

Table of Contents

Tourism

The Perceived Impacts of Tourism: Economic, Environmental, and Sociocultural Influences of Tourism on the Host Community. <i>James Murdy, Andrew Yiannakis, and Josh Stuart</i>	3
A Regional Analysis of the Consequences of Tourism Development From a Community Perspective. <i>Yoonshik Yoon and Joseph S. Chen</i>	11
An Evaluation of State Tourism Web Sites. <i>A. Leslie Burns and Robert A. Robertson</i>	17
Sustainability Indicators Regarding Tourism Development and Coral Reef Conservation: A Case Study of Akumal, in the Mexican Caribbean. <i>Wendy J. Garpow</i>	23
Developing a Culturally and Ecologically Sensitive Ecotourism in a Resource Extraction, Consumptive Recreation-Oriented Area. <i>Deborah Che</i>	30
Virtual Tourism on the Internet. <i>Robert S. Bristow</i>	35

Environmental Attitudes and Values

Environmentalism: A Study of Undergraduate Students. <i>Brijesh Thapa</i>	41
Attitudes of Outdoor Recreationists Toward Environmental Issues. <i>Gene L. Theodori and A. E. Luloff</i>	51
An Exploration of the Influence of Gender and Locality on Environmental Attitudes Using the New Ecological Paradigm (NEP) Scale. <i>Vinod Sasidharan and Brijesh Thapa</i>	57
Recreational Use of Wetlands in Juneau, Alaska. <i>James F. Palmer</i>	62
Environmental Education Needs Assessment: An Overview. <i>Anneliese Mueller, Robert A. Robertson, Eleanor Abrams, Scott Fletcher, Christine L. Schadler, and Dave L. Howell</i>	67

Water Resource Issues in Recreation

Improving Recreational Customer Satisfaction: Focusing on Communication and Changes in Quality of Experience at US Army Corps of Engineers Reservoirs. <i>James D. Absher, Robert C. Burns, and Alan R. Graefe</i>	73
Public Perception of the Connecticut River's Quality and Suitability as a Recreational Resource. <i>Jo Beth Mullens and Melissa McNally</i>	78
A Holistic Approach to Maintaining Quality in Environmental Management and Visitor Experience. <i>Elery Hamilton-Smith</i>	82
River of Promise: Community Based Conservation for the Cheat River Watershed in West Virginia. <i>Dave Bassage, Rick Buckley, Jeanne Kraje, Randy Robinson, and Steve Selin</i>	86

Gender, Ethnicity, and Special Populations

Ethnicity and Recreation: Problems With Concepts and a Need For New Approaches. <i>Edwin Gomez</i>	93
Similarities and Differences in the Outdoor Recreation Participation of Racial/Ethnic Groups: An Example from Illinois. <i>John F. Dwyer</i>	98
Disabled Wildlife-Associated Recreation Participants. <i>Allan Marsinko</i>	106

Visitor Experiences and Satisfaction

More on Conceptualizing and Measuring Leisure Involvement. <i>Gerard Kyle, Deborah Kerstetter, and Frank Guadagnolo</i>	115
User Satisfaction and Perceptions of Crowding in Four Adirondack Wilderness Areas. <i>Chad Dawson, Peter Newman, and Cathy Fuller</i>	120

Demographic Trends

Demographic Change in the 21 st Century: The Impact on Recreation Participation. <i>Amy L. Sheaffer, Ken Cordell, and Joseph T. O'Leary</i>	129
The New England Travel Market: An Update of Changing Demographics and Geographic Markets, 1980 to 1996. <i>Rod Warnick</i>	134
Promoting In-State Tourism Using Travel Consumer Profiles. <i>Sotiris H. Avgoustis</i>	141
The Relationship Between the Experiences of Organized Sports League and Leisure Attitude. <i>Seok-Pyo Hong</i>	150

Recreation Planning and Management

Park Partnerships: A Case Study of Yosemite Institute and Yosemite National Park. <i>Siri Doble, Chad Dawson, and Robin Hoffman</i>	157
The Importance of Environmental History in Natural Resources Management and Planning. <i>Karl Roenke</i>	162
The Effect of Fees on Recreation Site Choice: Management/Agency Implications. <i>Allan Marsinko</i>	164
Boosting Confidence In Importance-Performance Analysis: An Explanation and Application of An I/P Modification. <i>Erin K. Smith and Michael A. Tarrant</i>	172
The Destruction of Wildlife Habitat by Suburban Sprawl and the Mitigating Effects of Land Use Planning. <i>Richard B. Nichols</i>	177
Visitor Perceptions of Personal Security and Crime at Outdoor Recreation Areas: Contemporary Issues at US Army Corps of Engineers Lakes and Along the Appalachian Trail. <i>Robert C. Burns, Robert D. Lee Jr., and Alan R. Graefe</i>	186
Weather Related Liability in Outdoor Recreation. <i>Bruce Hronek</i>	190
Mountain Bicyclists' Behavior in Social Trail Etiquette Situations. <i>William W. Hendricks, Roy H. Ramthun, and Deborah J. Chavez</i>	194

Distinctions Between Permitted and Non-permitted Registered Snowmobilers. <i>Joel A. Lynch and Charles M. Nelson</i>	199
Historic Preservation in Recreation	
Museums and Cultural Institutions in Michigan: Can They Be Viable Tourism Attractions and Tourism Industry Partners? <i>Gail A. Vander Stoep</i>	205
Forest Resource Issues in Recreation	
Aspects of Nonindustrial Forest Ownership That Influence Attaining Recreation and Other Nontimber Objectives. <i>Donald F. Dennis, Thomas H. Stevens, David B. Kittredge, and Mark G. Rickenbach</i>	215
Recreationists' Attitudes Toward the Forest and Forest Management Policies. <i>Gene L. Theodori, A. E. Luloff, and Timothy A. Slack</i>	219
Human Dimensions of Fisheries	
Development and Verification of a Specialization Index for Angler Segmentation. <i>Ronald J. Salz and David K. Loomis</i>	227
Testing Recreation Specialization: Application of a Specialization Index. <i>Kelly L. Finn and David K. Loomis</i>	232
Assessment of Tourists' Attitudes Toward Marine Aquaculture - A Preliminary Investigation of UNH's Sea Grant Discovery Passengers <i>Torene Tango-Lowy and Robert A. Robertson</i>	242
Economics of Outdoor Recreation and Tourism	
Economic Impact of Elk Viewing in Rural Pennsylvania. <i>Bruce E. Lord, Charles H. Strauss, and Walter M. Tzilkowski</i>	251
Fiscal Trends in America's State Parks: A Eight-Year Analysis. <i>Daniel D. McLean, Deborah Chavez, and Julie Knapp</i>	257
Economic Impacts Of A Heritage Tourism System. <i>Charles H. Strauss and Bruce E. Lord</i>	264
Spending Priorities for Outdoor Recreation Planning in New Hampshire: Implications for Managers. <i>Al Williams, Sam Lankford, and Robert A. Robertson</i>	272
Determining Economic Impact Through Secondary Data. <i>Hans Vogelsohn and Alan Graefe</i>	275
Contemporary Issues in Recreation and the Environment	
Information Search by Backpackers: A Qualitative Analysis of Planning Behaviors. <i>Roy Ramthun</i>	285
Using Geographic Information Systems with Travel Cost Models: A Case Study. <i>William Zawacki and Allan Marsinko</i>	287

Visitor Experiences and Participation

Five Good Reasons to Have Reservations About Benefits-Based Management. <i>Thomas A. More and Walter F. Kuentzel</i>	295
Intensity and Extensity of Recreation Participation in Light of the Mean Scores on the Leisure Resourcefulness Scale. <i>Jerry L. Ricciardo</i>	304
The Relationship Between Quiltmakers' Level of Development and Participation in Other Leisure Activities. <i>Sharon L. Todd</i>	309
Self-Efficacy Perceptions Among Mid-Level Recreation Program Managers. <i>Julie S. Knapp and Daniel D. McLean</i>	317

Place Attachment

Differences in Place Attachment Among Allegheny National Forest Users. <i>John J. Confer Jr., Alan Graefe, Jim Absher, and Brijesh Thapa</i>	323
The Relationship Between Place Attachment and First Night Participants Views of Crowding, Overall Satisfaction and Future Attendance. <i>Thomas D. Wickham and Deborah L. Kerstetter</i>	332
Relationships Between Place Attachment, Activity Involvement, Desired Experiences, and Frequency of Urban Park Use. <i>Andrew J. Mowen and Alan R. Graefe</i>	336
Exploring Visitor Meanings of Place and Enriching Interpreter Knowledge of Audience in the National Capitol Parks. <i>Wei-Li Jasmine Chen, Theresa L. Wang, and David L. Larsen</i>	340

Round Tables

A Roundtable: Discussion of Three Case Studies Involving Tourism and Wilderness Areas. <i>Stephen C. Bentley, Katharine C. Bloom, and Mark Gleason</i>	347
Alternative Tourism: Gay and Lesbian Travelers - A Viable Hidden Market. <i>Kimberly Monk and Lisa Dingman</i>	352

Poster Session

Use of Qualitative Data Analysis Tool to Understand the Relationship Between Recreational Fishing and Open Ocean Aquaculture Development. <i>Angela Wright and Robert A. Robertson</i>	361
Estimating Tourism Impacts of Deer Hunting in New York State: A Case Study of 1997 Deer Take Data. <i>Russell W. Patterson, Aaron Alsheimer, James F. Booker, and Diana S. Sinton</i>	366
Recreational Use of Industrial Forest Lands in New York State. <i>Sergio Capozzi, Rene Germain, and Chad Dawson</i>	373
Competition for Common Property Space: New Hampshire's Recreational Fishers and Open Ocean Aquaculture Development. <i>Jody Grimes</i>	378
Use of Qualitative Data Analysis to Demonstrate Three Approaches Taken by New Hampshire Recreational Fishers Toward Open Ocean Aquaculture Development <i>Nena F. Stracuzzi</i>	384

The Use of GIS in Recreation Planning: An Application of Spatial Analysis to Find Suitable Locations for Recreational Trails. <i>Matthew Starr, Miklos Gratzer, and Allen Lewis</i>	391
Storm Chasing: Risk Recreation for the Nineties. <i>Heather Cantillon, Jeremy Merriam, and Christopher Naughton</i>	397
Who Owns the Ocean? A Qualitative Study Of Saltwater Recreational Fishers and Open Ocean Aquaculture in New Hampshire <i>Jody Grimes, Nena F. Stracuzzi, Robert Robertson, and Cynthia Duncan</i>	400
Management Sessions	
Maintaining the Quality of Park Resources and Visitor Experiences: An Overview of a New Handbook for Managers. <i>Theresa L. Wang, Dorothy H. Anderson, and David W. Lime</i>	409
Founder's Forum	
Reconceiving Recreation in an Era of Growing Social Inequality. <i>Thomas A. More</i>	415
Keynote Address	
Parks Have a Future - But it has More Problems than the Present. <i>Elery Hamilton-Smith</i>	423
Index of Authors	426

ROUND TABLES

A ROUNDTABLE: DISCUSSION OF THREE CASE STUDIES INVOLVING TOURISM AND WILDERNESS AREAS

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Abstract: Wilderness can be thought of in several different ways - from the Federally designated type to the International view. In this roundtable discussion, three case studies were presented describing three different influences of tourism on wilderness areas, from a very large national park in Africa to a Federally designated Wilderness Area in Lake Superior to a national recreation area in the eastern United States. Combined, these three case studies describe vastly different situations and the impacts that tourism has in those situations.

Introduction

The following roundtable discussion was presented by the authors at the 1999 NERR conference. The topic of this discussion was Management Issues in Tourism and Wilderness. For the purpose of this presentation, three case studies were chosen and compared. They were Isle Royale National Park (IRNP), the Delaware Water Gap National Recreation Area (DWGNRA), and Maasai Mara National Reserve in Kenya, East Africa. These three areas represent different types of wilderness areas which attract visitors who have varied impacts on the resource.

A comparison of the size, designation, number of annual visitors, and types of use in the three areas reveals the following. Varying in size from the 70,000 acres of the Delaware Water Gap to the 571,790 acres of Isle Royale to the over 4 million acres of Maasai Mara, these areas attract anywhere from the 20,000 visitors to Isle Royale to the 200,000 at Maasai Mara to approximately 5 million at Delaware Water Gap. Each of these areas represent differing types of wilderness that attract people who want a variety of experiences. Isle Royale attracts people that are mainly interested in a wilderness experience that could include hiking, camping and boating in a federally

designated Wilderness. Delaware Water Gap, as a National Recreation Area, is attractive to those people who are interested in water and land based recreation. Land based safaris are the main attraction at Maasai Mara, a National Reserve set aside for the preservation of wildlife in Kenya.

Whatever the type of wilderness, there are significant benefits for the world and its environment that can include but are not limited to the following: scientific value for research and education, watershed protection, historical and cultural preservation, spiritual and aesthetic benefits, and recreation. Some of the threats to wilderness areas across the world include human disturbance, heavy and inappropriate recreational use, overcrowding, air and water pollution, and the use of recreational vehicles.

Isle Royale National Park (IRNP)

Isle Royale National Park is an archipelago of approximately 400 islands, located in the northwest corner of Lake Superior. It is Michigan's only National Park and is part of a Park system that includes Pictured Rocks and Sleeping Bear Dunes National Lakeshores. While each of the Lakeshores receive hundreds of thousands of visitors each year, Isle Royale has fewer than 20,000. The largest user group at Isle Royale are backpackers, with powerboaters being a distant second. The Park's total size is approximately 571,790 acres, of which 133,781 acres are of land with 132,018 of those being a designated Wilderness. Approximately 80% of IRNP is made up of Lake Superior surface water as the boundaries of the Park extend four and one-half miles into the Lake from the islands (Isle Royale National Park Pamphlet, 1997). The Federal government, in recognizing the importance of IRNP's natural resources, designated 99% of it as Wilderness. The Park also has numerous cultural resources as is evidenced by numerous shipwrecks, fishing village remains, and lighthouses. IRNP has a long history of maritime activities which began with the arrival of Native Americans, followed by the Voyageurs, European miners and fishermen, up to the present day tourists.

Isle Royale's Cultural and Maritime Heritage

To mark shoals, islands, and the entrances to harbors, three lighthouses were built in the mid to late 1800s with a fourth being built in the early 1900s. These lighthouses proved invaluable to shipping on Lake Superior. The lighthouses are Rock Harbor Light built in 1855, Isle Royale Light in 1875, Passage Island Light in 1882, and the Rock of Ages Light in 1908. Of these four lighthouses, only the Rock Harbor Light ceased to operate after a few years. The other three were automated and continue to operate today. The National Park Service has established a maritime museum within the Rock Harbor Lighthouse.

These lighthouses were important due to the arrival of the mining population and as the maritime traffic around the islands grew. Larger vessels were making more frequent trips to supply the population and to transport fish and copper off the islands. It was during this time period that

settlements of commercial fishing families were established. A few of the present property holders at IRNP feel they can trace their connection with the Island to this time period, but their strongest connection is to a later group that arrived at the turn of the century. Prior to that time, the American Fur Company established eight fishing camps at Isle Royale between 1837-39. These eight camps employed more than thirty fishermen. Commercial fishing reached its peak in the 1880s with nearly thirty camps established on Isle Royale. At least one of these camps was occupied year round (DuFresne, 1984).

The maritime heritage of Isle Royale also includes a large number of boats and ships that have been wrecked on the shoals and shores of these islands. Numerous small craft have been both lost and deserted within Park boundaries. The Lake Superior waters surrounding IRNP have a large number of shipwrecks, of which ten have been located, identified and studied.

Tourism at Isle Royale

In the late 1800s, a new group of summer visitors arrived at Isle Royale by ship. Those individuals represented the beginning of the tourist industry at Isle Royale. Isle Royale fishermen established the first resort in 1894, the John's Hotel (Cochrane, 1990). These early tourists participated in many of the same activities as present day tourists such as hiking, fishing, boating, and observing nature. In the early 1900s, summer cottages and hotel establishments were built to accommodate these tourists coming from Michigan, Wisconsin, and Minnesota. Tourists of this time period generally stayed on the island for longer blocks of time than the four days that present-day visitors average, possibly due to the fact that it took about two days passage to get from Duluth, MN to Washington Harbor on the southwest end of Isle Royale.

Modern day visitors continue to add to the maritime history of the IRNP by arriving at the island, usually by boat, and touring the island by small craft. Of the 16,574 people who visited the island in 1996, approximately 85% arrived by boat, many on the NPS's *Ranger III* passenger and supply boat (Greg Blust, Park Staff Interview, 1997). Park visitors have expressed an interest in learning more about the maritime heritage of Isle Royale as shown through the attendance at NPS interpretive programs.

Tourism and Wilderness

In reviewing the Isle Royale example, natural resource managers could look to the interpretive activities that are connected to two of the lighthouses, the Rock Harbor and Passage Island Lights. The Rock Harbor Light has a maritime museum located in the Lighthouse Keeper's home that is attached to the tower. The museum has displays which cover the maritime history of the island. The tower itself is open to the public and provides views to the entrance of Rock Harbor. It is surrounded by federally designated Wilderness and is visited by tourists who primarily arrive by boat. Passage Island, which includes

the Passage Island Light, is used for interpretive walks guided by National Park Rangers. These guided walks also provide information to visitors about the maritime heritage of Isle Royale. Both visits to the Rock Harbor museum and the Passage Island guided walks assist visitors in their understanding of IRNP's maritime heritage. The impact by visitors on the resource has been limited due to the Park's management of these areas. This limiting of impacts has been achieved through the use of trails and guided walks which direct the visitors to a smaller sized area.

Delaware Water Gap National Recreation Area - (DEWA)

Among the congestion of the great megalopolis of the northeast United States lies one of America's many overlooked natural and cultural treasures. The Delaware Water Gap National Recreation Area (DEWA) is one of the last greenway corridors remaining in the northeast. DEWA is located in the tri-state area of New York, New Jersey and Pennsylvania. Its unique combination of natural and cultural resources offer numerous recreational opportunities for the public to enjoy in one of our most urbanized regions of the country. The significance statements below, describing the outstanding features of DEWA were taken from its 1998 Long Range Interpretive Plan:

- Delaware River waters are of exceptional quality; it is one of the last free-flowing rivers on the eastern seaboard; and, the river offers outstanding recreational and scenic opportunities. The approximately 40 miles of river within the boundaries of the Delaware Water Gap National Recreation Area have been designated the Middle Delaware Scenic and Recreational River, a unit of the National Wild and Scenic River system.
- As one of the largest public open spaces remaining in the northeast metropolitan corridor, the Delaware Water Gap NRA provides a broad diversity of exceptional, unique and close-to-home recreational opportunities for the more than 60 million people who live within a 6 hour drive of the park.
- Open space combined with other regional protection and preservation initiatives creates a multi-state greenway corridor which preserves essential habitat for the sustained health of plant and animal communities, including potentially threatened species, in the region.
- DEWA contains the most significant concentration and diversity of known archeological resources, from prehistoric to historic, in the northeast US, as well as outstanding examples of Native American and European settlement manifested by diverse cultural landscapes and structures.
- Over 4 million visitors a year, in top ten of most visited NPS units in the US.

Residential Development Threats to DEWA

Over the last decade the pocono mountain region of northeast Pennsylvania has witnessed an explosion in its population growth. According to the US Census (1998),

the two counties in PA. Pike and Monroe, in which a majority of the park lies have had their population almost double since 1990. Pike County's population has risen 43.6% since 1990 and Monroe 31.2%. A Social Science Research Plan for DEWA was completed in 1991. The plan outlines social science needs and priorities based on legislation and policy documents, interviews with park staff, other NPS officials and a nominal group workshop held at the recreation area. In 1994 and 1996 a research project was proposed by DEWA to study regional population changes. Population change information is necessary as it relates to park visitation and regional development for transportation and other infrastructure as well as residential and commercial development.

The pocono mountain region of Pennsylvania is only 80 miles from New York City and even less from the New Jersey locations. It is an hour or less drive for many commuters. Why would people choose to live and raise a family in the congestion of urban life when they could have own a few acres of lakefront property in the poconos? "A practical reason for this area's appeal is that home prices have dropped 30 percent since 1988. A 19th century farm on 4 acres of land might go for around \$225,000; lakefront homes start at \$85,000 and soar more than \$500,000 in posher developments. --- and property taxes, which have doubled in 10 years, are expected to keep rising as the growing population stretches resources." (Smith, Tharp, Hannon, McGraw 1995) This rural life atmosphere is very attractive to people who have lived or worked in urban areas their entire life.

Another reason for the residential development of the poconos is the increase in second-home purchases. "In a 1995 study by the American Resort Development Association, 35% of those surveyed thought there was a good chance that they would buy a second home in the next decade (up from 16% in 1990)." (Sherman and Ghani, 1995). According to Charski (1998) The second-home allure is catching. Homes that are used only seasonally now number 3.2 million, according to the Census Bureau, up from 3 million five years ago. The economy is largely responsible; interest rates are low, and getting a mortgage for a second home that won't be rented out or otherwise used as an investment is now as easy to get as one for a primary home, says Neill Fendly, vice president of the National Association of Mortgage Brokers. The combination of the many attractions of the poconos which include, skiing (both downhill and cross-country), arts, fine dining and etc., gives this area an appeal that is tempting for anyone.

Recreation at DEWA

"The mission of the Delaware Water Gap National Recreation Area is to provide outdoor recreation opportunities while conserving the natural, cultural and scenic resources of the Recreation Area by working cooperatively with

surrounding communities and the public to achieve conservation goals for the Delaware River Region" (Statement for Management, DWGNRA, 1997)

As stated in the mission of DEWA, providing an outdoor recreation experience to the public and minimizing the impacts on the environment are its chief concern. With the wide variety of interested parties (hikers, birders, mountain bikers, horseback riders, boaters, swimmers and etc.), how does a manager do this?

DEWA contains nearly 40 miles of the Delaware River which provides drinking water to almost 10 percent of the US population. Being a part of the National Wild and Scenic Rivers System gives DEWA the opportunity to provide a quality water-based recreation experience to visitors. This stretch of river is a favorite for canoeist and kayakers. For over night users on the river, there are over 100 river-campsites available for users. Fishing enthusiasts enjoy the opportunity to catch chad, smallmouth bass, walleye, and muskey. The park also contains two public beaches which attracts many visitors from the New York and New Jersey areas.

Besides the extensive water-based recreation opportunities at DEWA there lies many other outdoor recreation possibilities. Hikers and backpackers find that the park provides numerous treasures for them. Over 20 miles of the Appalachian Trail runs through DEWA. Scenic vistas, dozens of waterfalls and pristine hemlock ravines gives visitors a unique experience while on the trail. Mountain biking trails were recently added to the recreation area the last two years. A new addition to the park will be the proposed river valley trail. The river valley trail will be a multiple-use trail that a majority of it runs along the river. This multiple-use trail will be paved with an artificial surface for rollerbladers, wheelchair users and bicyclists. According to DeNise Cooke Chief of Research and Resource Planning at DEWA, locations that it will not be along the river are prime Bald Eagle habitat, rare plant habitat and etc.

Tourism and DEWA

Managers and researchers might dispute the fact that tourism has had its impact on DEWA. While much of the park borders private and residential housing, a portion borders commercial development as well. More than one hotel and resort community borders DEWA's boundaries. This gives direct access to park resources that could be impossible to monitor. Canoe liveries and adventure outfitters might be the most serious threat to DEWA. Canoeists, rafters and water skiers enjoy the pristine waters of the Delaware River. For this reason dozens of liveries and outfitters have flourished in the Poconos Area. Over used campsites, litter, and abuse of resources are just a few results of the booming adventure recreation industry. Sewer Treatment Plants (STP's) also pose a threat to DEWA. The enormous expansion of residential and commercial entities calls for a stronger infrastructure. The STP's discharge is

usually only one tributary aware from being directly emitted into the Delaware River.

Small water parks, professional golf courses and family oriented resorts are the primary tourists attractions for this area. The tourism contributions to the poconos both socially and financially are significant. According to the US Travel Data Center (1998), the tourism industry in the poconos generated over 1 billion dollars in sales, 18 thousand jobs and 257 million dollars in payroll revenue.

Recommendations for DEWA

- **Focus on existing resources vs new development-** "In the last four years, the Delaware Water Gap NRA alone has received more funding for new buildings and trails than Yellowstone Stone, Grand Teton, Glacier and all other national parks in Wyoming, Idaho, and Montana combined." (Mackay, 1998)
- **Acquisition of buffer greenways near park boundaries-** Because residential and commercial development is becoming more of a threat to DEWA's resources, acquiring buffer zones near vital park resources could help protect them
- **Monitor and more control of Delaware River use-** Limiting the number of canoes discharged by liveries could reduce over use, litter and misuse of resources. This might be done by a permitting system.
- **Develop of a VIM plan (Visitor Impact Management)-** Having a high visitor attendance rate, being near residential and commercial development and having the designation of a outdoor recreation provider are just a few reasons to design and implement a VIM for the Delaware Water Gap NRA.

Maasai Mara National Reserve

Maasai Mara National Reserve, located in the southwest corner of Kenya in the Narok District and bordering the Serengetti in Tanzania, is one of the most highly used of Kenya's 57 National Parks, Reserves and Protected Areas. Originally designated as a game reserve in 1948, it has been named a National Reserve as well as a World Heritage Site by the IUCN. Made up of 1,672 sq kilometers (4 million acres), it has both inner and outer reserve areas which experience different uses and use rates (Kenya Web, 1999). The Mara, as it is commonly referred to, is made up of open grasslands with patches of acacia woodland, thickets and riverine forests. It has a well-deserved reputation as a hotspot for wildlife, mainly because it hosts over 250,000 zebra, strong populations of the big five (rhino, elephant, lion, cape buffalo, and leopard), prolific bird life including 57 species of prey, and the great migration, in which some 1.3 million wildebeest migrate north following the rains (Gakahu, 1992). The Mara, like all of Kenya's National Parks and Reserves, is managed by the Kenyan Wildlife Service, under the authority of the Ministry of Wildlife and Narok County Council.

Tourism in Kenya and Maasai Mara

Tourism is the number one foreign exchange earner in Kenya, totaling about \$140 million per year (Gakahu, 1992). It brings in over 1 million visitors a year, many of whom travel to Kenya's National Parks, Reserves, and Protected Areas. The Ministry of Tourism actively manages tourism in Kenya, while the Kenya Association of Tourism Operators (KATO) manages the numbers and types of safaris offered as well as the tour operators. Kenya has a policy whereby tourism and conservation are managed based upon the benefits they will provide to the local people as well as the entire country. In effect, wildlife tourism pays for much of the conservation work occurring throughout the country.

Maasai Mara National Reserve absorbs approximately 27% of all visitors to Kenya. It receives over 200,000 visitors per year, more than any other park in all of East Africa. Visitation to the Mara is increasing at approximately 9% a year, or 19,000 additional people, with each visitor staying an average of 2.5 days (Gakahu, 1992). There are 17 facilities that have been created to accommodate these visitors, the majority having been built since 1962. Six of these lodges or camps are located within the outer portion of the reserve and are capable of accommodating some 600 visitors a night. Eleven of the facilities are located just outside the reserve and can accommodate up to 890 visitors per night. Visitors come to the Mara largely with two expectations in mind: (1) that they will be able to view an abundance and diversity of species along with scenic vistas, and (2) that they have competent staff and service. The majority of tourism within the Mara, as well as most protected areas in Kenya, is based around land-based safaris.

Issues Arising from Tourism in the Mara

Since the majority of tourist experiences within Maasai Mara involve land-based safaris in which groups of people view wildlife through open-roofed vans or land rovers, the majority of the issues arising from tourism are related to ecological and social issues. The ecological issues include the degradation of grasses, soil compaction, and wildlife becoming desensitized to humans, while the social issues include a decline in the quality of the experience, vehicle congestion and concentration within an area, and the vehicular constriction of wildlife.

The ecological impacts related to tourism within the Mara can be directly to the use of vehicles for safaris. Though the Mara has 582.4 km of roads, a high amount of use occurs on unrecognized tracks that have been established through safari drivers going off road. Degradation of the grasses and soil compaction are impacts caused by both the use of these off road tracks along with a high concentration of vehicles within a rather small area of the reserve. The majority of tourism within the Mara occurs on land that is located in the outer part of the reserve, near the concentration of lodges and camps. Overall damage estimates to vegetative cover based upon these vehicular

uses of the reserve is estimated at about 15.3% (Gakahu, 1992). Another ecological impact that can be associated with the vehicular use of the Mara is the desensitizing of the wildlife to humans and their vehicles. This desensitization is made worse by two factors: (1) the high concentration of use that occurs within the outer portion of the reserve, where wildlife is more exposed to humans, and (2) acts such as safari drivers who radio each other with the locations of wildlife species which subsequently allows for the surrounding of wildlife.

Social impacts arising from the influx of tourism within the Mara are based around a decline in the quality of the visitor experience and may include vehicular congestion and concentration within an area, and vehicular constriction of wildlife. People tend to visit Kenya to view wildlife in its natural state. A decline in the quality of the visitor experience can be caused when such occurrences as vehicular concentration within an area or the surrounding of wildlife by a number of vans happen. With more visitation and without further action, it is possible that occurrences such as these will happen with increasing frequency. Vehicular congestion and concentration, like that occurring in our National Parks, may also degrade the quality of the wildlife viewing experience through not only desensitizing wildlife to humans and vehicles, but also through the interruption of natural wildlife behaviors and through scars left on the land through off road driving. With a decline in the quality of the visitor experience, it can be assumed that there will be a future decline in the visitation to the reserve and thereby put wildlife conservation in serious jeopardy.

Recommendations for the management of tourism and wildlife

With wildlife conservation and tourism being interconnected such as they are in the Mara and Kenya, it is important that they are managed in a fashion that will produce benefits for both while allowing for their future sustainability. Some factors that might enhance the future of these two fields in Kenya include the following:

- **Education:** of the drivers as well as the tourists in terms of regulations, other wildlife areas to visit, as well as the impacts of their visit to the parks and on wildlife.
- **Stricter Regulations:** again for both drivers and tourists in terms of going off-road, the use of radios, and the surrounding of wildlife, etc. including monetary penalties, license restrictions, operator fines, etc.
- **Visitor Assessment and Capacity Studies:** study the conservation areas and develop frameworks for visitation to those areas including carrying capacities and visitor impact management.

Conclusion

Isle Royale National Park, Delaware Water Gap National Recreation Area and Maasai Mara National Reserve all represent various types of wilderness from the Federally

designated variety to the international variety. While each case study presented has its own intricacies, there are numerous similarities which revolve around the impacts that tourism has on the resource and its management. The discussion following the presentation of the case studies revolved around the following points:

- the development of partnerships
- how managers protect resources while providing for tourism
- impacts of motorized vs. nonmotorized tourism
- future implications

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ALTERNATIVE TOURISM: GAY AND LESBIAN TRAVELERS – A VIABLE HIDDEN MARKET

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Abstract: Continued growth of the tourism industry into the new century will be accompanied by changes in the nature of tourism itself. It has become impossible today to read a trade publication without reading the words: "Specialize to survive." While accounting for a sizable portion of tourism activity, most tourism authorities have not targeted the gay and lesbian market, and it is the least examined segment of the tourism industry.

This paper focuses on the hidden market - that of the gay and lesbian travelers - and highlights a number of key issues concerning tourism marketing and strategic planning. These issues include:

1. The importance of gay and lesbian travel to the local tourism market mix
 2. The role of three local government tourism agencies and their communities in attracting this lucrative market to their cities
 3. The importance of suppliers' support
 4. The importance of timely, accurate and reliable market data to underpin the development of any marketing strategy.
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Introduction

Niche marketing – "what everyone does today"

Host cities seek to attract tourists to their area because of the potential for improving existing economic and social conditions. Miami Beach, Montreal and Palm Springs are popular centers for the gay visitor, currently hosting conventions/conferences, festivals and parades. Attempts by the tourist boards of these cities to promote gay and lesbian travel have proven to be very successful. The existence of gay tourism illustrates the diversity of tourism, as well as the diversity of motives and activities of tourists. These cities have active gay populations, and a tradition of welcoming gay and lesbian visitors.

This market is being targeted for:

1. Overnight stays
2. Conventions
3. Gay games, parades and festivals

To ensure visibility, cities, suppliers and marketers are reaching this market by:

1. Advertising in gay publications
2. Developing specific travel material
3. Sponsoring AIDS organizations, benefits and other issues relating to the community
4. Joining gay organizations

According to a survey of participants who attended **The Gay Games IV**, held in New York City in June of 1994, gay consumers notice and appreciate marketers who make direct efforts to reach them. **Eighty-four percent** say they intentionally purchase products that are advertised in gay media, and they reward companies for reaching out to them (Mulryan, 1995).

Alternative tourism

The definition of the traditional family is changing. There has been a sharp decline in the nuclear family and an increase in blended families. We are now in an era of increased sexual liberalization - the recognition of an alternative lifestyle. This market is growing as a result of greater social permissiveness, the gay pride movement, and more homosexuals (especially lesbian women) who openly develop families, conceive or adopt children and build quasi-traditional families (Morgan & Pritchard, 1998).

Travel Trends

The Advocate, a national gay and lesbian magazine, commissioned Simmons Market Research for a survey of its readers' travel habits. The magazine has 72,000 subscribers. Among the findings of the 1994 survey:

- **92%** of *The Advocate* readers took domestic trips during 1993; the average number of trips taken was 7
- **72%** took domestic flights during 1993; the average number of flights was 5.8
- **58%** took foreign trips during the last three years; the average number of trips taken during 1993 was 3.5
- **78%** stayed at a nongay hotel, motel or resort in 1993; the average number of nights stayed was 16.2
- **37%** stayed at a gay hotel, motel or resort in 1993; the average number of nights stayed was 7.2
- **57%** rented a car in 1993, the average number of car rentals was 4.6
- **51%** are enrolled in a frequent flyer program (*Travel Weekly*, 1994)

Why is this market being pursued?

The trend to tap the gay market reflects the saturation of the current market place, and the fact that this group has become more visible. The gay tourism market includes a potentially large market of upscale, well-educated professionals

- In the United States, almost **40%** of unmarried partners of homosexuals hold a college degree, compared to **18%** of unmarried heterosexual partners and **13%** of married spouses

- 86% of the partners of gay men and 81% of the partners of gay women have more than a high school education; 74% of heterosexual unmarried partners have a high school diploma
- Readers of gay magazines also have an upscale profile: 7% have doctoral degrees, compared to less than 1% of the general US population. Their median income in 1992 was \$51,300, compared to the national average of \$30,050

As a result, in the late 1990s this high-income, free spending gay and lesbian community, the so-called "pink-pound," has become the latest target of mainstream marketers as a viable consumer group (Morgan & Pritchard, 1998), and is being described as the "closest thing to a recession-proof market" (Kasrel, 1997).

John D'Allessandro, president of The International Gay and Lesbian Travel Association (IGLTA) supports the following claim:

1. The majority of gay and lesbian households are dual income. When a couple involves two males, they generally have higher than average household incomes
2. This group is less likely to have children, and so there is more discretionary income and more leisure time to travel
3. Gays and lesbians are more prone to travel than their mainstream counterparts, taking 162 million trips in 1996. Business trips accounted for 127 million, and vacations were 35 million

Purchasing Power

The motives and actions of gay and lesbian travelers are often different from other types of tourists. Gay tourists tend to be "hyper consumers" who not only consume more, but also influence the purchases of their gay and straight friends and colleagues, thus providing word-of-mouth endorsements for products, brands and companies (Mulryan, 1995).

Gays are also extremely brand loyal. Surveys show they are especially appreciative of good service, and, if pleased, will return to a restaurant, hotel or resort again and again. For example, Miami's tourism officials noticed that gays were coming to visit even as less hardy travelers were being scared off by the area's troubles (Drummond, 1995).

The Tourism Industry Intelligence suggests that an estimated 525 million gay men and lesbians spend more than US\$10 billion on travel products each year.

Tourism in Cities

Being gay or lesbian influences choices of accommodations, nightlife, dining, shopping, and sometimes, sightseeing. The physical presence of the tourist alters the atmosphere and appearance of a location. Some of the changes that tourism produces may be predictable; some may be unexpected. For those involved in the business of developing tourism, the issues are how to successfully manage the change and the people affected by

the change, and to how judge what benefits accrue to appropriate stakeholders.

In using the space of urban areas, tourists transform that space in both the material and symbolic sense (Ashworth and Dietvorst, 1995). In the case of gay and lesbian tourists, transformation is the consequence of a group of people who are often marginalized by society.

Gay and lesbian tourism activity may seem to center around sexual encounters. Examination of previous (and sometimes current) gay press and its advertising (brochures referencing nudist beaches, pick-up places and the like) confirms this impression. Cities, however, are now modifying this perception: references to nightlife, clubs and bars have been discreet and emphasis has been placed on historical and cultural attractions.

Tourism in a city is related to a combination of its primary (core) and secondary elements. The primary elements, those that constitute the major attractions, have two components: "activity place" and "leisure setting." The activity place is composed of the attractions that most cities offer, such as museums, art galleries, historic sites and theaters. The leisure setting is the physical and social-cultural context within which the attractions are set, the overall spatial structure of the city and its ambiance.

Primary (core) elements

Secondary elements

Historical (including buildings)

Shopping, Cafes, Bars,

Cultural (including museum and lifestyle)

Restaurants, Hotels, Entertainment

Outdoor recreation (including parks)

Source: Based on Jansen-Verbeke (1994)

Impact

General tourists are, in large part, unaffected by the material manifestations of gay tourism (bars, clubs, etc.), as these are not dominant features of most mainstream activity space. Tourists are usually not given the opportunity to be affronted by a gay image of the city even though they may be aware of the reality. In addition, for tourism to thrive in an area it needs support from the area's residents.

Impacts of tourism refer to the ways in which tourism is perceived to contribute to changes in value systems, individual behavior, family relations, collective lifestyles, and public safety, among others and is usually measured in three ways:

Social - local language and cultural effects, lifestyle changes

Environmental - carrying capacity and the protection of natural resources

Economic - the benefits and costs that accrue to a destination

Positive Social Impacts

1. Improves understanding and image of different communities or cultures (Milman and Pizam 1998)
2. Promotes cultural exchange (Liu and Var, 1986)
3. Facilitates meeting visitors (Liu and Var, 1986)
4. Increases demand for historical and cultural exhibits (Liu and Var, 1986)

Positive Environmental Impacts

1. Preservation of historic buildings and monuments
2. Improvement of the area's appearance (Perdue, Long and Allen, 1990)
3. Preservation of the natural environment (Sethna and Richmond, 1978)

Positive Economic Impacts

1. Contributes to income and standard of living (Milman and Pizam, 1998)
2. Increases employment opportunities (Milman and Pizam, 1998)
3. Increases government revenue; federal, state, local (Gunn, 1993)
4. Improves the local economy (Perdue, Long and Allen, 1990)
5. Improves investment, development and infrastructure spending in the economy (Liu and Var, 1986)

Suppliers of tourist services may also cause a city, in whole or in part, to be transformed both materially and symbolically. The existence of bars, hotels, restaurants and the like, codes the city and alters its image. Places become positioned and constructed as sites of pleasure (Tyler, Guerrier and Robertson, 1998). Due to this upscale clientele, cities are striving to improve excellence in accommodations, bars, restaurants, cafes and attractions.

Supplement 1.1 - Travel Industry Suppliers

While some suppliers fear the political implications of catering specifically to the gay and lesbian community, others find that the demographics alone make the market a lucrative one to exploit (Travel Weekly, 1994).

It is important to note that marketing to gays and lesbians may involve coming up with a gay-specific product, which may or may not make sense. An example would be an African Safari; there are no gay specific activities attached, only the assurance that the people traveling are either gay or gay-friendly.

"The demographics of the gay market are perfect," said Marsha Butler, director of travel industry affairs for Northwest Airlines. The airline industry has been most active of the mainstream suppliers in courting gay businesses.

Below are examples of mainstream suppliers that are pursuing or have taken actions the gay community considers "gay-friendly":

Airlines

American Airlines

- The first airline and the first company in the Fortune 100 to have a specific marketing department devoted exclusively to gay and lesbian consumers
- Applauded for offering bereavement fares to gay couples
- Has been named the top gay-friendly airline two years in a row by the gay travel newsletter *Out & About*

"We realize that gay and lesbian people travel an awful lot," says American Airlines spokesman Tim Kincaid. He conservatively estimates American sells \$150 million in tickets annually to travelers going on gay related holidays. Of this group:

- 74% took holidays abroad
- 21 % vacationed on their own
- 43% vacationed with partners (Sasha, 1997)

Virgin Atlantic Airways

- After running advertisements featuring a male couple in *Out & About* and *The Advocate*, the nation's two most prominent gay magazines, Virgin received 250 thank you letters from gay and lesbian travelers as well as several bookings, including one from an individual for a block of 50 seats (Sasha, 1997)
- Offers packages tailored to the gay and lesbian market
- Donates tickets to various events benefiting gay and lesbian groups
- Commended for its industry-leading policies towards gay travelers and outreach to the gay community

"It's a business decision," said Bill King, North America vice president of sales for Virgin.

Continental Airlines

- Recipient of a 1994 *Out & About* Editors Choice Award for sponsoring the Gay Games IV, and for its participation in several gay and lesbian travel expos

Qantas Airways

- 1996 - sponsored IGLTA's convention to Sydney

Travel Guides

Fodor's Gay Guide to the USA - division of Fodor's Travel Publication, Inc.

Travel Companies

TBI - wholesale tour division of Japan Travel Bureau
ZMAX Travel - representative of American Express Travel Division
Certified Vacations - in collaboration with Men on Vacation, a San Diego tour operator

Car Rental Companies

National Car Rental
Avis Car Rental

Cruise Lines
Carnival Cruise Lines

Supplement 1.2 – Gay Tourism in Miami Beach

Coming out in Genre magazine this fall: Miami Beach. As part of a special promotion, the city of Miami Beach and the Greater Miami Convention and Visitors Bureau featured two full-page color ads, a consumer contest and a travel story in September and October 1998 touting Miami Beach as a gay tourist stop. In exchange for the publicity, worth about \$15,000 in advertising, the city and convention bureau played host to the magazine's editors, showing them the city's shops, stores, restaurants and gay-friendly arts and culture scene (Diaz, 1998).

In 1991, the Miami Beach City Commission passed unanimously a Human Rights Ordinance, and in October 1998 passed a Domestic Partnership Ordinance for all city employees. Billy Kolber, editor of *Out and About*, ranks Miami as the number three travel destination behind San Francisco and New York for the gay tourists. In the '50s, disenchanted Northeasters, many of them gay, began to discover Miami Beach. Film and fashion folks fell in love with the historic "Deco District," and several gay discos were opened. Old properties were refurbished and first-rate eateries established.

As the number of visitors dropped in 1994, there was one conspicuous bright spot: gay tourists with money to spend flocked Miami Beach by the thousands (Time Magazine, 1997). Tourism officials wanted the world to know all about their good fortune: "The gay and lesbian destination of the nineties," claims a published brochure from the South Beach Business Guild, which was established to support and promote gay tourism.

The gay travel dollars for 1997 was estimated at \$17 billion. Miami Beach tourism officials hoping to lure more of those tourists to Miami Beach targeted the readers of *Genre Magazine*. According to Jose Lima, media relations' manager for the Greater Miami Convention and Visitors Bureau, "it is not an ideological or political thing at all, but about hard dollars:

- 93% of *Genre* readers travel throughout the year
- The average income is about \$92,000
- 30% of gay men and 36% of lesbians stayed in a resort in 1997" (Diaz, 1998)

Michael Aller, Tourism and Convention Director/Chief of Protocol, believes it is a wonderful opportunity for Miami Beach to be promoted in a nationally gay publication, as it is a city where gays can be comfortable and will not be discriminated against. Thriving guesthouses, shops and restaurants prove that gay tourists will spend a lot when they feel welcome.

During a phone interview with Mr. George Neary, Director of Cultural Tourism, he cited that Miami Beach spends a portion of its tourism budget targeting gay visitors. He strongly believes that with local events such as the winter

party and the white party each reaching an audience of 4,000 - 7,000 visitors annually, it would be foolish not to.

Supplement 1.3 – Gay Tourism in Montreal

In 1998, Montreal's marketing theme was the "Year of Gay Quebec." With the variety of gay events and festivals, Montreal is becoming very popular on the gay international scene, and in trying to capture the gay and lesbian tourists, markets itself as a "European Destination" without traveling across the world (Montreal Chamber of Commerce, 1998).

Tourism promotion is coordinated by Tourisme Montreal, a non-profit organization, which works to raise the profile of Montreal as a destination among the tourism directors of Canadian, American and International associations, as well as convention and conference planners, representatives of major corporations and motivation travel agencies. Today, expanded markets include all of the United States, Canada, French-speaking Europe and Japan.

Montreal is proud of being the home to several popular gay events/attractions:

1. Black and Blue, the most popular North American Circuit Party with an annual estimated revenue of CAD \$15 million
2. The Festival Images and Nations, the third most important gay film festival in North America
3. Le complexe Hotel Bourbon, the biggest gay entertainment complex in the world

Montreal is often called the Northern Miami because of its diversity, ethnic mix and Latin way of life. The following months are preferred for visits by the gay tourists; events and attractions are offered accordingly:

- 46% visit in September
- 42% in May and June
- 41% in July
- 40% in August and October (Montreal Chamber of Commerce, 1998)

Supplement 1.4 – Gay Tourism in Palm Springs

Palm Springs boasts a very large "native" gay population, is considered one of the few true "year-round gay resorts," and is among the current top four American destinations for gay travelers (Lenkert, Poole & Yares, 1998). Long a mecca for the gay traveler, the city's gay theaters, restaurants, hotels, bars and clubs are a respected and valued part of its culture and add significantly to its colorful, diverse spirit.

The city of Palm Springs actively promotes gay tourism and promises that gay visitors are accepted, not merely tolerated. Bed tax revenue grew about 11 percent between 1995 and 1996, numbers that can be attributed directly to the gay-oriented hotels. As a result, in 1997, the Palm Springs Tourism Division agreed to spend \$45,000 per fiscal year to attract gay and lesbian tourists to the area. This is in collaboration with the Tourism Guild (made up of

gay-owned or gay-friendly tourism businesses), which has agreed to spend \$50,000 of its own funds on the campaign. In effect, they decided to create a gay tourism bureau (Business News, 1997).

According to Murrel Foster, director of the Palm Springs Tourism Division, "the gay population, though relatively small is worth pursuing. An excellent niche market with money to spend; no children involved and so disposable income is usually very high". The gay tourism dollar is courted as aggressively as straight spending.

Palm Springs Tourism, the city's tourism marketing organization, continues to set the pace for niche marketing to the gay community by advertising in 20 gay publications and attending the IGLTA travel show.

Collection of Data

A number of approaches for collecting material for this paper were considered. Despite the sensitivity of issues relating to sexuality, approaches such as interviews and questionnaires are commonly used. The authors of this paper chose to derive data by:

- Observation
- Primary documents such as brochures and guidebooks
- Secondary materials such as research papers and research reports
- Interviews with Directors of Convention & Visitors Bureaus and City Marketers.

Examples of interview questions:

1. How do you position and properly weigh the presence of this market in an overall tourism marketing effort?
2. In your attempts to identify and reach this market, were homosexual images presented in state tourism promotion material?
3. How are economic benefits of this alternative market recognized and measured?
4. The three cities (Miami Beach, Montreal and Palm Springs) were also asked to identify the number of "alternative" visitors, reason for visit; business, leisure, convention/special events, and spending power of visitors

While the cities could not provide published statistics on gay tourism, each agreed that a once-ignored community is now being tapped for its economic potential.

Conclusion

As more travel agencies are feeling the effects of the commission cap, and as cities are seeking to increase bed taxes and meeting revenues, there is a growing interest to increase market share through niche marketing. The emergence of this market will have significant implications for the tourism industry. Marketers can no longer describe and target consumers in simple terms. To ensure success, they must develop sophisticated marketing strategies.

While gay and lesbians welcome this new acceptance, homophobia will not disappear from the American

landscape. Heterosexuality remains the norm against which others are measured, a fact that has profound implications for the tourism experiences of gay people. As Miami Beach Mayor Seymour Gelber puts it, "Gays pay like everyone else. We're glad they are here"(Drummond, 1995).

To quantify anything in relation to the gay market can be difficult because it is a question of whether or not a person is out. However, it has been proven that this is an important market, demanding high standards and value for their money. They are today's discerning travelers: they have above average incomes, higher education levels and a marked inclination to travel.

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POSTER SESSION

USE OF QUALITATIVE DATA ANALYSIS TOOL TO UNDERSTAND THE RELATIONSHIP BETWEEN RECREATIONAL FISHING AND OPEN OCEAN AQUACULTURE DEVELOPMENT

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Abstract: The focus of this paper is to emphasize the role that social science research, specifically through the use of qualitative data analysis software, can be of importance in understanding the views of local people that may be affected by the proposed open ocean aquaculture project located near the Isle of Shoals, NH. Interviews were conducted with recreational fishermen and women in the fall of 1998 by sociology graduate students from the University of New Hampshire. These interviews were first transcribed, then imported into QSR Nud*ist 4.0 qualitative analysis software. With the tools available through this software, generalizations and theories were generated about the interviewees' responses to the survey questions.

Introduction

Open ocean aquaculture is an expanding field of commercial ocean harvesting that consists of setting up facilities to grow fish for commercial endeavors. It will play an important role in the current commercial fishing economy by providing more jobs for these fishermen and women and increasing the amount of fish of species that are currently dwindling in numbers. A project of this stature involves a number of factors that need to be investigated before it is put into action. In addition to the biological and mechanical aspects of creating and constructing the infrastructure of an aquaculture project, it is also important to understand the social aspect—the effects that such an endeavor would have on the local people that use the proposed project area.

Using qualitative data analysis as a preliminary research tool is a powerful way to understand the human dimensions aspect of an aquaculture project. As part of an extensive investigation into the feasibility of an open ocean aquaculture project located near the Isle of Shoals off of the coast of New Hampshire (**Figure 1**), interviews were conducted with local recreational fishermen and women about their views on ocean farming. The interviews were transcribed and then analyzed through the qualitative analysis software, QSR Nud*ist (Non-numerical Unstructured Data Indexing Searching Theorizing) 4.0, in search of theories and/or generalizations in the data.

Interviews were administered to sixteen recreational fishers located along the NH coastline. Fourteen males and two females responded to the questions about open ocean aquaculture. The ages of these respondents range from 28 to 61, with the majority falling between the ages of 40 and 60. Nine of them currently live in New Hampshire, four in Maine, and three in other New England states. The income levels of the interviewees vary from between \$20,000-30,000 and above \$50,000 per year, with the mean representing the latter category. Half of the respondents are self-employed or retired, while the other half are employed by somebody else. The methods of ocean fishing varied from fly fishing and bait fishing to bottom-dragging and spear fishing while snorkeling. Ten of the sixteen respondents have at least one boat that they use.

Nud*ist provides a number of analysis tools that enable the researcher to organize and analyze the enormous amount of data that qualitative research often requires. There is a great capacity for storing and for coding the raw data files into nodes, or combinations of related data. These nodes can then be structured into subnode categories based on reoccurring patterns. Text searches will identify an individual word or certain type of words, while index searches help investigate similarities between different nodes. Nud*ist allows for the importation of data files, both statistical and non-statistical, and other documents such as those containing photographs and/or notes. Once these documents are loaded into the program, they can be coded and placed into nodes which are later used to develop theories and other generalizations about the data. Nud*ist has seventeen different index search tools and two text search methods that aid in analyzing the raw data files. Although all of the tools were used in this analysis, only four of the index search tools were used quite regularly in this project, and both of the text search methods were utilized. Once these tools have been utilized, the data can be transferred to a word processing program and then structured into the final report based on the findings of the researcher.

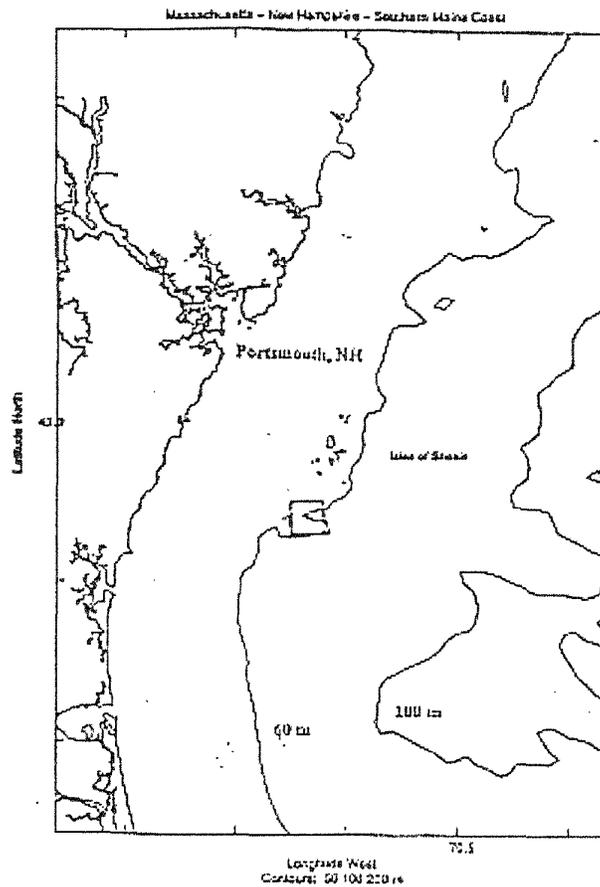


Figure 1. Location of the proposed open ocean aquaculture site off the Isles of Shoals, NH.

Nud*ist allows the researcher to obtain all of the information coded at the subnodes of a particular "branch" of the index tree (Figure 2). This method is called *collect*, and it produces a summary, segregated into sections based on the rawfiles, of the information presented under a particular node. *Inherit* is another function associated with gathering information at subnodes. The theory behind *inherit* is that all of the coding done at the nodes above the selected node, up to the parent node, is then listed in a report. There are two index searches that allow for combinations of coding to be made. The first, *union*, combines two or more nodes together based on the criteria selected by the researcher. *Intersect*, on the other hand, combines the nodes only if there is similar information coded at each node. Figure 3 offers a graphic illustration of these four index search tools.

Results

A number of concepts surfaced during the data analysis through Nud*ist that deserve attention: 1) the recreational fishers current knowledge about fishing regulations; 2) their opinion on the current status of the fish populations; 3) how they feel about commercial fishing; 4) how the increase in

crowds of recreationists has affected their fishing endeavors; 5) the respondents view of aquaculture; and 6) their opinion about the aquaculture site and it's implications.

Text & Index Search Tools

The *Collect* index search was used to evaluate the level of awareness that the respondents had towards the current ocean fishing regulations. This tool helped recognize that many of the interviewees have acquired their current knowledge about fishing regulations through the New Hampshire Fish and Game Department pamphlets and license descriptions. Popular fishing magazines, newspaper articles, books, and internet sites provide them with awareness about fishing techniques and political issues concerning the sport. In addition to the written information, there is a certain level of comradery within the fishing community, in that they share information about the types of equipment and common fishing locations with others. The majority of the respondents act politically through memberships and/or participation in organizations like the Coastal Conservation Association and the Atlantic States Marine Fisheries.

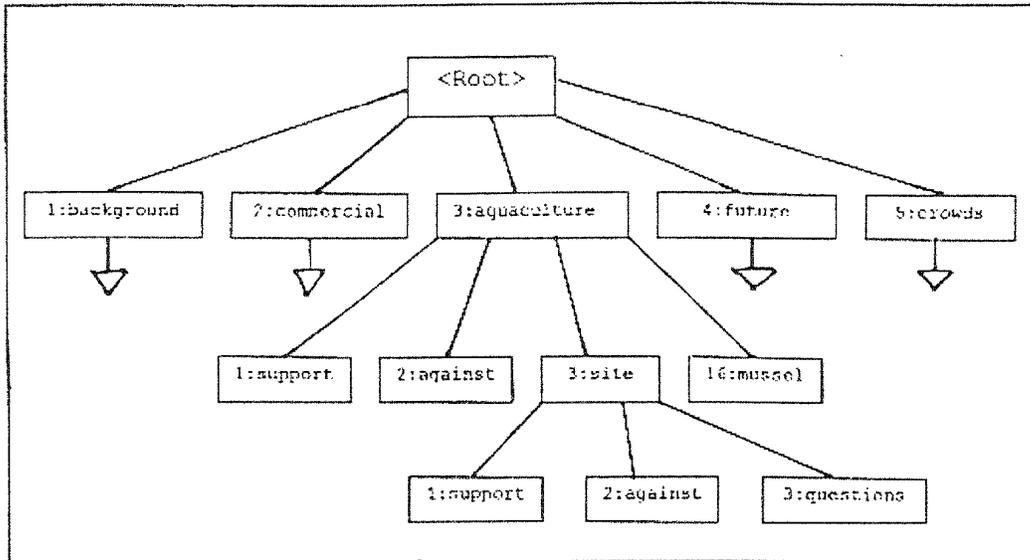


Figure 2. Index tree in QSR Nud*ist 4.0 with root, nodes, and subnodes

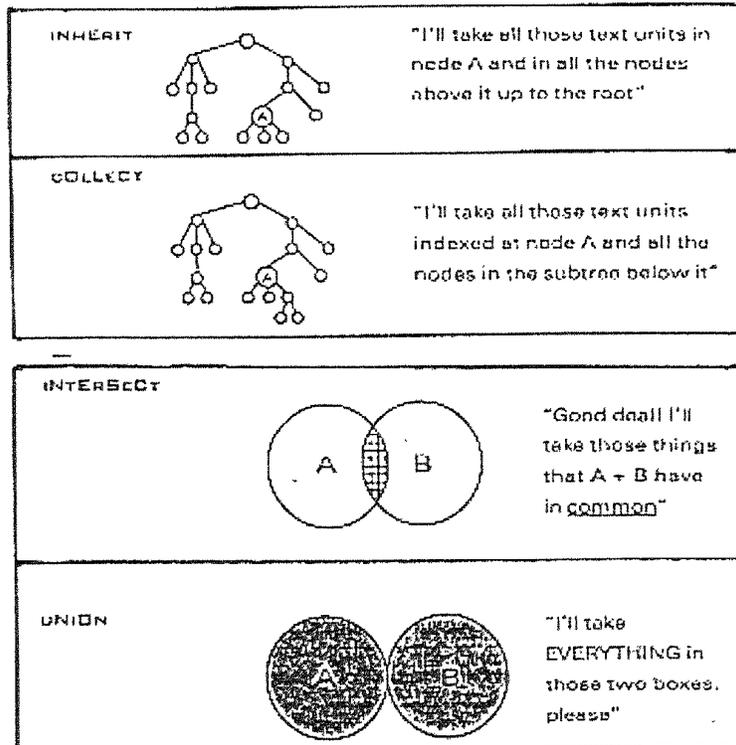


Figure 3. Index tools in QSR Nud*ist 4.0

Closely related to the respondent's awareness of regulation issues is their opinion on the current status of the fish populations. Blue fish, cod, haddock, and tuna were the species mentioned as dwindling in numbers, yet according to 75% of the respondents, the number of striped bass species has increased. When the node labeled, "fishstatus/decrease" and the "/gold rush" node were analyzed with the *union* tool, it emphasized that, according to some of the respondents, the reasons for high or low population counts are due to regulation efforts by the NH Fish and Game Department for the former, and the bottom fishing that the commercial fishing operations conduct along with the increase in value for fish on the Japanese market for the latter. One person commented, "... it's kind of like a gold rush. You know, it's like the tuna fishery at the same plane. It's like the last buffalo hunt. You know, as long as those fish are worth 22 bucks a pound, they're gonna kill every single one that they can kill."

The *inherit* tool was used to obtain insight into the feelings that the interviewees have towards commercial fishing operations by searching the text for coding done on future regulations, fishing methods, fish species status, and other political aspects related to commercial fishing. The responses varied, but nine reflected negative attitudes due to the practices, the poor attitudes, and the competition for space that this industry often produces. One interviewee responded, "Commercial fishermen are going to take everything in the ocean that they can. . . . You've got to regulate it somehow to keep it under control." Five of the respondents felt that, although the commercial industry did affect their fishing (i. e., either competition for space or the loss of significant numbers of fish species), they also realized that the commercial fishermen relied on this type of industry for their livelihood: "I would just hate to not see the small time individual family fishermen." Both sides, however, support the notion of imposing stricter regulations accompanied by tighter patrolling practices on commercial fishing as a means of controlling the negative aspects of the industry.

The competition for space between the recreational fishermen and women and the commercial fishing industry is further intensified when the influx of recreational boaters is included in the analyzation. The text search tool, *string*, was used to search all of the raw data files for the occurrence of the word "crowd." The resulting report provided the information for the following generalizations. Three of the respondents replied that the impetus for such an increase is due to the strong economy that much of the United States is experiencing right now along with the increase in leisure time and the desire to be outdoors. One respondent replied that "the biggest increase is due to the striped bass fishery." They also expressed a concern about having new boaters that may not have the skills necessary for safe boating and/or fishing.

The fisherperson's view of aquaculture involves a complex answer due to the many aspects associated with it. The *union* search tool was sufficient to analyze this concept because it allowed for the data to be combined in a number of different

ways. The first question that initiated this search was, *how much did the fishermen and women already know about aquaculture?* Each of the sixteen respondents mentioned either having toured a fish farm, or at least, having been aware of them. A few of them had eaten farm-raised fish, and commented on the lower price that this method produces: "I like the price of farm raised Atlantic fish."

Whether or not the respondents approved of the proposed aquaculture project depended upon a number of issues. Due to the small number of respondents, the impact that age, income level, current residence, and employment status had on their response was not readily apparent in the data. The impact that their current awareness about aquaculture in general and their knowledge of the proposed project, however, was more easily analyzed with Nud*ist. Furthermore, the analysis recognized the high level of interest by the respondents about the project.

There were five respondents that expressed support for the aquaculture concept. Their comments reflected this enthusiasm: "I think fish farming is absolutely the wave of the future," "Everybody's on a super health kick and they all want to eat fish," and "[Fish farming] is a necessary thing. Because human beings want to eat fish and a, we're wiping out all the fish stocks all over the world." Nine of the interviewees were split on their response, but three wavered towards supporting aquaculture. They expressed concerns about fish farming not necessarily helping them out (as individuals), the impact that the project would have on the surrounding ocean environment (i. e., wastes, odors, diseases, etc.), and issues of space infringement: "as long as it didn't get in the way of the recreational [fishing]. . . ."

Those respondents that were split on their opinion about aquaculture, yet leaned towards discounting aquaculture as a benefit, expressed many of the same questions about the viability of the project in addition to some others. The data indicates that the choice for the project site created uncertainty within their response: "I have a lot of concern about it in this area in New Hampshire because of our limited coastal resources." One interviewee said, "There's a good place for everything and that, that just doesn't seem like a very good place" accompanied by comments about navigational hazards, tidal influences on feeding regimes, and the interference of commercial endeavors. Questions about the regulation and protection of a site that is located in a turbulent environment such as the ocean came about as well: "the Coast Guard certainly wouldn't want to be baby-sitting that thing 24 hours a day," and comments about "very rough and very big waves" were also made concerning the site.

Two respondents did not express strong opinions either way about aquaculture, one only had questions with no opinion, but none of the respondents rejected the concept all together. The gentleman that expressed no opinion, had some very valid questions: "Is this going to be a big business thing or is this going to be designed and terms of local solution?" and "Who's going to regulate expansion [of the project]?"

The regulation of the project site was another recurring theme during the analysis. When asked about who should regulate aquaculture sites, seven respondents expressed the need for regulation by state and/or federal agencies such as the Fish and Game and Marine Fisheries departments. One suggestion for a lottery was made along with a few ideas about leasing and private ventures.

Conclusion & Recommendations

Unlike quantitative analysis where large numbers of data can be worked with at once to identify theories on a macro-scale, qualitative analysis works with fewer sets of data (although larger amounts of input) on a micro-scale, which not only help to identify the interviewees opinions about aquaculture, but it also allows for an in-depth look into recreational fishing as a sport. Nud*ist is an incredibly powerful tool for use with qualitative analysis data. Not only will it help store and manage large amounts of data, it also has search engines for word patterns and text patterns that enable the researcher to identify commonalities and theories based on the data. The sociological aspect of the University of New Hampshire's open ocean aquaculture project can also benefit from using Nud*ist in that the recreational fishermen and women are encouraged to express their opinions towards the project, which will help in future decision-making and planning.

Much can be learned from these interviews concerning the regulation of the ocean and other aspects of marine-oriented activities. The potential for sociological studies in the field of open ocean aquaculture is unlimited. The data collected for this research project can serve many purposes with respect to human interaction with ocean resources as a form of recreation. Although there were many generalizations and theories that came up during the analysis, the potential for continued interpretation of this data is infinite. If more interviews could be conducted, thus creating a larger base of

data, the following sociological questions could be analyzed and interpreted more thoroughly: *How does their birthplace (or long-term home) affect their opinions about: aquaculture, crowding, fish status, site/location for fishing, or their type of fishing techniques? Does income level affect their response about aquaculture? Do current (or past) occupations affect the response about aquaculture? How does their particular method of fishing affect their opinions about aquaculture? Does a catch and release philosophy perpetrate into their beliefs about open ocean aquaculture? Does it have any significance?*

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ESTIMATING TOURISM IMPACTS OF DEER HUNTING IN NEW YORK STATE: A CASE STUDY OF 1997 DEER TAKE DATA

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Abstract: This study explores the relationship between deer harvest, hunter participation, and hunter residence in New York State. Approximately 631,423 resident hunter and 32,605 non-resident hunters participated in deer hunting in New York State in 1997. Anglers and hunters together reportedly spend \$2.5 billion dollars and generate \$132 million dollars in sales and income taxes in New York State. These activities alone are estimated to generate millions of dollars in tourism and travel revenue for counties in New York State. This study examines the geographical distribution of these expenditures by hunters. Specifically, the hypotheses tested are a) that hunters frequently travel in order to participate in deer hunting, and b) that a substantial amount of tourism revenue is generated from such "hunter migration".

Introduction

"Recreational hunting and sport fishing play an important role in New York's economy" according to New York State Department of Environmental Conservation (NYSDEC) Commissioner John P. Cahill (NYSDEC, 1998a). What impacts do migrant hunters play in the local economies of New York State? Since 47% of hunters travel outside their home counties to hunt deer, there is the potential for large portions of expenditures to be considered tourism dollars. Specifically the questions addressed here are 1) Where do deer hunters go to participate in hunting, and 2) is there a substantial amount of tourism dollars generated from such "hunter migration"?

Background

Tourism is emerging in many communities as an increasingly important economic sector. Winterbottom (1991) estimated total U.S. employment supporting pleasure travel at 6 million in the late 1980s, with an annual income of \$80 billion and an annual growth rate of 4%. New York State has an estimated 6.1% share of U.S. domestic travel expenditures (U.S. Bureau of the Census, 1997), or about \$6 billion in total pleasure travel expenditures in 1996 dollars. The tourism sector may be particularly looked to for economic growth and development in regions with significant natural resource and environmental amenities. While traditional natural resource based industries such as agriculture continue to experience difficult economic conditions, tourism has continued to grow and expand (Powers, 1996). Much of New York State follows this general description of a decline in traditional industries and an increase in amenity based economic sectors.

Within New York State, deer hunting is a major recreational activity, and a significant source of tourism generated economic activity. In 1996 hunting related expenditures were estimated at \$763 million, including travel related expenditures of \$220 million (U.S. Fish and Wildlife Service, 1998). The most significant relative economic impact may be concentrated in a number of its rural counties, which attract hunters from the state's population centers. In these cases, the tourism impact of travel related expenditures by out-of-county hunters may be an important source of local business and tax revenue. Further, deer hunting by out-of-county hunters may be considered an important potential future area for economic development and growth.

Methodology

Data collected by the New York State Department of Environmental Conservation was used to determine whether or not hunter flows could be captured. Each record in the data set of 1997 reported deer take contained both the county where the deer was taken, and the county where the hunter resides. A matrix of hunter origin for deer taken in each county was generated to identify "importing" and "exporting" regions. This matrix was then brought into the ArcView GIS. A GIS system becomes useful in this study since each record includes spatial components, specifically the county where the deer was taken and the county where the hunter originated. These records were matched up with "canned" data included with the GIS software, allowing all of the data to be translated into ArcView Shapefiles for display and analysis purposes.

Data

The data set used in this study represents 135,992 deer reported taken in New York State during the 1997 hunting season. NYSDEC states that there were 631,423 resident licenses sold which allow for taking deer (including 21,709 second deer licenses) and 32,605 non-resident licenses for taking deer (Kautz, 1999). NYSDEC estimates that there

were nearly 217,000 deer taken during the 1997 season (NYSDEC, 1998b, 1998c). The 217,000 are estimated from the nearly 136,000 records of reported deer, thus making the data set used incomplete. The reported deer come from one or more of four sources. An individual deer can be reported by a wildlife biologist check, a conservation officer check, the hunter via the deer report card that the taker of the deer is supposed to fill out and submit, or a special hunt report that is filed when special hunts occur. In the data set of 135,992 successful hunters, 11,500 were not reported by the individual hunter but by some other method. The data contains 80,146 bucks and 53,141 doe with 2,705 either unknown or missing a gender response. These numbers should be compared with the 119,090 bucks and 97,746 doe that DEC estimates were taken in 1997. Of the nearly 136,000 records in the data set, 125,159 records contain valid county identification numbers for hunters. An additional 7,865 records are identified as out-of-state with no further information given.

Results

Figure 1 shows the number of deer taken by county from the data set. Chautauqua, Cattaraugus, Allegany, and Steuben Counties all had more than 5,000 deer taken. When the number of hunters for a given county who stay and hunt in that county is subtracted from the number of deer taken in that county, a measure of net "hunter migration" is generated (Figure 2). For example there are 1,954 hunters from Allegany County who stayed in the county to hunt. Since there were 7,440 deer taken in Allegany County, 5,486 must have been taken by out-of-county hunters. Cattaraugus, Allegany, and Steuben all show up as having a net migration of more than 2,500 hunters coming into the county in the 1997 data set. Also Delaware and Columbia Counties in eastern New York State are identified as having an "import" of more than 2,500 hunters.

The Eastern and Western Deer Markets

Figure 3 (western) and Figure 4 (eastern) break the state down further, showing two different "deer markets". Here it becomes much clearer that people are traveling to the "hot spots" to take deer, suggesting potentially large impacts to those local economies.

The western deer market is much larger than its counterpart in the east. Steuben County leads the state with 6,022 incoming hunters. Allegany and Cattaraugus Counties followed with 5,486 and 4,497 incoming hunters, respectively. The primary hunter inflows for these western

counties are from the region's major population centers, Buffalo (Erie and Niagara Counties) and Rochester (Monroe County). For example there are almost as many hunters in the database from Erie County (4,518) that hunt in the three county region (Allegany, Cattaraugus, and Steuben) as there are hunters from Steuben County (4,667) that hunt in the region. Similarly, while nearly 85 % of hunters from Allegany County hunt within that county, they represent only 25 % of the deer taken in Allegany County.

Although they received fewer incoming hunters than their counterparts in western New York, Columbia and Delaware counties still experienced significant inflows of deer hunters. For the most part, the 3,066 hunters traveling to Columbia County during the 1997 season. Delaware County had an inflow of 3,044 hunters. These hunters came mostly from the Capital District and New York City areas.

Estimating Economic Impacts

Estimating the expenditures made by individual hunters in the county to which they travel to do their deer hunting is necessary in order to determine the economic impacts to the counties visited. The estimation of expenditures per hunter came from the U.S. Fish and Wildlife Service (1998). Among other things, this survey lists trip and equipment expenditures made in New York by U.S. residents for big game hunting purposes. The data showed that, on average, each hunter spent \$577 in 1996. This total is comprised of \$143 for food and lodging, \$79 for transportation, \$14 for miscellaneous trip expenses, and \$342 for equipment. We do not make any adjustments from these 1996 dollar figures to our 1997 hunter data.

To find the economic impact of incoming hunters on a particular county, these figures are used to derive low and high estimates, for the expenses occurring in the county where the hunting takes place by the visiting hunter (Table 1). The low estimate is based on the following assumptions. The entire \$143 for food and lodging is included. A conservative estimate for transportation spending assumes that 10% of total transportation costs are incurred in the destination county, or \$8. In terms of miscellaneous trip expenses, the entire \$14 amount given in the survey is used. For the final category, equipment expenditures, only 10% of the annual per-hunter spending levels are used, equalling \$34. Taken as a whole, our low estimate of expenditures per incoming hunter was \$199.

Figure 1. 1997 Reported deer take by county

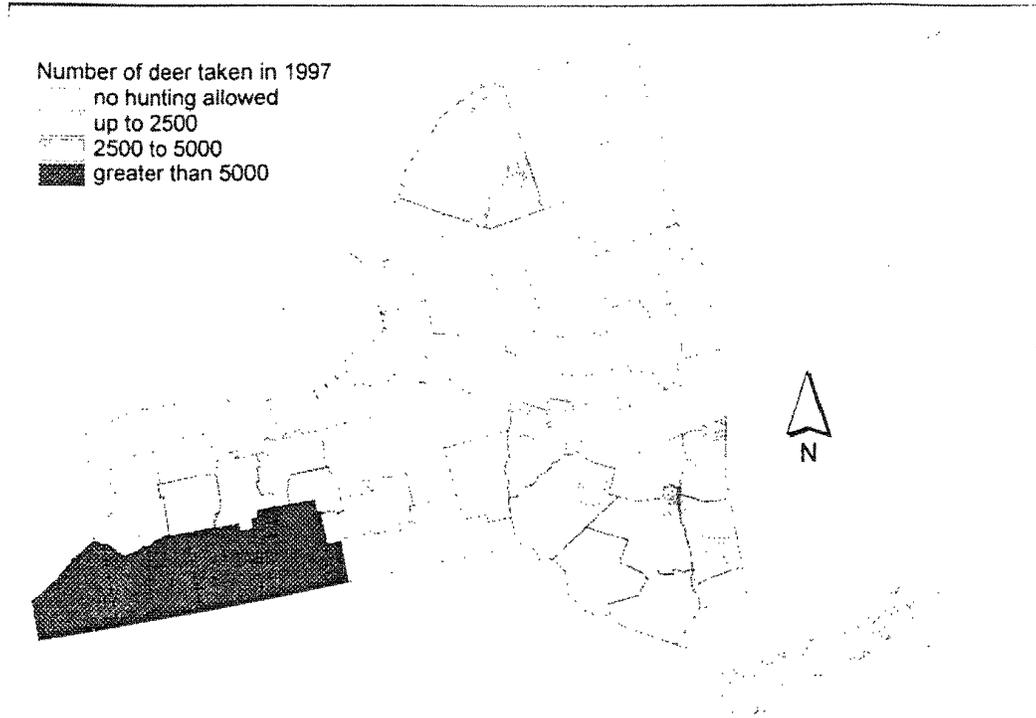


Figure 2. Hunter migration: Are they staying or going?

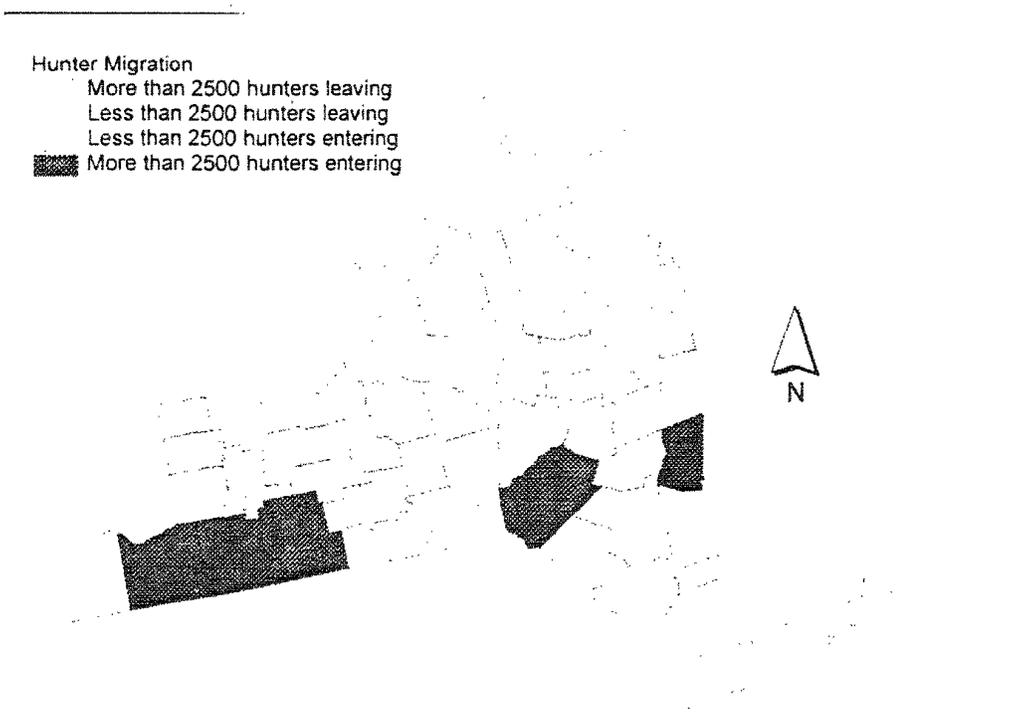


Figure 3. Where do hunters in Allegany, Cattaraugus, and Steuben Counties come from?

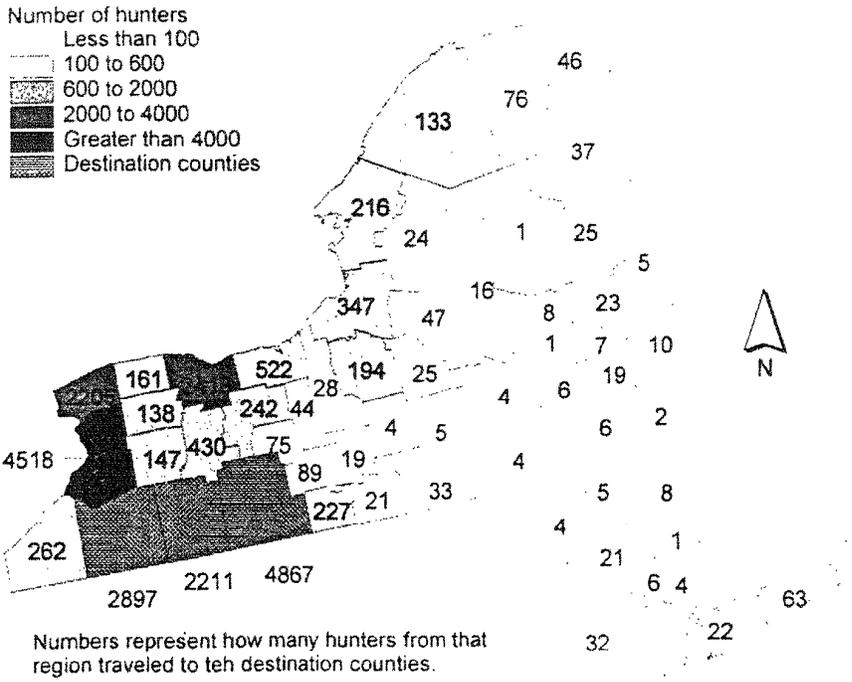


Figure 4. Where do hunters in Columbia and Delaware Counties come from?

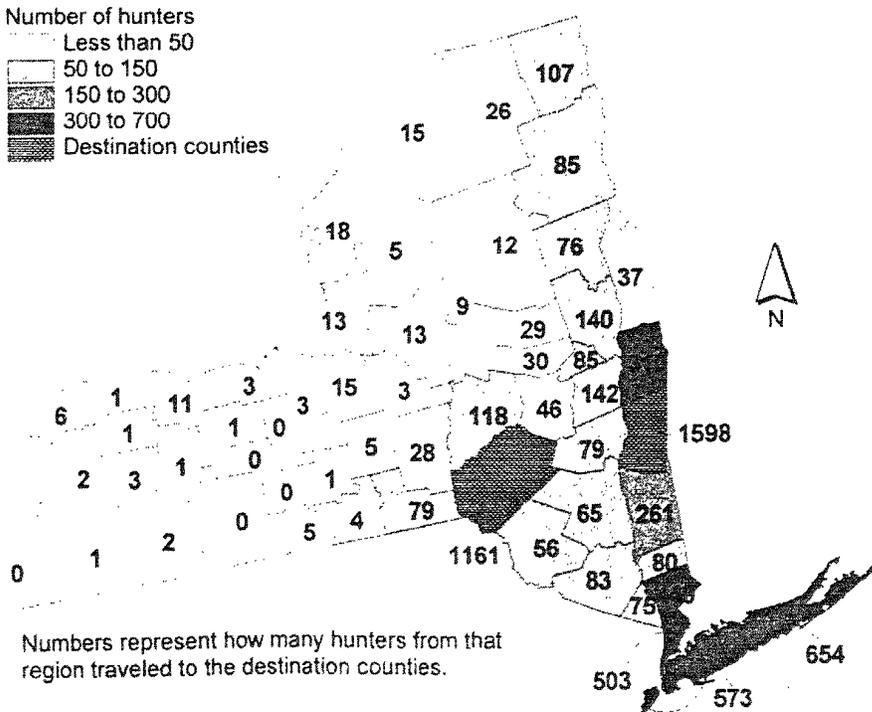


Table 1. Average trip and equipment expenditures

	U.S. Dept. of Fish & Wildlife Data ¹	Low Estimate ²	High Estimate ³
Food and Lodging	\$143	\$143	\$143
Transportation	\$79	\$8	\$40
Misc. Trip Costs	\$14	\$14	\$14
Equipment	\$342	\$34	\$113
Total	\$578	\$199	\$309

¹Based on 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation - New York. Figures represent average expenditures per hunter per season for big-game hunting.

²Low estimate assumes 10% of transportation and equipment costs are incurred within the destination county.

³High estimate assumes 50% of transportation costs and 33% of equipment costs are incurred within the destination county.

Our high estimate, like the low approximation of spending, assumed that all of the food and lodging and miscellaneous trip costs are incurred in the destination county. Transportation costs were increased to 50% of the Fish and Wildlife Service survey total, or \$40. Equipment expenditures are assumed to be 33%, equalling \$113. In the end, the total for our high estimate was \$309 per hunter.

Multiplying these estimated dollar amounts by the number of incoming hunters gives the tourism impacts from incoming hunters (Table 2). Total expenditures in Steuben

County by incoming hunters are estimated at \$1.2 million based on our low estimate and \$1.9 million based on the high estimate. Allegany County followed with total expenditures of \$1.1 million according to the low estimate and \$1.7 million according to the high estimate. Spending levels based on the low estimate were \$0.9 million in Cattaraugus County, \$0.6 million in both Columbia and Delaware Counties. The high estimate returned total economic impact figures of \$1.39 million in Cattaraugus, \$1 million in Columbia, and \$0.9 million in Delaware.

Table 2. Economic impact of New York's most popular deer hunting destinations

County	Number of Incoming Hunters	Total Expenditures (millions of 1996 dollars)	
		Low Estimate ¹	High Estimate ²
Steuben	6,022	1.2	1.9
Allegany	5,486	1.1	1.7
Cattaraugus	4,497	0.9	1.4
Columbia	3,066	0.6	1.0
Delaware	3,044	0.6	0.9

¹Low estimates of total expenditures by incoming hunters assume \$199 of in-county expenditures per hunter.

²High estimates of total expenditures by incoming hunters assume \$309 of in-county expenditures per hunter.

Putting it into Perspective

While these dollar values appear substantial, by themselves they do not indicate the overall significance of hunting for each county. The data set represents slightly more than 60% of the total number of deer believed to be taken during the 1997 season. Furthermore, not all hunters are successful. If all 664,028 license purchasers participated in deer hunting, our spending estimates capture 20% of all deer hunting related expenditures by out of county hunters. If 47% of all eligible hunters traveled outside of their resident county, and incurred \$199 in out of county expenses during the season, \$62 million in total tourism dollars are generated. This assumes of course that unsuccessful hunters incur the same expenses as successful hunters. In addition to this, there is the real possibility of one hunter taking more than one deer. A sportsman who participates in both archery and regular season and also gets a doe permit could possibly take 3 deer, or incur 3 times the expense for a single deer. Additionally, a certain segment of license purchasers may never spend a single day in the woods, since licenses can be purchased almost a

year in advance. Weather may also be a determining factor in hunter participation rates.

To take this analysis one step further, some measure of the economy of the county is needed in order to frame the hunter expenditures. The 1992 economic census estimates \$53.5 million dollars in taxable service revenues and \$211.6 million dollars for all retail trade in Allegany County (U.S. Bureau of the Census, 1992). Likewise, \$32.3 million dollars is said to be generated from the hotels, motels, camps, etc. (SIC code 70) and Restaurants (SIC code 53). Assuming that the data set is only 20% of all incoming hunters, we estimate that \$3.6 million dollars was spent by visiting hunters for food and lodging in 1992 dollars (Table 3). This can be contrasted with the neighboring Steuben County, which is believed to have generated \$170.4 million in taxable service revenues in 1992. It is estimated that Steuben received \$3.9 million dollars coming from food and lodging expenditures by all out-of-county hunters. According to the 1992 economic census, Steuben County saw \$18.4 million dollars in hotel and other lodging revenues.

Table 3. Comparison of estimated food and lodging expenses incurred by all out-of-county hunters to other indicators of economic activity. (millions of 1992 dollars)

County	Total Private Sector	Total Taxable Service Industry	Food&Lodging	
	1992 Economic Census			Estimated Sales to All Out of County Hunters ¹
Allegany	264	53.5	32.3	3.5
Cattaraugus	414	156.8	73.0	2.9
Steuben	1,656	170.4	72.2	3.8
Columbia	412	147.9	32.3	1.9
Delaware	275	77.2	31.2	1.9

Source: US Bureau of the Census, 1992 Economic Survey

¹ Assumes food and lodging expenses from Table 2. are 20% of all hunters.

Conclusions

For many of the rural counties of New York State, the arrival of the fall months and the annual deer-hunting season means a significant economic boost. Our estimates suggest that this boost is, in some cases, in the millions of dollars. Additionally, our estimates almost certainly understate reality since they are based on a portion of successful deer hunters.

The limitations of our study definitely lend support to the case for further research in this area. With the data that is available, much more could be understood about the recreation patterns associated with big game hunting in New York State. The use of license sales data would be useful in determining success rates for hunters based on their home county. This in turn could be used to adjust

particular flows of hunters and expenditures. Other parts of the study, such as the expenditure figures, could be refined. For example, since the county where the hunter is from and the township where the deer is taken are both in the data set, it would be possible to generate a more accurate estimate of travel expense incurred by the hunter. The findings presented here are thus a starting point in the process of estimating the economic value of hunting in the various counties of New York State.

This study shows that deer hunting does indeed play a major role in the local economies across New York State. The methods we have presented could be very useful to a county in its attempt to lure more hunters from other parts of the state. Knowing where hunters are coming from and understanding the extent of their economic impact is vital if

a county is to maximize the economic potential of hunting as a form of tourism.

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RECREATIONAL USE OF INDUSTRIAL FOREST LANDS IN NEW YORK STATE

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Abstract: As part of New York's Sustainable Forestry Initiative, a survey of the companies and individuals involved in forest products, forest management, and primary wood processing was conducted to establish a baseline about their operations in the state in 1997. Part of that study was to measure the use of industrial forest lands for recreational activities. Of the 396 companies and individuals sent a mail survey, 237 complete and useable surveys were returned (response rate of 45%). Nearly all of the forest industry's 1.1 million acres are used for recreation and open space in the state. Survey respondents indicated that forest recreation is managed through private recreation leases on approximately 800,000 acres and an estimated 180,000 acres of forest lands are open to the public for recreational activities. The five most often reported recreational activities on industrial forest lands are hunting, snowmobiling, hiking, fishing, and observing wildlife. Forest managers are seeking ways to better manage their lands for recreation and aesthetics in addition to commercial forest products.

Introduction

Since 1960, participation in outdoor recreation in the United States has increased steadily. Specifically, growth in outdoor recreation has been highest in land-based activities such as hiking, primitive camping, and off-road vehicle driving and non-consumptive activities such as bird watching and nature studies (Cordell et al. 1998). While demand for outdoor recreation activities continues to rise at a steady rate, the supply side, mainly publicly owned parks and recreation areas, has not been able to match this increase. Limited funds and tight budgets make it difficult for federal and state agencies to acquire new lands for public recreation. Private lands, especially in the eastern U.S., are currently being used to increase the recreation supply base, usually without the outright purchase of the land. Industrial forest lands, such as those owned by timber

and pulp and paper companies, represent large contiguous tracts of land with a high potential for certain types of recreational opportunities.

This exploratory study focused on the actual recreational use of industrial forest lands in the state of New York. The objectives were threefold: to estimate the amount of outdoor recreation on industrial forest lands in the state of New York, to identify possible acreage trends regarding the amount of land open without fee and amount of land with fee, and to determine the most frequently occurring activities on industrial forest lands. While this study provides a general description of recreational use of industrial forestlands, more research is needed to help owners better manage their lands for recreation and commercial profit. The results from this study will be used to guide subsequent research on recreational use on industrial forest lands.

Background

Corporate forest lands often have more contiguous acres and a larger percentage of land covered with forests and water than non-corporate landowners. Given these characteristics, corporate lands are able to serve many people and provide numerous opportunities for recreational use in addition to non-corporate lands. A majority of industrial firms realize the great potential their lands hold for recreation (Cordell et al. 1993). Trespassing, vandalism, and liability issues have caused some industrial owners to post their lands to restrict public use. While posting limits uncontrolled public access, recreational leases and easements are used as ways to facilitate public use of private lands for recreational activities.

Recreational easements and leases differ legally in regards to ownership and rights of the land. Easements transfer limited rights of one property to the owner of an individual, organization, or agency and are generally associated with right-of-way agreements or specific and limited recreational activities (e.g., access across one property to reach another or recreational hiking trails). Legal ownership of the property remains with the original owner, but specific, limited use is granted to specific users. On the other hand, a lease transfers use of the property to the lessee. A lease is bound by a specific time period and an agreed upon fee. Most recreation on industrial forest lands occurs through either free access or leasing, as easements usually are limited to right-of-way access to another property.

In the past, and to a lesser extent now, industrial forest owners kept all of their land open for free public access. The primary reason behind this was to maintain a good relationship with the neighboring landowners. As problems such as trespassing and vandalism arose and the need to maximize corporate profits became more important, industrial owners posted their lands and looked for new ways to provide recreational opportunities on their lands. In a 1969 study by Patrick, a representative from International Paper stated the high probability of changing from a no fee, open access policy to some sort of payment access policy,

citing both economic and ecological reasons. Leasing is one such payment access policy which allows for continued recreational access, but also provides a way to generate income to pay for the annual operational costs of managing a forest, such as property taxes. Additionally, it encouraged users to act responsibly and act as stewards of the land.

Recreational leasing on industrial forest lands, however, is not a panacea. Vandalism, destruction of property, and litter were and still are common problems that afflict industrial forestlands open for public use. Landowner liability for user injuries incurred while on the corporate property is a problem both for owners allowing free access and those leasing land. Furthermore, problems can arise from users who do not agree with the forest land use and harvesting techniques of the industrial landowner. These types of problems deter industrial forest owners from making their lands available for public use.

Posting lands against trespass is one way for owners to reduce problems associated with recreational use. Generally, private landowners, both corporate and non-corporate, with more than 500 acres tend to post their lands. Private landowners with less land seem to be able to control and monitor their lands without posting (Birch 1983). While posting restricts public access, it does not necessarily limit recreational use. Often, private landowners post their land to control access, not to completely bar recreational use (Brown et al. 1984).

Whether posted or not posted, leased or open access, the fact remains that the majority of industrial forestlands in New York are open to some form of recreation. Historically, most recreational use of industrial lands has been in the form of hunting. Firms tended to stay away from picnicking and camping-type activities because of site degradation problems and the possibility of fires on their property (Birch 1983). Hunting continues to remain the top draw for recreational use of industrial lands, but there is an increasing demand for other activities such as hiking and camping. As consumptive activities decrease in popularity and more emphasis is put on non-consumptive outdoor recreation, it may be necessary for industrial firms to reconsider their lease marketing strategies and target markets.

Methods

Results from this study were extrapolated from the 1998 New York Sustainable Forest Initiative (SFI) Progress Report. The SFI is a national program promoting environmentally sound forest management techniques. Its main goal is to meet the forest product needs of the present while planning for continued sustainability in the future. The SFI program works to achieve this goal by promoting environmentally and economically responsible management techniques, long-term forest health and

productivity, proper management of forests with special qualities (e.g., biological, geological, historical), and by continuously improving forest management practices through regular monitoring of progress toward the goal of sustainable forestry (Germain 1998). Progress in the state of New York is monitored through the use of an annual survey that is sent to the state's forest products community.

In the 1997 survey, 396 industrial owners and individuals involved in forest products, forest management and primary wood processing operations received questionnaires. 237 completed surveys were returned, but only 174 were useable (response rate of 45%). Of the 174 useable surveys, 82 were completed by industrial owners who indicated a response to the recreation portion of the questionnaire. The recreation portion of the questionnaire focused on four questions. These questions asked for the amount of acres of forestland open to public access without a fee, the amount of acres of forestland open for a fee, an estimation of recreational user days on forestlands in 1997, and a ranking of the three most frequent recreational activities on company forestlands.

This exploratory study benefited from information provided in the 1998 NY SFI Progress Report. The Statistical Package for the Social Sciences (Version 7.5) for Windows was used to generate general descriptive statistics. Further statistical analysis was done to determine what relationships and patterns of use, if any, existed for recreational use of industrial forestlands. However, any patterns discussed in this study are based on the analysis of general descriptive statistics. Further research is needed to test for the significance of any trends and relationships discussed in this paper. The general description obtained in this project will be used as a basis for a larger study looking specifically at recreational leases on industrial lands.

Results and Discussion

General information were summarized regarding the amount of acres open without a fee and acres open with fee in relation to the total acreage categories (Table 1). As expected, the three variables all increased as the total amount of forestland increased. Correspondingly, the largest total acre category had the greatest average amount of acres open without fee and open with a fee. This is consistent with previous studies that indicate larger tracts of land are more suitable for outdoor recreational activities (Cordell et al. 1993). A second interesting finding is that more acres are open without fee as compared to acres open with a fee except in the largest total acre category. Much like posting, this could be due, in part, to the fact that owners with smaller tracts of land are better able to control public access than those with larger tracts of land. Another explanation could be that charging fees is more financially viable on larger as opposed to smaller tracts of land.

Table 1. Average Acreage and Acreage With and Without Fees in 1997.

Range (Acres)	Acres	Acres Open for Fee	Acres Open without Fee
1-200	136	15	69
201-400	304	17	141
401-800	611	55	362
801-4,000	1,605	718	822
4,001-10,000	7,305	2,482	4,606
10,001-308,000	88,015	58,453	8,192

The percentage of total acres open without fee and open with fee varied across the total acre categories (Figure 1). There is a higher percentage of acres open without fee than acres open with fee in all categories except the 801-4,000 and 10,001-308,000 categories.

Percent open with fee is lowest in the three smallest acre categories and highest in the three largest. On average, over 40% of total land is open without fee, except in the largest total acre category.

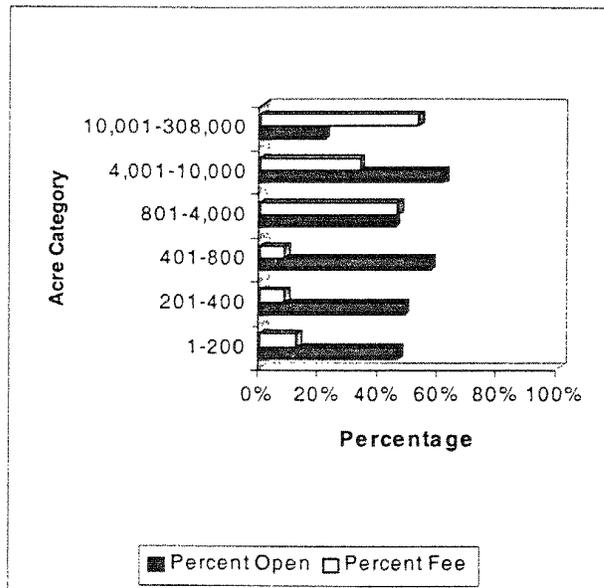


Figure 1. Average Percentage Comparison of Land with Fees and Open by Acre Category in 1997.

Of the 82 industrial forest respondents, 78 indicated a response to the acres open with a fee question. Approximately 60% of respondents however indicated having no acres open for fee access. Percentages of no open for fee responses were highest in the three smallest total acre categories (1-200, 201-400, and 401-800). Again, this could indicate that owners with small tracts of land are better able to control access to their lands and, thus, do not need to lease their lands. Of those landowners who gave a response other than no acres for the acres open with fee

question, landowners with larger total acres were more likely to charge a fee for use of their lands than those with smaller total acres (Table 2). Roughly 35% of all industrial forest landowners responding to the open with fee question fell into the three largest total acre categories (10% of landowners fell in the 801-4,000 and 4,001-10,000 acre categories and close to 15% fell in the 10,001-308,000 acre category). This indicates a greater opportunity for outdoor recreation on larger tracts of land, as there is a greater amount of land available for recreationists.

Table 2. Average Percentage of Acres Open With Fee, Compared to Total Acres, in 1997.

Total Acres	0	1-1,000	1,001-10,000	10,001-238,000
1-200	18.0%	2.6%	0%	0%
201-400	16.7%	1.3%	0%	0%
401-800	12.8%	2.6%	0%	0%
801-4,000	5.1%	5.1%	3.9%	0%
4,001-10,000	5.1%	3.9%	6.4%	0%
10,001-308,000	2.6%	2.6%	1.3%	10.3%

All 82 industrial owners responded to the open without fee question, but a large percentage indicated no acres were available without a fee as their response (44%). While close to 55% of all industrial landowners have a portion of their land open without a fee, there is only a slight difference between the percentage occurring among owners of small forest areas as compared to those with large forest areas. The two categories with the lowest percentage of acres

available without a fee are the 201-400 and 10,000-308,000 categories. The remaining three categories account for 11% or more of all owners who indicated a response for this question (Table 3). This suggests that total acres does not necessarily limit having a portion of land open without fee. Although a larger percentage of industrial owners have a portion of their lands open without fee, much more total land is available through the payment of a fee.

Table 3. Average Percentage of Acres Open Without a Fee, Compared to Total Acres in 1997.

Total Acres	0	1-250	251-1,000	1,001-7,000	7,001-40,000
1-200	9.8%	11.0%	0%	0%	0%
201-400	9.8%	0%	7.3%	0%	0%
401-800	2.4%	4.9%	7.3%	0%	0%
801-4,000	7.3%	0%	2.4%	4.9%	0%
4,001-10,000	4.9%	1.2%	0%	6.1%	4.9%
10,001-308,000	9.8%	0%	0%	0%	6.1%

Hunting is by far the most frequently occurring activity on industrial forestlands. Sixty-four percent of all owners listed hunting as the primary activity on their lands (Figure 2). Snowmobiling, hiking, fishing, and observing wildlife were the next most often indicated activities, but none of these were significantly considered as primary activities. More than 28% of owners indicated both snowmobiling and hiking as secondary activities. Cross country skiing and berry picking rounded out the top activities. A fairly small percentage of owners listed picnics, nature study, and canoeing as secondary and tertiary activities.

While these results are valuable, it is important to note that they may not be indicative of the total recreational use of industrial lands. The SFI survey asked companies to indicate acre totals based on public use. However, often owners, employees, and their immediate families are allowed to use the company lands for recreational activities. Including this type of use could significantly change the data in that a more realistic picture of recreational use of industrial lands could be created. This supplemental data would add to general public use of industrial forest lands.

Conclusion

Industrial forestlands account for 1.1 million acres of land in the state of New York. It was determined that almost all of this land is open in some form for public use. Nearly 800,000 acres are leased to individuals and clubs, while approximately 180,000 acres are open for public access without fees. These lands play an important role in providing recreation for the public and in partially relieving the stress of over use on public lands.

Some important results with regard to recreation on industrial forest lands emerged from this study. Many industrial landowners have a certain percentage of their land open with or without fee, but by far it is large landowners who provide the most land for public use. In fact, 78% of all lands that are open to the public (with or without fee) and 92% of all recreation user days occur in the largest total acre category of this study. These results indicate that there is more opportunity for outdoor recreation activities on larger tracts of land. While this initial study resulted in describing recreational use of industrial forest lands, more research is needed to help owners better manage their lands for both recreation and commercial profit.

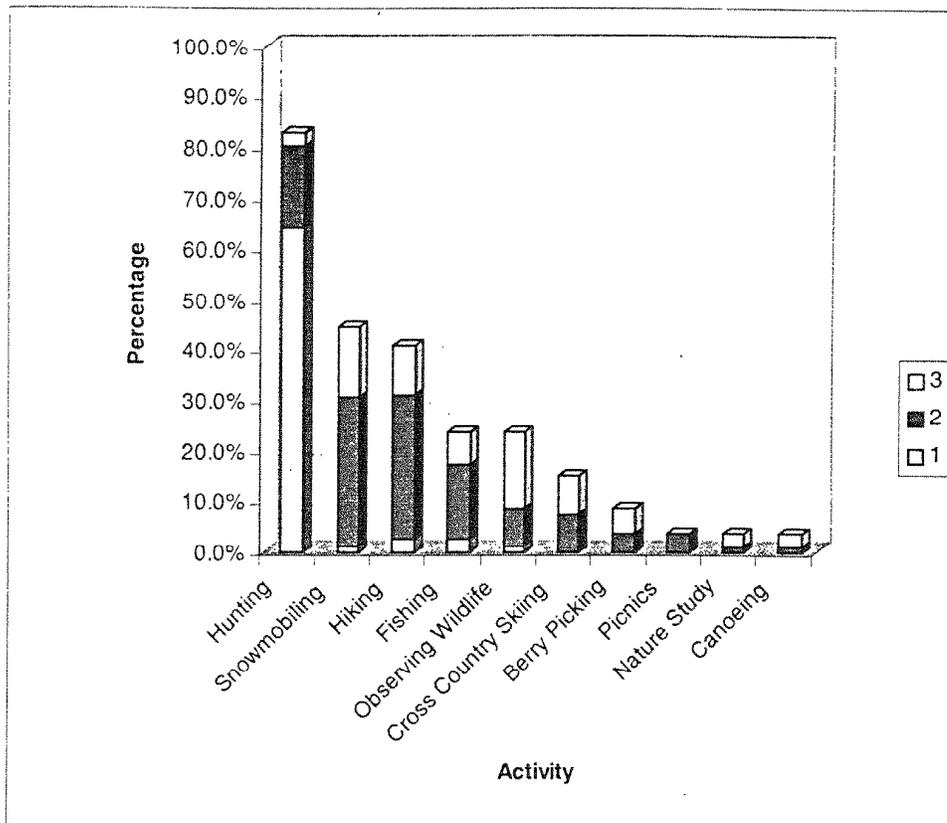


Figure 2. Recreational Activities and Their Ranking by Use on Industrial Forest Lands in New York State in 1997.

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COMPETITION FOR COMMON PROPERTY SPACE: NEW HAMPSHIRE'S RECREATIONAL FISHERS AND OPEN OCEAN AQUACULTURE DEVELOPMENT

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Abstract: This paper examines the opinions and attitudes of New Hampshire saltwater recreational fishers regarding regulating public access to common property for proposed aquaculture development. Using data collected from in-depth, semi-structured interviews with 16 recreational fishers, I describe the fishers' current perceptions of crowding and spatial conflicts, their methods of adapting to the spatial pressures put on the commons, and their attitudes toward open ocean access and public management issues. I argue that it is the social context of informal rules on the water and the fisher's perceptions of how well these informal procedures are working, coupled with their personal strategies for managing spatial conflict, that shape their attitudes about the future development and management of public ocean spaces.

Introduction

During the last decade, the decline of wild fish stocks has put increasing pressure on fish farming to meet the growing demand for seafood around the world. Aquaculture development often requires placing restrictions on public access to ocean waters where farming operations are constructed. How will current user groups respond to restrictions placed upon their activities when aquaculture is introduced? In this study, I examine the attitudes of one user group, recreational fishers, regarding the introduction of aquaculture to their waters. I argue that the degree to which recreational fishers currently perceive competition and crowding on the water, the degree to which existing informal rules for regulating common property use are working, and the degree to which the fishers' adaptive strategies for managing competition are successful are important factors shaping their attitudes about aquaculture development and open ocean access. These contextual factors are important for resource managers, planners, and water users to consider as they search for ways to meet the growing demand for fish products as wild fish stocks decline.

Declining Stocks, Aquaculture, and Common Property Issues

Wild fish stocks around the world are in trouble. "By recent U.N. estimates, a majority of marine fish stocks and all of the world's primary fishing grounds have reached peak production and are in decline" (McGinn 1998: 6-7). The capture fisheries that depend upon this resource have

been hit hard. Globally, catches have grown only 3% during the 1980s and only 1% during the 1990s (McGinn 1998). New England's fisheries have not been immune to the global decline in fish stocks. George's Bank was closed to fishing in 1994. Commercial groundfishing off Jeffrey's Ledge was closed during the mid 1990s. Most recently, in December of 1998, Maine's commercial fishers called for the closure of the Gulf of Maine.

Meanwhile, the world's growing appetite for fish has increased pressure on fish production. During the past decade, aquaculture has begun to fill the gap between increasing demand and diminished supply. Twenty percent of the fish consumed in 1995 were farm-raised as compared to eight percent in 1984 (McGinn 1998). Most of the world's aquaculture is done in freshwater, in tanks on land, and in protected bay areas. Open ocean aquaculture, the cultivation of certain fish species in containment structures in the open ocean away from the protection of land, is a relatively new development not widely in use. In New Hampshire, a project to test the feasibility of farming mussels and flounder in the open ocean is underway. The University of New Hampshire received funding from the U.S. Department of Commerce, through a special appropriation to the New Hampshire Sea Grant College Program, to develop an open ocean aquaculture demonstration project off the Isles of Shoals. The project will initially block off an area in the open ocean 74 meters by 332 meters for the aquaculture operation.

The blocking off of open ocean for a commercial aquaculture operation raises a number of issues. As McGinn points out, "the areas best suited for cultivating fish often coincide with ones already used by wild fish stocks" (1998:49). Not only does this create a potential problem for the wild fish stocks in the immediate area, it poses potential problems for the people who fish for those wild stocks. This, of course, includes commercial capture fishers, but it also impacts recreational fishers. Fishers, both commercial and recreational, have traditionally viewed the ocean as "common property," a communal resource to which they are entitled access. However, while viewing the open ocean as common property, fishers have also at times developed notions of territorial rights "even to the extent of outright private ownership claims, to valued fishing grounds, species, or techniques" (McCay and Acheson 1996:11). Common property has been seen by a number of scholars, most notably Garrett Hardin (1968), as problematic in that it leads to a "tragedy of the commons" in which self-interested actors exploit the common resource to the point that their collective actions cause the total depletion of the resource. Two methods for restraining the abuse of common property have been proffered by commons theorists: government regulation and privatization.

However, McCay and Acheson (1996) point out that the tragedy of the commons model does not recognize that property rights are social: property rights refer to relations among people. They argue that contextual factors such as notions of territorial rights and the "presence or absence of rules about uses of the commons, alternatives to

exploitation of common resources, [and] ways of monitoring and controlling the behavior of others” must be considered when examining common property activities and regulation (McCay and Acheson 1996:6). This means that understanding how New Hampshire fishers will think about and respond to future common property regulation depends, in part, on their current relationships with other common property users and the informal rules and strategies recreational fishers now use to monitor, control, and adapt to the behavior of competing users.

The Study

This paper examines the opinions and attitudes among New Hampshire saltwater recreational fishers regarding regulating public access to common property for proposed aquaculture development. Using data collected from in-depth, semi-structured interviews with 16 recreational fishers, I describe the fishers’ current perceptions of crowding and spatial conflicts, their methods of adapting to the spatial pressures put on the commons, and their attitudes toward open ocean access and public management issues. Data collection was conducted during November of 1998, by a team of graduate student researchers from the Sociology Department at UNH, funded by the Socioeconomic Component of the Open Ocean Aquaculture Demonstration Project, headed by Dr. Robert Robertson, UNH Department of Resource Economics and Development.

The topics discussed with the fishers in the interviews included their perceptions of how things have changed on the water, including the relationships between water users. They were also asked to comment on the proposed aquaculture site specifically and share their thoughts on ocean management generally, including who owns the ocean and how access should be regulated if and when the ocean off New Hampshire’s coast is developed. In this paper, I describe their current perceptions of crowding, their methods of adapting to the spatial pressures put on the commons, and their attitudes toward issues regarding open ocean access and public management that arise when sections of ocean are blocked off for commercial development.

I argue that some fishers have been little affected by conflicts over space and territory. The social context within which they consider future management of the commons is one where current informal procedures are working. This context shapes their attitudes toward future management issues and they are not overly concerned about regulation of the commons in the future. Other fishers have been directly affected by competition for common space, but have developed their own informal adaptive strategies to avoid conflict. They, too, believe that management of the commons will be worked out satisfactorily in the future. The last group of fishers have been bothered by spatial conflicts and have not developed satisfactory adaptive strategies. This group has more concerns about open ocean management, conflicts over usage of aquaculture sites, and public access to the commons.

Findings

The findings presented here provide demographic information on the fishers as well as a brief description of their fishing practices and territory. I then examine the relationship between the fishers’ perceptions of crowding and competition for space, their strategies for managing competition, and their attitudes about open ocean aquaculture development and future regulation of the ocean.

The Fishers and Their Practices

Our sample of 16 fishers included 14 men and two women. They ranged in age from 28 to 61. Most were in their 40s and 50s. They were a somewhat elite group of fishers. Most were educated, affluent, professionals who fished at least weekly. Some fished as often as daily during the summer months. They owned their own boats and fished in an area that reached from the Great Bay inland estuary out to Jeffrey’s Ledge in national waters, north into Maine and south into Massachusetts. All were familiar with the Isles of Shoals area six miles off the coast of New Hampshire where the proposed aquaculture site will be located. Their target species included tuna, lobster, mackerel, cod, haddock, and a variety of bait fish. However, the target species most often mentioned by these fishers was striped bass.

Striped bass have made a major comeback to New Hampshire waters in the past two or three years, after all but disappearing a few years ago. One of our fishers described the striped bass fishing in New Hampshire as “world class.” Almost all of the fishers mentioned a major increase in boat traffic and fishers on the water, especially since the striped bass have returned. Many attributed the increase to a combination of the striped bass fishery and an improved economy that has enabled more people to buy boats. The recent increase in boats and fishers competing for the same space on the ocean and surrounding tributaries is an important part of the context within which recreational fishers are experiencing and thinking about issues regarding access to the common property of the ocean.

Unaffected Users: “There’s plenty of space”

Seven of the recreational fishers interviewed did not perceive space to be an issue on the water. Although they mentioned the increase in boats and boat traffic, especially in the Piscataqua River, they did not discuss having conflicts over space. In some cases, this is because they have had positive, cooperative interactions on the water. Jill, a 51 year old lab manager, is an example of this type of fisher.¹ She has been fishing all of her life and has certainly noticed that there are more boats on the water. *The biggest difference is that there are a lot more boats out there than there used to be . . . and the very worst thing is these personal watercraft that make all the noise.* While

¹ Pseudonyms are used throughout this paper to protect the privacy of the people who graciously agreed to be interviewed.

Jill complains about the noise made by personal watercraft and says they disturb families that live on the ocean, she doesn't complain about them intruding upon recreational fishing space. Her encounters with other water uses have been positive. *I think that in general everyone's very friendly and they always wave and you always return the wave. I think that after all the hubbub on the roadway and driving and people cutting in front of you, it's kind of refreshing to have somebody wave to you.*

Joe, a 50 year old striped bass fisherman, held similar views. Although he, too, has noticed an increase in users, his interactions on the water have been fairly positive. He told about a trip to the Isles of Shoals to try out a new lure. The "magic" lure proved highly successful, so much so that fishers in nearby boats crowded around him to ask what he was using for tackle. He did not react in a competitive way, but rather was flattered by their interest and admiration, perhaps because his followers did not want his space, but instead wanted information about his tackle. In fact, he shared the information about his magic lure and later was amused to see that this lure disappeared from the shelves of local tackle shops during the next week. These two fishers have had positive interactions on the water and hold positive, cooperative attitudes towards others.

A couple other fishers in this group have seen other people get into conflicts over space, but don't perceive this to be much of a problem for themselves. When asked if there had been an increase in conflict since more people have gotten into the striped bass fishery, Danny replied, *No, it's pretty much stayed the same. I guess, you know, there might be some minor conflicts between, you know, "that's my spot, not your spot" sort of thing. But other than that, no.* He did not relate being personally affected by competition over space.

Others expressing little concern over spatial conflicts were those who employed specialized techniques that put them out of the way of competing fishers. Mark fishes primarily for ground fish, which few recreational fishers have competed for since the crash in ground fish stocks several years ago. Ground fishing takes him farther out into the ocean to Jeffrey's Ledge far beyond the range of striped bass fishers. He did mention that a lot of tuna fishers go out there, but he was fishing the bottom working the humps, not competing for the same water space as the tuna fishers. Similarly, Luke is a spear fisherman who dives in very shallow water, well away from the boat traffic. *There are definitely a lot more recreational power boats out there now and a lot more fishing boats, too. But it's really not bad around here . . . and we stay away from the boat traffic and that's not usually the best fishing spots anyway.*

Michael is primarily a fly fisherman. His technique keeps him somewhat protected from space competition. As a couple of our fishers commented, fly fishers are generally afforded more space and a courteous attitude. *The people that are heavy into fly fishing . . . come with an ethic and an understanding. That you give people a lot of room and a lot of respect. If it's fly fishermen, you're not supposed to be anywhere near 'em. And fly fishermen are much more*

composed about their behavior and give each other a lot more space. Michael was so unaffected by competition for space when fly fishing that he did not even mention the increase in boat traffic.

This group of fishers did not perceive conflict over space to be an important issue since they have been insulated from spatial competition either by virtue of the territory occupied by their target species and their specialized techniques, or by virtue of having had primarily positive encounters with others on the water. Among this group, even those who fish on weekends, the most crowded time, aren't concerned about space. As Joe put it, *There's plenty of space for recreational fishing.*

Their lack of personal concern over space on the water is reflected in their lack of concern about maintaining open ocean and assuring access to ocean space in the future when aquaculture development adds more users to the ocean. Most of the fishers in this group did not mention concern over the positioning of the proposed aquaculture site off the Isles of Shoals. Nor did they express concern about how access to open ocean spaces might be managed in the future. Some were wholeheartedly for aquaculture development, without reservation. Others had reservations, but not about space or access. For example, Jill mused, *There's just a tremendous amount of questions that need to be answered.* But for her those questions concerned long term effects on the ecology and economy and possible storm damage to the pens. Danny had similar concerns about environmental issues but not about space and access issues.

A few of these fishers did raise the question of controlling public access to commonly owned space, but they quickly resolved these issues as they continued to think out loud. Mark raised the issue by commenting, *Controlling access to the ocean, I think you're going to have a real uphill fight if you start saying, well, "You can't go to this area, you can't go to that area."* However, he concluded the interview by commenting, *The only other thing I can tell ya, you know, it's a pretty large ocean out there and certainly commercial fishing, recreational fishing and aquaculture—I see no reason why it can't all coexist.* In a similar line of thinking, Joe asked, *How could you privately own a piece of the ocean?* but in the same breath he continued, *I guess you could, but would you own the surface or the volume or the bottom and not the surface? Could you prevent people from traveling over the surface? Those are things, things to be answered, that's all.*

For this group, there are just some things to be answered, that's all. The unaffected users seem to have faith that issues regarding public space and open access can and will be worked out amicably, much like their current relationships on the water.

Adaptive Strategies: Finding "places where there are less and less boats"

Four of the fishers in this study did perceive problems with competition over space and territory, but had developed adaptive strategies that allowed them to continue fishing for

their target species without too much disruption. These fishers felt the pressure of competing for space, particularly in their "hot spots." Their adaptive strategies required that they do some things differently, perhaps find new territory or find ways to keep others from following them to their favorite spots. However, they did not perceive these changes as diminishing the enjoyment they get out of fishing.

Roy, a 44 year old who is relatively new to recreational fishing, felt enough pressure from competition over space and territory that *one year I took the name off the boat 'cause people were following me around.* Another problem he encountered was *all those racing boats in the river, cigarette boats. And they're just, you know, out of control. So a lot of people are moving out of the river. A lot of people fish at night. I don't—I usually fish low tide or the turn of the tide in the river. You have to fish when it's not the weekend. The weekends are horrible.* Roy is also very cagey about timing his trips to his favorite spots. *I might go out there for a whole day by myself and record the best time that I caught the most fish. And then when I go back, I could be near my hot spot, but I won't go there until I'm ready because it'll attract other boats.* He also fishes spots where other boats won't go. *There's quite a bit of traffic. But a lot of the boats are larger and I like to fish right in on top of the rocks and most people wouldn't be that crazy.*

Another fisher, Rob, told how space negotiation is supposed to work when conditions get crowded. *When it gets like that why then you, you get used to fishing tighter to your boat. You've got to keep the space. You know, it's no problem—well, normally what happens, you do what's called drift fishing. You get in a drift, you drift over a certain area, you take your boat up and around, get back on top of your drift and drift right down it. So while you're going down, another guy's coming in behind you and another guy comes in behind him. And it's just a real friendly chain.* However, conflicts still erupt as he went on to explain. *I went to my favorite spot and there was four other boats there . . . and this guy, I pulled right in behind the drift on him . . . Well he didn't like that. He thought I was too close. He started swearing at me that I was in his space. "Get out of here." And I'm like, "Look you just keep to yourself; I'm not moving."* Problems like this have made Rob adopt a secretive strategy about his fishing. When asked by the interviewer where he goes fishing, he replied, *Do I have to divulge where I fish?* He went on to explain that *it's rare that you find fishermen sharing information.* He referred several times to his "secret spots." However, his strategy changes when he encounters commercial fishers. He defers to lobstermen and to charter fishing boats on the water. With these users, he shares information to build cooperative relationships. He'll tell the small charter boats that come close to him that he is putting chum in the water to draw fish so they will stick around and the two boats can fish amicably side by side. *"So they start recognizing you, if you're, you know, fishing the same spots . . . and they'll start turning you on to little tricks here and there."*

Paul, a 52 year old who fishes frequently, described a huge increase in boats and fishers on local waters. This has made some fishing trips problematic for him, too. *On weekends, you know, it just doesn't work out very well. I'm not going to take—go to a spot that I know there's a lot of fish and show four or five other boats that are following me that spot. A day that would not be so good fishing wise, I would say that would be like a Sunday. There's a tremendous amount of people, a lot of boat wakes. The crowding has led to altercations. A boat [will] come along trolling and come right between you and the rock where there's almost—I mean, it's tough to fit . . . And then he'll go by and then I'll say something to the effect like, "Geez, I'm chumming here, I'd appreciate it if you'd just troll somewhere else." And then immediately they would be, you know, "You don't own the ocean." In spite of occasional scrapes, Paul has found ways to adapt. *I keep going farther afield to find places where there are less and less boats . . . I go early in the morning or the evening or when there's less boats around. Go somewhere else. They may catch up with me eventually, I mean there may be enough boats that I can't find spots all by myself. But so far that's, you know, I've been okay.**

Larry, a 50 year old who's been fishing since he was a young boy, also discussed being impacted by other users competing for space on the water. He related the following incident: *We were fishing in this one quiet area and the jet skis came right over and started zipping around in circles around us. So I actually fired up my boat and went after them.* He, too, has developed adaptive strategies to avoid such encounters now. *That's why I go early, so essentially I'm . . . if I go at 5 in the morning or 4:30, by 9:30 I'm ready to come back to the dock. And that's when people are just putting their boats in.*

These fishers have all been bothered by crowding and disputes over space. Yet, they have found ways to adapt their fishing so that they can avoid continuing conflicts over space. These adaptations have required changes in their routines or territory, but the changes have allowed them to continue fishing for their favorite species without sacrificing the pleasure they derive from fishing. Their ability to positively adapt to crowded conditions is echoed in their optimistic stance toward open access to common property and spatial competition. Indeed, Larry's response was similar to the unaffected users. His concerns were with environmental problems; he didn't bring up potential space conflicts or access issues.

Rob expressed more sensitivity to space and access issues in his responses. However, Rob seemed to appreciate the careful selection of the proposed aquaculture site. *That's a big flat area . . . I never would think of fishing there . . . I mean I can see what they're looking for.* He continued to discuss the site and raised the issue of expansion plans. *If they ever wanted to expand on this site—was one of the questions I was going to ask. I mean, you know, obviously if this is successful they're gonna want to expand.* However, Rob's question about expansion was not to express a concern about limited access in the future, but to express a hope. *But in any farm, you know, the bigger the*

farm the more you produce. All the more people that can live off the production of that . . . which I hope is what the goal of this is. Rob was clearly not worried about losing access to open ocean or competing over ocean space; indeed he hopes the space will be commercially developed.

Roy explicitly expressed the adaptive view. He raised some concern about maintaining access to his favorite spots, *but*, he concluded, *there's enough places to fish.* He expanded on this theme in his observation that *There's so much undeveloped fishing area that if a few people are affected by this, they will figure out where else to fish.* He concluded the interview by saying that the ocean is pretty big and there's room enough out there for everybody.

While somewhat more sensitive to potential conflict over space and public access to commonly owned waters, this group expressed optimism that such issues could be worked out, even if it required some adaptation on the part of recreational fishers. However, among this group, Paul was more concerned than the rest about potential conflict over space and access issues arising as aquaculture is developed. He thought that with the amount of usage that there is now, *I don't see any new use coming in that wouldn't compete. Now if something could be done where it wasn't competing with existing users . . . that's fine. But I don't see . . . it would be very difficult to have a fish pen or something that's gonna use habitat that is now being used by other user groups . . . even out in the ocean, you know, I see that that's going to be a problem 'til you get pretty far off shore. I see some potential conflicts there 'cause it's so much usage.* Finally he raises the question, *Who gets to determine who gets to use those waters? I think the public should be making those types of decisions.* Still, Paul thinks development of aquaculture sites is a great idea if it can be done accommodating the existing user groups. Paul may have been more sensitized to public access issues and competition for open water than his fellow adaptive fishers because he sits on several recreational fishing advisory boards and commissions and describes his role as being a voice for both recreational and commercial fishermen. It is likely that in this role Paul has been a sounding board for the concerns of other fishers like the next group of fishers who have not been able to adapt successfully to crowded conditions.

Without a Workable Strategy: "You're on my spot."

Five of the fishers interviewed had not developed an adaptive strategy that allowed them to continue fishing for favorite species or in ways that provided the same pleasure. While all continue to fish, they expressed deeper frustration over space conflicts on the water than did the fishers with adaptive strategies. Some of the fishers who did not develop a workable strategy have had to give up fishing for certain species or in certain ways.

Jake, who enjoys the peace and quiet of fishing, used to fish for tuna recreationally. When the price of tuna rose and more people got into tuna fishing, Jake found he simply couldn't enjoy the experience any longer. *That's why I gave up tuna fishing. There was no tranquility any more. No solitude. To go offshore and find yourself fishing*

in like 250 boats. So I gave that up. He went on to explain what it was like out there. *Oh it's the crowdedness . . . people staking claims. And I understand that there were yelling matches and fist fights and everything else about fishing on spots, "You're on my spot." It's like a stake of claim on an 80 mile stretch of the Atlantic Ocean. Did somebody deed that spot to somebody? I don't need to go out and argue with people when I'm out with the intention of having a good time.*

Dave, a commercial fisher, also used to fish for tuna recreationally in his off season. He, too, found that crowding made tuna fishing unenjoyable. He described the problems created by lack of space in the tuna fishery. *Each one has their own anchor. And you know they'll chum and if they hook up and you know a tuna fish is on, has bit the hook, then the first thing they have to do is cast off their mooring. Because if they try to play the fish while they're still anchored to the moorin', the fish will spit the hook or haul it out. So you have to cast off and let the tuna fish tow you around. And, of course, the fish doesn't know one anchor rope from another, so lots of times it will get all weaved amongst the . . . Oh, it's a hell of a mess. I very seldom go tuna fishing anymore. That's why, because it's, you know, it's just a snarl, that's all.*

Rick, a 61 one year old fisher, gave up fishing one summer when he was particularly troubled by boats following him around. *I changed boats twice 'cause guys were chasing me all over the place. I got aggravated. I just quit. I quit fishing. I'd come in, dump my live wells and come in. I said, Hell, I don't need this. I myself got into arguments over mackerel for cryin' out loud. Right outside the mouth of the harbor for bait. "You're too close to me, get the hell outa here." I just said when you can't have fun fishing you may as well quit.*

Reed has not given up fishing, but he talks with frustration about how difficult fishing has become in some of his favorite places. *There are so many boats anchored on the Maine and New Hampshire shore in the Piscataqua River that it's difficult to stop and anchor and fish. Or difficult to troll or whatever. Because there's just, just about every place that there's calm water there are buoys floating around with great big yachts tied to them or whatever. And some of those were pretty good fishing places, but you just can't go there anymore because it's all loaded with boats.*

Tricia, an avid tournament competitor, also feels frustrated with conflicts over space and has found no way to adapt. *We've had situations happen where we're catching say bait fish and other people can't catch it, so they pull their boat up next to yours, literally . . . I've had guys throw their lines into our boat. Now that's a little absurd, you know? And occasionally you have a run-in with a lobsterman who says, that claims, they own the ocean and you're not supposed to be there. Some of them think they own it, you know. Well, they don't, so too bad.* Tricia has tried to find new places to fish, but her strategy is no longer working. She seems resigned to the situation. *I mean you used to be able to go to certain areas and fish and know that no one*

would be there. There's no place now. They're everywhere.

This group of fishers has felt the competition for space on the water more keenly since they have been unable to find adaptive strategies that enable them to manage spatial conflicts while preserving the elements of fishing that they enjoy. It is probably no surprise that they also express more concern over space and access issues relating to the proposed aquaculture site and future aquaculture development.

Dave, the commercial fisherman, expressed concern over the heavy usage that already exists around the proposed site, including *offshore lobster boats coming and going . . . draggers coming and going . . . purse seiners coming and going, cruise ships going back and forth. Whale watching boats, oil tankers, tugs towing barges.* He thought there was some possibility that disgruntled commercial fishers would cut the anchor lines on the aquaculture pens if access to their fishing bottom was being blocked off.

Jake expressed a very similar opinion. *If there was going to be 300 boats fishing at the Isles of Shoals and you locked them out of a certain area, you'd probably have some problems keeping those buoys in place.* Jake went further to say that he personally would have problems if the area was blocked off to transit fishermen. *Well I don't agree with that. They should find a place that's less populated.* He is uncertain how public access and rights issues could be worked out, saying, *Nobody owns it. There's no boundaries. No stone walls to say "You own this side, I own that side." I'm not sure how that should be dealt with.*

Tricia was also concerned with the issue of public ownership rights, particularly over when and how state, federal, and international jurisdictions would come into play to confuse matters. *I mean are they leasing out something that doesn't belong to you? Can any Joe Blow go set up a mussel farm if he wants?*

Reed comes right out to say that competition over the space would be a definite downside to the project. He, too, raises the issue of who owns the ocean and who should have a say in open ocean space and access issues. *Well we already as U.S. citizens collectively own so far offshore right? And as New Hampshire citizens collectively I believe own offshore, off our state coast. I think it should be managed for all of us. Even the people who don't utilize it should have some input. And I believe the people from inland should be able to say, "There should be open space in the ocean," or "They shouldn't be doing this or they shouldn't be doing that."*

This group of fishers who have been sensitized to space conflicts on the water and have been unable to adapt and resolve those conflicts in a satisfying manner seem less certain that new spatial conflicts raised by future aquaculture development can be resolved. They also talk

more about questions of public ownership and who should have a say about usage of and access to common property. Reed even asserts that inland non-users are common owners who should have a say in ocean management issues. This group has a heightened awareness to these issues and more uncertainty about if and how these issues can and should be resolved. While they may express positive opinions about aquaculture in general, they have some real concerns about another user group gaining access to common space, especially a user group that would bring with it precedents and procedures for fencing off open space and limiting free access to common property.

Conclusion

As aquaculture continues to expand to fill the gap between declining wild fish stocks and increased demand for fish products, issues regarding public access to common ocean property will arise with more frequency. It is too simplistic to expect any group of users to have similar attitudes about public access to common property based on their group interests. This study suggests that interests toward the commons are mediated by the social context within which any user encounters the commons. Current usage of the commons, existing relationships among users, and the effectiveness of informal common property management techniques are an important backdrop against which to consider how individuals will perceive the regulation of common property.

For most of this small group of recreational fishers who ply New Hampshire's coast, the informal monitoring and management mechanisms for controlling who has access to certain spots and how people should behave toward each other seem to be working. They appear to have confidence in both government and individuals' abilities to continue to work out space and access issues amicably and equitably. However, fishers who find that current informal systems of regulation are not working well and who have been unable to adapt satisfactorily to increased competition for common space are more skeptical about successfully regulating access and space issues in the commons when pressure continues to mount from competing uses and users in the future.

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USE OF QUALITATIVE DATA ANALYSIS TO DEMONSTRATE THREE APPROACHES TAKEN BY NEW HAMPSHIRE RECREATIONAL FISHERS TOWARD OPEN OCEAN AQUACULTURE DEVELOPMENT

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Abstract: This paper demonstrates three approaches taken by New Hampshire recreational fishers towards a nearby open ocean aquaculture project at the Isles of Shoals—a favorite fishing area. This in-depth qualitative study was a student designed class project affiliated with one part of the Socioeconomic Component of the Open Ocean Aquaculture Demonstration Project, headed by Dr. Robertson of the UNH Department of Resource Economics and Development. Our primary aim was to assess how the fishers in our sample felt about aquaculture in general as well as how they felt about the particular nearby demonstration project. With the use of a qualitative research tool, we were able to gain a rich sense of what determined their opinions about local aquaculture development. I argue that these fishers' opinions vary by their feelings about the decline of fish stocks and whether or not they hold commercial fishers responsible. In particular, those who are most angry about their belief that commercial fisheries are destroying the ocean's resources are most apt to be in favor of the project and those who are the least upset about commercial fisheries are least apt to be in favor of the project.

Introduction

The majority of the most valuable marine fisheries around the world are on the brink of destruction as a consequence of excessive over fishing and other abuses of the world's oceans. According to the U. N. Food and Agriculture Organization (FAO), nearly all of the world's most important fishing areas and more than half of the major fish species are in decline. It is not readily apparent to the average consumer however, that the world's fish supply is on the verge of collapse, due in large part to the continued increase in aquaculture, or farmed fish production. Fishers and suppliers are increasingly looking to aquaculture to help meet global demands as a result of this decline in natural fisheries in addition to swelling global populations and rising human demand for fish. In 1995, roughly 20 percent of all fish consumed in the world were farm raised, compared to 8 percent in 1984. Aquaculture, if it is done in an environmentally conscious manner, can offer considerable resource benefits over marine fishing. It can help to meet global nutritional needs without depleting natural fish stocks. However, before aquaculture is looked to as a panacea for the world's marine fishery crisis, it must

be remembered that like everything else, it too can be abused and we must proceed with caution (McGinn, 1998).

The future development of sustainable aquaculture will rest on maximizing its production efficiency, assuring product quality and safety, while simultaneously improving its environmental compatibility. At present, the United States plays a small part in the world's farmed fish production, but has the potential to become a world leader by effectively utilizing science and technology in the process of developing a sustainable and competitive industry. Complex questions arise with this development however, such as: How will sustainable aquaculture be developed, who will benefit from the new technologies, and what are the environmental and social impacts (Keeler, 1998)?

The University of New Hampshire is currently involved in an offshore marine aquaculture demonstration project, as a necessary intermediate step between development and commercial application, in order to answer questions such as these. U.S. Senator Judd Gregg, at a check presentation for the development of this project on December 3, 1997, announced that, *"Aquaculture will play an increasingly important role in meeting the global demand for fisheries products as the world population continues to expand and fish stocks approach their biological limits. Aquaculture will also contribute to economic and community development, particularly in areas like New England, where wild capture fisheries are experiencing a crisis of unparalleled proportions. It is extremely important for folks in New Hampshire to understand the importance of the ocean and coastal science research that is taking place at the University. I support the aquaculture project because it will blend the concerns of coastal communities, entrepreneurs, and UNH scientists. I see this as seed money for the creation of a new industry, with New Hampshire at the helm"* (press release)." As Senator Gregg alludes to in his announcement, the support of the coastal community is a necessary component for the success of this project. Do folks in New Hampshire understand the importance of the ocean and coastal science research? To what extent are folks aware of aquaculture? What do they think about it? How do they think this project will affect them and others in their community? This paper is written to discuss a small piece of this project that was designed to look at the social dimensions of fishing and aquaculture in order to assess what some of the "concerns of the coastal communities" may in fact be.

Research Project

This study of New Hampshire Recreational Fishermen was begun as a class project affiliated with UNH Resource and Economics Development Professor Rob Robertson's larger study of Northern New England's Commercial Fishermen. The project was student designed and implemented with the guidance of Professor Robertson, along with our Qualitative Methods Class Professor, Mil Duncan. It was an in depth study of 16 fishers from the area. While our primary aim was to assess how the fishers in our sample felt about aquaculture, we, as sociologists, were interested in *why* these fishers may have these opinions. That is, in

what ways did these fishers' opinions vary by their social contexts? As qualitative researchers in particular, we were looking for the nuances of how they think and a richer sense of what goes into their answers than can be derived from survey data. Hence, we designed an interview guide that would enable us to understand who these people are so as to contextualize their aquaculture opinions. We asked open ended questions about their family backgrounds, their fishing backgrounds, what they liked and didn't like about fishing, what motivated them to get up in the morning and go fishing, changes they'd experienced over their years fishing, where they get their information on fishing, their feelings about fishing regulations and ocean management issues, and finally, what did they know about aquaculture, how did they feel about it, and how might they feel about a nearby open ocean aquaculture project at the Isles of Shoals? What we received in return was a very rich sense of who these fishers are.

Sample

There were fourteen men and two women. They range in age from twenty-eight to sixty-one, although most of them are in their forties and fifties. Their years of fishing experience range from four to sixty years, though most of them have between twenty and forty-five years of experience. They are all boat owners whose boats range from sixteen to thirty-two feet in length. This is evenly split between over and under twenty feet. More than half of the respondents are college educated. Approximately half of the sample are from blue-collar backgrounds. Income ranges are from \$20,000 to over \$50,000 per year. Most respondents are married, two are single, and three are divorced. The majority have children; many of them grown. Nearly all began fishing as children with their fathers, but a few were introduced to fishing by friends. All but a few of the fishers fish for striped bass in addition to other species such as cod, tuna, blue fish, mackerel, and flounder. They use a variety of fishing techniques, from fly-fishing to spear fishing. The range of fishing frequency or rather, how often they fish, is from 12 times a year to daily, depending on the season. Reasons for fishing include: being outdoors, solitude, fun, the challenge, adventure, relaxation, personal competition, excitement, and romance. They are not a particularly political group, although most vote in presidential elections. A few are involved in fishing organizations.

Clearly, this is a fairly homogeneous group. In sorting through the data, it became apparent that there were no obvious patterns between variables such as age, income level, years of fishing experience, family backgrounds, fishing techniques, education, or motivation and opinions about regulations, ocean management issues, and aquaculture. After extensive sorting however, I did finally discover some patterns regarding fishers' aquaculture opinions in general as well as their feelings about the Isles of Shoals project in particular. This paper will focus specifically on my interpretation of the patterns I discovered.

Findings

Surprisingly, everyone was aware of aquaculture in some capacity. Most everyone knew about farm raised salmon and there were several others who were aware of mussels, clams, and oysters. A few people mentioned cod, catfish, sea bass and tilapia. People's level of awareness ranged from, "[they had] heard about it, not much else," to, "[they had] seen several operations." A majority of the group had eaten farm raised salmon, mussels, or sea bass. Many of the fishers spoke about what a sensible idea it is to raise fish and how good it is. One fisher commented about all the farm raised sea bass that was available in local restaurants when he was vacationing abroad. When asked if he'd tried any, he answered, "*Oh yeah, I ate a lot of it. It was delicious.*" Another fisher said, "*Farm raised salmon is the best. It's better than the stuff in the ocean because it's cultivated. It's terrible to say, but they know what they're feeding it. The meat's good.*"

In a different vein, several fishers responded, to what they perceive as over fishing by commercial fishermen and the depletion of fish stocks. Many believe that aquaculture may actually be a necessity due to the depletion of fish. As one fisher put it, "*What do I think about aquaculture? I guess it's a necessary thing. Because human beings want to eat fish, and we're wiping out all the fish stocks all over the world.*" This general idea was repeated quite often. One fisher said that he is absolutely in favor of aquaculture as he sees it as something that would help to ensure that we don't continue to abuse the ocean. Others view aquaculture as a "*step in the right direction*"; a necessary step "*that will take the pressure off of the fish resources.*" Stemming from these feelings was the idea that aquaculture is the "*wave of the future.*" This phrase was used by a couple of respondents. Some pointed out that there is a growing population and aquaculture will provide a needed food source. One fisher said, "*[We're] only going to bring [fish] stocks up so much. The population is growing. At what point do we have to start substituting stuff in like aquaculture?*"

In addition to the benefit of aquaculture providing a needed food source for feeding the population in the future, several respondents believe that aquaculture will provide jobs and business opportunities. As one fisher put it, "*[Aquaculture] seems to work. It seems to be a good way for people to make a living and provide a product that people use. I think it serves very good purposes.*" And another said, "*Well, you're gonna create some jobs, which the fishermen need—these commercial fishermen that are slowly growing out of their work. You're going to create seafood that we have a need for. So those are both very positive. From that standpoint, it's great.*" Overall, the response to the concept of aquaculture in general was overwhelmingly positive.

Upon broaching the idea of open ocean aquaculture—specifically, the Isles of Shoals project, which is getting underway—the fishers responded differently. Whereas, prior to introducing the specific project, responses were pretty similar from each of the fishers, now, they seemed to

vary. In fact, there seem to be three fairly distinct approaches taken by these fishers in response to the Isles of Shoals project. I will refer to these three approaches as the conflict approach, the NIMBY (Not In My Backyard) approach, and the negotiating approach. The conflict approach, taken by several fishers, is the tendency to see aquaculture as a way of solving, what they consider to be the problem of exploiting the natural fish resources by big commercial fisheries. The NIMBY approach, also taken by several fishers, is the response to aquaculture in general as favorable, but the response to the Isles of Shoals project specifically, is not. Finally, the negotiating approach taken by several other fishers is the tendency to be in favor of the Isles of Shoals project, contingent upon certain conditions.

First, I will begin with the conflict approach taken by roughly a third of the respondents. As noted above, these fishers tend to see open ocean aquaculture as a solution to the problem of exploitation of natural marine resources by commercial fishers. They believe that big commercial fisheries are taking unfair advantage of their positions by stripping the ocean of its resources for their own gain, with no thought to the havoc being wreaked. Many of these fishers were particularly vehement in their denunciation of commercial fishers, and are as apt to blame individual fishers as industries. Some describe commercial fishers as "nasty" and "cut throat." Luke (pseudonyms used for all fishers) is perhaps one of the most outspoken on this issue. Very early into the interview, while discussing his early fishing experiences, he brought up the issue of dragnets and over fishing. He said, "*There aren't any bottom fish now because of the dragnets and the over fishing...You know how a dragger works? It scares up all the bottom fish and they, as they rise up to get away from the thing on the bottom, the net right behind 'em, the huge net takes 'em. But it takes all sizes of fish—young ones, small ones, big ones—plus ones they're not even fishing for. See, that's the real problem is the dragnets. That's why there's no fish anymore. And once they get fish out of an area, they just keep going back and forth and they run the bottom—all the seaweed gets... [There are] areas way out in the middle of the ocean where there's nothing, it's desolate now because dragnets have gone back and forth—[areas] that used to have all that life in it. Luke believes that he is particularly aware of this problem because he is a diver and can actually see the damage that has been done by over fishing.*

Throughout the entirety of his interview, Luke keeps coming back to over fishing by commercial fisheries. He explains how gill netting works and describes the damage that he perceives has been done by the gill netters as well as the dragnets. He talks about a "processing ship" being built in Maine that he'd heard about, that he claimed, "*could literally clean the Gulf of Maine of fish in probably a year and a half to two years [because] it could process and instantly freeze so many tons a day. He continued, "I think stuff like this is bad. I think it's really bad."* When asked about the comeback of the striped bass, whereas many fishers attribute their remarkable recovery to the regulations placed on recreational fishermen, Luke sees it a little differently. He claims that the reason that the striped bass have come back is because they shut down the

commercial fishery for years in the Chesapeake Bay. He claims that the closing of this fishery is what put the "*striped bass [on the] road to recovery."* While he believes that the regulations placed on recreational fishermen have definitely helped, they cannot make-up for the "*millions of pounds*" taken by commercial fishers. The only way to make up for that, in Luke's opinion, was to shut down a commercial fishery

Luke's strong negative feelings about the damage that he believes has been done by commercial fishers, seem to be commensurate with the strong positive feelings he has about aquaculture—both in general and site specific. He was very enthusiastic when asked what he thought about the whole idea of aquaculture. He repeated several times that he thought it was just a great idea. He said it was great in terms of the "*other reasons he told [me],*" by which he was referring to the over fishing by commercial fisheries (this was one of my interviews) and he also said it was "*good for the whole eco-system.*" By this he meant that it would take the pressure off of the fish resources, thereby improving the ocean's balance. Insofar as the Isles of Shoals project, Luke believes that the site couldn't be in a better spot because the current running through this area is particularly strong—a "*cleansing current*" he calls it—which will take care of potential problems such as excess food and waste. He goes on to describe "*the green waters of Maine.*" Again, because he is a diver, Luke believes that he is particularly in tune with what is happening below the water's surface, unlike other fishers. He said, "*You know they're called the green waters of Maine for a reason. It's because there's so much plankton. You know, there's so much life and the thing is, we (divers) go out and see the life. We see the huge schools of pollack, huge schools of herring, huge schools of mackerel...the schools of minnows next to the shore, and it's just incredible. And you realize how healthy this area really is and what it can support..."* Luke's only "concern" about this project is "*that there ought to be more of them than just one..."*

Several other fishers echoed Luke's feelings about commercial fishers. For example, Rick claims that 10 years ago, codfish were plentiful, but no longer. He attributes this change in fish stocks to commercial fisheries and the increase in technology used to target fish. He too brings this up early in the interview. He said, "*If they had to drag [like they did] in the olden days or gill net [like they did] in the olden days—by sight and nothin' else—you'd still have fish around. But when you got a guy with a LOWRAN and whatever, and he come back with the same numbers, make a drag and pick up so much fish and then make another drag and just tear the bottom completely up, it's gone. It's gone. There's no ifs, ands, or buts about it. Technology ruined everything as far as I'm concerned. Look at the flounders. You don't even have flounders around here anymore...you can't get ten fish in New Hampshire now. You try to find 'em. I've fished all day, might come up with two or three flounders. Fifteen years ago, you could fill a thirty gallon barrel. One stock disappears and they start to target another stock...they're gone, they're gone. They're over harvesting everything. Next thing, they'll be targeting the mackerel."* Throughout

this interview, like Luke, Rick kept coming back to the idea of commercial fisheries destroying the fish stocks. He used very strong language with words like *"decimated"* and *"annihilated"* and *"the ocean's gone to hell."* In his opinion, cod, flounder, tuna, sea urchins, and swordfish, have all been over fished by commercial fisheries. He believes that with all of the sophisticated electronics nowadays, used day in and day out, *"you're gonna have to deplete something."*

Rick's vehement negative feelings about the depletion of fish stocks at the hands of commercial fishers, similar to Luke, seem proportionate to his positive feelings about aquaculture. When asked if he'd heard anything about aquaculture, he replied, *"Oh yeah, I believe in it very much."* He spoke of tilapia and salmon and referred to what a great product is being brought in by farming fish. He sees aquaculture as something that can be done to stop depleting fish stocks. When asked if he had any problems with the Isles of Shoals project, he said, *"none, I believe in it."* He also said, *"I just hope they get off their funny and straighten things out before they get real bad. If they get worse, we're in trouble. We're definitely in trouble now unless they straighten things out. They're wiping everything out."* By this, Rick meant that commercial fishers are responsible for the ocean going to hell and something needs to be done or all of the fish will soon be gone. He sees aquaculture as a potential solution to this horrendous problem of monumental proportions. He does not foresee any problems with the Isles of Shoals site.

Other comments from fishers who have taken the conflict approach in response to the Isles of Shoals project are of a similar nature to what was said by Luke and Rick, though perhaps not as lengthy. Mark believes that *"commercial druggers have come into shore and worked the humps off of the Isles of Shoals and wiped 'em (fish) out."* David, who doesn't want to point fingers, but said, *"miles limitations enabled them (commercial fishers) to drag in close. [Just] a small boat would work very close off the back of the shoals and wipe those areas out."* And finally, Michael claims that commercial fishers are *"getting deadly efficient—to the point where they're taking, not only the fish they're targeting, but all the other fish in the ocean too."* Each one of these fishers brought up the idea of over fishing by commercial fishers with no prompting from the interviewers and each one feels that big commercial fisheries are responsible for depleting fish stocks. Each of them, just like Luke and Rick, are also in favor of aquaculture—both in general and at the Isles of Shoals.

It appears that those fishers who seem to be most against commercial fishers are accordingly, most in favor of aquaculture, in general, as well as the Isles of Shoals project. Aquaculture is looked upon by these fishers as a solution to the global problem of over fishing and their concern is not *where* it's done but *that* it's done, in order to begin taking pressure off of the remaining fish stocks. Michael thinks that the demand for fish could be offset by aquaculture and then possibly natural species could *"get a foothold again."* He said, *"there's not any fish left, so we have to do something—quickly."* When asked specifically

about the Isles of Shoals project, he said that he could not see anything wrong with it. David, who claims that he is a big fan of aquaculture, believes that the only potential problem with the Isles of Shoals project is that commercial fishers might *"mess with it."* He feels that a lot of commercial fishers think that they own the ocean and tend to be very territorial. In his opinion however, despite what he thinks some commercial fishers may attempt, he thinks this project will work and that it will help to solve the problem of the decline of flounder in the bay. Mark did not specifically address the idea of aquaculture as a solution but he did say *"somebody's going to have to be doing it"*, alluding to the idea that aquaculture is indeed necessary. These fishers are jumping onto the fish-farm bandwagon, which McGinn (1998) cautions against. She claims that aquaculture, like commercial fishing, can just as easily be transformed into a resource-intensive industry, with species being raised for quick cash with little thought to what environmental costs are incurred in the process.

In marked contrast to the conflict approach taken by the fishers noted above, is the NIMBY approach, which is taken by approximately, another third of the fishers. What is meant by this approach is that there are several fishers who are in favor of aquaculture in general—but in response to the particular project site, none of these fishers want to see this project in their own backyard or rather, in their own fishing spot. For example, Lawyer said, *"I think [aquaculture] is good. People have to eat protein—fish are protein."* As the interview progressed however, Lawyer, who is perhaps the most negative of any of the respondents in regard to the Isles of Shoals project, went on to say, *"[there's] disease--and then all the waste--what happens to all the waste? ...I guess my concern is more from a, a...How's it going to impact my fishing and what's the long term effect going to be?"* As it turns out, the only way that Lawyer is in favor of aquaculture at all is if it is done in tanks, on shore.

Paul too, sounded positive at first. He said that he believes that *"[aquaculture] is going to be an important component for replacing the groundfish."* However, like Lawyer, he is also concerned about disease and waste. His biggest concern is that this particular project will compete with existing user groups who fish this area, such as tuna fishers, ground fishers, and lobster fishers, and as a consequence will create conflicts. In addition, he is concerned that because this is a demonstration project, if it is a successful venture, it may become more of an issue as it requires more space. He asked, *"...if you're going to do it commercially, do you need ten times that size or twenty times that size or one hundred times that size?"* While he understands that the benefit of this type of expansion may be that jobs are created for commercial fishers, which they sorely need in his opinion, the Isles of Shoals just isn't the spot because it's not far enough off shore. He thinks that it needs to be far enough off shore where no one will care.

DAT, in response to the question of whether aquaculture would be beneficial, said initially, *"yeah, I think it would be [beneficial]—yeah, you know, it probably would."* However, as the interview continued he also said, *"I'm not*

against fish farmin.' I think it's a great thing and it may be a thing of the future. But I mean, there's a place for everything and that, that just doesn't seem like a very good place. DAT is particularly concerned with navigation. He thinks that with off-shore lobster boats, commercial draggers, cruise ships, whale watching boats, oil tankers, tug boats, and towing barges going back and forth, that it will be a "hazard to navigation" and may be the reason that somebody loses a lot of money.

Rob is also somewhat concerned with issues of navigation, though his first response to aquaculture was, "I can't see any reason why not to support something like that." More important than navigation issues however, Rob, like Paul, is concerned with expansion if this project is successful. He wonders whether this project is going to turn into "a big business thing or is going to be designed in terms of a local solution." He said, "...it seems pretty high tech in the sense of the way it's laid out...and so when something becomes real high tech, it starts becoming less and less a local operation and more and more a corporate operation...I want to see something that's more grass roots-something that's more for the local guys--for the friendly lobstermen with less and less catches and, you know, the guys that have been out drag netting and things like that. This is the way they can produce something without harming the bottom. Finally, Howie claims at first that he understands that we need aquaculture because the fish stocks are down. However, he is also concerned with expansion if this project is successful, particularly if the expansion will entail further sites at the Isles of Shoals. He is hoping to do some tuna fishing at the Isles of Shoals next year and does not want this project to interfere with that. He believes that recreational fishers will feel the greatest impact with this project because this is an area that they tend to frequent.

The fishers who take the NIMBY approach in response to the Isles of Shoals project seem much more sympathetic to the plight of the commercial fishers than the fishers who take the conflict approach. In addition to concerns about their own fishing, these fishers tend to be concerned that this project is going to get in the way of commercial fishers, in terms of both fishing and navigating. As a result, one concern is that it will somehow end up costing commercial fishers money. An additional concern is that this project may not provide commercial fishers with the jobs that are being touted as a potential benefit of this venture. These recreational fishers are also not so quick to point to the commercial fishers as being solely responsible for changes in fish stocks. Neither Rob nor Howie did any more than make brief mention of the commercial fishers. Howie said that he understands their plight, though he realizes that they have no regard for trying to maintain the fish population. Rob only brought them up in the context of aquaculture insofar as he thinks it should be for the local commercial fishers rather than a corporate operation (noted above). DAT didn't have much to say on the subject at all other than to explain how difficult it is for commercial fishers to make a living because costs have tripled and revenues have only increased by fifteen or twenty percent. (DAT may be somewhat biased however as he is a

commercial lobsterman. He does other saltwater fishing recreationally, which is how he came to be included in this study, but he makes his living as a lobsterman.)

Paul spoke much more about the commercial fishermen than the other fishers who take the NIMBY approach, but he is clearly sympathetic and speaks about them in the context of these poor guys trying to eke out a living. He blames the New England Fisheries Management Council for the depletion of fish stocks rather than pointing his finger at the commercial fishers themselves. As he puts it, "...there's no groundfish left and that's as a result of the New England Fisheries Management Council not stepping up to the plate. [They] tend to put it off, put it off, put it off. They won't make the hard decisions and no one wants to put anyone out of work. The fishing fleet is over capitalized and we have much more ability to catch fish than we can grow 'em. Therefore, you got to under capitalize it and nobody wants to do it. No one wants to say you're not fishing anymore. So until we do that, we're going to be in desperate shape. So I think we've done a horrible job of the management of the groundfish. It's going to be worse and it's going to be forever coming back. It's going to take years and years and years because they still haven't taken steps to...I mean they just gradually go down this path where these poor fishermen are slowly squeezed out of making a living...And we just continue to squeeze these fishermen, so everybody makes less and people slowly go out of business and the fishery stock never recovers." Paul obviously believes that the commercial guys are at the effect point of poor management, which has resulted in declining fish stocks, rather than the actual cause of the crisis themselves.

It appears that fishers who are least in favor of the Isles of Shoals demonstration project, are much less inclined than the fishers who take the conflict approach, to denounce commercial fishers. They are very sympathetic to the plight of local commercial fishers and worry mostly, that this project won't result in jobs for them after all. The fishers who take a NIMBY approach are primarily concerned with matters close to hand, as well as others in their community. They are concerned about the Isles of Shoals in particular as well as the immediate surrounding area if this project should be successful and expand. They are concerned about various boats being able to navigate through the area, as well as the idea that this particular fishing spot will no longer be available to them. They are also concerned about excess waste and diseases infecting the fish stocks in this particular area. They do not want this project to compete with existing user groups who fish the Isles of Shoals. Although they say they are in favor of aquaculture as a concept, their feelings about the Isles of Shoals project would dictate otherwise. It appears that they tend toward McGinn's (1998) point of view regarding the environmental threats posed by aquaculture. While they may be willing to eat farm-raised fish raised elsewhere, they are not willing to risk an area so close to home.

The negotiating approach taken by close to another third of the fishers is somewhat different from either of the other two approaches in that these fishers are in favor of

aquaculture in general as well as the Isles of Shoals project specifically, *contingent* upon certain conditions. These fishers are at the least in favor of experimenting to see how it all works out and seemingly more moderate in most of their opinions, including their feelings about commercial fishermen. For example, when Reed was asked why he thought fish stocks had declined, he replied, "*Commercial problems, I'm sure. It's not why do I think, it's why do I know. Yeah, it's pretty well publicized. But then he goes on to say, '...in my years on the water, I've seen stock drastically change. Up and down and up and down and I can't think of any other environmental conditions that would cause it, other than fishing pressure--commercial and recreational. Well, and I suppose its things like pollutants too. And you know, losing striped bass for a while because of poisons or something.'*" Reed looks at the possibility of other factors, besides commercial fishing, that may have contributed to the decline in fish stocks. He also includes recreational fishers as a possibility.

When asked what he thought about aquaculture, Reed replied, "*Oh, it's fantastic. Yeah, I like the price of farm raised Atlantic fish. Really, I think it's very sensible. However, he makes sure to add, 'Only thing is if it doesn't infringe on somebody else's use of the same water.'*" When asked about the specific project site, Reed expressed concern. He said, "*...when I read the location [in the newspaper], I was concerned about where it might be and what it might interfere with recreationally [because] that's a pretty big fishing area...and it's also very popular for duck hunting.'*" When asked if he would have a problem seeing aquaculture all over the place if this project is successful, he replied, "*Absolutely.*" As the interview continued however, he alluded to the idea that he has no problem with this demonstration project. He said, "*But this one demonstration project, that's not all that big, you know...That's not bad for starters to see how it works.'*" And when asked if he thought this project might be beneficial, he reflects on the plight of commercial fishers and expresses that he would like to see these guys be able to do these kind of projects. He also said, "*...as long as they could make a living at sea...then projects like this--yeah, I'd be 100% in favor of it.'*" As far as Reed is concerned then, the demonstration project is fine and, in the event that it is successful--*as long as* it benefits commercial fishermen, he is all for it.

Joe is similarly in favor of aquaculture in general as well as the Isles of Shoals project--*as long as* the public is kept current and are able to voice their opinions *and* everything is "*kept on the up and up.*" By this he means that as long as the site is closely monitored--for disease and excess food and waste--and "*everybody knows what's going on and [is] doing what's right [no one tries to pull anything over on anyone].*" Regarding his feeling about commercial fishers, at one point during the interview he said, "*Yeah, they're [fish] not there--cod or haddock or anything. They just don't seem to be there. So, I'd like to see that controlled. I think they ought to stop...they ought to do something about dragnets--bottom dragnets. I think bottom dragnets are just strip mining the bottom of everything that's there you know.*" Later on however, he

expresses positive feelings about the potential of putting commercial fishers to work and concern about commercial fishers being "*shut off from the ocean.*" Like Reed, Joe's attitude toward commercial fishers is more moderate than the fishers who take either the conflict or the NIMBY approach. He, like many of these fishers, sits somewhere in the middle--sort of a "yes they do over fish, but on the other hand, they have to make a living, and there are other reasons for the decline in fish stocks" attitude.

Tricia, another fisher who takes the negotiating approach also attributes the decline in some fish stocks to be the result of a combination of factors as opposed to the sole responsibility of commercial fishers. She believes that blue fish have declined because of a change in water temperature as well as the idea that striped bass and blue fish don't like to co-habitate, and with the increase in striped bass, it has caused the blue fish to decline. She attributes the decline of cod and flounder to over fishing by commercial fishers but makes brief mention of it. She attributes the decline of several species (didn't specify) at a particular point in time a few years back to a decline in water salinity due to an abundance of rain. She is in favor of the Isles of Shoals project *as long as* commercial fishers are put to work. Her comment reflects her "somewhere in the middle" attitude regarding commercial fishers: "*...so the commercial guys don't have a problem with [Isles of Shoals project]? Cause I would have thought they would, you know? They'd give you the 'we own the ocean' routine. [Aquaculture] would solve their problem. So many commercial guys are going out of business. It's so difficult for them because they pillaged already and now, you know, they gotta let the resource regenerate.*" She seems to move back and forth between feelings of sympathy and disdain.

Danny is in favor of the Isles of Shoals project *as long as* there is no negative environmental impact and there is a real potential to put commercial fishers to work. He, like the others has a "somewhere in the middle" attitude toward commercial fishers in that he believes they have "*raped the resource*" but he is also sympathetic to their plight because he realizes how hard it is for them to make a living. His feeling toward the project is guarded but positive, contingent on the noted concerns. Judy also has a similar attitude toward the project. She thinks we need to "*...try it, see what works and doesn't work and adjust accordingly.*" She too is concerned with the potential of harming the environment and hopes that it will put commercial fishers to work.

It is apparent that the fishers who take the negotiating approach are absolutely in favor of the demonstration project and are also in favor of additional sites in the area, if the project is successful, *as long as* certain criteria are met. Though they think the commercial fishers have definitely over fished the area, they also attribute declining fish stocks to other possibilities. Overall, they feel that if this project can be done well, i.e. no negative environmental impacts, that it will solve two problems--commercial fishers can be put to work and thereby stop depleting fish resources. They also tend to believe, like

McGinn (1998), that this project and any others that result from this project, must be regulated and closely monitored in order to minimize aquaculture's impact on the environment.

Conclusion

In sum, it appears that those who are most angry about commercial fisheries destroying the ocean's resources—those fishers who take the conflict approach—are also the most in favor of aquaculture as a potential solution to what they perceive as a global problem of enormous magnitude. Their enthusiasm for this project is without restraint. Conversely, those who are least upset about commercial fisheries—those who take the NIMBY approach—seem to be the least in favor of the Isles of Shoals project, though they have no problem with aquaculture in general. In other words, they don't mind eating farm raised fish. They do not however, want to see this project in their backyards. In addition to the negative environmental impacts that they foresee, they are concerned with existing users in the community. Those in the middle—those fishers who take the negotiating approach—recognize and are angry about the fact that commercial fishers are in large part responsible for declining fish stocks but they also tend to blame other factors as well. In addition, they realize that commercial fishers have to make a living, and one of their contingencies for being in favor of the Isles of Shoals project is that, if it is successful, it puts commercial fishers to work. They also want to see the project monitored to ensure the least negative environmental impact possible. Their enthusiasm for this project is much more circumspect than the fishers who take the conflict approach. Perhaps—as according to McGinn (1998)—it should be.

Although this was a class project with a very small sample, it should not be dismissed lightly. I think we genuinely tapped into some real concerns and with the quality of our data we have a much richer understanding of why recreational fishers may feel the way they do than would have been possible with survey data. Overall, these fishers were very knowledgeable about problems with the ocean's resources and potential problems with aquaculture. They have many interesting things to say on a number of issues, although I only touched on one for the purpose of this essay. We definitely interviewed fishers who have spent, and continue to spend, a lot of time on the water. All told, though few in number, their voices deserve to be heard, if in fact we care about the concerns of the coastal community.

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THE USE OF GIS IN RECREATION PLANNING: AN APPLICATION OF SPATIAL ANALYSIS TO FIND SUITABLE LOCATIONS FOR RECREATIONAL TRAILS

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Abstract: Geographic Information Systems have used spatial analysis on a variety of projects for some time now. Using this method in recreation planning, specifically finding suitable locations for recreational trails has not been common. Cortland and Chenango Counties have the highest density of State forests in New York State outside the Adirondacks and Catskill parks. Connecting the State forests with a recreational trail will increase recreational opportunities for a variety of user groups. New trails also have the potential to increase tourism in the region. One alternative location for the trail links five State forests, crossing only thirty-eight private properties.

I. Introduction

A. Project Description

The highest concentration of State owned lands (State Forests, Wildlife Management Areas, and State Parks) outside the Adirondack and Catskill Parks are located in Western Cortland and Eastern Chenango Counties in New York. Most of the lands in this area are State forests. The traditional use of State forests is to provide forest products. Management efforts focus on timber management. Recreational use is limited and dispersed. Hunting is currently the most wide spread activity occurring in this area.

Trail oriented recreational activities, such as hiking, mountain biking, and horse back riding, have increased nationally for the last fifteen years (Warnick, 1995; National Outdoor Recreation Survey 1993; Clawson 1985). The result has been to include recreation in the management plans for State lands by the Department of Environmental Conservation (DEC). The DEC is

currently drafting a new recreation plan for Region 7, which includes most of Central New York.

New recreation groups, such as mountain bikers, add to the demand for 'trail time' and increase conflict with equestrians and hikers. The addition of new trails and trail systems will provide opportunities to satisfy user demand. Additional trails will allow users to spread out and reduce potential conflicts between groups.

The Genny Green Trail is a new trail system proposed for Eastern Cortland and Western Chenango Counties, that can provide additional recreation opportunities, disperse users, and increase recreation as one component of tourism in the area. A trail system differs from a single linear trail or loop trail. A trail system is a number of individual trails that are interconnected as a network. This area of the State is being considered for a recreational trail because:

- i. The large percentage of State owned lands found here
- ii. The rural character of the landscape
- iii. A low population density 52,000 in Chenango County
- iv. The close proximity to urban tourist markets (see Fig. 1.).

A majority of this new trail system will be located on state lands, but connecting state lands will require crossing private land. The intent is to gain permanent access across private land by purchasing easements. Currently, four major trails exist in the area: the Finger Lake Trail, the Link Trail, the Onondaga Hill Trail, and the Snowmobile Trail. These trails cross private lands and were created without State intervention. They exist because of the goodwill of landowners and hard work of recreationist groups. Changing land use and property owners put these trails in danger of fragmentation, but without long-term legal protection.

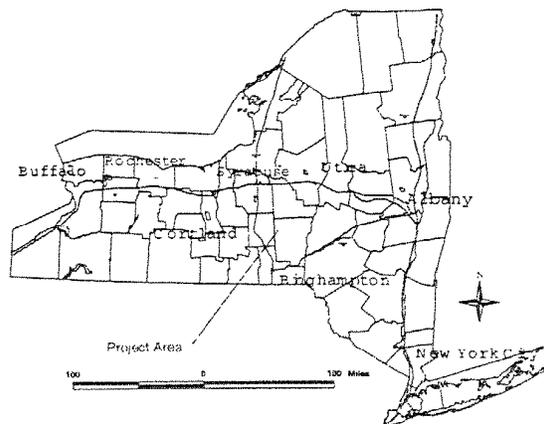


Figure 1. Location of the Project Area.

The goal of the Genny Green Trail Project is to develop a large trail network that is not in danger of being fragmented and does not disturb or alter the use of the land by the residents. Purchasing easements will solidify the connections of existing trails and potentially establish new ones. The trail system may use the connections that are already in place or change their route by establishing new links. Connections will consist of three equally important items: (1) the treadway, (2) right of way, and (3) the corridor. The treadway is the actual area contacted by the recreationist, which is usually devoid of vegetation. The right of way is the area cleared of vegetation. The

dimensions vary, but typically are set ten feet high and four to six feet on either side of the treadway. The corridor encompasses the all three items, as it is the area of land protected to create the trail within. Easement will be purchased and written to address land use on all three categories.

In most cases, new corridors are expected to be less than one mile. The high percentage of State Forests in close proximity to Bowman Lake State Park is in many cases literally, 'a stones throw away', making Bowman Lake State Park, a likely site a major trailhead (see Fig. 2).

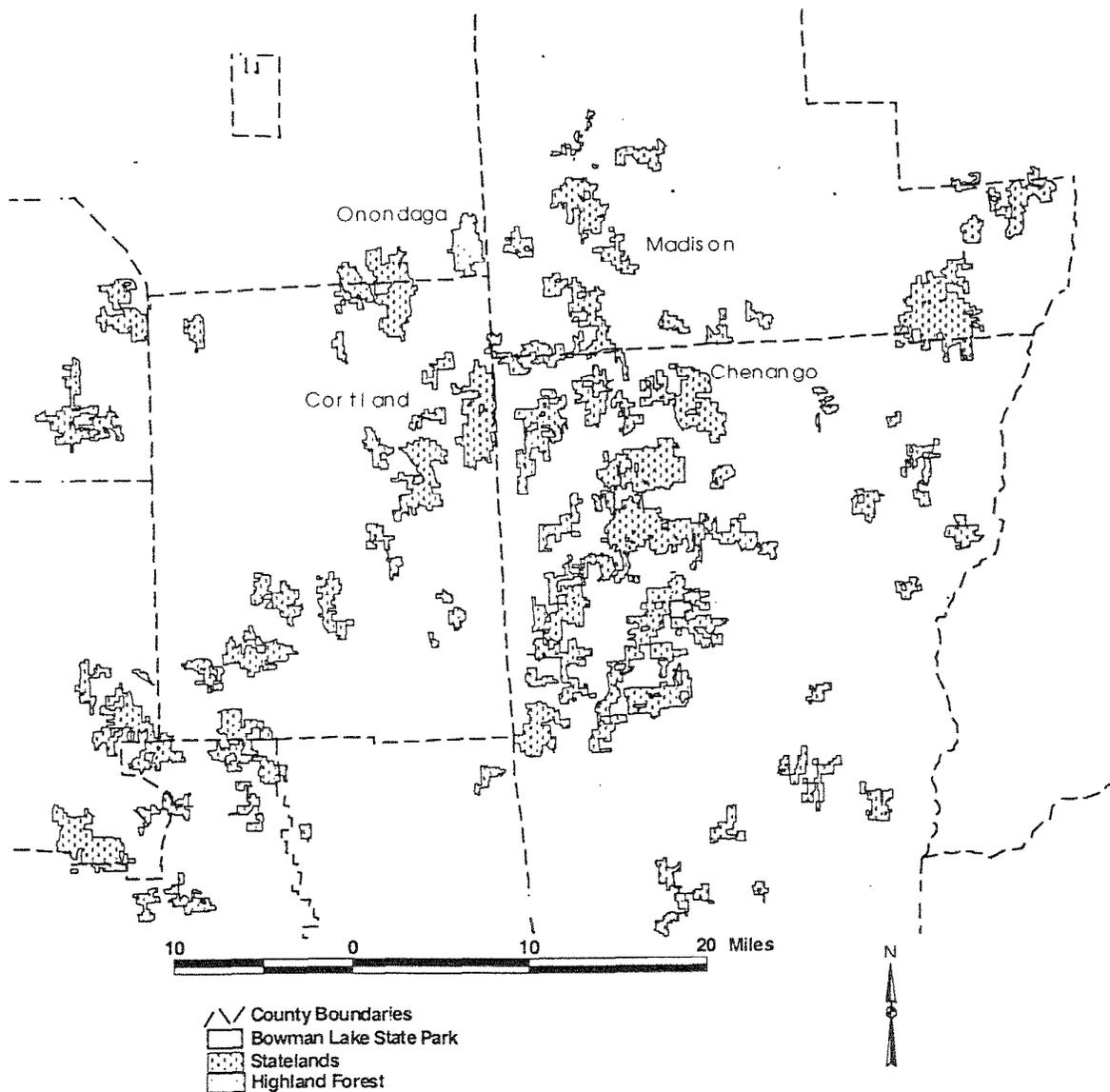


Figure 2. Concentration of State Lands Within the Project Area.

Bowman Lake State Park, in central Chenango County has the potential to become the major hub for the Genny Green Trail. Currently 50,000 annual visitors enjoy the park and the Genny Green Trail would increase its potential as a trail center for the Region. The park is conveniently located in the central southern tier of New York, which, is within a day's journey from urban centers such as Albany, Rochester and New York City and is easily accessible from route I-81. Day trips from Syracuse and Binghamton, sixty miles to the northwest forty miles to the south respectively, are expected to be quite regular.

Other areas in the northeast have experienced positive economic effects from creating trail systems. Users of the Oil Creek State Park Trail, in Pennsylvania, spent an average of \$22.85 per person per day. The total economic impact of this trail was \$1.8 million dollars annually (Holmes, 1995). A majority of the users surveyed were out of state residents, supporting the finding the outdoor recreation is the second top activity for U.S. travelers (Kelly, 1999).

A nation wide survey of State trail administrators identifies the top four growth activities are mountain bicyclists, hikers, other bicyclists, and equestrians (Moore, 1995). Mountain biking and other bicyclists, in the northeast, spend between \$26 and \$115 per person per day (Holmes, 1995). The northeast compares surprisingly similar to other areas of the country. For example, in Summit County Colorado bicycle recreationists spent \$51 - \$100 per person per day (Summit County Colorado, 1991).

B. Objectives

The DEC identified a need in the recreationist community for additional trails, and they also are aware of the need for additional economic development in the region. The DEC sponsored trail system can create a new economic resource currently untapped.

The problem is to identify suitable locations for a recreational trail from an infinite number of possible connections. The objectives of the project to create a large trail network is to locate potential connections that:

- i. Maintain the rural character of the landscape
- ii. Maintain agricultural activities
- iii. Avoid adverse effects on the environment
- iv. Minimize the cost of trail construction and maintenance

II. Methods and Materials

A. Geographic Information Systems: An Explanation.

A geographic information system (GIS) was used for the preliminary evaluation of potential corridors because a GIS allows multiple environmental and land cover characteristics to be interpreted simultaneously. A GIS is a computer-based tool for mapping and analyzing existing features and events in the environment. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization benefits offered by maps. The strength of this technology is its

ability to link tabular data with attributes on maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies (ESRI, 1999).

B. Spatial Analyst

ArcView is the basic GIS program that is used in this project. Additional tools called 'extensions' can be added on to ArcView to make the program more powerful and able to do specialized functions. ArcView primarily uses data in the vector format called feature themes. The Spatial Analyst extension allows the user to integrated feature themes and raster or grid formats.

Spatial Analyst is a tool of GIS that helps make decisions about the real world by overlaying many digital features in the environment at one time. It can be used to help discover, examine, and better understand relationships in spatial data. The strength of this extension comes in the ability to perform mathematical functions to manipulate the raster data layers in a process called spatial analysis. Spatial analysis is used in the decision making process to answer complex problems where there is not always one answer. (ESRI, 1996).

To help answer complex problems Spatial Analysis uses four basic functions: (1) overlays, (2) buffer and proximity calculation, (3) contouring and surfacing, and (4) classification and display. The overlay function allows two or more themes to be compared at the same time using map algebra

The analysis created for the Genny Green project is a simple and straightforward approach when compared to other analysis schemes. Five data layers: slope, drainage potential of soils, aspect, wetlands, and land cover were transformed into grids of equal dimension (10m) using Spatial Analyst. Each grid cell was normalized based on its characteristics. With the five major data components now as grids of equal size and assigned numeric values, they can be added together, multiplied by a weighting factor or any combination of mathematical functions. Additional feature themes, including the location of roads, streams, existing trails, and property boundaries are overlaid to show their relation to the potential corridors.

It should be recognized that the scores, weights, and analysis are value judgments. The scores and weights in spatial analysis are not standardized. For every project, new weights must be determined. On this project, the Delphi Method was used to determine the scores and weights to be used.

The Delphi method has been widely used in group decision making processes. It can be used to include large groups composed of experts and stakeholders to determine utility of objects, properties of objects, or events. The ideal use of this technique would employ a suite of actors and stakeholders including decision-makers, agency employees, local residents, farmers groups, and recreational user

groups. Due to time and budget constraints, this process was carried out solely with DEC employees.

The DEC Delphi Group (DDG) was composed of three members David Sinclair, Robert Slavicek, and Andrew Blum. David Sinclair is the Regional Forester and head of the Lands and Forests Division of the DEC in region 7. Robert Slavicek is a Supervising Forester in the Shurburn office within Region 7. Andrew Blum is a Senior Forester in the Shurburn office in Region 7.

III. Results.

A. Results of the DEC Delphi Group Meeting

The DEC Delphi Group (DDG) assembled to discuss the impact of slope, land cover, soil drainage, wetlands and aspect have on trail construction, maintenance, and to the environment. Because of the small group size, the participants did not individually assessed intra-criteria weighting scores for characteristics within each grid theme. Instead, the DDG decided to discuss the scores and the importance of each layer in an open format. A few mock runs of the model helped the group refine the scores given within each layer. Refinements in the weighting system continued until all members agreed.

The intra-criteria scores ranged from zero to one hundred. Low scores, in the one to ten range, indicate 'good' conditions. Moderate conditions, fifteen to thirty, are those conditions that require physical inspection or additional information to determine the appropriateness for a recreational trail. High scores, 100 and up, indicate conditions that are nearly impossible or extremely costly to construct and maintain a trail.

The DDG determined that all data layers should have equal weight in this evaluation. After long discussion, the DDG found no evidence to support that any layer was more important than any others layers. In essence, the inter-criteria weight for all layers is one. The DDG determined the intra-criteria weighting system to be adequate in accentuating the differences in the specific characteristics within each layer. Therefore, additional inter-criteria weights are not necessary.

According to the DDG, the best sites have gentle slopes, well-drained soil, and are located within forested cover types. The experience of the group was the main influence on the scores assigned to each grid theme. Aspect was eliminated from the initial evaluation of potential trail locations because aspects ideal for summer use are exactly opposite for winter use trails. Future analysis that focuses on the differences between winter and summer trails will use this information.

B. The Weights and Scores of Each Grid Theme and Composite Map

Wetlands are barriers to trail development and are weighted on their presence or absence. If present, they receive a score of 100, unacceptable conditions. If wetlands are absent in an area, they are equal to zero. This wetland layer is different then the wetland classification in the land cover

evaluation. Tables 1-3 summarize the classifications for each grid layer.

Table 1. A Summary Of The Reclassification Of Slopes Values

Slope Class	Intra-Criteria Weight
0-3%	3
4-6%	1
7-9%	2
10-13%	3
14-17%	4
18-21%	10
20-24%	15
25-30%	25
30+	100

Table 2 Summary of the Reclassification of Land Use

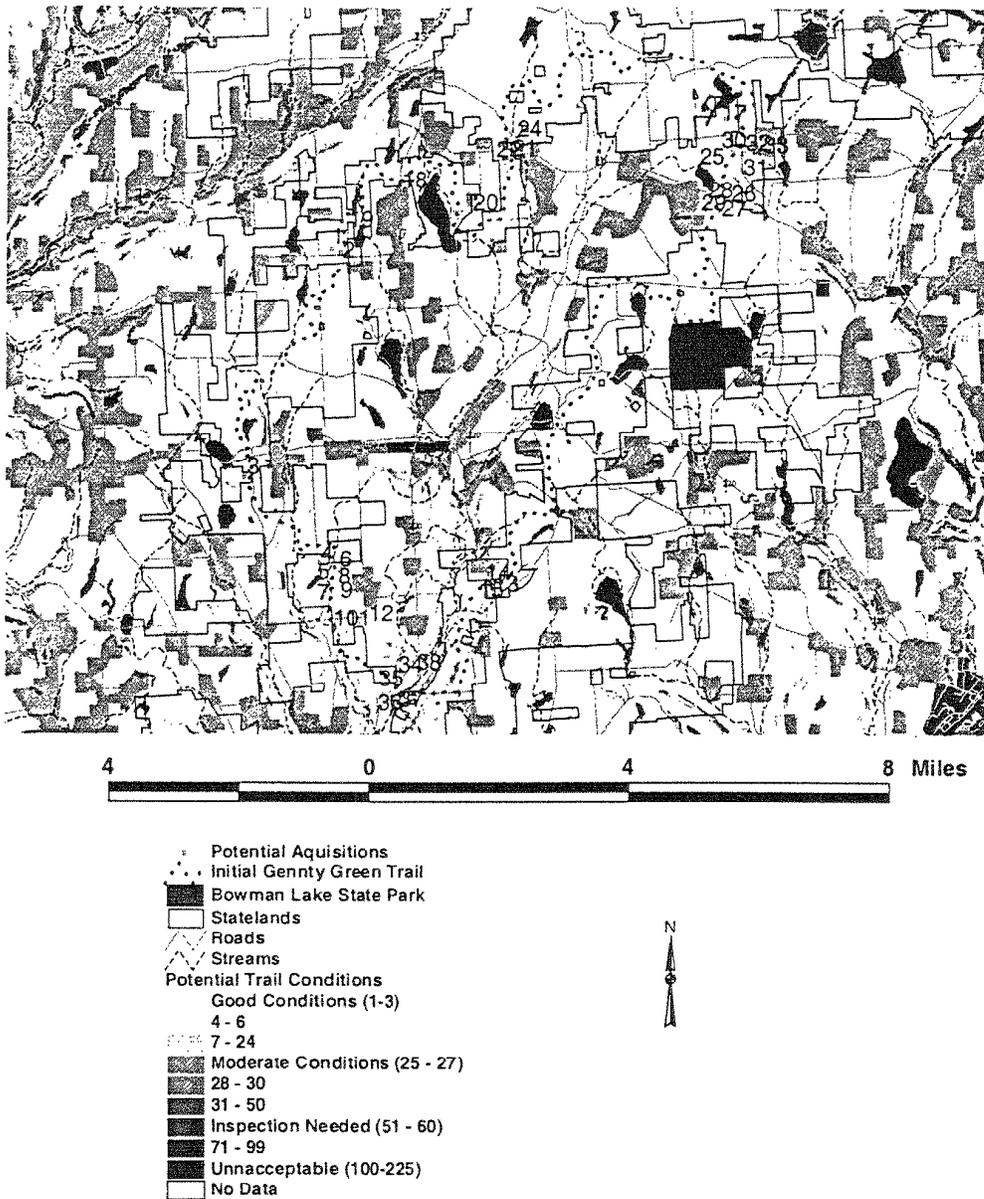
Land Cover Type	Intra-Criteria Weight
Lakes	100
Urban/Built up	75
Residential	50
Wetlands	100
Agriculture	25
Shrub/Brush Range land	1
Forested	1

Table 3 Summary of the Reclassification of Drainage Classes

Drainage Class	Intra-Criteria Weight
Good	1
Moderately Good to Good	1
Moderately Good	1
Moderately Good to Poor	15
Somewhat Poor	50
Poor	75
Very Poor	100

The composite image created through Spatial Analysis shows a number of potential connections, shown in lighter shades (see Map 1). The best conditions make up approximately thirty-percent of the project area, about 16000 acres. The top three classes, scores 1 - 24, make up sixty-percent of the total area. The initial trail is located on the best conditions about ninety-percent of its length and only crosses thirty-eight private lands. The initial location for the trail is also shown with existing trails.

Trails locations should be placed on the most suitable locations whenever possible. The trail can in many cases, weave between poor conditions to create an initial trail location, the backbone of the trail system (see Map 1). Overlaying data from, the Office of Real Property Services identifies landowners in the area and the trail suitability of their property. The real property data, visually represented as a centroid or point, is located in the center of the property owner's land. Each centroid corresponds to a landowner in the database.



Map 1. A Composite of Conditions and a Siting of an Initial Trail Connecting State Forests Around Bowman Lake State Park

C. Conclusion

The Genny Green Trail Project is an example of how state sponsored recreational trails can meet national policy guidelines. In 1988, the Commission on American Outdoors called for the creation of a national network of trails for various uses. President Clinton and bipartisan leaders of

the 106th congress have been advocating for the revitalization of the Land and Water Conservation Fund (LWCF). The LWCF uses off shore oil leasing royalties to fund the purchase of new public lands. Funding through the LWCF would allow the Genny Green Trail to pay potential landowners for easements across private land.

President Clinton announced January 12th 1999 that the Land Legacy Initiative would spend 1 billion dollars in fiscal year 2000 on a variety of land acquisition projects. The future of the Genny Green Trail is hopeful, considering potential federal funding sources such as this and the LWCF.

Recreational trails are important for a variety of reasons. Trails are necessary to promote health and fitness by providing opportunities removed from the hazards of motor vehicles. Trails increase property values, regional tourism and contribute to economic growth and development where they occur. Define zones free of human activities that protect natural resources and open space (American Hiking Society, 1990).

Development of the Genny Green Trail is potentially an educational resource for nature study by people of all ages. The trail will provide access for photography, primitive camping, and small game hunting. The project will create alternatives activities for young people and create an enjoyable retreat from the stresses of today's fast paced society.

Over 150 million people walk for pleasure, ninety three million bicycle, forty one million hike, eleven million Nordic ski, ten million use trails for horse back riding, and five million enjoy backpacking. The Genny Green Trail has the potential to create a public service for many recreationists (National Trails Project 1990).

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STORM CHASING: RISK RECREATION FOR THE NINETIES

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Abstract: Storm chasing has become a popular form of recreation in recent years. Following the popular "Twister" movie in 1995, amateur storm chasers scour Tornado Alley to catch a glimpse of the evasive killer. This paper introduces the reader to this new form of risk recreation, provides a brief background to the weather phenomena, and identifies sources of additional information.

Introduction

Since the movie "Twister" premiered in 1995 there has been an increase in the interest for storm chasing. The activity of storm chasing requires participants to locate and "chase" after a tornado-producing super-cell thunderstorm. Although this is somewhat a risky activity, storm chasing is becoming a popular form of recreation. For example, storm chasing is a sport not unlike rock climbing, in that to participate in either activity you must first have an understanding of basic techniques and safety measures. Further there is some level of danger associated with the activity. Although storm chasing is considered a new recreation activity, it has existed since the late 1940s; only now it is becoming a popular form of recreation.

Risk recreation traditionally has been applied to rock climbing, mountain biking etc. (Ewert 1995, Hollenhorst 1995). This paper explores a new form of risk recreation: storm chasing. First, a history of chasing will be given followed by some basic weather definitions. Safety issues are next explored, then risk recreation is defined and the reader is provided with ways to get more information on the topic.

History

Essentially storm chasing began after World War II. The reason it came about was because an abundance of airplanes and pilots that had a working knowledge of radar technology were given an opportunity to study storms first hand by flying through them. This project, which operated out of Ohio and Florida, became the baseline for understanding tornado producing storms. Along with the beginning of storm study, highways were modified helping to bring the chase from the air to the ground.

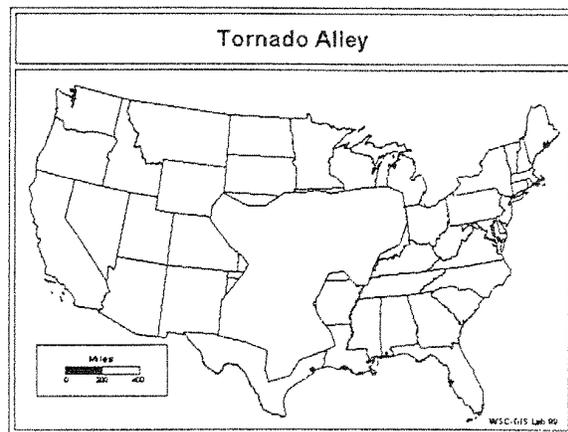
The Tornado Intercept Project based out of Norman, Oklahoma was the first organized ground-based groups of

storm chasers. This project was sponsored by the National Severe Storms laboratory (NSSL) to conduct research about storms that cause tornadoes and the effect they have on communities located in Tornado Alley (See Figure 1). The project was declared a success on May 24, 1932 when the scientists and chasers met face-to-face with a tornado in Union City, Oklahoma. This is where we can see storm chasing being born as a hobby rather than just for scientific reasons (Marshall 1993).

Tornado Formation

Many prospective tornado recreationists need to have a rudimentary understanding of tornadoes and how they work. Here is a brief scientific description of what a storm chaser should at least know about tornadoes. Tornadoes are produced as a thunderstorm develops an organized internal structure of sufficient strength to extend the vortex from the cloud base to the ground. The severe thunderstorm that develops a tornado is normally the largest thunderstorm in a squall line or a very large isolated thunderstorm. These storms are able to produce tornadoes because they have the organized internal structure that can support a tornado.

The warm, moist air of the thermal updraft flows in between the double vortex structure at low levels. The thunderstorm interacts with the jet stream, which provides a suction over the top of the storm, especially over the cyclonic vortex that has become better developed. The cyclonic vortex then forms a link between the cloud base and upper atmosphere by providing a tubelike connection up to the jetstream level. The dynamic updraft then develops through the core of the cyclonic vortex to combine with the rotation of the cyclonic vortex to generate a vortex of sufficient strength to reach the ground. This, then, is a tornado funnel (Eagleman 1990).



Safety

Storm chasing is an activity that can be dangerous if a person does not know what precautions to take. The three main threats to a person during a storm chase are: being on the highways, lightning, and the storm itself. Highway

driving presents its own set of obstacles that adds to the difficulty of chasing a storm. The storm can create dangerous driving conditions such as torrential rains, hail, and strong winds that are subject to change direction at any given moment. There is also the danger of running into stopped cars in or along the road. Since visibility is low and the chaser is usually trying to keep up with the storm, he will not have quick maneuvering capabilities if needed. Another problem with highways are underpasses. Many people congregate in these areas to get out of the fury of the storm. This has the potential for causing serious accidents if a driver is not paying attention while going under these bridges.

Lightning also poses a potential threat to storm chasers. Most chasers do not spend their entire chase experience in their vehicles. Time is also spent outside in the storm itself, trying to capture that "perfect" picture or gathering scientific measurements. Being outside unprotected with a metal tripod and camera in hand is not nectactly the safest way to avoid being struck by lightning. Many prime tornado viewing areas also happen to be on top of hills, which is yet again, not the safest pace to be when lightning is involved, but this is a risk that many chasers take.

The storm is another threat to a chaser, although it is the least likely to get you. There are however two aspects of the storm that can affect peoples lives. First, it is thought that the ultimate danger to a chaser is not the physical storm that is being chased, but those dangers that come as a surprise. There is another threat that a storm chaser must be careful of, but it does not involve the chase itself. Psychologically the storm can effect a person as well. Chasing can become a dangerous psychological obsession. There are some people that enjoy storm chasing so much that they begin to devote more and more time to this activity rather than to their life responsibilities. Some leave their professions and try to make a living selling pictures and videos that they have gathered during their chasing expeditions (Doswell 1998).

Risk Recreation Defined

Unlike traditional risk recreation, storm chasing uses its own definition that is geared towards just the act of storm chasing. Traditionally, risk recreation is a self-initiated activity in a natural environment that people partake in due to the activity's uncertain and potentially harmful nature and it's cognitive and affective involvement (Robinson 1992). In terms of storm chasing, the following definition is utilized: the recreational pursuit of an uncontrollable meteorological event.

Storm chasing is an activity that is associated with many risks, and those that chase storms should be aware of these risks. There have not yet been any media frenzies concerning the death of a storm chaser, but many think that when this happens, regulations and sanctions will be put into effect that will alter one's ability to chase a storm effectively (Doswell 1998). For example, climbing Mount Everest is an activity that people participate in, and there are many recorded deaths of such attempts. This fact has

not discouraged a lot of people from climbing the mountain, and similarly, any fatalities that may occur during a storm chase should not effect the way that chasers conduct themselves while hunting a storm.

Storm chasing can be considered a recreational activity. Although it was initiated for scientific purposes, there are many that chase simply for the joy of the chase. "The thrill for storm chasers is tracking nature out of control, finding themselves eye-to-eye with...the great grand-sucking twisters of Tornado Alley" (Paddy 1994:32). As with any recreational activity, there is a challenge to chasing, and it seems as though there is ore challenge and frustration to chasing than a lot of other activities. Storms are not spawned on command. Nature acts in mysterious ways and there has yet to be a method of knowing exactly when and where are tornado will hit. Tornado chasing is basically a guessing game with some help from scientific information to make these guesses educated. Besides the thrill of the chase, "what compels storm chasers to drive tremendous distances across the plains?...You can see forever...the sky and the air are clear, and what you see is tremendous—it's simply awe-inspiring" (Wolkomir 1994:52).

Another way that storm chasing is a recreaional activity is that there has been an increase in those interested in storm chasing, causing a noticeable influx in traffic on prime chase days. According to research by Wolkomir (1994), there are so many storm chasers out there that on prime chase days there are too many cars on the roads to drive. If storm chasing was not a popular recreational activity, there would not be such a demand for space for these chasers.

Storm Chasing Tour Groups

This section about storm chasing tour groups gives some minimal information about what exactly is entailed in a storm chasing package, and web sites are provided for those that wish to seek out additional information. Many people wish to try such a thing and joining with one of these groups is the perfect way to enjoy an experience of a lifetime.

Storm chasing in the past has mainly been done for scientific reasons rather than for pleasure or recreation. Now that more people have become interested in storm chasing, it has opened a door leading to a new hobby. Since it is not a hobby that you can pick up very easily, there are experts that you can seek out to join their storm chasing groups. They consist of expert storm chasers that do not mind having a novice along for the ride. Their territory ranges all throughout Tornado Alley looking for storms. Being difficult to chase and dangerous to do, these tours are expensive; a two-week tour costs anywhere from \$1,800 to \$1,900. These tours include room and board, and sometimes even a video of your experience. Minimal packing is necessary, as chasers are on the road all the time and never know what state they willed up in next. Of course tornado activity is not guaranteed, however during own time, the chasers will bring the groups to various sightseeing areas. Many people find these tours to be a good basis from which to start their own storm chasing careers.

Storm Chasing Groups To Contact on the Web

Cloud 9 Tours	http://www.pair.com/storms/cld9.html
Silver Lining Tours	http://silverlining.pair.com/chase.html
Storm Chasing Adventure Tours	http://www.storm-chaser.com
Tornado Alley Tours	http://www.pair.com/talley/tours.html
Tornado Research and Defense Development (TRADD)	http://www.abilene.com/tradd

Conclusion

With movies such as "Twister," interest has increased in the activity of storm chasing. This is apparent as seen through the increased traffic along the roads of Tornado Alley and with the institution of many storm chasing groups. Although storm chasing in real life is nothing like the movies, there is still a real rush that come from seeing one of Mother Natures's most destructive forces. People will pay outrageous amounts of money to have the opportunity to chase after something that most people would flee. True storm chasers are into this form of risk recreation for many reasons, to learn about tornadoes as much as possible, to help create warnings systems, but mainly to experience the thrill of the hunt.

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**WHO OWNS THE OCEAN? A QUALITATIVE
STUDY OF SALTWATER RECREATIONAL
FISHERS AND OPEN OCEAN AQUACULTURE IN
NEW HAMPSHIRE**

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Abstract: During the last decade, the decline of wild fish stocks has put pressure on fish farming to meet the growing demand for seafood around the world. Aquaculture development often requires placing restrictions on public access to ocean waters where farming operations are constructed. This paper examines the attitudes of saltwater recreational fishers toward open ocean aquaculture using data collected from sixteen in-depth, semi-structured interviews. We argue that the fishers' perceptions of crowding and spatial conflict, methods of adapting to the pressures put on common resources, and attitudes toward existing users shape their opinions about aquaculture development and the management of ocean resources and spaces.

Introduction

Wild fish stocks around the world are in trouble. "By recent U.N. estimates, a majority of marine fish stocks and all of the world's primary fishing grounds have reached peak production and are in decline" (McGinn 1998: 6-7). New England's fisheries have not been immune to the global decline in fish stocks. George's Bank was closed to fishing in 1994. Commercial groundfishing off Jeffrey's Ledge was closed during the mid 1990s. Most recently, in December of 1998, Maine's commercial fishers called for the closure of the Gulf of Maine.

However, it is not readily apparent to the average consumer that the world's fish supply is on the verge of collapse, due

in large part to the continued increase in aquaculture. Fishers and suppliers are increasingly relying on fish farming to help meet rising global demands as wild fish stocks decline. In 1995, roughly 20 percent of all fish consumed in the world were farm raised, compared to 8 percent in 1984 (McGinn, 1998). Most of the world's aquaculture is done in freshwater, in tanks on land, and in protected bay areas. Open ocean aquaculture, the cultivation of certain fish species in containment structures in the open ocean away from the protection of land, is a relatively new development not widely in use.

Presently there is a project underway in New Hampshire, designed to test the feasibility of farming mussels and flounder in the open ocean. The University of New Hampshire received funding from the U.S. Department of Commerce, through a special appropriation to the New Hampshire Sea Grant College Program, to develop an open ocean aquaculture demonstration project off the Isles of Shoals. U.S. Senator Judd Gregg, at a check presentation for this project on December 3, 1997, announced that, "Aquaculture will . . . contribute to economic and community development, particularly in areas like New England, where wild capture fisheries are experiencing a crisis of unparalleled proportions. It is extremely important for folks in New Hampshire to understand the importance of the ocean and coastal science research that is taking place at the University. I support the aquaculture project because it will blend the concerns of coastal communities, entrepreneurs, and UNH scientists" (University of New Hampshire News Bureau 1997).

As Senator Gregg alluded to in his announcement, the support of the coastal community is a necessary component for the success of this project. Blocking off an area of open ocean for a commercial aquaculture operation raises complex questions, such as: Who will benefit from the new technologies and what are the environmental and social impacts? (Keeler, 1998). The Socioeconomic Research Component of the demonstration project was designed to assess the social impacts on current users of the marine resource and to determine their attitudes toward local aquaculture development. McCay and Acheson argue that, when trying to understand attitudes toward ocean management and development, "What is required . . . is careful examination of the ways people understand and relate to their environments and of the ways ownership – common or exclusive – works in specific cultural and ecological settings" (1996:15).

Fishers, both commercial and recreational, have traditionally viewed the ocean as "common property," a communal resource to which they are entitled access. However, fishers have also at times developed notions of territorial rights "even to the extent of outright private ownership claims, to valued fishing grounds, species, or techniques" (McCay and Acheson 1996:11). Common property has been seen by a number of scholars, most notably Garrett Hardin (1968), as problematic in that it leads to a "tragedy of the commons" in which self-interested actors exploit the common resource to the point that their collective actions cause the total depletion of the

resource. However, McCay and Acheson (1996) point out that the tragedy of the commons model does not recognize that property rights refer to relations among people. They argue that contextual factors such as common notions of territorial rights and the “presence or absence of rules about uses of the commons, alternatives to exploitation of common resources, [and] ways of monitoring and controlling the behavior of others” must be considered when examining common property activities and regulation (McCay and Acheson 1996:6). This means that understanding how New Hampshire fishers will think about and respond to both declines in wild fish stocks and future common property regulation in the wake of aquaculture development depends, in part, on their current relationships with other common property users and the informal rules and strategies now used to monitor, control, and adapt to the behavior of competing users.

In this project we examined the social dimensions of saltwater sport fishing and aquaculture development to assess some of the concerns of New Hampshire’s saltwater recreational fishers regarding aquaculture development and future regulation of the ocean. This project was one part of the Socioeconomic Component of the Open Ocean Aquaculture Demonstration Project headed by Dr. Robert Robertson of the UNH Department of Resource Economics and Development. A team of graduate students, under the direction of Dr. Cynthia Duncan of the UNH Department of Sociology, conducted the research. One objective of the project was to develop a portrait of New Hampshire’s saltwater recreational fishers—who they are, why they fish, and the fishing activities in which they participate. Another objective was to determine how the fishers felt about aquaculture development in general and development at the Isles of Shoals in particular. We also wanted to develop an understanding of their attitudes and concerns about ocean management more generally. Finally, we wanted to know how the social context within which fishers considered ocean management and aquaculture development shapes their attitudes and opinions.

Methods

We developed a qualitative research design that combined participant observation with in-depth interviews to capture the complexity of the fishers’ experiences and thoughts. Initially, we conducted participant observation in sites where sport fishers congregate—marinas boat launches, and waterfront bars where they swap fish stories—to observe first-hand the context within which the fishers’ operated. Each member of the research team took extensive field notes after every field visit and entered them into a database management program adapted for qualitative analysis by UNH faculty (Duncan 1998). We used contacts made during participant observation to identify 16 interview candidates. We restricted our purposive sample to fishers who owned boats and fished in the ocean near the Isles of Shoals. Our intent was to tap the more frequent, dedicated recreational fishers who have made a greater investment in the sport and may, therefore, have more of a stake in the use of the ocean.

We also used the data from preliminary field work to identify factors that might influence the fishers’ opinions and attitudes about aquaculture and ocean management, out of which we developed the conceptual framework for the study. We decided that, in addition to learning the fishers’ opinions about this specific aquaculture project, we wanted to know where they stood on the larger issues raised by the demonstration project such as: public vs. private rights and responsibilities for development of marine resources and ownership of the ocean. We then identified three broad categories of contextual factors that might influence their ideas about ocean development and management: their relationships with other users of the resource, their attitudes about fishing regulations and political involvement in fishing management issues, and the characteristics of the fishers themselves such as their family background, fishing practices, and changes they’ve seen on the water. We then refined the broad categories of factors identified in the conceptual model to develop a detailed interview guide. The following is an abbreviated version of the four page guide:

- Background—Age: Occupation; Family: Education; Incomes; How got started fishing?
- Fishing Practices and Experiences—Frequency; Gear; Species; Tell about a recent fishing trip, your best trip, and your worst trip.
- Changes and Relationships—Is fishing different from when you started? Kinds of encounters with other users on the water; Relationships with other resource users.
- Regulations—Views on current fishing regulations; Involved in meetings or discussions on regulations? Active in political organizations?
- Aquaculture—Thoughts about aquaculture development; How will Isles of Shoals project affect you? Will it be beneficial? For whom?
- Managing resources—Who should have input? Who should be responsible? Who should/will benefit from development of public resources? Who owns the ocean?

Using the interview guide, each team member conducted two in-depth interviews, usually in the fishers’ homes or places of business. The 16 one hour interviews were taped and then transcribed into specially designed data base forms. In addition, each team member wrote field notes after the interview which were also entered into the data base. The data management program, by networking users through a server, allows a number of researchers to simultaneously view the data, work on analysis, and share thoughts and observations about emergent patterns. Following the analytical strategies of Lofland and Lofland (1995), Miles and Huberman (1994), and Weiss (1994), we worked together to systematically identify patterns and themes using propositional framing, descriptive codes and summaries, analytical codes and memos, and visual displays of the data.

Findings

The findings presented here provide a demographic profile of the fishers in the sample followed by an analysis of the

relationship between their attitudes toward competing users, commercial fishers, and open ocean aquaculture development. Finally, we examine the relationship between the fishers' experiences of crowding and competition for space on the water and open ocean aquaculture development. Names and identifying details used in the text have been changed to protect the privacy of the fishers who participated in this study.

Who Are New Hampshire's Saltwater Sport Fishers?

The first objective of the project was to develop a demographic profile of New Hampshire's saltwater recreational fishers. We interviewed 14 men and two women. They ranged in age from 28 to 61. The mean age was 45; most were in their 40s and 50s (Table 1). They were a somewhat elite group of fishers. Most were educated, affluent, professionals (Tables 2 and 3) who had many years of fishing experience (Table 4). Their boats ranged from sixteen to thirty-two feet in length, evenly split between those over and under twenty feet (Table 5).

Table 1. Age of Respondents

Age Group	% of Respondents
under 40	25.00% (4)
40-49	31.25% (5)
50+	43.75% (7)
Mean Age = 45	
Mode = 50	
N=16	

Table 2. Family Income

Income	% of Respondents
20-29k	12.50% (2)
30-39k	18.75% (3)
40-49k	6.25% (1)
50k +	62.50% (10)
Mean Income = 45k	
Mode = 50k +	
N=16	

Table 3. Educational Level

Education	% of Respondents
High School	18.75% (3)
Some College	25.00% (4)
College Degree	50.00% (8)
Professional Degree	6.25% (1)
Mode = College Degree	
(N=16)	

Table 4. Years of Fishing Experience

Years of Experience	% of Respondents
under 20	12.50% (2)
20-29	25.00% (4)
30-39	6.25% (1)
40-49	31.25% (5)
50 +	25.00% (4)
Mean = 35	
Mode = 40/50	
N=16	

Table 5. Boat Size

Length in Feet	% of Respondents
15-19 feet	43.75% (7)
20-29 feet	50.00% (8)
30 +feet	6.25% (1)
Mean = 21 feet	
Mode = 20 feet	
N=16	

These recreational fishers have been fishing for a large part of their lives. Fourteen started fishing as small children with their families or friends. Only two began fishing as adults. When interviewed, many fished at least weekly. Some fished as often as daily during the summer months and traveled south to fish during the winter. They fished for the challenge and adventure of fishing, mentioning the skill needed and the excitement of "playing a big fish on the line." Peace, solitude, and a love of the outdoors also inspired their dedication to sport fishing. Their fishing territory extended from the Great Bay inland estuary out to Jeffrey's Ledge in national waters, north into Maine and south into Massachusetts. Most had some general knowledge of what aquaculture is, but few were familiar with specific aquaculture projects. Their knowledge of aquaculture practices was limited.

Opinions about Aquaculture Development and the Isles of Shoals Demonstration Project.

Many fishers believed that aquaculture may actually be a necessity due to the severe depletion of fish stocks. Indeed, several fishers responded to the concept of aquaculture as a potential solution to the problem that they perceived as over-fishing by commercial fishermen. As one fisher put it, *What do I think about aquaculture? I guess it's a necessary thing. Because human beings want to eat fish, and we're wiping out all the fish stocks all over the world.* This general idea was repeated quite often. Another fisher said that he is absolutely in favor of aquaculture as he sees it as something that would help to ensure that we don't continue to abuse the ocean. Others view aquaculture as a *step in the right direction*; a necessary step that will take the pressure off of the fish resources. Stemming from these feelings was the idea that aquaculture is the *wave of the future*, a phrase that was used by several respondents. Indeed, the response to the concept of aquaculture in general was overwhelmingly positive. Yet, upon broaching the subject of the Isles of Shoals project the fishers responded differently. In fact, three fairly distinct approaches taken by these fishers in response to the Isles of Shoals project emerged.

The conflict approach, taken by roughly a third of the respondents, is the tendency to see open ocean aquaculture as a solution to the problem of exploitation of natural marine resources by commercial fishers. These fishers believed that big commercial fisheries are taking unfair advantage of their positions by stripping the ocean of its resources for their own gain. Many of these fishers were particularly vehement in their denunciation of commercial fishers, and are as apt to blame individual fishers as

industries. Some describe commercial fishers as *nasty and cut throat*. Luke was one of the most outspoken on this issue. Very early into the interview, he brought up the issue of draggers and over-fishing. He said, *There aren't any bottom fish now because of the draggers and the over-fishing . . . they take all sizes of fish—small ones, big ones—plus ones they're not even fishing for. See, that's the real problem is the draggers. That's why there's no fish anymore. And once they get fish out of an area, they just keep going back and forth until they ruin the bottom . . . [There are] areas way out in the middle of the ocean where it's desolate*. Luke said that he is particularly aware of this problem because he is a diver and can actually see the damage that has been done by over-fishing.

Luke's strong negative feelings about the damage that he believes has been done by commercial fishers was commensurate with the strong positive feelings he had about aquaculture—both in general and site specific. He was very enthusiastic when asked what he thought about the whole idea of aquaculture. He repeated several times that he thought it was a great idea and that it would be *good for the whole eco-system*. By this he meant that it would take the pressure off of the fish resources, thereby improving the ocean's balance. In regard to the Isles of Shoals project, Luke claimed that the site could not be in a better spot because the particularly strong current running through this area—a *cleansing current* he called it—will take care of potential problems such as excess food and waste. Luke's only concern about this project was that *there ought to be more of them than just one . . .*

Other fishers who took this approach in response to the Isles of Shoals project are similar to made similar comments. For example, Mark said, *commercial draggers have come into shore and worked the humps off the Isles of Shoals and wiped 'em [fish] out*. David didn't want to point fingers, but stated, *miles limitations enabled them [commercial fishers] to drag in close. [Just] a small boat would work very close off the back of the shoals and wipe those areas out*. Finally, Michael claimed that commercial fishers are *getting deadly efficient—to the point where they're taking, not only the fish they're targeting, but all the other fish in the ocean, too*. Each one of these fishers claimed that big commercial fisheries are responsible for depleting fish stocks. Each of them was also in favor of aquaculture—both in general and at the Isles of Shoals.

Those fishers who were most against commercial fishers were accordingly most in favor of aquaculture in general, as well as the Isles of Shoals project. Aquaculture was looked upon by these fishers as a solution to the global problem of over-fishing and their concern was not *where* it's done but *that* it's done, in order to begin taking pressure off the remaining fish stocks.

In marked contrast to the approach taken by the fishers noted above, the NIMBY (Not In My Back Yard) approach was taken by approximately another third of the fishers. These fishers are in favor of aquaculture in general—but in response to the particular project site, they felt differently. None of these fishers wanted to see this project in their own

fishing spot. For example, Larry said, *I think [aquaculture] is good. People have to eat protein—fish are protein*. As the interview progressed, however, Larry, who was the most negative of any of the respondents in regard to the Isles of Shoals project, commented, *[there's] disease—and then all the waste—what happens to all the waste? . . . I guess my concern is more from a, a . . . How's it going to impact my fishing and what's the long term effect going to be?* As it turns out, the only aquaculture that Larry favored was that done in tanks on shore.

Paul, too, sounded positive at first. He said that he believes that *[aquaculture] is going to be an important component for replacing the groundfish*. However, like Larry, he was also concerned about disease and waste. His biggest concern was that this particular project will compete with existing user groups who fish this area, and as a consequence will create conflicts. He was also concerned that if it is a successful venture, it may become more of an issue as it requires more space. He asked, *. . . if you're going to do it commercially, do you need ten times that size or twenty times that size or one hundred times that size?* While he understood that the benefit of this type of expansion may be that jobs are created for commercial fishers, which they sorely need in his opinion, the Isles of Shoals just isn't the spot because it's not far enough off shore.

In addition to concerns about their own fishing, these fishers were concerned that this project is going to get in the way of commercial fishers, for whom they feel some sympathy.

For example, Paul was clearly sympathetic and spoke about the commercial fishers in the context of *those poor guys trying to eke out a living*. He blamed the New England Fisheries Management Council for the depletion of fish stocks rather than pointing his finger at the commercial fishers themselves. As he put it, *. . . there's no groundfish left and that's as a result of the New England Fisheries Management Council not stepping up to the plate . . . I think we've done a horrible job of the management of the groundfish. It's going to be worse and it's going to be forever coming back . . . I mean they just gradually go down this path where these poor fishermen are slowly squeezed out of making a living . . . And we just continue to squeeze these fishermen, so everybody makes less and people slowly go out of business and the fishery stock never recovers*. Paul obviously believed that the commercial fishers were the victims of poor management rather than the actual cause of the crisis themselves.

Fishers who were least in favor of the Isles of Shoals demonstration project were much less inclined to denounce commercial fishers. They were very sympathetic to the plight of local commercial fishers and worried that this project wouldn't result in new jobs after all. The fishers who took this approach were primarily concerned with how this project would affect them personally, as well as others in their community. They were concerned about the Isles of Shoals in particular as well as the immediate surrounding area if this project should be successful and expand. They were especially concerned that this fishing

spot will no longer be available to them. And finally, they were also concerned about excess waste and diseases infecting the fish stocks in this area. Although they said they were in favor of aquaculture as a concept, their feelings about the Isles of Shoals project dictated otherwise.

The negotiating approach, taken by another third of the fishers, was somewhat different from either of the first two approaches. These fishers were in favor of aquaculture in general as well as the Isles of Shoals project specifically, contingent upon certain conditions. They were in favor of experimenting to see how it all works out and more moderate in most of their opinions, including their feelings about commercial fishermen. For example, when Reed was asked why he thought fish stocks had declined, he replied, *Commercial problems, I'm sure. It's not why do I think, it's why do I know. Yeah, it's pretty well publicized. But then he went on to say, . . . in my years on the water, I've seen stock drastically change. Up and down and up and down and I can't think of any other environmental conditions that would cause it, other than fishing pressure—commercial and recreational. Well, and I suppose it's things like pollutants too. And you know, losing striped bass for a while because of poisons or something.* Reed looked at the possibility of other factors, besides commercial fishing, that may have contributed to the decline in fish stocks. He also included recreational fishers as a possibility.

When asked what he thought about aquaculture, Reed replied, *Oh, it's fantastic. Yeah, I like the price of farm raised Atlantic fish. Really, I think it's very sensible.* However, he made sure to add, *Only thing is if it doesn't infringe on somebody else's use of the same water.* When asked about the specific project site, Reed expressed concern. He said, *. . . when I read the location [in the newspaper], I was concerned about where it might be and what it might interfere with recreationally [because] that's a pretty big fishing area . . . and it's also very popular for duck hunting.* When asked how he would feel about additional development if this project is successful, he replied that he would have a problem *if it interfered with boat operation or maybe if it were in that particular sea duck hunting area . . . [or] if it interfered with anchoring in that vicinity.* As the interview continued however, he alluded to the idea that he has no problem with this demonstration project. He said, *But this one demonstration project, that's not all that big, you know . . . That's not bad for starters to see how it works.* And when asked if he thought this project might be beneficial, he reflected on the plight of commercial fishers and expressed that he would like to see these guys be able to do these kind of projects. He also said, *as long as they could make a living at sea . . . then projects like this—yeah, I'd be 100% in favor of it.* As far as Reed was concerned then, the demonstration project is fine and, in the event that it is successful—as long as it benefits commercial fishermen—he is all for it.

The fishers who took the negotiating approach were absolutely in favor of the demonstration project and were also in favor of additional sites in the area, if the project is

successful, as long as certain criteria are met. Though they thought commercial fishers have definitely over-fished the area, they also attributed declining fish stocks to other possibilities. Overall, they believed that if this project could be done well, i.e. no negative environmental impacts, that it will solve two problems—commercial fishers can be put to work and depleted fish stocks can recover.

In sum, those who are most angry about commercial fisheries destroying the ocean's resources are also the most in favor of aquaculture as a potential solution to what they perceive as a global problem of enormous magnitude. Conversely, those who are least upset about commercial fisheries are the least in favor of the Isles of Shoals project. Though they have no problem with aquaculture in general, they do not want to see this project in their backyards. Those in the middle recognize and are angry about the fact that commercial fishers are in large part responsible for declining fish stocks but they also blame other factors as well. In addition, they realize that commercial fishers have to make a living, and one of their contingencies for being in favor of the Isles of Shoals project is that, if it is successful, it puts commercial fishers to work. They also want to see the project monitored to ensure the least negative environmental impact possible.

Opinions about Open Ocean Management and Access

The degree to which fishers felt a sense of personal ownership toward particular fishing spots, the degree of competition they experienced with other fishers over those favorite spots, and their adaptive responses to competition over favorite spots also shaped their opinions about management of the commonly held ocean. All of the fishers mentioned a major increase in boat traffic and users on the water during the last three years. Many attributed the increase to a combination of the booming striped bass fishery and an improved economy that has enabled more people to buy boats. The recent increase in boats and fishers competing for the same space on the ocean and surrounding tributaries was an important part of the context within which recreational fishers experienced and thought about issues regarding access to the common property of the ocean.

Some fishers have been little affected by conflicts over space and territory. They were not overly concerned about regulation of the commons in the future. Other fishers have been directly affected by competition for common space, but have developed their own informal adaptive strategies to avoid conflict. They, too, believed that management of the commons will be worked out satisfactorily in the future. The last group of fishers have been bothered by spatial conflicts and have not developed satisfactory adaptive strategies. This group had more concerns about open ocean management, development of aquaculture sites, and public access to the commons.

Fishers in the first group did not perceive space to be an issue on the water. Although they mentioned the increase in boats and boat traffic, they did not discuss conflicts over space. For example, Mark fished primarily for groundfish, which few recreational fishers have competed for since the

crash in groundfish stocks several years ago. Groundfishing took him farther out into the ocean to Jeffrey's Ledge far beyond the range of striped bass fishers. Similarly, Michael was a fly fisherman. His technique kept him somewhat protected from space competition. Fly fishers were generally afforded more space and a courteous attitude. *The people that are heavy into fly fishing . . . come with an ethic and an understanding. That you give people a lot of room and a lot of respect. If it's fly fishermen, you're not supposed to be anywhere near 'em.* Michael was so unaffected by competition for space when fly fishing that he did not even mention the increase in boat traffic.

This group of fishers did not perceive conflict over space to be an important issue since they have been insulated from spatial competition by virtue of the territory occupied by their target species and their specialized techniques. Their lack of personal concern over space on the water was reflected in their lack of concern about maintaining access to ocean space in the future when aquaculture development adds more users to the ocean. Most of the fishers in this group did not mention concern over the positioning of the proposed aquaculture site off the Isles of Shoals. Nor did they express concern about how access to open ocean spaces might be managed in the future. Mark summed up the attitudes of this group when he concluded the interview, *The only other thing I can tell ya, you know, it's a pretty large ocean out there and certainly commercial fishing, recreational fishing and aquaculture—I see no reason why it can't all coexist.*

Fishers in the second group did perceive problems with competition over space and territory, but had developed adaptive strategies that allowed them to continue fishing without too much disruption. Roy talked about the pressure from competition and his strategy: *All those racing boats in the river, cigarette boats. And they're just, you know, out of control . . . You have to fish when it's not the weekend. The weekends are horrible . . . a lot of the boats are larger so [in my small boat] I like to fish right in on top of the rocks and most people wouldn't be that crazy.* Paul had also found ways to adapt. *I keep going farther afield to find places where there are less and less boats . . . They may catch up with me eventually, but so far, you know, I've been okay.*

These fishers have been bothered by crowding and disputes over space. Yet, they have found ways to adapt their fishing so that they avoided continuing conflicts over space. Their ability to positively adapt to crowded conditions was echoed in their optimistic stance toward open access to common property and spatial competition. Roy explicitly expressed the adaptive view. He raised some concern about maintaining access to his favorite spots, but, he concluded, *there's enough places to fish . . . There's so much undeveloped fishing area that if a few people are affected by this, they will figure out where else to fish.*

The fishers in the last group had not developed adaptive strategies that allowed them to continue fishing for favorite

species or in ways that provided the same pleasure. They expressed deeper frustration over space conflicts on the water than did the fishers with adaptive strategies. Rick gave up fishing one summer when he was particularly troubled by boats following him around. *I changed boats twice 'cause guys were chasing me all over the place. I just quit. I said, Hell, I don't need this. I myself got into arguments over mackerel for cryin' out loud. "You're too close to me, get the hell outta here." I just said when you can't have fun fishing you may as well quit.*

This group of fishers felt the competition for space on the water more keenly since they have been unable to find adaptive strategies that enable them to manage spatial conflicts while preserving the elements of fishing that they enjoy. They also expressed more concern over space and access issues relating to the proposed aquaculture site and future aquaculture development. Jake voiced his concern: *If there was going to be 300 boats fishing at the Isles of Shoals and you locked them out of a certain area . . . Well I don't agree with that. They should find a place that's less populated.* He was uncertain how public access and rights issues could be worked out. *Nobody owns it. There's no boundaries. No stone walls to say "You own this side, I own that side." I'm not sure how that should be dealt with.* Reed was more emphatic, saying that competition over the space would be a definite downside to the project. He, too, raised the issue of who should have a say in open ocean access. . . . *New Hampshire citizens, collectively, I believe own offshore, off our state coast. I think it should be managed for all of us. Even the people who don't utilize it should have some input. And I believe the people from inland should be able to say, "There should be open space in the ocean," or "They shouldn't be doing this or they shouldn't be doing that."* This group of fishers who have been sensitized to space conflicts on the water, have been unable to adapt and resolve those conflicts in a satisfying manner. They were less certain that new spatial conflicts raised by future aquaculture development could be resolved. While they expressed positive opinions about aquaculture in general, they had some real concerns about another user group gaining access to common space, especially a user group that would bring with it precedents and procedures for fencing off open space and limiting free access to common property.

To summarize, the degree to which the sport fishers' experienced competition for favorite fishing spots, and their abilities to successfully adapt to that competition, influenced their attitudes toward ocean management and regulation of open space. Most of this small group of recreational fishers, those unaffected by competition for favorite spots and those with adaptive strategies to manage spatial competition, have confidence in both government and individuals' abilities to continue to work out space and access issues amicably and equitably. However, fishers who have been unable to adapt satisfactorily to increased competition for their favorite spots were more skeptical about successfully regulating access and space issues in the commons when pressure continues to mount from competing uses in the future.

Conclusion

In this study, we found that the opinions and attitudes of New Hampshire's saltwater sport fishers regarding aquaculture development in particular and the regulation of common space in general were shaped by their feelings toward commercial fishers and the depletion of wild fish stocks. Their ideas were shaped by their personal experiences on the water and the context within which each considers questions such as "Who owns the ocean?" or "What do you think about aquaculture development?"

The results of this study suggest that it is too simplistic to expect individuals in any group of resource users, no matter how homogeneous group members are, to have similar attitudes about resource development and regulation of public spaces based on their group position. Rather, interests toward public resources are mediated by existing relationships among users, the feelings of ownership users have toward specific places and resources, and the effectiveness of formal and informal management techniques. These features provide an important backdrop against which we should consider how individuals will perceive the regulation of common resources.

Future studies seeking to understand how people feel about complex issues such as the commercial development of commonly held resources or the privatization of public spaces might be enhanced by the inclusion of a qualitative component. A qualitative study can help uncover the ways experience, perception, and opinions are interwoven. For example, when we asked the question, straight out, "What do you think about aquaculture?" we got the simple and unanimous answer, "I'm all for it." However, more complex and sometimes contradictory attitudes emerged during the course of the interview. The same person who said open ocean aquaculture development is *great* later said *Controlling access to the open ocean, I think you are going to have an uphill battle*. We argue that in order to make sense of contradictory answers such as this, we must understand the social context within which the individual considers the question.

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