



United States
Department of
Agriculture

Forest Service

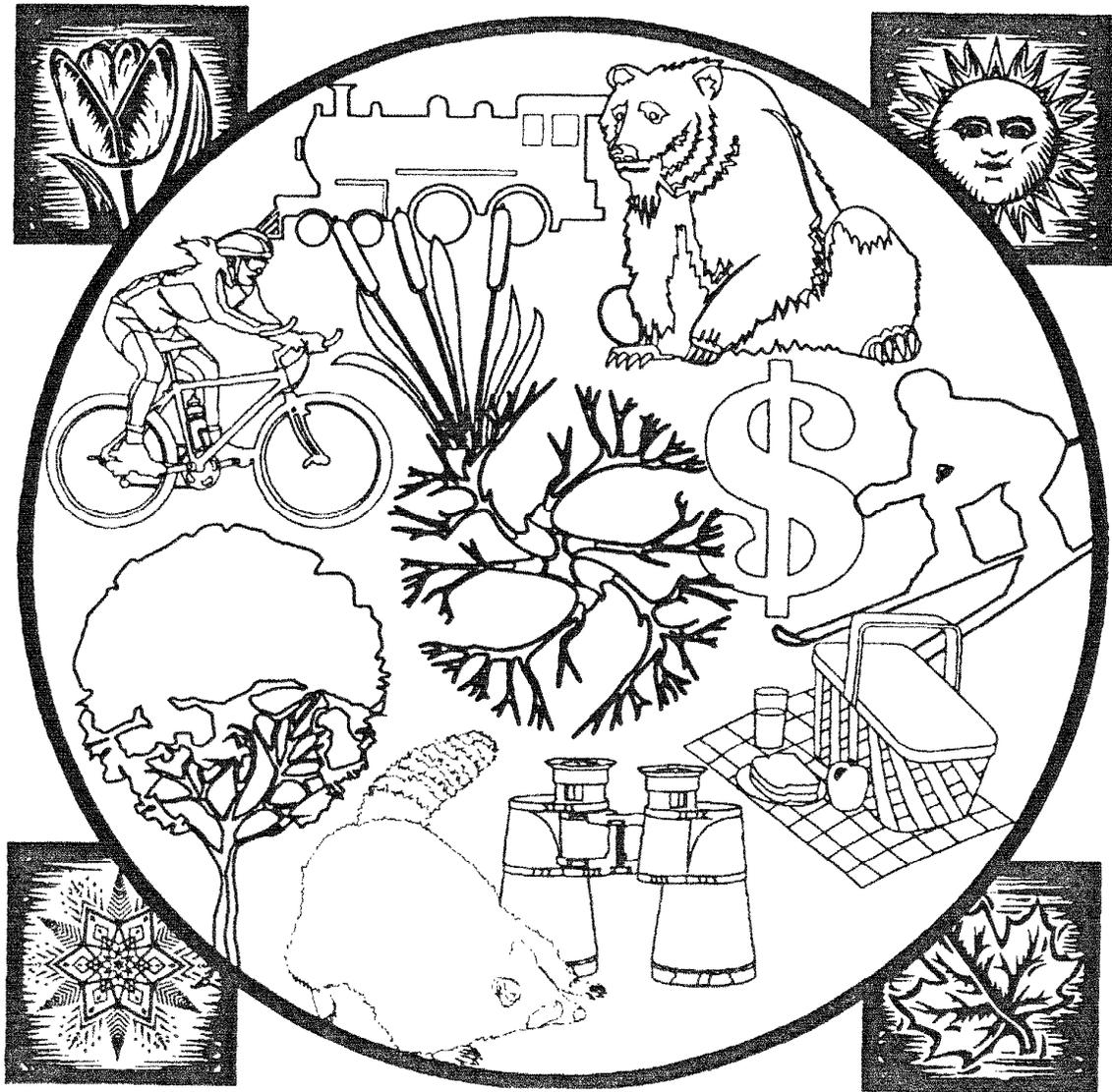
Northeastern Forest
Experiment Station

General Technical
Report NE-218



Proceedings of the 1995 Northeastern Recreation Research Symposium

April 9-11, 1995
Saratoga Springs, New York



Northeastern Recreation Research Symposium Policy Statement

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

NERR 1995 Steering Committee:

Chad Dawson, SUNY College of Environmental Science & Forestry, Committee Chair

Robert Bristow, Westfield State College

Alan Graefe, The Pennsylvania State University

Randolf Hyatt, NYS Parks Management and Research Institute

Jeffrey Marion, National Biological Service

Allison McLean, New Hampshire Division of Parks & Recreation

Tom More, USDA Forest Service

Steve Selin, West Virginia University

David Solan, Mansfield University

Julia Stokes, NYS Office of Parks, Recreation and Historic Preservation

Gail Vander Stoep, Michigan State University

Rodney Warnick, University of Massachusetts

Chris White, AScI Corporation

Rodney Zwick, Lyndon State College

***NOTE:** These proceedings have been prepared using electronic and hard copy supplied by the authors. While some editing has been done, the authors are responsible for the content and accuracy of their papers.*

COVER DESIGN by Susie J. Wheeler, Northeastern Forest Experiment Station, Burlington, VT

Proceedings of the 1995 Northeastern Recreation Research Symposium

April 9-11, 1995

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

Compiled by:

Chad P. Dawson

Sponsors:

USDA Forest Service, Northeastern Forest Experiment Station
NYS Office of Parks, Recreation, and Historic Preservation
NYS Parks Management and Research Institute
Society of American Foresters, Recreation Working Group
SUNY College of Environmental Science & Forestry
Westfield State College
The Pennsylvania State University
USDI National Biological Service
New Hampshire Division of Parks & Recreation
West Virginia University
Mansfield University
Michigan State University
University of Massachusetts
ASCI Corporation
Lyndon State College

TABLE OF CONTENTS

	<u>Page</u>
OPENING SESSION: Trends in the Recreation Profession	1
Perspectives and Insights Edward Koenemann (Vermont Department of Forests, Parks and Recreation)	3
MOUNTAIN BIKING	7
Recreational Challenge and Environmental Effects of Mountain Biking. Gus Bahrenburg, James Palmer (SUNY-CESF)	9
Information Sources and Attitudes of Mountain Bikers. Roy Ramthun (Radford U.)	14
Bicycle Tourism Development in the Adirondack North Country Region of New York State. Timothy Holmes (Holmes and Associate), Michael Schuett (Southwest Texas State U.)	17
RECREATION PRICING	25
Potential Equity Effects of a New Day-Use Fee. Stephen Reiling, Hsiang-Tai Cheng (U. of Maine), Chris Robinson (U. of Maine), Ronald McCarville (U. of Waterloo), Christopher White, ASci Corporation	27
Factors Associated with Willingness-to-Pay for Hunting License Increases Among Small and Big Game Hunters in Pennsylvania. Craig Miller, Alan Graefe (Pennsylvania State U.)	32
Increasing Revenues in Ohio State Parks: What Works and What Doesn't. Glen Alexander (Ohio State Parks)	36
OUTDOOR RECREATION MANAGEMENT	41
Examining the Nature of River Recreation Visitors and Their Recreational Experiences on the Delaware River. Katharine Pawelko (Western Illinois U.), Ellen Drogin, Alan Graefe, Daniel Huden	43
Increasing Michigan Boater Compliance With The Clean Vessel Act In Use Of Pumpout And Dump Stations: Information And Education Needs And Preferences. Gail Vander Stoep (Michigan State U.)	50
Managing New Forms Of Recreation In Heritage Areas. Per Nilsen (Parks Canada)	59
Crowding and the Beach: Examining the Phenomenon of Over- and Under-Manning in Alternative Environments. John Confer, Alan Graefe (Pennsylvania State U.), and James Falk (Sea Grant Advisory Service).	65
ENVIRONMENTAL PERCEPTIONS AND RECREATION RESOURCE MANAGEMENT	73
Environmental Ethics, Values, And Behavior: An Empirical Approach To Designing Nonformal Environmental Education Programs. Christine Negra, Robert Manning (U. of Vermont)	75
Negative Perceptions Of Natural Environments And Recreation Activity Preferences. Robert Bixler (Cleveland Metroparks), William Hammitt (Clemson U.), Myron Floyd (Texas A and M U.)	81
Comparing Quantitative And Qualitative Approaches To Characterizing Forest Recreation Environments. Robin Hoffman, James Palmer (SUNY CESF)	84
OUTDOOR RECREATION: SATISFACTIONS AND CONFLICTS	91
Influences on Perceived Crowding and Satisfaction on the Blue Ridge Parkway. Jefferson Armistead, Roy Ramthun (Radford U.)	93
User Satisfactions at Adirondack Forest Preserve Campgrounds. Chad Dawson (SUNY-CESF)	96
The 1994 Lake Groton Recreationist Survey: Policy Options for Resolving Lake User Conflicts. Kevin Wiberg (U. of Vermont), Susan Bulmer (Vermont Department of Forests, Parks and Recreation)	99
Activity Orientation As A Discriminant Variable In Recreation Conflict Research. Alan Watson and Hans Zaglauer (Leopold Institute), Susan Stewart (USFS)	103
Visitor Use and Conflict on the Carriage Roads of Acadia National Park. Charles Jacobi (Acadia National Park), Robert Manning, William Valliere, Christine Negra (U. of Vermont)	109
TOURISM	113
Legislative Mandates for Tourism in the 50 States. Eric Kingsley and Robert Robertson (Univ. of New Hampshire).	115

Marketing Research Framework For The Heritage Tourism Initiative. Dick Stanley (Parks Canada)	119
The Interplay Between Ethics and Sustainable Rural Tourism. Jeffrey Walsh (Pennsylvania State U.), Bruce Matthews (Cornell U.)	125
New York's Changing Bed & Breakfast and Inn Industry: 1987 to 1993. Diane Kuehn (New York Sea Grant), Chad Dawson (SUNY CESF)	131
ECONOMIC IMPACTS AND VALUES	135
The Economic Impact of State Forest Recreation in Southwestern Pennsylvania. Bruce Lord, Charles Strauss, Stephen Grado (Pennsylvania State U.)	137
Economic And Social Values Of Parks: An Empirical Approach. Alphonse Gilbert, Robert Manning, Christine Negra (U. of Vermont), Edward Koenemann (Vermont Department of Forests, Parks and Recreation)	141
Wetland Externalities: Implications for Policy and Decision-Making. Donald Dennis (USFS), Walter Kuentzel (U. of Vermont), Louise Tritton (USFS), Deane Wang (U. of Vermont)	148
HISTORIC AND CULTURAL TOURISM	153
Historic Preservation Attitudes Of The 90s America's Industrial Heritage Project - 1993. Deborah Kerstetter, Kelly Bricker, Patricia McGee (Pennsylvania State U.)	155
Antiquing as a Recreational Activity in Southwestern Pennsylvania. Stephen Grado, Charles Strauss, Bruce Lord (Pennsylvania State U.)	158
Residents' Attitudes Towards Tourism: An Applied Study in a Historic Community. Beth Weikert, Deborah Kerstetter (Pennsylvania State U.)	162
The Rural Action Class's Perceptions of Rural Tourism in Relation to Their Sense of Place: An Exploratory Study. Steven Burr (Western Illinois U.)	167
RECREATIONAL TRAILS	173
Differences Between Rail-Trail Users and General Trail Users of a National Recreation Area. Andrew Mowen, Daniel Williams (U. of Illinois)	175
State Trail Programs: A Survey Of State Trail Administrators. Roger Moore, Alan Roberds (North Carolina State U.)	180
Impact of Columbia's MKT Nature and Fitness Trail on Attitudes of Adjoining Property Owners. Hans Vogelsong, Hardeep Bhullar (Pennsylvania State U.)	186
RECREATION CHOICE AND PARTICIPATION TRENDS	191
Recreation Choice Behavior: An Application of Multidimensional Scaling. Robert Bristow (Westfield State College)	193
Outdoor Recreation Trends in the Northeastern United States: 1979 - 1993, An Update. Rod Warnick (U. of Massachusetts)	200
Forecasting Recreation Participation: A Cohort-Component Projection Model for the U.S. John Dwyer (USFS)	208
TRAVEL MOTIVATIONS AND DECISION-MAKING	215
Motivations for and Constraints to Spring Break Travel: A Cross Gender Comparison. Shayne Annett, Cindy Dabrowski, Robert Robertson (U. of New Hampshire)	217
An Exploratory Analysis of Travel Benefits Sought Among International Bus Tourists in the USA. Tony Yang, Alan Graefe (Pennsylvania State U.)	222
An Exploratory Analysis of International Vacation Decisions in the Context of Terrorism Risk. Sevil Sonmez, Alan Graefe (Pennsylvania State U.)	227
A Regional Arts Festival's Market: Can It be Segmented by Residence? Hoon Lee, Deborah Kerstetter (Pennsylvania State U.)	233
ROUNDTABLE AND MANAGEMENT DISCUSSION	237
Utilizing Integrated Resource Management to Achieve Recreation Goals in New Hampshire State Parks and Forests: An Evolving Model of Planning and Process. John Twitchell (NH Division of Parks and Recreation), Ken Desmarais (NH Division of Forests and Lands), John Lanier (NH Dept. of Fish & Game)	239

The Public Interest In Outdoor Recreation: Or Will The Invisible Paw Replace The Responsible Arm?	243
Ben Twight (Pennsylvania State U.)	
Bicycling and Walking: Linking Transportation and Recreation in New York State.	247
Jeffrey Olson (NYS DOT), John DiMura (Canal Recreationway Corp), Tom Cobb (NYS Trails Council & OPRHP)	
 POSTER SESSION	 253
Parks as Neighbors: The Experience of Living in and Around Cape Cod National Seashore.	255
Robert Manning, William Valliere (U. of Vermont)	
A Necklace Park Plan for Historic Holyoke, Massachusetts.	260
Stephanie Kelly, Barbara Moser, Philip Peterson (Westfield State College)	
Interpretation of New York's Eastern Lake Ontario Sand Dunes and Wetlands.	263
Gillian Earnest (SUNY-CESF), Diane Kuehn (NY Sea Grant)	
A Research Framework To Assess The Biophysical Impacts Of Nature-Based Tourism: A Thesis Project.	267
Tracy Farrell (SUNY-CESF)	
Development Of A Self-Guided Auto Tour To The Salmon River Corridor: Salmon River, New York.	274
Eric Weisman (SUNY-CESF)	
The Influence of Current Technical Training on Lifeguard Staffing in Connecticut State Parks.	280
Gus Constantine (Connecticut State Parks)	
New York Statewide Trails Plan: Core Issues And Key Recommendations.	282
Thomas Cobb (NYS OPRHP)	

MISSING PAPERS

NOTE: If you are interested in getting additional information about any of the papers that were presented but were not submitted for publication, please contact the authors directly. A list of those papers is included here to assist you in identifying the authors.

- Manager Perceptions of Mountain Bike Riders: New Users/New Conflicts.** Deborah Chavez (USFS)
- Participants' Assessments of Fairness and Pricing of A Public Leisure.** Ronald McCarville (U. of Waterloo), Stephen Reiling (U. of Maine), Christopher White (ASCI Corporation)
- Shenandoah and Great Smoky Mountains National Park Campsite Monitoring Surveys: Evaluation of Dispersed vs. Designated Site Camping Management Strategies.** Jeff Marion (National Biological Survey)
- What are the Critical Issues Facing the Management of New Hampshire's Coastal Zone?** Kristine Cheatham (New Hampshire Coastal Program), Robert Robertson (U. of New Hampshire)
- Assessing the Impact of the Wilderness Act Upon Tourism.** Steve Jacob, A. Luloff (Pennsylvania State U.)
- Values in Resource Management: A Theoretical Perspective and Critique.**
Thomas More (USFS)
- The Identification of Criteria for a Trail Rating System and the Development of a Trail Rating System Model.** James Harding, Ki-Joon Yoo, Joanne Tynon, Floyd Newby, (U. of Maine)
- Heritage Tourism in Vermont: Comparing Shelburne Museum Visitors and Nonvisitors.** Walter Kuentzel (U. of Vermont)
- Social Science in the National Park Service: Designing a Research Program.** Robert Manning (U. of Vermont) and Gary Machlis (U. of Idaho and NPS)
- Interpretive Media Plan and Preliminary Facilities Design: Kancamagus Scenic Byway, White Mountain National Forest**
Terry Dewan (Dewan and Associates)
- 1994 Outdoor Recreation Resources of New York State Map.** John Fox, Jim McFarland, Lynn Gort (NYS OPRHP)
- A Trail Information System Using Critical Criteria of Trail Settings: A GIS-Based Case Study in Acadia National Park, Maine.** Ki-Joon Yoo, James Harding, Floyd Newby, Joanne Tynon (U. of Maine)
- New York State Snowmobile Trail Mapping with GIS.**
Randolph Hyatt (NYSPMRI)
- Demographic Changes in New York State's Urban Areas and the Resulting Impact on Urban Recreation.** Wesley Bartlett (NYS OPRHP)
- New York State Open Space Plan.** Robert Reinhardt (NYS OPRHP)

Proceedings of the 1995 Northeastern Recreation Research Symposium

April 9-11, 1995

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

Compiled by:

Chad P. Dawson

Sponsors:

USDA Forest Service, Northeastern Forest Experiment Station
NYS Office of Parks, Recreation, and Historic Preservation
NYS Parks Management and Research Institute
Society of American Foresters, Recreation Working Group
SUNY College of Environmental Science & Forestry
Westfield State College
The Pennsylvania State University
USDI National Biological Service
New Hampshire Division of Parks & Recreation
West Virginia University
Mansfield University
Michigan State University
University of Massachusetts
ASCI Corporation
Lyndon State College

**OPENING SESSION:
Trends in the Recreation
Profession**

PERSPECTIVES AND INSIGHTS

Edward J. Koenemann

Director, Vermont State Parks, Dept. of Forests, Parks and Recreation, 103 South Main St., Waterbury, VT 05671-0601

Introduction

I have been asked to share with you my perspectives and insights on changing political, social, and fiscal environments and how we are likely to be affected as we approach the turn of the century. As I traveled around the nation during my year as president of the National Recreation and Park Association, I met some great, hard-working citizens and professionals. BUT, I became **adversarial, parochial, defeated**. I heard comments like, "They stole my aerobics instructor and the students were in my class," and "We can't compete." It seems to me with all the needs that are out there and the limited resources that we have, surely there are enough programs to develop that would serve your community, wherever it may be.

In an article that appeared in the Park and Recreation Magazine a few years ago, Dr. Doug Sessoms of the University of North Carolina asked, "Have we lost our way? Have we become myopic? Have we been so self-focused in trying to gain stature as a profession that we have forgotten our potential contributions to society? What happened to vision, initiative, leadership, adaptability, flexibility?"

The role of a recreation leader is to affect change in an individual. The value is in what the individual gains from the experience, not the activity he or she participates in. The choice of activity has little to do with it. We need to focus on the benefits of what we do. Note the Canadians' Benefits-Based Approach. We can learn a great deal from them. When I attended the national conference of the Canadian Recreation/Park Association last August, I had the opportunity to participate in a series of working sessions focused on the benefits of parks and recreation. It is worth seriously considering moving in that direction. The information is available from the National Recreation and Park Association.

Let's look at today's scene - changing demographics - multicultural, aging, female-oriented. There are identifiable social ills: crime; youth at risk; increasing unemployment; increasing poverty; increasing single-parent homes; rising health care costs; demand for value and benefits; increasing regulation; increasing inactivity; increasing obesity; increasing environmental degradation (e.g., vandalism, overuse, lack of resources for proper maintenance); reduced self-esteem; reduced trust in government; high taxes; and an eroded urban tax base.

Are these new issues? I think not! These are the issues that were prevailing at the turn of the century when our park and recreation movement began. Just a brief history - there were

four thrusts of the movement: community recreation; state and national parks; non-profit agencies; and private/commercial recreation. The first three developed very early in the century. Private/commercial recreation began to come into its own after World War II. Who were some of the early leaders of the movement? Frederick Law Olmstead, Jane Addams, Richard Lieber, and Steven Mather. They were social forces in our society. They understood the benefits of their actions. They provided services and protected resources for the benefits they would provide people. An excellent example would be Sid Lutzin, who for years was the New York State Youth Service Bureau. He parlayed millions of tax dollars into the "prevention of juvenile delinquency." What tools did he use? -- recreation services and facilities. Recreation was a means to an end or a benefit. In the evolution of the movement, the people involved, for whatever reason, wanted society to believe recreation was an end in itself. They focused on "fun" and "enjoyment," etc. In so doing the perception of recreation changed from a "benefit" to a "frill" -- something society could do without, particularly during tough times.

During my year as president of the National Recreation and Park Association, I had the distinct opportunity to hear Dr. John Crompton from Texas A&M University on several occasions. He has a message about how we must focus on the benefits of what we do, which is very thought provoking and worth hearing. He says that we must reposition ourselves so the services we offer "are perceived to be a central contributor to alleviating the major problems in a community identified by its residents and decision makers." We need to communicate what we do in terms that our customers, visitors, and clients understand and value.

There is not time to address all the issues outlined in today's scene, which I just described. I will focus on a few which I believe may be of greatest concern and in which we can and do play a central role. Let's look at:

- Changing demographics
- Economic development
- Youth crime
- Unemployment and homelessness
- Health and wellness
- Environment

As I proceed, I may use personal experiences as examples for illustrative purposes only. They are not intended to be models.

Changing Demographics Cultural Diversity

We have often heard the United States referred to as a "melting pot", or as I prefer it, a "fondue pot", where everything melts together into an unidentifiable one. Today, in reality, it is a "stir fry" where every ingredient retains its identity, but mixed together, creates a "delicious dish". That is the United States today. There are those who resist that concept. The "official language is English" movement is a good example. The United States today should be a celebration and preservation of our diverse cultural heritage.

How many of you avoided taking a "foreign" language in school? I tried to. I was exposed to German as I grew up, but I considered it unnecessary at the time. I had the distinct privilege to serve on the accreditation visitation team for the first Canadian institution to successfully seek accreditation in our U.S. program. The University of Ottawa is a bilingual university by charter. The faculty conducts classes in both English and French. Many of the documents that the team had to review were in French and not translated into English. It was embarrassing to me, coming from a state contiguous to the Province of Quebec and serving many French Canadians in our State Park system, which I manage. There is a certain arrogance in my situation that is disturbing. Our country is a mecca for travelers from other countries around the world. The Germans are coming to the Northeast. The Japanese are traveling everywhere. We need to think globally. We need multilingual staff, information, and research.

Aging Population

I feel certain that you all have read and heard much about our aging population, but there is a changing perception and changing needs. Picture a 93 year old woman running the 100 meter sprint in the Senior Games this year. She has already competed and won several medals in her age group and there are many ready to compete against her. Many in the aging population will spend more time in retirement than they did in their work life. They need special programs and services beyond recreation activity (housing, nutrition, health and wellness, transportation, and income maintenance, to name a few). We have a role to play here in addition to providing recreation services. There is a wealth of knowledge, talent and skill in this age group that needs to be utilized in a productive manner, not wasted in idleness. We need research. We need to think in terms of partnerships.

Redefining Lifestyles

Much has been about this scene. It can best be described as enforced leisure, limited work, less affluence, inexpensive leisure pursuits, two-income households, more females in the work force, two-job individuals, part-time employment, entrepreneurship, early retirement, unemployment, changing vacation patterns, year-round schooling, and economy of restraint. Do we have a role to play in all this? You bet we do - a very important role. We need more research. We need to pursue partnerships.

Economic Development

Dr. John Crompton says public recreation is the driving force in developing the economy of an area or community. We manage major attractions which bring visitors. Think how much a regional softball tournament sponsored by the local recreation and park department contributes to the economy. Recreation and parks attract "footloose" businesses, those not tied to a particular resource or infrastructure, looking for a "quality of life" for employees. Recreation and parks attract retirees, many of whom are relatively affluent. Recreation and parks are an integral part of urban rejuvenation projects. Recreation and parks enhance property values. Retail growth is dependent

upon public recreation facilities and programs. If you start a lacrosse or aerobics program that has not existed before, the participants need to purchase equipment and apparel which the local merchants need to stock. Recreation and parks are usually environmentally friendly.

Youth Crime

There are many efforts and programs that we can create or participate in to help alleviate this situation: first offender and court diversion programs; Youth Conservation Corp; leisure counseling; literacy; mentors, and on and on. We need to provide outreach, constructive programs, atypical schedules and programs, and opportunities for healthy social relationships, a sense of community, increased self-esteem, and a sense of accomplishment.

Unemployment and Homelessness

The needs here are many, and we have a unique role to play. There is a need for atypical schedules and programs, employment counseling, psychological support, physical fitness, temporary counseling, psychological support, physical fitness, temporary shelter, meals, health services and, most of all, research. Again, there may be a lot of knowledge and skill among this segment of the population. We have the opportunity to help develop feelings of self-worth and contributing to the community.

Health and Wellness

Can we contribute to cost reduction, longevity, psychological well-being, weight and substance abuse reduction, self-discipline, and education about nutrition? A fitness lifestyle is no longer considered as recreation, but a necessary part of living. We need to think in terms of partnerships and more research.

Environment

At times I sound like a real "green sneaker" environmentalist, but actually I am more of a pragmatist. What I am most interested in is providing the same opportunities for our nine grandchildren and their grandchildren that I have enjoyed. I want them to be able to swim in the brook or pond without becoming ill, eat the fish they catch, and to be able to see the horizon when they climb to the top of the hill or mountain. The primary purpose of clean air, clean water, and natural landscapes is recreation - to be able to enjoy all the benefits that these outdoor amenities offer. Dr. John Crompton talks about the research of one of his colleagues that clearly demonstrates the value of viewing a natural landscape to the rapid and complete recovery of surgery patients in a hospital. Frederick Olmstead created Central Park for the health benefits that would accrue to the citizens of New York City. Leisure is moving outdoors with the ecotourism movement. But we have a much broader role to play. We should be the models for energy conservation, purchasing practices, in construction and maintenance, and use of hazardous materials, etc. Our community centers can be the repository for recyclable materials. We should be composting garbage from our snack bars and grass clippings and leaves from our facilities and giving it back to the community to put on their flower beds and

gardens. We could be providing technical assistance on how to combat insects and weeds without using hazardous substances and how to prune trees and shrubs. There is much we could contribute to a healthy environment in our communities. Education is extremely important and we have a role to play. In our parks in Vermont we have a carry in/carry out rubbish policy in day use areas and a highly sophisticated waste separation and recycling program in campgrounds. They not only help improve the environment and educate the public but help reduce our cost of operation. We are experimenting with electric powered vehicles. There is much we can do.

In conclusion, let me go back a few minutes. In the comic strip by the same name, some years back, Pogo said, "We have met the enemy and it is US". Recreation is moving away from government, and leisure needs are moving away from what government has traditionally done best - providing facilities and formal, structured programs. We have not only resisted it, but we have resented it. Government is really in the facilitating and enabling business, but we have lost sight of that. Recreation as an independent service is declining and we are strongly resisting it. We have failed to strongly establish ourselves as an **essential** service. We have general ignored our close relationship to other social services and private business. **WE are our own worst enemy!** Dr. Crompton continues, "It should be emphasized that repositioning does not necessarily involve radical changes in the type or nature of services that agencies offer. Rather the task is to demonstrate and then communicate the benefits these services offer, in terms that consistently align and associate them with alleviating community problems".

We have a multitude of opportunities being presented to us, but we need a positive attitude and the fortitude to open our minds and senses and seize those opportunities. If we are to make a substantial contribution to society as we approach the turn of the century, it is time for a renewal of leadership. We recall the leadership qualities of the pioneers of our movement. Today, as then, we need leaders in our profession who are innovators, creators, enablers, facilitators, risk takers, peacemakers, negotiators, coalition builders, visionaries, organizers, planners, implementors, evaluators, researchers, contributors -- all wrapped up into one. I leave you with that **CHALLENGE!**

MOUNTAIN BIKING

RECREATIONAL CHALLENGE AND ENVIRONMENTAL EFFECTS OF MOUNTAIN BIKING

Gus Bahrenburg

Landscape Architecture Student, SUNY College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210

James F. Palmer

Associate Professor, SUNY College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210

In a few short years, mountain biking has become a major outdoor recreation. This study provides an approach to map and evaluate recreational challenges and environmental effects of mountain biking trails. It is applied to eight trails in the Western US. The results indicate the relationship between experience and impact varies for different trail surfaces.

Introduction

Mountain biking is a physically demanding outdoor recreational activity that has grown rapidly in the past decade (Ruff & Mellors 1993). It began about 20 years ago in the mountains of Marin County, California. Back then, equipment and trails were makeshift. Today, it is a national pastime which supports a multi-million dollar industry. A recent Roper Starch Worldwide survey for the Recreation Roundtable found 5 percent of Americans participated in mountain biking, an amount comparable to horseback riding, downhill skiing, or off-road vehicle driving (New York Times 1995)

The sport consists of riding specially-equipped bicycles over unpaved and unimproved land. Tracks vary from quick, intense down-hills, and long, seemingly endless distance trips, to very slow, articulated, climbing trails. Because of the diversity of acceptable trails, mountain bikers can turn any place into a challenging course.

A survey of mountain bikers found them to be largely "young, highly educated, affluent males from urban areas" (Chavez 1994 and this volume). On the average, respondents rode trails on National Forests about 20 times a year. Most spent two-thirds of their time riding off-road. They preferred trails, abandoned roads, or fire roads, and gravel roads in more mountainous areas. Over 80 percent of the mountain bike activity was informal and not associated with an organized event.

Mountain biking is a spontaneous, vernacular activity. Trails are typically formed when bikers see an area they think might be good for biking, so they try it out. If they like it and do not get chased away, word of mouth makes it more known. Users will lay out a trail to incorporate desirable traits and avoid undesirable traits. In fact, on more difficult passages on most trails, one can often see numerous optional routes. This provides multiple challenge levels for users over a wide range of skills.

There are three factors inherent to the rider that effect recreational experience and environmental impacts to the trail system. The first factor is knowledge – the rider's awareness of the potential for damage caused by his use or misuse. The second factor is skill – the rider's physical ability to avoid damaging the trail. The third factor is attitude – the rider's desire to care for, appreciate, and nurture the environment, including native flora, fauna, and other trail users. Managers can indirectly influence each of these factor through surveys, education materials, or other techniques. However, a more direct approach is for managers to apply an objective trail rating system that aids them in opening hardened, damage-resistant trails, and closing vulnerable ones.

This study develops a formal approach to assess the appropriateness of sites for mountain bike usage. Two perspectives are taken in assessing eight well established trails. On the one hand, these trail are evaluated from the perspective of the user: how are they laid out, what features do they offer, and how challenging are they. On the other hand, it evaluates their impact on the environment: what impacts do they have on the vegetation, how do they relate to the terrain and drainage. This study presents an approach for mapping trail attributes related to recreation experience and environmental damage. A weighting scheme is used to create experience and damage indices for a specified trail segment. These results can be used by both recreationists and managers to improve the mountain biking experience.

Methods

A list of trail features was developed based on personal experience and a review of the literature. In particular, the masters thesis work of Hopkins (1994) that was presented at the 1994 NERR meeting was particularly helpful in developing the rating scheme in table 1 for experiential attributes. The environmental damage rating scheme in table 2 uses features identified in trail organization and agency studies.

A set of symbols was developed to represent these experience and damage features. A trail map field sheet was created from existing maps for each of the eight study sites. The feature symbols were drawn on these field maps to indicate the location of trail features. Supplementary notes were made as necessary.

Table 1. Index points for trail features to rating recreation experience.

Symbol	Feature	oints	Description
	log (crossing)	2	crossed log > 3" thick
	log bridge	1	traveled along > 3'
	water bar	2	constructed erosion control, w/ positive effect
	snow/ice	3	snow or ice > 1" thick
	water crossing	2	unbridged, > 6' wide
	boulders/rocks	4	> 6" diameter
	boulders/rocks	2	< 6" diameter
	slick rock	3	hard smooth surfaces on natural rock, > 10' long
	switchback	3	both tangents > 10' long, on a slope of > 15%
	singletrack	4	winding path < 5' wide and > 30' long
	sand/pumice	1	> 30' long, 4" deep
	dirt roads(straight)	1	double track
	dirt roads(winding)	4	curves with included angles > 10°, > 100' long
	fast downhill	5	> 10% slope, 100' long
	technical sections	4	> 6 obstacles within 100' of trail, < 10% slope
	technical descents	3	technical section, > 10% slope
	loop trail	1	easily oriented to beginning
	muddy section	1	saturated soil > 10'
	ascent	1	> 10% slope
	technical ascent	1	> 10% slope and 6 obstacles within 100' of trail
	natural area/vistas	4	> 200' of trail
	washboard surface	1	> 10' length of constructed washboard surface

Table 2. Index points for trail features to rating environmental impact.

Symbol	Feature	oints	Description
	compaction	1	visibly depression compared to adjacent land
	erosion: washout	4	length of trail with > 2' of edge breakthrough
	erosion: washdown	3	> 10' of trail is a stream bed (gravel/pebble deposits)
	sedimentation	2	> 10' of visible fluvial soil deposits by trail
	saturation: mudhole	2	saturated soil > 10'
	saturation: water	3	water standing atop saturated soil > 10'.
	veg. damage: major	4	destroyed root systems
	veg. damage: minor	2	broken twigs/leaves
	wildlife damage: major	5	damaging critical nesting areas
	wildlife damage: minor	3	spooking animals who are out foraging
	wildlife damage: illegal	5	riding in designated wilderness areas, defined and posted by recognized org's
	waterbar	2	constructed erosion control w/ negative effect/hazard

Table 3. Summary of characteristics for mountain bike trails.

Site	Features per mile				
	Experience	Impact	Skill	Context	Surface
Deerfield Lake Loop	52	11	Adv'd	Forest	Soil
Moab Slickrock Trail	124	3	Adv'd	Rocky	Rock
Matthews Winters Pk.	74	2	Adv'd	Rocky	Rock
Elk Meadow	31	2	Begin	Forest	Soil
Black Canyon	7	1	Begin	Rocky	Gravel
For. Dev. Road 291	3	1	Begin	Forest	Gravel
Kokopelli's Trail	7	1	Adv'd	Rocky	Soil
White Rim Trail	6	0	Adv'd	Rocky	Rock

The length of the study segments was determined from the trail maps. The feature ratings were summed and then divided by the number of miles in the segment. The result is an experience and a damage rating for a standard mile length of trail.

Study Site Characterization

Eight study trails were surveyed during the summer of 1994. The trails were identified by word of mouth, and are in no sense a random sample. Table 3 summarizes the number of experience and impact features per mile, their skill rating, the character of their surrounding context, and the type of trail surface. The following descriptions provide a better sense of each trail's character.

Moab Slickrock Trail

This trail is in Utah on a plateau between the Moab fault and the Colorado River. It consists of petrified dunes, made up of Navajo Sandstone. The round wind-eroded, cone like shapes are what make this trail the intense roller coaster ride that it is. The Slickrock Trail is a trail for experienced, qualified riders. At many points of the trail, a fall in the wrong direction could prove disastrous.

The Slickrock Trail was established in 1969 on Bureau of Land Management land. It was originally laid out for motorcycles and Jeeps. The trail became dominated by mountain bikers in the last 6 or 7 years, seeing 10,300 mountain bikers in 1993.

As indestructible this trail appears, there are several guidelines that users should adhere to. First, users should stay on the designated trails. There are pockets of vegetation dotting this semi-desert landscape, that when even mildly damaged take a very long time to recover. Second, users should avoid riding through and/or bathing in potholes. Rain-filled natural basins in the rock are teeming with microscopic crustaceans and amphibians. In order to survive, they need the water to be in the potholes and to remain free of contamination by chain lube, sunscreen, insect repellent, and other biking related substances. Third, users should avoid skidding tires. Not only does this mar the beauty of the place, but skidding indicates a loss of control which can be dangerous on this particular trail.

Elk Meadow Park

This site is part of the Jefferson County open space system. It is located approximately 20 minutes southwest of Denver, near the town of Evergreen, Colorado. This park offers trails for a variety of users. The trail will take you up the side of the hill into a forest setting. This is an excellent site for mountain biking, as there is sufficient variety for the type and difficulty of riding one desires.

Matthews Winters Park

This is another Jefferson County park site located southwest of Denver. It consists of a ridge, which marks the beginning of the front range foothills. Portions of the Red Rocks and Morrison Slide trails were studied. This trail is very technical in nature, and provides a very strenuous ride that is popular

among local mountain bikers. These trails are designed to minimize conflicts. The trails are designed to make it undesirable for the uninvited user to ride the wrong way. An example is placing obstacles (water bars, gates, steps) on the trail segment to create an unpleasant experience for mountain bikers, thus encouraging them to bike on the nearby alternative. This site works well for the regular use it sees. It provides a challenging ride for an experienced rider, while being able to sustain minimum wear and still offer its opportunities to other types of users as well.

Forest Development Road 291

The trail is in the Black Hills National Forest, South Dakota. The Forest service maintains these roads for access for fire control, logging, management, and recreation. The studied segment was a level, gravel road providing access to a campground and private residences. The layout of the road provided several great views of the Black Hills NF, while having a minimum of trail related features. This a very easy trail to ride, which has a minimum impact on the surrounding environment. One of the reasons that there is so little impact from this road is the portions of it that are prone to damage had washboard base under the gravel. This is necessary, but is usually undesirable to mountain bikers.

Deerfield Lake Loop

This trail is also in the Black Hills National Forest, South Dakota. It is designated specifically for mountain bikes. It consists of a 10 mile loop around a reservoir, which tracks through several campgrounds. It appears to be adapted from an existing hiking trail for mountain bike use. This result is best for experienced, advanced riders.

There seems to be an extraordinary amount of trail breakdown, but it seems to be due more to the natural character of the terrain than to poor trail design. A high rate of erosion causes water bars to become quite deep and hazardous to riders. Several gates separating grazing areas are encountered along the trail. They are designed for mountain bikers, being easily open with one hand, and closing themselves after the biker passes through.

Black Canyon of the Gunnison

The Black Canyon was created by the Gunnison River, as it cuts across Southwest Colorado to join the Colorado River. The Canyon itself is 53 miles long, with the deepest portion being designated as a National Monument. The portion studied was North Rim Drive, the less popular and lesser developed half of the Monument. The Park Service's policy regarding the use of mountain bikes within the Monument consist of the basic rule of staying on the road. The road was designed for vehicle traffic, so it is a relatively easy ride with immediate access to many features. It made for a nice outing, interspersed with breaks for observing views, rock formations, and other natural features of the place.

Kokopelli's Trail

Kokopelli's Trail is a 139 mile back country trail that stretches from Loma, Colorado, to Moab, Utah. The segment studied is the Northern most portion. It is located between Interstate 70,

near Loma, Colorado, and the Colorado River, which it tends to follow. Most of the trail in this segment crosses the shale cliffs.

When first comparing the rating for this trail to others, it is easy to get misled that there are not many features to this trail. Quite to the contrary, this trail has many features, but they are just spread out over many miles. The mix between technical challenge and long scenic stretches makes for an excellent bike ride. This segment allows for a wide variety of opportunities, from quick afternoon outing, to a 3-day bike camping trip. Long outings are facilitated by numerous access points along the length of the trail system.

White Rim Trail

This site consists of a 91 mile length of unpaved road along the canyon edge above the Green and Colorado Rivers in Canyonlands National Park, near Moab, Utah. As a mountain bike trail, it is often experienced as a multi-day outing. Along the trail, there are two primitive campsites. Reservations for this sought after outing are usually booked years in advance, for prime seasons.

The trail is used mostly by off-road vehicles and mountain bikes. The only amenities are two primitive campsites with chemical toilets; the nearest available drinking water is located approximately 20 miles away. The only rule is to stay on the trail at all times. This is crucial for the same reasons as at the Slickrock Trail. The White Rim Trail is well designed to provide a challenging and enjoyable ride with little impact to the environment.

Experience and Impact Mapping

Figure 1 shows the experience and impact feature map of a 6 mile segment of Kokopelli's mountain bike trail. The map is created from the orientation of a rider going west, from the top to the bottom of the page. The ride begins with an ascent (1 experience point) on a double track dirt road (1 experience point). Shortly, to the north there is a vista (4 experience points) and to the south temporary damage to vegetation (2 impact points). The trail features are thus recorded for the full 6 mile segment. There are a total of 46 experience and 9 impact points, or a per mile rating of 7.6 experience and 1.5 impact points for this segment.

A full map would let the potential mountain biker know that this is an advanced trail. It would also inform the recreation manager that while the impact of this trail is not severe, the intensity of use is starting to cause some vegetation damage.

Relation between Experience and Impact

The number of experience and impact ratings (i.e. points per mile) is reported in table 3 for each of the eight study sites. There is a wide range in the experience ratings, and to a lesser extent of impact ratings. These sites also offer both beginner and advanced skill opportunities, trails through both forested and rocky settings, and trail surfaces that are predominately

rock, gravel or soil. With such variety and only eight sites, any statistical conclusions must be considered exploratory.

An investigation of these data, as well as a rereading of the trail notes, indicate that the relationship between the experience and impact ratings differ for trails with hard and soft surfaces. A plot of the experience and impact ratings is shown in figure 2. This figure also distinguishes between trails with hard rocky or gravely surfaces and those with softer soil surfaces. The two lines represent the linear relationship reported in table 4 between experience and impact for hard and soft surfaced trails

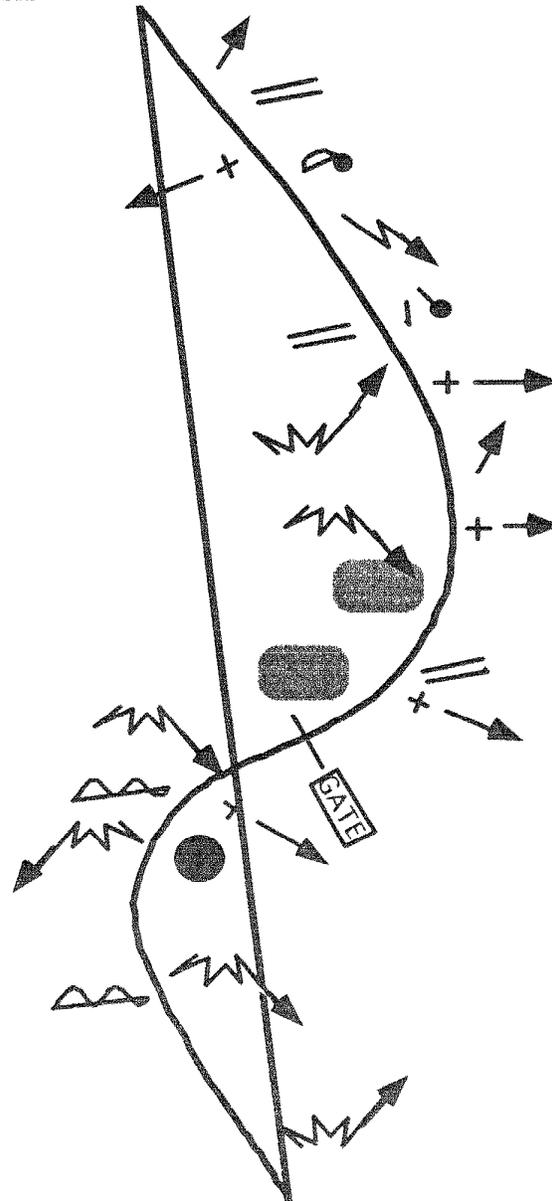
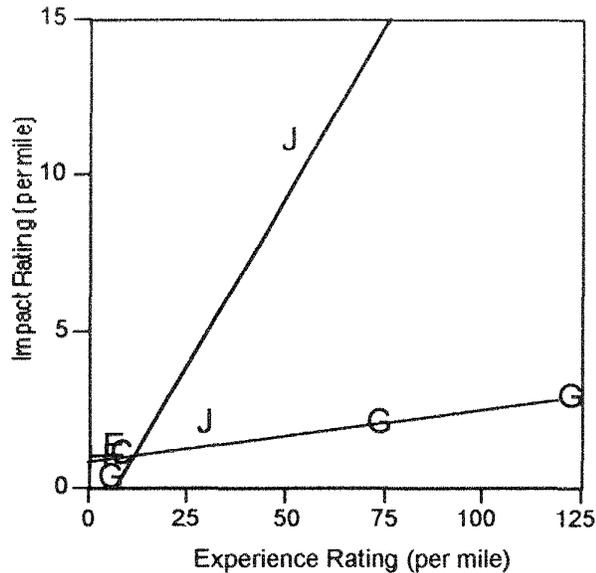


Figure 1. The feature map of a 6 mile segment of Kokopelli's mountain bike trail.



Context	Surface		
	Rocky	Gravel	Soil
Forested	B	H	J
Rocky	G	C	E

Figure 2. The relationship between experience and impact feature for sites of different context and surface condition.

Table 4. Results from regressing experience (x) onto impact (y) features for hard and soft surfaced trails.

Statistics	Trail surface	
	Hard	Soft
constant	0.563	-1.872
standard error	0.287	3.907
t-ratio	1.96	-0.48
probability	0.145	0.716
beta (experience)	0.020	0.218
standard error	0.004	0.111
t-ratio	4.40	1.96
probability	0.022	0.300
R-squared	0.866	0.794
R-squared (adj.)	0.821	0.588
probability	0.022	0.300

These regression equations can be interpreted to describe the expected impact rating a trail will have given a specific experience rating. The relationship suggests that the five hard surface trails begin with a .56 impact rating, which increases one unit for every increase of 50 in the experience rating. This regression explains over 80 percent of the variation in data points and is statistically significant ($p = .022$). The three soft surface trails begin with a -1.87 impact rating that increases one unit as the experience rating increases by approximately five points. While this relationship is strong, it is not statistically significant ($p = .300$) due to the limited sample size.

Conclusions

This exploratory study has demonstrated the application of a mapping system to record experience and impact related features along mountain biking trails. These maps can be used to inform users and potential users about the type of conditions they will encounter using a trail. These features can also be translated into ratings that can be used in several ways by trail managers. For instance, this approach to mapping and rating can aid in the planning and design of challenging trails. It can be used to determine difficulty levels for trails, such as are used for down-hill skiing and white water canoeing. As this study demonstrated, there is a significant relationship between the ratio of experience to impact ratings and the trail's surface. As this relationship is explored further, knowledge about surface material can be used to locate trails and design mitigation measures. If managers map the same trail segments at regular time intervals, they can then assess the changes in the level of impact to a trail over time. It is likely that there are additional ways that managers could use these tools to compare planned or existing trails.

Literature Cited

- Chavez, D. 1994. Recreation Research Update. Riverside, CA: USDA. Forest Service, Pacific Southwest Research Station.
- Hopkins, T. 1994. The relationship of recreation specialization to the setting preferences of mountain bicyclists. In G.A. Vander Stoep (ed.) Proceedings of the 1994 Northeastern Recreation Research Symposium. Gen. Tech. Rep. NE-198. Radnor, PA.: USDA Forest Service, Northeastern Forest Experiment Station. pp. 71-75.
- Ruff, A.R. and O. Mellors. 1993. The mountain bike--the dream machine? *Landscape Research*. 18(3): 104-109.
- New York Times. 1995. What do Americans do out of doors. *New York Times*, April 2, pp. F 11.

INFORMATION SOURCES AND ATTITUDES OF MOUNTAIN BIKERS

Roy Ramthun

Instructor, Department of Leisure Services, Radford University, Radford, VA 24142

The sport of mountain biking is relatively new and rapidly growing, producing a large number of participants with a relatively small amount of experience. The attitudes of bikers are more heavily influenced by reference groups and expert sources, such as popular magazines devoted to the sport, than by the individual's personal experiences. The attitudes of respondents in this survey were more accurately predicted by choice of information source than by levels of personal experience.

Introduction

Mountain bicyclists represent a relatively new user group currently attempting to establish a place in the plans of outdoor recreation managers. This has not always been an easy process, as more traditional users of trail systems have experienced conflicts and unpleasant encounters with bikers utilizing trails in a very different manner. Mountain bikers have somewhat different motives for engaging in their activity than hikers or equestrians (Hendricks & Ramthun, 1993). Often mountain bikers are seeking challenges and may ride their bikes in a manner that may lead other trail users to express safety concerns. In addition to safety concerns, many other trail users and land managers believe that mountain bikes are particularly damaging to trails and trailside environments (Grost, 1989). These fears and concerns have led some other users of trails to register complaints about mountain bikers and in many cases land managers have responded to these complaints by placing limits on trail use or access by mountain bikes (Badaracco, 1991; Leaf, 1983).

Mountain bikers have expressed concerns about continued access to lands and regulation of their activities by land managers. While mountain bikers rarely perceive conflict during encounters with members of other user groups, they do believe that other trail users are too possessive of trails and are working against the interests of mountain bikers (Schuett & Hollenhorst, 1994). Schuett and Hollenhorst's finding, in conjunction with other research indicating that mountain bikers rarely experience conflict caused by the behavior of other users (Ramthun & Ruddell, 1994), raises the question of how

mountain bikers develop negative attitudes toward other user groups while not actually having unpleasant encounters with them.

Social-psychological research on attitude formation suggests that the sources of information that an individual uses to learn about a subject are powerful influences on the individual's attitudes toward that subject (Hovland & Weiss 1952; Petty & Caccioppo, 1986). Some sources of information are more powerful than others. An individual's reference group is an especially persuasive influence on attitude, as is any source that may be deemed "expert". Sources that may be considered expert, and therefore especially credible, may include books, magazines, newspapers, or television reports (Sears, Peplau, Freedman & Taylor, 1986).

The literature on attitude formation suggests that attitudes are also influenced by on-going personal experience with the subject of the attitude. While experience use history has been a very useful predictor of attitudes in previous outdoor recreation research, mountain bikers represent a unique situation. The relative youth of the activity and its current exponential growth have created a situation where many participants in the activity have only recently taken up the sport.

The attitudes and beliefs that mountain bikers hold about land management agencies and other user groups will ultimately determine how bikers will work with land managers and other user groups. The purpose of this study was to examine potential influences on the attitudes of mountain bicyclists. The primary hypothesis being tested in this study is that information sources will be significant predictors of attitudes while experience variables will not.

Methods

Data were collected from 161 respondents utilizing on-site surveys. Respondents were primarily male (75%), young (mean age = 23 years), and fairly new to the sport of mountain biking (mean years of participation = 3.2). Data were collected from mountain bikers at trailheads in and around the Jefferson National Forest in southwest Virginia. The low mean age of the respondents may be attributed to the proximity of Radford and Virginia Polytechnic Universities. A very high percentage of respondents appeared to be college students.

Individuals were asked to respond to a series of items measuring the following independent variables: years of experience in mountain biking, personal experience of conflict with members of other user groups, membership in mountain biking organizations, use of mountain biking friends as a source of information, and use of mountain biking magazines and periodicals as a source of information. Individuals were also asked to indicate their level of agreement with a series of

statements concerning public access, other user groups and land management agencies. The attitude statements that were used as dependent variables were based on comments and statements derived from a review of popular mountain biking periodicals. The bikers' level of agreement with the statements was the dependent variable. Agreement with the attitude statements was measured on a five point Likert scale with 1 representing no agreement and 5 representing strong agreement. A series of stepwise regression analyses were conducted to measure the association of these attitudes with the bikers' reported sources of information about their sport.

Results

Respondents tended to agree that efforts to limit trail access were based on other groups misconceptions about mountain biking and this attitude had two statistically significant predictors (see Table 1). The attitude that other user groups have more political clout that bikers had two significant predictors (see Table 2). Respondents agreed with statements suggesting that other user groups wanted to limit access for bikers in order to maintain areas for their own use. This attitude also had two significant predictors and was the only attitude in which an experience variable was significant (see Table 3). Respondents also tended to agree that land management agencies were more responsive to other user groups with variance in this attitude being predicted only by magazine reading (see Table 4). Reading mountain biking magazines was a significant predictor of three attitude statements. Acquiring information from friends who bike was a significant predictor of two attitude statements, while membership in a biking organization was a significant predictor of only one attitude statement. Of the two experience variables regressed on each of the attitudes, personal experience of conflict was a significant predictor of one attitude while years of experience was not a significant predictor of any of these attitudes.

Table 1. Results of Regression Analysis I.

Dependent variable: I believe efforts to limit trail access are based on misconception about the activity (Mean = 3.24 SD = 1.2).

Independent Variable	Multiple R	R ²	P Value
Friends	.230	.053	.003
Membership	.294	.086	.0009

Table 2. Results of Regression Analysis II.

Dependent variable: I believe that other user groups are better organized and have more political "clout" than bikers (Mean = 3.05 SD = 2.19).

Independent Variable	Multiple R	R ²	P Value
Friends	.257	.066	.0011
Magazines	.304	.092	.0005

Table 3. Results of Regression Analysis III.

Dependent variable: I believe efforts to limit trail access are based on other user groups desire to have desirable areas strictly for their own use (Mean = 3.5 SD = 1.2).

Independent Variable	Multiple R	R ²	P Value
Magazines	.340	.115	.0000
Conflict	.373	.139	.0000

Table 4. Results of Regression Analysis IV.

Dependent variable: I believe that local land use agencies, such as the USDA Forest Service, are more responsive to other user groups than they are to bikers (Mean = 3.06 SD = 1.18).

Independent Variable	Multiple R	R ²	P Value
Magazines	.378	.143	.0000

Discussion

Much of the social-psychological research on attitude formation and attitude change focuses on the sources of information available to the individual (Petty & Cacioppo, 1986). This study suggests that the attitudes of mountain bikers toward management agencies and other user groups are heavily influenced by the popular literature of the sport. This is consistent with the view that these types of sources are regarded as "expert" by a large percentage of readers. Reference groups also have some influence. Membership in a mountain biking organization is less related to attitudes than other information sources. Years of experience was not a significant predictor of any of the dependent variable attitudes. A personal experience of conflict with other user groups was a

significant predictor of only one of the dependent variable attitudes.

Implications for Managers

In a sport such as mountain biking, which is currently demonstrating incredibly rapid growth, the majority of participants are new to the sport. They have not had an opportunity to be indoctrinated into the sport gradually, as often happens with anglers, hunters, campers, and other traditional outdoor recreation user groups. In an informal focus group prior to this study, the author asked a group of mountain bikers the question "How do you learn about your sport?". The two most common answers were that information was gained from biking friends or by reading the popular magazines devoted to the sport. Until these participants have acquired more personal experience and been exposed to a wider variety of information sources, the information acquired from peers and from popular literature will have a powerful influence on their attitudes and decisions.

While there is little that a land manager might do to assess the attitudes being reinforced by reference groups, mountain biking magazines do offer some insight into the attitudes and beliefs that are currently extant in the mountain biking community. The review of that literature that was done for this study suggests that mountain bikers (or at least the ones who write in magazines) have a basic distrust of the motives of land managers and other user groups. This distrust seems to be associated with a belief that mountain biking access to trails and recreation areas is being unfairly limited. In fairness to the mountain biking magazines, these publications also readily acknowledge that many bikers ride irresponsibly and the promotion of good trail etiquette is a frequent theme in these publications.

Land use planning is a process that usually requires public input through a process of hearings or focus groups. In situations where this public participation process may affect the interests of the mountain biking community, land managers should anticipate increased involvement by the growing number of mountain bikers with a stake in these decisions. It would be beneficial for managers to be aware of some of the attitudes and values common to this user group and take these attitudes into consideration in the process of making decisions. The popular literature of the activity is a simple way to gain some insight into this new and evolving user group.

Literature Cited

Badaracco, R. 1991. Status of bicycle use on MMWD watershed property. Unpublished staff report. Environmental Resources Division, Marin Municipal Water District, CA.

Grost, R. T. 1989. Managing the mountain bike. *American Forests*, March/April, pp. 50-55.

Hovland, C. I. & Weiss, W. 1952. The influence of source credibility on communication effectiveness. *Public Opinion Quarterly*. 16: 635-650.

Leaf, B. 1983. Banned from the trails: Fat-tire cyclists fight city hall and lose. *Bicycling*. 5: 198-199.

Petty, R.E. & Cacioppo, J. T. 1986. *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.

Hendricks B. & Ramthun, R. H. 1993. An examination of hiker and mountain biker motivations. The 45th Annual California and Pacific Southwest Recreation & Parks Conference, Research Abstracts. San Francisco: California Parks & Recreation Society.

Ramthun, R. H. & Ruddell, E. J. 1994. The role of experience, activity identification, and outgroup evaluation on perceptions of conflict. *The Fifth International Symposium on Society and Resource Management, Book of Abstracts*. Ft. Collins, CO: Colorado State University: 259-260.

Schutt, M. A. & Hollenhorst, S. J. 1994. Access, impacts, user-conflict and more: Issues and problems facing mountain biking in the national forests. *The Fifth International Symposium on Society and Resource Management, Book of Abstracts*. Ft. Collins, CO: Colorado State University: 234 p.

Sears, D. O., Peplau, I. A., Freedman, J. L., & Taylor, S. E. 1988. *Social psychology*. Englewood Cliffs, NJ: Prentice-Hall. pp. 198-199.

**BICYCLE TOURISM DEVELOPMENT IN THE
ADIRONDACK NORTH COUNTRY REGION OF
NEW YORK STATE**

Timothy P. Holmes

Social Scientist, Holmes & Associates, Saranac Lake, NY
12983

Michael A. Schuett

Assistant Professor, Southwest Texas State University,
Department of Health, Physical Education, and Recreation, San
Marcos, TX 78666

In order to obtain information on how to entice bicyclists to the region, the Bicycle Master Plan study team undertook a two part survey effort. The study team designed one questionnaire specifically for the lodging industry in the Adirondack North Country region. Another questionnaire was developed for bicyclists and other tourists to the region. The two survey efforts provide a unique opportunity for comparative analysis of service providers and potential visitors. The summary and recommendations based on the survey results provide guidance to interested tourism organizations and bicycle-related businesses on the most cost effective means of developing promotional materials, and offer insights on a regional marketing approach focused on bicycling.

Introduction

For the Adirondack North Country region, the economic potential for increased tourism exists in the form of vacations with a bicycling focus. The region is replete with beautiful scenery, mountains, lakes, and has a significant historic and cultural heritage. The lodging industry is well rooted in the area with accommodations ranging from bed and breakfasts to campgrounds, small inns, motels/hotels, and Adirondack Great Camps. For the bicyclist, there already exists a network of highways and roads highly desirable for bicycling touring. A recent increase in the number of bicycle shops in the region will provide the technical support necessary for individuals and

groups touring the region.

With the passage of new federal transportation legislation in 1991, bicycling planning began in earnest in many cities around the country. The Adirondack North Country Association (ANCA), a regional not-for-profit dedicated to increasing business development and improving quality of life, recognized that New York's North Country region would benefit from a bicycle planning effort. However, the urban focus of most contemporary bicycle planning did not address the needs and concerns of the rural North Country where tourism and natural resources are major sources of employment. In 1993, ANCA proposed to the New York State Department of Transportation (NYSDOT) that a bicycle planning effort be developed for the 14 county North Country region.

There are a number of bicycle studies that have attempted to quantify the economic impact of bicycling in local economies. Overall, previous research demonstrates the potential positive economic impacts of bicyclists and bicycling on local economies, with the impact being felt by local merchants in restaurants, retail stores, bike shops, and the lodging industry. Some of the findings of these studies listed in Table 1, and are briefly described below.

Studies of the Summit County, Colorado recreation trail system found that an estimated \$4.3 million was spent in 1989 by people using the trail system, primarily for bicycling. The average expenditure per person per day was \$50.56 for all respondents, while the average for out-of-state users was \$99.66 per day. Approximately 16% of the users were from out-of-state. The number of users on the pathway increased an average of 28% per year between 1986 and 1990. The pathway user count was projected at 212,779 in 1991 (Summit County Community Development Department 1989, 1991).

A study done in Pennsylvania: *Allegheny Valley Rail-Trails Feasibility and Development Plan* assessed the economic impacts of bicyclists to the local economy (Lord and Strauss 1994). Based on survey data, users of the Oil Creek State Park trail spent an average of \$25.85 per person per day (PP/PD) for a total economic impact of \$1.8 million annually. Two-thirds of the 22,700 visitors in 1991 came from out-of-state.

Within the Adirondack North Country region, a detailed economic analysis of the GEAR '92 event (Great Eastern Rally of the League of American Wheelmen) held in Canton, New York August 7-10, 1992, found that the average participant spent \$232. That translates to a per person, per day average of

Table 1. Summary of research findings on bicyclists' expenditures.

Location	Type of Bicycling	Year	Average Daily Expenditure per Person	Source
Colorado	Day use: trail system	1989	\$51-\$100	Summit County (1991)
Pennsylvania	Day use: trail system	1991	\$26	Lord & Strauss (1993)
Canton, NY	Bicycle Rally	1992	\$77	Lally (1992)
Vermont	Bicycle Touring	1992	\$115	Burgess (1992)

\$77. The total direct economic impact in the community of the 1,378 participants was \$319,696. The average income of participants was about \$60,000 (Lally 1992).

Finally, in research directed specifically at bicycle touring, as in the research carried out for this project, the owner of a successful bicycle touring business in Vermont estimated that in 1992, 32,500 out-of-state bicycle tourists in Vermont contribute as much as \$13.1 million to the state's economy. Of the total expenditures, lodging comprised 30%, food 21%, bicycle services and outfitters 22%, and personal expenses the remaining 27%. Additionally, the employment and indirect expenditures of bicycle touring companies contribute significantly to the local communities where they are located. In 1986, a Vermont bicycle touring company was sold for \$1 million; another was sold in 1987 for a reported \$3 million (Burgess 1992).

Purpose Of The Study

The purpose of the Adirondack North Country Bicycle Master Plan project was to develop a regional bicycle plan that clearly demonstrated the community benefits and economic value of local bicycle planning efforts, and that outlined the next steps necessary for creating bicycle friendly communities and for promoting the regional Scenic Byways System as the means for establishing the region's reputation as a bicycle tourism destination.

In order to realize these goals, the project consisted of the following eight distinct work objectives:

1. An inventory of highway corridors, including identification of major features, inventory of services and facilities, and identification of necessary structural improvements related to bicycling.
2. Compilation and use of existing geographic information system (GIS) digital data for the region.
3. Review of local, regional, state, and national programs for bicycling.
4. An economic analysis of bicycling in the North Country region.
5. The development of a master plan document and associated maps.
6. Strategic analysis and recommendations for promoting bicycling in the region and along the Scenic Byways.
7. A questionnaire survey of B&Bs, inns, lodges, hotels, and campgrounds in the 14 county region, with accompanying economic analysis and discussion of the industry's relationship to bicycling.
8. A questionnaire survey of people who have taken bicycling vacations, with accompanying economic analysis and

evaluation of the North Country's appeal to the bicycle tourist.

The focus of this paper is on reporting the main findings from work objectives 4, 7, and 8, and highlighting how survey research can effectively be applied to tourism planning in rural areas.

Method

There are at least four types of information necessary for determining how to entice bicyclists, and those who might be interested in bicycling, to the Adirondack North Country region:

1. Determine the potential market,
2. Examine current marketing efforts,
3. Assess how the area is perceived by consumers, and,
4. Assess how the market is perceived by the local tourism system (e.g., lodging industry, local merchants, etc.).

The task of compiling this type of information on a region the size of Vermont and New Hampshire combined could not be successfully completed without the aid of bicycle planners and bicycle enthusiasts from throughout the region. Coordinating regional bicycling planning with the many on-going local and county bicycle projects became a key component of the planning effort early in the process. Holmes & Associates participated in 16 separate meetings and presentations related to the project, attended by over 300 people involved in bicycling planning in the region. The audience for these meetings were primarily chambers of commerce, county planning departments, and local bicycle planning committees. The public outreach effort culminated in a North Country Regional Bicycle Forum, held on July 15, 1994, in Saranac Lake. The 60 attendees participated in three concurrent discussion groups, prioritizing regional needs related to bicycle maps, bicycle tourism along the Scenic Byways, and developing bicycle friendly communities.

In addition, the Bicycle Master Plan study team undertook a two part survey effort. In the spring of 1994, the study team designed two questionnaires: one specifically for the lodging industry and another for bicyclists and other tourists to the Adirondack North Country region. Items on the questionnaire included demographics, patterns of recreational use, destination choices, expenditures, specific needs and preferences, attractions and activities of interest in the North Country region. Data were collected by mail questionnaire to 236 past bicycle tourists and other visitors to the North Country region, and 460 North Country lodging businesses.

The profile of bicyclists documents patterns of recreational use, how they decide where to go, where they stay, what they spend, specific needs and preferences, attractions and activities of interest, and ratings of such in the North Country. The lodging

owner survey results tend to confirm the same type of behaviors, needs, preferences, etc. and demonstrate the lodgings' capability of satisfying them. Also documented are lodging owners' present promotions, and future promotion considerations.

Results

Seventy-seven questionnaires were returned by the bicyclists, for a response rate of 33%; while the lodging owners returned 132 questionnaires, for a response rate of about 30%. Bed & Breakfasts comprised 71% of the sample. The response rates were limited, thus caution should be taken in generalizing to all bicyclists visiting the region. However, this marketing information has been heretofore been unavailable so the nature of the results have yielded some valuable information.

Lodging Industry Survey

Results of the survey show that the lodging industry is tuned into the recent increase in bicycle participation and interested in becoming more involved in attracting this market (Table 2). Overall, 52% of the lodging participants feel that bicycling is on the increase. This attitude is reinforced by the 98% who responded that they would like to attract more bicyclists to their business. In addition, 70% indicated they are interested in offering bicycle touring packages, the highest response rate among the nine travel packages listed.

The lodging industry in the Adirondack North Country region has some experience with bicycle touring. Findings from the study showed that 69% have had guests who were traveling by bicycle. The same percentage of lodging establishments reported having one or more guests who brought bicycles with them in 1993, and 41% said that one or more of their guests wanted to rent bicycles last year.

Table 2. Lodging industry's perceptions and observations on bicycling.

Survey Item	Percentage
Would like to see more bicyclists use their business	98%
Bicycling guests leave by bicycle from the door	84%
Interested in offering bicycle touring packages	70%
Lodgings with guests who brought bicycles with them	69%
Bicyclists are interested in paved roads	62%
Feel bicycling is on the rise	52%
Lodgings with guests who wanted to rent a bicycle	47%

It appears that there is a viable interest in bicycling touring from both parties, the lodging industry and the traveler. Lodging owners estimate that at least 62% of the bicyclists staying with them are more interested in bicycling on paved roads, rather than on dirt roads or trails. The roads and trails preferred by bicyclists are by and large very close to the lodging establishments because the owners estimate that 84% of their bicycling guests usually leave by bicycle right from the front door.

Lodging owners note that bicyclists especially appreciate healthy foods high in carbohydrates, complemented by fresh fruits. Bicyclists were observed to be most interested in relaxing, swimming, exploring historic sites, and enjoying scenery. These perceptions of the lodging owners were confirmed as accurate by the bicyclist survey respondents. According to lodging owners, especially important to the bicyclist is the need to store bicycles where they can be locked up. A place to work on and clean their bicycles is also greatly appreciated. Some B&Bs mentioned that their garage and a garden hose have adequately served their bicycling guests. Close to 3/4s of the B&Bs, 1/4 of the campgrounds and 1/2 of the hotel/motels offer secure, covered bicycle storage.

In terms of attractions and points of interests in the vicinity of lodging establishments, the choices are as varied as the places to stay themselves (Table 3). For example, over 50% of the lodging sample have historic sites, museums, and mountain biking trails directly adjacent or within a short drive (less than five miles) of their property. Almost 75% have lakes, rivers, hiking trails, swimming spots, and scenic overlooks either directly adjacent or within a short drive (less than five miles). As indicated by the bicyclist survey respondents, these types of attractions are exactly what most bicyclists are looking for.

Table 3. Lodging industry's nearby amenities.

Seventy-five percent of respondents have the following within a short drive (5 miles or less):		
Lakes	Scenic overlooks	Historic sites
Rivers	Unique geological feature	Swimming spots
Hiking trails	Unique natural habitat	Restaurant/cafe

The advertising done by the lodging industry to attract travelers appears very diverse, yet the dollars spent by the industry in the area will remain steady for the next year. A statewide study of B&Bs found that the average private home B&B spent about \$750 on promotion in 1993, while the larger B&B inns spent an average of \$2,400 (Kuehn 1994). As shown in Table 4, only a quarter of the region's lodging industry will spend more on advertising next year. The most popular advertising strategies include: individual brochures, accommodation directories, and direct mailings. The majority promote locally (51%) and use local and regional publications rather than national publications. Of significance to groups interested in developing bicycle maps, 64% of the lodging owners indicated they would like to be contacted about advertising in a brochure or map focused on bicycling.

Table 4. Lodging industry's marketing behavior and attitudes.

Survey Item	Percentage
Would advertise in regional bicycle brochure or map	64%
Promotes locally	51%
Does not advertise in regional magazines	46%
Has own brochures	88%
Will spend more on advertising next year	25%

It appears that tourists who stay overnight in the Adirondack North Country region will find that the average B&B rate of \$59 is very reasonable compared to the national average of \$75 per night/couple (Emerick 1994). The rates for campgrounds average \$21/night/campsite, while hotels average \$71. A third of the B&Bs offer lunch and dinner, as do more than 2/3s of the motels. Almost all lodging types offer a total capacity that would accommodate the average 5 to 13 person bicycle tour group size.

Bicyclist Survey

Of the 236 bicycle tourers surveyed 77, or 33%, responded. Of the 180 non-bicycling visitors 19 (11%) responded. Due to the low response rate for the non-bicycling visitors, their responses are grouped with those of the bicyclists. In general, despite the average-to-low response rates for the mail-out questionnaires, the tendency for the lodging survey results to confirm similar items in the bicyclist survey, and the agreement of the bicyclist survey results with other bicycling surveys, strengthens both the results and recommendations.

It should be noted that most of the bicyclists responding to this survey were selected from mailing lists of touring companies in the area. Therefore the results generally reflect the views of those who might prefer group bicycle tours, as opposed to those who prefer planning and executing a bicycle trip on their own. Future bicycle survey efforts should target bicycle vacationers in general. Additionally, since the selection of bicyclists was non-random in terms of the population of all bicyclists, the findings are not statistically significant.

Results of the bicyclist survey show that the mean age of bicyclists is 45 years, 2/3s of the respondents were male, and their households had a mean income in the \$60,000 to \$69,999 range. Seventy percent of the bicyclists reside in New York, with an average six hour drive to the Adirondack North Country region. It appears that this sample is very capable of visiting this region for the weekend or longer, as well as financially able to enjoy it.

Highlights from the questionnaire show that 98% respondents own a bicycle, primarily of the touring bicycle type (52%), followed by racing road bikes (43%). A significant proportion (49%) own either a mountain bike or hybrid bicycle. The group responding to this survey classified themselves primarily as touring cyclists (92%), rather than mountain bikers.

Over 3/4s of the respondents (84%) reported that they usually ride on paved roads without a bicycle lane, although at least a third prefer paved roads with a striped bicycle lane. About 1/4 (27%) prefer dedicated bicycle lanes, while another 27% prefer paved roads without a bicycle lane.

A selection of average bicycle trip characteristics are shown in Table 5. In terms of how long and how far these bicyclists ride, this group is comprised of active cyclists, reporting many rides in the past year (1993) and visiting an average of 11 different bicycling areas. The average number of recreational rides of 1/2 day or less last year was 43, with 86% of the rides averaging between 1 to 6 hours. When asked what length of

ride they prefer, a little more than one third (37%) said they prefer 1/2 day rides, another third prefer longer tours of 3 or more days.

Table 5. Bicyclists' average ride and trip characteristics

Survey Item	Mean
Number of different bicycling areas visited in 1993	11
Number of days bicycling in an area	5
Miles in an average day's ride	39
Number of people usually ride with	7
Annual average number of 1/2 day bicycle rides	43
Number of bicycle trips of two days or more annually	8

Information on the average distance usually ridden in a day is especially of interest to lodging owners and tourism promoters because it indicates the optimal length for bicycle loops and day tours, and has implications for bicycle mapping. When asked about the average ride in a single day, distances ranged from 3 to 100 miles. The average distance varied from 30 to 39 miles, with a mean of 39 miles, a median of 35 miles, and a mode of 30 miles. A conclusion is that the length of loops and day-rides should be 40 miles at the most, and more generally in the 30 to 35 mile range. By way of comparison, the average mountain bike ride is about 15 miles (Hollenhorst et al. 1993).

Although the majority in this group prefer to take day trips, many do enjoy multi-day tours. Close to 2/3s (63%) have toured by bicycle for three or more days, traveling from campground to campground or lodge to lodge. Considering the planning involved in a multi-day ride, logistics are critical to the riders. Not surprisingly, 47% prefer the aid of a good bicycle map of the area for trip planning. Preferred areas where the bicyclists like to go include New England, Vermont, and the Adirondack North Country region. Specific reasons as to why this sample prefers these areas were varied, although they can be categorized into a few main attributes: scenery, low traffic, varied terrain, good roads, small towns, and people. A key finding here, and one advantageous to the North Country, is that most bicyclists like a "varied" terrain, rather than a flat terrain as might be expected. In fact, a "challenging" terrain is favored by many bicyclists.

When asked about their last bicycle trip in the Adirondack North Country region, the bicyclists reported an average bicycle group size of 5 people, based on the median value for all groups. The mean group size was 13 people, however, respondents from a large group of 600 people, and another of 200, likely influenced the mean upward. Length of trip in days ranged from one day to two weeks, with an averaging bicycle trip of five days. The mean distance traveled was 250 miles, while the median was 137 miles, for an average distance traveled per day of 27 to 50 miles on their last Adirondack bicycle trip. This corresponds with the average length of ride reported on earlier, 30 to 39 miles.

Expenditures averaged \$45 per person/per day (PP/PD) for the entire group of respondents. In examining the expenditures by

group size, we selected three size categories: 1-5 people, 6-50 people, and 51 people or more. Average total expenditures for a group of 1-5 people was \$52 (PP/PD), 6-50 people was \$48 (PP/PD) and for groups of 51 or more was \$9 (PP/PD).

In addition to trip characteristics, the study team used the bicyclist survey effort to inquiry on bicyclists' preferred attractions, activities, lodging types, and sources of information. On a scale of "Very Important" to "Not at all Important", attributes that were most influential in deciding where to take a bicycle vacation include the presence of: rural areas, lakes and streams, lodging, wilderness areas, restaurants, and historic sites or parks (Table 6). The attribute of their favorite bicycling area mentioned most frequently was "scenery". Respondents in this sample are very active and prefer numerous types of recreational opportunities while on vacation, in addition to bicycling. The most sought after activities during a bicycle trip were: visiting historic sites and museums, swimming, day hiking, and shopping.

Table 6. Bicyclists' preferred attractions.

Items rated as 'important'	Percentage
Rural areas	100%
Lodging and campgrounds	97%
Wilderness areas	96%
Lakes and streams	92%
Restaurants	88%
Historic sites and parks	85%
Beaches for swimming/sunning	66%
Interpretive centers and museums	62%

Data on information sources for these respondents reveals that by and large word of mouth is the most influential for trip decision making (59%), followed by previous visit to the area (51%). The third most influential item among the list of 14 items is "bicycle maps of the area". The quality of the bicycling map is another key component of trip decision making because the findings show that 78% find the map quality as very influential or somewhat influential.

Since 92% of this sample consisted of repeat visitors, the rating of attributes of the Adirondack North Country region is based on past experience. Ninety percent perceive the region to be associated with beautiful scenery, while 86% think of lakes, 84% mountains, 70% quiet roads, and 68% associate the region with rivers. Perceptions of the region are thus largely based on the natural environment.

When asked to rate the quality of bicycle infrastructure and support services in the Adirondack North Country region, the bicyclists surveyed tended to be very critical. The findings, as presented in Table 7, show that there are many improvements to be made. For example, less than 20% thought that the availability and quality of bicycle maps was good. Less than 1/3 thought that the condition and size of road shoulders was good, however, surface condition of roads was more favorably rated. Only 11% thought that the availability of bicycle shops was good in the region.

Table 7. Bicyclists' ratings of infrastructure and support.

Bicycling attributes rated as 'good'	Percentage
Road surface conditions	59%
Size of shoulders	32%
Condition of road shoulders	30%
Quality of bicycle maps	18%
Availability of bicycle maps	17%
Signage for bicyclists	14%
Availability of bicycle repair shops	11%

Implications for Marketing to Bicyclists

A key aspect of this bicycle planning effort is its close link to the local, predominately rural economies of the North Country. The study team carried out two separate, but related surveys as part of the planning effort. The response rates were limited, thus caution should be taken in generalizing to all bicyclists to the region. However, the results provide interested tourism and bicycle-related businesses with insights on the most cost effective means of developing their own promotional materials and offer insights on a regional marketing approach focused on bicycling.

The bicyclist and the lodging surveys provide a foundation of information that can be used, first, to entice the bicyclist to the area, and second, to make their visit as enjoyable as possible. Bicycle maps, events, and articles seem to be key to attracting bicyclists, while scenery, good roads, rural countryside, lakes, and quality lodging make their visits most enjoyable. On a regional basis, future bicycle promotional strategies should capitalize on bicyclists' natural environment-based perceptions of the region. At the more local, individual business level, these findings confirm that B&Bs and other lodgings involved in organizing lodge-to-lodge tours should plan bicycle routes of 40 miles or less to appeal to the widest possible clientele.

The significance of Canadian visitors to the region's tourism industry should also be recognized in regional promotions. Canadian visitors, including many French speaking Canadians, reportedly comprise up to 30% of the visitation at some attractions in the region. Meanwhile, a statewide B&B study in New York found that 17% of the B&B guests in the Adirondack region were from Canada (Kuehn 1994).

The lodging industry in the Adirondacks appears to be open and willing to attract more bicycle tourists and seems eager to put their efforts forward to capture some of this market. It seems clear that the major preferences of bicyclists include nature, history, and culture, all found in abundance in the Adirondack North Country region. A key finding is that these preferences correspond very closely with both the lodging industry's assessment of the region and the bicyclists' perceptions of the region. Significantly, most accommodations feature a diversity of attractions and points of interest valued by bicyclists. The strong interest in historic sites and museums among bicyclists is especially significant for those lodging

establishments in the vicinity of historic attractions, and should be prominently featured in promotions.

The expenditures by the smaller groups of bicyclists (less than 50 people) are similar to that found in other bicycle touring studies, except for data on Vermont touring companies (Burgess 1992). It appears that having local bicycle touring companies helping to market the area, as in the case of Vermont, leads to higher expenditures by the bicycling tourist. For example, the local touring companies are likely to be more involved in bicycle rentals and the sale of bicycle touring accessories. Local touring companies also would be better able to promote some of the local attractions, shops, and restaurants to the visiting bicyclist. The result appears to be higher expenditures and a more favorable economic impact on local communities. At present, many of the bicycle tours through the Adirondack North Country region are led by companies based outside the region.

With 62% of the bicyclist survey respondents having bicycled in the region before, their ratings of North Country bicycling attributes were based on experience. Rated good to excellent was the overall enjoyment of bicycling in the region, demonstrating that the development of a premier bicycling area is certainly feasible. In addition, over 50% indicated that it is very likely they will visit the area to bicycle during the next year or two. Yet there are improvements to be made, mainly in the area of maps and signage, with both showing up in the "average to poor" and "not sure" categories. This finding led to major recommendations in the regional Bicycle Master Plan for increased bicycle mapping at the regional and sub-regional level, and the coordination of bicycle signage throughout the region. Evidently, the fairly recent trend in constructing wider shoulders on State highways throughout the region needs to be promoted since bicyclists rated the size of road shoulders as only poor to average.

Conclusions and Recommendations

There is a vital interest in bicycle tourism in the Adirondack North Country region among both the lodging industry and active bicyclists. However, successful establishment of the region's bicycle reputation will require a new collaborative and cooperative effort that departs somewhat from the region's usual tourism promotion techniques and participants. Targeted marketing is key, and those who know the market, for example bicycle shop owners and bicycle clubs, need to be consulted. Products attractive to the bicycle market, such as bicycle maps and bicycle events, need to be developed and promoted. New partnerships need to be formed to support bicycle tourism planning and promotion, with a novel mix of key players that includes local highway departments, New York State agencies, planning organizations, ANCA, and the tourism industry.

Recommendations and implementation strategies in the short term include producing a map of regional bicyclé routes, coordinated planning of bicycle events, sub-regional mapping and promotion, and specific infrastructure improvements along the already established Scenic Byway Routes (Holmes et al.

1994). A major conclusion focuses on using the Scenic Byway routes to promote the region as a premier bicycle tourism destination.

In addition, two long term goals are strongly encouraged by the study team. First, the establishment of a regional bicycle/pedestrian advisory committee is crucial to the achievement of the short term goals. Successful tourism planning in a 14 county region the size of the Adirondack North Country depends on communication and coordination. Local economic impacts resulting from regional bicycle route planning and mapping will be enhanced through the on-going involvement of key players and stakeholders.

Second, is the production of a regional bicycle route map and the refinement of a regional recreation and tourism database. This project initialized a regional database that includes roads, scenic locations, natural features, and tourism facilities throughout the region. Much of this information was compiled in a GIS compatible format, and the database can be used to create the regional maps that will be effective in attracting bicyclists to the area. In the long term, the database can be used to develop a GIS-based traveler information system. Through computer access of locational and descriptive information on the region's rich and diverse resources, facilities, and attractions, tourism information centers of the future will be able to tailor maps and informational materials to each visitor's specific interests. The actual accomplishment of this goal will require the commitment to a vision of a future that is not here now, but with persistence will happen.

Acknowledgments

This research was sponsored by the Adirondack North Country Association, Saranac Lake, NY; with funding made available through the New York State Department of Transportation and the Scenic Byways Program of the Federal Intermodal Surface Transportation Efficiency Act (ISTEA).

Literature Cited

Burgess, Bruce. 1992. The impact of bicycle touring on the economy of Vermont. Paper presented at the Velo Mondiale conference in Montreal, Quebec. Middlebury, VT: Bicycle Holidays. 30 p.

Emerick, Robert E. & Carol A. 1994. Profiling American bed and breakfast accommodations. *Journal of Travel Research*. Spring:20-25.

Hollenhorst, Steven J.; Schuett, Michael A.; Olson, David; Chavez, Deborah J. 1993. An examination of the characteristics, preferences, and attitudes of mountain bike users of the national forests: A preliminary analysis. Report prepared for the USDA Forest Service, Pacific Southwest Experiment Station. San Marcos: Southwest Texas State University. 50 p.

Holmes, Timothy P.; Healy, David; Schuett, Michael A.;
Korths, Nadia; Boettger, Kenny. 1994. Bicycle master plan for
the Adirondack North Country region of New York State.
Report prepared for the Adirondack North Country Association
and the New York State Department of Transportation.
Saranac Lake, NY: Adirondack North Country Association.
164 p.

Kuehn, Diane. 1994. New York's 1993 bed and breakfast and
inn industry. Oswego, NY: New York Seas Grant, SUNY
College at Oswego. 10 p.

Lally, Dale Jr. 1992. GEAR '92 final report of the steering
committee. Canton: St. Lawrence University, Carnegie
Language Center. 40p.

Lord, B.F.; Strauss, C. H. 1992. The economic significance of
bicyclists in Oil Creek State Park within Crawford and
Venango Counties. University Park, PA: Pennsylvania State
University.

Summit County Community Development Department. 1991.
Summit County, Colorado 1991 recreation trail surveys.
Breckenridge: Summit County Community Development
Department. 20 p.

Summit County Community Development Department. 1989.
Summit County, Colorado 1989 recreation trail surveys.
Breckenridge: Summit County Community Development
Department. 20 p.

RECREATION PRICING

POTENTIAL EQUITY EFFECTS OF A NEW DAY- USE FEE

Stephen Reiling

Professor, Department of Resource Economics and Policy, 5782
Winslow Hall, University of Maine, Orono, ME 04469-5782

Hsiang-tai Cheng

Associate Professor, Department of Resource Economics and
Policy, 5782 Winslow Hall, University of Maine, Orono, ME
04469-5782

Chris Robinson

Research Scientist, Department of Resource Economics and
Policy, 5782 Winslow Hall, University of Maine, Orono, ME
04469-5782

Ronald McCarville

Associate Professor, Department of Recreation and Leisure
Studies, University of Waterloo, Waterloo, Ontario N2L 3G1,
Canada

Christopher White

ASci Corporation, 335 Claremont Circle, Vicksburg, MS 39180

A new fee at the Army Corps of Engineers day-use facilities could very well have an adverse equity effect on low-income users. The study finds that low-income users will terminate their use of the day-use sites at a greater rate than current users with higher levels of income.

Introduction

The Army Corps of Engineers is one of the leading federal agencies in providing recreational opportunities. In fact, the Corps accommodates more visits at its recreation sites than any other federal agency except the U.S. Forest Service. Both day-use and camping facilities are provided at most Corps projects throughout the U.S.

Although the Corps has a long history of charging fees at its campgrounds, it has not charged fees at day-use facilities until last year. Consequently, the Corps had no information about how current users would respond to the proposed fee system. One of the concerns of economists and recreation providers is that a new fee at a recreation area could displace current users, especially those with low incomes. Those familiar with the literature surrounding the use of fees in recreation are aware of the allegation that fees may displace low-income users of the

recreation facilities (Cockrell and Wellman, 1985; Cordell, 1985; Dustin, 1986; Fletcher, et al., 1993; Leuschner, et al., 1987; Manning and Becker, 1981; Reiling, et al., 1992).

Consequently, a study was conducted during the summer of 1993 to learn more about Corps day-users' attitudes toward fees and how they would respond to the user fee. One of the major objectives of the study was to determine whether low-income users would be displaced by the fee system when it was implemented. The purpose of this paper is to present the results of that part of the study.

Study Design and Data Collection Procedures

A total of eighteen Corps projects were visited to assess their suitability for the fee study. Criteria used to assess each project are: at least two day-use areas that contained beaches, picnic table and boat launching facilities, which are required facilities for charging a fee; day-use areas with varying degrees of development; different locations across the U.S. so that regional differences, if any, in users' reactions to fees could be considered; a mix of highly accessible and remote projects; and adequate locations where traffic could be safely intercepted to collect names and addresses of users.

Based on the above criteria, a total of six projects were selected for the study: Burnsville, West Virginia; Strom Thurmond on the South Carolina-Georgia border; J. Percy Priest, Tennessee; Truman, Missouri; Canyon, Texas; and Mendocino, California. Two day-use areas at each project were selected for collecting the names and addresses of current users. A sampling plan was then developed for each day-use area at each project.

A questionnaire was developed and pretested prior to the data collection phase of the study. The questionnaire contained questions designed to determine how current users would respond to a fee system and the number of trips they would make to the day-use area at alternative fee levels. Two types of fees were included: an annual fee for the day-use area and a daily fee. Both fees were expressed on a per-vehicle basis.

A sample of day users was collected at each project by randomly stopping vehicles and collecting the name and address of the driver. Those selected for the sample were then mailed a survey and appropriate follow-ups to obtain the desired information. A total of 1,405 of the 2,522 deliverable surveys were completed and returned, yielding a response rate of 55.7 percent.

A modified contingent valuation approach was used to collect the information needed to predict users' responses to the new fee system. The new fee system offers users the choice of either paying a per vehicle fee that is paid during each visit or purchasing an annual pass that was good for the entire year. Consequently, current visitors have three choices: pay the daily per vehicle fee; purchase the annual pass; or, pay neither fee and stop visiting the site. Respondents were presented these options in the following question:

There is legislation before Congress that would establish day-use fees at Corps of Engineer day-use areas, like the one where your vehicle was stopped. The Corps is interested in your views on recreation day-use fees. Suppose a recreation day-use fee was charged at the recreation day-use area where your vehicle was stopped, and at other similar Corps-operated day-use areas nationwide. If the fee was \$_____ per vehicle per day, or \$_____ per vehicle for an annual pass that would allow you to use all the day-use areas located on this lake for one year, which option would you personally choose? (please circle one number)

1. I would pay the per-vehicle per-day fee
2. I would purchase the annual pass
3. Neither—I would not visit Corps day-use areas anymore

Fee levels ranging from one to five dollars for the daily fee and from \$10 to \$100 for the annual pass were written in the appropriate spaces prior to mailing the surveys. For the analyses performed in this paper, respondents who chose either the daily or annual pass fees were grouped together into the "pay fee" group, while respondents who indicated they would not pay either fee are referred to as the "no fee" group.

Results

Responses to the fee question were analyzed to determine how the introduction of a fee system would impact different subgroups of current visitors. A comparison of users who self-selected the "neither fee" option and those who chose one of the two fees is shown in Table 1. It should be noted that over 40 percent of all respondents indicated they would not visit Corps areas if a fee was charged.

No statistically significant difference exists in the two groups in terms of age, household size, and the percent minority group members. Significant differences do, however, exist for the

other variables in Table 1. The group that selected the "neither fee" option has a higher percentage of males, a lower level of education, and a lower household income level. The latter difference is especially important because we are interested in whether a fee system would displace low-income users at a higher rate than users with higher incomes.

In terms of trip-related variables, respondents in the "no fee" group took over 60 percent more trips during the last twelve months than their counterparts in the "pay fee" group. One would think that the frequent users in the "no fee" group would opt for the purchase of the annual pass. However, this was not the case.

Differences in other trip-related variables are more consistent with expectations. Respondents in the "no fee" group spent less time at the site, reported lower quality and preference ratings for the areas visited, and a smaller fraction had paid a fee to use a day-use area located on a lake during the last year. The latter variable may partially explain the aversion to fees expressed by the "no fee" group. Historical experience in paying fees is often a significant factor in explaining people's attitudes toward fees.

Responses to the fee question also varied significantly across the six projects, thereby suggesting that regional differences in users' responses to fees exist.

To examine more closely the effect of the fee on current users with different income levels, a binomial logit model was estimated using the responses to the hypothetical fee question. In the binomial logit model, the dependent variable is equal to zero if the respondent chose the "no fee" option and is equal to one if the respondent chose either of the "pay fee" options. A set of independent variables including the socio-economic characteristics of users and their trip characteristics are used to explain the fee decision made by respondents. The model results indicate whether the independent variables increase or decrease the probability of respondents choosing the "pay fee" option.

The estimated binomial logit model is reported in Table 2.

Table 1. Socio-demographic and trip characteristics of corps day-use visitors, by willingness to pay day-use fee.

Characteristic	Would Pay Fee	Would Not Pay Fee
Average Age (years)	40.3	40.0
Sex (percent Male)*	58.9	65.3
Average Household Size (people)	3.1	3.0
Average Education (years)*	13.5	13.0
Average Income (\$)*	38,600	32,800
Race (% caucasian)	87.5	89.4
Average Party Size* (persons)	3.3	3.0
Average No. of Hours spent at Rec. Area*	5.4	4.5
Average One-Way Travel Distance*	32.8	26.8
Average Total Trip Expenses*	\$29.80	\$25.33
Average Preference Rating for Area Visited*	2.1	2.4
Average No. of Visits to Rec. Area in Last 12 Months*	16.6	27.3
Visited Lake Area in Last 12 months where day-use fee was charged? (% yes)*	26.8	12.2

* denotes a statistically significant difference in group means at the 10 percent level, two tail test.

Three of the independent variables are insignificant in the equation: the magnitude of the annual fee charged (ANNFEE), the number of hours spent at the site (HOURS), and the racial/ethnic background of respondents (RACE). Their insignificance indicates these variables neither increase nor decrease the probability that respondents would choose the "pay fee" option. In addition, three of the lake dummy variables used to capture regional differences in attitudes toward fees are also insignificant.

Table 2. Binomial logit results for corps day users.

Variable	Coefficient	Standard Error
CONSTANT	0.220	0.609
DAYFEE	-0.282*	0.065
ANNFEE	-0.003	0.004
DISTANCE	0.009*	0.003
VISITS	-0.005*	0.002
HOURS	0.015	0.016
FAMSIZE	-0.115*	0.057
QUALITY	0.392*	0.147
PAIDFEE	0.784*	0.187
PREFERENCE	0.773*	0.149
RACE	0.188	0.224
SEX	0.372*	0.146
LAKE1	-0.581*	0.241
LAKE2	0.209	0.241
LAKE3	-0.074	0.238
LAKE4	-0.300	0.248
LAKE5	0.665*	0.268
MEDINCOME	0.394*	0.190
HIGHINCOME	0.563*	0.202

* signifies coefficient is significant at the 5% level.

Among the statistically significant variables, three have negative signs: the amount of the daily fee (DAYFEE), the number of persons in the respondents' household (FAMSIZE), and the dummy variable for Burnsville Lake (LAKE1). As the daily fee or family size increases, the probability of respondents choosing the "pay fee" option decreases; furthermore, respondents at Burnsville are less likely, other things being equal, to choose the "pay fee" option, compared to the respondents at Mendocino Lake, which is the omitted lake in the dummy variable set.

All the other independent variables in the binomial logit equation are positive and statistically significant. Therefore,

higher values of these variables result in an increase in the probability of respondents selecting the "pay fee" option. For example, the farther one travels to visit the Corps day-use areas, the higher probability that the respondent will opt for the "pay fee" option. This is consistent with expectations because the fee accounts for a small part of the total trip expenses for those who travel some distance to visit the site. Other variables that increase the probability of users choosing the "pay fee" option include a high quality rating for the site (QUALITY), a high preference for the site on the part of visitors (PREFERENCE), and having paid a day-use fee for lake recreation in the past (PAIDFEE).

To examine the potential equity effect of the new fee, we are interested in the sign on the income variables in the binomial logit equation. Note that income is a categorical variable in the equation. The low-income category, which is the omitted category in the dummy variable set, includes all respondents with incomes of less than \$15,000. The MEDINCOME category includes all respondents with income between \$15,000 and \$40,000, and the HIGHINCOME group represents all respondents with incomes of over \$40,000.

Note that the coefficients on both MEDINCOME and HIGHINCOME are statistically significant and positive. This suggests that the probability of respondents selecting the "pay fee" option is higher for respondents in the medium and high-income categories than for respondents in the low-income category. Therefore, a potential equity effect may exist as result of the fee because low-income users (those with incomes of less than \$15,000) will opt for the "no-fee" option (and thereby stop using the Corps day-use sites), at a greater rate than those with incomes of \$15,000 or more. It is also interesting to note that the difference in the coefficients for medium and high income users are not statistically different. Therefore, current users with medium and high incomes will respond to the fee in about the same manner.

The potential discriminatory effect is illustrated in Table 3. The table shows the probabilities associated with respondents in the three income groups selecting the "pay fee" option at three different fee levels. Note that the probabilities for the low-income group are lower at all fee levels than for the other income groups. This suggests that more low-income users will opt to not use the Corps facilities after the fee system is initiated.

Table 3. Probabilities of choosing the "pay fee" option at alternative fee levels, by income group.

PRICE LEVELS (day/annual)	INCOME GROUPS		
	LOW (< \$15,000)	MEDIUM (\$15,000-\$40,000)	HIGH (> \$40,000)
\$1/\$10	.708	.782	.809
\$3/\$20	.572	.665	.701
\$5/\$30	.424	.522	.564

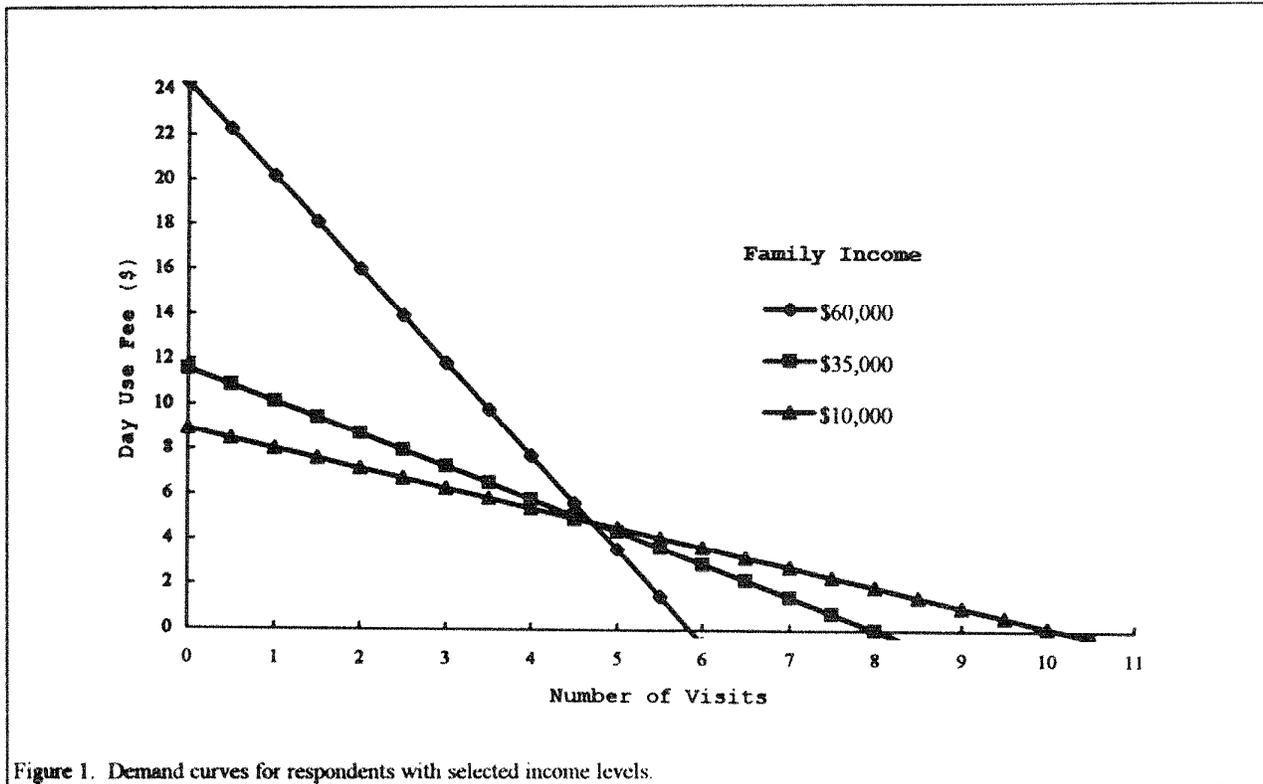


Figure 1. Demand curves for respondents with selected income levels.

A second type of analysis was conducted to investigate further the potential impact of the new fee system on current users. Using the responses obtained from users who chose the daily fee option, a demand curve was estimated for the Corps sites. Income was included as one of the independent variables in the demand equation. In addition, an interaction term between income and the daily fee amount was constructed and included in the demand equation. The interaction term allows the slope of the demand curve to vary, depending on the income of the users. If a discriminatory effect exists, the interaction term should be positive and statistically significant in the demand equation (Reiling, et al, 1992). This would signify that the demand curve of low-income users is more elastic than that of users with higher incomes. This would indicate that low-income users are more sensitive to the magnitude of a fee than their higher-income counterparts.

The demand curve was estimated using ordinary least squares and the results are shown in Table 4. Six variables, excluding the constant term, are statistically significant at the ten percent level or higher and have the correct sign. Note that the interaction term for income and fee (INCOME*DAYFEE) is significant at the ten percent level and is positive, thereby also suggesting a potential equity effect associated with the magnitude of the fee.

This equity effect can be illustrated by plotting the demand curves for selected levels of income. Figure 1 contains the demand curves for visitors with incomes of \$10,000, \$35,000

and \$60,000. Note that the demand curve for users with incomes of \$10,000 is much flatter than for the users with higher incomes. As can be seen, this means that the low-income users are more sensitive to the size of the fee charged. As the fee increases, they reduce the number of visits much more rapidly than do the users with higher incomes who selected the daily fee.

Table 4. Demand equation for Corps day-use sites based on respondents that chose the daily fee.

VARIABLE	COEFFICIENT	STANDARD ERROR
CONSTANT	11.546**	2.049
DAYFEE	-1.321**	0.477
DISTANCE	-0.065**	0.014
HOURS	0.132*	0.080
FAMSIZE	-0.077	0.287
QUALITY	-0.508	0.740
PAIDFEE	0.719	0.802
PREFERENCE	1.990**	0.758
RACE	-0.111	1.106
SEX	-0.097	0.703
INCOME	-0.000086**	0.000036
INCOME*DAY	0.000018*	0.00001
FEE		

* significant at 10% level, two tail test.

** significant at 5% level, two tail test.

Conclusions

The results of this study suggest that the new fee being initiated by the Army Corps of Engineers could very well have an adverse equity effect on low-income users. The binomial logit analysis suggests that low-income users have a higher probability of choosing the "no-fee" option and thereby terminate their use of the day-use sites at a greater rate than current users with higher levels of income. Furthermore, the demand analysis indicates that low-income users who chose the daily fee are much more sensitive to the size of the fee. Consequently, they will terminate their use at much lower fee levels than users with higher incomes. Hence, both analyses suggest that low-income users will react differently than high-income users in deciding whether to continue to use the facilities once the fee is initiated, and the amount they will curtail their use at the prevailing fee schedule.

The results also suggest some steps the Corps could take to minimize the detrimental impact that the fee system could have on users with low incomes. The most obvious is that the Corps could initially set the fee at a low level, such as \$1 per vehicle per day and \$10 or \$20 per year. This would reduce displacement of low-income users and would allow users to become more accustomed to paying fees. Fees could then be increased in subsequent years. This approach would also reduce the complaints the Corps will receive about the new fee system.

Ideally, the Corps should conduct a similar study a couple of years after the fee is implemented to determine whether the discriminatory impact predicted by our work actually occurs. This would provide the best approach for studying the potential discriminatory effects associated with recreation fees.

Literature Cited

- Cockrell, D., and J.D. Wellman. 1985. Democracy and Leisure: Reflections on Pay-As-You-Go Outdoor Recreation. *Journal of Parks and Recreation Administration*. 3(4): 1-10.
- Cordell, H.K. 1985. Criteria for Outdoor Recreation Pricing Policies. In: *Forest Recreation Research in the South*. Publication No. 1-17. Athens, GA: USDA Forest Service, Southeastern Forest Experiment Station.
- Dustin, D. 1986. Outdoor Recreation: A Question of Equity. *Forum for Applied Research and Public Policy*. 1(3): 62-67.
- Fletcher, J., R. Kaiser and S. Groger. 1993. An Assessment of the Importance and Performance of Park Fees in Funding Park and Recreation Infrastructure. *Journal of Parks and Recreation Administration*. 10(3): 75-87.
- Leuschner, W.A., P.S. Cook, J.W. Roggenbuck and R.G. Oderwald. 1987. A Comparative Analysis for Wilderness User Fee Policy. *Journal of Leisure Research*. 19(2): 101-114.

Manning, R.E. and S.C. Baker. 1981. Discrimination Through User Fees: Fact or Fiction? *Parks and Recreation*. 16(9): 70-74.

Reiling, S.D., H. Cheng and C. Trott. 1992. Measuring the Discriminatory Impact Associated With Higher Recreational Fees. *Leisure Sciences*. 14(3): 121-37.

Reiling, S.D., R. McCarville and C. White. 1994. Demand and Marketing Study at Army Corps of Engineers Day-Use Areas. Waterways Experiment Station Publication No. R-93-1. U.S. Army Corps of Engineers. 95 pp.

**FACTORS ASSOCIATED WITH WILLINGNESS-
TO-PAY FOR HUNTING LICENSE INCREASE
AMONG SMALL AND BIG GAME HUNTERS IN
PENNSYLVANIA**

Craig A. Miller

Department of Forest Resources and the Cooperative Park
Studies Unit, University of Idaho, Moscow, ID 83843

Alan R. Graefe

Recreation and Park Management Program, 201 Mateer
Building, The Pennsylvania State University, University Park,
PA 16802

Participants in the Pennsylvania Hunter Survey (n = 1005) were asked to indicate their support for an increase in the cost of an adult resident hunting license. Hunters were evenly divided, with a slight majority of hunters favoring the increase (52% versus 48%). Waterfowl hunters, archery deer hunters, and pheasant hunters most strongly supported the increase in the general license. Rifle and shotgun deer hunters were close to even (49% yes to 51% no), while the majority of grouse, turkey, and muzzleloader deer hunters opposed the license increase. The variable found to be most consistently significant in predicting a hunter's support was satisfaction with management programs, which was significant in five of the seven hunting categories. Income was significant for two categories, as was experience with hunting in other states, and hunters' level of education. Hunting in other states was found to be negatively related to willingness to pay.

Introduction

Hunting license fees have been the main source of income of wildlife management agencies for decades (O'Leary et al., 1987, Heberlein, 1992). Declines in the number of hunters and increased costs have prompted many agencies to look for additional sources of income and increase fees to traditional constituents (Walsh, et al., 1988, U.S. Fish and Wildlife Service, 1993). More than 75% of the money used for wildlife management in 1977 came from consumptive wildlife users (Jahn and Trefethen, 1978) In 1986, state wildlife agencies in the United States receive approximately 56% of their funding from the sale of hunting licenses (Wildlife Conservation Fund, 1987). For example, the Pennsylvania Game Commission receives 60% of their total operating budget from hunting license fees (Pennsylvania Game Commission, 1995).

As license fees increase to meet agency budget demands, those hunters who perceive cost as a constraint to hunting may cease to participate (Backman and Wright, 1993). Hunters who remain active have a higher commitment and place demands on managers to provide a return for their investment (Stribling, et al. 1992; Gan and Luzar, 1993). Changes in demographics and hunting involvement nationwide make it necessary for state wildlife agencies to understand those factors which lead to support for license fee structures among hunters.

Methods

The data for this study originated from the Pennsylvania Hunter Survey conducted in the summer of 1994. A sample of 1,295 resident adult hunters received a 12 page questionnaire by mail, of which 1,005 (78%) completed surveys were returned. The subjects for this survey were assigned to one of seven categories based on their response to the 1993 Game Take Survey conducted by the Pennsylvania Game Commission. The seven categories were: archery (A), rifle/shotgun deer (D), grouse (G), flintlock muzzleloader (M), pheasant (P), turkey (T), and waterfowl (W).

This study examined the relationship between those items that addressed the proposed increase to the general hunting license and variables related hunter attitudes toward management, degree of specialization, participation, and selected demographics. The response data are presented as total responses collapsed across the seven hunting categories and the responses generated for the individual categories. Analyses were conducted using logistic regression to find those variables significant in predicting the willingness of participants to support the increase in the general license fee.

Results

The number of completed survey questionnaires and response rate for each category is presented in table 1. Each survey participant was asked to respond to a question regarding support for an increase in the general adult resident hunting license: "The Pennsylvania Game Commission is a state agency operating independently of funding from the general fund (tax dollars). The majority of the PGC operating budget comes from the money generated from the sales of hunting licenses. Considering the increased demands for services and operating costs, and the license fee has not increased since 1985, would you support an increase in the general hunting license fee (for all small game, deer, and turkey)?" The results are presented in Table 2.

Willingness to pay for the general license increase and the special licenses were coded as a 1 for "yes" and a 0 for "no". A total of 1005 hunters (100%) responded to the question regarding support for an increase in the general adult resident hunting license. Table 2 presents the results for all hunters and for each of the seven hunting categories. An examination of the results for all hunters shows a majority of hunters supporting the increase (52%). When the responses are presented by hunting category, waterfowl hunters responded positively most

often (67%); archery hunters (64%) and pheasant hunters (52%) also indicated positive attitudes toward the proposed increase. A slightly negative response was obtained from deer hunters (51% "No"). Turkey hunters also were less supportive of an increase (54% "No"), while grouse and muzzleloader hunters were least supportive with 55% of the hunters in each category responding "No".

Table 1. Response rates for seven hunting categories.

Category	Number Received	Percent Response
Archery	125	69%
R/S Deer	144	76%
Grouse	148	81%
Muzzleloader	156	82%
Pheasant	137	73%
Turkey	138	82%
Waterfowl	157	80%

Table 2. Support for increase in general license fee by hunting category.

Category	Yes/No	Frequency	Percent	N
All Hunters	Yes	521	52%	1005
	No	484	48%	
Archery	Yes	80	64%	125
	No	45	36%	
R/S Deer	Yes	70	49%	144
	No	74	51%	
Grouse	Yes	67	45%	148
	No	81	55%	
Muzzleloader	Yes	70	45%	156
	No	86	55%	
Pheasant	Yes	66	52%	137
	No	71	48%	
Turkey	Yes	63	46%	138
	No	75	54%	
Waterfowl	Yes	105	67%	157
	No	52	33%	

In order to determine what factors were most important in determining hunters' willingness to pay for the increase in the general license fee, related items from the questionnaire were analyzed through logistic regression. Regression variables were selected on the basis of their logical relationship to the hunter's experience, attitudes toward the current wildlife management programs, demographic characteristics, and self-image as a hunter. The variables used for the regression models are provided in table 3.

The logistic regression procedure assessed the relative significance of the independent variables to a dichotomous dependent variable, in this case the willingness to pay for a license increase. Those variables found to be significant ($\alpha = .05$) are presented in table 4. The significant variables are presented in the order of significance, with most significant variables listed first for each hunting category.

Table 3. Variables used in logistic regression analysis of willingness-to-pay for license increase.

•	Commitment (index of four related variables)
•	Degree of Specialization (index of ten related variables)
•	Attitudes toward specific wildlife management programs
•	Out of state hunting experience
•	Days of hunting for hunting category
•	Importance of PGC employees as source of information
•	Income
•	Education

Discussion

The response frequencies found in table 2 show waterfowl hunters and archery deer hunters to be most supportive of the proposed license increase. Support for the increase on the part of the bowhunters may be due to the extra two weeks of hunting added to the fall archery season, extending the season to mid-November. This argument is substantiated in table 4, which shows bowhunting regulations and seasons to be the first significant factor in archers' willingness to pay for the increase. Bowhunters who hunted in other states were less likely to support the hunting license increase, as evidenced by the negative beta coefficient of $-.6569$. A similar direction was observed in the coefficient for degree of specialization; the odds that the license increase would be supported decreased with a corresponding increase in the specialization index. This result is contrary to what one would expect. As the specialization index in this study includes the dimensions of experience, skill, equipment, and lifestyle, it would seem logical to expect the willingness to pay for a license increase to increase with degree of specialization. This is not the case with archery hunters, however.

The reason for the support demonstrated from the waterfowl hunters is less apparent. The results of the logistic regression indicated that, to waterfowl hunters, the importance of Pennsylvania Game Commission staff as a source of information is the only factor significant in predicting their willingness to pay for the increase. Further investigation into demographic variables or overall hunting participation may shed light on this question.

Pheasant hunters exhibited a high level of support for both the proposed increase to the general license and several special licenses. These hunters displayed three significant predictors for willingness to pay for the general increase. The significant factors cover the dimensions of attitudes toward management, hunting experience, and the demographic variable income. As with archery hunters, those pheasant hunters who experienced hunting in other states were less likely to support the proposed increase ($B = -.6279$).

Satisfaction with management programs was associated with higher odds that the hunter would support the increased license fee for five of the seven categories: archery, rifle/shotgun deer, grouse, pheasant, and turkey. This makes intuitive sense, as hunters in this instance would serve as satisfied consumers willing to support the services provided, in this case game management. Income was positively associated with the odds for support for the license increase among muzzleloader, turkey and pheasant hunters. The relationship between income and willingness to pay could be argued from the standpoint that those of higher incomes have the resources to pay the higher fee. It must be pointed out, however, that income was significant for only three of the seven categories. Out of state hunting experience was negatively associated with the odds the hunter would support the license increase for archery and turkey hunters. It could be argued that those hunters who hunt in other states feel they have a basis for making a qualitative comparison of Pennsylvania's hunting and management programs to those of other states. It is also plausible that those archers and turkey hunters who hunt out of state would like to

see Pennsylvania's licenses kept low because of the amounts they spend on out of state hunting.

In summary, the results of this study indicate satisfaction with management programs, experience, and demographics are significant predictors of the individual's willingness to pay for an increase in the adult resident hunting license. A hunter's level of experience cannot be controlled by the agency; nor can demographics be affected by agency actions. Hunter satisfaction, however, may be influenced by the agency to some extent. Greater information services, expanded contact with agency officials, and increased visible support from sportsmen's organization could influence the hunter's satisfaction with the sport.

The results of this study indicate the support for a license increase varies among hunters participating in various types hunting public in order to educate hunters of the need for a license increase. It is beyond the scope of this paper to suggest strategies to gather support for the license increase, but this

Table 4. Predictors of willingness-to-pay for an increase in the adult resident hunting license.

Hunting category	Significant Variables	Coeff.	Significance	R	X ²	Percent Correct
Archery	Archery regulations and seasons	1.082	.0000	.3066	25.642	71%
	Out of state hunting experience	-.6569	.0086	-.1734		
	Archery degree of specialization	-.8727	.0254	-.1355		
Rifle/Shotgun Deer	Deer management program	.3737	.0225	.1268	9.868	68%
	Importance of PGC employees as sources of information	.0629	.0412	.1042		
Grouse	Pheasant stocking program	.2852	.0183	.1369	8.580	58%
	Grouse degree of specialization	.6583	.0495	.0988		
Flintlock Muzzleloader	Education	.4255	.0086	.1622	24.595	66%
	Income	.2703	.0266	.1251		
	Days of muzzleloader hunting	-.0766	.0314	-.1188		
Pheasant	Pheasant stocking program	.6133	.0009	.2187	26.482	67%
	Out of state hunting experience	-.6279	.0120	-.1508		
	Income	.1270	.0282	.1218		
Turkey	Income	.2880	.0072	.1739	13.501	64%
	Turkey management program	.4594	.0453	.1079		
Waterfowl	Importance of PGC employees as sources of information	-.6999	.0167	-.1669	6.060	70%

research does indicate that hunters who identify with a particular type of hunting may have concerns different from those of other hunters involved in different hunting pursuits.

References

Backman, S.J. and Wright, B.A. (1993). An exploratory study of the relationship of attitude and the perception of constraints to hunting. *Journal of Park and Recreation Administration*, 11: 1-16.

Gan, C. And Luzar, E.J. 1993. A conjoint analysis of waterfowl hunting in Louisiana. *Southern Journal of Applied Forestry*, 25,36-45.

Heberlein, T. 1991. Changing attitudes and funding for wildlife - preserving the sport hunter. *Wildlife Society Bulletin*, 19,528-534.

Jahn, L.R. and Trefethen, J.B. 1978. Funding wildlife conservation programs. In H.P. Brokaw, ed. *Wildlife and America: Contributions to an understanding of American wildlife and its conservation*. Council on Environmental Quality, U.S. Gov. Print. Off., Washington, DC.

O'Leary, J.T., Behrens-Tepper, J.B., McGuire, F.A., & Dottavio, F.D. (1987). Age of first hunting experience: Results from a nationwide survey. *Leisure Sciences*, 9,225-233.

Pennsylvania Game Commission, (1995). Annual report. *Pennsylvania Game News*, January, 1-15.

Stribling, H.I., Caulfield, J.P., Lockaby, B.G., Thopson, D.P., Quicke, H.F., and Clonts, H.A. 1992. Factors influencing willingness to pay for hunting in the Alabama Piedmont. *Southern Journal of Applied Forestry*, 16: 125-129.

U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census. (1993). 1991 National survey of fishing, hunting, and wildlife-associated recreation. U.S. Government Printing Office, Washington, DC.

Walsh, R.G., Harpman, D., Hof, J., John, K., & McKean, J. (1988). Long-run forecasts of participation in fishing, hunting, and nonconsumptive wildlife recreation. In *Benchmark 88: A national outdoor recreation and wilderness forum*, Tampa, FL, USDA Forest Service. p. 181-192.

Wildlife Conservation Fund of America. (1987). The 1987 survey of state wildlife agency revenue. Columbus, OH.

INCREASING REVENUES IN STATE PARKS --

WHAT WORKS AND WHAT DOESN'T

Glen D. Alexander

Chief, Ohio Department of Natural Resources, Division of
Parks and Recreation, 1952 Belcher Dr. C-3 Columbus, OH
43224

Two years ago, Ohio State Parks developed a methodology of measuring customer satisfaction to gauge the effectiveness of our customer service. What follows is a discussion of our installation of systems to measure and improve customer satisfaction, the interpretation of the data, and the positive results we have enjoyed.

Introduction

Ohio State Parks averaged 4.27% annual increase in revenue for the fiscal years 1986 through 1991. The fiscal years 1992 through 1995 saw this average nearly treble to 11.43% average annual increase. This translates to a 50%, or \$6,000,000 increase in revenues over these 4 years. Revenues are estimated at \$18,750,000 for fiscal 1995 compared with revenues of \$12,154,000 for fiscal 1991 just 4 years earlier. A graphic illustration of these increases is shown in Figure 1.

The following is a discussion of the methods used to increase this revenue stream, from about 23% of operations and maintenance (O&M) funding in FY-1995. Ohio State's fiscal years end on June 30 of the year. Ohio State Parks received just over \$29,000,000 for (O&M) in FY-1995 from General Revenue (Taxes) and will spend a total of about \$47,000,000.

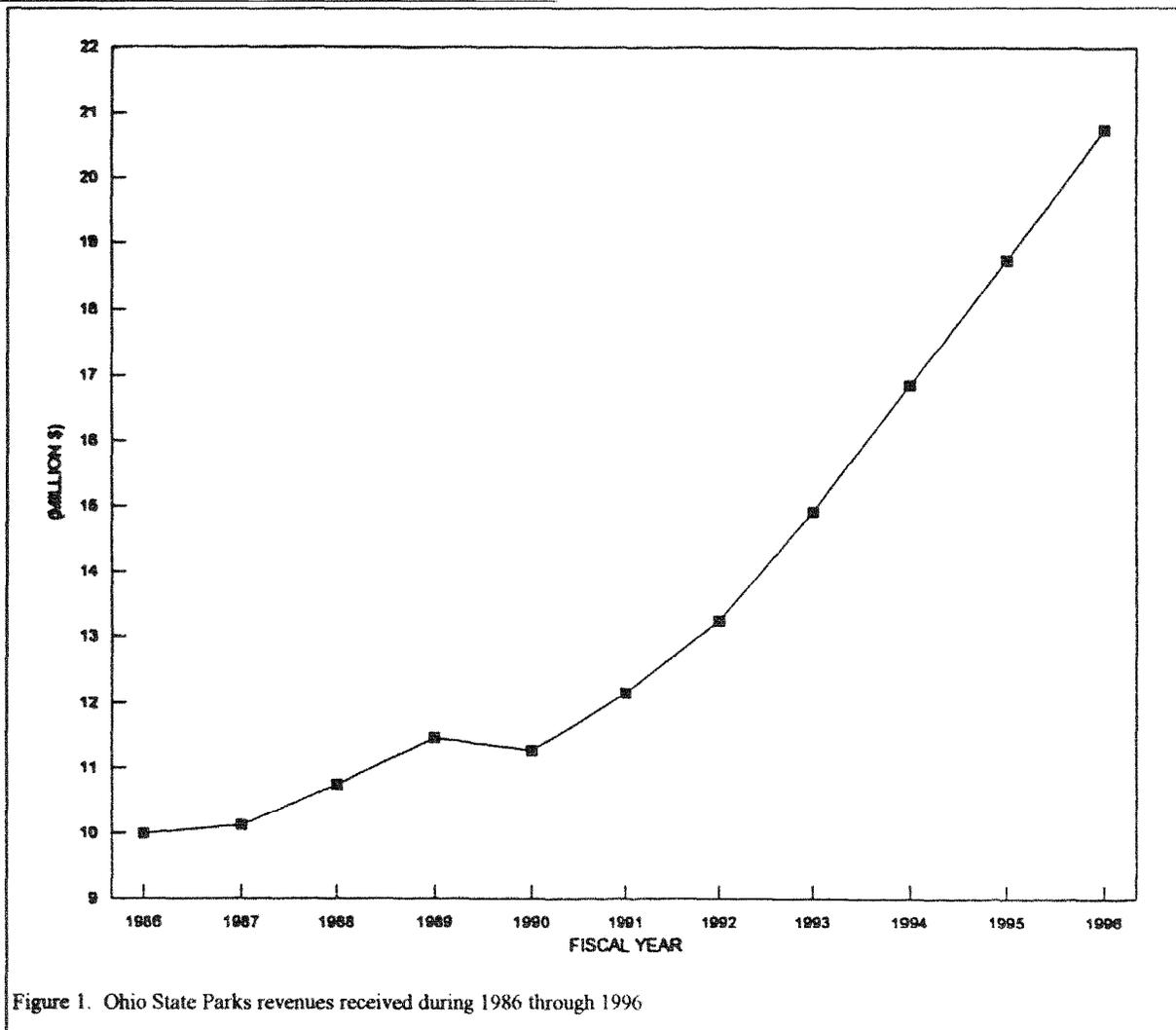


Figure 1. Ohio State Parks revenues received during 1986 through 1996

The discussion of how we did it breaks down into five topic areas:

- I. Price comparability studies to ensure tax dollars are not used to unfairly subsidize below market prices. Ohio State Parks do **not** compete on a price basis as the cheapest outdoor recreation available. We **do** compete on a **value basis**. We believe that we offer the best outdoor recreation values for our customers in the market place.
- II. Yield and differential pricing tactics which provide the best return to the State for our special services offerings in terms of time of offering, location of offering, and value adding amenities of offering.
- III. Charging for services that were previously offered for free. Specifically what customers will accept and what they resist and under what conditions.
- IV. Introducing new "special services" for a fee, not previously offered, and providing these at a profit. Taking a look at return on investment (ROI) "hurdles" for State dollars and how to maximize returns.
- V. Self operating concession facilities that were previously operated by private business. Specifically we shall discuss "**privatization**" and how we distinguish when it is in the State's best interest to "privatize" and when it is best to self operate. Decision analysis is performed in terms of balancing quality customer service and maximum revenue to the State.

Price Comparability

Ohio State Parks annually perform "price comparability studies" which serve as the basis for the annual price setting review for all fees charged for "special services" offered in Ohio State parks. It is useful to note here that Ohio is one of only about 8 states left in the United States which does not charge a parking or entrance fee of any type. Entrance and parking in all 72 Ohio State Parks remains completely free. The majority of the 60,000,000 visitors to Ohio State Parks are day users and do not pay a fee or make any purchases.

"Price comparability studies" consist of each park manager compiling a spread sheet which compares his offerings, by type, with those of the three nearest private business competitors. He may also add one or more public sector offerings which he competes with for further reference. However, the emphasis is on the data obtained from the private business sector. A typical spread sheet from one of our parks contains such variables as daily and weekly rates, facility capacity, outdoor recreation facilities, and activity opportunities. The spread sheet attempts, as much as is practical, to account for the differing amenities of each private business offering when compared to that of the park.

We are comparing the prices only for the "special services" we offer to users of Ohio State Parks. These "special services" include camp site rentals, cabin rentals, dock rentals, picnic shelter rentals, golf green fees, and the like. All Ohioans can come to Ohio State Parks and enjoy the scenery, picnicking, and trail walking without entrance or parking fees. Each year some 40% of all Ohioans do visit their state parks and well over 65% of all Ohioans do so in any five year period.

We take the data and the recommendations of the park manager and pull together a master list of price offerings and proposed changes. We put this result through the public meeting process and review by the Ohio General Assembly, Joint Committee on Agency Rule Review (JCARR), once we have secured Department and Administration approvals.

We desire prices that are **equal**, once amenities have been considered, to similar private business offerings. If we err, we must err on the low side however. This annual attention to prices ensures that a number of important goals are met:

1. The taxpayers are getting the fairest return possible on their capital investment in the these special service facilities that state parks visitors desire.
2. We are not competing unfairly with the private sector on the basis of price. That is we are not using tax dollars to subsidize unfairly low prices.
3. We are not charging our customers more than fair market rates for these special services.

Ohio State Parks do compete on a **value basis**. We believe that we offer the best outdoor recreation values for our customers possible. We have been training our employees and managers to concentrate upon the "quality" of our offering for price tendered. Things such as cleanliness of facilities, courtesy and helpfulness of employees, maintenance and upkeep improvements, added things to do, and additional small amenities all spell **added value** to our customers.

We are not trying to be the cheapest outdoor recreation value around. We are trying very hard to be the best quality for value outdoor recreation value in Ohio. Comparability studies and attendant analysis are good tools to help us get there.

Yield And Differential Pricing Tactics

It has long been the practice in the private business sector to provide discounts during slow periods to stimulate business and to charge rack rate during busy periods. In addition perceived amenities in terms of time, location, and added value amenities have long been charged extra for as well. A combined expression of differential pricing can be shown in the example of Super Bowl lodging. The rate for a suite (added value amenity) close to the stadium (location) the night before the game (time) is likely to cost one considerably more than "rack rate". (Rack rate is defined as the generally posted price

against which discounts are calculated and surcharges added.) State parks can quite profitably take a page out of this private business approach and make considerable use of these tactics.

Yield pricing is an interesting concept. Its theory is that prices can be raised or lowered across a continuum to achieve a point at which maximum gross sales occurs without regard to volume of sales. Since we are committed to market rates on our up side we have not done any experimenting with raising prices above market.

Discounting, however, gives us a range between the market price and the variable cost coverage price within which a number of managers have been experimenting. We need to determine whether off season rate discounts will actually bring in more gross dollars than simply leaving market rates intact. We are after more total sales dollars, not more sales. We generally expect more sales when a discounted price is offered. However, greater total gross sales dollars do not necessarily follow discount pricing.

The unknown being experimented with is how many of our off season visitors will use our facilities regardless of the price charged and how many additional will be attracted by a discount. We have adopted a general guideline that discounts will be employed when they increase gross sales dollars beyond levels existing at market pricing within a given period.

Differential pricing is being applied by us in three different situations: value adding amenities, time, and location. Our approach with each is as follows:

1. **Value adding amenities** is fairly easy.

Customers expect to pay more for fireplaces in cabins or for electricity at campsites. However, the addition of new amenities often goes unpriced for unless everyone is sensitive to the need to price for value adding amenities.

2. **Time** is one area that we had overlooked. We are now pricing for holiday weekends in our campgrounds and cabins. We have been selling the fact that our labor costs increase over the major summer holiday weekends and that a small increase for these periods is so justified to pay for the holiday pay and overtime we invariably experience. We have encountered surprisingly little price resistance with this tactic so far. We have generally learned, however, that price increases of \$1.00 to \$2.00 per campsite night and \$5.00 to \$10.00 per cabin night are about all customers will absorb every few years or so without significant resistance. Price increases above that hit significant resistance. We are also now sensitized to instituting price increases at the beginning of the visitor season. Any price increase in the middle of the season meets with confusion and resistance on the part of our customers.

3. **Location** is another area that we were overlooking. A view or access to water is a major locational amenity for campsites and cabins that we are starting to charge for. Again we have encountered essentially no customer resistance at modest price increase differentials because we always have alternative lower priced offerings available for those who want them. Additionally the campsites and cabins with these locational amenities are still the first to fill up regardless of the price differential. Location is often considered a "tertiary amenity" after the location inside the park and the value of site offerings such as electricity are considered. Consequently it is often overlooked as a basis for additional revenue.

Charging For Services That Were Previously Offered For Free

This is a very sensitive political area to attempt to make progress in. Our customers absolutely resist paying for something they were getting for free previously. The common comment is: "That is what I pay taxes for!" We have employed two strategies here relatively successfully. First we have "recast" the offering with additional value added for which we charge. This has been the easier to implement. Secondly we have used a "piecemeal" approach focusing upon the "fairness" to other taxpayers issue.

The first "recasting" strategy really worked well when we began to charge for reserving picnic shelters. Very few people objected and a great many were really appreciative that they now could make plans for that family reunion and have confidence that a particular picnic shelter would be held available for them. In a number of cases picnic shelter use actually increased once people learned that they could be reserved.

Our costs of picnic shelter reservations were absorbed easily within current staffing levels and the fees collected dropped directly to the bottom line. An additional benefit also accrued in that park maintenance now knew when the shelters were being used and could plan cleanings in advance. As a result we also received positive comments from customers on cleaner shelters.

One of our most difficult challenges was implementing fees for locking recreational boats through 10 historic locks over many miles of the Muskingum River. There is no substitute for doing your homework on an issue like this. Our costs amount to over \$40.00 in direct labor costs for every locking. Our goal is to communicate this to all of our boaters. The "fairness" issue comes into play when one stops to think about whether it is "fair" for a blue collar worker in Cleveland to have \$40.00 of his tax money go to provide a recreational locking experience for someone who is well off enough to own a \$20,000.00 boat. The majority of our boaters are sensitive to this issue and do not have a great problem with a small lock fee. Locking is a

"special service" and in "fairness" should have some fee attached to it.

We also prudently started small with a \$5.00 lock fee and appropriately priced annual passes. We spent a full year in advance of any implementation in education and getting the word out. This particular combination of strategies seems to have kept this situation manageable, so far.

Our estimate of this situation is that customer acceptance of fees for previously free services depends upon: low initial fee levels, long time frame notice, education of the users regarding costs of operations, and a strong public information and relations campaign focused upon the "fairness" issue. Missing any of these key points can be fatal to such an effort.

Introducing New "Special Services" For Fee

We have introduced a number of new special services for a fee for our park customers. In that process we have paid particular attention to ensuring that these new offerings perform at a profit over our costs of providing them.

Further, when we calculate the profitability of any new offering we are using a "hurdle rate" of 18 months to 36 months for return a full 100% on investment. This is in part dictated by the biennial budget system of Ohio and in part by our own cash flow needs. These two criteria rule out many "good ideas" that result in a net drain of very scarce tax dollars.

Some of the offerings we have implemented include:

1. Sales of firewood, ice, food, camper necessities such as bug spray and sun tan lotion, soda pop, apparel, and sundries at our camp check-in stations. By adding merchandise sales to these locations without adding any new labor costs and with minimal changes in physical plant we have increased the profitability of our campgrounds significantly. The private sector has mixed feelings about this venture into the business arena. However, our campers love it. They no longer have to break down their camper and drive for miles in many cases for necessities. We believe that this results in longer more convenient camper stays which benefits both us and the business community surrounding our parks. Anything which brings in more customers and has them stay longer benefits everyone.
2. Manufacturing our own firewood bundles is another profitable offering. Dave Barr, one of our entrepreneurial park managers, located a source of free slab wood in a lumber mill within a mile of his service area. All he had to do was to cut it to length and bundle it with seasonal labor - no splitting was necessary. Our best private business statewide firewood bid was \$2.50 a bundle. Dave can produce it for \$1.40 or less. Both deliver to the parks for that price. It should be noted that proposals from other locations to use expensive skilled labor in the "off

season" to haul, split, cut, and bundle firewood were rejected as not cost effective.

3. Rental of recreational vehicle trailers all set up on a campsite ready to move into was an idea generated by several of our park managers at the same time. There is an increasing market out there of folks who want to try out an RV before they invest in one or who simply want the experience without the hassle of ownership. Our numbers indicate that we can recover our initial investment within 20 to 30 months. Three to six RVs per campground incurs manageable cleaning costs with much cost being absorbed by existing staffs.

Self Operation Of Concession Facilities Previously Operated By Private Business Under Contract

This, like the charging for services previously provided for free, is a tough challenge that has to be approached very carefully. "Privatization" is a politically popular phrase these days and this idea goes just the other way. A number of critical criteria have to be met for self operation, or "self op", to be successful and accepted by your visitors and the political environment. These include:

1. The present concessioner is providing unsatisfactory service which is reasonably notorious and can be corrected by self op.
2. The return to the state is low or nonexistent from the concessioner and pro forma returns from self op appear substantially better.
3. The park manager has "the fire in the belly" to successfully self op, has a modicum of ability, and will accept direction and assistance.
4. The state can apply substantial economies of scale, which a concessioner cannot match in a parallel operation, and which enable it to self op at considerably better return than a concession contractor can provide.
5. The pro forma demonstrates that the "incremental" costs of self op result in a substantially increased net cash flow to the state. We differentiate here between "incremental" and "absolute" costs of self op. "Incremental costs" are those costs which actually decrease cash flow. "Absolute costs" are those costs actually attributable to the self op and which may or may not impact cash flow. As an example the salary of the park manager is an absolute cost but not an incremental cost. The park bears the costs of the park managers salary regardless of whether there is a self operation or not. The cost of goods sold is both an incremental cost, because it decreases cash flow, and an absolute cost because it is attributable to the self op.

6. The state, through economies of scale and innovative management, can produce customer services markedly superior to any present or projected concession operation.

The goal of any venture into this field is to demonstrate superior customer service and satisfaction with increased cash flows to the state. There are situations in which the cash flows are so marginal that we choose self operation as the only means by which we can provide satisfactory quality services to our customers.

There are also many situations in which we have an excellently performing concession contractor and have no plans to do other than support an already satisfactory situation.

Through experimenting in this arena we have learned many valuable lessons which enable us to make better decisions about which operations should be concessioned out and which ones make good self operations.

We operate 80+ beaches and nearly 40 of these have some type of food and sundry concession in or adjacent to them. Historically many of these operations have exhibited poor customer satisfaction ratings. As we attempted to self op some of the poorer ones we "discovered" that the cash streams they generate were so low that no one could provide any reasonable level of service because the labor costs were beyond recovery. The answer lay in implementing a vending machine operation and doing away with labor intensive operations at them. The vending operation provides much of what visitors want at far less cost and it totally resolves the complaint of not being open on low use days. Visitors accept the change reasonably well offsetting a somewhat lower level of service with uniform availability.

Our major tool for evaluating self operation versus a concession contract is a parallel pro forma with which we evaluate prospective concession contract bids against self operation figures. We have no problem with saying a self op simply didn't work out and going back to a concession operation -if the quality of service and cash flow evaluations so indicate.

In closing it is well to note that the future for funding the operation and maintenance of parks is likely to hold more emphasis on self sufficiency funding as opposed to tax dollar funding. Tax dollars at all governmental levels are getting more dear with each passing year. Innovating ways to increase cash flows from application of private business principles and methods may be the only way park managers can continue to provide quality operations for their customers.

OUTDOOR RECREATION
MANAGEMENT

**EXAMINING THE NATURE OF RIVER
RECREATION VISITORS AND THEIR
RECREATIONAL EXPERIENCES ON THE
DELAWARE RIVER**

Katharine A. Pawelko

Assistant Professor, Western Illinois University, Department of
Recreation, Park and Tourism Administration, 400 Currens
Hall, Macomb, IL 61455

Ellen B. Drogin

Research Analyst/Planner, Maryland-National Capital Park and
Planning Commission, Information Management Division,
Research Section, 14741 Governor Oden Bowie Drive, Upper
Marlboro, MD 20772

Alan R. Graefe

Associate Professor, The Pennsylvania State University, School
of Hotel, Restaurant and Recreation Management, Leisure
Studies Program, 201 Mateer Building, University Park, PA
16802-1307

Daniel P. Huden

Associate Professor, The University of Maryland, Department
of Education, Education Policy and Planning Administration,
Benjamin Building, College Park, MD 20742

This study investigated the nature of river recreationists and the meanings associated with their recreational experiences on the Upper and Middle Delaware National Scenic and Recreational River. A phenomenological, qualitative design based on Glaser and Strauss' (1967) Constant Comparative Method of Qualitative Analysis was utilized. Several key thematic axes revolving around the core theme of the "Delaware River" emerged from the data and were prepared in narrative formats. The main thematic axes included the following: a physical, sociocultural, legislative, and management profile of the Delaware River; key river access sites and their characteristics; types of river users and the attributes, properties, and dimensions of their experiences; and the nature of the river recreation experience. This research identified several unique themes that served to expand our understanding of the meanings river users attached to their recreational experiences. These themes provide new starting points for future exploration and broadened insight into the multiple properties and dimensions of recreation phenomena.

Introduction

Over the years, interest in and use of our rivers for recreational pursuits has greatly expanded. This has been especially the case with reference to rivers designated under the National Wild and Scenic Rivers Act of 1968. In particular, the Upper and Middle Delaware National Scenic and Recreational River is a prime and popular recreation resource located within the eastern megalopolis corridor that has attracted not only increased amounts of use, but greater diversity of use in the recreational forms and types of users (e.g., canoeists, rafters, kayakers, kayak rafts, anglers, jetskiers, motorboaters), and the cultural background of river visitors. This increased use has resulted in concerns about recreational carrying capacity. Furthermore, federal legislative mandates exist that require outdoor recreation resource managers to establish management guidelines to preserve the qualities of our outdoor recreation resources (Public Law 64-235; Public Law 90-542).

Early studies of the Delaware River (Dawson, Decker, Lime and Knopf 1981; Dawson, Decker and Brown 1981; Dawson, Decker and Smolka 1982; Strauss, Lord and Miller 1983; Strauss, Miller and Lord 1984) addressed recreational carrying capacity related concerns. These studies tended to focus on the numbers of river users and the different types of river recreationists and their recreational activity management preferences. These efforts were quantitative in nature and focused primarily on the questions "Who", "What", "When", "Where", and "How Many".

The notion of recreational carrying capacity was broadened in definition and scope and became referred to as "appropriate use management" (Marion, Cole and Reynolds 1985). This alternative management approach shifted the focus from recreational use limits (i.e., carrying capacity) to desired biophysical and social-psychological conditions appropriate for a particular resource setting (Knudson 1984). Inherent in the concept of appropriate use management is the subjective evaluation of what constitutes desired recreational use. With the continued introduction of new recreation technologies (e.g., jet boats, jet skis, inflatable kayak rafts), user groups, and ideas of how to use recreation places, questions concerning "what is appropriate use?" need to be posed by managers and to recreation user publics for periodic assessment of what constitutes the best recreational mix (Knudson 1984:478-480).

Determining appropriate recreational use is considered to be a highly individual matter based upon personal preference and one's prior experience background (Lime, Anderson, Knopf, Schomaker and Schreyer 1985:vi). Previous research has tended to categorize what people do in recreational environments. This may not, however, accurately reflect what is actually experienced during a recreational visit. As Laing (1967) pointed out,

We see other people's behavior, but not their experience....

Experience is man's invisibility to man....

People may be observed to sleep, eat, walk, talk, etc. in relatively predictable ways. We

must not be content with observation of this kind alone. Observations of behavior must be extended by inference to attributions about experience....

...behavior is a function of experience, and both experience and behavior are always in relation to someone or something other than self.

The literature suggested that a better understanding of the kinds of recreational experiences visitors sought, and the meanings recreationists attached to the settings and their experiences was needed. Research which raises the "Why", "For Whom", and "What Does It Mean" questions has been advocated as suitable for discovering the meanings users connect to their experiences (Knopf 1983; Downing and Clark 1985; Kelly 1987). This kind of information is important in the identification of factors that might contribute to more effective management of desired river recreation opportunities, so as to reduce undue impacts to the resource or social setting.

Since prior research has not provided sufficient explanation of the complex character of the recreation visitor experience through quantitative methods, it has been suggested that alternative approaches such as qualitative methods might yield greater holistic insight into the nature of the recreation experience (Kelly 1980; Lime et al. 1985:19). As O'Rourke (1989:11) noted, "In our quest for prediction and understanding, we often use linear models to explain what might well be a nonlinear phenomenon."

Purpose of the Study

In an effort to open up the realm of understanding about river recreationists and the experiences they desire, and the factors and conditions which produce these experiences, a phenomenological based qualitative research project was undertaken. Phenomenology as a research approach may be used to explore anew, various everyday things and experiences in people's lives: that which often gets overlooked or taken for granted in the ordinary patterns of daily life (Husserl 1911). As Harper (1981:117) explained,

It is the essential structure of whatever interests us which the phenomenologist attempts to describe. The phenomenologist is trying to make the implicit (what is taken for granted in our ability to recognize instances) explicit. The implicit is 'already there,' just not yet explicitly exposed to view. In describing what is commonly taken for granted, the phenomenologist looks for those necessary features which make a thing what it is.

The science of phenomenology presents us with a tool to explore recreational phenomena as experience rather than merely as activity. There has been support in the literature for approaching the study of leisure related phenomena from an experiential perspective (Kelly 1978, 1980; Iso-Ahola 1979,

1980). This study delved into river recreation experience phenomena from the recreationists' own perspectives and intuition.

The purpose of this study was to examine the nature and salient attributes (e.g., environmental and social) of river recreation visitors and the subjective meanings they ascribed to their recreational experiences on the Delaware River through grounded, naturalistic inquiry methods. This research was precipitated by a need to clearly identify the nature of river users and elements of their experiences so as to assist managers in understanding what contributes to and planning for satisfactory and appropriate river experiences.

Methods

Research Design

This study utilized a grounded, emergent, qualitative design to uncover the salient attributes, dimensions, conditions, and meanings recreational visitors attach to their river experiences. This approach was used since it is expansionist, discovery and process oriented, provides real, rich, deep, and valid descriptive narratives which are holistic in constitution, and facilitate understanding and meaning (Reichardt and Cook 1979:10).

Population and Sampling

This investigation was conducted at two river segments in the Northeast under the management of the National Park Service: the Upper Delaware National Scenic and Recreational River, which stretches 73.4 miles from Hancock, New York to a spot just downstream of Cherry Island near Millrift, Pennsylvania and Sparrow Bush, New York (Conference of Upper Delaware Townships 1986:59); and the Middle Delaware National Scenic and Recreational River, which flows 40.6 miles from just downstream of Port Jervis, New York to the geologic notch known as the Delaware Water Gap (Delaware River Basin Commission 1993:III-12). The population of this study included all river recreationists associated within the riparian corridor of the Upper and Middle Delaware River segments during data collection periods. Sampling was conducted at twenty-five river sites on 202 observation occasions; 158 interviews with recreationists were carried out. Additionally, eight background information gathering research visits were also made to related agencies (e.g., National Park Service District Offices, canoe liveries, historical societies, citizen advisory councils, local newspaper offices). The sampling of sites and subjects was inductively directed based on the determination of their theoretical relevance. Multiple visits were made to each site to account for different times of the day, week, weekend, season, or holidays. Sampling was conducted with the intent to uncover the typical as well as atypical phenomena. A purposive sampling plan was developed. The sampling process was also guided by application of Wiseman's (1974:326) criteria of adequacy for determining the relative importance of a finding in order to reduce the potential mass of irrelevant data:

- (1) Is it significant because it affects a great many people?

- (2) Is it significant because it illustrates or reveals something of a more general (and significant) nature about human behavior?

Instrumentation

The study investigator served as the primary, iterative research instrument in an ongoing process of gathering, coding, and analyzing data. Triangulated data collection strategies included investigator conducted on-site river recreation observations, interviews with river recreationists, and a researcher compiled reflexive journal. To meet the necessary demands for establishing trustworthiness (i.e., reliability, validity, objectivity) in a qualitative study, the standards of credibility, transferability, dependability, and confirmability as respective analogues to internal validity, external validity, reliability, and objectivity (Lincoln and Guba 1985:189, 219, 300-332) were implemented. Strategies such as the triangulation of techniques, prolonged observation and exposure in the field, a search for negative cases, and a cross-checking of sources contributed to the credibility of the data, while thick, rich description aided its transferability, and auditing techniques (e.g., transcript and reflexive journal paper trails) supported data dependability and confirmability.

Data Collection and Treatment

A purposive sampling plan guided data collection at observation and interview sites. Observations were conducted and field notes collected in an unobtrusive manner. Structured or unstructured interviews were administered according to the availability of time and willingness of river recreationists. Structured interviews included a set of pre-established questions (e.g., What were the salient attributes of the recreational visitor experience?; How did river recreationists define "appropriate recreational use" of the Delaware River?; etc.), whereas unstructured interviews consisted of open-ended, probing questions which permitted opportunities to uncover richness in the data, provide clarification on particular topics, and delve more deeply into the nuances and meanings river users associated with their river experiences.

Data collection, coding, and analysis were conducted as an inductive, iterative process. The data were prepared and recorded in the format of observation, interview, and reflexive journal transcripts. These data transcripts were then treated by applying Glaser and Strauss' (1967) Constant Comparative Method of Qualitative Analysis to code, process, and analyze the various emergent categories, properties, and dimensions inherent in the data. Open, axial, and selective coding techniques were performed on the data. Procedures that serve to promote theoretical sensitivity during the data coding process were utilized; these steps helped to break the data apart and then assisted in piecing the data back together around an emergent core axis. The data were transformed into narrative themes that explored the manifold concepts, categories, properties, and dimensions which were grounded in the data set. These themes served as a basis for comparability across study sites, and represented an idiographic and holistic versus a nomothetic explanation of phenomena associated with this study.

Findings

The principal focus of this investigation was concerned with answering the central question and research problem, "What is the nature of river recreationists and their recreational experiences, and the meanings they attach to these experiences on the Delaware River?" Results of this study were represented in several thematic axes as they emerged during the course of this qualitative inquiry. These thematic axes were discovered to revolve around the core theme of "The Delaware River".

The Delaware River and Its Characteristic Influence

Rivers occupy a special place in our history, culture, psyche, and soul. Numerous stories have been written about rivers: Twain's Life On The Mississippi; DeVoto's Across The Wide Missouri; Wolfe's Of Time and The River; Thoreau's A Week On The Concord And Merrimac; and Naipaul's A Bend In The River. Rivers are associated with the theme of wonder (DeVoto 1947). The influence of rivers courses through the exploration and settlement of our nation, the establishment of our commerce, literature, art, and, not the least of these, our recreational pursuits. The Delaware River is one of the significant rivers that has left its imprint on regional culture, and more recently, has shaped people's recreational interests and opportunities.

The Delaware River was found to attract a wide range of recreational users, some of whom were first-time visitors while others returned for repeated visits. A characteristic shared by many of these recreationists was their concern for and attachment to the outstanding aesthetic and environmental features associated with the Delaware River Valley. These strong connections occurred even though the Delaware River, while considered an aesthetic resource, is not usually associated with an accolade of superlatives; that is, the Delaware River is not the fastest river, not the most challenging whitewater river, nor the most remote river. Yet, the Delaware River seemed to evoke strong feelings of affection, loyalty, and attachment among a variety of recreational visitors, whether local or non-local users in terms of their points of origin. The Delaware River seemed to symbolize the experience of a very special place, as measured by the comments of recreational visitors to this area who developed and expressed strong attachments to this river valley.

A range of comments indicating recreational visitor affection for the river were noted. These comments reflected the following feelings for or attitudes toward the river as a place: possessiveness (e.g., "my river" or "our river"); gravitation to and fascination with water or water-oriented activities (e.g., "I never get tired of it"; or expression of being mesmerized by watching the flow of the river); protectiveness (e.g., "I would like to see the river remain unpolluted and the area kept from becoming too built up"); personal or family/group recreation tradition (e.g., "We come up here every year or so for a reunion"); leisure identity (e.g., "I'm a kayaker/canoer/angler..."; "I/We made it through Skinner's Falls without tipping over the canoe"); and recreational

symbolism inherent in this environment (e.g., "It's being able to know firsthand what it was like for the pioneers, such as the rugged individualism and sense of self-sufficiency, being a risk-taker engaged in adventure, witnessing the breathtaking beauty, and experiencing the frontier spirit and self-renewal associated with wild areas."). These Delaware River related phenomena seem to be similar to other research indicating the existence of a special relationship between human activity and the places or settings in which they occur (Proshansky, Ittelson, and Rivlin 1970; Tuan 1977). The relationships between recreational engagements and the physical settings in which they occur (Williams 1985) and the dimensions affecting attachment to these places (Moore and Graefe 1994) have been studied. Perhaps artist Alan Gussow's (1972:27) observations about our sense of place best captures the essence of the emotional qualities some river recreationists develop towards the Delaware River:

...as humans we also require support for our spirits, and this is what certain kinds of places provide. The catalyst that converts any physical location...into a place, is the process of experiencing deeply. A place is a piece of the whole environment that has been claimed by feelings.

Aside from aesthetic and affective qualities associated with the Delaware River, the river valley possesses a unique set of biophysical, sociocultural, legislative, and management characteristics that were influential in attracting recreational visitors to the area. Biophysical attributes included clean river water, exceptional trout, shad, and eel fisheries, wildlife to observe, and a location within the vicinity of major eastern metropolitan areas. Historical-sociocultural-economic attributes of the setting provided a special appeal to visitors. The cultural roots of the river valley can be traced to the earliest days of settlement of this nation. Remnants of that history remain as National Historic Landmarks or are included on the National Register of Historic Places. "Heritage Tourism" (Curtis 1993), a special brand of tourism which appeals to outsiders, generates important economic revenues while it contributes to the preservation of the traditional quality of life in a community. The existence of numerous canoe and raft liveries made river float trips especially attractive and convenient for recreationists, and the monies generated made important contributions to the local economy. River users enjoyed the legislative and management attributes that made the Delaware a special river in the Northeast by virtue of its designation in the National Wild and Scenic Rivers System. Not all river users were aware that the river was technically part of the national system of protected rivers, but most visitors had an inkling that the Delaware was a special park and were glad that it was recognized and set aside for its special qualities. Recreationists, overall, were supportive of the management attributes associated with the river, which allowed them a great range of freedom to use the resource so long as the various types of river use did not degrade the resource or encroach upon other peoples' freedom to enjoy the river. Public awareness and affection for the biophysical, historical-sociocultural, economic, and legislative roots and significance of the Delaware River as a special place provide powerful

incentives for public participation in caring for and managing the recreational resource appropriately

The following provides an illustration of the importance of the Delaware River as a place and what made it special to a river recreationist, whose thoughts reflect the sentiments of numerous other river visitors. A fellow from Manhattan, New York City spoke of his experiences at the Delaware River with the study investigator while onsite at Skinner's Falls, New York. This river user identified himself in multiple experiential roles as an advanced canoeist, kayaker, camper, and nature observer. He thought that it was wonderful and very farsighted to legislatively designate the river for resource protection and public use. He considered the Delaware River to be practically in his own backyard, so to speak, given its proximity to New York City. This avid outdoorsman explained that he had canoed or kayaked rivers in the western United States and on other continents that possessed a grandeur exceeding the Delaware River for beauty or challenge. Yet, he expressed a preference for the Delaware River; it was home to him. It was not a matter of one particular factor that made the Delaware a compelling place for him, but rather a combination of things. He spoke of the river as being a nice, verdant setting to be in during the summer. While the river valley did not have the spectacular peaks lining the area as found out west, he described the Delaware River Valley as having a special beauty of its own. He spoke of the rural character of the area and its history. He was grateful that, in this day and age and proximity to the eastern megalopolis, the Delaware River was still relatively untouched and that U.S. Congress acted to protect its outstanding qualities. The fact that a lot of "tacky", modern tourism effects had not invaded the area was also important to him. He emphasized that the Delaware River was a great place to bring his children to share and pass on his love of the outdoors and watersports with them, and have the opportunity to teach them ethical conduct in the outdoor tradition. Furthermore, he found that it was very convenient and feasible in economic, travel, and temporal terms to enjoy the Delaware River on numerous repeat visits.

Overall, the river provided visitors with some good opportunities to enjoy the out-of-doors, pass the time in an interesting way, and have some lighthearted fun. Many of these individuals were introduced to the river through a family member or friend. For some river users, however, the attachment to place went deeper: the river and the events it supported were an integral part of a visitor's life and lifestyle, and the river recreation experiences contributed meaning to the user's life. The river was a mesmerizing scenic amenity over the seasons of one's life. The river provided a source of mental and physical refreshment to visitors with its ever changing vista and possibilities for adventure. The river was a steadfast companion and confidant: a place where one could go to pass the time, enjoy a spot, consider one's thoughts, or leave the world behind. The river was a constant feature in one's life: something taken for granted as always being there, in a world that is otherwise adrift in change.

Discussion and Implications

Qualitative studies such as this one provide a window of opportunity to discover information that may be difficult to extract through quantitative study approaches. That is, a sense of the quality and meaning of a visitor recreational experience may not be satisfactorily revealed or represented by numbers alone. Qualitative studies which display narrative themes grounded in data gathered firsthand from the users provide a fuller palette of the "colors" reflected in their experiences and the finer "shadings" of meanings gained as a result of their recreational encounters. A grounded, qualitative approach also permits us to know and verify the intrinsic elements and characteristics which are essential to outdoor recreation experiences according to the participants. In an era of economic constraint and restraint, it is critical for managers to know that which is sacrosanct about outdoor recreation experiences to recreationists, so these components may be preserved intact or altered in the least intrusive manner.

Outdoor recreation resource managers need to have an understanding of the freedom recreational users have in designing either a primitive style river camping trip or a commercial livery campground style trip, especially on the Upper Delaware River. Numerous livery sponsored river trips were available, but they represented only one style of river experience. Some river users preferred to organize their own trip, but found it difficult to plan the overnight camping component if they did not want to stay at commercial campsites, since public sites were very limited in availability. Provision for the greatest range of recreational styles would permit river users greater freedom of choice and accompanying satisfaction associated with their river trip.

The notions of aural and personal space seem to be culturally relative phenomena. These factors warrant further consideration and monitoring in terms of how they affect appropriate recreational use and visitor satisfaction. These elements are especially important to monitor as the mix of recreation visitors becomes more ethnically diverse and the prospect of discordant norms of behavior among visitors increases. Management strategies may be needed to establish standards for appropriate behavior at recreational sites to reduce the potential for conflicts. Related to this, managers need to address the role of outdoor recreation as a facilitator of increased cultural understanding among diverse peoples to help reduce conflicts among visitors, and to expand appreciation for and the wise use of outdoor recreation environments. Furthermore, managers need to consider how to mediate the behaviors urbanists bring into park and recreation lands so some of those behaviors are more appropriate and sensitive to the rural character of outdoor recreation settings (e.g., through education and interpretation). Related to this, managers and researchers could address the relationship between nature appreciation and the exhibition of respectful outdoor recreation behavior norms.

Recommendations for Further Research

Mark Sageff (1992) wrote, "We become Americans by becoming native to this place." National Park visitors now reflect the diversity of the population. Future research may address the role of leisure acculturation, that is the role and influence of outdoor recreation places in the cultural assimilation and acculturation process of people from diverse ethnic backgrounds in this country. Cultural assimilation and acculturation is a two-way process, wherein new members of society are affected by the existing culture, and they in turn impart distinctive influences upon the society at large and its institutions. Research will be needed that investigates the types of conflicts that erupt when different cultural mores, attitudes, and traditions interplay and overlap in outdoor recreation settings. Additionally, the National Parks system is a uniquely American institution, tradition, and experience; how do experiences within the system contribute to diverse peoples' sense of and attachment to place, and thus contributes to their becoming native to a place?

Further research which incorporates qualitative methodologies in outdoor recreation studies is also suggested. The recreation experience and the numerous roles or "hats" that users "wear" (e.g., angler/canoer/picnicker/nature observer) are multidimensional and complex in nature, necessitating the selection of research methods best suited for the research problems to be examined. Furthermore, the application of qualitative methods to leisure phenomena provides an opportunity to enhance the validity of comparable findings gathered through quantitative approaches across the leisure studies field. More specifically, qualitative methods may contribute to the confirmation of what has been found through quantitative studies or they may help to reveal new avenues where research is needed, since qualitative inquiries help us to go beyond the typical "forced choice" selections associated with quantitative designs. Another value of phenomenological based studies rests in their ability to shed new light on commonplace topics so they may be viewed anew. The expanded understanding of leisure phenomena and new directions for further exploration arise from this process in a manner as reflected in one of T.S. Eliot's (1970:208) poems:

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And to know the place for the first time.

Literature Cited

Conference of Upper Delaware Townships (COUDT). 1986. Final River Management Plan. Upper Delaware Scenic and Recreational River: New York and Pennsylvania. Prepared in cooperation with the Commonwealth of Pennsylvania, State of New York, Delaware River Basin Commission, National Park Service, and the Upper Delaware Citizens Advisory Council, November. 197p.

Curtis, Mary E. 1993. A heritage tourism tool: National Register of Historic Places. In: Vander Stoep, Gail A. (ed.); Proceedings of the 1992 Northeastern Recreation Research

Symposium; 1992 April 5-7; Saratoga Springs, New York; General Technical Report NE-176. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station, April: 73-74.

Dawson, Chad P.; Decker, Daniel J.; Lime, David W.; Knopf, Richard C. 1981. Characteristics and management preferences of 1979 summer river recreationists on the Upper Delaware River. Natural Resources Research and Extension Series No. 15. Ithaca, NY: Cornell University Agricultural Experiment Station, and the New York State College of Agriculture and Life Sciences, Department of Natural Resources. 31p.

Dawson, Chad P.; Decker, Daniel J.; Brown, Tommy L. 1981. River recreation carrying capacity considerations for the Upper Delaware Scenic and Recreational River. Ithaca, NY: Cornell University, Department of Natural Resources, July. 71p.

Dawson, Chad P.; Decker, Daniel J.; Smolka, Jr., R. A. 1982. Management preferences of boaters and landowners along the Upper Delaware Scenic and Recreational River. In: Lime, David W., (technical coordinator); Forest and River Recreation: Research Update. Miscellaneous Publication 18; St. Paul, MN: University of Minnesota, The Agricultural Experiment Station: 14-19.

Delaware River Basin Commission (DRBC). 1993. Delaware River Basin Water Code. West Trenton, NJ: Delaware River Basin Commission, July.

DeVoto, Bernard. 1947. *Across the Wide Missouri*. Boston, MA: Houghton-Mifflin Company. 483p.

Downing, Kent B.; Clark, Roger N. 1985. Methodology for studying recreation choice behavior with emphasis on grounded inquiry. In: Stankey, George H. and Stephen F. McCool, (compilers); Proceedings--Symposium On Recreation Choice Behavior, March 22-23, 1984, Missoula, Montana; General Technical Report INT-184. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 101-106.

Eliot, T. S. 1970. *Collected Poems, 1909-1962*. New York: Harcourt, Brace and World, Inc.

Glaser, Barney G.; Strauss, Anselm L. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Hawthorne, NY: Aldine Publishing Company. 271p.

Gussow, Alan. 1972. *A Sense of Place: The Artist and the American Land*. 2 vols., illus. San Francisco, CA: Friends of the Earth.

Harper, William. 1981. The experience of leisure. *Leisure Sciences*. 4(2): 113-126.

Husserl, Edmund. 1911. *Philosophy as a Rigorous Science*. Translated by Q. Lauer. 1965. New York: Harper Torchbooks.

Iso-Ahola, Seppo E. 1979. Some social psychological determinants of perceptions of leisure: Preliminary evidence. *Leisure Sciences*. 2: 305-314.

Iso-Ahola, Seppo E. 1980. Toward a dialectical social psychology of leisure and recreation. In: Iso-Ahola, Seppo E., (ed.); *Social Psychological Perspectives on Leisure and Recreation*. Springfield, IL: Charles C. Thomas: 19-37.

Kelly, John R. 1978. A revised paradigm of leisure choices. *Leisure Sciences*. 1: 345-363.

Kelly, John R. 1980. Leisure and quality: Beyond the quantitative barrier in research. In: Goodale, Thomas; Witt, Peter, (eds.); *Recreation and Leisure: Issues in an Era of Change*. State College, PA: Venture Publishing: 300-314.

Kelly, John R. 1987. People and parks: What do we know? In: Herrman, Raymond; Bostedt-Craig, Terri, (eds.); *Proceedings of the Conference on Science in the National Parks, Volume I, The Plenary Sessions. The Fourth Triennial Conference on Research in The National Parks and Equivalent Reserves, July 13-18, 1986, Co-Sponsored by the U.S. National Park Service and The George Wright Society at Colorado State University, Fort Collins, Colorado: 103-121.*

Knopf, Richard C. 1983. Recreational needs and behavior in natural settings. In: Altman, Irwin; Wohlwill, Joachim F., (eds.); *Behavior and the Natural Environment. Volume 6 of Human Behavior and Environment: Advances in Theory and Research*. London and New York: Plenum Press: 205-240.

Knudson, Douglas M. 1984. *Outdoor Recreation*. (rev. ed.). New York: Macmillan Publishing Company. 568p.

Laing, R. D. 1967. *The Politics of Experience*. New York: Random House.

Lime, David W.; Anderson, Dorothy H.; Knopf, Richard C.; Schomaker, John H.; Schreyer, Richard. 1985. A research plan to study appropriate river recreation use on the Delaware Water Gap National Recreation Area, New River Gorge National River, and Upper Delaware Scenic and Recreational River. Research/Resources Management Report, Interagency Agreement No. IA-4000-4-0002. Philadelphia, PA: U.S. Department of Interior, National Park Service, Mid-Atlantic Regional Office, July. 38p.

Lincoln, Yvonna; Guba, Egon G. 1985. *Naturalistic Inquiry*. Beverly Hills, CA: Sage Publications, Inc. 416p.

Marion, Jeff; Cole, David; Reynolds, David. 1985. Limits of acceptable change: A framework for assessing carrying capacity. *Park Science*. 6(1)Fall: 9-11.

Moore, Roger L.; Graefe, Alan R. 1994. Attachments to recreation settings: The case of rail-trail users. *Leisure Sciences*. 16(1): 17-31.

O'Rourke, Thomas. 1989. Reflections on directions in health education: Implications for policy and practice. *Health Education*. 20(6): 4-14.

Proshansky, H. M.; Ittelson, W. H.; Rivlin, L. G. 1970. The influence of the physical environment on behavior: Some basic assumptions. In: Proshansky, H. M.; Ittelson, W. H.; Rivlin, L. G., (eds.); *Environmental Psychology: Man and His Physical Setting*. New York: Rinehart and Winston: 27-37.

Public Law 64-235. The National Park Service Act of 1916. *U.S. Statutes at Large*. Chapter 408. 39 Statute 535, 16 U.S.C. 1.

Public Law 90-542 (and as amended through Public Law 96-487). The National Wild and Scenic Rivers Act of 1968. Act of October 2, 1968. 82 Statute 906, 16 U.S.C. 1271-1287. (see: Chapter 28 - Wild and Scenic Rivers).

Reichardt, Charles S.; Cook, Thomas D. 1979. Beyond qualitative versus quantitative methods. In: Cook, Thomas D.; Reichardt, Charles S., (eds.); *Qualitative and Quantitative Methods in Evaluation Research*. Volume 1, SAGE Research Progress Series In Evaluation. Beverly Hills, CA: SAGE Publications, Inc.. 7-32.

Sagoff, Mark. 1992. Settling America or the concept of place in environmental ethics. *Journal of Energy, Natural Resources and Environmental Law*. 12(2): 349-418.

Strauss, Charles H.; Lord, Bruce E.; Miller, M. S. 1983. Boating usage in the Delaware Water Gap National Recreation Area. A formal report submitted to the U.S. Department of Interior, National Park Service, Delaware Water Gap National Recreation Area, Headquarters, Bushkill, Pennsylvania. University Park, PA: The Pennsylvania State University, School of Forest Resources.

Strauss, Charles H.; Miller, M. S.; Lord, Bruce E. 1984. 1984 Boating usage in the Delaware Water Gap National Recreation Area. A formal report submitted to the U.S. Department of Interior, National Park Service, Delaware Water Gap National Recreation Area, Headquarters, Bushkill, Pennsylvania. University Park, PA: The Pennsylvania State University, School of Forest Resources.

Tuan, Yi-Fu. 1977. *Space and Place: The Perspective of Experience*. Minneapolis, MN: University of Minnesota Press

Williams, Dan R. 1985. A developmental model of recreation choice behavior. In: Stankey, George H.; McCool, Stephen F., (compilers); *Proceedings--Symposium on Recreation Choice Behavior, 1984 March 22-23; Missoula, Montana; General Technical Report INT-184*. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, May: 31-45.

Wiseman, Jacqueline P. 1974. The research web. *Urban Life and Culture*. 3(3) October: 317-328.

**INCREASING MICHIGAN BOATER
COMPLIANCE WITH THE CLEAN VESSEL ACT
IN USE OF PUMPOUT AND DUMP STATIONS:
INFORMATION AND EDUCATION NEEDS AND
PREFERENCES**

Gail A. Vander Stoep

Assistant Professor, Department of Park, Recreation and
Tourism Resources, Michigan State University, 131 Natural
Resources Building, East Lansing, MI 48824-1222

To respond to the federal Clean Vessel Act and be eligible for related federal dollars to expand and improve facilities for recreational boat sewage disposal, states with coastal waters must develop a plan for a boat pumpout grant program. In addition to inventorying existing pumpout and dump stations, assessing numbers of boats with portable and installed toilets, and determining current boater use of pumpout facilities, understanding how boaters access and use boating information is a critical element of the planning process. This study, part of a larger Michigan boating study, focused on boaters' use of on-boat toilets and pumpout stations, barriers to use of this equipment, and the types of information and education sources used and preferred by boaters for getting boating information.

Introduction

Michigan residents and visitors from across the country are attracted by the numerous water resources present in Michigan. With its 3,200 miles of Great Lakes shoreline and numerous inland lakes and rivers, Michigan attracts many boaters and other water-based recreationists. For years, Michigan has been identified as one of the top two or three states for boating activity. In 1994 Michigan had 555,000 active registered boaters (of 770,000 total unexpired registrations) who reported 4.8 million boat days on the Great Lakes and 8.6 million boat days on inland lakes (Stynes, Wu and Mahoney, 1995). With this much boating use, the potential exists for extensive water quality degradation resulting from improper disposal of sewage from boats. While boaters certainly are not the sole source of potential sewage contamination of Great Lakes and inland waterways, they have been identified as one group to target for improved handling of sewage in a larger effort to reduce pollution of Michigan's waters. Because Michigan's coastal waters—composed of hundreds of bays, estuaries, river mouths, and harbors—do not enjoy the benefits of oceanic tides or longshore currents to flush or dilute pollutants, the potential for contamination from any accumulation of sewage is increased. Additionally, for Great Lakes waters there is no three-mile

limit from shore beyond which boats are allowed to dump treated sewage as are boats in ocean waters.

In 1992 federal legislation in the form of the Clean Vessel Act (PL 102-587) was passed in an effort to help reduce boat sewage pollution in US coastal and Great Lakes waters. The Act provides federal money to coastal states (including Great Lakes states) to increase the availability of sewage pumpout and dump stations for boats having Type III marine sanitation devices (either installed holding tanks or portable toilets). To access this money, states are required to submit a plan for providing sufficient numbers of pumpout and dump stations to meet boaters' needs, to increase access to and ease of use of these stations, and to otherwise facilitate their use by boaters. Part of this effort includes determining 1) boaters' awareness of relevant regulations, location of pumpout and dump stations, and how to use them; 2) boaters' current use of and need for pumpout and dump stations; and 3) boaters' used and preferred sources for boating information, including information about pumpouts and dump stations. By understanding these elements of boaters' awareness and behavior, an information and education plan can be developed as part of a total program for providing and facilitating increased use of pumpouts and dump stations by recreational boaters.

In some ways, Michigan had a head start on dealing with recreational boat sewage because its coastal waters were designated in 1987 as "no discharge areas" by the US Environmental Protection Agency (EPA) under Sections 312(f)(3) and 312(f)(4)A & B of the Clean Water Act. In response to that legislation, Michigan required all marinas with a capacity of 15 boats or more either to provide a pumpout facility or to have an agreement with a nearby marina to provide those services. That program and the Clean Vessel Act Pumpout Grant Program are administered in Michigan by the Michigan Department of Natural Resources' Land and Water Management Division. Through these programs, Michigan is attempting to provide additional pumpout facilities where needed and better facilitate boaters' use of those facilities.

Purpose of the Study

The overall purpose of this study is to develop an information and education plan to communicate more effectively with Michigan recreational boaters, marina operators and the boating industry about the Clean Vessel Act and the location and use of sewage pumpout and dump stations, and to increase use of these facilities.

The supporting objectives of the study were to:

- determine the actual number and location of sewage pumpouts and dump stations serving Great Lakes boaters in Michigan;
- determine boaters' current ownership of installed and/or portable toilet facilities on their boats;
- determine boaters' current use of pumpouts and dump stations;
- identify barriers and constraints to boaters' use of on-board toilets, pumpouts and dump stations;

identify boaters' sources of boating-related information, particularly about pumpouts and dump stations; identify boaters' preferred sources and locations for boating-related information, particularly about pumpouts and dump stations.

Methods

The information and education study was one part of a much larger Michigan recreational boating study, which included 1) a marina census (on-site inspections and interviews); 2) general boater survey (mail); 3) transient boater survey (on-site survey distribution); and 4) information/education and environmental attitude survey (mail survey plus focus groups). Some results from the other related studies will be incorporated in this paper; however, the methods and results will not be discussed in detail. For information, see Report 1 (Talhelm et al., 1995), Report 3 (Stynes, Wu and Mahoney, 1995), and Report 4 (Talhelm et al., 1995), all available from the Michigan Department of Natural Resources (DNR).

The information/education portion of the study used two primary data-gathering techniques: a mail survey and a series of three focus groups.

Mail Survey

The information/education mail survey, which used a sub-sample of respondents from the general boater survey, was conducted in November and December of 1994 after responses from the general boater survey were received. (The general boater survey used a stratified random sample of 6,000 from the total Michigan boater registration list of 901,000. This sample was stratified by geographic region and boat size class, with coastal boaters and owners of large boats being more heavily sampled.) The target sample size for the information/education survey was 2,000. Because this group was stratified only by boat size class and not by county or region, the smaller sample size was sufficient. The actual sample size of 1,949 was drawn from respondents to the general boater survey who indicated willingness to participate in a second survey. This survey was not included with the general boater survey because the combined length, which would have been extensive, probably would have reduced the response rate on both. The sub-sample was used so that responses from the general boater survey could be linked with those of the information/education survey and questions did not have to be repeated.

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

The sample was stratified by boat size class, with more drawn from boaters owning large boats because they are more likely to have installed and/or portable toilets than owners of small boats, for whom the questions might have seemed irrelevant. The final sample size of 1,949 was less than the target sample

size of 2,000 because not enough general boater survey respondents owning boats in Class Size C (21-28' boats) indicated a willingness to complete a second survey. Of the 1,949 surveys mailed, thirteen were undeliverable, three were returned and noted as "irrelevant" by the respondents, and two were marked with "respondent deceased," resulting in a final sample size of 1,931.

Boat Size	Original Sample Size	Sample Size adjusted for Undel/Irrel
≤ 16'	400	400
17-20'	400	395
21-28'	549	541
> 29'	<u>600</u>	<u>595</u>
TOTAL	1,949	1,931

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

Boat Size	Response Rate
< 16'	63.0
17-20'	63.0
21-28'	58.0
> 29'	66.0
OVERALL	62.0

Before analysis, 56 questionnaires were removed from the database either because the respondent stated having multiple boats (rather than the single boat corresponding with the registered boat upon which the sample selection was based) or because some other factor rendered the data unusable. With these surveys removed, the final number of usable questionnaires was 1,211. Of this total, the number and percent of the total respondents within each boat class size (before weighting) was:

Boat Size	Sample Size	Percent
≤ 16'	253	20.9
17-20'	248	20.5
21-28'	314	25.9
> 29'	<u>396</u>	<u>32.7</u>
TOTAL	1,211	100.0

Because there are many more small boats than large boats in Michigan, and because the original sampling scheme over-sampled the large boats, the responses were weighted to more accurately reflect the profile of boats of different sizes in Michigan. Based on the boat size profile weights, the percent of respondents with boats in each class size is listed in column A below. However, because some respondents own more than

one boat and completed the information/education survey based on a different boat from the one for which they were sampled, an adjustment to the weighted percent had to be made. Column B shows the revised weighting for each boat size class which was used for the analysis of survey data.

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

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

Focus Groups

Focus groups were used for the information/education portion of the study for three reasons: 1) to look for corroboration for results of the mail questionnaire; 2) to encourage candid discussion about boaters' use of and/or barriers and constraints to use of on-board toilets; and 3) to obtain more in-depth information about boaters' use of pumpouts and dump stations and their use of boating-related information systems.

Three focus groups were conducted in different parts of Michigan during early February of 1995. Respondents were selected from a list of registered boaters living within a 25-mile radius of each site and who were NOT on the sampling list for the general boater survey. An attempt was made to get representation from owners of both large and small boats, and both males and females. However, owners of small boats were less likely to feel they could contribute anything (size of boat, non-use of most boat facilities). Few females were listed on the boat registration list and, of those who were, many had unlisted phone numbers. Therefore, very few females and small boat owners participated in focus groups. (However, many of the focus group respondents owned more than one boat, both large and small. Some owned as many as 15 boats.)

Participation in the focus groups was 100% of those recruited, with the exception of one person for the Grand Rapids group who called about a week ahead of time about an unexpected schedule conflict. Because the focus group room was so small, no effort was made to replace this person. Group sizes varied depending on the size of the focus group research facility at each site.

Southfield (Detroit area)	13	participants
Grand Rapids	8	participants
Traverse City	12	participants

Focus group discussion addressed a variety of boating service and facility satisfaction issues, with a focus on boat toilets/pumpout and dump station use and sources of boating information. After introductions and an orientation to the session, the following outline was used to guide discussion.

1. Boaters' satisfaction with the following, based on the 1994 boating season:
 - a. Availability of boating access sites (public/private)
 - b. Availability of marina services (location, hours of operation, etc.)
 - c. Quality of marina services
 - d. Access to and quality of information about boating opportunities/facilities/regulations
 - e. Water quality
 - f. Fishing quality
 - g. Crowding perceptions
2. Boaters' use of on-board toilets, pumpouts and dump stations:
 - a. Type of toilet on boat
 - b. Use or non-use and why
 - c. Perceptions of boat sewage as a water pollution source
 - d. Personal procedures for disposing of sewage
 - e. Reasons that some other people do NOT use pumpouts/ dump stations
 - f. Awareness of existing pumpouts/dump stations; sources they used for information about pumpouts and dump stations
 - g. Cost issues related to pumpout/dump station use
 - h. Convenience (or lack of) for using pumpouts/dump stations
 - i. Their recommendations for increasing boaters' use of pumpouts and dump stations
 - j. Recommended providers of pumpouts and dump stations
3. Information sources for boating
4. Other issues
 - a. Experiences with and reactions to MI Department of Natural Resources' (DNR) boating regulation enforcement responsibilities
 - b. Identification of top 3 things that DNR could do to improve boating experiences
 - c. Identification of top 3 things that private boating industry could do to improve boating

- d. Identification of top 3 things that either the DNR or private industry could do to facilitate or encourage boaters to use pumpouts and dump stations
5. Miscellany. Any other comments/recommendations about MI boating

Each focus group session lasted about two hours, considerably longer than planned. Most participants were active discussants in all sessions.

Results

Factors Influencing Recreational Boaters' Use of Pumpouts and Dump Stations

Results for this portion of the report were taken from a combination of mail survey results and focus group comments. (Note that survey results are reported on weighted rather than raw data so that they are representative of the Michigan recreational boat fleet.)

Of those respondents with boats having any type of toilet on their boats, 55% had portable toilets and 45% had installed toilets. Only 3% indicated use of any other type of toilet system, which included pails, cans, portable urinals, a disposal chemical system, a self-contained unit with deck discharge, and "peeing over the rail."

For respondents having boats with toilets, it appears that the greatest use of facilities is of pumpout stations for boats with installed toilets, though some portable toilets (8%) appear to be emptied at pumpout stations. Those who have portable toilets tend to dump most often at home (73%). Some boaters use dump stations (20%), though it is unclear as to whether low use is due to the low number of dump stations provided at marinas and launch sites or because boaters simply find it easier to dump at their homes or cottages. Additionally, some boaters dump their portable toilets in public restrooms.

About 87% of all boats in the Michigan fleet do NOT have toilets of any kind, and so have no need for sewage pumpouts and dump stations. However, based on handwritten comments on the survey and from focus group discussion, small boat users are the ones who have the greatest difficulty finding ways to dispose of waste (this includes the lack of publicly accessible restroom facilities on shore as well as lack of toilets on their boats). Therefore, they are the ones most likely to urinate directly into the water or to use buckets and cans which are then dumped overboard. (This group is not represented in the data discussed above.) Focus group discussion indicated that all boaters, regardless of boat size, prefer to use land-based restroom facilities whenever possible and limit their use of both portable and installed toilets to when they are cruising or too far from a shore facility to make access quick and easy. Therefore, a major concern is the lack of on-shore, publicly-accessible restroom facilities and lack of places to dock temporarily while using on-shore restroom facilities.

Beliefs about Convenience of Using Pumpouts and Dump Stations

Respondents were asked a series of questions about factors that could facilitate or inhibit their personal use of pumpouts and dump stations. Overall, about one third of the respondents did not answer the question. Of those who did respond to the question, for all factors except "probability of getting caught," between 35% and 53% of the respondents said they "did not know" what they believed about pumpout station convenience factors (e.g., appropriateness of cost, ease of finding and using stations, proximity of stations to other boat services and facilities).

For this question, nearly 70% of respondents either did not respond or "did not know" if the cost of using pumpout stations was "about right." However, comments to open-ended questions and in focus group discussion indicate that high cost of pumping out tanks is a major deterrent and/or source of aggravation for boaters, even for those who do comply. Inconsistency of fees from place to place also is frustrating to boaters, who indicated finding fees ranging from \$1.00 to \$15.00 for a single pumpout. Those who use pumpouts and dump stations, especially if they boat regularly in a familiar area, tend to know where they are located and the hours of operation. Most do not have much trouble getting to or using them, nor do they have to wait in very long lines. Focus group boaters said that most boaters who slip their boats at a marina and boat in that area regularly, plan to use the pumpout stations during off-peak times to avoid waiting in lines. It is the transient and occasional boaters who find they have to wait in lines, particularly during peak holidays and weekends. Pumpout stations, where they exist, tend to be near other boat services. Most boaters do not have a concern about how long it takes to actually pump out a holding tank.

A variety of additional comments made by focus group participants support many of the questionnaire responses. In many cases, boaters pump out holding tanks while their fuel tanks are being filled; therefore, emptying holding tanks at such times is not considered an inconvenience. While there is strong sentiment among boaters, especially "serious boaters" (those with large boats and many years of experience), that almost everyone they know does actually use pumpout stations, most boaters do not think there is a strong likelihood that they will "be caught" if they dump directly into the lake.

Reasons for Non-use of Pumpouts and Dump Stations by Recreational Boaters

When asked in an open-ended question what they think are the main reason(s) that people do not use pumpouts or dump stations, the most often reported reasons were related to people's attitudes: laziness, being "too cheap," being inconsiderate and uncaring of other people and the environment, and generally being "low lifes." Often responses were given in bundles of two and three reasons (e.g., "lazy and cheap"). Also frequently reported as a reason for non-use was "general inconvenience." However, it is difficult to determine the specific factors contributing to this inconvenience. General attitudes of people are difficult and slow to change, and "general inconvenience" is difficult to define. Therefore,

management agency priorities probably should be placed on those factors which agencies and organizations can control and strategies they can implement. In the list of the top six reasons for non-use of pumpouts and dump stations (see Table 1), the most frequently mentioned controllable factors for boaters' non-use of pumpouts and dump stations are lack of education and information, and lack of sufficient numbers of facilities.

Table 1. Top six reasons boaters believe people do not use pumpouts and dump stations.

Reasons *	# of Resp (wtd)	% of Total Resp	% IDing Factor
People are lazy	63,635	20.3	27.8
Inconvenient (undefined)	42,322	13.5	18.5
People don't care (about people, environment)	31,098	9.9	13.6
People are "cheap," costs are too high**	27,392	8.8	12.0
Lack of education & information **	26,352	8.4	11.6
Lack of facilities (too remote, too far, at sea)	18,588	5.9	8.1

* Respondents could list up to four separate reasons.

** Factors printed in bold font are "controllable" by DNR or other agencies/organizations.

An additional comment frequently made (to this question and to several others, as well as during focus group discussions) was that boaters believe that the small amount of sewage dumped by recreational boaters is minuscule compared with other sources of water pollutants (e.g., sewage overflow from municipalities, dumping from commercial and foreign boats, agricultural runoff, and industrial discharge). Many believe that recreational boaters are inequitably singled out for enforcement and "hassle" when the major polluters appear to be "allowed" to discharge with minimal or no penalties.

Factors That Could Encourage Increased Use of Pumpouts and Dump Stations

When asked in the mail survey how effective each of a variety of strategies would be in increasing recreational boaters' use of pumpouts and dump stations, respondents identified that all the listed strategies could have some positive effect on increasing boaters' use of pumpouts and dump stations. However, those identified as being the five most effective include (in order by mean response) 1) strict enforcement of regulations; 2) more convenient location of facilities; 3) greater ease of maneuvering boats to dock; 4) better signs, brochures and other information, and 5) provision of more facilities (especially of dumps and in areas of highest boating use). Improved design of facilities (toilet systems and pumpout stations), extended hours of operation, shorter waiting lines, reduced cost to use facilities,

and provision of mobile pumpout facilities were also supported as effective to some degree.

In the open-ended question asking for recommendations for improving the availability and convenience of sewage dumps and pumpout facilities, education and information (18.5%), enforcement (12%), and development of more facilities (8.5%) were the most often cited strategies (see Table 2). There appears to be a contradiction in boaters' perception of the enforcement issue. On one hand, enforcement is strongly supported as a way to reduce illegal, dangerous or unwanted behavior—when it is for "the other guy." At the same time, there is strong sentiment that marine patrols (DNR, sheriffs, Coast Guard, etc.) focus too much attention and effort on recreational boaters, especially with "routine safety checks," in a way that "hassles" and is not customer service-oriented. There is some expression of suggestion that marine patrol officers should work first to educate boaters and provide information before administering sanctions (e.g., giving tickets, fines, etc.). A host of other ideas for improving the availability and convenience were identified also, but much less frequently than the top three. These included: a variety of design ideas, provision of self-service coin-operated and mobile pumpout stations, increased hours of operation, proper maintenance of facilities, and miscellaneous financial and other incentives for boaters and marina operators.

Table 2. Top three boaters' recommendations for improving availability and convenience of pumpouts and dump stations.

Recommendations *	# of Resp (wtd)	% of Total Resp	% IDing Strategy
More information and education	20,348	17.2	18.5
Enforcement (include fines, inspections, confiscation)	13,198	11.2	12.0
Provide additional facilities (require at all marinas, boat launches, harbors)	9,398	7.9	8.5

* Respondents each could list up to four separate reasons.

Recreational Boaters' Use of Information Sources

The mail survey was structured so that boaters first were asked to identify their primary sources of information related to boating. Most respondents checked more than one source, with source preference probably dependent on the type of information desired. Word-of-mouth (other boaters) was the primary source of information, followed by marina operators, boat stores, and boating magazines, suggesting that the boat industry and private sector are heavily involved in transmitting boating-related information. While nearly 30 different magazines were listed as a source of boating information, by far the most frequently mentioned was Lakeland Boating (75 respondents). When weighted, the most read magazine is still Lakeland Boating (13.2%). The next most often read (about

10% of boaters for each) are WoodenBoat, Boat US, and Classic Boat. Many boaters reported that they subscribe to more than one magazine. Yacht clubs were also listed as a source of boating information. In Table 3 are listed the respondents' primary sources of general boating information.

Respondents then were asked about their preferred sources of information related specifically to location and their use of sewage pumpouts and dump stations. For the most part, preferred sources for this type of information differed markedly from general boating information sources. The only exception was continued reliance on marinas and marina operators. The most preferred information sources included signs, marina operators, and brochures and pamphlets (see Table 4). While identified by a small number of respondents, the most frequently mentioned "other" sources (from open-ended question) included 1) information provided with boat registrations and renewals; 2) placement of pumpout station logos on charts, maps and harbor guides (including the DNR Harbor Guide); and 3) television spots.

Table 3. Primary sources of general information about boating activities, services and facilities (weighted).

Sources for General Boating Information	% Using Source
Word-of-mouth	69.4
Boat and marine stores	38.5
Government agencies	38.4
Launch sites	34.1
Marinas, marina operators	31.6
Boat shows	28.0
Boating magazines	23.8
DNR Harbor Guide	14.5
Other (non-DNR) harbor guides	6.7
Michigan Boating Annual (MBIA)	2.6

Table 4. Preferred sources of information about pumpouts and dump stations (weighted).

Preferred Sources for Pumpout/Dump Station	% Preferring Source Information
Signs	79.0
Marinas, marina operators	46.1
Brochures and pamphlets	47.5
Magazines and newsletters	25.5
Other boaters	23.5
Telephone hotline	21.5
On-line computer information sources	9.2
Videos	2.3

When asked in an open-ended format what they believed to be the single most effective media source and location for information about sewage pumpouts and dump stations, more than 20 different media formats and more than 25 different

locations were identified. However, by far the most preferred media formats included signs (large, standardized, and visible from the water) (26%), and brochures and pamphlets (20%). The next preferred sources included magazines and newsletters, telephone hotline, newspapers, and marina operators (however, all of these were much less preferred than signs and brochures). (See Table 5.)

Table 5. Top six boat owners' "single preferred media format" for receiving pumpout/dump station information (weighted).

Single Preferred Media Source	% Preferring Source
Signs	25.8
Brochures and pamphlets	20.0
Magazines and newsletters	8.4
Telephone hotline	7.9
Newspapers (local)	7.8
Marinas, marina operators	6.9

By far the most preferred locations for receiving pumpout information were marinas and launch sites, both public and private. The next most preferred locations were in boaters' "local area" (many identified their own town or county). While considerably less preferred than the top three locations, the DNR and Secretary of State's offices were ranked fourth as locations to get information. (For details about specific preferred locations for receiving pumpout information, see Table 6.)

Table 6. Boat owners' single preferred location for receiving pumpout/dump information (weighted).

Single Preferred Location for Pumpout Information	% Preferring Location
Marinas (public and private)	21.1
Boat launch sites (public and private)	20.6
Local area	20.1
DNR, Secretary of State's offices	7.9

During the focus group sessions, similar information sources and locations were identified. However, there was extensive discussion about whose responsibility it should be to provide this information. Many believed that DNR (i.e., "government") should not be interfering with boating and should not be responsible for disseminating information about pumpouts and dump stations. Private industry, they believed, should play a major role in disseminating the information, particularly because boaters frequently use private industry services (boat dealers, marine supply stores, marinas). On the other hand, discussions frequently evolved to recommending that "DNR should provide" the information to boaters, either directly to their homes, through private marinas and stores, or with boat registration materials.

Discussion and Recommendations: Plan for Provision and Distribution of Information about Pumpouts and Dump Stations

Provision of Sewage Pumpouts and Dump Stations

While many boaters either do not use (or do not need to use) sewage pumpouts and dump stations, and many believe that both services and information are adequate, a large number of boaters presented numerous recommendations for improving access to and use of pumpouts and dump stations as well as improving education and information distribution systems. It appears from combined results of the boating studies that perceived adequacy of facilities (in availability, maintenance and service) is largely dependent upon where the individual boat owners do most of their boating. Such differences were noted in focus group discussions, too, where people who boat in the southeast (where there is a high level of boating and heavy demand on facilities) and in more remote areas with limited facilities and few harbors of refuge (e.g., Mackinac Island, Isle Royale) are more likely to express a need for more boating services in general, including pumpouts and dump stations.

Based on these results, it is recommended that additional pumpouts and dump stations be constructed in those areas where there is expressed need rather than simply saturating the coastline with regularly placed pumpouts and dump stations. Some respondents did suggest requiring that pumpouts and dump stations be provided at A.I. marinas, gas docks and boat launches. In greatest statewide facility demand is provision of and information about dump stations for boaters who use portable toilets.

While recognizing a need for additional pumpout and dump station construction in some areas, respondents also expressed strong sentiment that effort and monetary resources be focused also on other factors. Based on their comments, recommendations include the following:

- Pumpout stations should be separated from fueling stations/gas docks so that those wanting only to empty holding tanks can do so without waiting in gas lines. (On the other hand, boaters commented that it is convenient to pump out holding tanks while filling fuel tanks. This may indicate that, in addition to providing pumpouts located at fueling stations, additional pumpouts [or perhaps longer hoses, or multiple hoses] located away from fuel pumps be provided.)
- Focus on design elements (in coordination with industry)— of installed toilets, pumpout station systems, docks, and access routes to pumpout station locations:
 - standard connectors, adapters for hose
 - tight seals on pumpout systems (toilet to pumpout station)
 - multiple hoses on pumpouts (to allow service to more than one boat simultaneously).
- Regularly inspect and assure that pumpout stations are maintained and function properly.

- Increase hours of operation (or at least match hours of operation with peak harbor use times, such as mornings and evenings).
- Do not allow docking space adjacent to pumpout stations to be used for boat slippage, which renders the pumpout stations inaccessible.
- Provide (require?) competent, trained and customer-friendly personnel at docks near pumpout stations (both public and private facilities) who can assist if problems arise.
- Provide more coin-operated, self-service pumpout systems (these are available at all hours, are more efficient, do not require paid staff, and allow the price for pumping to correspond with the volume disposed).
- Provide portable, mobile pumpout units which can be wheeled or floated (especially in locations where boats anchor or moor away from docks) to boats, especially the larger ones which have difficulty maneuvering to some pumpout station sites.

Another issue that was raised (discussed extensively during focus groups) with regard to use of toilet facilities was the need for more open-to-the-public restroom facilities on shore. Most boaters prefer to use on-shore facilities when they can; small boat owners believe they are limited to the on-shore/over-the-side choice. Most on-shore restroom facilities, where they exist, have restricted access or, in the case of some pit toilets, are not adequately maintained. A related issue is the need for adequate, temporary dock space (away from launch ramps) where boats can be tied while boaters use on-shore facilities. Provision of on-shore facilities would help reduce dumping directly into the lakes.

As discussed earlier, there seems to be disagreement among boaters about the role of law enforcement and boating activity, especially with regard to the issue of toilet use. Some want more and stricter enforcement; others want less. Regardless of the viewpoint, there seems to be mutual agreement that enforcement officers should be trained in "customer service," including positive communications strategies, education techniques, and provision of information messages/brochures. They should first try to inform and educate boaters before imposing sanctions.

Education and Information Systems

No single source or media format for receiving information about location, use, and rationale for pumpout station use was identified; rather, numerous sources and locations were strongly supported. Based on these results, and in accord with human tendencies to filter out much of the information constantly bombarding them, it is recommended that an integrated system be designed and implemented to disseminate information about use of pumpouts and dump stations. As indicated by boaters, there is a need for both education and information. (In this context, education is intended to mean

1) educating people about the biological and physical impacts of dumping raw or chemically treated sewage into the lake; 2) Great Lakes ecosystem and its benefits; 3) instilling a sensitivity to or resource ethic about preserving water quality; and 4) boaters' responsibility and contribution to protecting lake resources. Information refers to communicating information such as location of pumpouts and dump stations, how to use them, hours of operation, costs, etc.) Both education and information strategies are described below; however, first priority should be given to the information system because it has potential for the most immediate impacts and benefits.

Education is a long process and cannot be accomplished quickly or with a single "message." It should involve collaboration with organizations already teaching about the environment in general (school systems, nature centers, Extension specialists, youth groups, etc.). Information, materials and activities about the Great Lakes ecosystem, its health, and history can be incorporated into existing programs and curricula. Perhaps the boating industry (marina operators, Michigan Boating Industry Association [MBIA], boat dealers) could cooperate by sponsoring publication and distribution of materials, providing special training sessions, or simply by providing (and recommending) information materials through their marinas and stores.

It may be possible to work with the Power Squadron or Coast Guard to incorporate within their boating safety courses units about the Great Lakes ecosystem, the importance of protecting water quality, and suggestions about what boaters can do (technology, behavior, etc.) to contribute positively to water quality protection.

Additionally, mass media messages can be used, particularly during peak season, to remind boaters about their responsibility to properly dispose of sewage. Short TV spots, columns in local newspapers, short articles in yacht club magazines or bulletins could be used. Information could be provided about where to get detailed information or maps. Public Service Announcements, designed specifically for this purpose, could be developed in print, video, and audio format for publication and broadcast.

Information should receive the highest priority. A universal logo to identify pumpout stations and/or dumps should be designed. This should be used in a variety of venues.

- Install large, standardized signs (with pumpout station logo or icon) at harbor entrances, marina entrances or other appropriate locations (depending on physical layout), where they are easily visible from the water, to indicate that pumpouts and/or dump stations exist.
- Install duplicate signs, if needed, to further indicate exactly where in the marina or harbor they are located.
- Design clear, simple brochures (with both a map locating existing pumpouts and dump stations and a description of other relevant information [e.g., hours of operation,

attended or self-serve, cost, coin-operated or not]) which can be distributed through a variety of channels:

- provide brochures at marinas and boat launches;
- distribute brochures with boat registration and registration renewal notices (because this occurs in a three-year cycle, other outlets are needed also);
- provide brochures as an insert in Michigan or regional boating magazines, such as Lakeland Boating (perhaps publishers would consider cooperating by inserting them free of charge [as a print media public service announcement] if brochures are designed and printed by the State);
- insert brochures in DNR Harbor Guides;
- provide supplies of the brochures for distribution at boat shows, boat supply stores, DNR offices, state park offices, etc.
- As new Harbor Guides, charts, maps and other guides are printed, add the standardized pumpout station icon to those publications.

In general, important elements to remember in developing an effective information system are to provide consistent, repetitive, and accurate information in an integrated way in places the target audiences already frequent or where they receive services. Where possible, the information should be disseminated through existing, well-used channels. Consequently, cooperation in the design and implementation of an integrated information system should include representatives from the DNR, boating industry, marina operators, and enforcement officers. Each group must be committed to the mission of the information system, must facilitate its delivery, and be willing to provide the intended service in a timely, friendly manner.

Literature Cited

Dillman, D. A. 1978. Mail and Telephone Surveys: The Total Design Method. John Wiley and Sons: New York.

Clean Vessel Act Pumpout Grant Program. 50CFR Part 85, RIN: 1018-AB95 under authority of Public Law 102-587, Subtitle F. USDI Fish and Wildlife Service.

Talhelm, D. R.; G. A. Vander Stoep; E. M. Mahoney, G. Bishop, H.C. Lee; and T.C. Wu. 1995. Clean Vessel Act / Michigan Boating Study 1994-1995, Report 1: Great Lakes Boat Sanitation Facility Use and Needs in Michigan. East Lansing, MI: Michigan State University, Department of Park, Recreation and Tourism Resources.

Stynes, D.J.; T.C. Wu; and E. M. Mahoney. 1995. Clean Vessel Act / Michigan Boating Study 1994-1995, Report 3: 1994 Michigan Boating Survey. East Lansing, MI: Michigan State University, Department of Park, Recreation and Tourism Resources.

Talhelm, D. R.; E. M. Mahoney; G. Bishop; H. C. Lee; and T. C. Wu. 1995. Clean Vessel Act / Michigan Boating Study 1994-1995, Report 4: Great Lakes Marina Census And Marina Needs. East Lansing, MI: Michigan State University, Department of Park, Recreation and Tourism Resources.

MANAGING NEW FORMS OF RECREATION IN HERITAGE AREAS

Per Nilsen

Head, Appropriate Activity Assessment and Risk Management,
Natural Resources Branch, National Parks, Parks Canada, 4th
Floor, 25 Eddy St. Hull, Quebec, Canada. K1A 0M5

During the recent public consultation on proposed revisions to Parks Canada Policy (1979) the subject of the appropriateness of recreation activities services and facilities became a major issue. The paper describes the history of appropriate activities assessment in Parks Canada, Parks Canada's response concerns raised by the public and its initial success in implementing the Proposed Framework for Assessing the Appropriateness of Recreation Activities in Protected Heritage Areas.

History of Appropriate Activity Assessments

The principle that only certain recreation activities are appropriate to the setting of protected heritage areas is well established. In response to the tremendous growth in the number and variety of types of recreation use in national parks (e.g. backcountry use, motorized recreation such as snowmobiles and watercraft), Parks Canada Policy (1979) confirmed that not all types of outdoor recreation activities are appropriate to national parks. Furthermore, the 1979 Policy stated that Parks Canada would encourage those activities that foster public understanding, appreciation and enjoyment and which require a minimum of built facilities.

In the early 1980s, a process to assess the appropriateness of a recreation activity on a national basis was developed and tested using several activities (e.g. hang gliding, dog sledding, and trail bicycling) (Elliot, 1982), (Francis, 1982), (Mullen, 1982), (Bronson, 1983a; 1983b; 1984; 1985). The approach was innovative because it strived to be comprehensive through a workshop approach, and involved Parks Canada staff and stakeholders (participants, environmental groups, national organizations) to develop a position regarding the activity.

At this time, the basic concepts of the Visitor Activity Management Process (VAMP) were being established (Parks Canada, 1985b). VAMP had a significant influence on the criteria selected for appropriate activity assessments at the national level. This work in turn led to a proposal that the appropriateness of activities be assessed at the field level as part of VAMP.

The idea of appropriate activity assessments was premature and several shortfalls emerged:

- the complexity of the task had been underestimated.

- there was a lack of supporting social science information;
- Parks Canada became involved in an extended pilot project; and
- the assessments became complicated by political lobbying.

The national assessment of new activities was never fully established and no assessments have taken place since 1987. Several parks adapted the national approach to assess the appropriateness of activities at the field level (Tierney and Mcleod, 1985 and Nilsen, 1987) but these were never fully tested or widely adopted.

In 1990, Parks Canada initiated a process to revise and update the 1979 Policy. When a revised draft went to public consultation, the public and interest groups were quick to point out that key statements of principle stating that "not all types of recreation use are appropriate" had been omitted. In fact, this became one of the most frequently cited public criticisms of the proposed policy.

In response to the comments, the following steps were taken and incorporated in the Guiding Principles and Operating Policies (1994)[hereafter cited as Parks Canada Policies]:

1. One of the 10 Guiding Principles now addresses the question of appropriate activities;
2. Statements about appropriate use were re-instated in various activity policies;
3. A definition of an appropriate activity was included;
4. A requirement to specify the type and range of outdoor recreation activities and their supporting facilities at the park level as part of management planning was included; and
5. A set of criteria were defined to assess the appropriateness of the provision of services and facilities.

In essence, some of the principles of VAMP were incorporated in the policy and encouraged managers to answer the important questions:

- Who do we serve?
- What activities does Parks Canada support?
- Why should these activities be supported?
- Where should these activities be supported?
- When should these activities be supported?
- How (under what conditions) should they be supported?

Scope of Appropriate Activity Assessments

The activities which will be considered for appropriate activity assessments are those, which on a national basis, are allowable in heritage areas.

An allowable activity is defined as:

- One which does not contravene the National Parks Act and Regulations or Parks Canada Policies and which may also be appropriate to the conditions in a specific heritage area (Parks Canada, 1988b).

Examples of allowable activities include: backpacking, boating, camping, canoeing/kayaking, climbing, cycling, picnicking, pleasure driving, rafting, sail sports, skindiving, snowmobiling, snowshoeing, surfing, and swimming.

An appropriate activity is one which:

- is consistent with these [Parks Canada Policies] and the protection of ecological and/or commemorative integrity of protected heritage areas;
- is especially suited to the particular conditions of a specific protected heritage area, and
- provides the means to appreciate, understand and enjoy protected heritage area themes, messages and stories (Parks Canada Policies, 1994).

For example, trail bicycling is an allowable recreation activity in national parks, yet it may not be appropriate to the setting of a particular national park such as St. Lawrence Islands.

The Proposed Framework

The provision of opportunities for recreation activities is one important means of encouraging public understanding, appreciation and enjoyment of natural and cultural resources. Such first-hand experiences are a key method of fostering protection of these areas through environmental citizenship and stewardship. This principle is now reaffirmed in Parks Canada Policies (1994):

Opportunities will be provided to visitors that enhance public understanding, appreciation, enjoyment and protection of the national heritage and which are appropriate to the purpose of each park and historic site. Essential and basic services are provided while maintaining ecological and commemorative integrity and recognizing the effects of incremental and cumulative impacts.

Public opportunities are provided for in ways that contribute to heritage protection and national identity objectives, and that build public support for, and awareness of, Canadian heritage.

This commitment also presents challenges to protected area managers who must daily make informed decisions on the appropriateness and management of recreation activities. These

decisions must recognize that protection of ecological and cultural integrity is of highest priority in the establishment and operation of designated heritage areas. Parks Canada Policies state:

Parks Canada recognizes the need for control and management of appropriate activities. Public demand alone is not sufficient justification for provision of facilities and services in support of appropriate activities.

Services, facilities and access for the public must directly complement the opportunities provided, be considered essential, take account of limits to growth, and not compromise ecological and commemorative integrity nor the quality of experiences. They must be consistent with approved management plans. Also, they must reflect national standards for environmental and heritage protection and design, as well as high-quality services, the diversity of markets, equity of access considerations for disabled persons and visitors of various income levels.

Often these decisions must be made quickly, using the best available knowledge and research while giving full consideration to both the short-term and long-term consequences. The decisions must also withstand public scrutiny and be defensible by the Minister.

To assist protected area managers in addressing these important challenges and to fulfil policy requirements, a flexible tool for assessing the appropriateness of recreation activities at field locations has been developed. It was developed using Parks Canada's considerable experience and expertise in managing diverse visitor activities. The framework uses a checklist approach and is designed to complement and support implementation of the Visitor Activity Management (VAMP), Natural Resource Management, Management Planning, and Environmental Assessment and Review Processes (EARP) (Parks Canada, 1985a,b,c; 1991; 1992b).

The Goal of an Assessment

The goal of an appropriate activity assessment is to develop a management position regarding a particular outdoor recreation activity. There are three possible outcomes from an assessment.

1. An activity will be actively supported.
2. An activity will be permitted but not actively supported.
3. An activity will be prohibited from taking place.

Situations Requiring an Assessment

There are different situations which could generate the need for an Appropriate Activity Assessment:

1. The development or review of a management plan;

2. The development or review of a service plan and/or public safety plan; or
3. An independent assessment of an issue or new activity between management plans.

Steps in Completing an Assessment

There are five steps to completing an Appropriate Activity Assessment. A summary of the steps are presented here. For a more detailed description please refer to the technical paper - *A Proposed Framework for Assessing the Appropriateness of Recreation Activities in Protected Heritage Areas* (Parks Canada, 1994b). Parks Canada has also developed an electronic presentation/training package in conjunction with the Department of Recreation and Leisure Studies, University of Waterloo (Avedon, E. and Mighton, L. 1994).

Step 1: Setting the Context for an Assessment

Define the context of the activity assessment.

1. Is the activity new to the heritage area, an evolving activity or the result of a changing heritage area situation?
2. Outline the perceived issues relating to the activity.
3. Identify the goals and objectives of the assessment.

Step 2: Identification of Issues and Opportunities

There are ten criteria under which all of the issues and opportunities associated with the assessment of an activity are to be identified. The criteria can be viewed as a checklist.

1. Heritage Area Management Context
2. Visitor Experience Opportunities
3. Setting Opportunity
4. Heritage Theme Presentation
5. Market Expectations
6. Visitor Conflict
7. Visitor Risk Management
8. Heritage Area Services and Facilities
9. Co-operative Activities/Regional Integration
10. Environmental Impact

The headings are organized and presented using the basic VAMP concept. The concept illustrates that the provision of visitor opportunities must be within the context of Parks Canada's mandate and objectives. In defining these opportunities, one must also respect natural and cultural resources features/values and give consideration to public needs and expectations. Once the visitor opportunities that the heritage area is capable of providing are defined, one can begin to determine the activities, services and facilities that are necessary to provide high-quality visitor experiences consistent with Parks Canada's mandate.

Questions related to the first three criteria examine the heritage area management context and its relationship to visitor experience and setting opportunities. In essence: Does the heritage area have the resource base to support the activity and do the visitor experience opportunities provided by the activity

complement policy and long-term management orientation for the heritage area?

Questions grouped under the next six criteria focus on assessing the *suitability* of the activity to the environment. They examine the ability of the activity to present heritage themes and support visitor demand, the potential for visitor conflict, visitor risk management issues related to the activity, infrastructure needs/costs, co-operative activity potential and regional integration opportunities and issues.

Once the relative scale of the potential service offer is understood, then the last criteria, the environmental impact of the activity can be assessed using the initial screening component of EARP. It must be remembered that appropriate activity assessments are just that, preliminary assessments. If the results of an assessment show that an activity has some merit for a heritage area, then a service offer can be outlined based upon the service planning principles found in *The Guide To Service Planning*, 1988a.

Step 3: Synthesis

At this stage of the appropriate activity assessment all of the issues and opportunities related to the activity have been described. It is now time to take a more analytical approach, to identify the key issues and constraints, to identify potential solutions to issues and finally, to develop a management position towards the activity. To arrive at a synthesis, use the information from Step 2 to answer the following questions:

1. Does the heritage area have the resource capability to support the activity?
2. Is the activity suited to the heritage area environment?
3. How feasible is it for the heritage area to support the activity? Does the area have the human and financial resources to support the activity?
4. What are the key management issues emerging from the assessment of the activity?
5. What management alternatives are available to deal with the issues? For example, can a combination of direct (enforcement, zoning, rationing use, restricting activities, and indirect (physical alterations, information dispersal, economic constraints, management strategies (Loomis, 1985, be used to manage the activity? Are there partners and locations outside of the heritage area that are better suited to supporting the activities?
6. Are there viable options which can be selected?
7. Are there some issues that are not within the power of heritage area managers to resolve?
8. What is the impact of these issues?

Establishment of a Management Position

Using the information assembled thus far, the next task is to describe the heritage area's management position towards the activity. The possibilities range from encouraging the activity through to prohibiting it within the heritage area. If the management decision is to identify the activity as a supported

or permitted activity, a brief future service offer description should be prepared (see Step 4).

If the management decision is to identify the activity as a prohibited activity, a brief synopsis of the rationale for the decision should be prepared to document and justify the position taken.

Supported Activity

There are very few concerns related to the introduction of these activities because they relate positively to all aspects of heritage area management. The following checklist can be used to verify the appropriateness of an activity.

- Respects mandate of Parks Canada and the heritage area management objectives.
- Maximizes opportunities for appreciation, understanding and enjoyment.
- Supports presentation of natural and cultural resource themes and values.
- Activity is suited to the natural and cultural resource base.
- Responds to public needs and expectations.
- Provides high quality opportunities for heritage theme presentation.
- Can be supported using existing services or those which can be added within available resources.
- Can be supported with existing facilities or minor modifications to existing facilities.
- Can be operated within the context of existing budgets and person year allocations.
- Supports high priority Visitor Activity Groups
- Does not compete with existing opportunities outside of the heritage area.
- Provides opportunities for cooperative management, community support.
- Creates management benefits (e.g. revenue generation).
- Provides opportunities for new clientele.

An example is the bicycle trail network in Kouchibouguac National Park. The park was able to diversify opportunities available to visitors, while at the same time take advantage of existing roads and trails. The flat terrain is suited to the family orientation of the park's clientele.

Activity Permitted but not Supported

Generally these are activities which do not place significant demands on the heritage area's natural, cultural or financial resources and which only appeal to a limited visitor market, or are activities whose long-term popularity is untested. The superintendent may give permission without supporting the activity. This can provide the heritage area with the opportunity to assess the viability of the activity without establishing a long-term commitment.

An example of this type of opportunity is snowshoeing. It is an activity whose impact and popularity is generally limited, meaning that while heritage areas do not go out of their way to accommodate the activity, they also do little to regulate it.

There are pitfalls to this approach in that it is seldom easy to get rid of an activity once it has been permitted (e.g. snowmobiling).

Prohibited Activity

These are the activities that have significant constraints which render the activity incompatible with the management goals of the heritage area. Typically the constraints relate to the most important aspects of the Parks Canada mandate, that of the protection and conservation of a heritage area's natural and/or cultural resources. Attributes of discouraged or prohibited activities include the following.

- Directly inconsistent with one or all of the following: federal, provincial or municipal laws, National Parks Act, Parks Canada Policies, management directives, management plan, ecosystem conservation plan, service plan and public safety plan.
- Significant environmental, cultural and social impacts associated with the activity.
- Activity offers limited opportunities to appreciate and understand the heritage area themes.
- Activity does not relate directly to: the appreciation, understanding and enjoyment of a heritage area's purpose and objectives; ensuring ecosystem or commemorative integrity.
- Highly specialized activity appealing to a limited numbers of individuals.
- Activity requires more than a minimum of built facilities.
- High cost to develop services and facilities in support of the activity.
- Will result in negative effects upon or conflict with other heritage area users.
- Competes with existing opportunities available outside of the heritage area
- Significant visitor risks and/or liability issues.

An example was the decision to eliminate frontcountry camping in Point Pelee National Park. Other potential constraints which could preclude an activity from taking place are activities with an excessively high level of risk for participants (e.g. paragliding), or activities for which the cost to develop and manage is excessive in relation to the number of participants (e.g. paved in-line skating trails).

Step 4: Describe Future Service Offer

This step involves preparing a brief future service offer description for the new activities which are to be permitted or promoted as per the *Guide to Service Planning*. This can be in the form of a one or two page summary which includes headings such as objectives, discussion, levels of service, service priorities, and action items

The future service offer description becomes an important tool for the introduction and subsequent management of new appropriate activities. This description can be later updated and integrated into the new or revised service plan.

Step 5: Implement and Monitor

Once a management position is agreed upon and a service offer description is prepared, a brief implementation strategy, including appropriate monitoring actions, should be started. An important component of the implementation is to communicate to staff, stakeholders and the public which activities will be supported, discouraged or prohibited and under what conditions this will occur.

Discussion and Implications

The preceding description of Parks Canada's experience in responding to a major policy issue with a practical innovative tool has led to some initial success stories. Pilot applications of the proposed framework at Bruce Peninsula National Park, Fathom Five National Marine Park, Waterton Lakes National Park, Jasper National Park, Banff National Park and the Bar U Ranch National Historic Site have demonstrated that the approach can be adapted to a variety of situations and can produce important benefits to managers.

These include:

- helping the superintendent and staff at individual heritage areas to make informed and documented management decisions about the types of recreation opportunities offered to the public;
- guiding the development of a management position regarding these specific opportunities;
- providing a consistent framework within which activities can be assessed for their ability to contribute to the appreciation, understanding and enjoyment of heritage areas;
- assisting in the implementation of Parks Canada's decision making frameworks such as: Visitor Activity Management (VAMP), Natural Resource Management, Management Planning and Environmental Assessment and Review Processes (EARP);
- contributing to the protection of heritage resources by helping to apply EARP at the earliest possible stage consistent with Parks Canada's Management Directive 2.4.2;
- pro-actively contributing to Visitor Risk Management;
- guiding the provision of services and facilities and the development of service standards;
- contributing to wise allocation of financial resources by only supporting activities which are consistent with the National Parks Act, Parks Canada Policies and the specific role of the heritage area;
- considering visitors' needs within the context of the protection and conservation of heritage resources; and
- assisting managers to assess quickly proposals for new offers of service by partners and stakeholders (e.g. guides, outfitters, tour operators) which will lead to improved service to the public and enhanced regional integration.

The proposed framework has also been integrated with Parks Canada's Visitor Risk Management program (Parks Canada, 1994c) and associated Visitor Risk Management Training that is currently being implemented.

Now the time has come to share the accumulated knowledge, experience and innovations more widely so that the proposed framework can be tested in as many situations as possible and subsequently refined.

Bibliography

Avedon, E. and Mighton, L. 1994. A Proposed Framework for Assessing the Appropriateness of Recreation Activities in Protected Heritage Areas. Presentation/Training Package prepared by the Department of the Department of Recreation and Leisure Studies, University of Waterloo, for Parks Canada.

Bronson, P.D. 1983a. Hang Gliding in Canada's National Parks. Parks Canada. Interpretation and Visitor Services Division. Pp. 9.

Bronson, P.D. 1983b. Selection of Appropriate Visitor Activities. Parks Canada. Interpretation and Visitor Services Division.

Bronson, P.D. 1984. National Assessment: Acceptability of an Activity. Parks Canada. Interpretation and Visitor Services Division. Pp. 7.

Bronson, P.D. 1985. Trail Bicycling in National Parks: Summary Report for the Activity Assessment. Parks Canada. Interpretation and Visitor Services Division.

Elliot, C. 1982. Hang Gliding. National Parks Branch. Interpretation and Visitor Services Division. Pp. 40.

Francis, M. 1982. Selection of Appropriate Activities. Parks Canada. Interpretation and Visitor Services Division.

Loomis, L. 1985. Park Crowds are Pushing the Limits: NPCA has a Plan. National Parks. Vol. 59: 1-2. Pp. 12.

Mullen, E. 1982. A Process for Determining and Prioritizing Visitor Activities: Kejimikujik National Park. Wildlands Associates for Parks Canada.

Nilsen, P. 1987. Visitor Activity Assessment: Point Pelee National Parks. Environment Canada - Parks. Pp. 10.

Parks Canada. 1979. Parks Canada Policy. pp. 69.

Parks Canada 1985a. National Parks Management Planning Process Manual. National Parks Branch. Pp. 122.

Parks Canada 1985b. Management Process for Visitor Activities. Program Headquarters. Pp. 76.

Parks Canada 1985c. Procedures for the Application of the Environmental Assessment and Review Process. Management Directive 2.4.2. Natural Resources Branch. Pp. 20.

Parks Canada 1988a. Getting Started: A Guide to Park Service Planning. National Parks Directorate. Program Headquarters.

Parks Canada 1988b. Assessment of Visitor Activities. Management Bulletin 4.6.15. Visitor Activities Branch. Pp. 4.

Parks Canada 1990. Yoho National Park Service Plan. Western Region Office. Pp. 151 plus append.

Parks Canada 1991. Visitor Activity Concept. VAMP Technical Group. Program Headquarters. Pp. 16.

Parks Canada 1992b. Natural Resources Management Process Manual. Natural Resources Branch.

Parks Canada 1993b. Visitor Risk Management Framework. Pp. 14.

Parks Canada 1993c. Visitor Risk Management: Proposed Risk Assessing and Risk Control Guidelines. Program Headquarters. Pp. 35.

Parks Canada 1994. Parks Canada: Guiding Principles and Operating Policies. Department of Canadian Heritage. Pp. 125.

Parks Canada 1994a. Allowable Outdoor Recreation Activity Profiles: A Tool for Visitor and Risk Management. Prepared by Ashley Consulting for Natural Resources Branch and Visitor Activities Branch.

Parks Canada 1994b. A Proposed Framework for Assessing the Appropriateness of Recreation Activities in Protected Heritage Areas. Department of Canadian Heritage. Pp. 58.

Parks Canada. 1994c. Visitor Risk Management Handbook. Natural Resources Branch. Pp. 72.

Tierney, K. and A. Mcleod. 1985. Activity Assessment Form: Pukaskwa National Park. Parks Canada. Pukaskwa National Park. Pp. 5.

CROWDING ON THE BEACH: EXAMINING THE PHENOMENA OF OVER- AND UNDER-MANNING IN ALTERNATIVE ENVIRONMENTS

John J. Confer, Jr.

Instructor/Researcher, Program in Recreation and Parks Management, School of Hotel, Restaurant and Recreation Management, The Pennsylvania State University, 201 Mather Building, University Park, PA 16802

Alan R. Graefe

Associate Professor, Program in Recreation and Parks Management, School of Hotel, Restaurant and Recreation Management, The Pennsylvania State University, 201 Mather Building, University Park, PA 16802

James M. Falk

Marine Advisory Specialist, Sea Grant Marine Advisory Service, University of Delaware, Lewes, DE 19958

Crowding has been one of the most studied phenomena in the field of outdoor recreation, both directly and indirectly as it relates to social carrying capacity or visitor satisfaction. Few researchers have examined environments where too few people, or under-manning, might be as much a concern as too many people, or at least where higher densities are expected. This paper examines the traditional crowding model by testing relationships between observed density and perceived crowding, as measured by the standard 9-point crowding scale in a study of Delaware ocean beach users. However, we also attempt to examine the phenomena of under-manning using a 9-point, double-ended "influence of others" scale that provides a measure of over- and under-manning. Both models are further expanded to include other predictor variables including motivations for the visit. Finally, the traditional satisfaction model is tested using two different measures of crowding to predict overall satisfaction as measured by both a 10-point overall satisfaction scale and a separate measure of willingness-to-pay for beach recreation.

Introduction

Many researchers have examined a crowding model suggesting a causal link between visitor density and perceived crowding; while others have examined the impact of density and/or crowding on visitor satisfaction, commonly referred to as the "satisfaction model" (Heberlein and Shelby, 1977; Manning, 1986). In measuring crowding, also known as over-manning, some have attempted to measure crowding directly by asking

users the extent to which they felt crowded, typically on a nine-point scale from not at all crowded to extremely crowded. Others have posed hypothetical density levels and asked respondents to indicate their reaction to the various proposed densities and/or contact levels. However, most of the studies dealing with crowding or over-manning have dealt with wilderness, backcountry or other semi-primitive environments where motives associated with solitude are often cited (or assumed).

Crowding is defined as a negative psychological evaluation of a certain physical density or number of encounters (Altman, 1975). This was theorized to be associated with a reduction in enjoyment or user satisfaction (Wagar, 1964, Alldredge, 1973). Physical density is an objective measurement, often referred to simply as density, and usually refers to the use level without any evaluative component. Technically speaking density is a measure of the number of objects per unit area. However, density is most often used as a synonym for use level. Relative density typically refers to a rank ordering of number of users, with one level being more dense than a lower level.

Gramann and Burdge (1984) divided crowding based on social interference theory into three types, goal-related crowding, behavioral crowding, and physical crowding. Social interference theory is a conceptual foundation that suggests that crowding is a negative evaluation of incompatibilities between a level of physical density and the valued psychological goals or expectations a person holds for an experience. Goal-related crowding was defined as the degree of density-compatibility of valued psychological goals motivating a behavior. For example, if a major goal for participating in a certain activity is solitude, perceived crowding would interfere with the realization of the goal.

There have been a number of crowding models proposed in the literature (Wagar, 1964; Altman, 1975; Shelby and Heberlein, 1986; Kuss et al., 1990; Drogin and Graefe, 1990). Some of the major determinants of crowding suggested by these models include use level or physical density (Wagar, 1964); as well as, actual, perceived, reported, expected and preferred contacts (Shelby, 1976). Also, past experience and level of specialization (Graefe et al., 1985); type, location and duration of contact (Ditton et al, 1983) and degree of environmental impact and site degradation (Vaske, Graefe and Dempster, 1982) have all been shown to influence perceived crowding. Crowding varies by time or season of use; by location of contact or spatial distribution of use level; by resource abundance or availability; by resource accessibility or convenience; by type of use and depending on management actions (Shelby et al, 1989).

To measure perceived crowding many studies use a single item that asks visitors to indicate how crowded they felt (see Shelby, Vaske and Heberlein, 1989 for a more complete listing of studies using the nine-point crowding measure). This item, developed by Heberlein and Vaske (1977) has been well accepted and used in many studies. Shelby, Vaske and Heberlein (1989) suggest a compression of this 9-point scale into a two-category variable (not crowded [1-2] and crowded [3-9]). They reviewed, compared, and analyzed 35 studies that

used the 9-point crowding scale. They suggest that the compression will facilitate inter-site comparisons and allow managers a simple and quick instrument to gauge crowding problems. There has also been a scale proposed by Ditton, Fedler and Graefe (1983) that attempts to measure the impact of others on the visitors' enjoyment. This 7-point scale asked users to rate the effect of the number of others encountered ranging from positive, where it increased enjoyment, through neutral to a negative determination where their enjoyment was reduced. This scale was later expanded to a 9-point scale measuring the impact of others on enjoyment by Graefe and Drogin (1989). This "impact of others" scale offers an insight into the phenomena of 'undermanning' (Wicker, 1973; Heberlein, 1977). Undermanning is the reverse of crowding, where a user makes a negative evaluation of density as being too few people to realize their goals. For example, if you go to the beach to meet new people and socialize, you would not be able to realize this goal if the beach was deserted.

However, for the most part, the efforts to examine crowding and social carrying capacity reported to date have typically studied wilderness, backcountry and/or other low use areas. These areas typically experience low density use and visitors often express solitude as a goal or motive. There have been a few studies that examined high density use areas, such as the beach. McConnell (1977) examined the impact of congestion and other site qualities on beachgoers willingness to pay for Rhode Island beaches and found no significant relationship. When he controlled for other variables the relationship was significant but varied substantially from beach to beach, suggesting different types of beach may attract users with contrasting attitudes about crowding.

Methods

The data used in this analysis was collected from beachgoers in five Delaware ocean beach communities during the summer of 1993. Five-hundred and sixty-two on-site personal interview surveys were completed by two interviewers on 34 sampling days over the 5 beaches in June (n=96), July (n=225) and August (n=242). The interview counts for each beach are as follows: Rehoboth Beach, 129; Dewey Beach, 118; Bethany Beach, 115; South Bethany Beach, 96; and Fenwick Island Beach, 104. These beaches vary in size, level of use, degree of facility and amenity development and other beach attributes. This data was collected as part of a larger project assessing the economic benefits of coastal beaches and shoreline protection projects. The survey instrument included a variety of questions addressing users' attitudes and opinions on crowding, satisfaction, willingness-to-pay, motives for visiting the beach, as well as socio-demographic characteristics and a variety of other measures.

Relative density was measured using an interviewer estimate of beach use level based on a 5-level scale (1=light, 2=light-moderate, 3=moderate, 4=moderate-heavy, 5=heavy). The density estimates were conducted by only two field personnel and showed a high degree of consistency suggesting a reliable indicator of beach density. Crowding was measured using two

different scales. The more common 9-point crowding scale that asks respondents to indicate how they would describe the level of perceived crowding from 1=not at all crowded to 9=extremely crowded. An alternative measure of crowding was also used. This measure asks users how the number of people impacted their enjoyment of the beach, also a 9-point scale. However, this scale allows positive, neutral and negative evaluations of use level with 1=increased enjoyment, 5=no impact, and 9=decreased enjoyment. Visitor overall satisfaction was measured using a 10-point scale, with 1 = worst possible trip and 10 = perfect trip. Willingness-to-pay was also used to estimate visitor satisfaction, based on the assumption that visitors who were more satisfied would be willing to pay more for the experience. In addition, motives for choosing which beach to visit were measured.

Results and Discussion

Density

Relative density varied across the sample with 19% of the surveys completed on days classified as light use, 29% on light-moderate, 37% moderate, 14% moderate-heavy, and 1% heavy use days. Heavy use was described as the highest physical density with very little beach visible between users and their belongings, approaching the physical carrying capacity.

Crowding

As can be seen in Figure 1, crowding results across all of the beaches indicated a significant difference between the two crowding measures. The "impact of others" scale suggested that, overall, most users did not feel that the beaches were crowded with a mean value of 4.5. For example, almost one-third of the respondents indicated the number of others actually increased their enjoyment and slightly more than half said the number of others had no impact on their enjoyment of the beach on the day they were surveyed. Using the standard "perceived crowding" scale about half the visitors indicated a 5 or higher with a mean value of 4.7, implying moderate or extreme crowding.

Table 1. Comparison of crowding measures: "Perceived crowding" vs. "impact of others"

Impact of Others	Perceived Crowding			
	Not at all Crowded	Slightly Crowded	Moderately Crowded	Extremely Crowded
Increased Enjoyment	64%	40%	16%	9%
No Impact on Enjoyment	28%	55%	60%	31%
Decreased Enjoyment	8%	6%	24%	59%

Table 1 shows the crosstabulation of the two crowding measures. Only the bottom row, reporting decreased enjoyment due to the number of others fits the researchers' definition of crowding as a negative evaluation of density. For example, 59% of those who rated the conditions as extremely crowded (8-9) indicated that the number of others decreased their

enjoyment. On the other end of the scale, 64% of those indicating that it was not at all crowded (1-2) said that the number of others increased their enjoyment. These people tend to fit the traditional definition of crowding where low crowding levels increased enjoyment and high levels of perceived crowding decreased enjoyment. Interestingly enough, 9% of respondents who indicated it was extremely crowded said the number of others increased their enjoyment. These individuals appear to enjoy crowded conditions. On the other end of the scale are the visitors who may be experiencing undermanning. These respondents indicated that it was not at all crowded and the number of others decreased their enjoyment, suggesting they would like to have seen more people.

Satisfaction

Satisfaction was operationalized by asking visitors to rate, on a scale of 1 to 10 (with 10 being perfect), the overall quality of their beach experience on the day they were interviewed. Using this indicator, visitors appear to be very satisfied with an overall mean satisfaction value of 8.4. Only 5% of respondents rated their experience as a 5 or less, while almost one-quarter (23%) rated it a perfect 10 and another one-quarter rated their experience as a 9 (Fig. 2). High levels of satisfaction are not uncommon in recreation studies; however, these ratings seem to indicate that visitors to the Delaware beaches are very satisfied with the overall quality of their experience.

Visitors' willingness to pay, a second indicator of visitor satisfaction based on the work of Alldredge (1973), and Clawson and Knetch (1966), was measured using a two-part question. The first part used a dichotomous choice question that asked if the respondent would be willing to pay a use fee of a specific dollar amount (between \$1 and \$5) per person to use the beach. Fifty-six percent of respondents indicated they would pay the proposed fee amount. As a follow-up respondents were then asked what was the maximum amount they would be willing to pay for a day at the beach. The average that respondents were willing to pay to use Delaware beaches was \$3.01 per person per day. As shown in Figure 3, almost 23% of respondents indicated their willingness to pay as zero; however many of these were later classified as protest bidders (Falk, Graefe, and Suddleson, 1994). The modal WTP was \$5.00, possibly indicating a digit bias. Only 10% of respondents were willing to pay more than \$5.00.

When the two satisfaction measures were cross tabulated few trends became obvious and none were statistically significant. Visitors with low levels of reported satisfaction (1-6) tended to be willing to pay less than those reporting higher levels. However, those reporting the highest levels of satisfaction were not willing to pay more than slightly less satisfied visitors. One possible reason for the lack of observed differences might be because overall there was little variation across the quality rating.

Past studies have used a variety of measures to test the relationships between user density, perceived crowding and visitor satisfaction. Bivariate product moment correlation coefficients (Pearson's R) calculated for all indicators for comparative purposes are shown in Table 3. Relative density

(DENSITY) was significantly correlated to both measures of crowding, the perceived crowding (CROWD) and "impact of others" (ENJOY) scales with Pearson's R of 0.40 and 0.22 respectively. The "impact of others" scale was the only indicator significantly correlated to overall satisfaction (QUALITY) and was also not surprisingly correlated with the other indicator of crowding. Visitors' willingness to pay (WTP) was not correlated to any of the other measures.

Table 2. Comparison of overall quality and willingness-to-pay.

WTP	Overall Quality Rating				
	1 - 6	7	8	9	10
\$0.00	38%	26%	20%	19%	25%
\$0.01-\$1.00	21%	11%	13%	16%	16%
\$1.01-\$2.00	15%	14%	19%	19%	15%
\$2.01-\$3.00	12%	14%	12%	13%	11%
\$3.01-\$5.00	12%	24%	27%	23%	27%
> \$5.01	6%	11%	10%	10%	6%

Table 3. Zero order correlation of all measures.

	DENSITY	QUALITY	CROWD	ENJOY	WTP
DENSITY	1.00				
QUALITY	-0.01	1.00			
CROWD	0.40**	0.00	1.00		
ENJOY	0.22**	-0.11**	0.49**	1.00	
WTP	0.06	0.02	0.04	0.03	1.00

Regression Models:

The simple "satisfaction model" where density predicts satisfaction was not significant for either satisfaction measure, willingness to pay or overall visitor satisfaction. However, the simple crowding models where density predicts crowding were significant. For example density predicted 16% of the variance in perceived crowding with B=0.40 and B=0.22 and R²=0.05 for the "impact of others" scale. The expanded satisfaction model (Fig. 3) where density predicts crowding and crowding in turn predicts satisfaction was significant for overall quality as an indicator of satisfaction, but not for visitors' willingness to pay. This relationship was very weak with only 1% of the variance in overall satisfaction predicted by this configuration.

Based on the crowding literature and the goal interference model it was posited that including visitors' motives might add to the predictive power of the expanded satisfaction models. Motives were operationalized in this study through a series of statements that asked visitors their level of agreement to a list of reasons why they chose to visit a particular beach. Table 4 shows the percentage of respondents agreeing or strongly agreeing with each statement for all of the beaches and the label assigned to the statement in the regression models. It is notable that only 18% of respondents indicated that they came to the beach to be with a large number of people. In contrast, 37% indicated they came for solitude. However, 90% of respondents indicated socializing as a reason they came to the beach. The remainder of the list of possible motives tend to address physical beach attributes or available amenities.

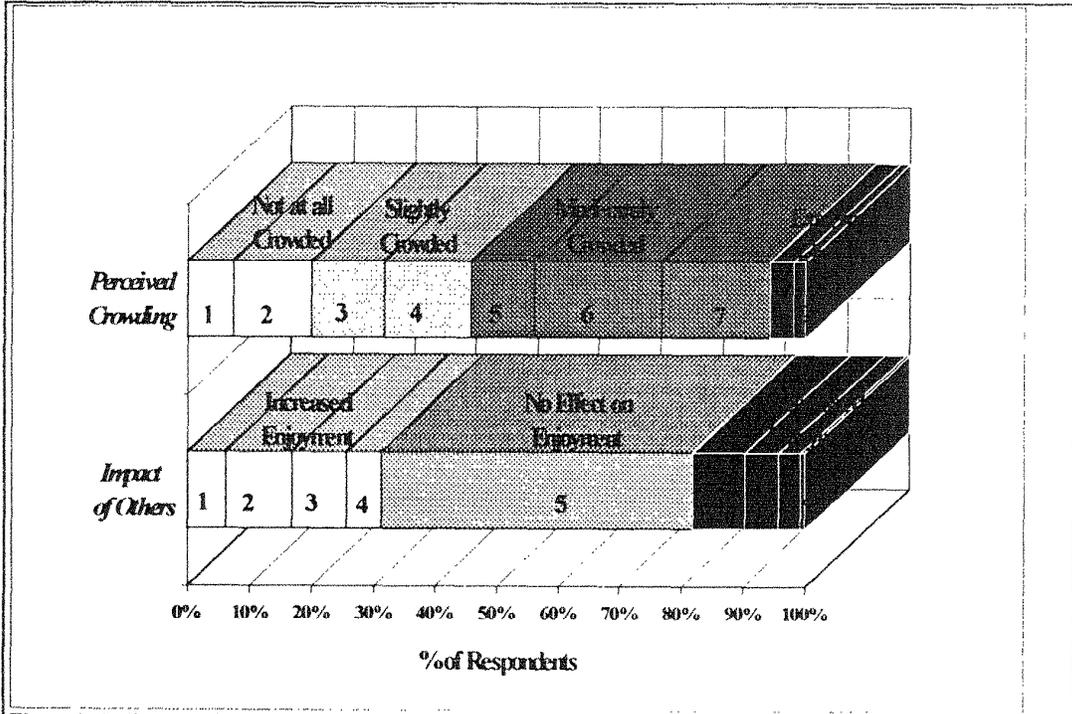


Figure 1. Indicators of crowding.

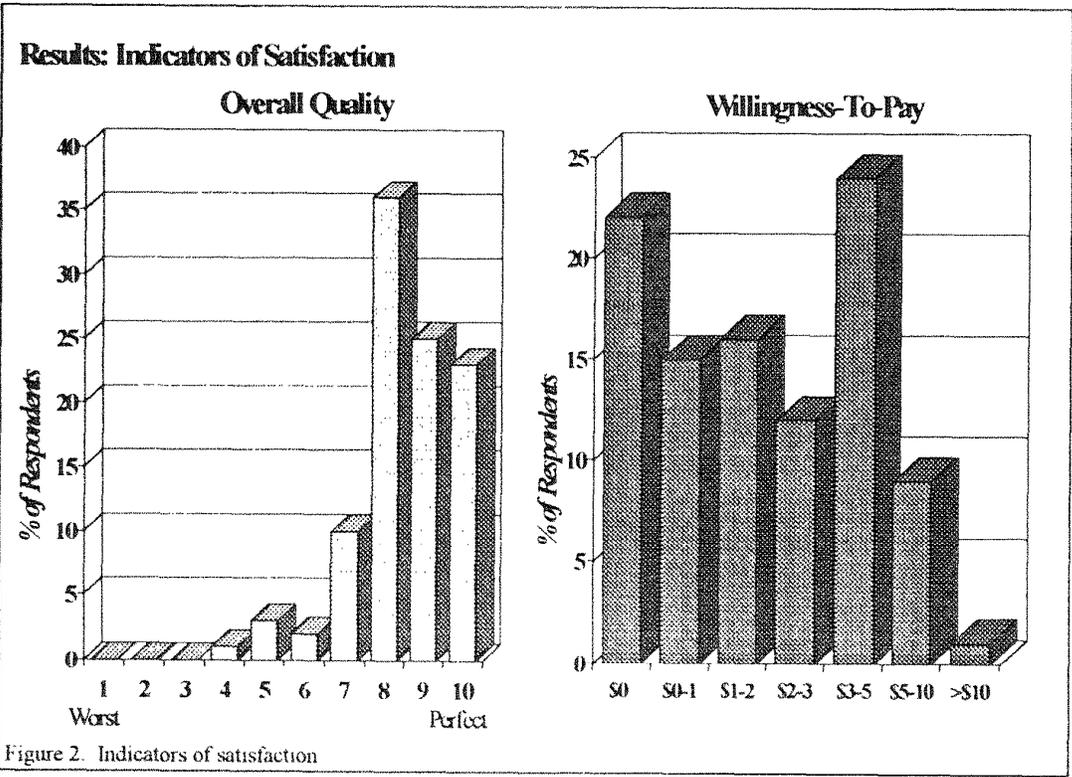


Figure 2. Indicators of satisfaction

However, motives addressing socialization and solitude did not enter the model. With the motives included, 5% of the variance in visitors' willingness to pay was explained by the expanded model (Fig. 4). For willingness to pay the strongest predictors tended to be the inexpensive nature of visiting the beach and the proximity of the beach to their residence. Overall quality, also shown in Figure 4, was predicted by perceived cleanliness and width of the beach. While perceived crowding was predicted by observed density, availability of rentals and beach width; the "impact of others" was predicted by density, availability of rentals, beach width, proximity to their residence and perceived scenic quality.

Table 4. Reasons why respondents choose to visit the particular beach where they were interviewed.

Motive Statement	Label ¹	% of Users ²
To be with a large number of people	(NUMBER)	18%
It has public restrooms	(RESTROOM)	32%
For solitude or to be alone	(SOLITUDE)	37%
There are adequate concessions/rentals	(RENTALS)	52%
There is little/no cost to enjoy it	(CHEAP)	76%
It is wide enough to enjoy my activities	(WIDE)	85%
It is close to my home/rental unit	(CLOSE)	86%
To socialize with friends, family and others	(SOCIAL)	90%
The beach is kept clean/attractive	(CLEAN)	93%
To engage in beach related activities	(ACTIVITY)	95%
To enjoy the visual qualities of the beach	(SCENERY)	97%

¹ Variable label used to indicate the statement in the models

² Percent agreeing or strongly agreeing with the statement

McConnell (1976) and others suggested that differences in beach attributes and type of beach may influence variation in willingness to pay. To test this we classified each of the five beaches in one of two types, Type I and Type II, based on geographic location, general use level, type of users, ease of

access, size of beach, and overall level of development. Type I beaches were more northern, tended to have generally higher use levels, were used more by nonresident singles and families, access was easier with public parking and large highways, beach area tended to be larger, and both the beaches and the area in general were more developed with more amenities (public parking, restrooms, beach rentals, concessions). Rehoboth Beach and Dewey Beach (n=247) were classified as Type I beaches. Type II beaches are located to the south, have lower use levels, are used mostly by resident families, with few visitors or singles, access was more limited with little public parking and smaller highways, beaches were smaller and less developed with fewer facilities and amenities. Bethany Beach, South Bethany Beach and Fenwick Island (n=315) were classified as Type II beaches.

Figures 5 and 6 show the expanded satisfaction models for both types of beaches. The relationships between density and crowding tend to be slightly lower than those observed for wilderness and backcountry areas. The results of these tests indicate the density/crowding models are valid for both types of beaches. The relationship between density and perceived crowding, however, was more significant on the Type II beaches with 45% of the variance in perceived crowding explained by density and two of the beach attribute motives, availability of concessions/beach rentals and width of the beach. These beaches typically experience lower densities and are more like the wilderness and backcountry research from which these models came. The other crowding indicator also differed significantly between the type of beach, but in the other direction. Almost twice as much variance in the impact of others measure was explained in the model for Type I beaches (14% for Type I vs. 8% for Type II). This difference may be due to the double-ended nature of the impact of others scale, allowing for the more social nature of these beaches where higher visitor density is not necessarily bad.

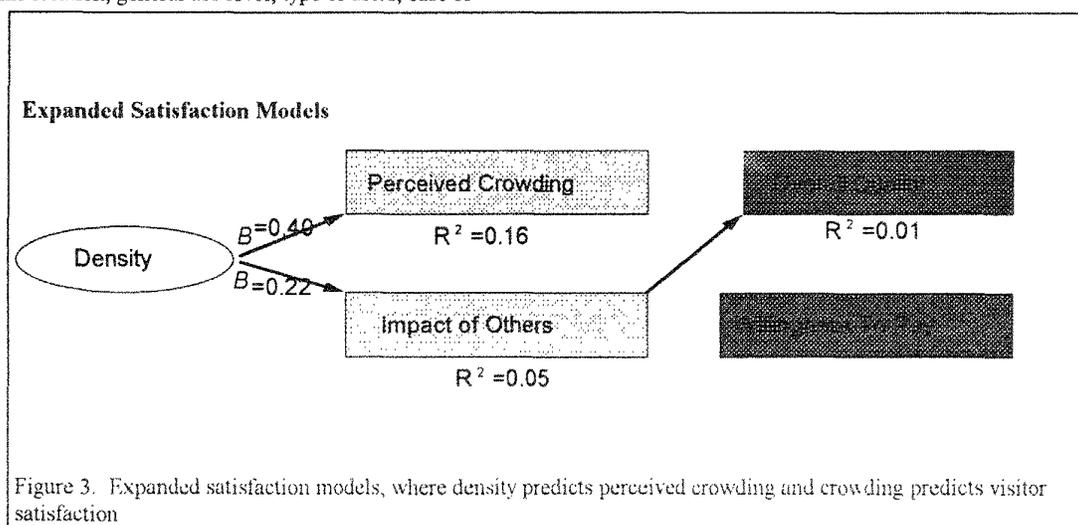
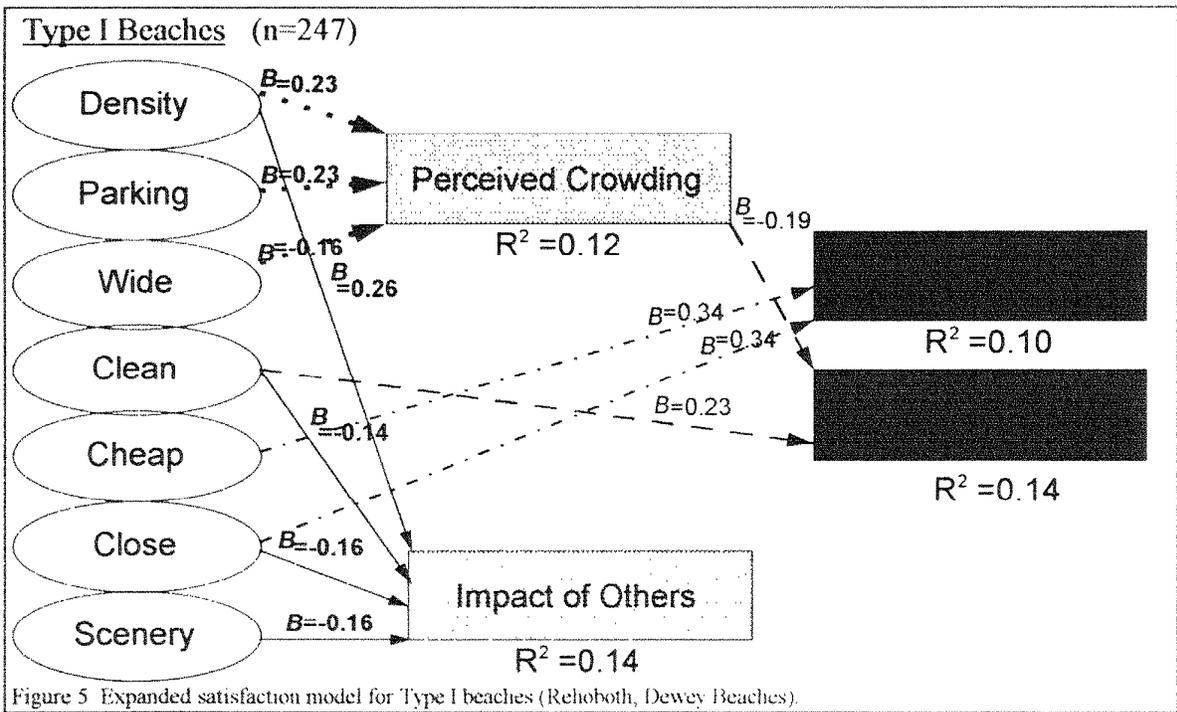
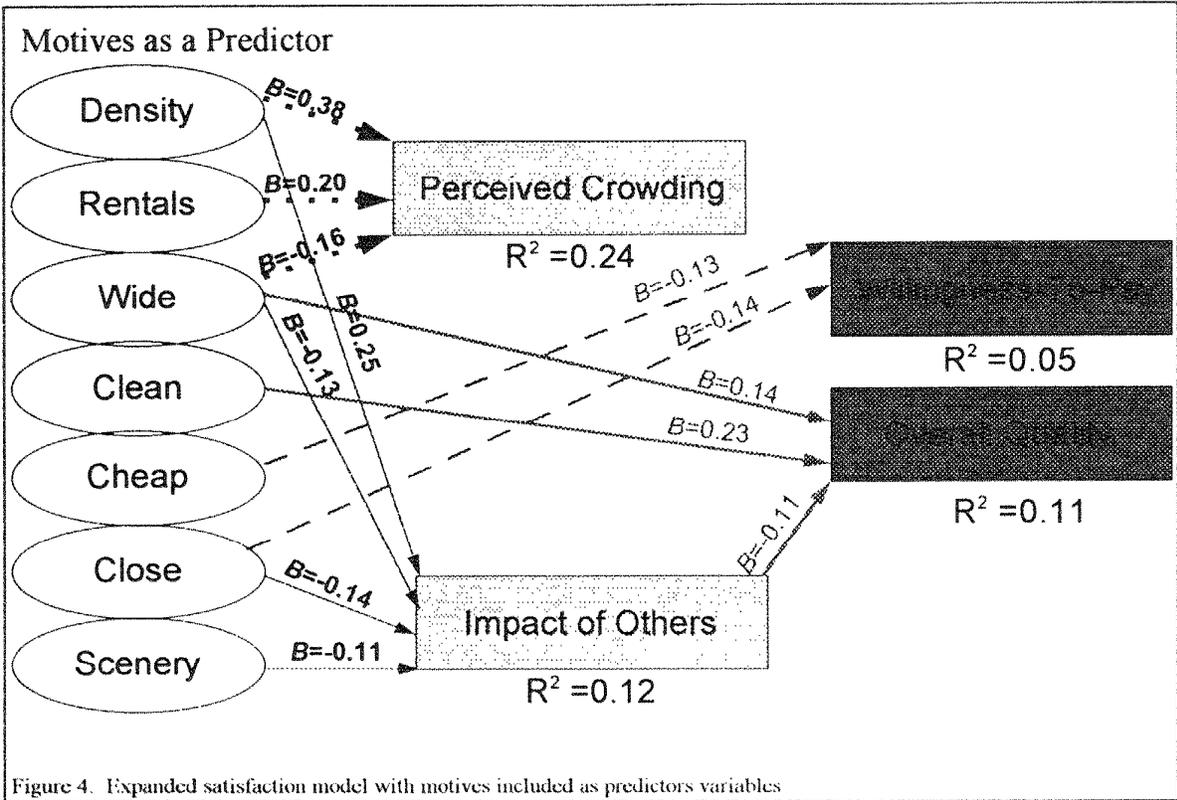


Figure 3. Expanded satisfaction models, where density predicts perceived crowding and crowding predicts visitor satisfaction



The indicators of quality were not predicted well by either measure of crowding (R^2 's in the 0.03 to 0.14 range), but were more often related to beach attribute and amenity motives. The satisfaction model using the 10-point overall satisfaction scale exhibited this trend in Type II beaches, but in the Type I beaches perceived crowding did enter the model. However, the separate measure of willingness-to-pay was found to be not significantly related to any of the crowding predictor variables and the predictive power of the models was very low.

As stated before, most of the original work on perceived crowding and visitor satisfaction was completed in wilderness, backcountry or other low use recreation areas. This research lead to the development of many of the theories on visitor attitudes and preferences still used today. Additionally, these original theories often form the rationale for carrying capacity determination and visitor impact management. This analysis seems to indicate that visitors to intensively used recreation areas tend to react similarly to those using less developed and low use areas. The simple satisfaction model where density predicts satisfaction is not well supported in either traditional settings or in this study of the beach environment. Manning (1986) reviewed 27 studies and found only limited support for this model. Shelby, Vaske and Heberlein (1989) review 35 studies and came to a similar conclusion. Our results also found no significant relationship between density and satisfaction. The simple crowding model, testing the relationship between density and perceived crowding was significant with between 5% and 16% of the variance in perceived crowding predicted by density. The backcountry models tended to predict crowding better with between 5% and

40% of variance explained. The crowding-visitor satisfaction link in the backcountry studies found a weak relationship, with R -squares in the range of (-0.05) to (-0.20). This model was not well supported in our analysis with an $R^2=0.01$. Further adding in motives increased the reliability of the models, but motives that entered the model tended to address beach attributes and amenities. In the backcountry, motives, usually dealing with solitude, played a large role. Like McConnell (1977) we found limited support for the relationship between willingness to pay and density and/or crowding.

When taken together our results tend to support the traditional crowding and satisfaction theories. However, caution should be used when applying these theories and concepts developed for backcountry and wilderness settings to more developed and intensively used front country settings. As more researchers and managers examine crowding and carrying capacity issues in front county settings they need to be aware of the historic roots before applying theoretical models that were developed for different conditions.

Acknowledgment

This work is a result of research sponsored by the Delaware Department of Natural Resources and Environmental Control, Division of Soil and Water Conservation; and the U.S. Army Corps of Engineers, Philadelphia District

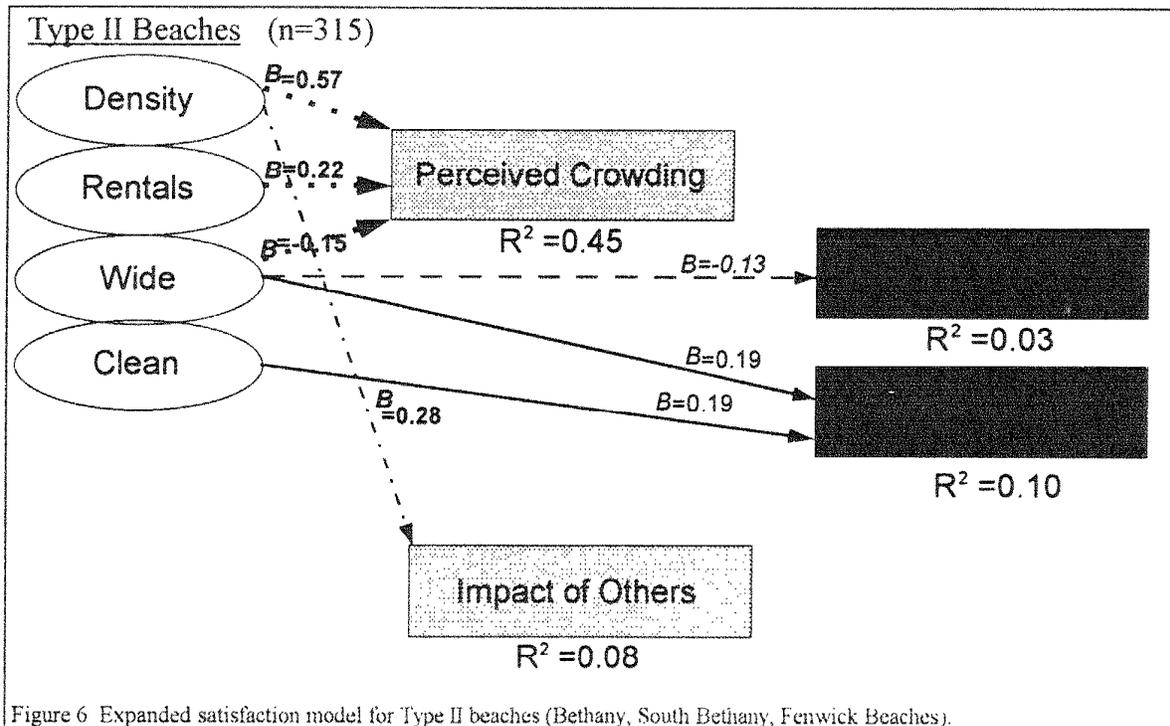


Figure 6 Expanded satisfaction model for Type II beaches (Bethany, South Bethany, Fenwick Beaches).

Literature Cited

- Absher, J.D. and R.G Lee. 1981. Density as an incomplete cause of crowding in backcountry settings. *Leisure Sciences* 4(3):231-247.
- Allredge, R.B. 1973. Some capacity theory for parks and recreation. *Trends* 10(Oct.-Dec.): 20-29.
- Altman, I. 1975. *The Environment and Social Behavior: Privacy, Personal Space, Territory, Crowding*. Monterey, CA: Brooks/Cole Publishing Company. 256 pp.
- Clawson, M. and J.L. Knetsch. 1966. *Economics of outdoor recreation*. Baltimore, MD: Johns Hopkins University Press.
- Ditton, R.B., A.J. Fedler and A.R. Graefe. 1983. Factors contributing to perceptions of recreational crowding. *Leisure Sciences* 5(4):273-288.
- Drogin, E.B., A.R. Graefe and J. Titre. 1990. Factors affecting boating satisfaction: a replication and comparative analysis. In: *Proceedings of the 1990 Northeastern Recreation Research Symposium*. February 25-28, 1990; Saratoga Spa State Park, State Parks Management and Research Institute, Saratoga Springs, NY. Burlington, VT: USDA Forest Service; General Technical Report.
- Falk, J.M., A.R. Graefe, and M.E. Suddleson. 1994. Recreational benefits of Delaware's public beaches: Attitudes and perceptions of beach users and residents of the Mid-Atlantic Region. Report # DEL-SG-05-94, University of Delaware, Sea Grant College Program, Newark, DE.
- Graefe, A.R., M.P. Donnelly and J.J. Vaske. 1986. Crowding and specialization: a reexamination of the crowding model, pp. 333-338 in *proceedings - National Wilderness Research Conference: Current Research*. July 23-26, 1985; Fort Collins, CO, General Technical Report INT-212. USDA Forest Service Intermountain Forest and Range Experiment Station, Ogden, UT.
- Graefe, A.R., J.J. Vaske and F.R. Kuss. 1984a. Social carrying capacity: an integration and synthesis of twenty years of research. *Leisure Sciences* 6(4):395-431.
- Graefe, A.R., J.J. Vaske and F.R. Kuss. 1984b. Resolved issues and remaining questions about social carrying capacity. *Leisure Sciences* 6(4):497-507.
- Graefe, A.R. and E.B. Drogin. 1989. Factors affecting boating satisfaction at Raystown Lake. In: *Proceedings of 1989 Northeast Recreation Research Symposium*. April 3-5, 1989; Saratoga Spa State Park, State Parks Management Research Institute, Saratoga Springs, NY. Burlington, VT: USDA Forest Service; General Technical Report NE-132.
- Gramann J.H. and R.J. Burdge. 1984. Crowding perception determinants at intensively developed outdoor recreation sites *Leisure Sciences*. 6(2):167-186.
- Hanmilt, W.F. 1983. Toward an ecological approach to perceived crowding in outdoor recreation. *Leisure Sciences* 5(4):309-320.
- Heberlein, T.A. and B. Shelby. 1977. Carrying capacity, values, and the satisfaction model. *Journal of Leisure Research* 9(2):142-148.
- Heberlein, T.A. 1977. Density, crowding and satisfaction: Sociological studies for determining carrying capacities. Pages 67-76 In: *Proceedings: River Recreation Management and Research Symposium*. USDA Forest Service General Technical Report NC-28.
- Heberlein, T.A. and Vaske, J.J. 1977. Crowding and Visitor Conflict on ythe Brois Brule River. Water Resources Center, Technical Report #OWRT A-066-WAS. University of Wisconsin, Madision.
- Lindsay, B.E., J.M. Halstead, H.C. Tupper and J.J. Vaske. 1992. Factors influencing the willingness to pay for coastal beach protection. *Coastal Management* 20:291-302.
- Manning, R.E. 1986. Density and crowding in wilderness: search and research for satisfaction. In *Proceedings: National Wilderness Research Conference: Current Research*. July 23-26, 1985. Fort Collins, CO. Ogden, UT: USDA Forest Service, General Technical Report INT-212.
- Manning, R.E. 1986. *Studies in Outdoor Recreation: A Review and Synthesis of the Social Science Literature in Outdoor Recreation*. Corvallis, OR: Oregon State University Press. 166 pp.
- McConnell, K.E. 1977. Congestion and willingness to pay: A study of beach use. *Land Economics* 53(2):185-195.
- Shelby, B. and T.A. Heberlein. 1986. *Carrying Capacity in Recreation Settings*. Corvallis: Oregon State University Press.
- Shelby, B., J.J. Vaske and T. A. Heberlein. 1989. Comparative analysis of crowding in multiple locations. results from fifteen years of research. *Leisure Sciences* 11(4): 269-291.
- Vaske, J.J., A.R. Graefe and A.B. Dempster. 1982. Social and environmental influences on perceived crowding. In *Proceedings: Wilderness Psychology Group Conference*. Morgantown WV. pp. 211-277.
- Wagar, J.A. 1964. *The Carrying Capacity of Wildlands for Recreation*. Forest Science Monograph 7. Washington, DC: Society of American Foresters 24 pp