *trophy hunting*. Loadings on this factor reflect large numbers of respondents who hunt to obtain a trophy animal (.792), who see the greatest reward in hunting in bagging a trophy (.677), who hunt to experience the kill (.595), who specialize in only hunting specific types of game (.559), and who are motivated because of the challenge (.529). The fourth factor loaded on hunting to be with friends (.654) and family (.548), and respondents indicated they rarely hunted alone (.650), suggesting a factor related to the *social aspects of harvesting*. The four underlying dimensions, thus, appear to form differentiating structures of hunting motivation profiles.

A four factor solution was also suggested for fishing motivations. Similar decision criteria (i.e., eigenvalue convergence, explained variance, and scree test) were used in determining the number of factors to extract for a final solution. The first motivational factor was seen as *outdoor*

escape, characterized by moderate to high loadings on fishing to enjoy nature (.743), importance of fishing to be outdoors (.741), and fishing as an important part of the respondent's life (.621). This factor also had moderate loadings on fishing to relax, fishing for enjoyment, and keeping the catch. Similar to the first factor of the hunting motivational dimensions, the second factor of fishing motivations was related to *food procurement* loading heavily on the importance of fishing for food supply and the motivation of fishing for food. The third factor was unique because of the inverse loadings on fishing to catch a trophy (-.708), fishing for extra income (.574), and seeing trophy catch as a big reward (-.508). The motives for fishing are non-trophy oriented, and seem to indicate a dimension in which people just *dabble* in fishing, that is they fish just to fish. The fourth factor again is related to the social aspects of the harvesting activity. Here the motivation is to fish to be with family (.662), enjoy fishing without harvesting (.534), fish to be with friends (.532), rarely fish alone (.467), and an inverse loading on the statement that they wouldn't fish even if they wouldn't catch anything (-.460). The loadings on this latter factor indicate a *social experience* motivational dimension.

Table 4. Motivation/Importance factors for fishing.

Motivation /Importance	Factor I Outdoor Escape (16.0%) ^a	Factor II Food Procurer (9.1%)	Factor III Dabbler (8.5%)	Factor IV Soc. Experience (9.8%)
Go fishing to enjoy nature	.743			
Go fishing to be outdoors	.741			
Fishing is important to my life	.621			
I fish to relax	.584			
Fish for enjoyment*	-.555			
Only keep the fish I'll eat	.544			
Fish for food supply		.832		
Fish for food*		-.643		
Fish to catch a trophy			-.708	
Fish for extra income*			.574	
Trophy catch is biggest reward			-.508	
Fish to be with family				.662
Enjoy fishing w/o harvesting				.534
Fish to be with friends				.532
Rarely go fishing alone				.467
I wouldn't fish if I thought I wouldn't catch anything				-.460

^a/ Proportion of post-rotation variance explained

* Reversed scale

Again employing the aforementioned criteria for determining the optimal number of dimensions, a three factor solution was suggested for motivations in berry harvesting (see Table 5). The first factor for berrying was characterized by loadings on berrying to be outdoors (.795), berrying to enjoy nature (.781), pick berries to have peace and solitude (.696), and to a lesser extent pick berries to be with family (.549) and friends (.514). This first factor was labeled *outdoor escapist*. The second factor, *food procurement*, was characterized by motivations for picking berries for food and picking specific types of berries. The third factor was again a *family gathering* factor. The motivations loading on this factor were "pick berries to be with family" (.618) and a high loading on "rarely go berrying alone" (.781).

A review of the factors across the three harvesting activities indicates a commonality of motivations related to food procurement, having an outdoor experience, and social contacts. Hunting is differentiated by a trophy motivational dimension, whereas fishing has a unique motivational dimension related to fishing for its own sake. Factor scores from the rotated factor solutions for each of the three harvesting activities were then used in subsequent cluster analyses to partition harvesters into types.

Table 5. Motivation/Importance factors for berrying.

Motivation /Importance	Factor I Outdoor Escapists (18.5%) ^a	Factor II Food Procurers (12.8%)	Factor III Family Gathers (9.7%)
Go berrying to be outdoors	.795		
Go berrying to enjoy nature	.781		
Pick berries for peace/ solitude	.696		
Enjoy berrying w/o harvesting	.618		
Pick berries to be with family	.549		.618
Go berrying to be with friends	.514		
Berrying for family food supply		.731	
Pick berries for food*		-.675	
Berrying important to my life		.608	
Pick only specific types		.497	
Rarely go berrying alone			.781

a/ Proportion of post-rotation variance explained

* Reversed scale

Cluster analysis is essentially a mapping procedure. The output from the procedure allows one to identify and label the cluster, and understand how cases group together. Various cluster analytic procedures are available, but generally can be divided between hierarchical and nonhierarchical techniques. A nonhierarchical, or iterative, cluster procedure (K-means) was selected for use in this study because of the relatively large number of cases. The nonhierarchical technique uses multivariate profiles to sort the cases into k-clusters based on "seed" points (Goldsmith 1987). The initial seed points were automatically defined by the cluster program used and each case was assigned to an initial seed. Seed points were then redefined through subsequent iterations. In the first stage of the cluster analysis for this study, an iterative partitioning method was employed to determine respondents who were outliers. Through subsequent iterations and elimination of outliers (single case clusters) the original 141 respondents who responded to the hunting motivation questions were reduced to a set of 140; those who responded to the fishing motivations were reduced to 178 cases; and berry pickers were reduced to 231 respondents.

One of the difficulties in using nonhierarchical cluster analysis is the determination of the optimal number of homogeneous groups for the final solution. Aldenderfer & Blashfield (1984) suggest heuristic procedures for determination seem to be predominant. In this study, we subjected the hunting motivational factor dimension scores of the reduced set of respondents to eleven different cluster runs that ranged from 12 clusters to 2 clusters. A five cluster solution was selected as optimal based on the criteria of interpretability of the clusters and modified scree test (Aldenderfer & Blashfield 1984)). An examination of Cluster I, which contained the largest number of cases (50), revealed that the factors related to Outdoor Life (Factor II) and the Trophy Harvesting (Factor III) factor could be identified as interpreting the cluster (both factor means were positive); this cluster was subsequently labeled as *Specialists* because of the emphasis on trophy harvesting (see Table 6). The second cluster of 22 cases had a moderately high mean associated with the first factorial dimension and was negatively related to the other three. Because this first factor was a Food Procurement oriented dimension, the cluster was characterized as *Food Procurers*. The third cluster contained only 3 cases. This cluster was characterized by negative means on all four factor dimensions. A further examination of the raw data on these respondents revealed very minimal participation in hunting activities and little agreement with any motivational statements for participating; this cluster was labeled as *Un-Hunters*. Cluster IV (44 cases) was characterized

by a moderate positive mean on the second factor—Outdoor Life, and a positive mean on the fourth factor—Social Harvest. This cluster was labeled *Outdoor Socializers*. The 21 cases comprising Cluster V, had a very high mean on the fourth and third factors (Social Harvest and Trophy Harvest respectively), and a moderate positive mean on the first factor (Food Procurers). Cluster V was labeled *Trophy Socializers*. This latter cluster may be epitomized in by those who attend deer camp for both the hunting and socializing aspects.

Table 6: Hunting clusters.

Clusters	Factor I (Food Procurers)	Factor II (Outdoor Life)	Factor III (Trophy Harvest)	Factor IV (Social Harvest)
I Specialists	-0.16	0.32	0.62	-0.71
II Food Procurers	0.62	-1.21	-0.67	-0.34
III Un-Hunters	-2.98	-2.68	-0.39	-0.27
IV Outdoor Socializers	-0.30	0.63	-0.76	0.45
V Trophy Socializers	0.66	-0.47	1.03	1.16

Eleven different cluster solutions also were run on the fishing motivation factor scores. A five cluster solution was selected based on interpretability of the clusters and scree/fusion test (see Table 7). The first cluster contained 86 harvesters and was defined by moderately low positive means on all four fishing motivational factors. This first cluster was labeled as *Generalists*. Cluster II had negative loadings on Factors I (Outdoor Escape), II (Food Procurement), and IV (Social Experience), and a positive loading on Factor III (Dabbler). The relatively inverse relation to outdoor escape and positive relationship with the third factor suggests labeling this cluster of 28 cases as *Dabblers*. Cluster III contained 46 harvesters and was distinguished by the single positive mean associated with the Outdoor Escape motivational factor (Factor I). This cluster was labeled as *Outdoor Enthusiasts*. Cluster IV was clearly related to the third factor—food procurement and was inverse to the social experience; the cluster of 10 harvesters was labeled —*Food Procurers*. The fifth cluster was positively related to Factor II (Food Procurement) and Factor IV (Social Experience). As a result of the higher positive mean on the social dimension, Cluster V (8 cases) was labeled as *Social Participants*.

Table 7: Fishing clusters.

Clusters	Factor I (Outdoor Escape)	Factor II (Food Procurement)	Factor III (Dabbler)	Factor IV (Social Experience)
I Generalists	0.47	0.59	0.20	0.37
II Dabblers	-1.11	-0.22	0.19	-0.32
III Outdoor Enthusiasts	0.37	-1.20	-0.22	-0.25
IV Food Procurers	-0.93	0.97	-0.05	-2.38
V Social Participants	-2.20	0.09	-0.79	1.35

A five cluster solution was also selected for the berry harvesters (see Table 8). Cluster I was characterized as *Generalist Gatherers* because of the positive relationship to all three motivational factors (Outdoor Escape, Food Procurement, and Social Gatherers) of berrying. Sixty eight berry pickers were classified into this type. The 51 berry harvesters of Cluster II had a moderately positive mean on Factor II (Food Procurement) and negative means on Factors I (Outdoor Escape) and III (Social Gatherers). This cluster was subsequently labeled as *Food Gatherers*. Cluster III, labeled as *Outdoor Enthusiasts*, had one positive mean on the first factor dimension (Outdoor Escape) and negative means on dimensions two and three. There were 55 harvesters classified into this type. Cluster IV partitioned 25 berry pickers into a cluster characterized by a positive mean associated with Factor III (Social Gatherers) and negative means on Factor I and Factor II. The cluster was labeled as *Family Pickers*. The final cluster type had moderately positive means on Factors I (Outdoor escape) and III (Social Gatherers); and a negative mean on the Food Procurement factor. This fifth cluster was labeled *Outdoor Kinship* and partitioned 32 berry harvesters into this type.

Table 8: Berrying clusters.

Clusters	Factor I (Outdoor Escape)	Factor II (Food Procurement)	Factor III (Social Gathers)
I Generalist Gatherers	0.45	0.68	0.79
II Food Gatherers	-1.09	0.59	-0.39
III Outdoor Enthusiasts	0.66	-0.13	-1.12
IV Family Pickers	-1.24	-1.20	0.22
V Outdoor Kinship	0.58	-1.15	0.66

In summary, the cluster analysis indicated that five distinct motivational "types" of harvesters are prevalent for each of the three harvesting activities. Such constructed types help reduce the data's complexity and can be useful for comparing real events related to the attributes of the type (Lorr 1983). The value of constructed types lie in their use in comparing empirical data, so the taxonomic scheme should be tested to be useful.

The viability of the constructed typology was explored by testing whether clusters within each harvesting activity could also be distinguished on a specialization construct. Various research studies have used frequency of participation as a surrogate for specialization in activities; others have used the purchase and use of specialized equipment as an indicator of the specialization concept. It was hypothesized that the five clusters for each of the three harvesting activities could be distinguished by their participation rates in the respective harvesting activity. Because of the small numbers of cases in some of the clusters, a non-parametric version of Analysis of Variance, the Kruskal-Wallis Test, was used to examine whether differences existed among the five cluster "types" on

their participation rates. Significant differences in participation rates were found among cluster "types" for each of the three activities—hunting, fishing, and berrying (see Table 9). An examination of means days of participation in hunting indicated that Trophy Socializers (Cluster V) differed significantly from Un-Hunters (Cluster III) and Food Procurers (Cluster II). In fishing, Generalists (Cluster I) significantly differed in mean days of participation from Dabblers (Cluster II) and Food Procurers (Cluster IV). Generalists and Outdoor Enthusiasts showed significant differences from the clusters labeled Family Pickers and Outdoor Kinship in mean days of berry harvesting.

Kruskal-Wallis analysis was also employed to test whether clusters in each harvesting activity differed in the numbers of specialized equipment used in their respective natural resource harvesting activities. No significant differences were found among fishing or berrying clusters, but significant differences were found among the hunting clusters (see Table 10). An examination of mean numbers of specialized equipment used in hunting indicates that Specialists (Cluster I) and Trophy Socializers (Cluster IV) differed appreciably from Food Procurers (Cluster II) and Un-Hunters (Cluster III) by using a greater number of specialized equipment in their harvesting activities. The results of the Kruskal-Wallis analysis, thus, indicate limited support for the viability of the cluster constructs' ability to differentiate harvesters on other empirical variables.

Table 9. Hunting, fishing, and berrying clusters: Differences in participation.

Participation	(Kruskal-Wallis)	Test statistic Significance ^a
Hunting Clusters	H = 11.263	p ≤ .025
Fishing Clusters	H = 19.043	p ≤ .005
Berrying Clusters	H = 26.339	p ≤ .005

a/ p ≤ .05, 4 df.

Table 10. Hunting, fishing, and berrying clusters: Differences in numbers of specialized equipment used in natural resource activities.

Participation	(Kruskal-Wallis)	Test statistic Significance ^a
Hunting Clusters	H = 9.663	p ≤ .05
Fishing Clusters	H = 8.095	N.S.
Berrying Clusters	H = 5.203	N.S.

a/ p ≤ .05, 4 df.

Implications

Given the limitations of the natural resource base and the demands for a variety of consumptive and non-consumptive uses as well as non-user interests, natural resource management agencies are faced with exceedingly difficult allocative and managerial choices. Managers must define what is to be delivered at any given resource in the context of the system of resource areas (Knopf et al., 1992, p. 151). In some instances the goal may be to provide opportunities for experiences that fit with the intrinsic nature of the resource (Knopf et al., 1992, p. 151). For example, for one constituency partitioned in this study fisheries managers may want to enhance and protect a trophy fishing lake, or conversely improve habitat for a prolific warm water species and provide additional access for a

lake frequented by dabblers. In contrast, an alternative goal may be responsiveness to new constituencies as traditional users change their patterns of use or there is attrition of users. For example many of our public resource agencies are pressured to justify budgets by the number and types of users on the resource areas. As use declines for certain traditional activities (e.g., hunting) these agencies are expected to "market" to new constituencies. The extent of use and relatively low service and impact requirements of berry and mushroom pickers suggest a possible new market segment for those agencies wishing to expand their clientele.

Market segmentation may also help to accommodate a mix of users with similar motivations and to structure services to appeal to these distinct motivational types, i.e., designating and managing a resource area for trophy hunting or fishing. Alternatively, a particular resource area may be designated and managed for food procurement at the exclusion of other uses or users and may be marketed using strategies designed to appeal to those motivated by such concerns by emphasizing success of harvest for all three activities or the quality of fish, game or berries/mushroom. In both instances a typology of motivations can contribute to a more effective and efficient marketing strategy.

Partitioning harvesters by motivation is also useful for understanding the non-consumptive benefits accruing to those who engage in consumptive activities such as hunting, fishing and berrying. All three activities have distinct harvester types who are motivated to participate by social reasons, being outdoors and enjoying nature, and food procurement. These three types may have unique beliefs about how resource areas should be managed and unique ways they develop social support networks that cross harvesting activities. Such a taxonomy, as that provided in this study, is a more parsimonious method of exploring these differences. Further studies should explore whether these "types" differ in belief and interaction structure.

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***ECONOMIC DEVELOPMENT
ASPECTS OF TRAVEL AND
TOURISM***

RURAL TOURIST AND NON-TOURIST COMMUNITIES IN MASSACHUSETTS: QUALITY OF LIFE PATTERNS 1980-1990

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Over the past 30 years there has been considerable interest in evaluating various impacts of the tourism industry. Most research efforts have tended to examine relationships between the presence of tourist-related activities and traditional economic factors at the community level. Such studies have generally focused on relationships at a singular point in time. This study examined relationships between tourism in rural communities and selected variables which are related to the quality of community life spanning a ten-year period. In addition, rural tourist communities were compared to rural non-tourist communities in the Commonwealth of Massachusetts in terms of quality of life changes that took place from 1980 to 1990.

Introduction

In recent years, communities, states and even nations have been actively promoting tourism with the hope of energizing their economies and enhancing the quality of life. There is some risk in this since the effects of tourism may be quite varied and highly dependent upon the particular setting and the particular type of tourism activity that is involved. For example, in discussing the social impact of tourism on developing regions, Crandall (1987; p. 382) stated, "Most of the social impacts contain both negative and positive aspects, which might or might not balance the other." This is evident from the earlier research of Fritz and Konecny (1981) who found positive correlations between tourism and economic stimulation, and the work of Pizam (1977), Pizam and Pokela (1978) and Miller (1980) who identified negative associations between tourism and community quality of life factors. Furthermore, Perdue, et al., (1990) found that community support for tourism was mixed while Dogan (1989) and Ap (1990) cited studies which identified both positive and negative factors that seem to be associated with tourism.

As Massachusetts and many other states continue to promote tourism activities, it becomes increasingly important to attempt to identify what has been happening in tourism communities and what is likely to occur in the future. Thus, the purpose of this study was to compare selected quality of life factors in communities that were categorized as rural, tourist communities with non-tourist, rural communities in the Commonwealth of Massachusetts. Variables in tourist and non-tourist communities were examined in 1980 and 1990 and the results for both years were compared. The results of this

study were of particular interest since in the study conducted prior to this one, the authors found a number of negative relationships between the presence of tourism and selected quality of life factors at the local level (Klar, Keegan and Warnick, 1985).

Method

In an effort to strengthen the validity of this study, the sample size was increased significantly over the number utilized in the previous study (Klar, Keegan and Warnick, 1985). In the first study, 17 rural, tourist communities were identified and only 17 communities were randomly selected from all non-tourist towns having 1980 populations of at least 2,500 residents, but less than 25,000 residents. In the present study, the sample of rural, tourist communities was increased to 21 and the rural, non-tourist sample was expanded to include all of the 48 towns that met the criteria. The increase in tourist communities occurred as a result of slight changes in the criteria defining tourist communities. Specifically, in the previous study, for communities to be classified as tourist communities, their populations had to be within the same range as non-tourist communities (less than 25,000 residents), and at least the following resources had to be available within their towns: (1) ten eating and drinking establishments, (2) four hotels, motels or inns and (3) three amusements (e.g., theme park, bowling alley, golf course). The criteria for this study were virtually the same with one exception: a community could be categorized as a tourist community with less than three amusements if, instead, there was a major amusement that clearly attracted tourists to that community. Examples of such communities include Rockport, which attracts visitors seeking a variety of ocean experiences, and Sturbridge, which attracts visitors to Old Sturbridge Village. The 21 rural, tourist communities and 48 rural, non-tourist communities making up the two study groups are listed in the Appendix.

Data were collected from a variety of secondary sources which included the data base of the Massachusetts Executive Office of Environmental Affairs (1990), the U.S. Census (1980, 1990), Massachusetts Municipal Profiles (1990), Massachusetts Department of Commerce (1984), Massachusetts Department of Research Monograph (Gibney, 1984) and Massachusetts Town Annual Reports (1980, 1981, 1982).

Results

Despite similarities in populations and, to a large extent, rural character of the study communities, there were many differences between tourist and non-tourist communities in both 1980 and 1990. In addition, numerous differences were found in their rates of change from one decade to the next.

If one assumes that tourism activity should be of benefit to local economies, one would expect increases in populations within tourist communities. In fact, over the past 10 years in Massachusetts, this was the case. The growth rate for rural, non-tourist communities was approximately 10 percent while the rate in rural, tourist communities exceeded 13 percent (Table 1).

On the other hand, one might also expect greater increases in the median family income within tourist communities, however, this was not the case (Table 1). It should be emphasized, however, that the differences between tourist and non-tourist communities was relatively small (9%). By 1990 the actual mean incomes were less than \$2,600 apart (tourist, \$39,600; non-tourist, \$42,200). It should also be noted that other research found that the relative impact of tourism income on a community's gross income is relatively low in rural communities (Kottke, 1985).

Table 1. Percent change in population and median income, 1980-1990.

Variable	Tourist	Non-Tourist	Difference
Percent increase in population growth 1980-1990	13 %	10 %	3 %
Percent Change in Median Family Income 1980-1989	102 %	111 %	- 9 %

In 1980, the median value of houses in tourist communities was slightly more than one-third higher than in non-tourist communities (Table 2). At the end of the decade, that difference was reduced to 21 percent. Despite the fact that housing values did not grow at as a great a rate in tourist communities, overall property taxes in tourist communities grew at a substantially greater rate from 1980 to 1990 (Table 3). This finding would be expected if infrastructure needs were to become greater in tourist communities which would then necessitate higher taxes to support those services.

Table 2. Tourist and non-tourist 1980 - 1990 median house values.

Variable	Tourist	Non-Tourist	Difference
1980 Median House Value	\$59,000	\$44,000	\$15,000 (34%)
1990 Median House Value	\$170,000	\$140,000	\$30,000 (21%)
Percent Change Median House Value 1980-1990	188.1 %	218.2 %	-30.1 %

As is evident in Table 4, this would seem to be the case. The combined expenditures for police, fire, human services and recreation in tourist communities exceeded those of non-tourist communities. Also apparent in Table 4 is the fact that in tourist communities more is spent to educate their pupils.

Table 3. Tourist and non-tourist 1980 - 1990 property tax evaluations.

Variable	Tourist	Non-Tourist	Difference
Total Property Tax Evaluation 1980 (in millions)	\$197	\$104	\$93
Total Property Tax Evaluation 1990 (in millions)	\$1,100	\$428	\$672
Percent Change Property Tax Evaluation 1980-1990	458.4 %	311.5 %	146.9 %

Table 4. Selected tax expenditures.

Variable	Tourist	Non-Tourist	Difference
Per Pupil Tax Expenditure 1980	\$1,900	\$1,500	\$400
Per Pupil Tax Expenditure 1990	\$3,900	\$3,400	\$500
Percent Change Per Pupil Tax Expenditure 1980-1990	105.2 %	126.7 %	- 21.5%
1989 Tax Expenditures for Police, Fire, Recreation, Human Services (in millions)	\$1.9	\$1.3	\$0.6

Finally, the acres of publicly owned recreation and conservation land in tourist and non-tourist communities were identified in the study communities. It was expected that tourist communities would have more of these resources, many of which might be directly connected to local tourism efforts. This did prove to be the case; more than 7,500 acres of municipally owned recreation and conservation areas were found in tourist communities compared to less than 4,800 acres in non-tourist communities.

Summary and Conclusions

How, then, might rural, tourist communities in Massachusetts be characterized? Rural tourist communities seem to have experienced greater growth in population than rural, non-tourist communities over the past 10 years. Although the percent change in median family income in that period more than doubled in both study groups, rural, tourist communities lagged behind by almost 10 percent.

While differences in earning power were relatively small, considerable change took place in median housing values. Values in non-tourist communities increased at a substantially greater rate than in tourist communities, yet property taxes in tourist communities outpaced those in non-tourist communities by a considerable margin.

Among the variables examined in this study, perhaps those best quality of life indicators relate to the provision of education, recreation and community services. By 1990, tourist communities had acquired considerably more recreation and conservation land than non-tourist communities. In addition, in both 1980 and 1990 they spent more than their counterparts for public education and for the combination of police, fire, recreation and human services. It must be emphasized that it is not clear whether these expenditures stemmed from increased infrastructure needs, or out of a desire to enhance the quality of life through the provision of increased services to the community.

It is our opinion that the results of this study more accurately reflect the differences between rural tourist and rural non-tourist communities in Massachusetts than the differences that were found using 1980 data (Klar, Keegan and Warnick, 1985). This is probably due to differences in the samples; that is, in this study the number of tourist and non-tourist communities was increased. In retrospect, it is likely that the sample of 17 tourist and 17 non-tourist communities in the first study was too small, particularly for the non-tourist sample. Communities in the present sample should continue to be tracked on a regular basis.

These are but a few variables that seem to be connected to tourism and, even among these, the findings are not consistent. The question of whether tourism can, in fact, have a major impact on the economy and quality of life of local communities remains largely unanswered. Additional research is needed to compare these and other quality of life variables in tourist and non-tourist communities. Ideally, non-tourist communities that turn to tourism will be monitored very carefully and additional studies will be conducted which evaluate community life over the years in municipalities that continue to place a great deal of importance on the tourism industry.

Appendix

Non-Tourist Communities

Abington	Nahant
Acushnet	Northbridge
Amesbury	Northfield
Athol	Orange
Barre	Oxford
Blackstone	Palmer
Bookfield	Rockland
Cheshire	Sheffield
Dalton	Shirley
Dighton	Spencer
Dudley	Templeton
Easthampton	Tisbury
Essex	Upton
Hadley	Uxbridge
Hatfield	Ware
Hopedale	Warren
Hull	Wellfleet
Ipswich	West Bridgewater
Leicester	West Brookfield
Merrimac	Whitman
Middleborough	Williamsburg
Millbury	Winchendon
Monson	Winthrop
Montague	Wrentham

Tourist Communities

Adams	Nantucket
Bourne	Newburyport
Brewster	Oak Bluffs
Chatham	Orleans
Deerfield	Provincetown
Dennis	Rockport
Eastham	Stockbridge
Edgartown	Sturbridge
Great Barrington	Williamstown
Lee	Yarmouth
Lenox	

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ECONOMIC IMPACTS FROM SELECTED

AIHP VISITOR CENTERS

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The expenditures of non-resident visitors to six historic sites in a nine-county region of southwestern Pennsylvania were analyzed with an input-output model of the local economy. These sites and their visitors contributed \$18.8 million of value added to the regional economy. This activity provided support for 844 jobs in the region.

Introduction

In 1991, the Southwestern Pennsylvania Heritage Preservation Commission, through its Economic Development Advisory Group, contracted with The Pennsylvania State University to develop a five year series of economic impact analyses of individual America's Industrial Heritage Project (AIHP) visitor centers. Each year, individual AIHP visitor centers are evaluated in terms of their regional economic impact and the behavioral and demographic profiles of their visitor audiences. This year-by-year build of information will eventually provide an overview of the entire AIHP system and an ability to project the future economic and marketing features of the system.

Objectives

During 1992, the study focused on the economic impact of six individual AIHP visitor centers within a planning region consisting of Bedford, Blair, Cambria, Fayette, Fulton, Huntingdon, Indiana, Somerset and Westmoreland counties. Expenditures associated with these visitor centers were identified in terms of (1) regional purchases made by the non-resident visitors to AIHP centers, (2) public funds originating from outside the region and used for the operation of AIHP centers, and (3) public funds originating from outside the region and used for the capital development of AIHP centers.

The total economic impact of these expenditures was determined by the Impact Analysis for Planning (IMPLAN) model of the region. This model established the direct and secondary impacts resulting from the initial expenditures. Included in the secondary impacts are the indirect effects of inter-industry trade within the region and the induced effects of household consumption originating from employment in direct and indirect activities. Economic impact is measured in terms of value of shipments, value added to the total economy, and employment attributed to direct and secondary activities.

This report identifies the economic impact of five visitor centers surveyed in 1992 and one visitor center surveyed in 1991. During 1992, the following centers were surveyed:

- Allegheny Portage Railroad National Historic Site (ALPO)
- Horseshoe Curve National Historic Landmark (HC)
- Johnstown Flood National Memorial (JFMem)
- Johnstown Flood Museum (JFMus)
- Johnstown Inclined Plane (IP)

An estimate of the 1992 economic impact for the Altoona Railroaders Memorial Museum (RRM) was made using an update of the center's 1991 visitor expenditure patterns and its 1992 attendance records.

Procedures

Survey Methods

A random survey of visitors was completed in 1992 at selected AIHP sites during the peak tourism season, from June to mid-October. User information was collected through interviews at the visitor centers and a follow-up survey questionnaire. Candidates for the interviews were selected on a random sample basis. The interview solicited information on the respondent's socio-demographics and related trip information. The respondent was then given a follow-up questionnaire, to be mailed back after the completion of the trip. This latter instrument secured information on total trip expenditures and further details on the respondent's socio-demographics, behavior patterns, and perceptions of the AIHP sites.

The sample of visitors gathered during each week at a particular visitor center was classified as a survey group. Thank you/reminder postcards were sent to each survey group on the Monday following each week of interviews. If no response was received, a follow-up survey was mailed to each visitor on the second Friday following the completion of a survey week. A final reminder postcard was sent one week from the second Friday. All follow-up surveys were coded to designate whether the return survey was from the questionnaire initially handed out at the site or the one sent in the second mailing.

Organization of User Expenditures

The expenditure profile for the visitor was established from their survey questionnaire. This included an itemized listing of all expenditures made within the nine-county region during their AIHP site visit.

For the purposes of identifying economic impact, the visitors were classified into four categories. The first category included residents of the study region. Since their expenditures did not represent an influx of new money to the region, these amounts were excluded from impact analysis. In the case of non-residents, if the AIHP site visit was the primary purpose of their trip, then all of their regional expenditures were attributed to the site. If the AIHP site visit was one of several mutually important purposes for the non-resident's trip, then their regional trip expenditures were divided equally among the several purposes. Finally, if the AIHP site visit was of minor importance to the non-resident's trip, then only their daily expenditures were considered, with this cost divided among the number of activities pursued on the day of the AIHP visit.

Average expenditures per visitor day were calculated for each site. Visitor expenditures were further classified by type of major purchase (e.g., food, transportation, and lodging). Site-related expenditures, even if they pertained to food, transportation or lodging, were classified separately. Miscellaneous purchases not tied to the site were organized as a fifth class. Within each of these classes, a more detailed stratification was made relevant to the actual industrial sector producing the good or service. Averages were calculated for the amounts directed to each industrial sector, and entered into the IMPLAN model as absolute expenditure levels for further analysis.

Economic Modeling System

The economic contributions of the America's Industrial Heritage Project (AIHP) were modeled with the Impact Analysis for Planning (IMPLAN) System, developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the University of Minnesota. The IMPLAN model was designed by the Forest Service to estimate the regional economic impacts of management plans for National Forests (Alward et al. 1985). IMPLAN is a computerized data base and modeling system for constructing regional economic accounts and regional input-output tables.

Regional expenditures were organized into final demands on regional industries. In the case of retail goods, these direct sales were less than the regional expenditure. This resulted from the model treating retail sales outlets as margined sectors. In this situation, only the value added for the retail outlet was identified with the sector, with the actual cost of the commodity directed back to the producing industry.

Final demands, or direct sales, were analyzed by IMPLAN in terms of their indirect effect on other supporting industrial activity and their induced effect from the income spent by households employed in direct and indirect activities. The combination of direct, indirect, and induced effects (total impact) was measured in terms of the total sales of goods and services, the value added to the region's economy, and annual employment.

Results

Survey Responses

A total of 2114 surveys were taken at the five visitor centers during the 1992 season. The survey period ran from June 1 to October 10, 1992. From these initial surveys, 1766 responses were secured by way of completed mail-back questionnaires, representing an overall response rate of 83%. This compared well to the previous 1991 survey season, which netted 1718 completed questionnaires from five sites for an 83% response rate.

Annual Attendance

Attendance at the visitor centers was gathered by site managers. The origin of these users, as residents or non-residents of the nine-county AIHP region, was based on the visitor surveys (Table 1). The Flood Memorial and Flood Museum displayed a greater percentage of non-residents (65% and 73%, respectively) than did the Inclined Plane or Allegheny Portage (53% and 56%, respectively). Somewhat in contrast, the Railroaders Museum and Horseshoe Curve showed the highest percentage of non-residents (77% and 80%, respectively).

Table 1. Annual attendance at AIHP visitor centers and distribution of attendance among residents and non-residents of the nine-county AIHP region, 1992.

Visitor Center	Attendance	Resident	Non-Resident
ALPO	37,528	44.5%	55.5%
RRM	28,054	23.0%	77.0%
HC	172,424	21.1%	79.9%
JFMem	60,468	34.9%	65.1%
JFMus	36,342	26.8%	73.2%
IP	170,737	47.1%	52.9%
Total	505,553		

The non-resident visitors to AIHP centers identified the relative importance of their site visit in the context of their regional trip (Table 2). At the Horseshoe Curve, 62% of the non-residents placed their site visit as the primary purpose of their regional trip. This ranking was also found among 37% of the non-residents at the Flood Museum and 32% at the Flood Memorial. A fairly narrow range of non-residents ranked their AIHP site visit as one of several mutually important purposes to their regional trip (shared), ranging from 14% of the non-residents at Horseshoe Curve to 22% at Allegheny Portage. The third classification ranked the AIHP visit as a minor component of the non-resident's overall regional trip. Only 24% of the non-resident audience at Horseshoe Curve used this classification. Approximately one-half of the non-resident visitors at the Flood Museum, Flood Memorial, and Allegheny Portage classified their visit as a minor event. Nearly 70% of the non-resident visitors to the Inclined Plane used the same classification.

Table 2. Distribution of non-residents classifying their AIHP visit as primary, shared, or minor to their regional trip.

Visitor Center	Primary	Shared	Minor
ALPO	22.6%	21.5%	55.9%
RRM	17.4%	28.2%	54.4%
HC	62.3%	13.6%	24.1%
JFMem	31.5%	15.6%	52.9%
JFMus	37.1%	15.1%	47.8%
IP	13.4%	18.3%	68.3%

Visitor Expenditure Profiles

A review of the average expenditures per visitor day shows a marked contrast between resident and non-resident visitors (Table 3). Not surprising, non-residents spent three to four times more than residents, largely due to their dependence on local businesses for food and lodging services and their increased cost for transportation.

Table 3. Average regional expenditures per visitor day for resident and non-resident visitors to AIHP centers, 1992.

Visitor Center	Resident	Non-Resident	All Visitors
ALPO	\$7.89	\$38.93	\$25.12
RRM	\$14.17	\$51.39	\$42.91
HC	\$17.97	\$55.62	\$47.66
JFMem	\$13.56	\$39.61	\$30.51
JFMus	\$13.29	\$48.18	\$38.82
IP	\$12.22	\$33.81	\$23.65

On an absolute measure, the non-resident visitors to the new Horseshoe Curve facility registered the largest average expenditure level, \$55.62 per visitor day. The next largest expenditure levels for non-resident visitors were at the Altoona Railroaders Museum (\$51.39/vd), Johnstown Flood Museum (\$48.18/vd) and the Flood Memorial (\$39.61/vd). Of interest, the resident visitors at Horseshoe Curve had the largest expenditures among all resident AIHP visitors, \$17.97 per visitor day.

On the basis of types of expenditures made by non-resident visitors, the lead item at most sites was food-related costs, usually involving about one-third of the average daily expenditures (Table 4). Following food costs were lodging expenses, representing from 20 to 30% of total expenditures. Transportation ranked third, representing 15 to 20% of the total. All other expenditures associated with the trip ranged from 10 to 15% of the daily totals. Site-related costs, including such items as entrance fees and souvenirs, typically accounted for 10% of daily expenditures.

Table 4. Allocation of average expenditures for non-resident visitors by site and type of expense.

Visitor Center	Food	Lodging	Transport	Site-related	Other
ALPO	31.2%	21.9%	22.3%	9.4%	15.3%
RRM	31.2%	20.1%	22.1%	10.2%	16.5%
HC	29.7%	31.4%	15.3%	11.3%	12.3%
JFMem	31.6%	25.4%	18.4%	8.6%	16.1%
JFMus	33.2%	31.3%	15.5%	10.8%	9.3%
IP	33.8%	24.0%	18.3%	9.2%	14.6%

Total Annual Expenditures

Total annual regional expenditures attributed to resident and non-resident visitors (Table 5) was provided by the multiplication of each AIHP site's annual attendance by their respective average visitor expenditure levels. Expenditures attributed to non-resident AIHP visitors represented 87% of the regional total. The \$15.1 million in non-resident expenditures was largely attributed to two AIHP visitor centers -- Horseshoe

Curve with 51% of the total and Johnstown Inclined Plane with 20% of the total. The remaining four centers contributed individual shares ranging from 5 to 10% of the total.

Table 5. Total annual regional expenditures for resident and non-resident visitors to AIHP centers, 1992.

Visitor Center	Resident	Non-Resident	All Visitors
ALPO	\$131,763	\$810,836	\$942,598
RRM	\$48,207	\$747,345	\$795,552
HC	\$653,775	\$7,662,588	\$8,316,363
JFMem	\$286,161	\$1,559,234	\$1,845,396
JFMus	\$129,440	\$1,281,701	\$1,411,141
IP	\$982,697	\$3,053,715	\$4,036,412
Totals	\$2,232,043	\$15,115,419	\$17,347,462

Two other types of expenditures were added to the IMPLAN analysis. The first type was federal monies used for the operation of two National Park Service sites (Allegheny Portage and Johnstown Flood Memorial) and the federal contribution to operating costs at the Horseshoe Curve. Federally supported operating costs for the three sites amounted to \$1.87 million in 1992. The second type of "non-resident" expenditures was federal funds used for capital development at two of the AIHP sites. This amounted to \$124 thousand in 1992, with 91% tied to Allegheny Portage and 9% to the Johnstown Flood Memorial. For purposes of this study, the \$2.0 million in federal operating and development funds was organized as a separate economic center for IMPLAN evaluations.

Table 6. The economic impact of six AIHP visitor centers on the nine-county economy, 1992.

Visitor Center	Direct Sales	Total Sales	Value Added	Wages/Salaries	Employment
ALPO	\$495,200	\$1,372,600	\$868,200	\$538,300	38.6
RRM	\$649,200	\$1,856,300	\$1,101,700	\$656,500	51.6
HC	\$4,702,300	\$13,505,700	\$7,985,300	\$4,775,200	374.0
JFMem	\$900,200	\$2,554,500	\$1,612,200	\$998,800	72.6
JFMus	\$715,600	\$1,856,600	\$1,096,400	\$640,300	46.8
IP	\$1,835,000	\$5,528,100	\$3,354,200	\$1,980,600	161.1
Federal	\$1,248,800	\$2,533,900	\$2,831,350	\$2,213,050	99.9
Totals	\$10,546,300	\$29,207,700	\$18,849,350	\$11,802,750	844.5

Summary

Just over one-half million visitor days were registered at the six AIHP centers during 1992. Nearly 67% of this audience originated from outside the nine-county study region, spending \$15.1 million within the region in conjunction with their AIHP visits. The average expenditure profile showed \$44.95 per visit, with 33% directed to food and food services, 28% to lodging, 17% to transportation, and 22% to site-related and other purchases. An additional \$2.0 million in regional expenditures was credited to the AIHP centers on the basis of federally supported operating and development costs.

The IMPLAN analysis of regional expenditures showed \$10.5 million in direct sales credited to specific economic sectors. About 50% of the direct sales were in the service sector, primarily identified with hotels, automotive repair, and the sites themselves. An additional 35% in direct sales was in the wholesale and retail sector, representing such businesses as restaurants, gas stations, food stores, and wholesalers.

The secondary effect of direct sales, measured in terms of indirect industrial activity and the induced household demands, totaled \$18.8 million. The lead sector, with 27% of the total, was finance, insurance, and real estate, largely due to business and household demands for financial services and the household sector's investment in real estate. Other key sectors were services - with 25% of the secondary activity;

In total, \$17.1 million in non-resident expenditures were attributed to the six AIHP visitor centers, with 88% tied to non-resident visitor expenditures and 12% to federal monies used for the operation and development of these six centers. These expenditures were introduced to the nine-county IMPLAN model, specific to the particular economic sectors receiving the payments.

Economic Impact

In developing the economic impact of non-resident expenditures, these initial amounts were allocated as final demands to appropriate industrial sectors. Final demand, or direct sales, does not include the value of retail goods produced outside the region. The subsequent rounds of secondary activity were generated by inter-industry trade and commerce (indirect sales) and household consumption originating from the employment tied to direct and indirect sales (induced sales). Total sales are identified in this report as the sum of direct and secondary sales. Value added represents that portion of total sales attributed to employment, capital use, profit, and taxes. Whereas the cumulation of total sales among various sectors could include a certain "double count" (one sector's input costs can represent another sector's output revenue), the accumulation of value added omits this duplication providing a net measure of economic gain within the region. An important component of value added is the employee income garnered by the region's labor force. This was also measured by the number of jobs, reported on an annual measure of full-time and part-time positions. A summary of the economic impacts is presented in Table 6.

wholesale and retail trade - with 19%; transportation, communications and utilities - with 10%; and manufacturing - also with 10%. Total direct and indirect sales within the region credited to the six AIHP centers was \$29.2 million.

The net gains to the various sectors, identified in terms of value added, was \$18.8 million. In addition to the key sectors that participated in direct and indirect sales, the National Park Service was credited with 7% of the value added, on the basis of NPS employment. Employment supported by direct and secondary sales amounted to 844 jobs with an annual payroll of \$11.8 million. Two sectors realized most of this employment gain; wholesale and retail trade with 44% of the jobs and 32% of the employee income and the service sector with 35% of the jobs and 35% of the income.

Conclusions

The six AIHP visitor centers represent a unique cultural and historical aspect of this region and the nation. They describe, in part, the industrial revolution of the 19th century as it occurred in southwestern Pennsylvania. Their presence insures a continued dialogue and interpretation of this important part of Pennsylvania's and America's heritage.

Allied to this role are the economic benefits associated with travel and tourism. Here, we can measure the sales registered and the jobs supported by the influx of visitors to this region.

The six AIHP centers contributed \$29.2 million in total sales and \$18.8 million in value added to the nine-county region. Over 844 jobs and \$11.8 million in income were generated by this recreation-based activity. These were the tangible economic benefits to the region attributed to the six AIHP visitor centers.

Further Work

As currently planned, the five year project will provide a year-to-year build of information on the expenditure characteristics and overall economic impact of the entire AIHP system in the nine-county region. This will include other AIHP visitor centers and an updating of economic impacts for AIHP centers previously studied. This will lead to a total economic description of the entire AIHP system and predictions of future growth.

A more rigorous examination of the nine-county region is also available in terms of the cause-effect relationships among particular SIC industries. Allied with this effort will be an evaluation of the relative strengths and weaknesses of this nine-county region in meeting the economic needs of an expanded AIHP system.

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THE ROLE OF RURAL TOURISM IN COMMUNITY DEVELOPMENT—A CAVEAT¹

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This paper draws upon the interactional approach in sociology to better understand the relationship between rural tourism development and sustainable community development. Hopefully, this understanding will enable individuals and organizations involved in rural tourism development to be more effective in attaining the goal of truly benefiting communities and their residents for the long term.

Introduction

While the popular view of tourism is that of "urban bigness" (Gunn 1988, p. 237), this perspective neglects a major segment of tourism. As tourism demand has diversified, the role that small towns and rural areas play in regions beyond the major cities has been recognized in terms of the provision of strong resource assets for tourism. Many rural areas have willingly, or unwillingly, become "host" communities to a growing influx of tourists attracted to resource amenities of the rural environment. Much of the impetus of this attraction may be attributed to the images individuals hold of rural areas.

Advertisers have long recognized the market potential of rural images and have used it to sell a wide range of products, many which are only tangentially related to rural life (Goldman and Dickens 1983). If rural images can be used to market these products, it seems reasonable to expect that the same images can be used to attract tourists to small town communities and rural areas for sight-seeing, shopping and other vacationing activities, and in the process make a contribution to the local rural economy (Willits, Bealer and Timbers 1992, p.11).

According to a recent state-wide survey conducted in Pennsylvania (Willits et al. 1992), a substantial proportion of state residents held positive images about rural living, agrarian values, and wilderness areas. These findings suggest that the population as a whole in the state, where 80% of the people reside in Metropolitan Statistical Areas, sees rural people and places as good, wholesome and desirable. "Indeed, the positive imagery is so strong and so pervasive that it seems appropriate to speak of a 'mystique' of rurality" (Willits et al. 1992, p.8). These findings demonstrate that there exists in Pennsylvania, and perhaps elsewhere in the nation, a deep reservoir of warm feelings about rurality (Willits et al., 1992, p.10). For many people, subscribing to the "rural mystique" translates directly into rural lifestyle choices—choosing rural-based leisure activities such as camping, hunting, fishing, picnicking, and sight-seeing in rural areas, buying produce directly from farmers, and enjoying shopping in small towns.

Clearly, there can be many benefits for rural communities and areas involved in tourism development initiatives and efforts (The Economic Policy Council Working Group on Rural Development 1990; The Federal Task Force on Rural Tourism 1989; Subcommittee on Procurement, Tourism, and Rural Development of the Committee on Small Business 1989; 1990). Tourism development is being promoted as a viable economic development strategy for rural communities attempting to address the multitude of problems facing them in the modern world (Brown 1992; Stokowski 1992). The hope here is that tourism will help stabilize, diversify and improve the local economies of struggling rural communities, and help improve the quality of life in rural societies. Rural tourism development is often thought of as contributing to the viability and sustainability of rural communities, and to overall community development.

However, without careful planning and local control, the negative impacts of tourism can have devastating effects on rural communities. Recently, tourism development in rural communities has been approached with a sense of caution (Goodall and Stabler 1992), recognizing that "... ill-conceived and poorly planned tourism development can erode the very qualities of the natural and human environments that attract visitors in the first place" (Inskeep 1991, p. 460). In response to the potentially exploitive tendency of rural tourism development, the concept of "sustainability" has recently become associated with developmental initiatives and efforts (French 1992; Long and Nuckolls 1992). A critical challenge associated with sustainability is to not degrade environmental resources nor negatively exploit local human and cultural resources, in order that resources are maintained for present and future generations.

Therefore, keeping all of this in mind, our focus is to examine the role of tourism in relation to rural community development. As a field of inquiry, tourism is relatively new. As such, studies of tourism impacts on communities have been criticized for lacking a theoretical base or foundation (Burr 1992). The purpose of this paper is to draw upon one theoretical approach in sociology helpful in understanding the relationship between sustainable tourism development in rural communities and community development. Hopefully, this understanding will clarify the role of tourism development in rural areas and will enable individuals and organizations involved in rural tourism development to be more effective in attaining the goal of truly benefiting communities and their residents for the long term.

An Interactional Approach to Community and Community Development

The concept of community is a puzzling but frequently studied social phenomenon. Basically, the substance of community is the patterns of relationships among people that have developed through the centuries to ensure human existence. Taken collectively, these patterns of relationships among people are known as social interaction, the one commonality that really stands out among the many sociological definitions of community (Wilkinson 1990). Social interaction is the foundation of community, involving individuals and groups working together in pursuit of commonly-held goals (Wilkinson 1990). It is natural and inherent to human existence—a given, whenever and wherever people live together. Community occurs through human interaction, simply connecting people through their relations with others, allowing for interaction as individuals and groups go about living their daily lives, and in this process establishing a sense of community (Wilkinson 1992).

This interactional approach to community recognizes three necessary elements for the emergence of community. First, there is a locality or place where together people meet their daily needs. Second, there exists a more or less complete local society of organizations and groups. Third, there is the opportunity for interaction, where community members,

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whose lives are connected through a range of associations and collective actions, share interests in a local social life (Wilkinson 1991). These connections indicate the formation of a special kind of social field—a community field (Wilkinson 1970). In the presence of a viable community field, the activities of individuals and groups are less oriented to the pursuit of special interests and become more oriented towards the general needs and concerns of the entire community as a whole. Where these conditions exist, community naturally emerges, and contributes to the social well-being of community members. Where these conditions do not exist, community is blocked and social well-being is at risk (Wilkinson 1992).

Summers (1986) suggested that there are two types of development related to community, development *in* community and development *of* community. Development *in* community focuses primarily on factors such as economic growth, increased employment opportunities, or increased median family income. Development *of* community often involves the creation and maintenance of integrative social structures. Community development, as an interactional concept, refers to collective efforts by local residents for the purpose of building community relationships among themselves, or the development *of* community. If growth is to be an effective means of promoting rural community development, it should involve and encourage community action. Here the emphasis is on the process, because development is in the doing, in the efforts of people and not necessarily in the outcomes or achievements (Wilkinson 1990).

Economic Stability of Rural Communities

Rural communities continue to lag behind urban areas in terms of higher education and health care (LeDuc 1991), employment rates, job growth, median family income, and equality of housing (Flora and Christenson 1991), and many other public services (e.g., fire and police protection, transportation facilities, and water and sewage systems) (Willits, Bealer and Crider 1982). To address these problems community leaders have historically focused on economic development strategies in hope of ultimately achieving economic stability (Smith, Hogg and Reagan 1971). Usually economic strategies in rural communities have been developed around "... 'basic industries' and the multiplier effect ..." (Olsen and Johnson 1990). McCool (1992) suggested that in the West, communities have implemented various types of economic development strategies focusing on basic industries including, "... timber harvesting, mining, oil and gas, coal and agricultural" (p. 5). These resource-based communities are often dependent upon a single industry, and many experience "boom-and-bust" economic cycles at least to some degree (Grambling and Freudenburg 1990; Marchak 1990; Robinson 1984; Weeks 1990). Other communities have developed an economic base with a single focus (e.g., defense installations, manufacturing plants, gambling, nuclear energy), and also often become entangled in this "economic roller-coaster" (Pulver, Selik and Shaffer 1984). While there are diverse reasons for these boom-and-bust cycles, such as trends towards globalized economies, capital mobility, and devaluation of labor (Flora 1990), a commonly cited reason for economic instability in these communities is the narrowness of their economic base (Robinson 1984). Tourism development is presently touted as a viable economic development strategy to diversify a rural community's economic base and therefore has the potential to lead to economic stability (Dorsey 1989; Hunt 1992; LeDuc 1991; Long and Nuckolls 1992).

The aforementioned economic development strategies are examples of development *in* community—focusing primarily on such factors as economic growth, increased employment opportunities, or increased median family income, rather than development *of* community—creating and maintaining integrative social structures (Summers 1986). For example, local actions can be directed toward economic development,

say through efforts to increase tourism in a community. Individuals and groups involved in such actions perform certain tasks that are oriented towards accomplishing the specific goals of tourism development. These actions and interactions represent the formation of a special interest field, where efforts by individuals and groups within a community focus solely on the economic development strategy of tourism development (development *in* community), rather than the general needs and concerns of the entire community (development *of* community).

The caveat or warning presented within this paper pertains to the rationale behind the use of tourism as an economic development strategy. Tourism may help diversify a rural community's economic base and lead to development *in* community. However, from an interactional perspective, understanding rural tourism as a special interest field may lead to development *of* community and may be more helpful in establishing sustainable rural communities.

Implications of Rural Tourism Development as a Special Interest Field of Community Action

Rural tourism development can play a part in reaching the goal of community development. Ideally, rural tourism development involves community action. Community members' support and involvement are important components of sustainable rural tourism development, for these local actions and interactions help ensure the protection and preservation of environmental and community amenities which are the foundation of tourism (McCool 1987). From an interactional perspective, local action in tourism development offers key opportunities for interaction within the community, leading to relationships between and among community members and other special interest fields, and allowing for the natural emergence of community (Wilkinson 1992).

There are many examples of dynamic rural tourism development where community interactions start with a specific local action initiated by a few key leaders in their community and lead to further community development (Dahms 1991; Fleming 1988; Lins 1991; Stokowski 1992; Stubbles 1990; The Wilderness Society 1992). Often governmental officials and organizational leaders provide support and legitimation to these highly involved leaders. Common interests and overlapping group memberships among these leaders provide a basis for cooperation and are an indication of a functioning community field. However, even with strong local leadership and community interest and support, it is often necessary to obtain the expertise of specialists not available locally for planning and implementing complex projects, and to secure outside funding in order to realize most large-scale projects (Israel and Beaulieu 1990). The successful implementation of sustainable rural tourism development in a community is often dependent upon a community's ability to establish connections with other special interest fields and other community fields. This can lead to dynamic sustainable development of rural tourism, creating opportunities for further community development and contributing to the general quality of life for community residents.

Community development is represented in efforts to develop the community field, the network of social interactions that includes and integrates a variety of interests found in the local society (Wilkinson 1991). An effective approach for individuals working together on some community project is to focus on the relationships that develop as they work together. Using rural tourism development as an example, the goal of increasing jobs and income for local residents through tourism development initiatives, drives the action, but special attention paid to relationships among local residents can have the effect of making sure this action truly addresses common local needs. Otherwise, local economic development can be divisive and disruptive as elite local players, in league with outside investors, scramble for private profits at the expense

of community welfare. Community development can occur if individuals and groups working in tourism development also make efforts to build relationships through which community actions can occur on other issues, thus providing opportunities for further community development. Community actions would meet the needs of all people and create an atmosphere where interaction flows freely and openly among all individuals and groups.

The solution here is purposive intervention at all levels of government to protect rural interests and to remove barriers in order for the process of community development to succeed. Intervention must be focused on the essential steps in the process of community development (Wilkinson 1992, p. 7-8). First, the opportunity must be created for people to participate as the main players in the process of identifying and tackling community problems. Facilitation of local leadership and wide residential participation in planning and decision making about community change is very necessary. Second, inequality must be reduced—in rural-urban power relations and between the disadvantaged and more powerful groups. This requires local influence and control, education, as well as opportunity. Third, new modes of rural organization are required to focus community efforts on problems common to all residents. Mobilization of local and extra-local resources—people, ideas, materials and money—is a fourth essential step. A fifth step is informed decision making through better access to information to aid in making sound decisions about community goals and action strategies. Finally, the most important step is the action itself—community action builds the capacity for subsequent community actions as it creates networks, roles and a pool of shared experience. The development of community can be self-sustaining if all these steps are possible.

The effective implementation of sustainable tourism development appears to occur in highly interactive communities where local leaders from diverse special interest fields interact with one another, and in the process create a viable community field, the network of social interactions that includes and integrates a variety of special interests found in the local society. The main task confronting all of these special interest groups is to remove those barriers and constraints interfering with the natural tendency of community to develop, by simply making sure that nothing prevents the development of relationships and free-flowing interaction from happening.

An awareness and application of the components of an interactional approach to community development can help in the implementation of a policy of sustainable tourism development, regardless of whether a rural community is attempting to develop rural tourism as an economic development tool or simply attempting to capture the economic benefits of current tourism visitation.

Local efforts directed towards sustainable tourism development in rural communities also contribute to the long-term sustainability of those communities. In the presence of a viable community field, the activities of individuals and groups become less oriented to the pursuit of special interests, such as tourism development, and more oriented towards meeting the general needs and concerns of the entire community as a whole, resulting in community sustainability. Whatever economic development strategy is selected, an interactional community will be able to move towards sustainability because community members have developed the ability to adapt to changing trends and needs, and to select and integrate development strategies with a goal of benefiting all community members.

Not all rural communities lend themselves equally well to economic revitalization efforts through tourism development. Distance from population centers, the nature of access, and the characteristics of the local area may restrict or enhance such

development (Willits et al. 1992). However, in all instances, local communities must weigh the advantages against the costs of tourism development. Social impacts from visiting tourists, more intensive development of historical, cultural and natural resources, and increased burdens of infrastructural support, must be offset by advantages of social and cultural exchange and strengthened economies (Gunn 1988, p. 249). Rural communities need to utilize all strategies available to them to increase their awareness about tourism and to initiate effective actions to deal with tourism development. In the process, rural tourism development, as a special interest field of community action, can encourage, cultivate and contribute to sustainable rural community development.

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***RECREATION RESOURCE
MANAGEMENT***

INCREASING CUSTOMER SATISFACTION

WHILE CUTTING BUDGETS

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The intent of this paper is to demonstrate the successful implementation of a "cutback" strategy which changed the mission of the Ohio Division of Parks and Recreation to one which focused upon customer satisfaction, reorganized the Division into a responsive horizontal structure, and installed a customer satisfaction feedback system which produced measurable increases in customer satisfaction. The statistical accuracy of the customer satisfaction feedback system is demonstrated through an independent follow-up survey conducted by The Ohio State University Polymetrics Laboratory. Lastly, we will show that this measurably successful strategy was atypically implemented during a time of severe budget cuts. It was installed in a period when the inclination of many other public organizations under similar circumstances is to "hunker down" and do less with less.

The Change in Mission

Prior to 1992 the mission of the Ohio Division of Parks and Recreation was perceived to be that contained in the 1949 legislation establishing the Division. It embodied the work processes of the Division and stated that the Division of Parks and Recreation was to "...create, supervise, operate, protect, and maintain a system of state parks and promote the use thereof by the public."

In 1992 we restated that mission, one which embodied the work products of the Division and stated that the Division of Parks and Recreation was to "...produce the service of an outdoor recreational experience for visitors to Ohio State Parks which meets or exceeds their expectations."

This new mission translated into many major changes in the key policies of the Division. The major thrust of these changes can be summed up as follows:

The old: policies and procedures were designed to insure customer compliance with rules and regulations and to facilitate administrative practices.

The new: policies and procedures are designed to insure customer satisfaction and rules and regulations will be modified as necessary to ensure customer satisfaction.

Two examples of policy changes taking place include:

1. The expansion of pet camping provision to all campgrounds from a few.
2. The change in check-in times in campgrounds to accommodate specific clientele such as fishermen staying out late on the lakes.

The Reorganization

The approach to "rightsizing" the Division of Parks was to eliminate layers of middle management and to delegate a much higher degree of responsibility and accountability directly to the park managers in the field. The four district offices were eliminated in favor of a regional cluster organization which required no additional manpower. The regional cluster coordinators do not supervise the park managers in their clusters. Rather, they coordinate the cluster's activities as a team function. Park managers are now empowered to unilaterally make a wide range of decisions without seeking approval from a higher authority. (An organization chart of the old organization is shown in Figure 1, and the contrasting new organization chart is shown in Figure 2.)

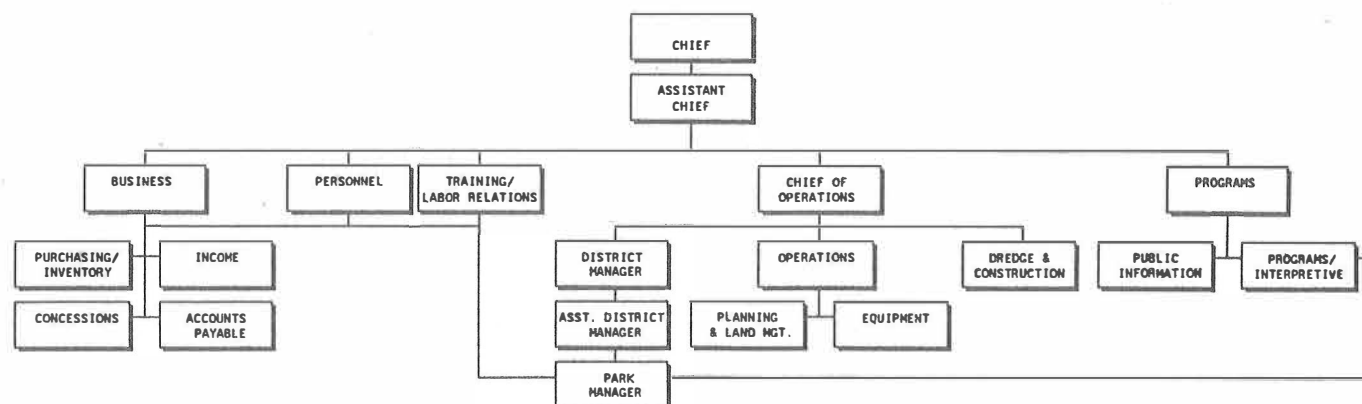


Figure 1. The Division of Parks and Recreation prior to November 25, 1991.

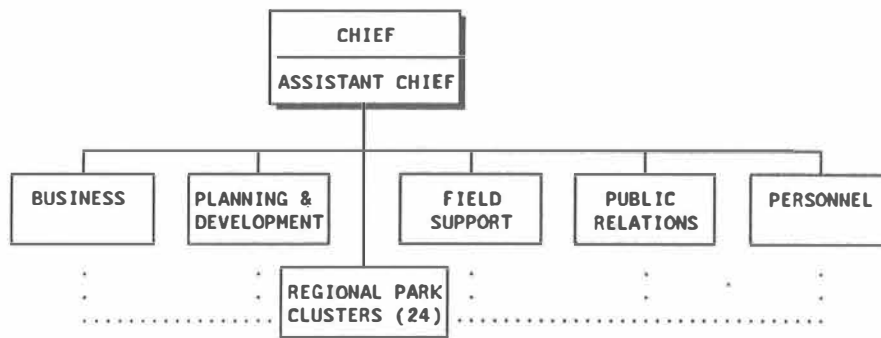


Figure 2. The new organization of the Division of Parks and Recreation.

Park managers became responsible for the first time for supervising all employees in their parks and for budgeting all of their funding. The hiring, scheduling, and supervising of park naturalists by the Columbus office and districts was ended and park managers assumed all supervisory duties for naturalists working in their parks. The centralized construction crews were reduced significantly in favor of using existing park maintenance staffs on projects; especially over the winter. Full time employees such as campground coordinators, park rangers, and others were replaced with summer seasonal employees to decrease fixed costs in the winter. A rigorous zero based budgeting system was also implemented for the managers at this time.

This reorganization resulted in the reduction of permanent full time employees from approximately 813 to just over 650. Much of the reduction was accomplished through early retirements, directed reassignments to vacant positions, and abolishment of vacant positions. However, a total of nearly 81 full time employees had to be laid off in this process. The business of parks is one of high fixed costs and low variable costs. Salaries and wages consume 72% of our operating funds. This fact alone dictates that any reorganization must significantly impact numbers and categories of employees.

Out of this very major reorganization came an organization which is very horizontal in structure, with many fewer layers, which delegates vastly more authority to the managers of the 72 parks, and within which employees operate in a much more "matrix" or "collegial" mode. Most importantly, the new organization focuses the human resources of the Division in the parks where we deliver our product of visitor services and in the summer season when most of our park visitors come.

In 1991 over 10% of the operating funds of the Division were spent on district and central office "overhead". Today only about 4.7% of the operating funds for the Division are spent for "overhead" in the central office. The balance of 95+% is spent on producing the services for our visitors in the parks.

Reorganization is also an ongoing process for the foreseeable future. Each vacancy is evaluated and a decision made as to the most effective and efficient use of the financial resources it represents in terms of customer service.

System for Increasing Customer Satisfaction

Customer surveys are a dime a dozen in the private sector and are beginning to get that way in the public sector. To loosely paraphrase Grantland Rice: "It ain't whether you have a customer survey system that counts; it's how you analyze and use its data." In our exploration of customer surveys we found many instances in which the surveys were just filed and forgotten. In other instances the negative comments and positive comments were answered routinely by a "customer complaint person" and front line operating people were not involved. We felt that there was real potential to make a difference in our operations if we could involve the employees

actually doing the job with the data we would receive from a customer satisfaction survey.

For the 1992 heavy use season of May through September, when 80% of the visitation occurs in Ohio State Parks, we installed a customer survey feedback system which involved the front line employees. Ohio has one of the nation's largest and most heavily visited state park systems. It is comprised of 72 state parks serving 65 million visitor occasions annually. Only New York and California compare in scope and usage.

We prepared and printed 200,000 customer surveys (a copy of this survey is shown in Figure 3, next page) and followed up with a second printing of 200,000 more later in the summer. These surveys were available to our visitors everywhere in the parks. They were at restaurant cash registers, in lodge and cabin rooms, at golf pro shops, at beach lifeguard and concession stands, at dock and boat ramp facilities, at every campground check-in station, on picnic shelters and the like. Employees in all capacities also passed them out directly to visitors not otherwise contacted.

The surveys were addressed to the Chief of the Ohio State Park System and were returned directly to Columbus. They were entered into a database, copied, and filed. Each week a bundle of the copies were sent to each of the park managers. The managers in turn shared them with their operating staffs and analyzed them for ways they could improve customer satisfaction by correcting things complained about, by implementing customer suggestions, and by capitalizing upon customer pleasing items singled out in the returns.

We also reviewed the returns on a park by park basis at headquarters and made "suggestions" to park managers on items which were recurring and which obviously were not receiving attention over the course of the weeks and months.

The response of the front line employees was surprisingly favorable. We found that most employees appreciated feedback and responded favorably to the ideas presented by our customers. This was no doubt aided by the 87% above average favorable response rate that our customers returned. Employees really do like to get favorable feedback on how well they are doing their job; especially from their customers.

We received about 2,000 responses a month for our five month summer period for a total return of 9,832 survey forms. A statistical strength of our survey lies in its almost 10,000 replies.

We ran a summary sheet for each month and a cumulative one for the entire five month season. (The cumulative summary for the entire season is shown in Figure 4.) We were able to demonstrate an increase in the overall average of customer satisfaction each and every month of the 1992 visitor season through this system. (See Figure 5 for a graphic display of the monthly overall average numbers.)

As chief of the Ohio Department of Natural Resources, Division of Parks and Recreation, I strive to provide the best possible experience for all park visitors. Your comments can help me make our parks a better place for you to visit. Please take just a few minutes to fill out applicable sections of this evaluation form and drop it in the mail to me.

How would you rate your visit to this park overall?

Excellent	Good	Average	Poor	Unacceptable
☐	☐	☐	☐	☐

Specifically, how would you rate the following ...

General Park

	Excellent	Good	Average	Poor	Unacceptable
Appearance	☐	☐	☐	☐	☐
Cleanliness	☐	☐	☐	☐	☐
Convenience	☐	☐	☐	☐	☐
Employee Helpfulness	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐
Your Experience	☐	☐	☐	☐	☐
Services You Received	☐	☐	☐	☐	☐

Comments: _____

Campground

	Excellent	Good	Average	Poor	Unacceptable
Cleanliness	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐
Employee Helpfulness	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐

Comments: _____

Cabin

	Excellent	Good	Average	Poor	Unacceptable
Cleanliness	☐	☐	☐	☐	☐
Comfort	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐

Comments: _____

Lodge

	Excellent	Good	Average	Poor	Unacceptable
Activities	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐
Cleanliness	☐	☐	☐	☐	☐
Employee Helpfulness	☐	☐	☐	☐	☐

Comments: _____

Food Service

	Excellent	Good	Average	Poor	Unacceptable
Quality	☐	☐	☐	☐	☐
Service	☐	☐	☐	☐	☐

Comments: _____

Picnic Areas

	Excellent	Good	Average	Poor	Unacceptable
Cleanliness	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐

Comments: _____

Beach

	Excellent	Good	Average	Poor	Unacceptable
Employee Helpfulness	☐	☐	☐	☐	☐
Cleanliness	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐

Comments: _____

Marina

	Excellent	Good	Average	Poor	Unacceptable
Cleanliness	☐	☐	☐	☐	☐
Facilities Condition	☐	☐	☐	☐	☐
Employee Helpfulness	☐	☐	☐	☐	☐

Comments: _____

Golf Course

	Excellent	Good	Average	Poor	Unacceptable
Course Condition	☐	☐	☐	☐	☐
Employee Helpfulness	☐	☐	☐	☐	☐
Cleanliness	☐	☐	☐	☐	☐
Pro Shop Services	☐	☐	☐	☐	☐

Comments: _____

Name _____
 Address _____
 City _____ State _____ Zip _____
 Date of Visit _____ Park Visited _____

Figure 3. Customer survey form.

OHIO DIVISION OF PARKS AND RECREATION
Customer Satisfaction Survey
Summary of All Parks
As of 10/29/92

Total surveys returned: 9832

Number of Numerical Ratings

	Avg.	Avg.	5 Excel.	4 Good	3 Avg.	2 Poor	1 Unacc.
Overall percent distribution:			48%	39%	9%	3%	1%
Overall average:		4.283	4689	3784	932	279	139
General park average:		4.268					
Appearance:	4.445		5112	3269	598	140	50
Cleanliness:	4.303		4357	3492	893	218	95
Convenience:	4.229		3738	3405	1021	281	69
Employees:	4.412		4990	2533	744	211	96
Facilities:	3.996		3094	3444	1441	507	224
Experience:	4.290		3859	3365	733	206	105
Services Received:	4.301		3843	2929	820	172	104
Campground average:		4.244					
Cleanliness:	4.336		3057	2203	522	140	80
Appearance:	4.367		3090	2145	460	154	52
Employees:	4.400		3200	1686	481	150	63
Facilities:	3.905		1973	2125	947	400	256
Cabin average:		4.093					
Cleanliness:	4.195		558	380	123	56	33
Comfort:	4.099		457	414	163	47	30
Facilities:	3.999		421	416	156	73	40
Lodge average:		4.238					
Activities:	4.145		570	448	179	63	26
Facilities:	4.262		774	548	183	55	22
Cleanliness:	4.271		830	536	169	63	31
Employees:	4.316		844	502	151	52	30
Food average:		3.800					
Quality:	3.768		601	721	440	177	93
Service:	3.842		708	644	365	158	114
Picnic average:		4.240					
Cleanliness:	4.354		2548	1997	417	103	39
Facilities:	4.129		1949	1918	611	184	118
Trail average:		4.360					
Cleanliness:	4.467		74	37	6	4	1
Condition:	4.267		58	40	10	7	1
Beach average:		3.941					
Employees:	4.158		1497	1319	486	111	79
Cleanliness:	3.944		1481	1633	696	288	149
Facilities:	3.861		1257	1535	743	309	150
Marina average:		4.101					
Cleanliness:	4.141		849	846	280	61	51
Facilities:	4.000		740	808	289	82	96
Employees:	4.252		909	620	223	42	46
Golf course average:		4.324					
Condition:	4.220		323	254	43	30	24
Employees:	4.366		347	219	48	13	13
Cleanliness:	4.473		370	223	41	9	2
Pro shop:	4.295		293	218	69	13	7

Figure 4. Cumulative summary for the entire season.

DIVISION OF PARKS & RECREATION Overall Park Rating

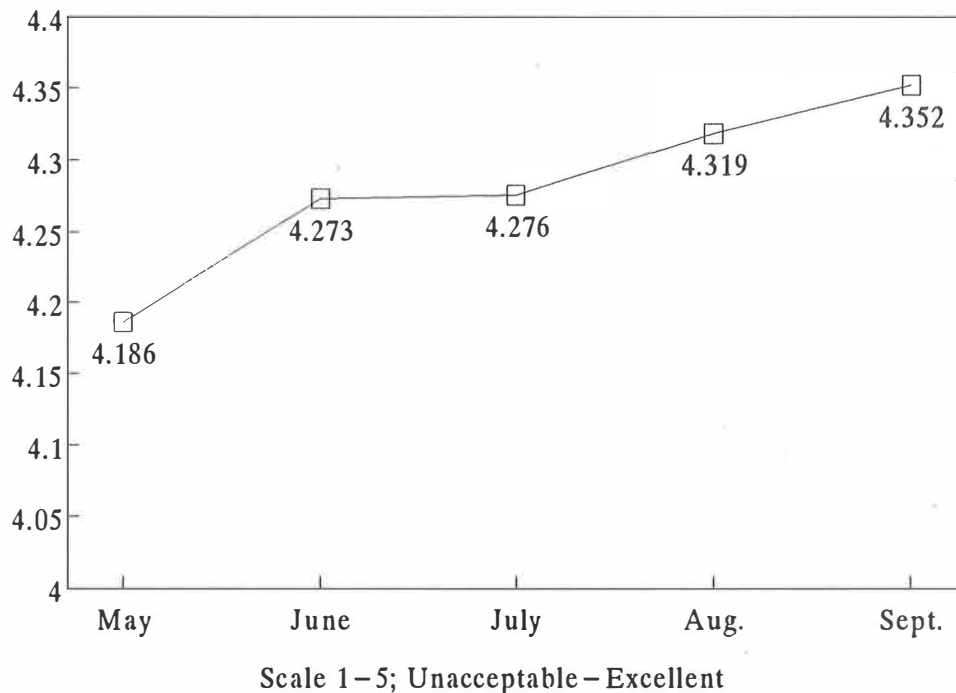


Figure 5. Monthly overall average numbers.

Predictably the improvement from our first month to our second one was the greatest as we corrected the most egregious problems. The progress we made during the season, so apparent on the accompanying graph, also became apparent to managers and employees alike as we implemented changes. For example, as we expanded pet camping, at our customers' suggestion, to all units in the state park system, complaints from pet owners dropped off and positive comments increased from satisfied customers who experienced the ability to take their pet to our campgrounds for the first time.

Our improvement of monthly means from 4.186 to 4.352 over five months represents about a 3% movement on our 5.0 scale. We believe that given our present high approval rating already and the great numbers of visitor occasions we are dealing with that this 3% improvement indeed represents a significant gain. The point here is that changes can demonstrably be effected by park managers and staffs which decrease the number of dissatisfied customers and increase the number of satisfied customers. Employees can now see and measure the results of their efforts.

The Statistical Validation

The results of any survey which is not tightly controlled by a scientific, systematic random sampling process is suspect. Even though our "in house" survey looked good and had a very large "N" out of nearly 10,000 responses, it could not meet the test of a scientific, systematic random sampling process. However, we felt we could validate our survey results by comparison to a parallel survey which did employ a scientific systematic random sampling process. We contracted with The Ohio State University Polymetrics Laboratory to perform this service for us.

The OSU survey used a systematic random telephone survey technique to identify customers who used the parks in the last year and to carefully administer exactly the same survey to them that we used in the field. Nearly 1,100 people were contacted to generate the necessary sample size of 306. This survey was conducted in late summer of 1992 while we were collecting our own survey data. The mean they generated of 4.320 with their 306 sample size compares quite favorably with the mean of 4.283 which we generated with 9,832 responses and is within the $\pm 4.4\%$ reliability factor that OSU developed for their data. These means do not appear to be statistically different. (The OSU data and percentages are shown in Figure 6 and a graphical comparison between the data in our survey and the OSU survey is displayed in Figure 7.)

Our survey results showed 87% above average satisfaction and The Ohio State University survey showed 91% above average satisfaction. Predictably the returns at the extreme ends of the scale of our own "in house" survey were higher than the OSU survey. We received more "excellent" and "unacceptable" ratings than the OSU survey turned up. When survey respondents self-select participation, they tend to be more motivated to do so at the extremes of the scale used. These two figures are within the $\pm 4.4\%$ confidence factor that OSU developed for its data and do not appear to be statistically different.

OHIO DIVISION OF PARKS AND RECREATION
Ohio State Customer Satisfaction Survey
Summary of All Parks

Total valid responses: 306

Number of Numerical Ratings

	Avg.	Avg.	5 Excel.	4 Good	3 Avg.	2 Poor	1 Unacc.
Overall percent distribution:			42.5%	48.7%	7.8%	0.3%	0.7%
Overall average:		4.320	130	149	24	1	2
General park average:		4.181					
Appearance:	4.278		126	143	34	2	1
Cleanliness:	4.213		113	149	39	3	1
Employees:	4.247		88	106	25	4	0
Facilities:	4.023		75	174	37	11	3
Services Received:	4.157		74	144	29	0	2
Campground average:		4.246					
Cleanliness:	4.317		51	60	12	0	0
Appearance:	4.264		48	63	13	1	0
Employees:	4.321		46	50	9	0	1
Facilities:	4.091		29	76	14	2	0
Cabin average:		4.068					
Cleanliness:	4.091		7	10	5	0	0
Facilities:	4.045		6	11	5	0	0
Lodge average:		4.275					
Activities:	4.234		18	22	7	0	0
Facilities:	4.216		17	28	6	0	0
Cleanliness:	4.231		16	32	4	0	0
Employees:	4.420		22	27	1	0	0
Food average:		3.918					
Quality:	3.745		16	50	24	7	1
Service:	4.093		24	58	15	0	0
Picnic average:		4.048					
Cleanliness:	4.134		69	128	31	2	1
Facilities:	3.961		47	137	36	7	2
Trail average:		4.326					
Cleanliness:	4.428		92	93	9	0	0
Condition:	4.223		62	114	15	2	0
Beach average:		3.913					
Employees:	4.009		25	63	14	5	0
Cleanliness:	3.853		28	82	33	4	3
Facilities:	3.903		24	89	24	7	0
Marina average:		4.035					
Cleanliness:	4.097		21	39	11	0	1
Facilities:	4.000		18	37	14	2	0
Employees:	4.000		20	22	12	4	0
Golf course average:		4.167					
Condition:	4.182		8	10	4	0	0
Employees:	4.143		7	12	1	0	1
Cleanliness:	4.364		9	12	1	0	0
Pro shop:	3.947		3	13	2	1	0

Figure 6. Ohio State Customer Satisfaction Survey.

DIVISION OF PARKS & RECREATION Survey Comparisons

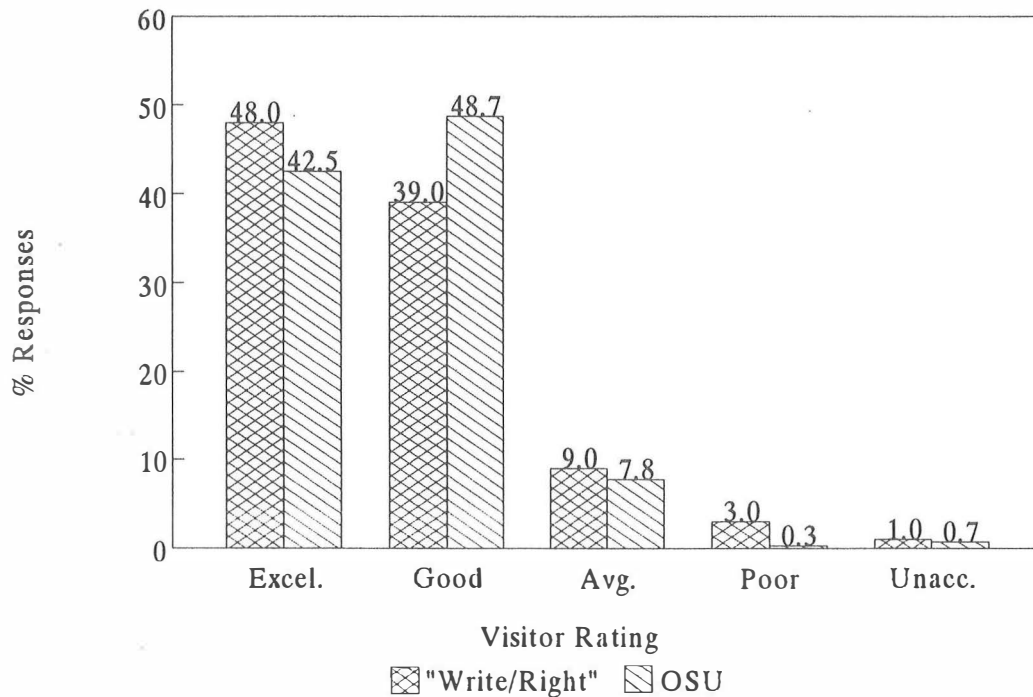


Figure 7. Comparison between the data in our survey and the Ohio State University data.

The Budget Cuts Absorbed

In fiscal year 1992 the Ohio Division of Parks absorbed approximately a \$6.0 million budget cut on about a \$40.0 million operating and maintenance base. In fiscal 1993 it absorbed an additional \$1.2 on the reduced base. The combined cut, just short of 18%, is discussed because the fiscal years for Ohio begin on July 1 which is right in the middle of the high recreation season for park visitors.

Services to our park visitors were not significantly cut during our implementation of these changes. In fact, in some instances customer services were expanded somewhat. The mentality of cutting services to customers to protect jobs was avoided. The old "when we are cut, we bleed" attitude just was not permitted to take root.

Some programmatic changes were affected at park levels which had negligible effect upon visitor services yet saved significant dollars. A costly dairy milking operation which few visitors viewed was terminated. This historic locks on the Muskingum River had their hours of operation reduced for recreational boaters to weekends and "on demand".

The mission of the Division has shifted from one of "ensuring customer compliance with rules and regulations" to one of "ensuring customer satisfaction" with our product of outdoor recreational services. The new horizontal organization is much more responsive to input from managers and employees at every level of the organization enabling front line employees to make customer pleasing changes much faster.

The implementation of the weekly customer survey feedback loop to the folks who are really delivering the product of customer services is an excellent "fit" with the new organizational structure. Managers and employees can see the positive results of their action each week as the customer feedback forms are returned to them for review. The results of all these changes is a measurable improvement in customer satisfaction. In the public sector this doesn't make a bad "bottom line."

One last note: It is apparent from the foregoing that the Ohio Division of Parks and Recreation has just undergone a change of very major magnitude in its mission, organization, and the very way it measures its success. Changes of this magnitude are usually very difficult to bring off at all, let alone successfully during a time of severe budget constraints. This whole change just would not have been possible without the personal commitment, support, and individual efforts of the park managers of the Ohio State Parks who dedicated themselves to "making it happen."

YIELD MANAGEMENT IN RECREATION

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The concept and techniques of yield management have received a great deal of attention in the travel industry. Recently, the hospitality industry, particularly hotel operations, has begun to implement yield management techniques as well. The purpose of this paper is to discuss the concept of yield management and evaluate its potential use in the recreation industry. Implications and measures for implementing the technique in recreation settings are provided.

Introduction

The recreation industry has been affected by the downturn in the economy. People find themselves with less discretionary income and the government, both state and federal, have reduced their budgets for public recreation. Economic problems have caused public recreation facilities to consider charging for services that used to be free. For instance, a public park in Northampton, MA charges people to enter the gate and use basic facilities. In addition, there are separate fees for using tennis courts and swimming pool at the same park.

Private companies such as ski resorts and golf courses are also finding it difficult to attract customers in this highly competitive economy. Consequently, recreation managers must become more creative in their marketing strategies and find some way to obtain a competitive advantage. Often the trend implemented is to consider competing with large price discounts and special promotions. However, these short-term strategies need to be implemented correctly if the firm is to realize adequate profits over the long-term.

Yield management has been used successfully applied by the airlines and hotels as a means of maximizing revenue or profit. The basic premise of yield management is to determine pricing and promotion strategies based on estimated demand for a given period (Orkin 1989, 1990; Relihan 1989). Product companies have been using this concept for some time. Prices and promotions are based on the seasonal demand for the product, as well as changes in the business cycle related to the economy. This method of pricing seems to be even more relevant to the services industry because there is no way to inventory unused products.

Conditions for Yield Management

A basic yield management model usually focuses on maximizing revenues (Orkin 1989). However, this does not necessarily result in the maximizing of profit. The basic model must be expanded in order to include cost information so that profit maximization can occur. Yield management can be complicated and is not necessarily warranted for every situation. Kimes (1989) suggests that yield management techniques are only appropriate when the following conditions occur.

Where capacity is relatively fixed. Most recreation services are limited in their capacity. For example, the Basketball Hall of Fame in Springfield, Massachusetts is constrained by local fire laws as to how many visitors can be in the building at one time. Even outdoor recreation facilities would face similar constraints, although they may not necessarily be legal. A golf course or a theme park can certainly hold many customers at one time. There are physical limitations, often referred to as carrying capacity within most recreational facilities. However, when people have to wait for very long periods between holes (in golf), or between rides (in amusement or theme parks), it will drastically reduce their levels of satisfaction.

When demand can be separated into distinct market segments. The markets for almost all products and services can be segmented to some extent. Hotels have developed different pricing strategies aimed at their various target markets (Lewis 1986). This would also pertain to the recreation industry which markets to all stages of the family life cycle. There is no question that families, senior citizens and a variety of different user groups represent distinct market segments for recreation services.

When inventory is perishable. This is the case for all services. Because services are intangible, it is impossible to hold or store unused capacity. If there is little use of the golf course during certain times, days, or months, it results in a forfeiture of potential revenues. Or, if the New England Region experiences a relatively warm winter, this region's ski resorts will not attract visitors throughout the winter months which results in lost revenues.

When the product is sold well in advance of consumption. This condition is frequently met in the recreation field when season tickets are available or when advance bookings at resorts and/or campgrounds are taken. This would pertain to sports (participating and spectating), museums, aquaria, parks, and other major attractions. Advance sales make it easier to forecast demand, which is essential in determining pricing strategy and implementing profit yield management strategies.

When demand fluctuates substantially. If the demand for a service is steady over time, then it would be unnecessary to offer different prices or to aggressively consider new yield management strategies. In essence, there would not be any peak periods or off-peak periods to worry about. This is normally not the case in recreation. The demand for recreation is highly seasonal and it varies by time of day, day of the week, month of the year as well as season of the year. The use of many outdoor recreation facilities can likewise be affected by the weather during the season. Even indoor facility use (health and racquet clubs for instance) find demand to fluctuate over a variety of time intervals. Therefore, this condition is met in nearly every form of recreation.

Where marginal sales costs are low and marginal production costs are high. Marginal sales costs tend to be low for most recreation services. This is more pronounced in agencies where employees are normally salaried and ticket gates and entrances are covered during normal operating hours. The cost of then providing one more person with a ticket or pass is minimal. Marginal production costs are also low in regard to recreation services. Most recreation services require the customers to service themselves to some extent thereby contributing to the production and delivery the service.

Yield Management Techniques

This section will the components of a typical yield management system. The application of yield management is an attempt to enhance a facility's ability to operate a flexible, adaptive and predictive market response strategy which seeks to match variable market conditions with the pattern of product or service offerings (Brotherton and Mooney 1992).

Unfortunately, many yield management systems are designed to maximize revenues assuming it will also result in profit maximization. This is not always the case depending upon the cost structure of the firm.

Yield, as a financial terms refers to the return on an investment. In order to maximize the return, it is important to know the relationships between "price and demand" and "cost and demand." Price elasticity of demand suggests that as price is decreased, the demand or quantity sold increases. However, total revenue will only increase in this case if the demand for the service is elastic. Demand is elastic if the percentage change in quantity demanded is greater than the percentage change in price.

Profits will increase in the above example if the costs associated with service delivery remain the same, or decrease. However, it is not uncommon to see the fixed costs of operation increase as demand increases. For example, increasing the demand for a highly labor intensive service will require the firm to hire more workers. An increase in demand could also result in capital expenditures for additional equipment or facilities. For example, a ski resort which drastically lowers its prices may find a increase in skiers, but be faced with building higher fixed costs facilities such new trail development and increased lift capacity. Therefore, it is important to perform a detailed financial- analysis before price is changed to determine the level of demand that can be accommodated given the current operating parameters of the firm.

Brotherton and Mooney (1992) present the following equation for yield management:

$$\text{Yield} = \text{realized revenue/potential revenue}$$

They would suggest that it is necessary to maximize yield as defined in the equation. However, once again this equation does not consider the costs involved in providing the service. It assumes that it is always good to increase revenues without regard to profit or profit potential. Economic theory indicates that one can increase profit by selling additional units only when the marginal revenue received for each unit exceeds the marginal cost of providing that unit.

Even though it is difficult to determine the marginal cost of providing a service to an additional customer, it is still necessary to perform some type of profit analysis. One possibility is to assume that fixed costs are sunk and not worry about allocating them on a per unit basis. This is the nature of the argument for maximizing revenues. Many hotels feel that they do not incur any significant increase in cost by selling an additional room. Salaries or wages for maids, front desk personnel, and food service personnel are already being paid. However, other factors such as the desired length of stay and the potential income from other sources, e.g. restaurants and retail services must be considered when deciding the optimal mix among market segments.

Duns and Brooks (1990) address the problem of looking at the various cost elements associated with each market segment and using a long-term profit approach rather than the standard short term quick yield management technique. The authors also consider the potential sources of additional revenue generated by the various market segments. They discuss the following considerations which are necessary to apply their approach:

1. Interdependence of operating department revenues.
2. Functional relationships between expenses and market segments.
3. Support costs from overhead departments.
4. Fixed costs.

Their technique is called "Market Segment Profit Analysis" or "MSPA" and is certainly an improvement over the typical

yield management approaches. However, it must be expanded to provide the flexibility needed to analysis of potential strategies so that decisions can be made in a timely manner. Furthermore, it requires detailed tracking of customer or guest or user history profiles. This is somewhat easy in hotels and restaurants, but may require more aggressive monitoring or tracking in recreation service situations.

The best approach to the maximization problem is probably using a linear programming model that looks at the overall profitability of a portfolio or range of prices and market segments. Furthermore, one would need to know more about their responsiveness to price sensitive issues. The first step would be to determine the marginal cost of servicing each segment. Then, revenue projections would have to be made for each market segment based on room revenues for resort hotels, camp site revenues for campgrounds, green fees or membership fees for golf courses as examples and then other income generated by the market segment would need to be projected (e.g., food and beverage, related retail sales, etc.). The room revenue projections are straight forward, however, the other income projections would have to be handled using a multiplier based on the past history of each segment (Yesawich 1984).

An Application of Yield Management

In the tables which follows this section, information about a yield management technique is shared. A simplified, straight forward yield management technique example is provided in Table 1 (next page). This example shares how yield management could be hypothetically applied to the operation of a public golf course. The scenario could be easily adapted for other public and private service delivery situations.

This yield management application examines how by segmenting the market into different groups revenue can be generated in pricing memberships. There are two basic comparisons made in this application. First, an examination of the revenue generate with and without a market membership segmentation approach should be examined. In this case, with no different membership plans or no market segmentation only 250 memberships were recruited and \$71,250 in membership dues were generated. However, when membership plans were introduced [four different plans -- student membership, membership A plan (play anytime during the week) and membership B plan (play only during weekdays) and senior membership]; 371 memberships were sold and \$100,850 in membership fees were generated. This application could be further enhanced by including information on daily fee or green fee revenue by daily use for comparison purposes. Second, a comparison is made here by also examining the total revenue generated by the membership plans to the potential revenue if the golfers were only able to pay by round played at \$12 per nine holes. This assumes that the golfers would play at the same rate. Many golfers make the decision to purchase membership plans based on the number of rounds of golf they play (Warnick 1993). In other words, golfers purchase membership plans because they view it as a discounted method for playing golf. Many will determine if they play enough rounds to recover the membership cost. In this situation, the potential revenue is what could be realized if only the daily fee charge were available, but is used here as a comparison for the revenue generated by the membership plans. The yield management ratios are then calculated for each of the segments based on this potential revenue (if charged by individual use only) and revenue generated by each market segment membership plan. In this situation it appears that the agency has probably undercharged for the college student and the senior membership plans. Adjusting these plans slightly upward based on play levels would generate additional revenues. However, the agency must consider the elasticity for each segment as pricing changes are made. In both of these cases, each segment may be very price sensitive due to fixed incomes. Other factors to consider would be the substitutes for

Table 1. Example of Simplified Yield Management Technique in Public Golf Course**Golf Course Pricing for Club Memberships (Market Segments) vs. Standard Membership Plan**

	<u>Price</u>	<u>Participation Rates</u>	<u>Average Rounds Played Per Year with Membership</u>
Typical Market Segments:			
College Student Membership Plan	\$150	15.1%	24
Membership Plan A (Weekly Play, Any Day)	\$375	15.5%	36
Membership Plan B (Weekday Play Only)	\$225	7.9%	17
Senior's Membership Plan	\$275	8.8%	45
No Market Segments (Standard Membership)	\$285	11.5%	28
Typical Round of Golf (Nine Holes)	\$12		

	<u># Members</u>	<u>Unit Revenue</u>	<u>Total Realized Revenue (RR)</u>	<u>Potential Revenue (PR) If Charged Per Round</u>	<u>(RR/PR) Yield Mgmt Ratio</u>
Typical Market Segments					
College Student Membership Plan	95	\$150	\$14,250	\$27,360	0.52
Membership Plan A (Weekly Play, Any Day)	135	\$375	\$50,625	\$58,320	0.87
Membership Plan B (Weekday Play Only)	56	\$225	\$12,600	\$11,424	1.10
Senior's Membership Plan	85	\$275	\$23,375	\$45,900	0.51
Totals - Market Segmentation Plans	371		\$100,850	\$143,004	0.71
No Market Segments (Standard Membership)					
Totals - No Market Segments	250	\$285	\$71,250	\$84,000	0.85

golf memberships and the unique character of this golf facility. The fewer substitutes, the more unique the course and lower the percent of players who are low or fixed income individuals; the less sensitive the pricing decision will be. This application could be enhanced by including additional cost, and revenue sources by market segment.

Legal Considerations

The concept of yield management also lends itself to legal scrutiny. After all, the underlying premise is to charge different customers different prices depending upon when they call, or consume, and what market segment they represent. The Robinson-Patman Act states that it is unlawful to discriminate in price between different purchasers of commodities of like grade and quality, if the effect is to lessen competition. Agencies must be careful in developing services and attractions that are of like grade and quality especially if it is intended to eliminate or lessen the competition. This is particularly true when public or non-profit agencies compete for the same markets with identical service levels.

Morris (1987) found price differentials to be widely used by industrial product managers; however, many of the managers were unaware of the Robinson-Patman Act and its importance in using price differentials. The arguments for differential pricing are: 1) to make due allowances for differences in the cost of manufacture, sale, and or delivery of the product or service, 2) to match competition, or 3) to compensate for changing market conditions. Differential pricing is not legal if the intent is to charge each customer, or market segment, a price based on the value that the customer's received.

There are several articles in the hospitality literature that discuss the deceptive practices by hotels in conjunction with yield management systems (Herman and Quain 1982; Lewis 1986; Lewis and Roan 1986; Wilson 1992). According to Wilson (1992), federal and state unfair and deceptive acts and practices statutes are purposely written to be broad and flexible so as to apply to many types of abusive business practices. The Federal Trade Commission is also responsible for enforcing laws dealing with unfair and deceptive business practices such as price discrimination.

Conclusions and Implications for Recreation Resource Managers

There is no question that yield management can be useful to organizations in the recreation industry. In fact, a number of organizations are already using yield management principles to some degree. The main task for most firms is to quantify the process and gather more information such as price elasticities and cross-selling by segment. Furthermore, total expenditures of added revenue and the perception of value of the part of different target markets may be very helpful in this process. This information can be used as input into a structured yield management system, such as those shared in this article and can help management to make better and more informed decisions under uncertainty.

Yield management techniques and the concept may be useful in recreation resource management in both the private and public sectors. The current economic conditions and the trend toward privatization places the burden on governmental agencies to maximize revenues and yield. For example, states like Kentucky, West Virginia and Ohio have park systems that include lodging, golf courses, campgrounds, concessions and additional amenities. It is necessary for these organizations to compete with the privately owned lodging and recreation facilities and to make a profit under varying economic conditions. Pricing strategies must be part of an overall marketing plan and they should be based on the market characteristics of the various consumer segments.

Managers must also recognize that if they desire to implement yield management techniques they must quantify the process and gather more customer history information and carefully

monitor demand with regard to price elasticities and the cross selling potential of various market segments. If the trends towards privatization continue; then, burden public agencies and highly competitive private sector agencies must maximize revenues, profits and yields.

The conditions for the application of yield management are satisfied within the recreation management field as described in this article. However, managers must use caution in recognizing the difference between maximizing revenues and maximizing profits. Brotherton and Mooney's (1992) recommendations for developing a yield management equation provides particularly sound promise of the application within this field. Combined with the additional sources of information (e.g., additional revenue sources and cost information) by market segment as suggested by Dunn and Brooks (1990) through the "Market Segment Profit Analysis," improvements in the yield management technique and its application may be enhanced in this field. Furthermore, agencies must understand the legal ramifications of their pricing decisions with regard to price discrimination. Private agencies which directly compete with public sector agencies in the delivery of the same products and services are now more aggressive in pursuing unfair pricing strategies of both public and non-profit recreation agencies.

Finally, yield management is not a cure-all for unprofitable operations nor a way of confusing customers and forcing higher rates. It is a process that serves to increase revenue and profits and provide better services, products or programs to customers. The ultimate test of implementing a yield management technique is the response of the customers or users of the facility. They must perceive the decisions made by management in executing their purchases to be fair, to provide choice, and to provide value. The technique will need more serious consideration in the recreation management field as it moves more aggressively to revenue enhancement.

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RECYCLING AND SOLID WASTE MANAGEMENT PROGRAMS WITHIN IOWA'S CAMPING AREAS: A STUDY OF PARK MANAGERS

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The specific purpose of this study was to collect baseline information on solid waste management/recycling programs and practices within Iowa's public and private camping areas. The information was collected through a scientific survey (mail questionnaire) of the managers of local, state, federal and private camping areas in Iowa. The data reported represent 86 percent of the camping areas in Iowa. This research suggests that Iowa's camping areas make a significant contribution to the total waste stream in Iowa. Only a small percentage of the areas currently provide the opportunity to recycle, even though a majority of the managers recognize the value of recycling and are willing to participate in model recycling programs. This research points towards the need to develop comprehensive solid waste management plans and policies that integrate various units and levels of government and provide guidelines and mandates for recycling and other waste management programs within Iowa's camping areas.

Introduction

The garbage crisis has become a major issue for every governing body in this country. The development of effective and successful policies and plans of action for reducing, recycling, storing, or disposing of solid waste are increasingly difficult. These problems are particularly difficult for park and recreation agencies with limited resources and vague directives. Iowa's parks and camping areas provide an excellent setting for the exploration and evaluation of innovative policies and methods for solid waste management. Such efforts could serve to minimize the impact of camping areas on local (mostly rural) landfills, while extending a progressive and "good neighbor" image. These efforts could ultimately have a carry-over effect on values and behaviors of persons when they return home.

Despite the many values and benefits associated with recycling and comprehensive solid waste management, no data is available on the volume of solid waste generated or on the barriers to the development of recycling programs and solid waste management plans within park and recreation settings. To address these information needs Iowa State University, with grant support from the Iowa Science Foundation, conducted a study of managers of Iowa's local, county, state, federal and private campgrounds in the fall of 1991.

Study Objectives

The purpose of this research was to collect preliminary data which will assist in the development of comprehensive recycling and solid waste management programs and policies within Iowa's camping areas. This paper will provide a summary of the research to include a description of the survey methods, profiles of the campground managers and of the camping areas, brief descriptions of key findings, and recommendations for the development and management of campground recycling programs.

Survey Methods

Various references and lists were utilized to compile a listing of 488 camping areas within the state of Iowa. The managers of each of the identified camping areas were mailed a questionnaire with a letter explaining the study and the importance of obtaining a valid assessment of current solid waste management programs in Iowa's camping areas. By April 1st of 1992, 378 questionnaires were returned for an initial response rate of 77 percent. An additional 40 questionnaires were returned blank with an explanation that the manager had included this camping area, when completing the questionnaire for another camping areas, for an adjusted and final response rate of 86 percent.

Profile Of Camping Area Managers

Table 1 presents a demographic profile of the managers participating in the recycling study, as well as information on their personal recycling behaviors. The average campground manager has considerable experience in the profession of park management, is well educated (4 years of college) and has been exposed to recycling programs (84% recycle household waste).

Table 1. Profile of camping area managers.

Summary of Demographic Information	
Age	40 years (mean, mode, median)
Total family income	\$25,000 to \$34,999 (35%)
Education	4-year college degree (52%)
Educational training	Natural Science (55%)
Current job title	Director (43%)
	Park Ranger (34%)
Years in position	9 years (mean)
Years in profession	13 years (mean)
Home residence	Town or city (44%)
	Rural or farm (37%)
	At park (20%)
Summary of Recycling Behavior	
Recycle household waste	Yes (84%)
Recycling opportunities	Curbside pickup (17%)
in home community	Local drop off (58%)
Attended a workshop or seminar on recycling	Yes (45%)

Profile Of Camping Areas

The research project collected descriptive information on Iowa's camping areas, to include the following:

- Administrative Agency for Campgrounds: 70% County; 16% State; 6% Private; 5% Federal; 3% Local and other.
- Visitation to Campgrounds: 1,317,500 Federal; 1,298,000 County; 701,000 State; 55,500 Other. Total visitation to the camping areas was estimated at 3.3 million visitor for 1991. This estimate of total visitation combined with the average length of stay (2 days) and the average amount of waste generated per person per day (3.8 lbs) suggests that the yearly waste stream for Iowa's camping areas is over 25 million pounds. (Figure 1, next page).
- Types of Campgrounds and Number of Spaces: 2% backcountry; 39% primitive; 28% modern/flush toilets; 31% developed with full hook-ups.

- **Years Campgrounds have been in Service:** The majority of campgrounds (53%) have been in service for over 20 years.
- **Proximity of Campgrounds to Closest Community:** 75% of the camping areas are within five miles of a community. Sixty-two percent of the communities located closest to camping areas have a population of less than 2,500.

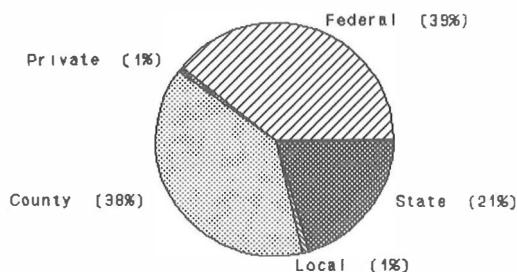


Figure 1. Estimated percentage of Iowa's total camping area waste stream by administrative unit.

(1) Findings: Waste Stream, Current Solid Waste Disposal Practices and Costs

Waste Stream

According to the campground managers, waste paper makes up the greatest proportion of waste stream in camping areas, followed by food waste and plastic containers, aluminum cans, tin cans and glass. The least common materials were cardboard, newspaper and fish remains. This initial analysis of the waste stream indicates that a paper recycling and/or composting project(s) would be the first steps toward waste reduction. (Although a more detailed analysis of the waste stream should be conducted before any concrete plans are made).

Waste Disposal and Collection Techniques

Ninety-one percent of the respondents indicated that the campground waste is hauled out of the park to a landfill. Forty-nine percent use private waste haulers and 42% use park staff to haul waste. Fifty-five percent of the camping areas have garbage cans or dumpsters distributed around the campground. Forty-three percent of the sites have centrally located collection areas, 8% have garbage cans at each site, and 1% require campers to haul out their own garbage. Collection of solid waste is frequent in the majority of campgrounds, 55% had one trash pick up a week, while 36% had more than one a week.

Cost of Collection

The results indicate that nearly 33% of the campgrounds pay between \$61 and \$100 for garbage removal and disposal. The total cost for garbage removal for the 300 campgrounds (those which provided this information) was nearly \$33,000 in 1991. These figures may seem nominal, however the cost of waste disposal is expected to increase at a much greater rate than other budget items.

(2) Findings: Inventory of Campground Recycling Programs, Availability of Markets for Recycled Materials, and Fiscal Costs of Recycling Programs

Inventory of Campground and Staff Recycling Programs

Only 13% (49) of the camping areas included in the study provide the opportunity for campers to recycle (Table 2). However, 69% (260) of the administrative offices associated with the camping areas have established some type of recycling program for staff; these programs offer an initial infrastructure for recycling programs for campers.

Table 2. Recycling opportunities provided within camping areas.

Recycling Receptacles Provided for:	Camp-ground	Office
Aluminum cans	9%	47%
Plastic	5%	24%
Glass	4%	17%
Tin cans	4%	15%
Paper and cardboard	2%	34%
Oil and grease	1%	53%
Other materials	3%	23%

Recycling opportunities are more available for staff than visitors to the camping areas. Seven percent of the campgrounds provide campers with the opportunity to recycle only one of the listed items; approximately 4% provided the opportunity to recycle two or three of the materials, and 2% provided the opportunity to recycle four or more of the items.

Fifty-six percent of the campgrounds were involved in some type of environmental education programs. Almost 40% use recycled paper products, and 27% recycle their office paper. About 18% of the campgrounds are involved specifically with recycling education.

Markets for Recycled Materials

A majority of the camping areas included in this study are within a thirty minute drive of a market for most types of materials. The managers had the most knowledge of locations to recycle aluminum and the least knowledge of where to recycle tin and glass.

Cost of Recycling Programs

Thirty managers reported the expenditures for on-site recycling for park visitors averaging \$1,630 a year. Staff recycling programs, reported by 55 managers, averaged a cost of \$350 a year. Off-site recycling programs, drop off sites and collection outside of the park, averaged about \$1,060 a year according to 40 managers. Finally, 109 managers reported that environmental education programs, for campers or the general public, cost on an average about \$2,240 a year.

(3) Findings: Managers' Attitudes Toward Campground Recycling Programs

The most important reasons for recycling efforts are related to the conservation of natural resources for current and future generations (Table 3). Managers identified the lack of staff, money and inadequate resources as the most important reasons for not sponsoring a recycling program for visitors to the campground.

Table 3. Motivations and barriers to recycling.

Motivations for and Barriers to the Development of Recycling Programs	Percent Agreeing
Important reasons for recycling	
• To conserve natural resources	56%
• It saves resources for future generations	54%
• To save landfill space	52%
• Shortages in raw materials	40%
• Recycling is an effective way to protect resources	36%
Important reasons for recycling	
• Not enough staff	25%
• No market for recycled materials	24%
• No pick-up in area	17%
• Lack of appropriate facilities	15%
• Not enough volume of solid waste	13%

Thirteen percent of the managers felt that the most important reason to not recycle was not sufficient quantities of solid waste to justify a recycling program.

(4) Findings: Importance of Solid Waste Issues

Ninety percent of the campground managers disagree or strongly disagree with the statement, "More fuss is being made about the need to recycle than is justified". Less than 30% of the park managers believed that landfills are a safe way to dispose of waste. However, almost 50% of the managers believed that new technology will solve future garbage problems.

According to the results of the survey, managers are aware of the need to recycle and the safety related problems associated with landfills. However, there is considerable disagreement between the managers over the ability of new technology to resolve waste management problems. A vast majority of the park managers appear to be sensitive to the need for comprehensive solid waste management policy.

The most serious problems associated with park management, according to this sample of managers, are lack of markets for recyclable materials, not enough places to recycle, soil erosion, inadequate support for parks and recreation, inadequate environmental education programs, and lack of long range community and regional planning. Thirty to forty percent of the park managers were not aware of the solid waste management plans in the community closest to their camping area. However, the managers did report that nearly 80% of these adjacent communities were presently involved in curbside or drop-off recycling, and about 40% were composting garbage.

(5) Findings: Management and Administrative Support for the Development of Recycling Programs

Nearly 50% of the managers have had specific education on recycling, and about 80% recycle household waste and use recyclable products. Over 85% percent of the campground managers said that they would be willing to participate in a model/demonstration recycling program and/or an environmental education program. The most common reason for wanting to take part were related to the conservation and educational benefits. The reasons for not participating were insufficient resources (i.e. staff, time and cost), and that they already tried it and it was not worth the trouble.

Most managers know how to recycle and are willing to be involved, but nearly 70% say the agency they work for does not sufficiently support recycling efforts. Eighty-five percent of the sample believe that agencies involved in resource-based

recreation have an obligation to encourage recycling behavior. Only 26% believe that the cost should be offset by penalties to campers who do not separate recyclable materials. A greater percentage, 45%, believe that camping fees should be increased to pay for the recycling programs.

Managers are in agreement that programs that depend on external sanctions/rewards, volunteers, or campers carrying out their own garbage would not be effective solid waste management strategies. According to Table 4 there is less agreement on what programs would be effective, however, a majority (60%), believe that education on the values and the methods of reducing waste, and the provision of campground recycling are the most effective solid waste management programs (61%).

Table 4. Managers' perceptions of the effectiveness of various solid waste programs.

Programs Which Will Be Effective	Percent
• Educate the public on value of recycling	62%
• Provide the opportunity for campers to recycle	61%
• Educate the public on waste reduction practices	60%
Programs Which Will Not Be Effective	Percent
• Fine campers who don't separate waste	93%
• Require that campers "carry out" waste	82%
• Charge a garbage fee based on the volume of waste	77%
• Use volunteers to assist with recycling program	72%
• Provide financial incentives to encourage recycling	59%

Conclusions and Recommendations

This research suggests that Iowa's camping areas make a significant contribution to the total waste stream in Iowa. Only a small number of camping areas (13%) currently provide the opportunity for campers to recycle, even though a majority of the managers recognize the value of recycling and are willing to participate in model recycling programs. The research points towards the need to develop comprehensive solid waste management plans and policies that integrate various units and levels of government and provide guidelines and mandates for recycling and other waste management programs within Iowa's camping and recreation areas. Specifically this research suggests that:

- Composting could significantly reduce the proportion of waste currently being landfilled. Park staff could develop a compost area on site which serves multiple functions (e.g., waste reduction, environmental education and soil enrichment).
- Any federal or state policy mandating the development of solid waste management plans for local municipalities must include provisions for camping and recreation areas; and should include mechanisms to insure compliance and to promote teamwork between the federal, state, county, and local units of government.
- There is a need for a detailed on-site waste composition study within Iowa's camping areas.

- Future research needs to evaluate the advantages and disadvantages of various waste collection strategies in terms of their impact on the development and operation of recycling programs, and to empirically address the question "will campers participate?" with a random sample of visitors to camping areas.
- The initial infrastructure for the development of recycling programs is already in place (i.e., many of the materials are already being collected at a majority of the parks through staff recycling programs) and could be used and expanded to include recycling programs for the camping "public".
- Guidelines should be prepared as to what constitutes recycled products and procedures for ensuring that agencies purchase the products made with recycled materials, and a list of markets for specific materials should be developed and distributed to campground managers.
- A model recycling programs should be developed and evaluated at various locations with various administrative units.
- There is a need for a series of focus groups with managers and campers to determine the most efficient and equitable way to pay for campground recycling programs.
- A manual or guidelines should be developed as a reference for park managers interested in initiating a campground based recycling program.

MEASURING THE EFFECTIVENESS OF CAMPGROUNDS AND OTHER FACILITIES

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Recreation managers must find ways to reduce costs. This paper demonstrates an indicator of cost effectiveness of campgrounds and other recreation facilities. Managers who critically examine their levels of service can use this indicator to help them determine which of their services are cost effective.

Introduction

In 1985, Parks Canada was concerned with expanding camping and with appropriate pricing. This prompted studies such as a price elasticity study (Beaman, Hegmann, DeWors 1991). The price for camping was roughly doubled in the middle 80's. Still there was a general orientation to expansion. Beaman (1988) developed a "Campground Expansion Coefficient" (CEC) and calculated a value for the coefficient for all campgrounds to aid decision making regarding campground expansion.

In fact, by 1989, some camping was suffering from under-utilization so that capacity built in the 70's was being closed in the 80's. Market research and promotion campaigns were seen as part of an answer. For example, the Fundy National Park Camping Study (Parks Canada, 1989) was carried out, resulting in a marketing campaign to get "old" regional users of Fundy to come back to camping. A marketing campaign was successful at getting total camping use at Fundy up enough that capacity previously closed was opened.

Parks Canada undertook a variety of camping studies in the late 80's to address a variety of decision issues. In this period, proposals for action were often based on new clients wanting more service so resources were requested for two reasons: first, to market camping to get more users; and second, to upgrade facilities so that more sites would at least have electricity in order to attract "the changing breed" of camper of the 90's and beyond. However, Parks Canada's budgets were shrinking and even with camping fees doubled, it was recognized that fees only roughly paid for operating costs. Marketing and upgraded services resulted in more revenue and higher operating and recapitalization costs. This was a serious problem. We were making decisions about camping supply in isolation from issues of cost or of whether the benefits we were producing were worth the costs.

The situation described is not unique. LePage (1983) recognized it as the typical approach of recreation planners. He also recognized that it was important to measure client satisfaction instead of assuming it was identical to planner satisfaction when planning campground supply. In other words, managing camping is more than just keeping the numbers up. Clients and costs are also important.

How can notions of clients and costs be incorporated into management decisions about offering campgrounds and other facilities? For managers to take these issues into account, they must be able to measure the benefits a facility produces as well as have a clear idea of what part of their budgets are attributable to the production of those benefits.

Because public agencies generally do not charge for services and programs, or charge at prices that are below the cost of production, it is difficult to let market forces decide whether a product or service is "worth it". Letting the market set the price or setting special prices also raises issues (Wicks and Crompton, 1986) of worth to whom? Surrogate measures or indicators can sometimes be derived to make up for the lack of market-established prices as indicators of the worth of the programs or services.

When Parks Canada recently undertook a review of its campground operations with the objective of finding more economical ways to provide that service, researchers in the Research Coordination Branch had the occasion to try to come up with a surrogate measure of the benefits of campgrounds (benefits in terms of the agency's mandate, which do not include the full set of benefits which can accrue to the camper). Although we did not try to monetize benefits, we aimed to develop a way to help managers get an idea of what is costing them to produce the benefits and to focus on what client groups were getting them at what cost.

This paper describes how we analyzed the costs and benefits of campgrounds, and how the results of that analysis produced a simple coefficient which can be used by managers to indicate that their campground or other service was performing as planned or was in need of examination. In addition, this approach appears to be generalizable to other facilities, services and programs which park visitors use.

Analysis and Results

Costs

Costs we considered were the cost to operate the campground annually and capital costs. Operating costs included such things as maintenance, garbage collection, registration gate operation, utilities. Capital costs were defined as the amount that would have to be set aside annually in order to have enough money to replace campground assets when they had lived out their useful life. Interest on the money was not considered because, with more than 200 campgrounds, recapitalization is an ongoing operation requiring a regular annual flow of cash, not an amount we have to borrow or pay interest on.

As part of their asset maintenance program, Parks Canada engineers have estimated the replacement cost of individual assets in campgrounds (Public Works Canada, 1991). They also estimated life cycles of these various assets. Dividing the replacement cost of an asset by the length of its life cycle gives an average annual amount that should be set aside to replace it. Adding all the average annual replacement costs for all assets that make up a campground gives the annual capital cost of the campground, assuming normal maintenance is carried out. Parks Canada managers use such data to justify requests to central agencies for sufficient long term capital funding to restore all capital assets to normal operating condition.

Although our analysis dealt with specific campgrounds, we believed that we would better be able to illustrate our point about the economics of campgrounds if we used typical costs. Therefore, we took annual capital and operating costs for all Parks Canada campgrounds with thirty or more sites, and which regularly reported use. We examined cost data for 1990 and 1991, the two years which were available to us. For each year, we regressed the operating and capital costs separately against the number of sites in the campgrounds to obtain parameters to allow us to estimate the marginal operating and capital costs for an hypothetical average campground.

done, it is clear that weekend visitors are short term local users and weekday users are people from farther away who stay longer.

Table 1. Some characteristics of visitors to our example campground by day of arrival.

Origin and Length of Stay	Parties which Arrive on Weekends (%)	Parties which Arrive on Weekdays (%)
Halifax	25	15
Rest of Nova Scotia	12	25
Outside Nova Scotia	<u>63</u>	<u>60</u>
	100	100
5+ nights	5	22
3-4 nights	17	36
1-2 nights	<u>78</u>	<u>42</u>
	100	100

Source: Kejimikujik N.P. registration records, summer 1992.

If the fact that weekend visitors stay a shorter period of time translates (as seems likely) into other differences of behaviour, such as less interest in natural heritage and interpretive programs (which they can see again and again) and more interest in recreational boating or sunbathing (which can be done over and over), then it may well be that more benefits (of the sort we are mandated to provide) are derived by visitors that arrive on weekdays than by those arriving on weekends. This is because our mandate to promote an understanding of Canadian Heritage takes precedence over any mandate we have for providing recreational opportunities. However, weekday visitors cost us \$9.00 per party night. Weekend visitors cost us from \$10 to \$70 a party night. If the benefits we gain from providing a camping experience for the weekday visitors are worth the \$9.00 subsidy we give to obtain them, are the possibly smaller benefits we get from the weekend visitor worth the \$10 to \$70 we must pay? Research cannot give an answer to this. It is a policy question. What research can do is to set out the question in clear terms so that managers can make appropriate policy on the issue.

Discussion

Decision support systems need simple coefficients if managers are going to be able to use them to monitor performance of their facilities and programs. Manning and Cormier (1980) proposed a concentration index for campgrounds which could serve as such a coefficient. Beaman (1988) recognized this explicitly when developing the Campground Expansion Coefficient. It is clear from these initiatives that degree of use plays a central role in how a facility's performance should be judged. However, as pointed out at the beginning of this paper, costs are critical as well. The advantage of the cost-effectiveness measure described in this paper is that it takes account of use, but includes the notion of cost. This makes it a realistic coefficient in that it indicates what we are achieving at what cost. Services provided to a particular client group may be worth it at a certain cost, but not at others.

In decision support systems, coefficients such as this provide signals of potential resource allocation problems and a call for management examination. A low coefficient need not be a signal for immediate action. If the campground was built to

accommodate future growth, or is the subject of some management action such as a promotion campaign or if the campground is intended to absorb users after the closure of a second, uneconomic campground, then low coefficient (which is short term) does not necessarily signify a problem. It is possible, on the basis of forecasts of use, to estimate how the coefficient will change over the next few years, and this may act as justification for the building and maintaining of the campground at its present size. The coefficient can then be tracked over the period of years to see what the campground actually achieved. If the coefficient reaches expected levels, the manager's judgment was borne out. If not, he can be held accountable for a bad decision.

The coefficient becomes very useful when you consider a senior manager looking at the performance of a whole series of campgrounds. Looking at use patterns, or at occupancy tables soon becomes very confusing. It is much easier to look at a list of campgrounds, each with its expected coefficient value, and its actual coefficient value, and seeing at a glance which are performing well and which not.

Furthermore, this notion of a coefficient is readily applicable to other facilities which are used in a park. Any facility that is used by visitors can have a cost per transaction calculated for it. If the transactions and costs can be differentiated according to the different client groups served (some of whom are more crucial to the mandate of the organization than others), management can judge whether certain levels of use are cost effective and so set baselines under which the service becomes problematic.

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PUBLIC WORKSHOPS FOR STATE PARK MANAGEMENT INPUT: A CASE STUDY

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In a time of budget cuts, increased scrutiny and accountability of public agencies by the general public, increasing diversity of needs and demands by service users, and increasing grassroots involvement by some segments of the public, it is becoming increasingly important that public input and involvement be solicited during planning and policy development phases. As a follow-up to a survey of western Massachusetts residents to determine their perceptions of budget cut-related service changes and public meetings, an alternative form of public workshop dealing with state park management issues was conducted.

Introduction

Across the country public agencies involved with managing outdoor recreation and natural resource areas are facing budget cuts. At the same time, the general public, observing or experiencing the effects of constrained budgets and what they perceive as inappropriately used funds, is increasingly scrutinizing actions and policies of "the government," and is holding public agencies accountable for how they spend funds as well as how they fulfill their missions. For land managing agencies, including those which provide and manage outdoor recreation opportunities, this public scrutiny presents both a challenge and an opportunity for how management policies and actions are made and implemented. Traditionally, land managers have based decisions on their training, experience and research results. However, with increased public interest and involvement, managers are finding they must at least consider (voluntarily) opinions of a diverse public in developing management strategies or be forced to consider them through litigation or other public actions. Management decisions also are becoming more difficult due to the increasing diversity of needs and demands by users and those with interests in non-use values (e.g., land preservation, biodiversity, animal rights, etc.).

The Commonwealth of Massachusetts is not immune to public interest and scrutiny. The state has a patchwork pattern of public open space and park lands that provide watershed protection, wildlife habitat, sports fields, skiing/hiking trails, campgrounds and a variety of other recreation opportunities. They are managed by a complex variety of agencies, including local conservation commissions and recreation departments, private non-profit land trusts, the Metropolitan District Commission, the Department of Environmental Management, and others. Some trails and access sites cross private lands, sometimes with legal easements, sometimes simply as a result of traditional use.

Rapid growth in the state during the late 1980s resulted in increased demands on and use of the area's land, including its park and recreation resources. New residents, often with different needs, lifestyles and expectations than those of long-time residents, complicated demands on the area's resources.

More recent economic decline led to major state budget cuts, which included cuts in budgets for park and recreation facilities, services and site maintenance. This resulted in some park closures as well as service reductions at other sites. As a consequence there has been increased potential for negative resource impacts, recreation use conflicts, park use restrictions, displacement of users to alternative sites or activities, deferred maintenance, and safety threats (both perceived and real). The challenge for park managers is to continue to provide resource protection and quality recreation opportunities without alienating or disappointing the users and other residents. Consequently it is important to know and understand the perceptions, perspectives and opinions of those clients.

As a preliminary step in assessing opinions of residents of the Connecticut River Valley, a survey of residents (systematic random sample) was conducted in spring of 1992 to determine: 1) how their use of state parks has been affected by budget cuts; 2) their issues of concern relative to provision of state park facilities, services, and management; and 3) if they participate (why/why not) in public forums dealing with park-related issues. (Partial results of this survey are presented in Vander Stoep and Dunlavy, NERR 1992 Proceedings.) Following completion of the survey, a non-traditional public meeting was conducted to gather additional input in a manner which facilitated face-to-face participant discussion. The selection of an interactive format was predicated on the assumption that effective public involvement strategies can help increase the public's awareness of the complexity of management issues facing resource managers while improving relations among diverse special interest groups. Related benefits of a non-traditional public workshop include:

- reduction of residents' (and park users') antagonism toward and legal action against management decisions;
- improved consideration of multiple issues during the decision-making process;
- increased public commitment to and support for final action plans; and
- improved public image of land management agencies (Vander Stoep and Dunlavy, 1992).

Workshop Methods and Format

The non-traditional public workshop was planned to involve both interested survey respondents and other members of the Connecticut River Valley community. The purpose of the workshop was to provide a forum for residents to identify and discuss with each other, in small groups, the park management issues most important to them. Usually public meetings deal with predetermined issues or new park policies, and are often conducted to get public reaction to a proposal or plan. The purpose of this meeting, however, was to identify more broadly the most important issues to the public, which then could be considered during planning and policy decision-making by DEM staff, a time frame much earlier in the planning process than is often used. Because parks serve a variety of functions and provide multiple opportunities and benefits to diverse people, it is important for managers to "hear" diverse perspectives. This workshop format provides one tool for gathering this diverse public opinion for integration into future planning, and provides a non-threatening venue for direct public participation and interaction.

Of the approximately 450 respondents to the original state park survey, 55 had indicated an interest in participating in a follow-up workshop. Invitation letters, with RSVP postcards and maps to the workshop site enclosed, were sent to these 55 people. A total of 25 postcard responses were received, with 6 indicating that they would attend the workshop. (Of the other postcards received, most indicated a continued interest in the workshop and results, but were unable to attend because of previous commitments, evening work, lack of child care, or because they had moved from the area.) Four of these people actually participated. (It should be noted that the workshop was held on the evening before the national presidential

election. Also, the weather had turned cold and icy, perhaps prompting some people to stay home.) Additionally, invitations were sent to 18 representatives of organizations and legislative groups which might have an interest in the workshop content (state and local government officials, DEM personnel, local business owners, representatives of local non-profit organizations with interests in resource management and/or recreation, and members of state park/forest friends groups). Ten response postcards were returned, with four indicating that they would participate. Three actually attended. Additionally, two DEM representatives and four students (all of whom had worked seasonally for various land management agencies) participated.

To summarize, the final group of workshop participants included survey respondents, Massachusetts DEM employees, a legislative aide, representatives of organizations with state park interests (such as park "friends" groups, nature center directors, special interest group representatives), and seasonal land management agency employees.

The workshop was conducted at the University of Massachusetts, a location central to the study area and neutral relative to special interest groups and DEM. The building was posted liberally with signs directing participants to the wheelchair entrance and the workshop room. Participants were greeted at the door, given name tags, and asked to sign in if interested in receiving a copy of workshop results.

Participants, who had been invited to arrive as early as 30 minutes before the start of the workshop, were offered refreshments, then encouraged to interact informally with other participants and workshop facilitators. When the structured part of the workshop began, participants were presented with an overview (and selected results) of the survey which had preceded the workshop. The survey overview was followed by a brief introduction to the Massachusetts state park and forest system and the general impacts of recent budget cuts on park services, presented by Gary Briere (Bureau Chief of Recreation, Division of Forests and Parks, Department of Environmental Management). Workshop procedures were explained to participants and they were invited to get more drinks or refreshments whenever they wanted. The structured part of the workshop lasted two and one-half hours, from 7:00 - 9:30 p.m.

The initial plan was to use a computer aided systems approach (using EZ-Impact software, Bonnicksen 1991) to involve participants in identifying park use and management issues, proposing alternative management policies, assessing multiple impacts of such policies, then prioritizing objectives and selecting appropriate policies and strategies. However, due to a variety of logistical and technical problems (hardware/software incompatibility, professional move of the principal investigator, and challenges of orchestrating an extensive public process from several hundred miles distant), a substitute process was selected with the hope that at least some of the original intent of the alternative workshop format could be maintained.

Therefore, for this workshop, a modified **nominal group process** was used. This is a process through which participants first work individually, then as members of a small group to identify priority issues and recommendations. The process was selected because it helps to remove some of the barriers and fears people have about expressing their ideas in a public forum, particularly if they believe that they (or their ideas) will be judged harshly or reacted to negatively. The nominal group process, which attempts to build consensus, encourage understanding of others' perspectives, and facilitate EACH person's active involvement, works as follows:

- All participants are allowed to first develop their own ideas about a specific issue (and write them on a worksheet on which is written the general "guiding question").

- In rotation among small group members, all participants are asked to "put their ideas on the table" (in this case, written on flip charts visible to all group members)...*without* anyone else being able to comment, question or judge.
- Group members discuss the ideas (asking for clarification, discussing implications and alternative perspectives, identifying pros and cons, etc.).
- Individuals then rank their top 5 issues on a second individual worksheet.
- Rankings within each small group are tallied, then one member of each group (NOT the facilitator) presents his/her group's conclusions/ideas to the entire workshop group for further discussion and clarification.
- Individuals then "weight" their top X issues by dividing 100 points in any way they wish (imagining that they have \$100 to allocate) among as many of the possible alternatives or issues listed in the full workshop ranking lists (participants may have changed their opinions since the first ranking).
- Final group responses, complete with "funding allocation," are tabulated.

Two group facilitators worked with each of two groups, each composed of seven people representing a mix of perspectives. Two guiding questions were used with the groups, and the full process (as described above) was followed twice. The two guiding questions were:

- 1) *What major concerns do you have regarding the future management of Massachusetts state parks and forests, and visitors' access to and use of those parks?*
- 2) *Assuming a need to cut state park services, maintenance levels, facilities, and new land purchases in the future (based on tight budgets), which do you believe are most important to preserve?*

An additional question, for which the nominal group process was not followed due to lack of time, was responded to by individuals using a third worksheet. This question was:

Assuming continued insufficient state funds for state park operations, would you advocate service reductions and park closures OR use of more user fees?

WHY?

If fees, for what types of park uses?

Workshop Results

Final results of the entire workshop group, based on allocation of each person's "100 dollars" (or 100 points) to their priority issues are presented below. The number in the right hand column indicates the sum of all the "dollars" allocated by the workshop participants. The services or facilities receiving the highest allocations of dollars overall, therefore, indicate the groups' highest priorities for use of available state park funds. [It should be noted that these "dollars" do not reflect any realistic relative costs for each of the services or facilities; they simply indicate weighted prioritizations of the individual items.] Results from the first and second phases of idea generation and prioritization are presented in subsequent tables to illustrate some of the flow of issues discussion throughout the three phases of the nominal group process.

While questions 1 and 2 were intended to address separate issues, it was clear on the individual worksheets and during discussions for Question 2 that the participants' thoughts and comments were influenced strongly by discussion and prioritizing of issues raised in response to Question 1. Therefore, responses and issues similar to those addressed during Question 1 discussion are noticeable in Table 2 (Question 2).

Table 1. Final nominal group process results from phase three for Question 1.

QUESTION 1: What major concerns do you have regarding the future management of Massachusetts state parks and forests, and visitors' access to and use of those parks?

Total Group Ranking	General Issue Identified	Total "\$" as allocated by all 14 participants
1	Adequately maintain facilities and equipment	425
2	Hire enough personnel to adequately staff parks and provide direct services to users	145
3	Keep the parks open	125
4	Provide appropriate and planned handicapped access	100
tie 4	Develop and implement better marketing strategies (residents need to know what's available)	100
4	Provide adequate law enforcement and ranger presence	100
7	Manage staff more effectively and efficiently to increase work accomplishments across the system	65
8	Provide quality (and adequate) signage, maps, information & educational materials	60
tie 9	Provide frequent trash collection	40
9	Seek alternative funding sources (besides state funds) to support park operations and staff	40
11	Reduce services to fit within budget rather than trying to do too much with too few resources	35
12	Assure compatible (not conflicting) uses within individual parks and adjacent to each other; and assure that uses provided are compatible with the resource itself	30

The additional question, to which participants responded using a third individual worksheet, placed participants in a position of having to make a decision about a general approach to park management under tight budget conditions. They were forced to decide whether to simply cut services across all parks, possibly closing some parks, or to try to raise additional funds to meet operations needs by implementing a fee system. Some respondents chose to implement a combination of user fees and service reductions (see Table 3).

Responses to this question as listed here are taken directly from individuals' preliminary worksheets. Due to lack of time, no group discussion occurred. It is possible that, had time been available for discussion, additional issues may have been raised, or the group may have come to some consensus about how to approach the challenge of reduced funding.

Table 2. Final nominal group process results from phase three for Question 2.

QUESTION 2: Assuming a need to cut state park services, maintenance levels, facilities, and new land purchases in the future (based on tight budgets) which do you believe are most important to preserve?

Total Group Ranking	General Issue Identified	Total "\$" as allocated by all 14 participants
1	Adequately maintain facilities and equipment	375
2	Keep as many parks open as possible (to be close to all segments of region's population)	260
3	Use strategic planning as a way to continually update and prioritize park management issues, policies	220
4	Preserve the "natural" parks	145
5	Have adequate ranger presence and staffing (for both safety and service)	115
6	Incorporate marketing into management strategies	80
7	Focus on service to the public (the users)	70
8	Develop a strong volunteer program to supplement park staff and services (hire a volunteer coordinator)	35
9	Encourage park activities that require the least cost for provision, maintenance and management of facilities	15

Table 3. Individual written responses to Question 3.

QUESTION 3: Assuming continued insufficient state funds for state park operations, would you advocate service reductions and park closures OR use of more user fees?

Prefer service reductions as a way to manage within the budget	2
Prefer user fees as a way to manage within the budget	7
Prefer a combination of service reductions and user fees as a way to manage within the budget	4

Two respondents preferred **service reductions** over user fees, citing the following as reasons or recommendations for this preference (direct quotes from worksheets).

- Keep as much operational as possible and curtail the services offered (*comment only; no justification was given*)
- Increasing user fees will not help parks a great deal because 1) fees go into a general fund, not kept in park fund, 2) it would be difficult for a park to pay for itself--couldn't generate enough \$--people wouldn't pay what the park needs to earn. I feel services should be reduced to a point. But first a study must be done to see what the users want to keep and what they feel is unnecessary or could be modified. User input is important and DEM doesn't ask for enough of it.

Seven respondents preferred implementing some system of **user fees** to be able to maintain a reasonable level of services and opportunities. Their comments regarding types of fees, how to implement fees, or why to use fees are as follows (direct quotes from worksheets):

- Selective fees for specific functions (with retained revenue) could generate revenue without closing the facility to the general public.
- Increase user fees (IF they are dedicated to the park). It will not be as permanent as service reductions. If economy should get better it is easier to reduce fees than to re-implement services.
- I would try to add in more user fees but combine with fund raisers and donations. If this still is not sufficient, instead of raising them higher, I would slowly cut down on some services. Better to keep open and hope times will get better.
- Fees collected should be retained by park or facility they are generated to maintain. I think folks would be willing to pay for a quality experience.
- Public needs what parks and forests have to offer.
- Instead of closing parks and reducing services, ask for local volunteers.
- User fees could be the first step but can only go so high. State Parks provide a good service that can and does compete with the private sector.

Those preferring fees indicated they should be charged for the following services and facilities (again, the following are direct quotes from worksheets):

- Rinks, swimming and other site-intensive uses.
- Site-specific areas. Highly concentrated use areas (e.g. campsites)
- Entrance fee; facility fee; rely on donations and fund-raisers.
- Hiking, biking, bird watching, swimming, canoeing, camping, picnicking, fishing.
- Parking, picnicking, hiking trails, swimming, bird watching.
- User fees for high maintenance facilities (i.e. skating rinks, swimming pools, trash collection).
- Swimming, camping, picnicking. Things that require direct park services (i.e., trash pick-up, toilet cleanings, etc.)
- Pooled fees, with revenue retention, so that people feel they are donating to park services/upkeep instead of paying for something they already own--to increase money available to maintain parks - and to build a feeling in public that they have some responsibility to "replace" the impact they made on the park - and to provide an incentive to increase revenue generating activities without increasing costs that would eat up all increases - while still focusing on public interest and service aspects of the park as state assets.
- Entrance fees - walkers should be exempted. Should be a balance between free and too expensive -- would depend upon how many activities/uses are available.
- Trash pick-up; maintaining trails, etc.

Even with this small group, there seems to be some disparity in where, when and how to implement user fees. It is unfortunate that the group did not have time to discuss this issue and to move toward some consensus. It is expected that

discussion also could have helped clarify nebulous concepts, and allowed those with management experience to explain some of the operations and maintenance logistics as well as the current flow of money collected in fees to non-managers. Such insight could have influenced individuals' final decisions about fee priorities and implementation strategies.

Four respondents preferred a combination of **user fees and service reductions**, choosing to use as many managerial tools as possible in helping meeting management and operations needs. Their comments were as follows:

- Try to keep the public involved with the parks - Reduce services - seek other options to keep open - before closing outright. Build a strategy based on services - and where they can happen - rather than on a facility and what can we do with it. (*service reductions must be strategically planned*)
- The basic user fee should be minimal, i.e. entrance fees. The public has already paid for state park operations through taxes for the acquisition of the land, taxes staff. User fees in general are discriminatory in nature and typically hurt that segment of the public that needs publicly supported facilities the most. Fees for services, not basic, should be increased (i.e. for private events on state lands or special interpretive services).
- People are going to enter public parks and forests anyway, so some minimal surveillance/law enforcement is necessary. For those that are "more active" parks/forests - then some user fees are necessary for funding to keep people aware that services are not free and that some responsibility is on the individual too.
- If service reductions are necessary - may they be for the larger facilities - natural areas require less maintenance, less money.

The following tables show the results of phases one and two of the nominal group process. (They represent concepts and discussion leading to phase three results, which were presented in Tables 1 and 2.) In the left hand columns are complete lists of issues generated by members of each of the two workshop groups, based on their written completion of phase one (the individual responses) **BEFORE** any ranking or prioritizing occurred. Ideas listed are in no particular order, except for the top issues identified by each group, each of which is indicated in bold face type and followed by its ranking. In the right hand column are the group rankings for each of the highest priority items for each group based on their discussions and prioritizations during phase two of the nominal group process.

Unsolicited Comments

Though not part of the workshop discussions, a few comments were submitted unsolicited by survey respondents who earlier had indicated an interest in the workshop and received invitations, but who were not able to participate on that particular evening. Comments were written on their workshop RSVP postcards. Some were simply statements of personal preferences and wishes (e.g., "We'd like to keep the Mt. Tom Reservation open full time."). Others provided recommendations for operating parks under restricted budgets (e.g., "Have retired people with park passes donate time to help at parks.").

How Results Were Used

After the workshop was completed, all workshop results were compiled and sent to workshop participants and facilitators. Additionally, results were sent to regional and state headquarters of DEM where they were to be considered as one source of input for future planning and management of state parks and forests. After the workshop, the Bureau Chief of Recreation for DEM (who participated in the workshop) expressed an interest in possibly conducting similar workshops in other parts of the state. As of this writing, it is not known if such workshops have indeed been conducted.

Table 4. Results of phases one and two of the nominal group workshop for Question 1.

QUESTION 1: What major concerns do you have regarding the future management of Massachusetts state parks and forests, and visitors access to and use of those parks?

Issue	Group Ranking
GROUP A	
• maintenance of facilities	1
• marketing for current & future issues	2
• ranger presence	(tie) 3
• management of staff, problems with "idle time"	(tie) 3
• trash collection (needs to be regular)	5
• reduced service equated with reduced public support	6
• maintenance of swimming facilities	
• inadequate staff levels	
• issues related to open and closed parks	
• retained revenue (currently fees collected at an individual park are not retained on-site, or within DEM, but sent to the general fund)	
• user safety (law enforcement needs)	
• cleanliness of sites and facilities	
• handicapped access	
• vandalism	
• unqualified staff	
• visitor education and interpretation	
• status of closed areas (user unawareness)	
• access to information about park services, facilities, hours, fees, etc.	
• impact on open areas when other areas are closed	
• hours of operation	
• user fees - affordability	
• decision making process on major decisions	
• retrenchment of staff	
GROUP B	
• natural quality	1
• good signage and maps made available	2
• money for adequate personnel	3
• keep parks open	4
(will the parks really stay open?)	
• maintenance of trails and facilities, equipment, buildings, and trash removal	(tie) 5
• assure provision of uses that are compatible with the environment; & maintain appropriate use levels	(tie) 5
• adequate law enforcement	7
• maximization of limited fund	8
• new ways to seek alternative funding	9
• budgets	
• personnel	
• clean trails and beaches and campgrounds	
• feeling of safety at facility	
• interpretive services to enhance experience or some kind of educational component	
• land acquisition where applicable	
• handicap accessibility	
• assigning certain activities to certain parks/areas -- as ATVs and mountain bikes in one or more parks, but not in every one	
• matching funds to what park personnel can really accomplish within equipment, time, money constraints	
• user fees - will they be increased? established where there aren't any?	
• any volunteer efforts or means of accepting volunteer assistance?	

Table 5. Results of phases one and two of the nominal group workshop for Question 2.

QUESTION 2: Assuming a need to cut state park services, maintenance levels, facilities, and new land purchases in the future (based on tight budgets) which do you believe are most important to preserve?

Issue	Group Ranking
GROUP A	
• strategic planning (long term and present situation considered)	1
• maintenance of facilities	2
• keep as many parks open as possible	(tie) 3
• interpretation	(tie) 3
• preservation of natural resources	5
• direct services to public	(tie) 6
• marketing - change trends to prevent further cuts	(tie) 6
• restroom facilities where people are	
• maintain staffing	
• quality staff	
• education for users	
• new land purchases, new facilities	
GROUP B	
• prioritize uses (don't be everything to everyone at each park; don't spread resources too thin)	1 (combined idea)
• maintain areas for low cost activities (i.e., bird watching, hiking). Provide more of opportunities that don't require personnel	1 (combined idea)
• preserve the state forests (facilities that require the least expense)	3
• maintenance of facilities, buildings, equipment	4
• ranger presence/law enforcement	5
• increase volunteer support systems	6
• preservation of trails and picnic areas... "low maintenance areas"	
• good signs and maps	
• provide the most services to most people - keep maximum number of parks open, even with limited service	
• be practical and innovative - "if you have a tree stump, don't build a bench"	

Discussion and Management Implications

Despite some of the logistical, technical and timing difficulties of the workshop, and the relatively small size of the workshop group, those who participated were active discussants in their groups, were willing to stay longer than we had anticipated, and were engaged in discussions on specific issues for longer periods of time than had been anticipated (preventing our being able to go through all three phases of the nominal group process for Question 3). Although no formal evaluation of participants' reactions to their participation in the workshop were conducted, verbal responses from participants before they left, and their eagerness to receive copies of the compiled results, indicated interest and effectiveness of the workshop for those involved. Regardless of the implementation of the group's ideas, two major objectives were met: 1) one more source of public input was presented to DEM to assist in its future planning and policy development; and 2) a group of diverse citizens with differing ideas, needs and motivations were able to share ideas, clarify their perspectives, and have an opportunity to "step into the shoes" of people with different perspectives than their own without feeling threatened.

This alternative format public workshop presents a model which can be adapted and applied to other resource management sites and issues. One advantage is that it can be used BEFORE major plans or changes are made (thus eliminating the simply reactionary role of most traditional public meetings), and that participants have relatively free reign with their comments rather than being restricted to a single, focused issue or situation. While such "looseness" presents some challenges (e.g., participant responses not directly responding to guiding questions; low degree of specificity in some comments and ideas; and limited consideration of interactions between recommendations, as evidenced in some of this group's comments), it does allow for broad exploration of ideas, discussion of diverse ideas, and an opportunity for intragroup negotiation about ideas and priorities. Such negotiation is evident in the differences between groups' phase two prioritizations of issues (see differences between Groups A and B in their top priorities in tables 4 and 5). Some of the differences are resolved to some degree during the phase three "allocation of dollars."

When planning such a public meeting, it is important to recognize the benefits, and to plan and conduct the meeting accordingly. However, it must also be recognized that there are certain constraints and challenges of such workshops that must also be considered...in order to minimize problems, to understand the limitations of the results, and to properly use the results of such meetings. Summaries of the primary benefits and challenges are listed below, as well as a list of suggestions for facilitating an alternative public workshop.

Benefits of Conducting a Public Workshop

Public workshops can be beneficial because they allow participants (who may have differing perspectives from each other) to discuss issues and ideas informally with other users as well as with park personnel, legislative representatives, and organization representatives, in a context in which none of the participants' opinions is more important or valid than any other participant's. Additionally, it:

- provides up front public input to planning process and policy development;
- breaks down barriers between agency and public;
- allows participants to hear perspectives of others in a non-threatening environment;
- allows participant recognition of the complexity of park management issues;
- builds sense of ownership in participants; and
- hopefully reduces legal challenge, project blockage, and litigation later.

Constraints and Challenges of Conducting a Public Workshop

Because typically there is strong self-selection bias in participation in such a workshop, we acknowledge that the workshop group responses are not representative of all Connecticut River Valley residents or all state park and forest users. Needs and concerns of other groups also must be integrated in future management decisions. Perhaps public workshops for specific, typically underrepresented groups can be conducted. However, this strategy sidesteps one of the major advantages of this type of workshop, which is allowing people of diverse needs and opinions to sit down face-to-face and discuss their differing ideas openly, and to identify common ground on which further discussions can build.

Some specific challenges of conducting a non-traditional public workshop are listed below:

- takes time and detailed planning;
- requires patience and sincere interest (positive attitude) of those facilitating the workshop;
- requires numerous facilitators;
- requires effort to make participants comfortable with non-traditional format;

- must minimize negative impact of vocal skeptics or nay-sayers who refuse to "follow the rules" during the process;
- requires follow-through;
- requires clarifying that the workshop is only ONE means of gathering input, and that results do not dictate final agency decisions or policies;
- must make sure that ALL relevant parties participate (or are invited).

Giving a Public Workshop that *Little Extra Touch*

There are several "extra touches" that workshop planners and facilitators can use to make residents feel that their opinions truly are wanted and will be used, to make them feel more at ease in talking with others (most of whom are strangers), and to help build a sense of cooperation and trust rather than laying out a special interest battleground. Some of the details include use of the following:

- personalized letters of invitation
- trained facilitators
- continual personal contact with participants
- neutral site, comfortable atmosphere, easy access and parking, clear directional signage
- personal greeting at the door
- refreshments
- name tags
- list to sign in (to receive workshop results)
- organized, yet informal structure
- enforcement of judgmental comment restraint during first phases
- summary of results sent to participants along with thank you

Most importantly, sincere efforts should be made to consider and integrate participants' comments and ideas when appropriate and feasible. When this is done, the general public should be made aware of the contributions of workshop participants...and given information how they can become involved in the future.

Conclusion

While there are constraints on workshop results (most notably with regard to respondent bias and lack of representation of all citizens and relevant special interest groups), the results can be used as one information source about important park issues and management perspectives. However, a single workshop should not be the ONLY source of user information. Efforts must be made to specifically target minority and other less represented user groups.

If planned, facilitated and conducted properly, with a real desire to gather and use public input, it appears that non-traditional public forums can attract participation, at least by some segments of the population. However, there are still major barriers which must be overcome to ensure open participation and to incorporate input into management decisions, not the least of which involve changing attitudes. First, it is important to change agency attitudes. Employees must recognize 1) that the public may really have some valuable input and insights, 2) that their (agency employees') professional opinions and expertise should not be threatened by honest public input (when collected in a non-adversarial environment), and 3) that there may be long term benefits from gathering public input to counterbalance what may be perceived as short term hassles and nuisances of actually involving the public. Second, it is important to change the public's attitudes about their input, to assure (or show) them that their input is valued and used. Simultaneously, people must realize that there are many different publics, with many different viewpoints, and just because they have a specific opinion, it is not necessarily representative of everyone.

It is only with everyone working together, hearing and understanding the ideas and perspectives of those different from themselves, and exchanging ideas in a non-adversarial, non-threatening environment that progress toward inclusive, probably also compromising, decisions can be made. If public

land agencies are to manage for the people, and if they are to receive long term support for their efforts (legislatively, financially, in volunteer support, in lack of destructive behavior), they MUST manage for ALL the people, and must consider the opinions and needs of all those groups in their decisions. This does not mean that they should try to be all things to all people, or to make decisions counter to agency missions or policies; it means simply that their decisions should acknowledge and be sensitive to diverse needs, and that people's input should be facilitated rather than inhibited.

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***TRAVEL AND TOURISM
BEHAVIOR***

INVESTIGATING SPATIAL STRUCTURE

INFLUENCES ON RECREATION

ACTIVITY PACKAGES

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The purpose of this paper is to explore the link between the resources where outdoor recreation may take place and the origin of travel. A recent study in Massachusetts suggests individuals that concentrate travel to park resources may intrinsically be identifying activity packages. It is hypothesized that proximity to resource may explain some of these activity packages. Highlighted will be the supply characteristics of recreation opportunities and the demand of activities as identified by the use of a Geographic Information System (GIS) with data from the 1988 Massachusetts State Comprehensive Outdoor Recreation Plan.

Introduction

Travel behavior in recreation is correlated with sociodemographic information about the traveler, purpose of the trip and proximity to destinations. Studies suggest that destination diversification may be a surrogate for activity compatibility (Bristow, Klar and Warnick 1992; Bristow 1989; Fesenmaier and Lieber 1988). It has been shown that activity participation may provide the best explanation to travel diversification and hence activity packages.

The purpose of this paper is to identify the spatial link of the resource to activity packages. It is hypothesized that proximity to resource may explain activity packages. Further it is hypothesized that the destination chosen for some activities may be inherently linked to a particular activity. For example, campers may elect to "get away from it all" and seek distant camping sites, while boaters desiring to "escape" may wish a closer opportunity. The relationships between these activities and available opportunities will be explored using a geographic information system.

Following this introduction, is a review of the relevant literature. Then the data and methods used in this study will be described. The results will then be summarized next along with implications to managers and planners.

We gratefully acknowledge the support of Professors Klar and Warnick (UMASS) for the SCORP data and MassGIS for digital data layers.

Literature

A primary goal of travel research is to understand what factors might influence the decision making process (Burnett 1981). In this manner, recreation planners and managers can identify determinants of patronage patterns to estimate the returns on investments. In particular, recreation and tourism travel is assumed to be a function of the travelers socio-economic and demographic characteristics, the activity or purpose of the trip and the relative availability of alternative destinations.

Travel behavior can viewed in one of two ways; either individuals visit the same park repeatedly or they visit a variety of destinations. Repetitious travel is best exemplified by a recreator visiting a "favorite fishing hole". Diversified behavior is a form of variety seeking, where the angler seeks a new and different opportunity.

Certain demand of the activity may preclude diversified travel, however. For example, the angler who fishes from a large vessel may moor the boat close to home. Large boats are unwieldy to transport great distances by car. A review study (Graefe 1986) in The President's Commission on Americans Outdoors (1986) found that boaters tend to stay close to home. Average travel distance to boating opportunities averaged 25-40 miles and the vast majority traveled less than 50 miles. Peterson (1991) supports this by reporting the boater markets in the Great Lakes Region were found close to the resource.

Another example of concentrated travel may be best exemplified by the trend to time-share campsites. This will lock a camping family into staying at the same park resort.

Recreationists who seek variety in their activity may tend to diversify their travel. Boaters, especially those constrained by the large vessels may not exhibit diversified behavior because of the aforementioned reasons. Campers, on the other hand, are not so clearly delineated. Urban recreationists tend to visit the country for their camping experience. However, KOA type campgrounds are often located near urban centers to provide inexpensive housing for tourists. In Massachusetts, for example, KOA campgrounds are found in close proximity to Boston, Springfield and the Cape Cod region (KOA 1993). Park resources that cater to boaters and campers are plentiful in the region. But as some research has found (e.g., Warnick and Vander Stoep 1990) participation rates for boaters have been dropping because of an aging population. Demand, however, continues to escalate as people seek an outdoor experience. Since visitation may be increasing and it is unlikely that supply will increase much substantially, it is important to learn about the discrepancies between each.

A recent study of recreation patterns in Massachusetts (Bristow, Klar and Warnick 1992) found travel concentration occurred when recreationists boated and visited parks or camped and visited parks. Interestingly enough, these travel strategies changed when patterns of participation in boating and camping were investigated. Under these circumstances, the households who participated both in boating and camping tended to diversify travel and thereby were unlikely participating in the two activities together. Incompatible activity packages become apparent.

The Data

The analysis identified in this research is based on the Massachusetts Department of Environmental Management (DEM) data gathered for the 1988 State Comprehensive Outdoor Recreation Plan (SCORP). A full description of the SCORP data is found in Smith et al. (1988). The SCORP project incorporated a statewide stratified random digit-dialing telephone survey. Completed interviews yielded a sample size of 3,500. Collected were standard socio-economic and demographic information about the respondent, levels of participation in warm and cold weather outdoor recreation activities and places where each activity took place most frequently.

Supply data collected by the State's DEM included an inventory of 11,000 sites throughout the Commonwealth, both private and public. Information about the site's facilities, such as number of campsites, length of trails and handicapped accessibility is identified. Boating supply was measured by available boat slips and boat ramps, while camping supply was collected by noting the number of tent sites or trailer sites available on each site. Each were tallied by town to provide a measure of facilities.

Spatial data were linked to MassGIS data sets obtained from the Massachusetts Executive Office of Environmental Affairs. A digital data base of Massachusetts provided the political boundaries on which the resources and demand information were mapped.

Methods

To explore the spatial factors of the study, a Geographic Information System (GIS) was employed. A GIS is the complete sequence of components for acquiring, processing, storing and managing spatial data (Star & Estes 1990). It permits the recreation manager to explore the interrelationships between the human and physical environments.

The GIS incorporated in this study was Idrisi (Clark University) version 4.0. The software was installed on 386-40mhz IBM compatible PC with VGA graphics. The base map of Massachusetts was imported in the GIS stored as both a raster and vector file. The former is important for geographic analysis in Idrisi, while the latter data form is necessary for presentation reasons.

In order to investigate the interrelationships between the supply of opportunities and the demand, it is important to delineate the market as specifically as possible. This distinction allows recreation planners to identify the policy sensitive factors important to groups of people (Kutter 1981).

On our base map of Massachusetts, supply characteristics, as measured by the availability of boating slips and ramps, and camp sites and trailer sites were encoded for each of the 351 towns in the Commonwealth.

Demand measures were standardized because not all communities were sampled in the SCORP survey. Therefore, this information was mapped at the county level.

To investigate the surplus or deficit of opportunities and demand, the state mean value for each category was calculated. State supply and demand surpluses in excess of the mean were then encoded in the GIS. The mean value was used, rather than median value, was used because of the outlier regions that far exceed the rest of the state in opportunities or demand. Surplus supply therefore represents a true (and conservative) measure of surplus of recreation opportunities.

Results

The available market of recreation opportunities is clearly regional. For example, boating excess supply tends to be located along the coast and adjacent to inland lakes. Ocean frontage provides ample opportunities for boaters. Camping follows the boating example by being present in the Cape Cod region as well as the Berkshire Mountains. Pockets of camping opportunities are found between.

To identify the relationship of supply and demand, a series of GIS overlays were created. Figure 1 illustrates some of the results for boating. Areas identified as the local surplus supply exceeding the local surplus demand have the darkest tone. These regions tend to have a greater, and perhaps overabundance of resources for the activity. On the other hand, areas with a lighter tone, are those where the excessive local demand exceed the local supply. Here, the lack of available resources nearby may force recreators to travel

greater distances to participate in boating. Where the local demand and supply are in equilibrium, no shading is displayed on the maps.

As expected, boating demand was found to exist near the existing resources. Boat slips provide mooring for large vessels that are difficult to transport. Generally, demand for boat slips, was found to be located along the coast and on the Connecticut River. Excess local supply is found in Westport, the Boston Proper and in Pittsfield. The neighboring communities utilize these resources by traveling by auto to a moored boat.

A similar relationship is found with boat ramps. Boat ramps are typically used by smaller horsepower boats that the owner transports from resource to resource. A greater abundance of boat ramps is apparent from Figure 1.

Camping opportunities are highlighted in Figure 2. Here the Berkshires and Cape provide more resources than the local demand, especially for tent camping. Trailer opportunities exceed local demand in the Berkshires and much of Worcester County. The populated eastern region and northern Connecticut River Valley exhibit surplus demand. In the rest of the Commonwealth demand equals supply.

Implications

The use of a GIS to explore surplus as well as deficit measures of recreational opportunities is relatively new. Traditional SCORP documents have attempted to spatially map distributions of opportunities and match with real or projected demand for forecasting purposes.

The purpose here, however, was to explore the links of resource dependency to existing behavior. Boaters, for example require not only a body of water to recreate in, but also need a variety of support infrastructure to moor the boat and to provide access to the resource.

The small scale analysis identified here is useful for agencies planning for regions as well as individual site planning. For example, surplus boat ramps may not actually be a waste of taxpayers money since upkeep is minimal. And vacancy rates can be used to measure the appropriateness of boat slips.

Camping opportunities may be more flexible because despite some resource dependence, the ancillary activities found at parks may stimulate participation more than the camping pad. Nevertheless, recreation opportunities can be investigated on a regional basis to evaluate the overall distribution of participation.

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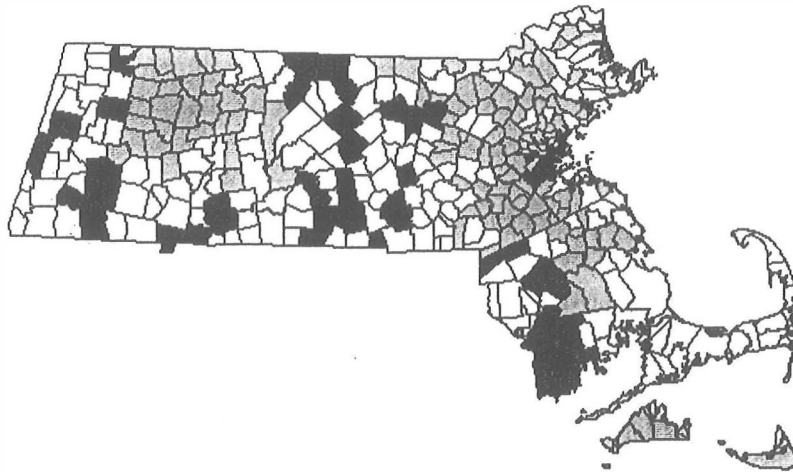
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Surplus/Deficit of Boat Ramps

Sup. = Dem. 
 Sup. < Dem. 
 Sup. > Dem. 



Idrisi

Surplus/Deficit of Boating Slips

Sup. = Dem. 
 Sup. < Dem. 
 Sup. > Dem. 

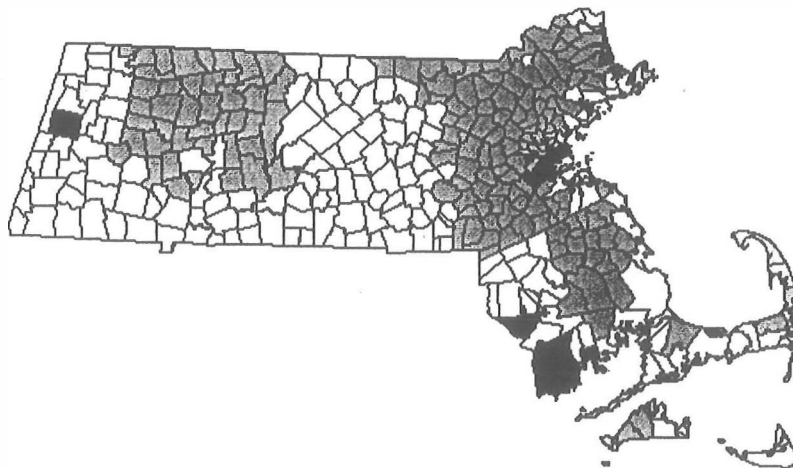
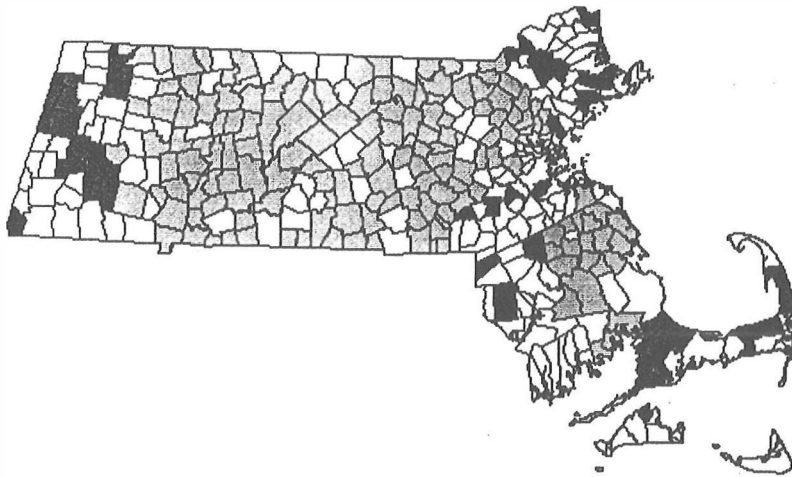


Figure 1. Measures of surplus and deficit for boating ramps and slips in Massachusetts.

Idrisi

Surplus/Deficit of Tent Camping

Sup. = Dem. 
 Sup. < Dem. 
 Sup. > Dem. 



Idrisi

Surplus/Deficit of Trailer Camping

Sup. = Dem. 
 Sup. < Dem. 
 Sup. > Dem. 

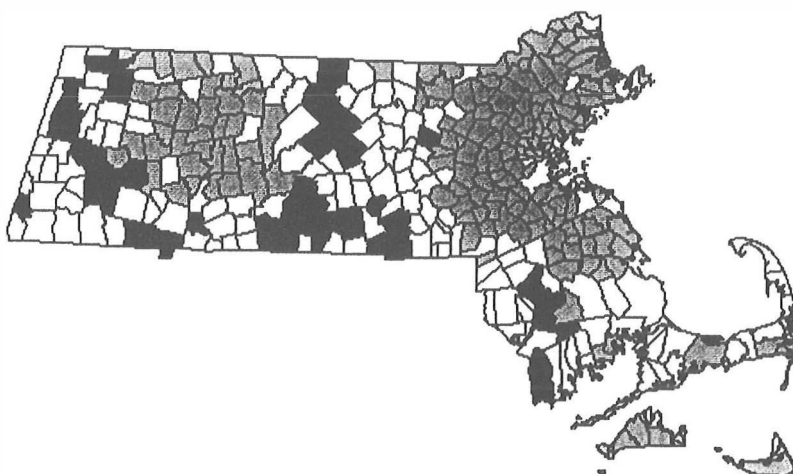


Figure 2. Measures of surplus and deficit for tent and trailer camping in Massachusetts.

Idrisi

PATTERNS OF SITE VISITATION AT AMERICA'S INDUSTRIAL HERITAGE PROJECT SITES

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Findings are presented on site visitation patterns of heritage tourists at 14 of America's Industrial Heritage Project (AIHP) sites. Of interest are responses to questions on visitation to AIHP sites prior to their trip, during their trip, and future visitation plans. Marketing implications for the future of AIHP are discussed.

Heritage Tourism

The culture and heritage of an area have long appealed to American tourists. In fact, "... heritage [is] increasingly becoming [a] major catalyst for the whole travel experience" (Hall and Zeppel 1990, p.1). Americans are "...increasingly becoming interested ... in the intricacies of the American landscape where the natural and cultural ... fuse in distinctive regional patterns, and where layers accumulating over generations eventually impart a rich patina to the scene" (Bradley 1992, p. 1).

Heritage tourism is perceived by many to be a subset of cultural tourism which is defined by the World Tourism Organization (1985, p. 1) as:

"... movements of persons for essentially cultural motivations such as study tours, performing arts and cultural tours, travel to festivals and other cultural events, visits to sites and monuments, travel to study nature, folklore or art, and pilgrimages."

Heritage tourism is "... about the cultural traditions, places and values that ... groups throughout the world are proud to conserve" (Millar 1989, p.13). Tangible remains of the past in the form of historic buildings or districts, archaeological sites, monuments, or cultural artifacts are also thought to be components of heritage tourism (Konrad 1982; McNulty 1991). Heritage tourism also includes the natural heritage such as

gardens, wild and wilderness areas of scenic beauty, and valued cultural landscapes (Oldman 1992; Tassell and Tassell 1990).

Heritage Tourists

Overall, tourists who travel to heritage areas tend to be older, more wealthy, and interested in extended family and education-oriented experiences. Fun is secondary to learning because they travel to increase their knowledge of people, places and things—to experience a sense of nostalgia for the past (Hawley 1990; Solomon and George 1977; Weiler and Hall 1992). These individuals are motivated "more by a search for heritage 'experiences' than by a detailed interest in factual history" (Weiler and Hall 1992, p. 54). In fact, for the vast majority of heritage tourists, the experiential component is most important (Peterson 1990). They are attracted to a destination primarily for the "atmosphere" and ambiance associated with a site (Mawson 1984), for a "bundle" of benefits, rather than just the factual history.

The majority of the market for heritage areas is local or regional. Locals tend to bring visiting friends and relatives to historic sites and are "more likely to visit 'their' historic site... if they perceive [it] to be a stimulating, dynamic, and fun place..." (Seale 1989, p. 18). In addition, the greatest percentage of visits are part of multi-purpose trips (Wall 1989).

America's Industrial Heritage Project

In 1989, the Southwestern Pennsylvania Heritage Preservation Commission, created by Congressional authorization in 1987, was officially formed and charged with recognizing, preserving, protecting, interpreting, and making available for the benefit of the public the cultural heritage of the region. The 21-member Commission, appointed by the Secretary of the Interior, included representatives from the National Park Service (NPS), state government and regional tourism and economic development agencies, along with individuals from the private sector representing 9 counties in southwestern Pennsylvania. This predominantly rural region has been designated as America's Industrial Heritage Project (AIHP). AIHP was developed as a broad-based partnership effort to identify, preserve and interpret the region's cultural and industrial heritage.

The Resources

Three industries in southwestern Pennsylvania were the foundation for industrial growth in America. The iron and, later, steel industries brought about the creation of heavy industry that was critical to the rise of the United States as the leading industrial power in the world. The iron and steel companies depended on coal production and the railroad network—coal was the critical fuel for both the steel and railroad industries, and the railroads created a transportation network that established national markets. The economic value of coal increased as it became an integral part of the steel and rail industries. Like iron and steel, coal was also a major factor in establishing the United States as a world power. The railroads were dependent upon and essential to the expansion of the steel and coal industries. They also brought about greater organization and regulation of the American society through product standardization, the creation of railroad time and development of a new managerial class. The railroad industry fostered a closer relationship between business and government, united the nation's geographic regions and provided greater mobility for Americans.

These three industries of southwestern Pennsylvania were not only dependent on each other—they also made other industries possible. Iron and steel provided the basic material for manufacturing a myriad of products, and numerous related industries sprang up, such as coal, glass-making and aluminum, all of which trace their roots to southwestern Pennsylvania.

The common denominator for the stories of America's industrial heritage in southwestern Pennsylvania is the people, whose tasks, working conditions, struggles and efforts to better themselves were similar throughout the region's era of industrial growth.

The AIHP Visitor Experience

AIHP commemorates and celebrates the legacy of our industrial past. The project is identifying significant resources, sites and stories related to the iron and steel, coal and transportation industries and their workers. At the core of the visitor experience in the region will be the stories of the people, told through first-person accounts. The stories will be recounted in visits to steel mills, coal mines, railroad yards, canal and coal company towns, shops, festivals, fairs, demonstrations, drama and musical presentations and special events. Many of the tours will be given by community residents whose heritage and culture are being shared. Visitors will see first-hand the diversity of human experiences within the developing industries of the 19th and early 20th centuries, with emphasis on the interdependency of the region's natural, cultural and human resources, and the resulting industries.

Visitors will find varied opportunities and activities, ranging from heritage centers to quick-stop single facility visits to multi-day, multi-site tours. To date, heritage centers based on a major single topic have been proposed for Johnstown (the iron and steel story), Windber (the coal story), Altoona (the railroad story) and Bedford (the transportation story). As planning continues, other centers, such as coke, glass and aluminum, may be identified and developed.

Studies have identified 17 major historic sites, including 4 NPS units, and nearly 200 related sites and amenities. Several of the major sites have undergone rehabilitation and are now open to the public. Others are proceeding on schedule, according to the project plan, and will be phased in over a decade. When complete, the entire project will be linked by a 500-mile tour route and hundreds of miles of subloop tours.

While visitors can now experience individual sites and their linkages, when complete the AIHP will direct visitors to one of the heritage centers for an overview of the particular story and associated resources. At the centers, visitors will also learn about other places they can visit across the region to find out more about other aspects of that particular story. At heritage centers, NPS units and developed facilities, full visitor services will be offered, including audiovisual media, conducted and self-guiding activities, exhibits, information, orientation, publications for sale, trails and visitor services. Rail tours, trolley tours and other methods of transportation between and within sites will also be part of the experience.

The Southwestern Pennsylvania Heritage Route, an automobile tour route along existing public roads marked by signage and interpretive publications, is a key link to the historical, cultural, natural, scenic and recreational sites in the region. The first leg of the tour route opened in 1992, connecting AIHP sites in the Johnstown area with those in the Altoona area; the final leg of the main route will be opened in 1994. The Heritage Route provides visitors with many choices to fully explore the region and its cultural and natural landscape.

Through all of the AIHP visitor experiences, visitors gain an appreciation of a) the regional and national significance of the iron/steel, coal/coke and transportation industries of the nine-county region, b) the social factors affecting the people whose work in those industries catapulted the United States to a position of world leadership, and c) the effect of these industries on the region's current economy and social structure.

The AIHP Study

The America's Industrial Heritage Project (AIHP) is a rather ambitious and groundbreaking attempt to promote our nation's industrial heritage. In response to a request for baseline information from the Southwestern Pennsylvania Heritage Preservation Commission and the Economic Development Advisory Group of the National Park Service, Penn State's Center for Hospitality, Tourism and Recreation Research initiated a five-year study in order to establish the economic impact of selected AIHP sites and to provide a user profile that

includes both behavioral and socio-demographic characteristics of visitors to these sites. Beginning in 1991, a long-term research project was initiated to develop a profile of the AIHP visitor. A primary objective of the study is to answer the following questions;

- 1) Who is visiting these AIHP sites?
- 2) Why are they coming to these sites (and for nonlocals, why are they coming to the region)?
- 3) What are they doing while in the region?
- 4) When do they make the decision to visit these sites and what information is used in this planning process?
- 5) How aware are these individuals of the AIHP and the Heritage Route (which is a designated route containing and connecting AIHP sites)?
- 6) What is the economic impact of nonlocal visitors on the region?

The overall benefit of this information will be two-fold. First, by understanding the different types of groups visiting the AIHP sites, AIHP managers can continue to fine tune their interpretive efforts and provide the services that visitors desire. Second, the information will help in the various stages of marketing the AIHP, which is crucial to the future growth of the AIHP.

Now, after two seasons of data collection, this paper presents preliminary, descriptive findings related to patterns of site visitation at 14 AIHP sites of interest for both residents of the region and non-residents from outside the region. Of particular interest are visitor responses to questions designed to find out about a) visitation to AIHP sites prior to their trip, b) visitation to AIHP sites during their trip, and c) future visitation plans.

Methodology

In 1991 and 1992 a random sample of individuals at selected AIHP sites in the Johnstown area of Cambria County and the Altoona area of Blair County were asked to take part in the study. During 1991, three of these sites were in the Johnstown area (Johnstown Flood Memorial, Johnstown Flood Museum, and the Inclined Plane) and two sites were in the Altoona area (Allegheny Portage Railroad and the Railroader's Museum). During 1992, the Horseshoe Curve was substituted for the Railroader's Museum.

Sampling took place each year from Memorial Day/early June through mid-October. Sampling times at the five sites included in the study were randomly selected using a stratified design based on time of the week (i.e. weekday or weekend) and time of day (i.e. morning, midday or afternoon). Each site was sampled during one weekday and one weekend day from June through August, and on one day during each weekend in September and the first two weekends in October. Data were collected through a combination of on-site interviews and follow-up mail questionnaires administered to visitors at the five selected AIHP sites.

Selected individuals were asked to complete a brief on-site interview (their responses were recorded on a short one-page questionnaire which took three to five minutes to complete). The individual was then handed a more extensive follow-up questionnaire, along with a pre-addressed stamped return envelope, that was to be completed after the trip was over. During the interview, individuals were asked to provide information about themselves and about their group (only about 6% visited alone) with whom they visited the site. The refusal rate to take part in the study was less than two percent. Study participants were also asked to provide their names and addresses for the purpose of additional follow-up efforts if their survey had not been returned after 10 days. In 1991, of the 2,075 individuals who completed the on-site survey, 1,718 returned the follow-up questionnaire for a response rate of 83%. Of the 2,114 individuals who completed the on-site survey in 1992, 1,754 completed the follow-up questionnaire for another response rate of 83%. Attendance at the five sites during the study period is presented in Table 1 for the first two years of the study.

Table 1. Attendance figures from June through October at study sites. ^a

	Allegheny Portage	Horseshoe Curve	Flood Memorial	Flood Museum	Inclined Plane
1991	18,460	*	40,705	25,253	117,090
1992	25,267	133,523	41,352	22,529	110,598
% of total 1992 attendance	67%	77%	68%	62%	65%

^a The study was conducted during these months.

* The Horseshoe Curve was closed during 1991.

Presentation of the Data

Nearly half of all those interviewed (46%) visited more than one AIHP site. Although roughly 10% of those sampled visited sites in both Johnstown and Altoona, the vast majority stuck to one theme (flood-related in Johnstown or railroading in Altoona). This corresponds with a primary intent of the AIHP to create heritage centers around a major theme such as railroading or steel, or a significant event, such as the Great Johnstown Flood of 1889. Thus, the information for the three Johnstown sites was combined, as was the information from the two Altoona sites, for the purposes of reporting the results. Additionally, the data were weighted based on the attendance figures at each of the sites.

Based on the sample sizes for the two area locations, the figures presented here are within ± 3 percent of the actual figures at a confidence level of 95%. These figures apply to those individuals who visited the selected AIHP sites during the study period (from June through October).

Findings and Results

Where AIHP Visitors Live

As would be expected, a significant percentage of visitation at the five sites can be accounted for by residents of the two respective counties in which the sites are located. Blair county, where Altoona is located, accounted for 12% of visitors at the two railroad sites, while Cambria county, which includes Johnstown, accounted for 23% of attendees at the three flood-related sites (Table 2).

The nine counties in the AIHP region accounted for 26% of the visitation at the Altoona sites and 39% of visitation at the Johnstown sites. Visitors residing in the rest of Pennsylvania accounted for 35% of the visitation at the Altoona sites and 23% of visitation at the Johnstown sites. The only county in Pennsylvania, outside of the AIHP region, which contributed at least 5% of the visitors in Altoona and Johnstown was Allegheny County, which includes the Pittsburgh metropolitan area.

Ohio, Maryland, New York, and New Jersey each accounted for 4 to 5% of the visitors at the Altoona sites. Ohio and Maryland each accounted for about 6% of the visitation at the Johnstown sites. Visitors residing in other states and countries accounted for 21% of the visitors at the Altoona sites and 22% of the visitation at the Johnstown sites. Overall, 74% of the visitors to the Altoona area sites and 61% of the visitors to the Johnstown area sites reside outside of the nine-county AIHP region.

With regard to the distance traveled to AIHP sites, 85% of those visiting the Altoona area and 81% of those visiting the Johnstown area live within 350 miles of the sites (Table 3).

Table 2. Residence of site visitors (expressed as percentages).

Residence	Altoona sample (percent)	Johnstown sample (percent)	Combined sample (percent)
Cambria County	6	23	7
Blair County	12	3	16
Other 7 counties in region	8	13	11
Rest of Pennsylvania	35	23	29
Ohio	4	6	5
Maryland	4	6	5
New York	5	2	3
New Jersey	5	2	3
Other States	19	21	20
International	2	1	1

Table 3. Distance visitors live from sites (expressed as percentages).

Distance from site	Altoona sample (percent)	Johnstown sample (percent)	Combined sample (percent)
30 miles or less	17	30	25
Between 30 and 90 miles	16	18	17
91 to 150 miles	16	8	12
151 to 350 miles	36	25	29
Over 350 miles	15	19	17

Site Visitation Patterns

As expected, site visitation patterns to the 14 AIHP sites of interest varied a great deal with respect to a) visitation to AIHP sites prior to the visitor's trip, b) visitation to AIHP sites during their trip, and c) future visitation plans.

Visitation to AIHP sites prior to this trip. Nearly two-thirds (64%) of the Altoona sample had visited the site before this visit. Approximately two out of five (43%) visitors to Johnstown had been to the site before this visit (Table 4). Over half (56%) of the visitors to the Altoona sites had visited Horseshoe Curve before this trip. At least one-fourth of the Altoona visitors had been to Allegheny Portage Railroad, East Broad Top, the Altoona Railroader's Museum, the Johnstown Inclined Plane, and Old Bedford Village. Over 40% of the visitors to Johnstown had previously visited the Inclined Plane and the Horseshoe Curve. Approximately one-third of these individuals had also been to the Flood Museum, the Flood Memorial, Old Bedford Village, and Fort Ligonier. Approximately 70% of all visitors to AIHP sites (regardless of

location) had visited at least 1 AIHP site prior to this trip. Forty to fifty percent of all visitors had been to at least three AIHP sites before this visit (Table 5).

Table 4. Sites visited before this trip (expressed as percentages).

Sites visited	Altoona sample (percent)	Johnstown sample (percent)	Weighted sample (percent)
Had been to the site visited during this trip before this visit	64	43	51
Had not visited any sites before this trip	27	31	29
Altoona Railroader's Memorial	31	16	22
Allegheny Portage Railroad NHS	26	18	21
East Broad Top Railroad	27	11	17
Johnstown Inclined Plane	26	45	37
Johnstown Flood Museum	17	32	26
Johnstown Flood National Memorial	19	35	28
Old Bedford Village	26	33	30
Horseshoe Curve	56	42	47
Somerset Historical Center	4	11	8
Fort Ligonier	19	36	28
Fort Necessity National Battlefield	12	16	15
Bushy Run Battlefield	6	7	6
Friendship Hill National Historic Landmark	<1	2	1
Guided Train Ride (Johnstown-Altoona)	6	7	7

Table 5. Number of sites visited before this trip (expressed as percentages).

Number of sites	Altoona sample (percent)	Johnstown sample (percent)	Weighted sample (percent)
Had not visited any site before this trip	27	31	29
One site	14	10	12
Two sites	16	9	12
Three or more sites	43	50	47

Visitation to AIHP sites during this trip. The largest percentage of respondents (54%) visited one site only during their trip, which may reflect a preponderance of single site visits by region residents (Table 6). Of special interest are the patterns of multiple visitation to sites in close proximity to each other and with a common heritage theme. Approximately 50% of the visitors went to more than one site and most of this multiple visitation occurred in either the Altoona or Johnstown area. Of these visitors, approximately 26% visited two or three of the AIHP sites in the Johnstown area associated with the historic Johnstown Flood of 1889, while 29% visited two or three of the AIHP sites in the Altoona area associated with historic canal and train transportation. Ten percent of the respondents "crossed-over" and visited sites in both areas during their trip and may well have been traveling the Heritage Route which connects the AIHP sites.

Nine percent of the respondents exhibited other patterns by visiting any of the eight other AIHP sites of interest located throughout the nine-county region, in addition to the site where they were interviewed. Fourteen percent of those visiting Altoona went to both the Horseshoe Curve and the Railroader's Museum and eleven percent visited both the Horseshoe Curve and Allegheny Portage Railroad (Table 6). Nearly one-quarter of all visitors were going to two sites, while a little over one-fifth of all visitors were visiting three or more sites (Table 7).

Table 6. Sites visited during this trip (expressed as percentages).

Sites visited	Altoona sample (percent)	Johnstown sample (percent)	Combined sample (percent)
One site only	52	55	54
Flood Memorial and Flood Museum	*	3	2
Flood Museum and Inclined Plane	*	7	4
Flood Memorial and Inclined Plane	*	6	4
All 3 Johnstown sites	*	10	6
Horseshoe Curve and ALPO	11	*	5
Horseshoe Curve and Railroader's Museum	14	*	6
Horseshoe Curve, ALPO, & Railroader's Museum	4	*	2
Altoona sites and Johnstown sites	10	10	10
Other patterns	9	9	9

* Does not apply to that sample

Table 7. Number of sites visited before this trip (expressed as percentages).

Number of sites	Altoona sample (percent)	Johnstown sample (percent)	Weighted sample (percent)
One site	52	55	54
Two sites	30	20	24
Three sites	11	16	14
Four or more sites	7	9	8

Future visitation plans. One-half of the Altoona area visitors and forty percent of the Johnstown area visitors do plan to visit AIHP sites in the next 12 months following their visit, which indicates that future visitor interest and intended visitation to be substantial for both areas (Table 8).

Table 8. Sites plan to visit in next 12 months (expressed as percentages).

Sites plan to visit	Altoona sample (percent)	Johnstown sample (percent)	Weighted sample (percent)
Does not plan to visit any sites	50	60	56
Altoona Railroader's Memorial	32	15	18
Allegheny Portage Railroad NHS	18	12	14
East Broad Top Railroad	18	6	11
Johnstown Inclined Plane	15	16	15
Johnstown Flood Museum	18	13	15
Johnstown Flood National Memorial	14	10	12
Old Bedford Village	10	10	10
Horseshoe Curve	26	15	19
Somerset Historical Center	4	6	5
Fort Ligonier	4	7	6
Fort Necessity National Battlefield	5	6	6
Bushy Run Battlefield	5	5	5
Friendship Hill National Historic Landmark	4	4	4
Guided Train Ride (Johnstown-Altoona)	16	15	15

Implications for the Future of AIHP

Findings from this study, which identify site visitation patterns, should be of great interest to the managers of the individual AIHP sites, to the 21 members of the Southwestern Pennsylvania Heritage Preservation Commission, and to National Park Service personnel. In addition to helping managers fine tune their interpretative efforts, this particular information will be helpful in future marketing campaigns. An AIHP objective is to increase both site visitation and use for residents of the nine-county region and for non-residents, and longer stays for visitors from outside the region. Knowledge of present patterns of site visitation, as baseline data, will be useful in future planning and implementation efforts related to AIHP site and heritage route development, operation, and marketing.

It becomes evident from this data that it's important to not forget the impact of local visitation on the AIHP sites. Residents of the nine-county AIHP region account for approximately 34% of the visitation to the combined Altoona-Johnstown sites. Additionally, over 50% of the visitors reside within 150 miles of the sites. Currently, there appears to be very little promotion and advertising of the AIHP sites within the region. This could certainly be expanded, and is important because many of the residents visiting the sites bring relatives and friends from outside the region with them. Greater awareness and visitation by regional residents can also create good feelings of pride in the natural, cultural and historic heritage of the region.

The data also show the importance of on-site quality performance, because two thirds of the Altoona area visitors and two out of five Johnstown area visitors had been to the site visited during their trip before this visit. It's important for these visitors to have satisfying heritage experiences at the AIHP sites in order to improve and keep return visitation high. Word-of-mouth promotion is one of the best ways to increase visitation.

With slightly over one half of the visitors (54%) visiting one site only during their trip, the opportunity exists for AIHP managers to increase their promotion of adjacent sites having related heritage themes. This could be done by increasing visibility of AIHP information for visitors at each site, for example, through increased use of effective signage and interpretation, making brochures more visible and available, and increasing verbal information from on-site staff. Additionally, limited displays could be developed and set up which highlight opportunities for visiting adjacent AIHP sites, along with the potential benefits of an expanded heritage experience.

A substantial number of visitors (46%) are visiting two or more sites and "accumulating" attractions during their experience. Of those visitors touring more than one site, most of this multiple visitation occurred in *either* the Altoona area *or* the Johnstown area. Only ten percent of the study respondents "crossed over" and visited sites in both of these areas during their trip. The data definitely illustrate these two distinct patterns of multiple site visitation in each heritage area. The first leg of the Southwest Pennsylvania Heritage Route has been created, linking the historic flood sites in the Johnstown area with the canal and train transportation sites in the Altoona area, and illustrating a fascinating and complex story of people, the land and industrialization. There is obviously a need to make visitors more aware of this Heritage Route and of the different "theme-related" sites within a single area and adjacent areas. Hopefully, further promotion will increase the use of the entire Heritage Route in the future.

The development and marketing of "clusters" of heritage sites can enhance the visitors' appreciation of the regional and national significance of southwestern Pennsylvania's historical and industrial heritage, and make for interesting and satisfying heritage experiences in the region. Additionally, with knowledge of more to do and see, visitors from outside the region may be willing to extend their stay. Joint marketing of all the AIHP sites and associated attractions in the region together makes a lot of sense in terms of efficiency and effectiveness in increasing site visitation and use. Data generated from this study, over the past two years and in the future, will be helpful in the various stages of development and marketing crucial to AIHP's future growth and success, and contribution to the region's economy.

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THE NEW ENGLAND TRAVEL MARKET: CHANGING DEMOGRAPHICS AND GEOGRAPHIC MARKETS, 1980 TO 1990

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The purpose of this study was to examine and explore the New England domestic travel market trends, from 1980 through 1990 within the context of changing demographics and geographic markets. The existing travel markets, who travel to New England, are changing. Implications and discussion points were provided. Keywords. Domestic travel, trends, New England, demographics, geographic markets, and market implications.

Introduction

Changing demographic shifts in the population age structure will directly affect recreation participation and travel related behavior. Likewise, the geographic markets, where people come from, to travel to distinct regional destinations (i.e., New England or the Pacific Northwest for example) will likely also change over time. These distinct differences in travel-specific behavior and participation rates exhibited by changes in an aging society and evolving geographic markets will likely shape future demand. Recent studies (Warnick, 1992A and 1992B) indicated domestic travel in the Northeast has become a mature market. Recent economic trends and recessionary times have indicated that travel patterns to different geographic destinations may, in fact, change, also. With the exception of Florida, Hawaii and perhaps Colorado, (all of which are state tourist draws), New England exhibits the characteristics of one of the United States' most definable and perhaps most marketable geographic travel destination regions. Travelers usually know what states comprise New England and each of the individual New England states has substantial tourism based business segments and attraction power. Indeed, New England has a rich and long history as a geographic tourism destination -- rich in historic, recreational, natural and educational resources. However, previous studies seem to indicate that the region has suffered some setbacks. Therefore, there is a need to study how the region's markets have changed over time.

Purpose of the Study

The purposes of this study are two-fold: 1) to examine domestic travel to New England during the 80s; and 2) to identify changing patterns in these travel trends by examining such variables as demographic and geographic markets of travelers who visited New England during this period.

Method

For the analysis of domestic travel, data were drawn from *Study of Media and Markets* (Simmons Market Research Bureau, Inc. 1980-1990). These annual market studies were stratified national random probability samples for each year from 1980 through 1990. The methods included the distribution of self-administered questionnaires, personal interviews and follow-up telephone interviews. Sample sizes ranged from approximately 19,000 to over 23,500 adults over the period. The sample statistics were then extrapolated to the U.S. adult population of 18 years of age and older. The data were made available through Simmons Market Research Bureau¹ of New York and the University of Massachusetts Library. Within this study only travelers who indicated that they traveled to

New England were included. Excluded from this analysis were travelers who visited the New England from other countries.

The nature of domestic travel and participation requires the description of three major components of travel demand. First, the term "domestic travel" must be defined. "Domestic travel" is defined as "any trip(s) of over 100 miles (one way) within the continental 48 coterminous U.S. states taken in the previous 12 month period" (Simmons Market Research Bureau, Inc. 1990). This definition of domestic travel includes all types of travel taken which fits the mileage and regional description; but excludes all types of travel taken of distances shorter than 100 miles. Second, "market size" is the "number of people who participate in domestic travel." This statistic in and of itself it is somewhat less meaningful than a statistic which more specifically quantifies demand or travel volume. However, the nature of this data set does not easily allow a projection of the number of travel days to New England. Third, "participation rate" is the percentage of total adults by descriptor (total U.S. population or age -- such as 18 to 24 year olds or geographic home -- the South) who elected to travel to New England for any reason as a primary destination during the previous 12 months. In this study the geographic region definition of "New England" includes the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. The "Northeast Travel Market" includes travelers from the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, and New Jersey.

Age cohorts in terms of the demographic patterns of travel include the following categories: 18 to 24; 25 to 34; 35 to 44; 45 to 54; 55 to 64 and 65 and older. Other groupings of age cohorts include young adults -- 18 to 34; middle aged adults -- 35 to 50; and mature adults -- 50 and older. Target regions, or the place where travelers come from, are defined by Simmons (1990) in four broad areas of the U.S.: Northeast, South, Midwest and West.

The data were analyzed using an average annual growth rate which is defined as the percent change in terms of the size of the market or travel volume. It is derived by taking the current year number (market size or market volume) subtracting the previous year number and dividing by the previous year number; percent change from year to year was then averaged over the study period of 1980 through 1990. Travel market composition is defined as the percentage of the market from each area -- such as from each region.

Selected Findings

Overall Market Conditions for 1980 through 1990
The participation rate of all adults selecting New England as a primary destination averaged 3.7% over the decade. An adjusted annual change rate indicated 2.2% decline per year for the U.S. adult market choosing New England as a primary destination. This translates into losing about 140,000 primary destination travelers per year to the region. The peak year during this period was 1985 when 6.9 million destination travelers selected New England as a primary destination. The bottom year was 1989 when 4.9 million destination travelers selected New England. The region, as a primary destination rebounded in 1990. The statistics for this section may be found in Table 1. Graphic tables also have been included to view the data after each section below.

^{1/} Permission to use the travel data base was granted by Simmons Market Research Bureau, Inc., of New York for the purposes of this study. The interpretation of the data is the author's and Simmons is the source.

New England Primary Destination -- U.S. Adult Participation Rates: 1980-1990

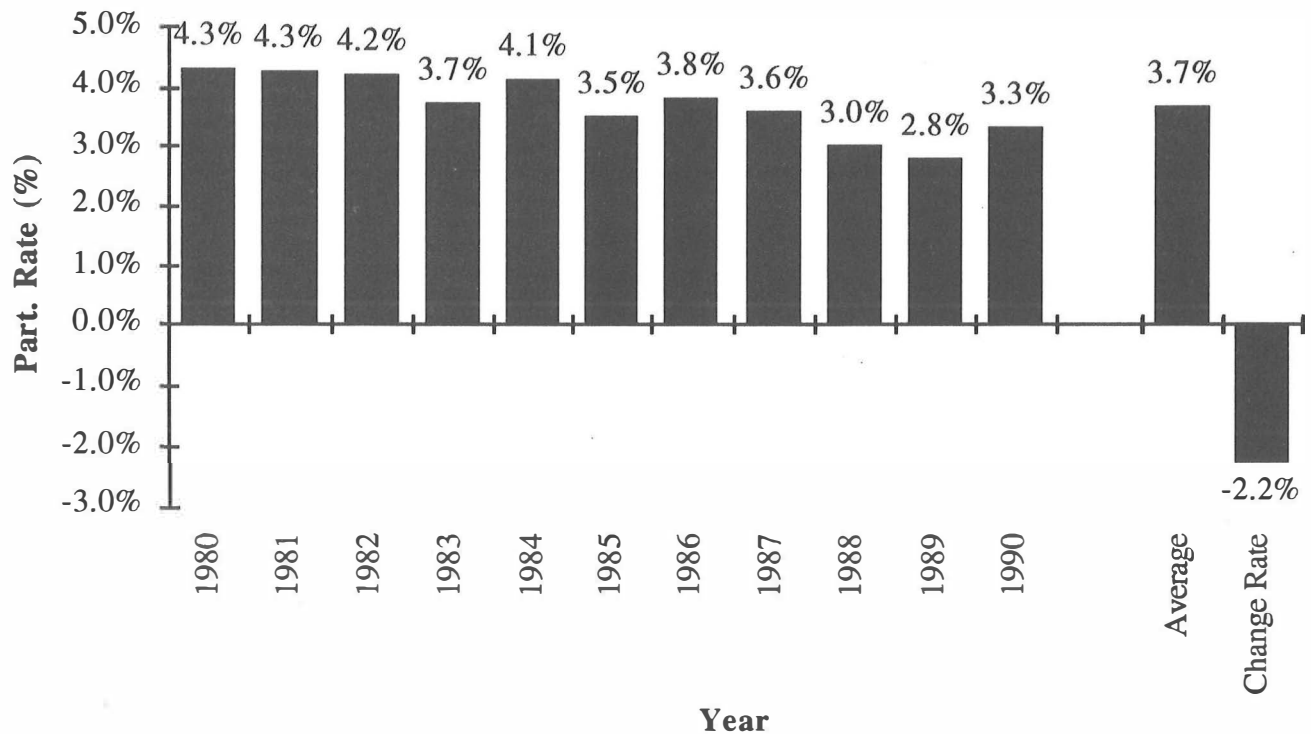


Figure 1. Adult participation rates for New England travel destination, 1980 through 1990.

New England's Demographic Markets

Are the travelers to New England young or old and are there are prevalent trends noted here? New England declined as a destination choice for four of the six age cohorts:

- 18 to 24 year olds -- declined by 5.1% per year
- 25 to 34 year olds -- declined by 2.5% per year
- 45 to 54 year olds -- declined by 1.0% per year
- 55 to 64 year olds -- declined by ".1%" per year

However, New England grew as a destination choice for two of the six age cohorts:

- 35 to 44 year olds -- increased by 1.7% per year
- 65 and older -- increased by 4.0% per year

New England Destination Markets by Age Cohorts: 1980 to 1990

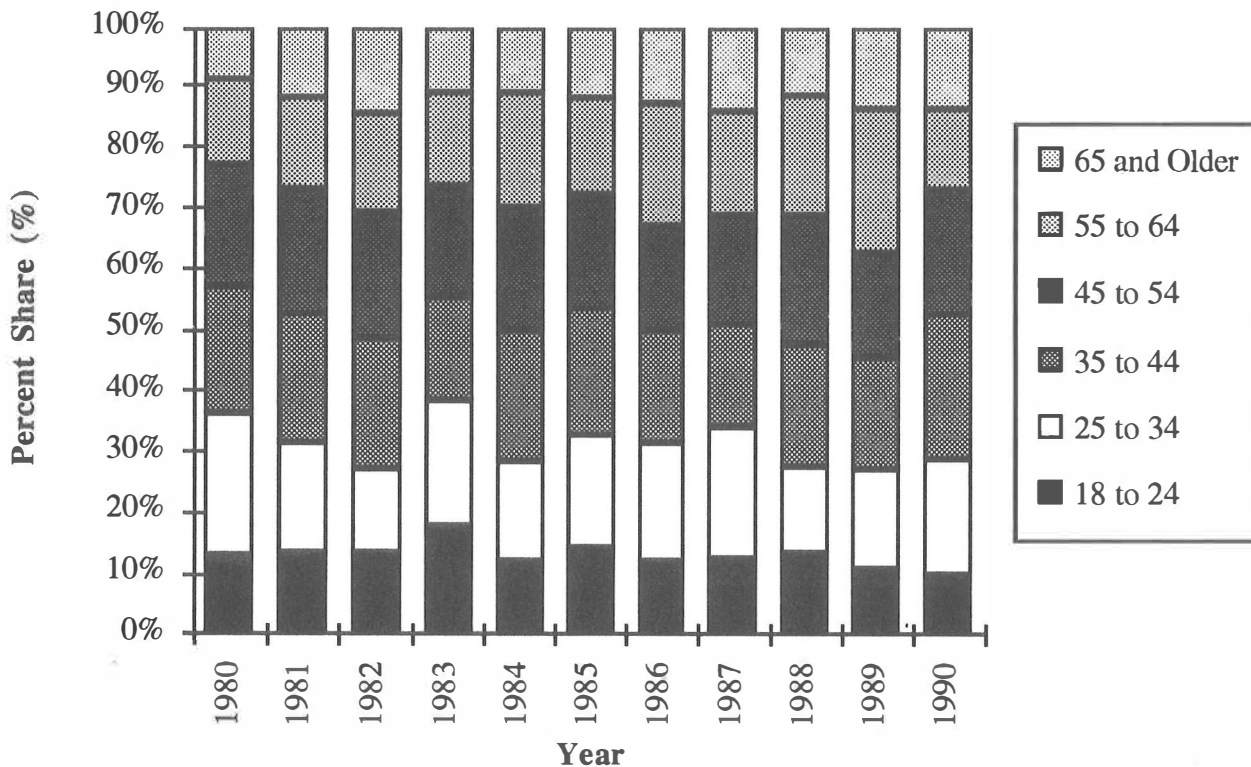


Figure 2. Age cohort composition for New England travel destination, 1980 through 1990.

The age cohorts also were grouped into three broad segments: young adults (age 18 to 34); middle aged adults (age 35 to 50) and mature adults (age 50 and older). The young adult market declined by 3.6% per year, the middle age market grew by 1.6% per year, and the mature market declined slightly by .6% per year.

New England Destination Markets by Broad Age Cohorts: 1980 to 1990

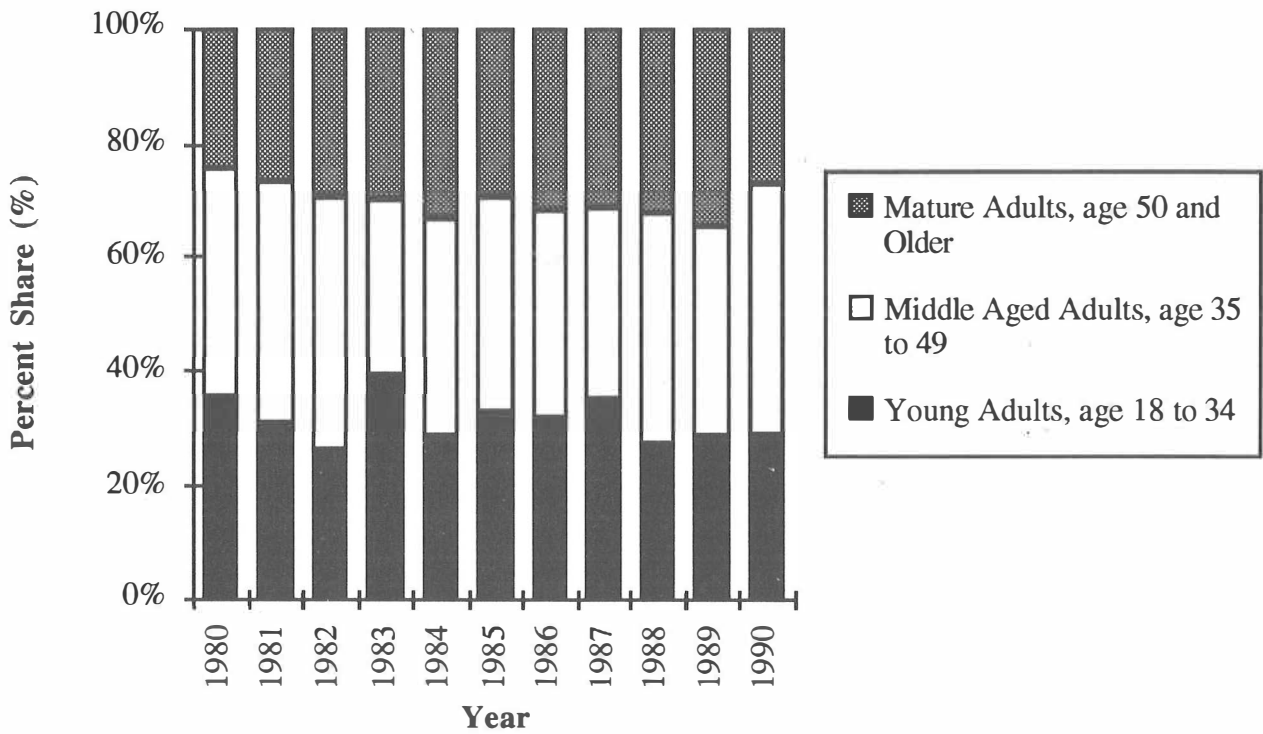


Figure 3. Broad age cohort composition of New England destination market, 1980 through 1990.

New England's Geographic Markets

Where do people come from who visit New England as a primary destination? New England declined as a destination choice for three of the four geographic markets examined here over the period of 1980 through 1990.

- Northeast -- declined by 1.2% per year
- South -- declined by ".1%" per year
- West -- declined by ".4%" per year

New England grew as a destination choice for only one geographic market: the Midwest -- this geographic market grew by "3.6%" per year.

New England Destination Markets by Regional Shares: 1980 to 1990

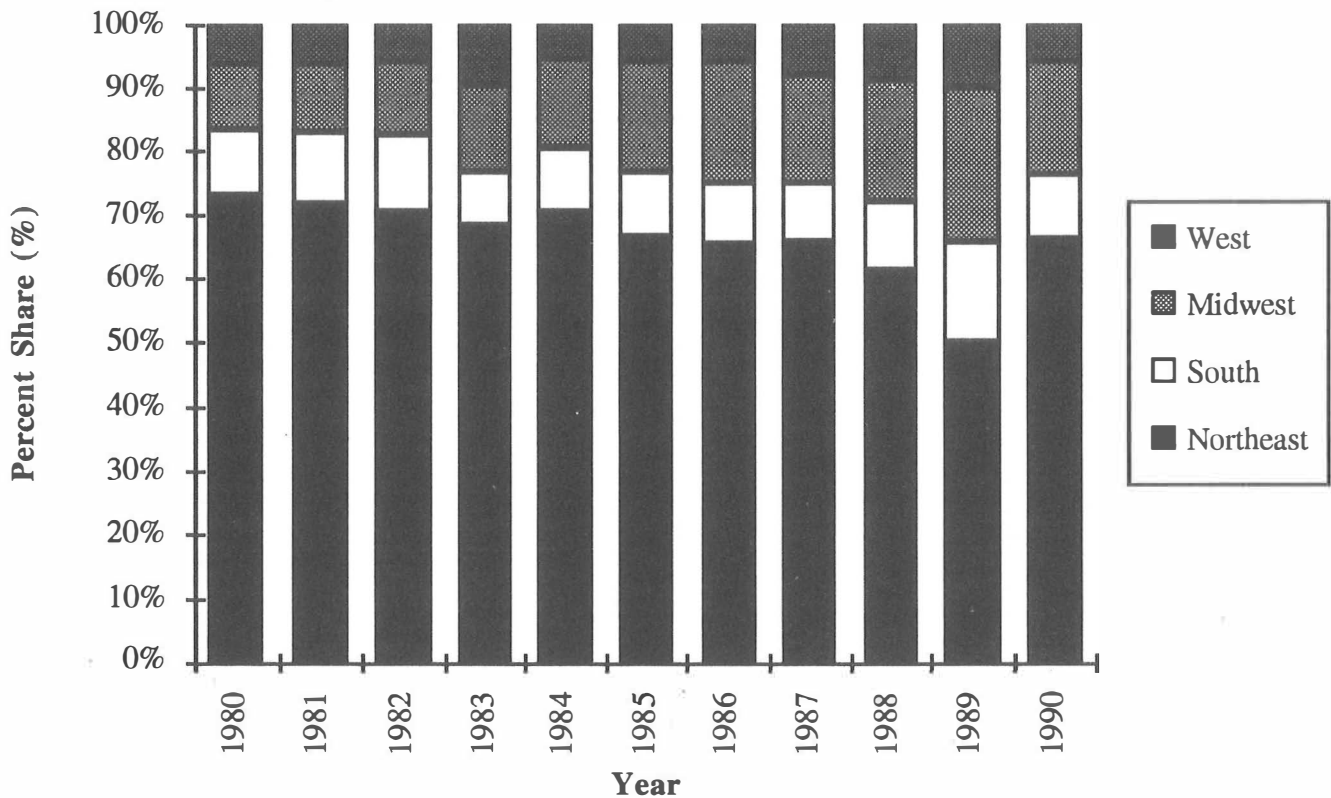


Figure 4. Source of New England destination market by U.S. geographic shares, 1980 through 1990.

The Composition of New England's Geographic Markets

Which geographic market is New England's primary market? The total traveling market indicated that the Northeast comprises 66% of New England's market and is its primary geographic market. The evolving composition of the New England travel market appears to be one comprised mostly or Northeastern travelers with a relatively growing share of Midwesterners.

Specifically within the Northeast travel market, New England as a destination has not suffered overwhelmingly losses. The total U.S. destination market grew only slightly during this time -- by .1%. While the Northeast market overall declined by 1.0%, more of the decline was experienced by the Mid-Atlantic Region rather than New England. New England's

Northeast market declined only slightly by .1%; however, the Mid-Atlantic's Northeast market declined by 2.0%. All other regions visited by travelers from the Northeast appear to be growing in numbers -- up almost 1%. Nevertheless, the overall trend statistic does not appear to show a large loss of the Northeast market travel to and within the New England region. But, the loss could be considered to be fairly substantial and hidden here by the up and down patterns of change. The number of Northeast travelers visiting New England was at its highest point in 1980 when it was 4.9 million. The market declined to 4.3 million in 1984, rebounded to 4.8 million in 1985 and then declined steadily through 1989 when it reached a decade low of 2.4 million -- a drop of over 50% in its market size. The 1990 statistics indicated an increase to 3.9 million. Whether or not this is a spike in an overall downward trend is probably too early to know. More data will be needed.

Destination Choices by Northeast Travel Market: 1980 to 1990

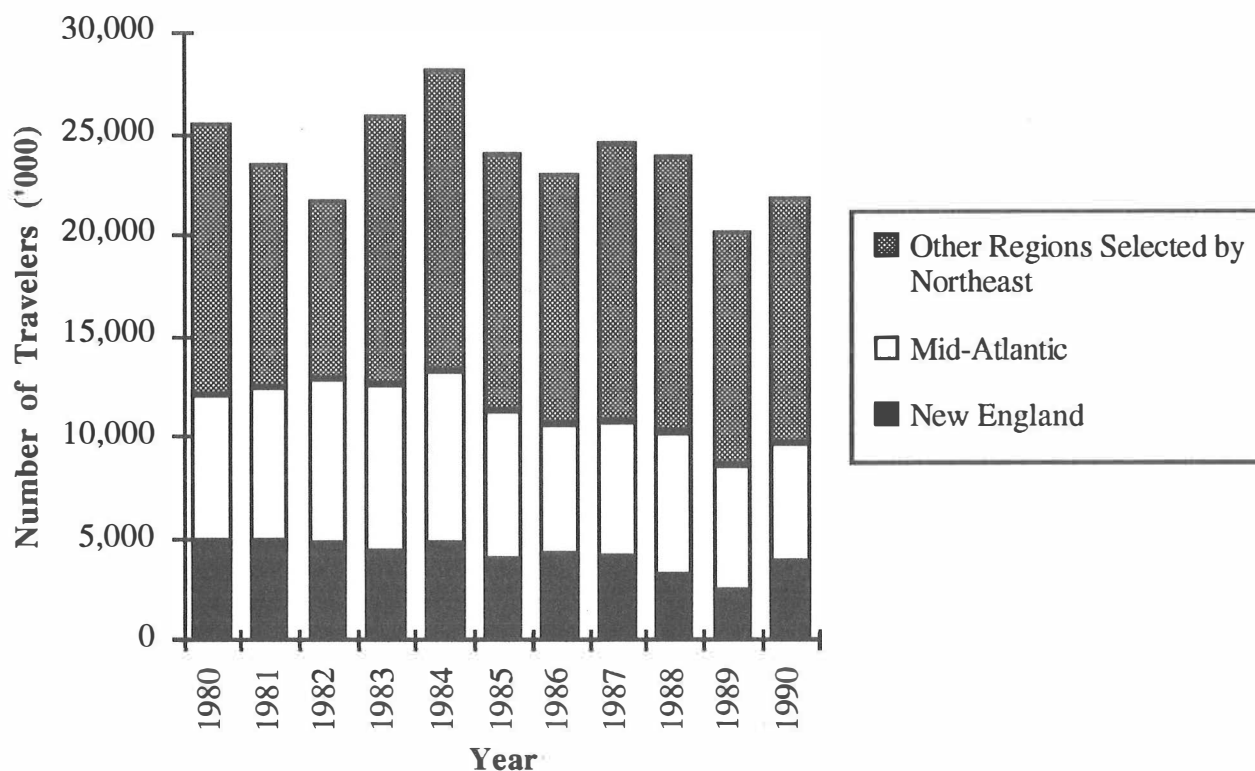


Figure 5. Destination choices of Northeast travel market by number of travelers, 1980 through 1990.

Conclusions and Implications for Recreation and Tourism Resource Managers

Trends were evident in the New England Travel Destination Market from 1980 through 1990. New England has become a mature destination market over the last decade. It is not in a high growth mode. The actual adult participation rate has declined and the actual number of travelers is down slightly. Although New England is without a doubt one of the United States' most definable or marketable travel destination regions, the decline can be partially attributed to changing demographics and, to some degree, changing geographic markets.

While it is interesting to uncover new trends within regions and at the national level, the overall limitations to defining domestic travel as all trips of over 100 miles one-way continue to be problematic. Missed in this analysis are the many "day trips" or even overnight trips taken to see friends and family or simple "mini-vacations" to get-away that are shorter than 100 miles one-way. The regional geography of the New England may account for larger portions of this type of travel. This type of travel does not fit the "domestic" travel description used here. For example, travel trips to Maine and New Hampshire from Boston and Worcester are within the 100-mile limit for large portions of the population of these cities, and even for large portions of Cape Cod destinations. Furthermore, it must be acknowledged that these data do not include foreign travelers to the New England. These limitations are important to note and a problem in the form of how the data are obtained and presented through Simmons Market Research Bureau's techniques (Simmons Market

Research Bureau 1990). Nevertheless, the New England destination is a large and important economic market force within the region's overall economic vitality. Monitoring trends within the region are necessary even though there are limitations in these studies.

Trend analysis on an on-going basis is necessary. An analysis of these data for the period 1980 through 1989 would indicated much concern over a continued overall declining market for domestic travel in the New England. However, the addition of one more year of data indicated that the overall market experienced a sharp decline in 1989 and it recovered in 1990. Was this a reflection of real market conditions or a spike in the data for 1990? Probably, it is a combination of both conditions. Furthermore, an examination of only year to year change can be misleading. For example, domestic travel to New England by the Northeast market indicated a 2.3% increase in travelers selecting New England as a primary destination during the period of 1986 through 1990 (Warnick 1992B).

Market change over time is another important travel trend issue that was examined here. People who participate in travel pursuits may change their rates of travel based on their individual household conditions. It is very possible that people who travel frequently one year might not travel as frequently the following year. Travel related behavior, as recreational related behavior, may reveal changing patterns over the lifespan or through age cohorts. In a previous study, Warnick (1992B) noted that the Northeast experienced the economic downturn of the late 80s early 90s sooner than other parts of the country and signs of this impact upon domestic

Table 1. New England Travel Market

New Englad Primary Destination Choice												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Adult Part. Rate	4.3%	4.3%	4.2%	3.7%	4.1%	3.5%	3.8%	3.6%	3.0%	2.8%	3.3%	3.7%	-2.2%
#New Eng. Trav.('000)	6,814	6,793	6,772	6,122	6,889	5,960	6,581	6,302	5,324	4,915	5,903	6,216	-0.9%
Age Cohorts												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Adult Overall Rate	4.3%	4.3%	4.2%	3.7%	4.1%	3.5%	3.8%	3.6%	3.0%	2.8%	3.3%	3.7%	-2.2%
18 to 24	3.3%	3.4%	3.4%	3.9%	3.0%	3.0%	2.8%	2.7%	2.5%	1.8%	1.9%	2.9%	-5.1%
25 to 34	5.8%	4.7%	3.5%	4.5%	4.0%	3.8%	4.4%	4.5%	2.6%	2.7%	3.5%	4.0%	-2.5%
35 to 44	5.2%	5.4%	5.5%	3.6%	5.3%	4.3%	4.3%	3.6%	3.7%	3.1%	4.5%	4.4%	1.7%
45 to 54	5.1%	5.2%	5.3%	4.0%	5.0%	4.0%	3.9%	3.8%	3.9%	2.9%	3.9%	4.3%	-1.0%
55 to 64	3.5%	3.9%	4.2%	3.4%	4.7%	3.3%	4.6%	3.7%	3.7%	4.0%	2.5%	3.8%	-0.1%
65 and Older	2.3%	3.0%	3.7%	2.4%	2.7%	2.5%	3.0%	3.0%	2.1%	2.3%	2.6%	2.7%	4.0%
Other Age Cohorts												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Adult Overall Rate	4.3%	4.3%	4.2%	3.7%	4.1%	3.5%	3.8%	3.6%	3.0%	2.8%	3.3%	3.7%	-2.2%
18 to 34	4.7%	4.1%	3.5%	4.3%	3.6%	3.5%	3.7%	3.8%	2.5%	2.4%	2.9%	3.5%	-3.6%
35 to 49	5.3%	5.6%	5.9%	3.4%	4.9%	4.1%	4.3%	3.6%	3.8%	3.1%	4.4%	4.4%	1.6%
50 and Older	3.2%	3.6%	3.9%	3.3%	4.2%	3.2%	3.7%	3.4%	3.0%	2.9%	2.7%	3.4%	-0.6%
Target Region												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Northeast	14.3%	13.9%	13.4%	11.5%	13.1%	10.8%	11.5%	11.1%	8.8%	6.5%	10.2%	11.4%	-1.2%
South	1.8%	1.9%	1.9%	1.2%	1.6%	1.4%	1.5%	1.4%	1.3%	1.8%	1.4%	1.6%	-0.1%
Midwest	1.3%	1.4%	1.5%	1.5%	1.7%	1.8%	2.1%	1.8%	1.7%	1.9%	1.7%	1.7%	3.6%
West	1.3%	1.3%	1.3%	1.9%	1.2%	1.0%	1.2%	1.5%	1.3%	1.4%	0.9%	1.3%	-0.4%
Target Region Composition												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Northeast	72.9%	71.8%	70.7%	68.5%	70.5%	66.7%	65.6%	65.9%	61.5%	50.1%	66.3%	66.4%	-0.3%
South	10.6%	11.3%	12.0%	8.4%	9.9%	10.1%	9.7%	9.4%	10.7%	15.7%	10.2%	10.7%	2.3%
Midwest	10.3%	11.0%	11.6%	13.6%	14.2%	17.6%	18.9%	16.8%	19.3%	24.2%	17.8%	15.9%	7.5%
West	6.3%	6.0%	5.7%	9.5%	5.3%	5.6%	5.8%	7.9%	8.5%	10.0%	5.8%	6.9%	4.6%
Total Travel Destinations of Northeast Market ('000)												Decade	Adj. Annual
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Average</u>	<u>Change Rate</u>
Total	130,431	131,425	132,419	129,781	126,112	119,659	121,750	125,319	122,738	122,913	130,839	126,671	0.1%
Northeast	25,426	23,534	21,642	25,862	28,141	24,064	22,931	24,620	23,877	20,069	21,780	23,813	-1.0%
New England	4,965	4,877	4,788	4,335	4,860	3,975	4,318	4,151	3,276	2,460	3,913	4,174	-0.1%
Mid-Atlantic	7,135	7,600	8,064	8,205	8,307	7,276	6,268	6,632	6,978	6,094	5,772	7,121	-2.0%
Other Regions	13,326	11,058	8,790	13,322	14,974	12,813	12,345	13,837	13,623	11,515	12,095	12,518	0.9%

travel are evident in these data even though the period covered ends in 1990. The finances of planned travel behavior are also important here although thoroughly reviewed within the context of this study. For example, the decline in the "light" travel market was most adversely reflected in the travel trends for the Northeast (Warnick 1992B). This market declined the most and nearly 50% of all light travelers have household incomes of under \$30,000 per year (Simmons Market Research Bureau 1989). In contrast, 65% of all the "heavy" travelers, which did not decline as much, are from households of yearly incomes in excess of \$30,000 per year (Simmons Market Research Bureau 1989). Over 73% of all travelers to New England are from households with incomes in excess of \$30,000 per year. The travel patterns and behavior of the larger Northeast market do directly affect the New England destination market.

This study revealed further changes in the overall market traveling to New England. First, New England appears to be falling out of favor with young adults. This was most evident in the 18 to 24 year old segment where the rates declined by over 5% per year. The 25 to 34 year market also declined in participation of traveling to New England by over 2% per year. Finally, the 45 to 64 year old segments also declined, but not as dramatically as the others. Two age markets did grow during the decade though. This included the 35 to 44 year old market, which is largely a family market, and the over 65 market or mature senior market or retirement market.

New England is not the "hot market" it was a decade ago for domestic travel. Other regions appear to have aggressively marketed their regions more successfully. More of the Northeast travel market, New England's primary source of travelers, has revealed increasing tendencies to travel to other parts of the United States over the decade. The choice of New England as a prime destination choice has declined and the choice of New England even within the Northeast has declined overall. The decline was not as drastic as what was indicated in the earlier study (Warnick 1992). The aggressive nature of other regions, the revitalization of market areas, and overall changing domestic travel patterns may explain the repositioning of the New England Region. However, the Midwest appears to offer some promise as the New England seeks to maintain or grow its markets. This region now comprises over one-sixth of New England's market.

What are the choices for the tourism and travel industry and businesses within the New England? First, it must be noted that there is not high growth in the domestic travel market as defined within the context of this study. It is a mature market. Long term, there are signs that market conditions may improve. More retirees and an aging population with more free time should help to increase domestic travel demand to this region. Short term, the growing family market and the more mature or senior market groups must not be overlooked as important niches. Agencies positioning statements and plans and market place promotions must consider if they are able to attract these markets. The aging population and the increase of older markets are particularly promising for New England. The longer stay behavior patterns of the family and older age markets does traditionally match well with the typical New England vacation. Those agencies which depend on a younger market (i.e., young adults 18 to 30 for example) must carefully review the future market potential and understand that this market's behavior is different from that of the older adults. This group of young adults belongs to the "Thirteenth or X Generation" and is very different in its travel behavior than was the older Baby Boom Generation. While they like to travel, destination choices must offer high quality and exciting experiences at relatively low cost. Value is key to them due to income constraints. It is likely that this market will be one of shorter stays. The message to them should reflect their culture of being blunt, flashy, kinetic, "MTV-ish" and survivalistic (Warnick 1993, Strauss and Howe 1991).

With no strong growth patterns in the domestic market, recreation and tourism businesses must try to balance market demand by seeking new markets or encouraging current markets to travel or return to their destination more frequently or to stay longer. New markets to examine would include foreign travelers such as the Canadians and travelers from other countries (i.e., England, Germany, France, and Japan) and or other regions. Furthermore, the Midwest geographic market appears to be a very responsive market. Agencies and businesses may want to carefully consider penetrating this market more aggressively. Also, travel related businesses should seek out travel markets within local areas. More travelers are taking shorter more frequent day trips. The New England Region does appear to have strong local market potential.

Domestic travel patterns are complex, dynamic and not always easily understood. The review of domestic travel within the context of the New England destination market area provides new insights in agency responses and how the market conditions for the 1990s may be evolving. National trends can be misleading within a regional context. However, closer monitoring of travel trends, both domestic and localized, is still needed. Much is still not known about the inner travel patterns within New England or about the travel volume of each of these segments examined here. Economic and business cycle changes also appear to negatively impact the travel market.

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RECREATION DEMOGRAPHICS

ATTITUDES ABOUT RETIREMENT, WORK AND LEISURE AMONG SENIORS

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Retirement, and specifically retirement among university professors, poses interesting changes and challenges in how people perceive the roles of leisure and the relationships between leisure and work. This paper discusses some of those issues.

Introduction

There are presently 45 million people between the ages of 45 and 65, but this number will swell to 65 million within the next ten years. These demographic changes pose a number of challenges, not the least of which is the relationship between work and leisure in the lives of older citizens. Among the interesting questions: how long can people be "productive" members of society, and how should job responsibilities change with aging? Are phased retirement programs beneficial both to the individuals involved, and to the companies or agencies which employ them? Should the average age of retirement continue to drop, or, given increases in life expectancy, should it begin to rise? Will retirement simply lead to other forms of employment? As these questions all require answers based on policy and changes in public policy, research should be conducted to investigate these issues, and this research must be both quantitative and qualitative.

Studies of retirement issues usually begin with an examination of the reasons for retirement, and analysis of satisfaction with the life-style changes effected by departure from the work force. The retirement literature indicates four principle reasons why people consider retirement: (1) health-related problems that make work difficult; (2) fatigue or boredom with work; (3) desire to explore new opportunities; (4) desire to engage in more leisure behavior.

Companies and agencies express a variety of concerns with regard to the issue of retirement, but these concerns usually fit into four categories: (1) expectation of replacing an older worker with a younger, more energetic, better trained worker; (2) financial advantage of replacing older, more expensive workers with young workers employed at a lower salary; (3) the hope of employing an older, experienced and talented worker on a part-time basis; (4) reluctance to let an older, wiser, and more experienced worker depart from the company. Oddly enough, a company may experience all four of these sentiments, with respect to the retirement of any given worker. As recent early retirement offerings from such companies as IBM and Westinghouse indicate, however, the financial advantages of bidding good-bye to older workers seems to be the major motivation larger corporations have for encouraging retirement.

Statement of the Problem

Universities are special situations. While some people may think that university professors are really retired, at whatever stage or age they may be, most university professors not only work hard at what they do, but have a high level of dedication, and a great deal of job satisfaction. For many professors, what they are doing has deep and abiding personal interest, and involves them with concerns they believe are intrinsically worthwhile. To stop doing this, may be to stop doing the things they are most interested in. For other university

professors, what they are doing is just a way of earning a living, or they feel they have made their contribution, and may be working only out of economic necessity.

Retirement is eagerly anticipated by some, but dreaded by others. Some faculty members wish to continue some aspect of what they have been doing much of their life, while others wish to withdraw completely, and separate themselves as much as possible from the University. West Virginia University has had over 200 professors retire in the last ten years, and more than half of them have retained some direct ties to the University. Some serve on important faculty committees, some are involved in research projects, and some have contractual arrangements to teach one or more courses per year. Retired professors have been surveyed, to determine the nature and purpose of their continued connection to the University, or their separation from it, and a number of retired professors have volunteered for interview and discussion sessions.

In a qualitative research study of retired professors from West Virginia University's College of Agriculture and Forestry, it was found that (1) the research and publication aspect of work was intrinsically rewarding for many, and independent of financial remuneration; (2) for some, continued involvement with students was rejuvenating, and opportunities to participate in lectures, classroom discussions, supervision of graduate students, curriculum or program development, were regarded as intrinsically rewarding; (3) mentoring younger faculty, especially helping them develop research projects, seemed to be very satisfying; (4) opportunity to emphasize some aspect of previous work that had not been developed, was of great importance; (5) freedom from committee work and other administrative duties was much appreciated. Some of the retired professors who returned to work indicated some degree of contempt for those who retired to a life of recreational pursuits, affirming that such an existence would seem relatively empty and devoid of meaning or purpose.

Discussion and Implications

Professors differ from most members of corporate workforces, in that the field of study and the area of expertise are usually self-chosen, and the economic incentive for academic work is normally not as great as the financial opportunities offered by businesses. Professors and government workers have more in common, as both are providing services, and have careers that are somehow oriented to the "common good." Professors have also benefited from such academic arrangements as tenure, which facilitate pursuing one's own interests, independent of most political considerations. Not infrequently, professors have some reluctance to retire, because their employment pays them for doing what they find most interesting. In line with the observations of Csikszentmihalyi, for professors, much more "flow" experience may be produced at work, than in recreation or leisure, simply because of the interest in what is being done or produced. A retired history professor who returned to his office for two years to complete a book on his pet concern was perhaps our clearest illustration of this. While this individual played both golf and bridge, these were clearly diversions or amusements, and did not produce the same glow of excitement, as talking about his pet project.

This study should lead to greater discussion of the place of retirement in the academic community, and in other forms of public service, such as the employment of dedicated professionals in various recreation management agencies. Should there be more arrangements for phased retirement? Are older workers able to make unique and distinctive contributions, while increasing the time they have available for other pursuits? As we eliminated mandatory retirement, should more be done to prepare people to examine "life after and apart from work," both so that they may benefit from realizing that work is not the whole of life, and so that society may benefit from the initiation of younger workers into positions of influence and power? And should leisure professionals be doing more to

preach the attractiveness of leisure to those whose lives have been dominated by a work ethic?

As 65 million people reach the edge of retirement over the next decade, more research needs to be done into what makes work and leisure meaningful, what balance of work and leisure there should be in the lives of older citizens, and what public policy and public program decisions need to be made, to accommodate the needs of older workers and younger retirees. The recreation profession has long maintained that leisure is the realm of activities that are intrinsically worthwhile--activities ranging from art, contemplation, sports, to engagement in public services--and it is time the recreation profession exercised some leadership in educating the public as to what leisure should be. If successful in this, more workers will make smoother transitions from work to retirement, and more workers of mature years will find a happy balance of work and leisure in their lives. The work of recreation is to promote meaning in human life; just as little league was a major promotion in the post World War II years, so too education about work and leisure for the adult population should be a major effort on the part of the recreation profession at the present time.

This study indicated that retired workers return to work for a large variety of reasons, not the least of which was the absence of meaningful leisure opportunities in their lives. As we go about reinventing government, re-engineering corporations, and revitalizing academia, we must also go about rethinking the customers we have for recreation services. What can we do (1) to make work more pleasant for people who wish to continue working, and (2) make leisure opportunities more attractive to the people of mature years? Creating meaningful leisure for mature adults is one of the major challenges of the recreation profession.

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PORTRAYAL OF WOMEN IN CLIMBING

MAGAZINE, 1970-1990:

A CONTENT ANALYSIS

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A content analysis was conducted to examine the representation and portrayal of women in Climbing magazine over a twenty year period. This study was approached both quantitatively and qualitatively. During the first decade, women were portrayed primarily in the role of "spectator," or as the wife (or companion) of a male climber. In the latter part of the second decade, there was a considerable increase in the number of articles recognizing women climbers as independent and capable. The prevalence of linguistic sexism, however, was noted throughout the study period.

Introduction

The spirit of climbing, over the years, has captured the interest of both men and women of all ages and lifestyles. The world has many fine women climbers, vastly outnumbered by their male counterparts (Birkett and Peascod 1989). This may be due, in part, to social attitudes regarding the "role" of women. For example, appropriateness of adventure activities for women has been questioned; testing physical capabilities through outdoor pursuits was once contemptuous, and gaining freedom from gender imposed roles was (and for some still is) a challenge in itself.

Regarding women's experiences in physical recreation and outdoor adventures, the literature tells us that many women who are involved, or wish to be involved, continue to encounter long-standing ideologies of femininity which consider women's involvement in physical recreation inconsistent with the image of women as passive, cooperative, responsible, dependent, frail, sweet, fragile, and first and foremost, mothers and wives (Yerkes and Miranda 1985). In particular, Hollenhorst (1988) has concluded that the main barrier to women's participation in rock climbing is not skill and ability, but rather cultural stereotypes and misconceptions regarding the appropriateness of climbing as a leisure activity for women. Birkett (1989) admits that "blind prejudice and years of social conditioning have developed ridiculous attitudes born of ignorance." Prominent researchers tell us that sex-role stereotyping is so ingrained that it has inhibited women from enjoying physical recreation, being outdoors, and spending time on the rocks and in the mountains.

In terms of media presentation regarding differences in the portrayal of men and women, the literature strongly suggests that women continue to be 1) under-represented in general and 2) portrayed in stereotyped social, sexual, and vocational roles. Examples of "stereotypical" portrayals include men in positions of leadership, taking risks, adventurous and powerful, while women are associated with domestic responsibilities, victims of violence, passive, weak, and "unable." For women, stereotyping can mean being portrayed as inferior, restricting the dignity and opportunity for women to pursue goals in relation to themselves. Investigating media

messages about female athletes, Kane and Parks (1990) emphasize the importance of analyzing the extent and nature of media coverage because "how they [women] are viewed in this culture is reflected in and created by media images." Studies reveal that women are primarily portrayed in the media with a focus on appearance and gender role, rather than ability and accomplishments. There has undoubtedly been some progress in terms of the changing image of women in sport and physical recreation. While the mass media may not tell the public what to think, the public is told what to think about.

Method

Climbing magazine was selected for analysis because of its large numerical and geographical circulation, outstanding reputation and world-wide recognition. Through a systematic random sampling of 123 issues over the 20 span (1970-1990), 60 issues containing 266 feature articles were analyzed. Although this analysis was quantitative as well as qualitative, this paper highlights the qualitative component.

Feature articles written about females or which included mention of females were examined, and articles which discussed males only were coded solely for descriptive information. Those articles focusing on women and men, yet which made reference to women in any social, physical, or psychological capacity were also included. Subsequently, women were mentioned in only 84 of the 266 articles reviewed for this study, an average ratio of one female mentioned for every eight males.

Quantitative data categories analyzed consisted of the total number of feature stories, the amount (number of pages), number of female and male authors, the type of climbing reported in the article, whether the article is primarily related to recreation or competition, and the gender focus (number of female and male climbers, and percentage of articles per issue mentioning women). In this study, gender characteristics, sex roles, stereotypes, language use and perspectives of leisure time as related to climbing (that is, rock, mountaineering, and ice) were qualitatively examined. In order to examine feature articles, key statements and descriptions were recorded. Due to the nature of content analysis and media studies, interpretation of these statements is inextricably tied to use of language. Thematic categories which were synthesized from the data guided the qualitative analysis.

Findings

Females represented 11% of the total authors of feature articles while males accounted for 89% of the total authors (refer to Table 1, next page, for quantitative summary). This paper will provide the analysis of general comments about portrayal, without differentiating comments on the basis of author gender, because there was a certain degree of overlap in article content.

As magazines are a form of printed media, the choice of words and degree of language used is critical in the communication of messages. The categories formed in this analysis reflect the style and appropriateness of language used by the various authors. The language used in these articles was a means by which the authors internalized their experiences, and conceptualized how best to share their "statements" with magazine readers. Inevitably, it is these words, verbal exchange of the mass media and popular literature, that produce images and mold experiences.

Exclusion of females as participants characterized the tone set during the first couple of years of publication. For example, during the first year Climbing was established (1970), as found in issue 4: "We planned to attempt the unclimbed 3,000-foot. South Face of Lone Peak in February -- without the girls, of course." Another example can be raised in question as to why Barbara watched the men climb instead of participating herself -- she might have been fully capable of actively climbing. In

1971, Barbara may not have been permitted to do more than just watch: "Leaving our friend Barbara Allen to hassle with a camp fee, Fritz and I hiked up the ridge keeping our eyes on the monster, black peak....Barbara was able to later watch our climb through the eyes of binoculars." Although women slowly began to be acknowledged as climbers, there were still instances 13 years later where women were portrayed as observers and not climbers: "My girlfriend came along to take

pictures and provide moral support, so conditions were as ideal as one could hope for." Twenty years after the magazine was established and even after evidence was clear that women had become more active climbers, many were still categorized as spectators, one author writes: "I remember looking down the wall to the desert floor where my wife, dog, and rusting van awaited my return."

YEAR	CLIMBERS MENTIONED (N=2482)		RELATED PHOTOGRAPHS (N=962)			AUTHORSHIP (N=327)	
	Female	Male	Female	Male	Unidentified	Female	Male
1970-1975	12% (36)	88% (264)	6% (7)	92% (103)	2% (2)	5% (2)	95% (42)
1976-1980	3% (12)	97% (388)	4% (11)	94% (259)	2% (7)	3% (3)	97% (83)
1981-1985	7% (49)	93% (611)	5% (12)	93% (205)	1% (3)	3% (2)	97% (69)
1986-1990	16% (179)	84% (943)	19% (67)	79% (279)	2% (7)	23% (29)	77% (97)
TOTALS	11% (n=276)	89% (n=2206)	10% (n=97)	88% (n=846)	2% (n=19)	11% (n=36)	89% (n=291)

Table 1. Summary of key article attributes by years of publication (includes "Women's Issue," no. 103).

A perception of rock climbing is not just that one must be strong, but that a great deal of muscular strength is necessary if an individual is to be successful. For this reason, many women are discouraged from participating. It has been learned that climbing and mountaineering (at many levels) can be enjoyed if one possesses general good health and moderate fitness. Climbing, in particular, is like dancing on rocks, and takes a lot of finesse and agility -- characteristics stereotypically associated with women. The prevailing myth of sheer strength as a requirement to climb exacerbates a stigma with which many women do not want to be associated.

The sport of climbing began in Europe even before it became a craze in the United States. Although women had therefore been climbing much sooner than people realize, there were still prevailing stereotypes. As stated in 1972, "women's accomplishments often amaze the visitor more than do those of the men. And they don't have that Russian shotputter look. They're more like members of the ballet. The contest ends with team climbing - for men only." In 1976 another author writes "while many or perhaps most women lack the muscular strength to climb, there is a definite disproportion between the number who can and the number who do..."

It has been the contention of many researchers that females involvement in "masculine" sports and adventure recreation directly challenges traditional definitions of femininity. In the introduction of his book, *Women Climbing*, Birkett (referring to a French woman climber) admits once stating "how can a woman, a mere girl, so obviously feminine, climb that hard?" As the history of climbing illustrates, such activity has been (and is still) dominated by men. For many years females who excelled and were successful in their own right were told that their skill was "damn good for a woman." In 1988, an article profiled Kitty Calhoun: "The leader of a large German expedition...wondered about the young looking American. She was petite, alluring, and none of the hardness which most alpinists wear like a badge on their sleeves...the German approached

one of the American men gesturing is that your basecamp manager? No, he replied, she's the leader of our climb."

Portrayal in the early 70s of women in *Climbing* trivialized females not as potential (or even active) climbers, but as unequal contenders with their male counterparts. The traditional message regarding females who climbed was that they were seen as unfeminine and were not compatible with society's image of how females were supposed to behave. In an interview Mimi Stone shares the following: "A while back, I was practicing at the climbing rock and this little girl came running over to the rock and started to climb it. I was climbing right near her. Her mother came over and towed her away, telling her that girls didn't do that. And I was right there! Sure, I'd like to get to the top of Everest because I'd like to do it, but I'm also out there climbing so that little girls like that one know that we DO do that."

In 1974-1977, several articles by women were linked with the concept of feeling safe with a male partner. As women were viewed as the girlfriend or wife, they in turn viewed themselves in a passive, support role, rather than as a solid climber (or one having the potential to be a solid climber). Male authors usually conveyed the desire for male camaraderie. Their involvement during this first decade rarely included women with the exception of "moral support" or conducting risky feats to "impress" a female companion.

During the six year period 1978-1984 there were no female authors in the issues which were randomly selected for the study. It was, however, during this time that several studies about participation of women in the outdoors began to emerge. Those women who were portrayed as active climbers were depicted as part of a husband and wife team or climbing primarily with a male partner. A trend began to develop in the mid to late 80s where women desired the company of other women climbers for companionship, as well as to gain a new and different perspective on varying styles and strategies of climbing.

Miller and Swift (1980) report that emphasis on the physical characteristics and appearance of women is offensive when in the same context where men are described in terms of their achievements. The following statement was written in 1988 about a female climber in the first U.S. International competition: "...with her short, bleached-blond hair, dangling earrings, and flashy white print lycra, she climbed steadily upwards combining grace and power to crank through the first two cruxes." Another piece about the same competition was titled "A View from the Gallery" -- the author states "I must admit I enjoy the women's competition a lot more. It's pretty sexy to see a well-honed woman in turquoise lycra flowing up a difficult climb. (Note: A sexist reference which provides another example of what is meant by style and use of language). If you weren't a climber, I doubt the men's competition would hold your interest for very long. I mean who bothers to watch the men's figure skating in the Olympics? It's the women who are art."

Several analogies (re: climbing and women's roles) were made by authors therefore creating sexist depictions with no relevant connection. "Personal challenge...gives a sense of self-reliance...If on the other hand, the risk is taken as a substitute for something lacking in your life, then it's not healthy, we thought. For instance, the classic case of the guy who can't make it with women so he has to go fanatically at mountains" (Issue 24, 1974). In 1981, after a marriage and quick divorce, one author writes, "Hell, I know most of these routes like old lovers; if I don't dare to free-solo them, I just don't do them." In 1984, another author draws an analogy comparing this view of beauty and vast greatness with sights in a girls' lockerroom. Such linguistic sexism only serves to detract and limit women, not encourage them.

During the 70s and early 80s, the continued efforts of society as a whole to improve equity among women and men, and support of media recognition of the women's movement are indicative of the celebration of women's achievements. Several profiles of female climbers acknowledged their skills as capable and proficient; giving them credit and recognition for their talents and extraordinary skills. Written in 1974: "Boulder climbers have seen another pioneer in Diana Hunter. She has been places and achieved things that no women - and most men - never have...It seems incredible to watch a girl lead 5.10 with perfect composure and flawless footwork...constantly improving her technique, increasing strength, endurance, and agility and developing the finesse necessary to lead..." In 1982, a few authors acknowledged women in other parts of the world, stating that they are becoming more committed to rock climbing...and that "they are going far beyond their predecessors frequently doing hard climbs and even first ascents in some places."

Leisure behavior is based on a social context as it relates to gender. Based not only on biological sex, it is important to understand that gender is a basis by which to culturally define behavior. Furthermore, this may be contingent upon what is appropriate for the sexes in society at any given time. For instance, in 1976 one author writes, "It's not that climbers have chosen a sport which could naturally select women out, but that - as their life would lead us to expect - American middle class men are more under the direct pressures of the values of work than are women in this society." Ten years later Rosie Andrews writes: "Women as a rule struggle far more to make the breakthrough to that state where an inner voice rings with confidence...The fact that barriers exist isn't a valid reason for not trying. I don't think physically there's anything holding a woman back from being as good a climber as she wants."

The recognition of women as independent and capable through feature articles in Climbing increased throughout the study period. For instance many first ascents were noted, role models were recognized, a history of female climbers was acknowledged (that is from the 1920s to 1950s), and the physical skills and abilities of female climbers began to precede

descriptions of their appearance. The changing emphasis of coverage given to females from passive observers to active climbers and expedition leaders, is indicative of greater recognition of female climbers and the changing image of women's involvement in adventure recreation.

Discussion and Implications

It is imperative that practitioners encourage women to seek challenges, in part by presenting them with all available options. In certain activities, teachers, instructors and administrators may in fact constrain and inhibit participation of women based on their portrayal of women. Fifty-one percent of individuals in the U.S. are female, therefore how women climbers are depicted will inevitably affect the majority of individuals served by the profession.

Media have tremendous power in setting cultural guidelines for the treatment of women and in shaping political discourse. It is essential that news media -- along with other institutions -- be pressured to be fair and accurate. The first step in challenging sexism in the media is monitoring and documenting bias. Several questions could be asked: 1) From whose point of view is news being reported?, 2) Are too few women reporting on substantive issues?, 3) Is there a lack of female sources?, 4) Are women participants and authors subject to a double standard?, 5) What stereotypes exist in the media?, and 6) Are there sexist underlying assumptions in the material being reviewed?

Active professionals are aware of the need to hold their board members and elected officials accountable, yet rarely is the media held to the same standards -- a powerful tool that shapes the political debate. Once bias is identified, media personnel must be apprised of objections. Most importantly, perhaps, individuals should promote media that accurately reflects women's lives and issues, and that allow women to speak for themselves. A good first step in taking action is a letter or phone call to the reporter. If the reporter is not receptive, the editor should be contacted. Another valuable effort would be to organize "letter to the editor" and phone/fax campaigns about media bias or exclusion. Additionally, a community or campus forum, or workshop on sexism in the media should be convened.

As the media are a key force in influencing and documenting participation in adventure recreation, a critical analysis of gender portrayal can only enhance equitable presentation and subsequent encouragement of participation by all.

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USE AND NON-USE OF PUBLIC PARKS IN NORTHEAST OHIO: DIFFERENCES BETWEEN AFRICAN-AMERICANS AND WHITES

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Data from an in-park survey and a telephone survey were used to examine differences between African-Americans and Whites in their use of public parks in Northeast Ohio. Analysis of the surveys revealed a number of similarities between the groups, but some important differences.

Introduction and Purpose of the Study

Administrators and scholars from the Academy of Leisure Sciences were recently questioned as to what key issues they felt faced local park and recreation agencies in the 1990s (Whyte, 1992). One issues cited as having great impact was the growing cultural and ethnic diversity of the American population. Another issue was the growing difficulty in providing equal opportunity and services to all people. Providing services to a growing minority population is no easy task because park and recreation officials often lack information about the recreation preferences and needs of these groups, and are, thus, unsure how to proceed (Dwyer and Gobster, 1992; Dwyer and Hutchison, 1990).

There is a growing body of research that suggests that minorities and non-minorities differ in their rate of participation in different activities (e.g., Warnick, 1991; Kate, 1993), their use of park and recreation services (e.g., West, 1989), and their preferences for particular environments and landscapes (e.g., Kaplan and Talbot, 1988). Differences between African-Americans and Whites have been typically explained in terms of economic factors (marginality) and/or cultural factors (ethnicity). These studies and explanations provided a basis for exploring whether African-Americans and Whites differ in their use of public parks in Northeast Ohio. Because of insufficient numbers, Hispanic and other minority groups were not included in these analyses.

Study Area and Methodology

Data for this paper come from two sources: (a) an in-park survey conducted at 12 Cleveland Metroparks reservations, and (b) a telephone survey conducted of residents of seven Northeast Ohio counties. African-Americans comprised about 10 percent of respondents in each sample.

The in-park survey was conducted within Cleveland Metroparks, a regional park district in Northeast Ohio. Cleveland Metroparks consists of over 19,000 acres of land in 12 different reservations (parks). Facilities and features operated by the Park District include hiking, bridle, all-purpose and fitness trails, golf courses, swimming beaches, nature centers, interpretive programs, picnic areas, play fields, wildlife sanctuaries, and boating and fishing areas.

Approximately 5,000 people were interviewed during the spring, summer, and fall of 1991 by trained interviewers. Interviews were conducted on random weekdays and weekends. Visitors were interviewed using a random selection process. Respondents were asked about the kinds of activities they pursued during their visit, how often they visited, how long they planned to visit, their mode of travel, how long it took

them to travel to the reservation, the number of people and children in their party, their use of the Park District reservations, their attitudes toward recreational development, and their ratings of Park District facilities and services. Demographic characteristics of respondents were also acquired.

Data for the second study were drawn in October, 1991. Using random digit dialing, 1,054 people in Northeast Ohio were interviewed about their use of public parks in the greater Cleveland Metropolitan area. Only people 18 years and older were interviewed. Respondents were asked how frequently they used public parks in Northeast Ohio. Non-users and infrequent users (individuals who used parks less than once a month) were asked questions about why they did not use public parks more often, and questions about whether different changes in park operations might result in their using parks more.

Chi-square tests were used to test whether African-Americans and Whites differed significantly in terms of their use of Cleveland Metroparks and parks in general. Logistic regression was also used to determine whether some of these differences are confounded by the effects of income and other variables.

Results - In-park Survey

Demographic Characteristics of Visitors

African-Americans comprise roughly one-tenth of all Cleveland Metroparks visitors. In contrast, African-Americans comprise about one-quarter of people living in Cleveland Metroparks tax district. Hence, African-Americans use Park District facilities at a level far below their numbers in the population.

Not only do African-Americans comprise only a fraction of all Cleveland Metroparks visitors, there is tremendous variation in visitation by day of the week and season of the year (Figure 1). During the spring, 9% of weekday visitors and 11% of weekend visitors were African-American. During the summer, almost 15% of weekend visitors and 11% of weekday visitors were African-American. During the fall, less than 6% of both weekday and weekend visitors were African-American. In general, African-Americans' use of Cleveland Metroparks peaks during the summer months (especially on weekends) and drops precipitously during the fall months.

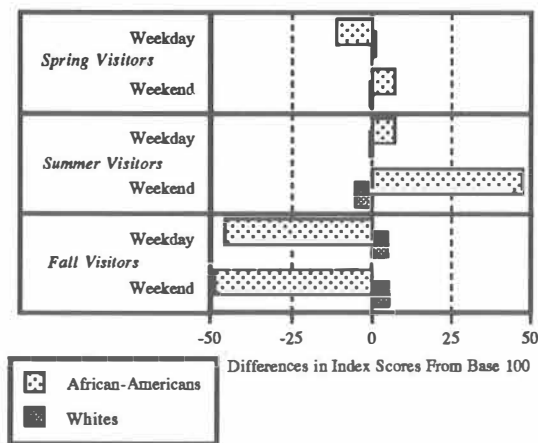


Figure 1. Temporal patterns of visitation in Cleveland Metroparks - by race.

Table 1 compares African-American and White visitors in terms of their demographic characteristics. Notice that African-American visitors are more apt to be female and

younger, and have lower levels of education and income. Particularly striking is the fact that only 4% of African-American visitors are over 65 years of age, compared to 15% of White visitors.

Table 1. Demographic characteristics of Cleveland Metroparks visitors - by race.

	African-Americans %	Whites %	Chi-Square
Gender			
Female	58.1	44.4	
Male	41.9	55.6	32.33***
Age			
16-24	12.7	11.6	
25-44	55.1	48.1	
45-54	13.8	13.8	
55-64	13.6	12.5	
65-74	3.2	11.7	
75+	1.6	2.3	31.16***
Level of education			
Didn't graduate from H.S.	11.	8.4	
High school graduate	54.0	50.9	
Tech. School/some college	8.6	7.1	
College graduate	25.2	33.7	12.82**
Yearly household income			
Less than \$15,000	16.3	13.2	
\$15-24,999	25.1	19.4	
\$25-34,999	18.7	20.6	
\$35-49,999	21.3	22.3	
\$50,000 or more	18.7	24.5	13.56***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

General Patterns of Visitation

African-American and White visitors were also found to differ markedly in terms of general patterns of visitation. These differences are summarized in Table 2.

African-Americans traveled slightly further than Whites: 55% of African-American visitors said they live within 15 minutes of the reservation visited, compared to 60% of White visitors. While this difference is small, it was significant at the .01 level. While African-American and White visitors differed in terms of travel time, there was virtually no difference between these groups in terms of mode of transportation to Cleveland Metroparks.

African-Americans and Whites differed significantly in how often they said they visit Cleveland Metroparks. Here, African-American visitors reported visiting more infrequently than White visitors. In fact, almost twice as many African-Americans (17%) said they were first-time visitors compared to Whites (10%).

African-Americans reported a significantly longer length of visit than Whites. Thirty-seven percent of African-Americans said they planned to stay for two hours or more, compared to 26% of Whites.

African-Americans were significantly more likely than whites to visit in the company of small children. About 37% of African-American visitors said they visited with at least one small child, compared to 28% of White visitors.

African-Americans visit significantly fewer Cleveland Metroparks reservations than Whites. Nearly 30% of White visitors said they had visited three or more Park District

reservations during the last year, compared to only 17% of African-American visitors.

African American visitors were significantly less likely than White visitors to receive a free Park District newsletter through the mail. Only 11% of African-American visitors said they received the newsletter, compared to 23% of White visitors.

Table 2. General patterns of visitation at Cleveland Metroparks - by race.

	African-Americans %	Whites %	Chi-Square
Travel time to reservation			
Less than 15 minutes	54.8	60.0	
15-30 minutes	33.3	31.4	
More than 30 minutes	12.0	8.6	7.28*
Frequency of visitation			
First-time visitor	17.3	9.8	
Less than once a month	34.6	27.3	
Once a month	11.4	13.7	
Once a week	15.8	23.0	
Almost daily	20.9	26.3	47.64***
Duration of visit			
Less than 1 hour	31.5	35.2	
1-2 hours	31.5	38.4	
2 hours or more	37.0	26.5	23.97***
Mode of transportation			
Foot or bicycle	5.7	6.9	
Car or van	92.1	91.4	
Other	2.3	1.6	1.93
Number of children in group under 14 years of age			
Zero	62.9	71.9	
1-2	17.4	18.8	
3 or more	19.7	9.3	50.91***
Other Park District areas visited during the last 12 months			
Zero	43.4	28.6	
1-2	39.6	41.8	
3 or more	17.0	29.6	56.24***
Receive Park District newsletter			
No	88.7	76.6	
Yes	11.3	23.4	34.16***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Attitudes Toward Recreational Development

Visitors were asked to choose among three statements which best reflected their attitude about the reservation they were visiting: (a) favor more recreational development, (b) favor more natural areas, or (c) currently a good balance between recreational development and natural areas. A majority of both African-American and White visitors said there is currently a good balance between recreational development and natural areas. However, as evident from Figure 2, African-American visitors were more likely than White visitors to favor more recreational development. Twenty-two percent of African-American visitors favored more recreational development, compared to only 13% of White visitors. This relationship was significant ($p \leq .001$) even after the effects of gender, age, income and travel time were controlled.

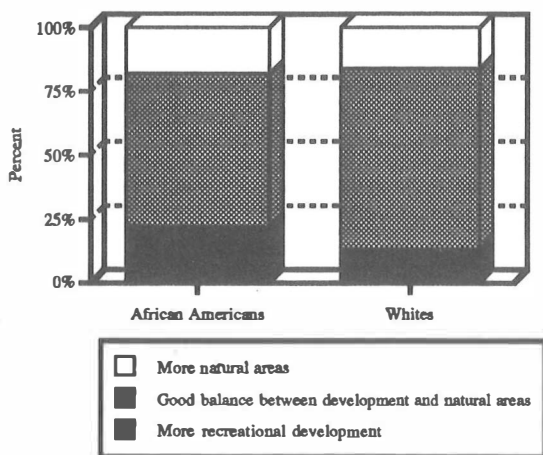


Figure 2. Attitude toward recreational development in Cleveland Metroparks - by race.

Kinds of Activities Pursued

Respondents were asked to indicate whether they participated or planned to participate in a number of different activities during their visit. A comparison of participation rates for selected activities is provided in Figure 3. Notice that African-Americans and Whites differed only slightly in terms of the kinds of activities pursued. For example, while a greater fraction of Whites said they walked or hiked than African-Americans, this difference was not statistically significant. Nevertheless, there were some significant differences. African-American visitors were significantly more likely to participate in league sports, fitness activities, running or jogging, playing with children, picnicking, and relaxation. In contrast, White visitors were significantly more likely to walk a dog. When controlling for the effects of gender, age, income and travel time to the parks, all but two of these differences remained significant at the .05 level (relaxation and walking a dog.).

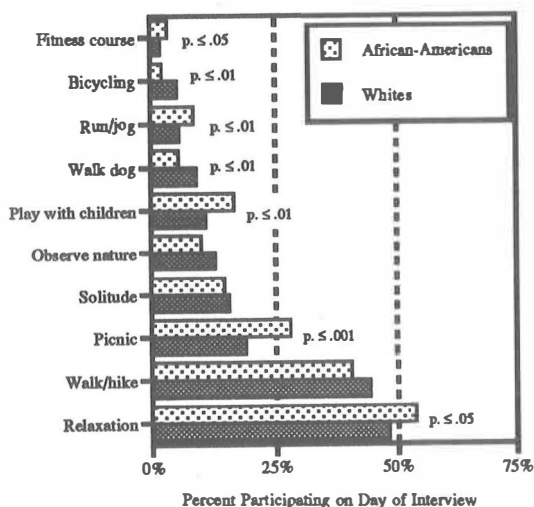


Figure 3. Activity rates in Cleveland Metroparks - by race.

Results - Telephone Survey

The telephone survey revealed that African Americans are far more likely than Whites to be non-users or infrequent users of parks in Northeast Ohio (Table 3). Whites were more than twice as likely to be regular users of public parks (individuals who use parks at least once a month).

Table 3. Frequency of park visitation in Northeast Ohio - by race.

	African-Americans %	Whites %	Chi-Square
Never	38.5	26.2	
1-2 times per year	30.8	21.8	
Less than once a month	12.1	10.3	
Once a month	9.9	26.9	
Once a week or more	8.8	14.8	19.23***

*** p ≤ .001

Non-users and infrequent users were asked to indicate whether different factors were very important, somewhat important, or not at all important in limiting their use of public parks in Northeast Ohio. For purposes of display, two of the response categories for these items were combined (somewhat important and not at all important). A summary of responses to twelve of these items is presented in Table 4.

Table 4. Factors that limit people's use of public parks in Northeast Ohio - by race.^a

	African-Americans %	Whites %	Chi-Square
Lack of time	43.9	45.6	0.63
Lack of information	29.2	20.6	2.73
Fear of crime	47.3	32.3	6.53*
No one with whom to go	13.5	15.3	0.15
Parks are too far away	16.4	12.7	0.77
No way to get to parks	18.9	10.1	5.13*
Cost too much	16.4	4.7	15.28***
Pursue recreation elsewhere	31.9	25.5	1.36
Don't like outdoor recreation	18.1	12.1	2.00
Busy with other activities	37.0	42.0	0.66
Lack public transportation to parks	23.3	8.88	14.23***

^a Percentages include individuals who said factor was very important in limiting their use of public parks.

* p ≤ .05; ** p ≤ .01; *** p ≤ .001

In most cases, African-Americans and Whites differed very little in kinds of factors that limited their use of public parks. There were, however, a few significant differences. African-Americans were significantly more likely than whites to say that costs, fear or crime, having no way to get to parks, and a lack of public transportation were very important in limiting their use of parks. However, when the effects of income were controlled, only two of these differences remained significant at the .015 level: costs and lack of public transportation.

Non-users and infrequent users were also asked to indicate whether they might use public parks more given a number of changes. A summary of responses is provided in Table 5. Notice that for seven of the eight change items, African-Americans were significantly more likely than whites to say they might use parks more. However, after controlling for the effects of income, only four of these differences remained significant at the .05 level: reduce travel time to parks, provide public transportation to parks, make parks safer, and provide more activities in parks.

Table 5. Changes in park operations that might lead to park visitation - by race.^a

	African-Americans %	Whites %	Chi-Square
Develop parks closer to home	63.0	50.3	4.18*
Provide more information about parks and park programs	79.5	69.3	3.18
Reduce travel time to parks	63.0	38.1	16.42***
Provide public transportation to parks	55.6	30.5	17.92
Make parks safer	86.3	70.0	8.49**
Provide more activities	75.7	53.0	13.56***
Reduce costs associated with going to parks	54.8	35.5	10.12**
Provide assistance with care of children and family	58.9	41.1	13.69***

^a Percentages refer to individuals who said that a change might result in their using public parks more.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Discussion and Implications

These data indicate that African-Americans and Whites differ in terms of their use of Cleveland Metroparks. They also differ in terms of frequency of park visitation in general and the kinds of factors that limit their use of parks. These data raise a number of issues and questions for Cleveland metroparks and other individuals involved in the delivery of park services in Northeast Ohio.

- African-Americans currently do not use Cleveland Metroparks and other regional parks at rates equal to their numbers in the population. This should be a concern given that African-Americans and other minorities are expected to increase their share of the region's population in the future. In simple fact, the tax base for Cleveland Metroparks and other regional park districts will increasingly fall on people who have not traditionally used these areas.
- African-Americans travel further to Cleveland Metroparks than Whites. Further, African-Americans said they lacked easy access (e.g., public transportation) to public parks in general. Hence, accessibility to public parks appears to be a key factor that limits African-Americans' use of park services. To better serve African-Americans, Cleveland Metroparks and other park districts may have to locate new parks or become more involved in park initiatives in residential areas with high concentrations of African-Americans.
- While there are a number of commonalities in the kinds of activities that African-Americans and Whites participate in while visiting Cleveland Metroparks, there are some significant differences. Specifically, African-Americans participated at higher rates in activities such as league sports, fitness activities, jogging and running, and children's activities. These differences were evident even when the effects of income, gender, age, and travel time to the park were controlled. These results suggest that park officials may need to be sensitive to basic cultural differences that accompany African-American and Whites' use of Park District facilities.
- African-Americans were more likely than Whites to favor greater recreational development in the reservations they visited. African-Americans were also more likely to favor more activities in public parks. For Cleveland Metroparks and other park districts, these results are problematic since their principle mandate is to conserve area natural resources. Strategies to make park services and programs

more relevant to African-Americans and other groups must be done in ways that are consistent with the underlying mission of the Park District.

- African-Americans were far less likely than Whites to subscribe to a free Cleveland Metroparks newsletter. Also, African-Americans visited fewer Park District areas than Whites. These data suggest that current efforts to inform African-Americans about park services and facilities are inadequate. Cleveland Metroparks officials may need to evaluate their marketing efforts as a means of determining how best to inform African-Americans about Park District services.
- These data suggest that park districts in Northeast Ohio may need to evaluate whether their employees have the skills to relate to a minority population. Further, park districts may lack adequate citizen input from minorities. Efforts may need to be developed (e.g., training of current employees and/or hiring of new employees) that facilitate a better dialogue with minority group members. Again, this may be problematic given the fact that many park officials are recruited primarily because of their ability to relate to park resources rather than park visitors.
- Both economic and cultural factors are working simultaneously in explaining differences in African-Americans' and Whites' use of public parks in Northeast Ohio. These results should not overlook the fact that there are many commonalities in the way African-Americans and Whites used public parks. Future research must be directed at exploring the variability among African-Americans and other minority groups in their use of park services and facilities (Edwards, 1991).

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The proceedings contains 40 research and management papers on the following subjects: trends in recreation research and management; social science in resource management; outdoor recreation management and planning; greenways; urban recreation; landscape and visual perceptions; economic development aspects of travel and tourism; travel and tourism behavior; recreation resource management; recreation demographics; social psychology and recreation.

Keywords: outdoor recreation, tourism, economics, urban recreation, landscape, research, management.

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