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North Carolina Coastal Plains Paddle Trails Initiative

The State of North Carolina Coastal Paddling Survey

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Table of Contents

List of Tables

The State of North Carolina Coastal Paddling 2000: Final Report

EXECUTIVE SUMMARY

Since the early days of Native American and colonial explorations of eastern North Carolina, coastal waterways have played an important role in transportation and development. More than 3,800 miles of estuarine and ocean shorelines line brackish and marine waters. The more protected swamps, creeks and small rivers provide an ideal setting for canoes and small boats, while the more open waters of the larger rivers and sounds provide venues for touring and sea kayaks. In many places the only way to explore these backwaters is by paddling canoes and kayaks.

A collaborative effort of North Carolina Sea Grant, N.C. Division of Parks and Recreation and Partnership for the Sounds, with funding from Confluence Watersports Company, formulated the North Carolina Coastal Plains Paddle Trails Initiative (NCCPPTI). This survey research was a part of the collaborative effort and met all the NCCPPTI objectives. (See UNC-SG-01-08).

NCCPPTI Objectives

1. To develop a system of information dissemination that will provide background to the public related to existing water-based paddle trails and local infrastructure required for its support;
2. To determine what attracts paddlers to the waterways and the surrounding communities of coastal North Carolina and to determine the economic, environmental and quality-of-life impacts paddlers may have in the area;
3. To identify the local, state and federal governments, nonprofit and forprofit stakeholders and to identify potential partners to develop successful paddling trails and better understand their potential benefits and costs; and

4. To design and produce a working symposium that will evaluate existing and newly developed waterway materials, network operators and owners of infrastructure such as restaurants and lodging, and provide the opportunities to learn from experiences of other successful trail development initiatives.

The state of North Carolina reports that currently more than 7 million people reside in the state. North Carolina ranks as the fifth highest in the country based on growth rate from 1995-2000. North Carolina's population is estimated to reach 9.3 million by the year 2025. Days spent canoeing have been estimated to increase 30 percent more than the population growth through the year 2050. If these figures hold true, attention is needed to manage the coastal areas for paddlers as well as to gain knowledge about what attracts paddlers to particular sites.

This study was designed to determine what attracts paddlers to eastern North Carolina (east of I-95), to determine what infrastructure is desired by the users to make their trail outings more enjoyable, and to measure paddlers' economic impacts on the coastal plain. The study area was divided into nine mutually exclusive and exhaustive regions. A total of 601 paddlers agreed to participate in the study, and a modified Dillman mail survey methodology was followed.

Results

Respondents' mean age was 46.62 years. They had a mean annual income of $76,570 and a mean workweek of 37.85 hours. On average, respondents took 10.45 (SD = 16.32) trips per year and logged longer miles in the Outer Banks than any of the other nine regions. The average (mean) number of days spent paddling was consistent across paddling areas (Table 5). The number of days ranged from a high of 2.38 days for the Southern Coast to a low of 1.37 days for the Upper Neuse.

The majority of those surveyed claimed they took trips in which paddling was the primary purpose of their trip. Eighty-five percent supported the idea of developing additional paddle trails, and 84 percent supported additional access sites. In order to manage for future trails and access sites, 36 percent of the sample thought that user fees would be the best practice. Once established, 66 percent of the sample felt the state government should pay for the upkeep and operation of the paddle trails.

Respondents reported expenses for lodging, restaurant meals, food, ice, beverages, gasoline and auto care, other retail purchases, boat rentals and access fees, guides or outfitters,

and equipment purchases. Overall, the average expenses per paddler per trip ranged from $158.08 in the Outer Banks to $42.11 in the Cape Fear Region.

ACKNOWLEDGEMENTS

The authors would like to thank the collaborative efforts of North Carolina Sea Grant, N.C. Division of Parks and Recreation, Partnership for the Sounds and Confluence Watersports Company. Our efforts would have been futile if it were not for the funding from Confluence Watersports Company. The foresight and desire of the above created the North Carolina Coastal Plains Paddle Trails Initiative (NCCPPTI), and allowed it to reach its fruition. Finally, we would like to acknowledge the 601 paddling participants who took the time to complete the mailed questionnaires in order to provide the information on which this study is based.

I. INTRODUCTION

Since the early days of Native American and colonial explorations of eastern North Carolina, the coastal waterways have played an important role in development. More than 3,800 miles of estuarine and ocean shorelines line brackish and marine waters. The more protected swamps, creeks and small rivers provide an ideal setting for canoes and small boats, while the more open waters of the larger rivers and sounds provide venues for touring and sea kayaks. In many places the only way to explore these hidden wonders is by paddling canoes and kayaks.

Historically, these waterways have been important to the economic development and the environmental quality of our state. These estuarine and riverine waterways have a new economic and environmental potential of providing the infrastructure for regional systems of paddle trails. It is possible to provide the public with paddling access throughout the coastal estuarine and rivers of North Carolina.

This survey research was part of the North Carolina Coastal Plains Paddle Trails Initiative (NCCPPTI), a collaboration of North Carolina Sea Grant, N.C. Division of Parks and Recreation, and Partnership for the Sounds, with funding from Confluence Watersports Company. This project is an effort to enhance the development of a paddle trail network in the coastal plain waters of North Carolina. The driving force for this two-year project is to better understand the potential of nature-based ecotourism as a development option for rural coastal counties. The development and maintenance of access to North Carolina's coastal, natural and cultural resources — which equal any in the U.S. and abroad — plus marketing and promotion will enhance the rural economy and commitment to a healthy coastal ecosystem.

A. NCCPPTI Objectives

1. To develop a system of information dissemination that will provide background to the public related to existing water-based paddle trails and local infrastructure required for its support;
2. To determine what attracts paddlers to the waterways and the surrounding communities of coastal North Carolina and to determine the economic, environmental and quality-of-life impacts paddlers may have in the area;

3. To identify the local, state and federal government, nonprofit and forprofit stakeholders and identify potential partners to develop successful paddling trails and better understand their potential benefits and costs; and
4. To design and produce a working symposium that will evaluate existing and newly developed waterways materials, network operators and owners of infrastructure such as restaurants and lodging, and provide the opportunities to learn from experiences of other successful trail development initiatives.

B. Web-Based Paddle Trail Guide

During the past several years, the N.C. Division of Parks and Recreation, through its State Trails Program, has been assisting groups and organizations to develop canoe and kayak trails throughout eastern North Carolina. These groups have included local paddle groups, local recreation departments, local and regional nonprofit organizations, and other government agencies. These trails have been developed in cooperation with a variety of government agencies at the local, regional, state and federal levels.

By early 1999, more than 12 groups had developed 141 individual trails — totaling approximately 1,200 miles — in 23 eastern North Carolina counties, with assistance from the State Trails Program. Several other groups were developing an additional 800 to 1,000 miles of paddle trails. It was becoming apparent that there was an opportunity to develop an extensive system of paddle trails in eastern North Carolina that could total more than 3,000 miles. With such a considerable resource and with the potential to provide significant economic impacts in the local communities throughout eastern North Carolina, a consolidated effort was needed to begin marketing eastern North Carolina as a paddler's destination.

Through a partnership from previous projects, discussions had occurred among Andy Scott, a partner in Wilderness Systems Kayaks; Lundie Spence and Jack Thigpen, North Carolina Sea Grant; Sue Lintelman, Partnership for the Sounds; and Tom Potter, formerly with the State Trails Program, N.C. Division of Parks and Recreation, to determine how the paddle trails could be marketed in a more efficient manner. This exchange of information led to the development of the North Carolina Coastal Plains Paddle Trail Initiative. The above-mentioned groups developed a project description and objectives and submitted a project proposal to Andy

Zimmerman, then CEO of Confluence Watersports Co., for consideration of funding to support the initiative. After several meetings, Zimmerman agreed to fund the initiative.

II. COASTAL PADDLE TRAIL INITIATIVE PRODUCTS

NCCPPTI products proposed were:

- Development of a Web site of Existing Coastal Paddling Trails;
- Producing a Coastal Paddling Trails Guide;
- Survey of Paddlers' Needs (UNC-SG-01-06);
- Symposium (UNC-SG-Ol-08); and
- Research Proceedings (UNC-SG-Ol-O7)

A. Development of a Web-Based Inventory of Existing Paddling Trails on a Coast-Wide Basis

Paddle Trail Development Criteria

In North Carolina, all waterways are considered public trust waters, which means they can be used by anyone. The State Trails Program adopted criteria for the development of paddle trails on these public trust waters. The criteria included:

1) a request by the local government having jurisdiction to have the waterways designated as paddle trails;
2) management of the trail by an agency or organization;
3) description of ownership for access sites and other facilities that support the trail, such as camping, etc.;
4) description of the trail in relation to urban areas and population within a two-hour drive, including appropriate maps;
5) degree of difficulty in terms of physical exertion and skill required of the trail users;
6) trail length;
7) trail description, including rate of water movement, normal effects of winds, tides, distances between access sites or camping facilities, and identification of other groups who might use the trail, such as fishermen, barges, water skiers, etc., and approximate travel times between access sites or camping facilities;
8) description of vegetation and wildlife that occur along the trail;
9) description of surrounding land uses along the trail;

10) areas connected by the trail, such as recreation areas, wildlife preserves, general points of interest;
11) facilities available along the trail, such as potable water, picnic areas, bathroom facilities, camping, guides/tours, other services;
12) special features along the trail;
13) description of management plan for the trail;
14) description of any fees charged for use of the trail or trail facilities;
15) description of any major existing or potential problems and probable solutions; and
16) a published guide for the trail.

Inventory of Existing Paddle Trails

Through the State Trails Program, an inventory was conducted of all existing paddle trails that had met the designation requirements as local trails and that were included in the first round of the Web site and coastal trail guide. Maps of the existing trails were provided to the staff at the North Carolina Center for Geographic Information and Analysis (CGIA) to be converted into a digitized format that would be utilized on the Web site and trail guide. The maps included trail lengths, with mileage indicators along the trail, access sites, camping sites, and other information related to the trail.

To facilitate the inventory of the trails, the coastal plains was divided into eight regions. These regions roughly represented the river basins located within the coastal plains. A catalog number was assigned each trail, made up by the first two letters of the region name, the first two letters of the county in which the trail is located, and the sequential number of the trail located in each individual county. In cases where a trail was located in multiple regions or counties, the trail name contains the representative letters for each region and county. This would allow the trails to be identified by a specific number where by additional trails from each individual region could be added in a consecutive order.

Using GIS technology, existing trails were inventoried and designated on a digitized and Web accessible coastal map. The geographic area of this inventory was east of Interstate 95. Trail maps of existing paddle trails were supplied by the Trails Program to NCCPPTI coordinator Glenn Bailey, a NC State research assistant. Bailey was the liaison between the NCCPPTI and the CGIA GIS analyst who developed a digitized data layer of the paddle trails routes, access sites and other information. This information was used to develop an inventory

that made available to the public via a Web-based, clickable map that is hotlinked to infrastructure home pages, such as local chambers of commerce, commercial ventures, and cultural and environmental sites, as well as state and university Web sites.

This process, which created a Web-based inventory, can be used as a model on how other water trails can be promoted. The benefit is that interested paddlers or curious vacation planners from North Carolina or elsewhere can easily gain information about the paddling resources of the coastal plain. Visit the Web: http://ils.unc.edu/parkproject/nctrails.html.

B. Coastal Paddling Trails Guide

In addition to the Web site, a N.C. Coastal Plain Paddle Trails Guide was published for people who aren't Web users. The guide is also used to promote and introduce the Web site, to provide information for other print materials and management of the local paddling trails, and to market of the paddle trails system.

The Coastal Plain Paddle Trail Guide provides potential trail users information on existing paddle trails throughout eastern North Carolina. This information includes the trail number, name, difficulty rating, skill level required, access sites, length, and contact information for the managing agency. The guide also explains how the difficulty rating and skill level were determined.

Thirty-five thousand copies of the guide were published in the spring of 2001. The guide will be disseminated at the state's Welcome Centers located on interstates and other major roads in the state, chambers of commerce, travel and tourism bureaus, N.C. Division of Parks and Recreation, guides and outfitters, retail outlets and other places that are utilized by paddlers.

The Addition of Trails to the System

With the current system in place, additional paddle trails can be added as they are developed. Current plans are to contract with CGIA to digitize the new paddle trails for addition to the Web site. When the current supply of trail guides are depleted, the guide will be updated and reprinted. The newly formed North Carolina Paddle Trails Association will assist the N.C. Division of Parks and Recreation with the Web site.

The catalog numbering system will allow the addition of new trails to the system in a systematic manner. They can be added in sequential order to the region in which they are

developed. This should allow the Web site and trail guide to provide information to the users in a logical fashion.

III. SURVEY DEVELOPMENT

A. Description of Study Area

The state of North Carolina reports that currently more than 7 million people reside in the state. North Carolina ranks as the fifth highest in the country based on growth rate from 1995-2000. North Carolina's population is projected to reach 9.3 million by the year 2025.

The impact area consists of counties bordered by I-95 to the west and Virginia to the north and South Carolina to the south. (The impact area can be viewed at www.cgia.state.nc.us/tt/paddletrails.) Water trails flow along corridors of flat waters that are part of freshwater lakes, saltwater sounds, rivers, and estuaries. Vehicle parking, put-in and take-out areas are provided, and occasionally sleeping platforms have been built along the trail banks.

Twelve percent of North Carolina's population resides in the Southeast Partnership Region and the Global Transpark Partnership Region, and five percent reside in the Northeast Region. The projected growth in population is lower in all three regions than that of the entire state. The nonwhite population percentage is above the state average in all three regions. The percentage of the population in all three regions of the labor force is below that of the statewide average. The percentage of adults with a high school education matches the state average in the Southeast Region and the Global Transpark Partnership Region. However, the percentage of adults with a high school education in the Northeast Partnership Region is lower than the state average. The percentage of adults with a college education is lower in all three regions than the state overall. Manufacturing and wholesale/retail trades are the largest employment sectors in the eastern part of North Carolina. Government is a large employment sector in the Global Transpark Partnership Region. Agriculture, construction and services are the fastest-growing sectors in the regions. The average annual wages of the three regions are lower than statewide averages for all sectors (http://cmedis.commerce.state.nc.us/region/).

For the purpose of this study, the eastern part of the state was broken down into nine regions, based on river basins and county lines. The study area has five river basins containing approximately 1,189 miles of designated water trails. (The coastal plains paddling region can be viewed at the following Web site: http://ils.unc.edu/parkproject/nctrails.html.) The mean value of

water quality conditions from county level data range from a 1.7 to a 3.5 on a 6-point scale with the lower the value the better the water quality (U. S. Environmental Protection Agency, 2001).

Appendix A is a map of the nine study regions while Appendix B provides characteristics of the nine regions. Region 1 is made up of Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimons counties, covering approximately 1,200 square miles, 3,233 acres of which are State Park land (Appendix B). The region has 7.8 miles of water trails, with an average water quality of 1.7, and 9 maintained access points. There are approximately 18 lodging accommodations, 111 campsites (tent and trailer), and 101 food establishments. The population density, measured by people per square mile by the 1990 U.S. census, was 66. The 1999 economic impact of domestic tourism was $77.5 million.

Region 2 is made up Currituck and Dare counties covering approximately 633 square miles, 419 acres of which are state park land. Eighty-six miles of water trails are located in this region, with an average water quality of 2, and 7 maintained access points. There are approximately 97 lodging accommodations, 1,615 campsites (tent and trailer), and 222 food establishments. The population density measured by people per square mile by the 1990 U.S. census was 57. The 1999 economic impact of domestic tourism was $552 million.

Region 3 is made up Beaufort, Hyde, Tyrrell, and Washington counties, covering approximately 2,208 square miles. Thirteen and a half miles of water trails are located in this region, with an average water quality of 1.6, and 8 maintained access points. There are approximately 33 lodging accommodations, 793 campsites (tent and trailer), and 98 food establishments. The population density measured by people per square mile by the 1990 U.S. census, was 27. The 1999 economic impact of domestic tourism was $80 million.

Regions 4 and 5 are made up of Craven, Pamlico and Carteret counties, covering approximately 1,499 square miles, 654 acres of which are state park land. Three hundred ninety-seven miles of water trails are located in this region, with an average water quality of 1.5, and 10 maintained access points. There are approximately 72 lodging accommodations, 1,221 campsites accommodations (tent and trailer), and 307 food establishments. The population density measured by people per square mile by the 1990 US census, was 185. The 1999 economic impact of domestic tourism was $284 million.

Region 6 is made up Brunswick, New Hanover, Onslow, and Pender counties, covering approximately 2,609 square miles, 1,635 acres of which are state park land. Thirty miles of water

trails are located in this region, with an average water quality of 2.9, and 17 maintained access points. There are approximately 113 lodging accommodations, 1,537 campsites accommodations (tent and trailer), and 794 food establishments. The population density measured by people per square mile by the 1990 U.S. census, was 254. The 1999 economic impact of domestic tourism was $676 million.

Region 7 is made up Bladen, Columbus, Robeson, and Sampson counties, covering approximately 3,713 square miles. The region has 239 miles of water trails, with an average water quality of 3.5 and 12 maintained access points. There are approximately 59 lodging accommodations, 379 campsites accommodations (tent and trailer), and 303 food establishments. The population density measured by people per square mile by the 1990 U.S. census, was 62. The 1999 economic impact of domestic tourism was $166 million.

Region 8 is made up of Duplin, Greene, Jones, Lenoir, Wayne, and Wilson counties, covering approximately 2,871 square miles, and 893 acres being state park land. Twenty-six miles of water trails are located in this region, with an average water quality of 2.2, and nine maintained access points. There are approximately 49 lodging accommodations, 235 campsites accommodations (tent and trailer), and 423 food establishments. The population density measured by people per square mile by the 1990 US census was 106. The 1999 economic impact of domestic tourism was $219 million.

Region 9 is made up of Bertie, Edgecombe, Halifax, Martin, Northampton, and Pitt counties, covering approximately 4,002 square miles, 2,287 acres of which are state park land. Twenty miles of water trails are located in this region, with an average water quality of 3.35, and 20 maintained access points. There are approximately 49 lodging accommodations, 299 campsites accommodations (tent and trailer), and 425 food establishments. The population density measured by people per square mile by the 1990 U.S. census was 76. The 1999 economic impact of domestic tourism was $242 million.

B. Literature Review

Very few studies in recreation literature were found to directly focus on canoeing or kayaking, and none specifically on flat-water activities. Most related research has been performed in the context of "river recreation" or canoeing and kayaking in general. Actually, a few studies have focused on white water activities, obviously very different from the calm waters of slow-moving rivers, lakes and estuaries. The following paragraphs discuss what little research has been done, divided into separate topics.

Participation Rates

Cordell et al (1999) reported in the 1999 Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends that 7.0 percent (14.1 million) of Americans 16 years and older participate in canoeing and 1.3 percent (2.6 million) participate in kayaking. According to that same study, the mean number of trips per participant per year for canoeing was 2.8 and kayaking was 3.0. The total trips per year in the United States were 38.95 million and 8.02 million for canoeing and kayaking, respectively. The mean number of days per participant per year for canoeing was 5.3, leading to 74.6 million total days per year. The mean number of days per participant per year for kayaking was 7.3, leading to 19.3 million total days per year. The above canoeing figures were comparable to other boating activities such as sailing, floating/rafting, and jet skiing, but significantly trailed participation rates for water skiing and motor boating.

In another study involving outdoor recreation participation, Cordell, Lewis, and McDonald (1995) reported national participation rates according to age, income, and gender. The age group with the highest participation rate for both canoeing and kayaking from 1994 to 95 was 16-24, where 10.6 percent participated in canoeing and 1.3 percent in kayaking. The participation rates decrease slightly as age increases to 49 years, then drops sharply for people 50 years and older. The income group with the highest participation rate for canoeing was $50,000 to $75,000, in which 10.4 percent of the United States population in that category participated during 1994 to 95. Participation rates dropped slightly for higher income groups and more noticeably for lower income groups.

For kayaking, the income group with the highest participation rate was those who earn over $100,000 at 1.4 percent, with rates decreasing as income categories become lower. In terms of gender, males had higher participation rates than females for both canoeing and kayaking at

8.5 percent versus 4.9 percent for canoeing and 0.9 percent versus 0.5 percent for kayaking, respectively.

Trends

From the same 1999 Outdoor Recreation Assessment by Cordell et al, the authors state that "participants in canoeing and kayaking grew from estimated 2.6 million in 1960 to approximately 15 million in 1982-83. The estimated number of participants in 1994-95 was 17.5 million" (p.237). "Ninety-one percent of those reporting participation went canoeing, 20 percent went kayaking, and 11 percent went both canoeing and kayaking during 1994 to 95. The estimated percentage of 1994 to 95 participants who used their boats in white water was 21.1" (p. 237). Since 1994, however, overall canoeing participation rates have dropped 13.7 percent for those who participate more than once per year and are seven years old and older (National Sporting Goods Association, 1999).

In terms of future use, "the number of days spent canoeing is expected to increase about 30 percent more than the population growth through the year 2050" (Bowker, English, & Cordell, 1999 p.329). "Nationally, the number of primary-purpose canoeing trips is projected to increase by 29 percent over the same time period" (p. 329).

Participation in North Carolina

In the North Carolina Outdoor Recreation Plan 1995 to 2000, canoeing and kayaking were ranked as the 32nd most popular outdoor recreation activity, with 13 percent of households participating. It was ranked third among boating activities, behind power boating (26 percent) and water skiing (19 percent). There were 1,520,576 annual occasions of canoeing/kayaking by North Carolina households for a participation rate of 0.66, the average number of occasions per year. This rate was among the lowest of the recreation activities along with snow skiing, sail boating, and windsurfing — "all significant components of the state's commercial outdoor recreation industry" (P. II-23). The future demand and support for public funding for canoeing/kayaking in North Carolina, along with all other boating activities, was rated as low.

According to the 1998 North Carolina State Trail and Greenway Survey (Moore et al, 1998), 3.6 percent of North Carolinians sampled canoed during the 12 months prior to the survey, and 0.8 percent kayaked. The overall participation rate was 0.26 mean annual trips for canoeing and 0.09 mean annual trips for kayaking. From the same sample of North Carolinians, 37.3 percent were aware of the existence of designated water trails. Among all types of trails,

designated water trails were given the highest priority for future trail development with a mean of 3.5 on a 5-point scale where 1 indicated "very low priority" and 5 "very high priority."

Canoeing is a popular activity in all regions of North Carolina, although it is the most popular in the swift water of the mountains (N.C. Division of Parks and Recreation, 1995). "Eastern North Carolina has its share of popular rivers and streams, although these slower moving, flatter waters are attractive for different reasons" (p. V-23). "No attempt has been made to measure the total economic impact of North Carolina's rivers and streams on the state and local economies" (p. V-24).

User Characteristics

No user characteristics were found for North Carolina paddlers, specifically (Cole, Watson, and Roggenbuck, 1995). However, examined trends in wilderness visitors and visits to Boundary Waters Canoe Wilderness in northern Minnesota found that between the years of 1969 and 1991 the mean age of overnight visitors increased from 25 to 37, respectively.

The median household income of those visitors also increased from $31,500 to $43,000, both in 1990 dollars. In 1991, overnight visitors had attained a median of 16.4 years of education, 18 percent were currently students, 29 percent were female, and 35 percent belonged to conservation organizations. In terms of visits, 67 percent of overnight visitors in 1991 reported a trip frequency of at least once per year. The majority, 53 percent, visited with groups consisting of family members, and the mean number of other groups seen per day was reported as 4.1.

Valuation and Economic Impacts

No studies were found to directly estimate the recreation value of flat water canoeing and/or kayaking. A related study, however, was completed by Frymier and Mitchell (1997) who measured the value between users and nonusers of the White River in Vermont. The purpose was to compare the value of instream uses against stream diversion purposes such as snowmaking and hydropower.

A contingent valuation survey of 3,000 Vermont households was conducted to estimate the total economic value of maintaining the river in its free-flowing state. Results indicated that users of the White River spend a significant amount of money while enjoying the river — $33 million in nondurable goods and $2.5 million in durable goods per trip were attributed to recreation on the White River.

Users and nonusers were found to be willing to pay up to a combined estimate of $6.7 million per year to prevent a reduction in natural water flow, in terms of both use and nonuse values. The authors seem to believe these numbers emphasize that the White River, in its natural state, is valuable to Vermont residents and should be considered in future decision-making processes.

In another related study, Cordell, Bergstrom, Ashley, and Karish (1990) examined the economic effects of river recreation on local economies. Three separate rivers were selected for analysis, each representing a different type of recreation — a national wild and scenic river, a national recreation area, and a national river park. The total effects of recreational spending on economic growth were estimated using IMPLAN or the Input-Output Economic Impact Software (Johnson et al, 1989). The major categories of trip expenditures included lodging, transportation, food and beverages, and miscellaneous. The estimated mean expenditures per person per trip for each site ranged from $19.42 to $40.89 (1986 dollars). "The total gross output stimulated by recreational spending ranged from $2.57 million to $13.35 million. The total income generated by recreational spending ranged from $1.22 million to $5.58 million, and the total employment generated ranged from 60 to 292 jobs.

"Economic effects were largest for the National Wild and Scenic River site and smallest for the National River Park Site" (p.59). The authors point out how the study suggests that "protecting and managing rivers for outdoor recreation may provide a clean, economically viable means for enhancing local economic development, as well as for providing needed recreational opportunities to the nation" (p. 59).

A similar study utilizing IMPLAN by Douglas and Harpman (1994) estimated a jobs' impact of expenditures for recreation trips to the Lee's Ferry site on the Colorado River in the Glen Canyon Dam region of Arizona. Nonresident expenditures to the region generated an estimated 585 jobs, pointing to how the high positive jobs' impact outdoor recreation contributes to the economy.

In yet another related study, the N.C. Division of Community Assistance in 1982 conducted an economic impact assessment of the white water resource of the Nantahala River in western North Carolina. "The study concluded that the river businesses make a substantial and favorable economic impact on the region" (Fishback, 1982).

User Fees

Fees for public outdoor recreation have the potential to generate revenue as well as change the behavior of those who recreate (Richer and Christensen, 1999). When considering a user fee, the land manager faces the tradeoff between generating revenue through the user fee and preserving public access for all (Richer and Christensen, 1999). Legislation was enacted to collect fees in the late 1950s by the Title V, Independent Office Appropriations Act (Bowker, Codell & Johnson, 1999).

However, the collection of fees was not perceived as a major contributor to the revenue of land management agencies (Bowker, 1999). Another reason management has constituted a no-fee policy is that federal agencies have maintained the philosophy that lands for recreation should be available to all socioeconomic classes at no cost (Bowker et al, 1999).

Benefits of user fees include reducing overcrowding in congested areas and covering the full cost, which include operating cost and the cost of ecological damage (Richer and Christenesen, 1999). More (1999) considers the benefits of user fees to "1) recover costs and provide revenues to improve quality; 2) allocate recreation resources efficiently, relieving congestion and its effects by shifting use among sites; 3) stimulate the production of recreation opportunities by avoiding unfair competition with the private sector; 4) provide a comprehensive index of relative recreation preferences to facilitate resource allocation across programs; and 5) promote equity by shifting the burden of paying to those who actually use the resource."

Appropriate fees are those that take into consideration the benefits of generating revenue, maintaining access, fairness, equity, the users' ability to pay, and congestion (Richer and Christenesen, 1999). Fairness refers to the users' perceptions of right and wrong, and equity refers to who else is paying for the goods (Richer and Christenesen, 1999). Cordell (1995) hypothesized that the implementation of fees would not exclude low-income users' ability to pay due to the fact that the low-income users are already severely underrepresented in 13 out of 15 outdoor activities.

Studies on minority preferences and behavior have been involved in the recreation research since the 1960s (Bowker and Leeworthy, 1998). The ethnicity theory claims that the lower levels of minority participation in outdoor recreation is explained by subculture values about leisure. The marginal theory maintains that the lower level of use is due to structural barriers such as lack of discretionary funds, transportation, and information about the facilities

and resource. Bowker and Leeworthy (1998) found that there was a significant price response between whites and Hispanic user groups, which raises equity concerns of implementing user fees.

Opponents also argue that charging fees could be considered double taxation, with recreation consumers paying once through taxes and a second time through fees (Bowker, 1999). Public lands are shared by the entire population and benefit a broad range of individuals. Managing and protecting such areas should be borne by all through the general tax revenues (Richer and Christensen, 1999).

Proponents of user fees make the case that while the nonuser benefits from the existence of the resource, the user receives a disproportionate benefit and should therefore bear a greater share of the cost in providing the recreational resource (Bowker, 1999).

Exclusionary pricing may be more of an issue in urban areas. However, in resource-based recreation, low-income groups are already subject to high travel and equipment cost, prohibiting the use of the resource (More and Stevens, 2000).

Since everyone must make choices about how they spend their money, it may not be surprising that lower-income groups do not make resource-based recreation a high priority (More and Stevens, 2000). More and Stevens estimate "that a $5 daily fee for the use of public lands will significantly impact about 49% of low-income people." Bowker (1999) found receptiveness by the general public for recreation fees. Ninety-five percent of the sample supported either user fees or an arrangement of user fees and taxes to fund at least one recreation service on public lands.

C. DATA COLLECTION

Sampling

The study was designed to determine what attracts paddlers to eastern North Carolina, determine what infrastructure is desired by the users to make their trail outings more enjoyable, and measure their economic impacts on the coastal plains. The population was defined as individuals who have paddled (kayaked or canoed) in the N.C. coastal plains (east of Interstate 95) within the last year.

Survey Administration

Relative to powerboats, which are registered in North Carolina, nonmotorized floating craft are not registered, making it difficult to contact canoeists and kayakers. As an alternative, a one-page letter describing the research objectives and purposes of the paddling study was sent to potential survey respondents asking them to complete the enclosed postage-paid postcards with their names and addresses (Appendix C, D). Three methods were used to solicit respondents. First, the one-page letter was sent to approximately 600 individuals whose names appeared on a mailing list requesting information about coastal paddling from resource development and state park sources.

Second, 11 commercial paddling businesses geographically dispersed throughout North Carolina, one outlet in Tidewater, Va., and one outlet in Charleston, S.C., were contacted and they agreed to cooperate by sending a one-page cover letter to customers on their mailing lists. Finally, the sampling process was supplemented by posting the project description and request for survey participants on paddle clubs, associations, outfitters and other e-mail list servers in North and South Carolina and Virginia. Postcards were sent out, and 601 individuals who went canoeing and kayaking during 2000 agreed to participate in the survey.

Next, a modified Dillman mail survey methodology was followed with each potential respondent receiving a packet containing a cover letter, a survey instrument and a postage-paid envelope (Appendix E). Nonrespondents were encouraged to respond with follow-up postcard reminders and additional survey packets. Using a random start, each individual received one of four different versions of the questionnaire. The four versions reflected the different dollar values associated with the hypothetical campsite fee and annual fee questions.

D. SURVEY RESULTS

Profile of paddlers

Respondents' mean age was 46.62 years. They had a mean annual income of $76,570 and a mean workweek of 37.85 hours. On average, respondents took 10.45 (SD = 16.32) trips per year.

Paddler Preferences – what do they want?

Table 1
Community and Environmental Attributes that Attract NC Coastal Paddlers

When I paddle I...	Agree*	Neutral	Disagree
Want to paddle in unpolluted waters	99.4	0.4	0.2
Like to hear the sounds of nature	99	1	0
Want to breathe fresh air	98.5	1.5	0
Want to see wild animals	98.5	1	0.4
Want to see birds	98.3	1.7	0
Like being away from the city	94.8	4.8	0.4
Like to find out about the local history	82.2	15.9	1.9
Like to get the feel of local culture	75.1	20.9	4
Like to eat at local cafes and restaurants	69.9	19.2	10.8
Like to meet the locals	61.1	32.2	6.4
Like to stay at local campgrounds	52.4	31.4	16.1
Want to catch fish	41.2	38.1	20.7
Like to look for local arts and crafts to buy	37.7	35.6	26.7

* Responses recorded on a 5 point scale (Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree) were aggregated into a 3 point scale for this table.

Table 2
Sources that May Repel NC Coastal Paddlers

When I paddle I...	Agree*	Neutral	Disagree
Can't find a decent meal	3.6	15.3	81.1
Do not want to eat local food	3.8	17.5	79.2
Am leery of sleeping at a local motel	5.5	16.4	78.1
Feel that locals often stare at me	6.9	17.2	75.9
Worry about my safety	11.6	21	67.4
Fear that locals may hassle me	14.9	31.8	53.4
Am a long way from medical care	23.8	32.1	44.7
Worry about my car getting broken into	52.2	26	21.8

* Responses recorded on a 5 point scale (Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree) were aggregated into a 3 point scale for this table.

Paddling Behavior

Viewing the map of nine paddling areas in eastern North Carolina (Appendix A), water trail users took, on average, the most trips during the past year to the Southern Coast (7.69), Outer Banks (5.23), Cape Fear (5.11), and Lower Neuse (4.92) paddling areas. Canoe and kayakers in our sample took, on average, 6.52 trips to other rivers (Table 3).

One-way miles, on average, traveled by canoe and kayakers in our sample ranged from a high of 131 miles to the Outer Banks to a low of 40 miles to the Upper Neuse (Table 3).

There was little variation in group sizes. On average, groups varied in their sizes from five persons for Albemarle, Pamlico Peninsula, Lower Neuse, and Cape Fear to at least three persons for the Outer Banks, and the Roanoke and Tar rivers (Table 3).

Table 3
Number of Annual Paddling Trips, Miles Traveled, and Group Size

M = Average (Arithmetic Mean)
95% CI = 95% Confident Interval (see notes)
n = Number of Observations
Responses for the Last Trip to a Paddling Area

Paddling Area	Annual Trips				Miles Traveled (one-way)				Group Size			
	M	95% CI		n	M	95% CI		n	M	95% CI		n
Albemarle	3.98	3.63	4.36	115	104	86	117	106	5.05	4.03	6.07	111
Outer Banks	5.23	4.87	5.61	155	131	108	150	142	3.45	2.94	3.97	151
Pamlico Peninsula	4.32	3.94	4.73	110	82	68	95	100	5.29	2.99	7.59	104
Lower Neuse	4.92	4.44	5.43	79	60	40	74	72	5.06	2.52	7.60	77
Carteret	4.44	4.10	4.79	150	101	89	114	142	3.89	3.15	4.63	147
Southern Coast	7.69	7.27	8.13	162	92	76	106	149	4.23	3.27	5.19	156
Cape Fear	5.11	4.65	5.60	89	64	53	74	84	5.44	4.39	6.48	84
Upper Neuse	3.51	2.97	4.11	43	40	29	51	42	4.06	2.75	5.38	43
Roanoke and Tar	4.78	4.13	5.49	41	58	35	80	39	3.94	2.76	5.10	39
Other Rivers	6.52	5.75	7.36	40	65	43	83	36	6.10	3.44	8.76	39

Note: 95% Confidence Interval implies that we were 95% confident that the average or arithmetic mean fell within the interval.
For example, the average trips for Albemarle was 3.98, and we are 95% confident that the sample mean was between 3.63 trips and 4.36 trips.

Primary Trip Purposes

Not surprising, the largest percentage of canoe and kayakers in the sample took trips for the primary purpose of paddling (Table 4).

Thirty-five percent of the paddlers visiting the Outer Banks were on vacation, while between 3% and 6% of the respondents noted that the primary purpose of their trips was to visit friends and relatives.

Table 4
Primary Purposes of Last Trips to Paddling Areas

		Primary Purposes of Last Trips			
Paddling Areas	**Obs.**	**Paddling Only**	**Part of Vacation**	**Visit Friends or Relatives**	**Part of Work-Related Trips**
Albemarle	**110**	**74.55%**	**17.27%**	**3.64%**	**4.55%**
Outer Banks	**151**	**55.63%**	**35.76%**	**3.97%**	**4.64%**
Pamlico	**104**	**80.77%**	**15.38%**	**3.85%**	**--**
Peninsula					
Lower Neuse	**81**	**83.95%**	**9.88%**	**4.94%**	**1.23%**
Carteret	**148**	**72.30%**	**21.62%**	**3.38%**	**2.70%**
Southern Coast	**158**	**67.09%**	**23.42%**	**6.96%**	**2.53%**
Cape Fear	**83**	**86.75%**	**9.64%**	**2.41%**	**1.20%**
Upper Neuse	**44**	**86.36%**	**4.55%**	**4.55%**	**4.55%**
Roanoke and	**38**	**86.84%**	**5.26%**	**5.26%**	**2.63%**
Tar					
Other Rivers	**40**	**87.50%**	**5.00%**	**5.00%**	**2.50%**

Days Spent Paddling

The average (mean) numbers of days spent paddling was consistent across paddling areas (Table 5). The number of days ranged from a high of 2.38 days for the Southern Coast to a low of 1.37 days for the Upper Neuse.

Table 5
Average Days Spent Paddling Per Trip by Areas in Eastern North Carolina

Paddling Areas	Days Spent in Each Area			
	Mean Value	95% Confidence Interval		Obs.
Albemarle	2.11	1.51	2.7	111
Outer Banks	2.04	1.73	2.35	147
Pamlico Peninsula	1.89	1.11	2.68	104
Lower Neuse	1.43	1.18	1.68	80
Carteret	2.16	1.85	2.47	145
Southern Coast	2.38	2.01	2.74	158
Cape Fear	1.92	1.47	2.38	85
Upper Neuse	1.37	1.09	1.64	43
Roanoke and Tar	1.84	1.01	2.66	41
Other Rivers	1.68	1.2	2.16	38

Note: The 95% Confidence Interval estimates that 95 times out of 100 the average (Arithmetic Mean) of days spent paddling fell within the specified interval.

For example, 95% of the time the average or sample mean number of paddling days per trip in Albemarle was between 1.51 and 2.70 days.

Opinions about Management Actions

If paddlers had their choices, 47% would appoint a statewide paddle trail association to manage the network of water trails in North Carolina. Only 2% would expect local governments to manage the network of trails (Table 6).

Table 6
If You Had the Opportunity to Appoint ONE Organization to Manage the Network of Paddle Trails in North Carolina, Which Organization Would That Be?

Organization		Frequency
Statewide paddle trail association	47%	222
Statewide user group member association	9%	43
Statewide nonprofit member organization	19%	89
Local government	2%	7
State government	20%	94
Other	3%	14

Note: The standard error, a measure of sampling error, is plus or minus 2.56%. Reported percentages, 68 times out of 100, will vary plus or minus 2.56%.

Approximately, 66% of the respondents felt that state government should pay for the upkeep and operation of paddle trails in North Carolina, as compared with 32% who felt that a statewide paddle trail association should pay for upkeep and operations (Table 7). Twenty-four percent of the respondents favored a pay-as-go-system to maintain water trails.

Table 7
Which Organization(s) Should Pay for the Upkeep and Operation of Paddle Trails in North Carolina? (N = 466)

Organization	Mean	95% Confidence Interval	
Statewide paddle trail association	32%	28%	36%
Statewide user group member association	15%	12%	18%
Statewide nonprofit member organization	18%	15%	22%
Statewide Paddle Craft Registration System with Fees	13%	10%	16%
Local Government	25%	21%	29%
State Government	66%	61%	70%
Pay-As-Go System	24%	20%	28%

Note: Column percentages do not sum to 100% due to rounding errors and other suggestions regarding managing organizations.

Respondents felt that user fees (36%) were the best way to manage future access to paddle trails (Table 8). Paddle trail permits (30%) and camping fees (30%) were the next preferred methods to manage future access to paddle trails.

Table 8
By Which of the Following Methods Could Officials Best Manage Future Access to the Paddle Trails? (N = 466)

Alternative Pricing Strategies	Mean	95% Confidence Interval	
User fees	36%	32%	41%
Parking area permits	20%	16%	24%
Paddle trail permits	30%	26%	34%
Camping fees	30%	19%	27%
Use of free reservations	23%	8%	13%
Paddle Craft Decal with reservations	10%	21%	30%
User group member association	25%	11%	17%

Note: Column percentages do not sum to 100% due to rounding errors and other suggestions regarding alternative pricing strategies not included in the table.

When asked about the conditions of the paddle trails last used, the majority of respondents supported developing additional paddle trails (85%), developing additional access site (84%), developing separate access sites from power boats (65%), providing more signs, maps for paddle trails (84%), and providing more information about local amenities and services (69%) (Table 9). Respondents opposed limiting access to a certain number of paddlers per day (65%) as a management alternative to maintain water trail conditions.

Table 9
Given the Conditions at the Paddle Trail That You Last Used, to What Degree Would You Support or Oppose Each of the Following Management Alternatives?

Management Alternative	Oppose	Support	Undecided
Develop additional paddle trails	4% (20)	85% (406)	10% (49)
Develop additional access sites	7% (34)	84% (406)	9% (41)
Develop separate access sites from power boats	12% (58)	65% (304)	22% (105)
Limit access to a certain number of paddlers per day	65% (304)	9% (42)	26% (119)
Provide more signs, maps, and brochures for paddle trails	6% (27)	84% (405)	10% (49)
Provide more information about local services, restaurants, lodging guides, outfitters, and emergency services	8% (37)	69% (327)	23% (107)

Note: Column percentages do not sum to 100% due to rounding errors. Standard errors, a measure of sampling error, for all responses to the questions above were less than ± 2%. For example, the 4% responses opposed to developing additional paddle trails would be between 2% and 6%, 68 times out of 100.

Table 10 lists alternative annual user fee options ($5, $25, and $50) and paddle trail users opposition and support for the alternative fees. Eighty-eight percent of the sample would support a $5 annual fee, while only 55% would support a $25 annual fee, and 29% would support a $50 annual fee (Table 10). As expected, paddlers would take increasing more trips if they were willing to pay the increase in annual fees.

Table 10
Annual User Fee Options

Options

Suppose there is an annual user fee of *$5* for a permit to access the paddle trails. User fees would provide more signs, maps, and brochures, as well as more information about local services, restaurants, lodging, guides, outfitters, and emergency services.	**Yes**	**No**
	88%	12%
Would you purchase a $5 annual access permit?	(426)	(60)

If yes, how many trips would you take during the next 12 months to the paddle trail?	**More**	**Fewer**	**Same**
	19%	--	81%

Then each respondent was asked either the $25 option or the $50 option permit price.

$25 Option

Now, suppose there is an annual user fee of *$25* for a permit to access the paddle trails. In addition to more information to paddlers, the additional money from permits would develop additional paddle trails, additional access sites, and separate access site from power boats. *Would you purchase a $25 annual access permit?*	**Yes**	**No**
	55%	45%
	(136)	(113)

If yes, how many trips would you take during the next 12 months to the paddle trail?	**More**	**Fewer**	**Same**
	28%	1%	71%

$50 Option

Now, suppose there is an annual user fee of *$50* for a permit to access the paddle trails. In addition to more information to paddlers, the additional money from permits would develop additional paddle trails, additional access sites, and separate access site from power boats. *Would you purchase a $50 annual access permit?*	**Yes**	**No**
	29%	71%
	(67)	(163)

If yes, how many trips would you take during the next 12 months to the paddle trail?	**More**	**Fewer**	**Same**
	38%	1%	60%

Note: All the respondents were given the $5 fee option. Approximately one-half of the respondents received the $25 permit offer and the other half the $50 permit offer.

Seventy-nine percent of the sample supports construction of overnight campsites along the paddle trails (Table 11). The majority for canoeing (52%) and kayaking (47%) preferred to paddle on the waterway a distance of 6 to 10 miles between overnight campsites.

Table 11
Support of the Construction of Overnight Camping Sites Along the Waterways

			Support		Oppose
Percent of respondents who support or oppose construction of overnight campsites			79% (383)		21% (100)
	Distances are in miles				
If support, then	5 or less	6 to 10	11 to 15	16 plus	Undecided
What would be the ideal distance between access point and an overnight campsite when *canoeing*, if you had a choice?	19%	52%	19%	3%	7%
What would be the ideal distance between access point and an overnight campsite when *kayaking*, if you had a choice?	17%	47%	24%	5%	6%

Notes: Row percentages may not sum to 100% due to rounding errors. Standard errors were all less than ±2%, 68 times out of 100.

The last set of questions concerned management actions regarding varying sizes of camping sites and different camping fees. There was only a slight variation in the future number of trips paddlers would take if the camping fees were to increase.

When paying from $5 to $15 for campsites of large groups of 13 or more people, only 1% of the paddlers would not take the same number of trips (Table 12).

When paying from $7 to $17 for campsites of from nine to 12 people, 5% of the paddlers would not take the same number of trips, with 31% taking fewer trips at the $17 fee when compared to 16% taking fewer trips at the $7 fee (Table 12).

When paying from $10 to $20 for small group campsites of three to eight people, 8% would not take the same number of future trips with 31% taking fewer trips at $20 compared with 12% at $10 fee (Table 12).

Considering individual campsites from $15 to $25 per night, 52% would take the same number of trips at the $15 fee while only 33% would take the same number of future trips at the $25 fee.

Table 12
Alternative Campsite Fee Options and Campsite Scenarios

Scenarios	Future Number of Trips More	Fewer	Same
Consider a camping area with cluster of camping sites for large groups of 13 or more people.			
Suppose the daily camping fee is *$5*. How many overnight trips would you take to this type of site in the area of your last paddling trip during the next 12 months?	21%	18%	61%
Suppose the daily camping fee is *$15*. How many overnight trips would you take to this type of site in the area of your last paddling trip during the next 12 months?	14%	26%	60%
Consider a camping area with clusters of camping sites for medium groups of 9 to 12 people.			
Suppose the daily camping fee is *$7*. How many overnight trips would you take to this type of site during the next 12 months?	19%	16%	64%
Suppose the daily camping fee is *$17*. How many overnight trips would you take to this type of site during the next 12 months?	10%	31%	59%
Consider a camping area with cluster of camping sites for small groups of 3 to 8 people.			
Suppose the daily camping fee is *$10*. How many overnight trips would you take to this type of site during the next 12 months?	28%	12%	60%
Suppose the daily camping fee is *$20*. How many overnight trips would you take to this type of site during the next 12 months?	16%	31%	52%
Consider an individual camping site.			
Suppose the daily camping fee is $15 per day. How many overnight trips would you take to this type of site during the next 12 months?	21%	27%	52%
Suppose the daily camping fee is $25 per day. How many overnight trips would you take to this type of site during the next 12 months?	16%	51%	33%

Note: Row percentages may not sum to 100% due to rounding errors. One-half of the survey respondents were randomly given the low ($5, $7, $10, and $15) campsite fees for the varying size campsites and the remaining one-half of the respondents were given the higher ($15, $17, $20, and $25) campsite fee options.

Expenses per Paddler per Trip

Expenses by respondents for lodging, restaurant meals, food, ice, beverages, gasoline and auto care, other retail purchases, boat rentals and access fees, guides or outfitters, and equipment purchases are reported in Table 13.

Expenses were listed by per paddler per trip. Expenses included the actual expenditure of money. Expenses did not incorporate zero values by respondents. For example, those respondents who reported not spending money on lodging were not included in the average expenses for lodging. Also, as paddlers traveled through the different paddling areas spending money, those expenses were incorporated into the average expenses for each paddling area. Note: the expenses are averages based on the number of observations in that cell. Therefore, the total expense does not equal the sum of the averages.

The highest average lodging expense per paddler was $99.53 per trip at the Southern Coast area (Table 13). The highest average expenses per paddler for restaurant meals ($28.13), food and beverages ($13.89), other retail purchases ($26.80), boat rentals and access fees ($16.21) per trip were also at the Southern Coast. The highest equipment expense per paddler per trip was $281.66 in the Neuse area. Equipment purchases, unlike the other consumable expenses, is not consumed at one time. Rather, its use can be apportioned to future trips.

Overall, the highest average expenses per paddler per trip were $140.77 in the Southern Coast and $128.30 in the Carteret paddling area (Table 13). The average total expense per paddler per trip was $83.42 for all the areas.

Table 13

If respondents made expenditures in the categories below, on average how much money did respondents spend on items in those categories? All dollar values are per paddler per trip.

Cell: Average[a] (Standard Error) [Paddlers]	Paddling Areas in Eastern North Carolina (See Notes Below)							
Expense Categories	**All Areas**	**Albemarle**	**Outer Banks**	**Roanoke and Tar**	**Neuse**	**Carteret**	**Southern Coast**	**Cape Fear**
Lodging	$49.55	$19.18	$32.93	$18.01	$62.89	$74.15	$99.53	$16.50
	($2.82)	($3.00)	($3.13)	($3.80)	($13.37)	($7.71)	($7.71)	($2.73)
	[842]	[108]	[467]	[82]	[19]	[120]	[125]	[16]
Restaurant meals	$19.74	$13.41	$15.90	$3.49	$9.23	$19.96	$28.13	$9.45
	($1.00)	($1.49)	($1.45)	($0.48)	($2.48)	($1.45)	($2.11)	($1.26)
	[1402]	[155]	[547]	[469]	[149]	[273]	[261]	[117]
Food, ice, beverages	$10.95	$4.73	$7.09	$5.35	$7.51	$13.47	$13.89	$5.82
	($0.49)	($0.37)	($6.46)	($0.42)	($2.13)	($1.37)	($1.12)	($0.54)
	[1455]	[266]	[546]	[222]	[99]	[281]	[287]	[190]
Gasoline, oil, auto repairs	$9.37	$4.89	$6.32	$3.02	$6.76	$10.96	$9.17	$6.67
	($0.42)	($0.32)	($0.54)	($0.27)	($0.72)	($0.86)	($0.73)	($0.71)
	[1648]	[276]	[628]	[599]	[133]	[290]	[312]	[206]
Other retail purchases	$15.78	$9.37	$10.97	$10.86	$14.83	$22.56	$26.80	$5.54
	($1.23)	($1.77)	($1.31)	($2.45)	($3.52)	($3.19)	($2.62)	($0.66)
	[749]	[56]	[421]	[37]	[31]	[137]	[92]	[46]
Boat rental, access fees	$6.56	$5.24	$3.10	$8.07	$10.00	$16.17	$16.21	$16.25
	($0.43)	($0.45)	($0.39)	($1.38)	($7.50)	($2.26)	($1.65)	($2.64)
	[627]	[86]	[366]	[42]	[5]	[56]	[56]	[20]
Guides or outfitters	$39.75	$7.50	$117.14	$10.87	--	$105.00	$25.93	--
	($11.25)	--	($60.20)	($4.72)	--	($27.83)	($10.45)	--
	[52]	[2]	[7]	[8]	--	[3]	[32]	--
Equipment purchase	$153.44	$73.23	$101.74	$111.52	$281.66	$129.42	$209.27	$174.57
	($13.58)	($4.75)	($27.41)	($41.33)	($96.62)	($38.57)	($30.04)	($17.36)
	[250]	[39]	[39]	[21]	[12]	[52]	[62]	[35]
Total expenses	$83.42	$44.25	$158.08	$45.84	$84.48	$128.30	$140.77	$42.11
	($3.83)	($66.36)	($187.54)	($87.25)	($198.47)	($220.25)	($218.99)	($58.94)
	[1884]	[63]	[97]	[78]	[48]	[87]	[105]	[52]

[a] Given the small sample sizes ($n < 30$) in some cells, the contents should be interpreted with caution by readers. Note: *Respondents when round-trip traveling to destination areas may have spent money in one or more areas.* This was why expenses were per paddler per trip *and not per day*. We simply did not know how visitors allocated there round-trip travel days among paddling areas. To compute averages, total expenses by each respondent's traveling group were divided by the number of paddlers in that group. This value was the expenses per paddler per traveling party per trip. When summed, the expenses were weighted by the number of paddler per traveling group to arrive at the expenses per paddler per trip.

Standard errors represented the amount of dispersion around each average or mean value. For example, 68 times out of 100 the average expenses for lodging was $49.55 per paddler per trip plus or minus $2.82.

Expenses in Table 14 include the zero dollars spent for consumable and nonconsumable expense items. The zero values were average with the dollar expenses by respondents.

On average, respondents spent a high of $120.58 per paddler per trip for lodging at the Southern Coast to a low of $25.81 per paddler per trip in the Neuse (Table 14).

Table 14
Expenses per Paddler per Last Trip by Trip Destination
(Estimates Include Zero Trip Expenditures)

Last Trip Destinations to Paddling Areas	Average or Arithmetic Mean Trip Expense	95% Confidence Interval		Paddlers
Albemarle	$34.20	$27.05	$41.02	218
Outer Banks	$58.88	$49.03	$68.72	577
Roanoke and Tar	$26.63	$17.29	$35.96	222
Neuse	$25.81	$10.72	$40.90	200
Carteret	$103.89	$80.92	$126.85	270
Southern Coast	$120.58	$99.44	$141.72	337
Cape Fear	$50.19	$38.42	$61.96	194
All Destinations	$77.88	$70.80	$84.96	2018

[a] Confidence intervals imply that 95 times out of 100 the sample arithmetic mean was within the interval. For example, the on average total expenses per trip per paddler for the Albemarle paddling area was $34.20. We were 95% confident that the sample's average expenses for Albemarle were between $27.05 and $41.02 per paddler during their last trips. The amount of dispersion in trip expenses around the average or mean was attributable in part to the fact that many respondents reported zero dollar trip expenses.

Note: Trip expenses were listed by paddler per trip, and the data included those trips where respondents reported spending zero dollar amounts on their last paddling trips. Total expenses included lodging, restaurant meals, gasoline, oil, auto repairs, food, ice, beverages, other retail purchases, boat rentals, access fees, guide or outfitter services, and expenditures for canoes, kayaks, or equipment purchases.

Table 15 displays average expenses per paddler per trip by local paddlers and tourists. Local paddlers live within one of the paddling areas.

Tourists live outside the seven paddling regions. On average tourists outspent local paddlers by two to one, $33.87 per local and $62.06 per tourist, respectively (Table 15).

Table 15
Mean Total Expenditures Per Paddler Per Trip if Made Locally and by Tourists

Region	Money Spent By Local Paddlers Per Trip		Money Spent By Tourists Per Trip	
	Mean (Freq.)	Standard Error[a]	Mean (Freq.)	Standard Error
Albemarle	$20.45 (83)	$2.65	$40.86 (218)	$4.07
Outer Banks	$12.79 (144)	$2.56	$76.08 (534)	$5.96
Roanoke and Tar	$5.67 (337)	$2.74	$26.23 (281)	$2.84
Neuse	$24.68 (64)	$18.68	$37.49 (174)	$7.27
Carteret	$26.30 (23)	$6.42	$104.10 (305)	$10.52
Southern Coast	$90.27 (93)	$26.17	$131.34 (270)	$10.33
Cape Fear	$76.60 (73)	$12.71	$30.18 (164)	$3.99
All paddling areas	$46.57 (1,225)	$3.85	$126.25 (793)	$6.64
Per paddler per day for all areas	$33.87 (1,146)	$3.13	$62.06 (779)	$3.91

[a] Standard errors are measures of variations for the arithmetic mean. For example, 68 times out of 100 the mean amount of money spent by Albemarle local paddlers was $20.45, ± $2.65, per trip. Cell having large standard errors should be treated with caution.

Notes: Total expenses included lodging, restaurant meals, gasoline, oil, auto repairs, food, ice, beverages, other retail purchases, boat rentals, access fees, guide or outfitter services, and expenditures for canoes, kayaks, or equipment purchases. Numbers in parentheses were the number of paddlers. For each observation, they divided the expenses among the number of paddlers in that traveling party. Then, the expenditures per paddler per traveling group per trip were weighted by the number of paddlers in each group to get mean values.

Expenses per Party per Night

Table 16 was prepared for economic impact analysis. Expenses were segmented by local paddlers who spent money for lodging (Motel-IN), local paddlers who spent zero dollars for lodging, tourists who spent money for lodging (Motel-OUT), and overnight tourists who evidently stayed with friends, family, or indicated zero expenses for lodging. Group expenses were divided by the number of days spent paddling. No attempt was made to further segment paddlers.

Expenses per party night are also reported by the primary purposes of last trips. Approximately, 77.8% of the parties' trip purposes were primarily for paddling. The primary purposes of the last trips for the remaining 22.2% of the sample were for vacations, visiting friends and relatives, or part of a business trip.

Overall, excluding groups with other purposes, those groups that primarily went paddling (77.8%) spent less money for lodging, restaurant meals, gas and auto care than did the total group or respondents. Locals on average tended to spend more per party night on lodging and restaurant meals than did tourists.

Table 16
Average (Mean) Party Night Expenditures by Locals and Tourists from Inside and Outside the Seven Paddling Areas for Respondents' Last Trips

	Money Spent By Locals[a]		Money Spent By Tourists	
	Motel-IN	Local Paddlers	Motel-OUT	Overnight Tourists
Expense Categories	(n = 33)	(n = 203)	(n = 114)	(n=141)
Lodging	$160.96	$0.00	$145.84	$0.00
Restaurant meals	$85.55	$11.81	$63.95	$14.98
Food, ice, beverages	$44.15	$9.83	$30.19	$9.38
Gasoline, oil, auto repairs	$56.22	$12.52	$25.07	$12.01
Other retail purchases	$44.97	$6.77	$21.15	$4.56
Boat rental, access fees	$19.85	$4.62	$5.38	$3.80
Guides or outfitters	$0.00	$2.64	$4.35	$.10
Equipment purchase	$6.92	$73.61	$22.71	$35.18
	Primary Purpose of Last Trip Was Paddling (77.8%)			
	(n = 19)	(n = 191)	(n = 62)	(n = 110)
Lodging	$128.09	$0.00	$62.91	$0.00
Restaurant meals	$79.55	$11.51	$42.06	$7.22
Food, ice, beverages	$63.59	$12.30	$20.96	$10.32
Gasoline, oil, auto repairs	$46.74	$9.87	$16.52	$6.48
Other retail purchases	$50.48	$6.55	$11.85	$2.55
Boat rental, access fees	$9.47	$4.60	$5.96	$1.61
Guides or outfitters	$0.00	$2.81	$7.20	$0.14
Equipment purchase	$6.76	$73.33	$35.38	$32.91

[a] Locals are parties of paddlers who live within the seven paddling areas. *Notes.* Numbers in parentheses were the number of paddling groups (parties). For each observation, appropriate expense per paddling group (party) was divided by the number of days in the paddling areas. There were four segments: those paddlers who paid for lodging inside the paddling areas (Motel - IN), local paddlers, tourist from outside the paddling areas who reported paying for their lodging (Motel - OUT), and overnight paddlers who did not spend money for lodging.

IV. PADDLING USE AND ECONOMIC IMPACTS

The level of industry services demanded by visitors at vacation areas and the quality of services are important to analysts and decision makers in understanding their travel behaviors and in estimating economic impacts (Stynes, Prost, Chang, and Sun, 2000; and Lieber, Fesenmaier, & Bristow, 1989).

Economic impact is determined by the structure of the local economy and the amount and type of spending. This section will focus on estimates of on-site days and a means to separate the direct and indirect economic contributions made to a local economy by visitors (English, Kriesel, Leeworthy, & Wiley, 1996). An overview of the recreation demand theory is found in Appendix F.

The popularity of economic impact studies is evident by the number of applications listed in the Park Service's Money Generation Model 2 (Stynes et al, 2000.). For example, using a combination of primary data from a survey of businesses and the U.S. Forest Services IMPLAN system, analysts estimated the contributions to local incomes from tourists' spending and found the process to be less expensive than building a primary input-output data model (Johnson, Obermiller, & Radtke, 1989).

In the absence of total visitation counts to a recreation area from devices like traffic counters or the issuance of permits or site passes, modelers find themselves having to specify travel cost models. Early applications of pooled (single-site) recreation demand models for nature-based trips include the Boundary Water Canoe Area Wilderness, a multiple site regional area (Walsh, Peterson, & McKean, 1989; Peterson, Stynes, & Arnold, 1985; Peterson, Anderson, & Lime, 1982).

But the primary purpose of a travel cost model is to estimate recreation demand for site trips, and then consumer surplus — the dollar amount above the average travel cost (Fletcher, Adamowicz, & Graham-Tomasi, 1990). The travel cost reflects the round-trip distance by a visitor from an origin, usually a primary residence, to a destination site times a mileage charge plus an access fee, if applicable. When observed through site surveys, the monetary trip outlays by visitors are separable into trip expenses for lodging and the like.

The pivotal assumption in the travel cost method is that the closer the proximity of visitors' residences to a recreation site, the more inclined they are to visit closer sites and at lower travel costs. What differentiates the recreation expenditure method from the traditional travel cost method is that visitors choose the number of vacation trips and on-site days. The daily trip expense is the primary determinant of the demand for days (Bell & Leeworthy, 1990; Parsons & Wilson, 1997; Kerkvliet & Nowell, 1999; Siderelis & Gustke, 2000).

The on-site term comes from the economic literature and refers to the days spent in a particular regional recreation area, park, or facility. That single site may be the primary trip destination in a region or a side trip on an itinerary. Trips to a single site are also to an economic impact region where that site is located. Visitors may spend the entire trip budget or a portion in the economic impact region (English et al., 1996). In an economic analysis, the amount of money spent is attributed to that economic region and not to the destination site— even though the destination site is the primary attraction.

A. Use Area

An economic impact modeler, in apportioning the sales and income from participants to a local economy, must define a use area that encompasses the local impact region. When estimating the potential participant size of a use area, the modeler wants to make sure that the use area is large enough to ensure a nonzero share of site use to be outside the local impact region. The U.S. Army Corps of Engineers, for example, defines a reservoir use area by a radius that is the one-way distances 95% of the respondents reported traveling from their permanent addresses to the reservoir (Loomis & Walsh, 1997).

B. Local Impact Region

Defining a local economic impact region in a nature-based application can be somewhat problematic. A local impact region is dependent on how the modeler draws a geographic

boundary around the area immediately surrounding a nature-based site or a multi-site area of interest, thereby defining a local impact region (Loomis & Walsh, 1997). The participants residing in the economic impact region are considered locals by impact modelers (Loomis & Walsh, 1997). The exact boundaries of the resulting region can be quite arbitrary and may contain counties or regions. Therefore, the modeler's choice of a spatial configuration for the impact region is endogenous and modeler-selected. Modelers choose local impact regions based on their inspections of the economic conditions surrounding the nature-based site and participants' travel behaviors. Travel distance is important because the proximity of participants to a destination site influences the separation of the direct and indirect economic contributions to a local economy from the local spending by participants. Expenditures made by nonlocal participants are treated differently from those expenses by locals (Appendix G).

C. Joint Costs

Stynes, Prost, Chang, and Sun (2000) preferred counts of party nights as opposed to the traditional practice of weighting visitor expenditures by a count of park visitors (Donnelly et al., 1998). In keeping with the outcome from the recreation expenditure model, party days were favored in this analysis.

Also, the logic of analyzing the joint expenses of traveling parties in terms of party days was adopted as opposed to the daily expenses per visitor. The disaggregation of joint costs was problematic, no matter how the expenditure questions were posed in the questionnaires (Haspel & Johnson, 1982; Fletcher, Adamowicz & Graham-Tomasi, 1990). For example, the value from group service discounts, the intermingling of travel expenses among group members and other industry incentives for group purchasing services and other items distorted individual trip expenses (Mendelsohn, Hof, Peterson, & Johnson, 1992).

D. Recreation Demand for Paddling Days

Probit Analysis

Probit analysis of the selection model was significant (likelihood ratio _2 = 217, p > 0.00)(Table 17). As expected, the likelihood of a participant being a local increased significantly when both travel costs and the hours worked per week decreased. These results indicated the economic impact region was congruent with participants' travel behaviors. That is, local participants traveled shorter distances and spent more days engaged in paddling water trails. This finding did not imply anything about the appropriateness of the spatial configuration. Rather, this finding simply affirmed that the spatial configuration of the local impact region coincided with participants' local proximateness to the water trails in the region. For ease of interpretation, the predicted probabilities of local participants were computed from the selection model ' s results.

Regression Analysis

Overall, the linked recreation expenditure model was significant [F(8,419) = 7.39, p > F = 0.0]. The coefficients on the noninteractive variables in Table 17, Column 2, met prior theoretical expectations. Trip expenses were statistically significant (p < .01) and negative in the coefficient sign. As trip expenses decreased (increased), the demand for days paddling increased (decreased). Annual income, as a proxy variable for all other household expenditures, was significant and positive in the coefficient sign indicating increased income shifted the demand curve. Owning a kayak, a dummy variable (1, 0) had a significant impact on days with 46% of the sample owning at least one kayak. The annual expenditure on water trail equipment was an insignificant determinant of demand.

Useful in economic assessments to describe the different kinds of economic impacts, trip purposes (e.g., paddling water trails, visiting friends, family, or vacationing) were not significant determinants of coastal paddling demand and were dropped from the analysis. In fact, Parsons & Wilson (1997) found that multipurpose trips had no effect on recreation site benefits. While Kerkvliet and Nowell (1999) found that the diversity of participants onsite solved the spatial limit's problem by classifying participants by their trip purposes.

The coefficient sign on the inregion variable was positive and significant, suggesting that as the probability increased of a participant being a local, the days spent on-site paddling

increased, all other things being equal. The interactions between the probability values with the trip and equipment expenses were insignificant (Table 17, page 45). While trip expense was a significant determinant of demand, evidently the interaction between daily expenses and the likelihood of local participants had no effect on demand. However, the demand for days was influenced significantly ($p = 0.021$) by interacting the annual incomes with the probabilities of participants being local, suggesting participants with higher probabilities of being local had different annual incomes than participants with lower inregion values.

The elasticities (Table 17, page 45) told the percent changes in the dependent measure or days with a 1% change in the explanatory variable. The price elasticity was -0.16 (5 days). A 10% increase in expenses resulted in a 1.6% decrease in days. The inelasticity of the daily trip expenses indicated that there was a larger increase in daily expenses relative to a smaller decrease in days. Comparing the price elasticity of days demanded with the canoeing elasticities and average days in parentheses from those published by Loomis and Walsh (1997, p. 121), vacationing (5.17 days) was -.29, a weekend trip (2.58 days) was -.19, and a day outing (2.54 days) was -.16. In this study, the estimate of price elasticity tended to be somewhat more inelastic than the vacationing and weekend trip elasticities.

Annual income was also inelastic (.776) with a larger increase in income relative to a smaller increase in days. A 10% increase in annual income resulted in a 7.76% increase in days. When compared to the estimated income elasticities of demand for recreation expenditures in general (1.40) in the United States, the income elasticity of demand for paddling days is somewhat lower, but it was higher than for all food (.20) or boating trips (.34) (Loomis & Walsh, p. 125).

The proportionality factor was the inregion elasticity of .654, and was interpreted as the local participant's share of days (Table 17, page 45)Residents accounted for approximately 65% of the share of days spent paddling water trails with the remaining share of days being attributed to nonlocal participants.

Economic Impact

Coastal plains trails contributed to the paddling service industry by producing paddling experiences. One of the primary purposes of this paper was to demonstrate the linked recreation

expenditure method in estimating nature-based demand for economic impact analysis. The median values, instead of sample mean values, were estimated because of the overdispersion in the days reported by respondents (M = 12.35; SD = 23.57; Range = 1, 240; n = 428). The conservative sample average or median was five days, and the predicted median was also 5.00 days from the linked recreation expenditure model.

By convention, modelers attributed the economic activity resulting from participant spending to the sole purpose of nature-based trips. Economic impact computations were delimited, therefore, to paddling water trails only. The aggregate demand for party days by water trail participants was calculated as follows:

$(((POP \times c_1) / c_2) \times c_3) \times DAYS^*$

where

DAYS* = estimate of 5.00 median party-days,

POP = 14,091,600 people living in the potential use area, which roughly encompassed the 260 one-way miles or less than 95% of the study respondents reported traveling to reach paddling sites in the local impact region,

c_1 = .044 or the participation rate of people went canoeing or kayaking on water trails at least once (Moore, Siderelis, Lee, Ivy, & Bailey, 1998). Actually, the 1998 North Carolina State Trail and Greenway Survey, indicated that 3.6 % of the sample of North Carolinians visited water trails for canoeing and 0.8% for kayaking during the 12 months before the survey (Moore et al.),

c_2 = 3.8 or sample mean group size from survey to compute party days,

c_3 = .67 probability from survey results that a reported trip was for the sole purposes of paddling a water trail.

The aggregate demand for coastal plains paddling trails was approximately 546,605 party days. The share of days for locals was approximately 357,480 (= 546,605 x .654) party days and for nonlocal participants was 189,125 (= 546,605 x (1-.654)) party days. At this stage, use estimates and the trip expenses disaggregated by certain expense categories could be directly entered into the National Park Service's Money Generation Model 2 (Stynes et al., 2000) or combined with economic multipliers from other sources, wages-to-sales ratios, or wages-to-

employment ratios, and a spreadsheet to compute an economic impact assessment (Wang, 1997). See Table 18 for a display of the economic contributions by participants to the coastal plains.

Table 17
A Linked Recreation Expenditure Model(n = 428)

Explanatory Variable	Coef.	t-value	Mean	dy/ex[a]
	Primary Regression			
Constant	.4753821	1.96	1.00	n/a
Trip expense(C)	-.0009609	-3.73	$165.46	-.159
Own kayaks	.4486574	3.74	.53	.210
Equipment expense(E)	.0003255	1.56	$88.79	.029
Annual income(I)	.0000097	3.49	$79,953	.776
In-region(L*)	1.302018	3.16	.50	.654
L* x C	.0006569	1.41	$58.55	.042
L* x I	-.0000108	-2.32	$36,612	-.405
L* x E	.0000836	0.24	$49.09	.004
	Probability Estimator			
	Coef.	z-value	Mean	
Constant	1.58117	8.60	1.00	
Travel cost	-.047143	-10.09	$24.35	
Hours worked	-.016315	-4.01	37.21	
Regression summary				
Estimated standard error	1.22			
F (8, 419)	7.15	p > F = 0.00		
Probability summary				
Likelihood ratio _2	217.28	P > _2 = 0.00		

Notes. The estimated standard error is of the regression. A t-value ∀1.96 is significant at the .05 decision level and ∀1.65 at the .10 decision level.

[a] Are the elasticities of demand. For a 1% change in expenses, for example, there is a -.159% change in party-days.

Table 18
Economic Contributions to Coastal Plain's Region from Paddling Water Trails (M = Millions of dollars)

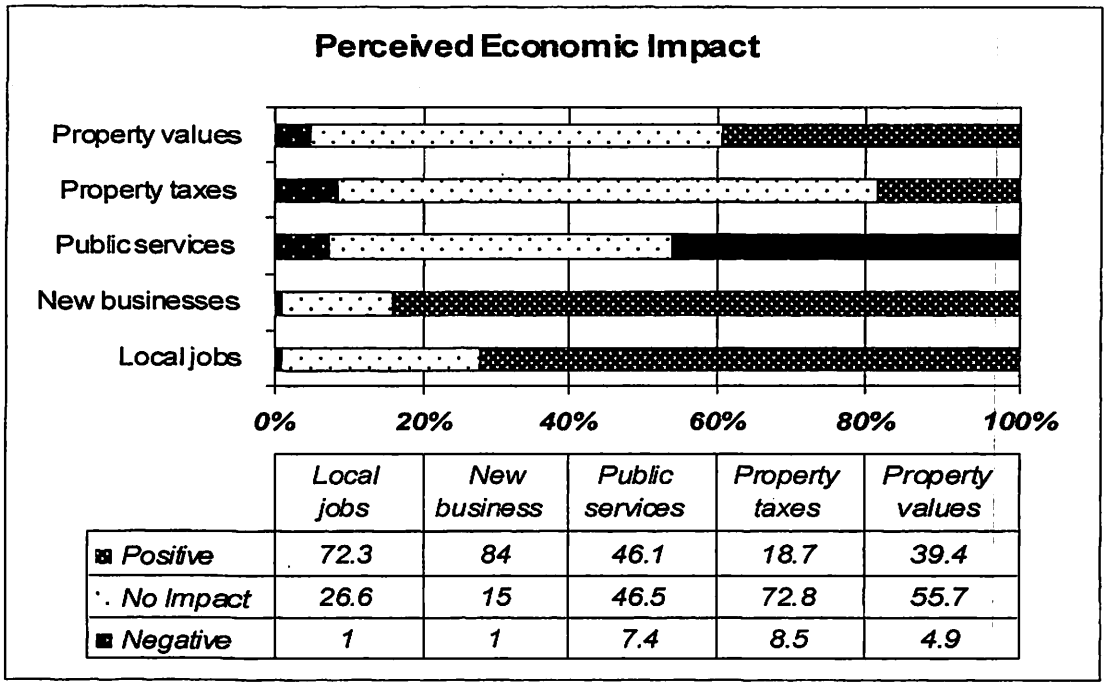
	Local	Non-local
A. Estimate of party days	357,480	189,125
B. Daily trip expense per party	$116.86	$216.62
C. Annual direct spending[1] (M)	$41.78	$40.97
D. Multiplier[2]	--	1.23872
E. Economic impact of consumables[3] (M)		$50.75
F. Canoe, kayaks, equipment sales per party	$97.72	$81.45
G. Annual direct spending on durables[4] (M)	$6.99	$3.08
H. Multiplier	--	1.424334
I. Economic impact of durables[5] (M)		$4.39
J. Economic contributions[6] (M)	$48.76	$55.14
Regional tourism impact (North Carolina Commerce Department, 1998)[7] (M)		$2,297.49
Percent of reported tourism impact		2.40%

[1] Annual direct spending equals rows A x B.
[2] See endnote one for 1997 IMPLAN multiplier values.
[3] Economic impact of consumables equals rows C x D.
[4] Direct spending on durables equals row G x (row A / 5 median party-days). The value is for number of inregion and nonlocal parties and not party-days.
[5] Economic impact of durables equals rows G x H.
[6] Economic contribution equals the sum of rows E and I for nonlocal and sum of rows C and G for local.
[7] A tourist is defined as an out-of-state visitor. So, we underestimate economic impact given our definition of nonlocal resident, which includes instate residents living outside the economic impact region.

Economic Impacts

There is the perception that an increase in paddling activity will change the local economy. That change could take shape as having a positive effect on the economy, a negative effect on the economy, or no impact on the economy. Table 19 shows the majority of those surveyed (84%) felt the effect on new businesses would be positive. Seventy-two percent felt an increase in paddling activity would have a positive effect on the local job market. Having an effect on property tax raised the most perceived negative effect (8.5%).

Table 19
Perceived local economic impacts of increased paddling activity



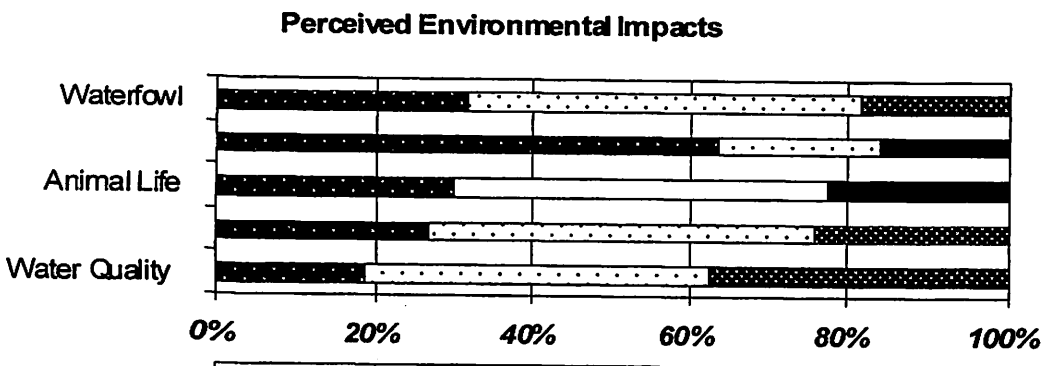
	Local jobs	New business	Public services	Property taxes	Property values
Positive	72.3	84	46.1	18.7	39.4
No Impact	26.6	15	46.5	72.8	55.7
Negative	1	1	7.4	8.5	4.9

* Responses recorded on a 5 point scale (strongly agree, agree, neutral, disagree and strongly disagree) were aggregated into a 3 point scale for this table.

Environmental Impacts

With an increase in paddling activity, there may be the perception that there may be a positive, negative, or no impact on the surrounding environment (Table 20). Sixty-four percent felt that litter would increase as paddling activity increased. Almost 50% of the sample perceive that there would no impact on water quality, plant life, animal life and waterfowl. Thirty-seven percent of the sample felt that the water quality would increase as paddling activity increased.

Table 20.
Perceived local environmental impacts of increased paddling activity



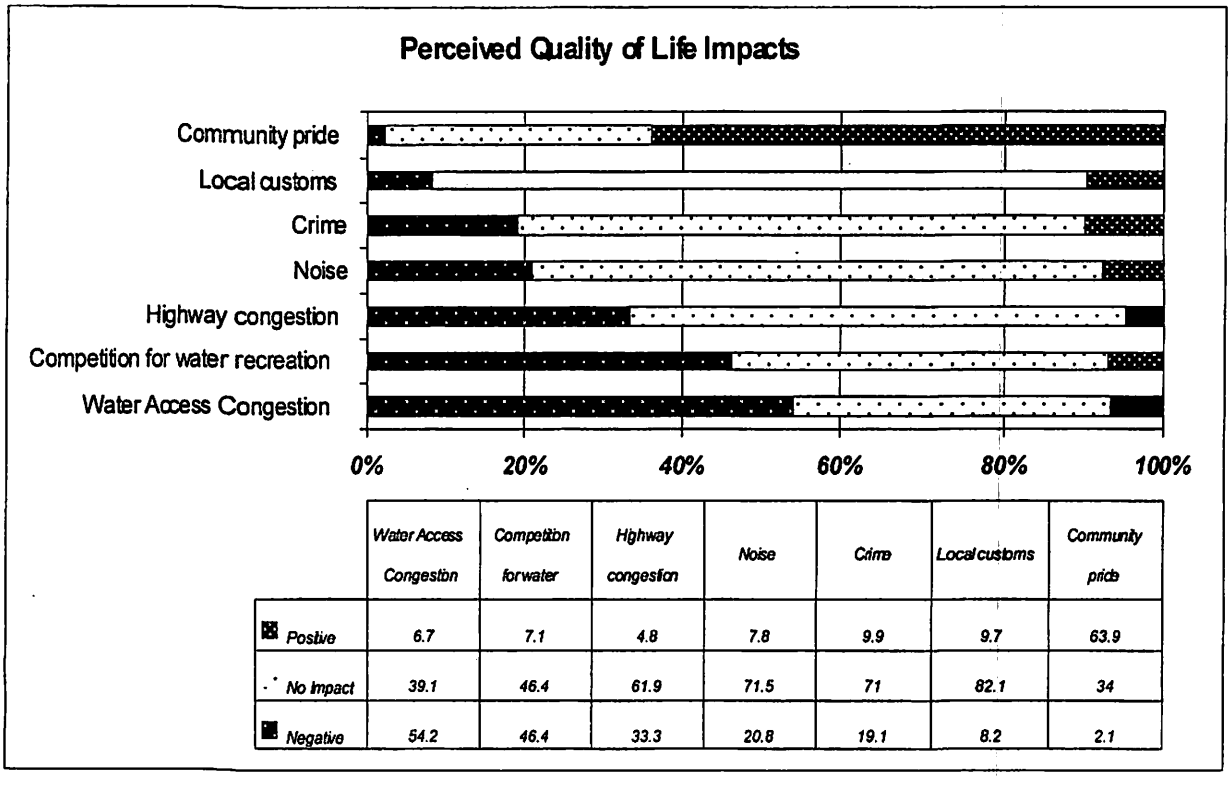
	Water Quality	Plant Life	Animal Life	Litter	Waterfowl
Positive	37.4	24.3	22.6	16.1	18.5
No Impact	43.8	48.9	47.3	20.3	49.8
Negative	18.8	26.8	30.1	63.6	31.7

* Responses recorded on a 5 point scale (strongly agree, agree, neutral, disagree and strongly disagree) were aggregated into a 3 point scale for this table.

Quality of Life Impacts

With an increase in paddling activity, there is also the perception that the quality of life may change. Table 21 shows how those surveyed felt the increase in paddling activity would affect the quality of life. The greatest perceived positive impact that increased paddling activity would have is on community pride (63.9%). The majority of the sample felt that there would be no impact in highway congestion, noise, crime, and local customs. There was the perception that social conflict may become an issue. Fifty-four percent and 46 % felt there would be a negative impact on water access congestion and competition for water, respectively.

Table 21.
Perceived local quality of life impacts of increased paddling activity



	Water Access Congestion	Competition for water	Highway congestion	Noise	Crime	Local customs	Community pride
Postive	6.7	7.1	4.8	7.8	9.9	9.7	63.9
No Impact	39.1	46.4	61.9	71.5	71	82.1	34
Negative	54.2	46.4	33.3	20.8	19.1	8.2	2.1

* Responses recorded on a 5 point scale (strongly agree, agree, neutral, disagree and strongly disagree) were aggregated into a 3 point scale for this table.

V. SUMMARY AND CONCLUSIONS

The study was designed to determine what attracts paddlers to eastern North Carolina (east of I-95), to determine what infrastructure is desired by the users to make their trail outings more enjoyable, and to measure their economic impacts on the coastal plain. The study area was divided into nine mutually exclusive and exhaustive regions. A total of 601 people agreed to participate in the study, and a modified Dillman mail survey methodology was followed.

Respondents' mean age was 46.62 years. They had a mean annual income of $76,570 and a mean work week of 37.85 hours. On average, respondents took 10.45 (SD = 16.32) trips per year, and logged longer miles in the Outer Banks than any of the other nine regions. The average (mean) numbers of days spent paddling were consistent across paddling areas (Table 5). The number of days ranged from a high of 2.38 days for the Southern Coast to a low of 1.37 days for the Upper Neuse.

Overall, the highest average expenses per paddler per trip were $140.77 in the Southern Coast and $128.30 in the Carteret paddling area (Table 13). The average total expense per paddler per trip was $83.42 for all the areas. The percent of reported tourism impact found to be affiliated with paddling in the eastern North Carolina was 2.40%.

More than 99% of the respondents reported that they want to paddle in unpolluted waters. The Southern Coast region, which is the region where most trips were taken, maintains a water quality level of 2.9 of a 6 point scale with the lower value indicating better W.Q. There are high percentages of people (above 75%) who want to hear the sounds of nature, see birds and other wild animals, find out more about the local history and culture, and eat at the cafes and restaurants. To provide these attractions to the paddlers, a cost is involved.

One thought in creating the capital to provide these attractive items is through a user fee. Eighty-eight percent of the respondents claimed they would purchase a $5 annual access permit, with 99% of the paddlers taking the same number or more trips. The permit would provide funds for signs, maps, brochures and information about the local services. Fifty-five percent of the respondents claimed they would pay an annual access permit at the cost of $25, with 99% taking the same number or more trips. The $25 permit would create funds for additional access, separate access from power boats, and developing additional paddle trails in addition to the information provided by the $5 scenario.

The discussion around user fees and public lands is one that has been on going for quite some time. Proponents of user fees argue that critical services provided to visitors would significantly be reduced if modest fees were not charged for those services. These questions arise: what is a fair and reasonable fee for public agencies to charge people for access to public lands, and how is that fee managed?

Finding a reasonable and equitable user fee is a multivariate exercise that includes analysis of what visitors are willing to pay, how much visitors are able to pay, what responsibility the public agency has to provide services from general tax revenues, which services should be exempt from fees, which services should be primarily fee driven, and the administrative costs associated with managing a fee system.

It has been questionable to the percentage that actually ends up providing services and managing the land for which the fee was initially set. Consideration needs to be given to the impact to the local community's economy, both positive and negative. Our society, at one time, committed itself to providing recreational activities through public lands regardless of socio-economic status. It is in our best interest to continue to question this commitment as the population increases, recreation increases, and the demand on our limited public land also increases. Imposing and collecting fees is a deceptively simple solution, which is sometimes attractive to agency staff and political leaders, but may not always be the best public policy.

We have noted that the level of services demanded by visitors at vacation areas and the quality of the services are important to analysts and decision makers in understanding the travel behaviors of the visitors as well as estimating economic impacts (Stynes, Prost, Chang, and Sun, 2000; and Lieber, Fesenmaier, & Bristow, 1989).

One of the primary purposes of this paper was to demonstrate the connection between the expenditures of nature-based travel and the economic impact analysis. The survey asked respondents to record trip expenditures during their last paddling trip to the coastal plains. The trip-specific expenses were for gross categories as: (a) lodging; (b) restaurant meals; (c) gasoline, oil, auto repairs; (d) food, ice, beverages; (e) other retail purchases; (f) boat rentals and launch fees; and (g) guide or outfitter services. The overall estimated tourism impact on the coastal plains was nearly $2.3 billion in 1998 (N. C. Department of Commerce, 1998). Coastal plains water trails contributed to the paddling service industry by producing paddling experiences,

which is found to be 2.4% ($55.14 million) of reported tourism economic impact of the eastern North Carolina region. When combining local and nonlocal expenditures, the coastal paddling experiences produced $103.9 million.

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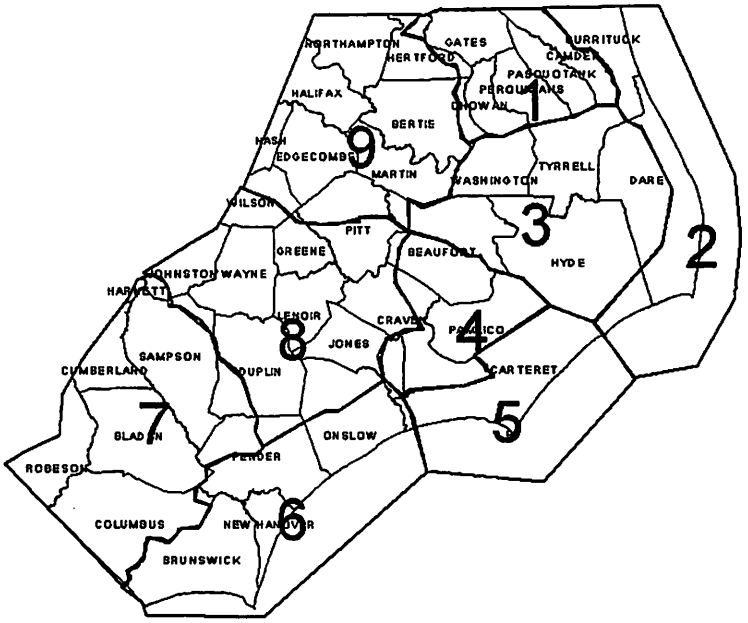
VII. APPENDICES

A. Nine Regions of Eastern North Carolina
B. Characteristics of the Nine Regions
C. Letter Sent to Potential Respondents
D. Postcard to be Sent by Respondent Agreeing to Participate in the Survey
E. Mail Survey of Paddle Trail Users
F. An Overview of Recreation Demand Theory
G. An Overview of Modeling

Appendix A
Nine Regions of Eastern North Carolina



Appendix B
Characteristics of the Nine Regions

Region	Area (Sq.Miles)	Lodging	Camp Sites	Food Est.	SP Acreage	Pop. Density	H2O Qual. 1=good	Access Points
1	1200	18	111	101	3233	66	1.7	9
2	633	97	1615	222	419	57	2	7
3	2208	33	793	98	2740	27	1.6	8
4	1011	23	88	154	0	77	1.75	5
5	488	49	1133	153	654	108	1	5
6	2609	113	1537	794	1635	254	2.9	17
7	3713	59	379	303	8652	62	3.5	12
8	2871	49	235	423	893	106	2.2	9
9	4002	49	299	425	2287	76	3.35	20

Appendix C
Letter sent to potential respondents

Dear Paddler;

We are asking for your help on the NC Coastal Plain Paddle Trails Initiative

THE PROJECT -- North Carolina Coastal Plain Paddle Trails Initiative: NC Sea Grant, NC Division of Parks and Recreation, and the Partnership for the Sounds with funding from Confluence are working together with coastal communities to enhance the development of a paddle trail network in the coastal plain waters of North Carolina. The driving force for this project is to increase paddling opportunities and the awareness of nature-based ecotourism as a viable economic option for rural coastal counties.

THE SURVEY – In order to better understand what paddlers want and need we are partnering with NC State University to conduct a mail survey. This study will determine what attracts paddlers to eastern North Carolina, determine what infrastructure is desired by the users to make their trail outings more enjoyable, and measure their economic impacts on the coastal plain.

HOW YOU CAN HELP – If you have paddled (kayak or canoe) in the NC coastal plain area (east of Interstate 95) within the last year please respond by returning the enclosed postcard. You will be placed in a database from which a randomly selected sample will be chosen to participate in a mail survey project. This list will only be used for this project, will be kept confidential, and results will be used in an aggregated or summarized form only.

Thanks you for your cooperation on this important project.

Appendix D
Postcard to be sent by respondent agreeing to participate in the survey

I HAVE PADDLED IN THE NC COASTAL PLAIN AND WOULD LIKE TO HAVE INPUT INTO THE PADDLE TRAILS INITIATIVE BY PROVIDING INPUT FOR THE SURVEY.

NAME: _____
ADDRESS: _____
_____
_____

THANKS FOR YOUR TIME AND PARTICIPATION!

Appendix E
Mail survey of paddle trail users

North Carolina Sea Grant

MAIL SURVEY OF PADDLE TRAIL USERS

This survey is part of a major study of individuals who kayak and canoe on water trails in North Carolina, east of Interstate 95. Important information is needed to expand and maintain water access, design new launching areas, and generally make your paddling experience as enjoyable as possible. Please take the time to answer the following questionnaire EVEN IF YOU HAVE NOT BOATED ON A WATER TRAIL RECENTLY. The questions ask about how and why you use water trails in North Carolina and your opinions about the management of trails. Please read the instructions at the beginning of each section.

Your participation in this survey is voluntary. Since you are one of only a small number of randomly selected individuals, you will be representing many others that we were unable to include. Therefore, your cooperation is extremely important. All of your responses are confidential. When you have completed the survey, please place it in the postage paid envelope and drop it in the mail. The number in the upper corner of this page is for mailing purposes only. We will use this number to remove your name from our mailing list when we receive your completed questionnaire. If you have any questions, please feel free to contact us. Thank you for your assistance.

Jack Thigpen
Coastal Recreation &
Tourism Specialist
(252) 441-3663

Glenn Bailey
Paddle Trail
Initiative Coordinator
(919) 515-3276

ITEM A. TOTAL TRIPS. In the first space after the name of the paddling area, please write the total number of trips you made during the last 12 months. If you made no trips to that river basin in the last 12 months, then you should leave the row blank and skip down to the next paddling area on the list.

ITEM B. MILES, ONE-WAY, TO LAST SITE VISITED. Look at the map. Please write-in the number of miles, one-way, you traveled during your last trip to a site in that paddling area.

ITEM C. HOW MANY PEOPLE (including yourself) WERE IN YOUR BOATING GROUP? Record the number of people, including yourself, who were with you during your last trip to each of the paddling areas.

ITEM D. PRIMARY PURPOSE OF YOUR LAST TRIP. In the first column after the names of the paddling areas, please check the purpose of your last trip you made to each of the paddling areas.

ITEM E. WHAT WAS YOUR LENGTH OF STAY (days) AT YOUR MOST RECENT PADDLING LOCATIONS? Record the number of days that you spent at your most recent paddling locations at each of the paddling areas.

ITEM F. HOW MUCH TIME DID YOU SPEND PADDLING? In the next spaces under column F, write in the number of days that you spent canoeing the water trails, rivers, or sounds. If the time you spent paddling was the same as your length of a stay, then leave it blank.

SECTION 1. GENERAL INFORMATION

We would appreciate a few minutes of your time to answer this survey. For our survey, a paddling trip consists of putting-in, paddling a river corridor or other body of water, and taking-out.

1. Where do you live?

   City/Town _____ State _____ Zip Code _____

2. Did you take any paddling trips during the last 12 months?

   _____ NO (If "NO," please skip to PART 2 on the last page)

   _____ YES (Continue)

SECTION 2.
YOUR PADDLING TRIPS DURING THE LAST 12 MONTHS

We would like to learn about your use of the **nine paddling areas along the North Carolina Coast.** Inserted in your questionnaire is a map that displays the **nine paddling areas.** Use the map to find the paddling areas you visited **during the last 12 months.** The questions are about your trips. Please include only trips you made. For the nine paddling areas, please provide the information asked for in the tables. We label each table column with a capital letter. More detailed instructions for completing each question are on the following page. You may refer back to the instructions on the next page to assist you in answering the questions. The instructions are organized by column heading beginning with ITEM A.

QUESTIONS ABOUT YOUR PADDLING TRIPS:

Please complete the table about your trips to the nine paddling areas during the last **12 months.** If you did not visit a paddling area, please leave the row blank.

IF YOU TOOK NO TRIPS TO ANY OF THE NINE PADDLING AREAS IN NORTH CAROLINA DURING THE LAST 12 MONTHS, THEN SKIP TO PART 2.

PADDLING AREAS	ITEM A	ITEM B	ITEM C
PLEASE USE THE MAP INSERT TO FIND PADDLING AREAS YOU VISITED	TOTAL TRIPS TO EACH AREA	MILES, ONE WAY, TO **LAST** WATERWAY USED IN EACH AREA	NUMBER OF PEOPLE IN YOUR GROUP, INCLUDING YOU, TO LAST TRAIL USED IN EACH AREA
1. Albemarle	_____Trips	_____Miles	_____People
2. Outer Banks	_____Trips	_____Miles	_____People
3. Pamlico Peninsula	_____Trips	_____Miles	_____People
4. Lower Neuse	_____Trips	_____Miles	_____People
5. Carteret	_____Trips	_____Miles	_____People
6. Southern Coast	_____Trips	_____Miles	_____People
7. Cape Fear	_____Trips	_____Miles	_____People
8. Upper Neuse	_____Trips	_____Miles	_____People
9. Roanoke and Tar	_____Trips	_____Miles	_____People
10. Other Rivers	_____Trips	_____Miles	_____People

PADDLING AREAS	ITEM D PRIMARY PURPOSE OF YOUR LAST PADDLING TRIP (check only one)				ITEM E LENGTH OF STAY IN EACH AREA	ITEM F TIME SPENT PADDLING IN EACH AREA
	Go Paddling Only	Part of Vacation	Visit Friends or Relatives	Part of Work Related Trip		
1. Albemarle	_	_	_	_	_____days	_____days
2. Outer Banks	_	_	_	_	_____days	_____days
3. Pamlico Peninsula	_	_	_	_	_____days	_____days
4. Lower Neuse	_	_	_	_	_____days	_____days
5. Carteret	_	_	_	_	_____days	_____days
6. Southern Coast	_	_	_	_	_____days	_____days
7. Cape Fear	_	_	_	_	_____days	_____days
8. Upper Neuse	_	_	_	_	_____days	_____days
9. Roanoke and Tar	_	_	_	_	_____days	_____days
10. Other Rivers	_	_	_	_	_____days	_____days

SECTION 3. TRIP EXPENSES FOR YOUR LAST PADDLING TRIP

PLEASE, LOOK AT THE MAP INSERT.
In which area did you last paddle? (Check one box.)

Albemarle	Outer Banks	Pamlico Peninsula	Lower Neuse	Carteret	Southern Coast	Cape Fear	Upper Neuse	Roanoke/ Tar

ON YOUR LAST PADDLE TRIP, HOW MANY PEOPLE WERE IN YOUR TRAVEL GROUP?

_____ People

HOW MUCH MONEY DID YOU AND YOUR ENTIRE GROUP SPEND ON YOUR LAST PADDLING TRIP IN EASTERN NC?

Please estimate the total amount of money that you and the people with you spent on your LAST PADDLING TRIP. **PLEASE, LOOK AT THE MAP INSERT.** If you traveled through a paddling area, please record any trip expenses in the appropriate expense categories that you and your travel party had while in that area. If you did not visit a paddling area, please leave the column blank.

Expense Categories	1 Albemarle	2 Outer Banks	3 Pamlico Peninsula	4 Lower Neuse	5 Carteret	6 Southern Coast	7 Cape Fear	8 Upper Neuse	9 Roanoke/ Tar
Lodging	$____	$____	$____	$____	$____	$____	$____	$____	$____
Restaurant meals	$____	$____	$____	$____	$____	$____	$____	$____	$____
Gasoline, oil, auto repairs	$____	$____	$____	$____	$____	$____	$____	$____	$____
Food, ice, beverages	$____	$____	$____	$____	$____	$____	$____	$____	$____
Other retail purchases	$____	$____	$____	$____	$____	$____	$____	$____	$____
Boat rentals, access fees	$____	$____	$____	$____	$____	$____	$____	$____	$____
Guide or outfitter services	$____	$____	$____	$____	$____	$____	$____	$____	$____
Canoe, kayak, or equipment purchase	$____	$____	$____	$____	$____	$____	$____	$____	$____

SECTION 4. MANAGING PADDLE TRAILS

If you had the opportunity to appoint ONE organization to manage the network of paddle trails in North Carolina, which organization would that be?

_ Statewide paddle trail association
_ Statewide user group member association
_ Statewide nonprofit membership organization
_ Local governments
_ State governments
_ Other (please specify_____)

Which organization(s) should pay for the upkeep and operation of paddle trails in North Carolina?
(You may check more than one organization.)

_ Statewide paddle trail association
_ Statewide user group member association
_ Statewide nonprofit membership organization
_ Statewide Paddle Craft Registration System with fees
_ Local governments
_ State governments
_ Pay-as-you-go system
_ Other (please specify_____)

By which of following methods could officials best manage future access to the paddle trails?
(You may check more than one item.)

_ User fees
_ Parking area permits
_ Paddle trail permits
_ Camping Fees
_ Use of free reservations
_ Paddle Craft Decal with reservations
_ User group member association
_ Other (please specify_____)

Given the conditions at the paddle trail that you last used, to what degree would you support or oppose each of the following management alternatives?
(Check the column that best indicates your feelings.)

MANAGEMENT ALTERNATIVES	SUPPORT	OPPOSE	UNDECIDED
Develop additional PADDLE TRAILS	_	_	_
Develop additional ACCESS SITES	_	_	_
Develop separate ACCESS SITES from power boats	_	_	_
Limit ACCESS to a certain number of paddlers per day	_	_	_
Provide more SIGNS, MAPS, and BROCHURES for paddle trails	_	_	_
Provide more infromation about local services, restaurants, lodging, guides, and emergency services	_	_	_

We want to explore your reaction to charging an ACCESS USER FEE for paddle trails.
(All fee situations listed below are purely hypothetical.)

Suppose there is an annual fee of $5 for a permit to access the paddle trails. User fees would provide more signs, maps, and brochures, as well as, more information about local services, restaurants, lodging, guides, outfitters, and emergency services.

Would you purchase an annual permit for $5?

_ Yes, I would purchase the annual paddle trails permit
_ No, I would not purchase the annual paddle trails permit

If you purchased the $5 permit, how many more trips would you take during the next 12 months to the paddle trails?

_ I would take **MORE** trips. About how many **MORE?** ____trips
_ I would take **FEWER** trips. About how many **FEWER?** ____trips

Now suppose there is an annual fee of $25 ($50) for a permit to access the paddle trails. In addition to providing more information to paddlers, the additional money from the permits would develop additional paddle trails, additional access sites, and separate access sites from powerboats. Would you purchase the annual permit?

Would you purchase an annual permit for $25($50)?

_ Yes, I would purchase the annual paddle trails permit
_ No, I would not purchase the annual paddle trails permit

If you purchased the $25 ($50) permit, how many more trips would you take during the next 12 months to the paddle trails?

_ I would take **MORE** trips. About how many **MORE?** ____trips
_ I would take **FEWER** trips. About how many **FEWER?** ____trips
_ I would take the **SAME NUMBER** of trips.

Do you support the construction of OVERNIGHT CAMPING SITES along the waterways?

_ Yes
_ No (If no, skip to Section 5.)

If you had your choice, what would be the ideal distance between an access point and an overnight campsite?

CANOEING (Check one.)

_ 5 or less miles
_ 6 to 10 miles
_ 11 to 15 miles
_ 16 and more miles
_ undecided

KAYAKING (Check one.)

_ 5 or less miles
_ 6 to 10 miles
_ 11 to 15 miles
_ 16 and more miles
_ undecided

If you support the need for campsites, answer the following questions. Think about the area in which you took your last paddling trip. Imagine that the overnight campsite is the ideal distance from your access point.

Consider a camping area with clusters of camping sites for large group of 13 or more people. Suppose the daily camping fee is $15. How many overnight trips would you take to this type of site in the area of your last paddling trip during the next 12 months?

_ I would take **MORE** trips. About how many **MORE** _____ trips?
_ I would take **FEWER** trips. About how many **FEWER** _____ trips?
_ **SAME NUMBER** of trips.

Consider a camping area with clusters of camping sites for medium group of 9 to 12 or more people. Suppose the daily camping fee is $17. How many overnight trips would you take to this type of site during the next 12 months?

_ I would take **MORE** trips. About how many **MORE** _____ trips?
_ I would take **FEWER** trips. About how many **FEWER** _____ trips?
_ **SAME NUMBER** of trips.

Consider an individual camping site.. Suppose the daily camping fee is $25. How many overnight trips would you take to this site during the next 12 months?

_ I would take MORE trips. About how many **MORE** _____ trips?
_ I would take FEWER trips. About how many **FEWER** _____ trips?
_ **SAME NUMBER** of trips.

SECTION 5.
PERCEIVED IMPACTS ON ECONOMY, ENVIRONMENT, AND QUALITY OF LIFE

Please **CIRCLE** the choice that best describes your usual preferences and/or perceptions.

When I paddle I:	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
...like to eat at local cafes and restaurants	SA	A	N	D	SD
...like to stay at local campgrounds	SA	A	N	D	SD
...like to meet the locals	SA	A	N	D	SD
...like to get a feel of local culture	SA	A	N	D	SD
...like to find out about the local history	SA	A	N	D	SD
...like to look for local art and crafts to buy	SA	A	N	D	SD
...like being away from the city	SA	A	N	D	SD
...want to breathe fresh air	SA	A	N	D	SD
...want to paddle in unpolluted waters	SA	A	N	D	SD
...want to see birds	SA	A	N	D	SD
...want to see wild animals	SA	A	N	D	SD
...want to catch fish	SA	A	N	D	SD
...like to hear the sounds of nature	SA	A	N	D	SD
...worry about getting my car broken into	SA	A	N	D	SD
...fear that locals may hassle me	SA	A	N	D	SD
...do not want to eat local food	SA	A	N	D	SD
...feel that locals often stare at me	SA	A	N	D	SD
...can't find a decent meal	SA	A	N	D	SD
...am leery of sleeping at a local motel	SA	A	N	D	SD
...worry about my safety	SA	A	N	D	SD
...am a long way from medical attention	SA	A	N	D	SD

SECTION 6. INCREASED PADDLING IN RURAL AREAS

New paddlers to a rural area can have both positive and negative impacts. Please tell us how you feel increased paddling may impact the following aspects of rural paddling areas:

	IMPACTS OF INCREASING THE NUMBER OF PADDLERS				
	Very Negative	Moderately Negative	None	Moderately Positive	Very Positive
Local jobs	1	2	3	4	5
New business opportunities	1	2	3	4	5
Local public services	1	2	3	4	5
Property taxes	1	2	3	4	5
Property values	1	2	3	4	5
Water quality	1	2	3	4	5
Plant life	1	2	3	4	5
Animal life	1	2	3	4	5
Litter	1	2	3	4	5
Waterfowl	1	2	3	4	5
Crime	1	2	3	4	5
Congestion for locals at water access sites	1	2	3	4	5
Competition for locals for water recreation	1	2	3	4	5
Highway traffic	1	2	3	4	5
Change in local customs	1	2	3	4	5
Community pride	1	2	3	4	5
Noise	1	2	3	4	5

PART 2. ABOUT YOU

None of this information will be linked to your name. The following information will help us better understand the characteristics of river users. Please respond to the questions only about yourself and remember that all of your answers are strictly confidential.

How many people, including yourself, are in your household? _____ People

How many people, including yourself, go paddling? _____ People

How many canoes does your household own? _____

How many kayaks does your household own? _____

Are you a member of an outdoor recreation or environmental group?

_ No

_ Yes How many? _____

In what year were you born? _____

To assess the benefits to users of paddle trails in North Carolina, we need information about your occupation. Check the appropriate box below for your current occupation.

_ Clerk	_ Manager	_ Laborer
_ Craftsman	_ Professional	_ Homemaker
_ Driver	_ Retired	_ Student
_ Farmer	_ Sales	_ Unemployed

Annual income is a good indicator of participation in outdoor recreation. What was your approximate 1998 household income, including income from interest and investments? (Please check the appropriate box for you.)

_ less than $10,000	_ $60,000 - $69,999	_ $120,000 - $129,999
_ $10,000 - $19,999	_ $70,000 - $79,999	_ $130,000 - $139,999
_ $20,000 - $29,999	_ $80,000 - $89,999	_ $140,000 - $149,999
_ $30,000 - $39,999	_ $90,000 - $99,999	_ $150,000 - $159,999
_ $40,000 - $49,999	_ $100,000 - $109,999	_ $160,000 - $169,999
_ $50,000 - $59,999	_ $110,000 - $119,999	_ $170,000 - over

Which, if any, paddling clubs are you currently a member of? _____

THANK YOU FOR YOUR TIME AND PARTICIPATION!

Appendix F

An Overview of Recreation Demand Theory

Simply viewed, the economic behavior of consumers rests on the concept of two-stage budgeting. Under two-stage budgeting, the direct utility function for all goods and services required by a household is separable into different groups of expenditures for services and goods demanded. One group of expenditures could be for leisure services. Consumers are viewed as first allocating expenditures to leisure services and then distributing money income to the detailed expenditures like nature-based trips within the broad leisure services demands (Blundell, 1988). While weakly separable, this does enable the allocation of expenditures for nature-based travel to be determined solely by the relative prices for travel within the leisure services group and ultimately a consumers spending on trips.

Continuing with the nature tourism example, the consumer combines the industry services delivered daily (e.g., lodging, site tours) with the quality of natural resources to produce a nature-based experience, the real source of satisfaction. For instance, a recreation resource like a water trail may be combined with travel costs and recreation expenditures for a canoeing trip. What makes this nature-based trip different from other market goods and service is that there is no economic market for water trails, which are an integral part of the nature-based experience. Consumers can access recreation resources, but cannot directly purchase them. Accordingly, the full price of the trip cannot be observed.

What can be observed from the consumer's household production process are items like the number of site trips, on-site days, travel costs, annual income, daily recreation expenditures, and the quality of site attributes (Loomis & Walsh, 1997). An recreation expenditure function, $E(P_D, P_R, P_Y, S)$, delineates the amount of income that is necessary to achieve a desirable trip experience when a consumer is facing the following prices:

P_D = daily trip expenses,

P_R = direct costs from an origin to a destination and return, and admission fees,

P_Y = price of composite (all other) goods and services that enter the household,

S = particular levels of trip satisfaction.

The remaining terms are

R = number of trips to a particular site over the season,

Y = all other goods and services,

D = on-site days per trip.

We view each consumer as choosing the optimal quantity of trips and on-site days to achieve a satisfactory experience with minimal expenses based on their perceptions of quality about opportunities and individual tastes and preferences (Bell & Leeworthy, 1990). By viewing the consumer's behavior this way, the requirement is avoided that all visits are day trips, and allows for the separation of daily trip expenditures from travel costs (Parsons & Wilson, 1997).

To determine a consumer's willingness to pay for trips, we begin by assuming that all money income is expended as follows, $D * P_D + R * P_R + Y * P_Y$ (Kerkvliet & Nowell, 1999). First, let us suppose the travel cost P_R increases to a P_R^+ amount. The household will need R times P_R^+ more money to keep satisfaction constant. The ratio of the change in the recreation expenditure function to the P_R^+ change in the travel costs is expressed by the compensated demand function, $g_R(P_D, P_R, P_Y, S)$.[1] In fact, if the travel cost P_R becomes large enough, it will drive R trips to zero (Parsons & Wilson, 1997).

Also, if P_D trip expenses increase, the number of onsite days will decrease. In this manner, we are hypothesizing a weak complementary relationship between travel costs and recreation expenditures. The measure of all other household goods and service expenditures P_Y will increase with the number of on-site days. Since there can be a considerable sunken cost in equipment (e.g., kayaks, canoes) and services with nature tourism, it is expected that higher income households will participate more frequently than lower income households.

We are characterizing the demand for a nature-based activity as a recreation expenditure function. So, it really doesn't matter if there is no variation in the number of trips demanded by consumers over a season (i.e., R = 1), as is the case with a travel cost model. The duration of days or the number of annual trips multiplied by the average number of on-site days per trip becomes the dependent variable. In summary, the quantity of on-site days is a function of P_D daily trip expenses, travel costs P_R, annual income as the proxy variable for all other P_Y expenditures, and visitor's tastes and preferences.

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[1] The compensated demand function is $ME(P_D, P_R, P_Y, S)/ MP_R$, which is the partial derivative of the recreation expenditure function during a season with respect to trip expenses. Compensation in the context of revealed preference theory is defined as the Slutsky compensated demand (g_R) where conceptually the sum of the interactions between trips and their prices is substituted for the utility term (Deaton & Muellbauer, 1980, p. 52-53).

Readers may recognize that the recreation expenditure model is different from the behavioral models with Engel curves explaining visitor spending, which are usually found in the tourism literature (Downward & Lumsdon, 2000). An Engel curve focuses on the relationship between visitor expenditures and annual incomes for given tastes and preferences. The measurable form of the demand relationship consists of expenses per trip as a function of the annual income and each visitor's tastes.

Appendix G
An Overview Of Modeling

Since modelers choose economic impact regions, the empirical demand models to estimate recreation participation for local impact studies must account for the selection of the impact region. This choice complicates the empirical estimation of the recreation demand because the modeler can only observe the residential locations of participants and must assume that participants choose to live in their residences. The important point is that participants are not self-selecting themselves to be inside the local impact region. Rather, the modeler in defining the local impact region is self-selecting local participants. As a result, the demand for on-site days is bias because demand is conditional on the modeler's spatial configuration of the local impact region.

Just regressing the demand for on-site days on a dummy variable to identify whether the respondent is a local or not will not accurately capture how the modeler's choice of the local impact region affects recreation demand unless one of two conditions is met: The decision process of choosing a local impact region is completely random or there are no unobservable effects on recreation demand. Both of these conditions are unlikely to occur in recreation economic impacts. Therefore, an endogenous variable reflecting the modeler's choice of locals is defined to explain the effect of the modeler selection process.

The predicted probabilities (L*) from the endogenous choices by the modeler are a function of the direct travel costs, average hours worked per week, and a random disturbance term, which is attributable, in part, to the unobservable characteristics that affect the modeler's choice of a local impact region. (This may not be evident to nonmodelers, but the asterisk next to the capital letter L means predicted values, like would be estimated with a probit model, as opposed to observed values.) Travel cost is an obvious candidate because it reflects the resulting proximity of each participant to nature-based sites.

In fact, the participants' choices of permanently residing close to nature-based centers of outdoor activity can enter the demand analysis through the distance travel costs (Parsons, 1991). Also, travel cost and hours worked appear to be functionally related instead to the opportunity cost of travel time (Feather & Shaw, 1998). This approach avoids assumptions like individuals could trade time for money at their wage rate or having to value the time of a respondent not in the labor force.

The modeler's selections of local participants are expected to be inversely affected by travel cost and hours worked to be consistent with the argument that participants closer to the nature-based sites are more likely to be local. Note, nothing here is being implied about the appropriateness of the spatial size or exact boundaries of the local impact region. Only, the impact region should be configured in such a way as to be consistent with the travel behaviors of participants, so that local economic contributions can be apportioned appropriately to the local economy.

What the modeler cannot directly observe are the probabilities, L*. Given the boundaries on the local impact region, the modeler observes whether or not the j^{th} participant resides in the impact region (L = 1) or not (L = 0). The modeler is then able to infer the likelihood of local participation from the predicted probabilities of the selection model. What is being proposed is the standard formulation of a binary choice model. A probit specification follows assuming that the random disturbance is normally distributed with zero mean and unit variance:

$L^*_j = \_ - \__1 (TC_j) - \__2(HW_j) + u_j,$

TC = travel cost,

HW = average hours worked per week,

L* = predicted probabilities. (See endnote 1.)

The Greek letter alpha is a constant, _'s (gamma), u the error term, and a rule, Lj = 1, if $L_j > 0$ (a participant is selected in-region); $L_j = 0$, otherwise. Travel cost is the self-reported distance traveled from each participant's origin to the activity destination and return multiplied by a constant cost of $.14 a mile. The $.14 estimate is based on a report, breaking down driving costs by mile and by year, @ in the Autoweek (April 1, 1996, p. 9) adjusted to 2000 prices and gas at $1.70 in North Carolina.

By pooling the regional nature-based sites and specifying an expenditure function in semi-logarithmic form (ln), the demand for days is linked to the modeler's choice of a local impact region with the instrument, L*, and is represented by the following equation with error component (Kerkvliet & Nowell, 1999):

$$\ln(DAYS_j) = \_ - \__1(C_j) + \__2(E_j) + \__3(I_j) + \__1(L^*_j) + \__2(C_j)(L^*_j) + \__3(E_j)(L^*_j) + \__4(I_j)(L^*_j) + e_j,$$

C = daily expense,

E = annual equipment expense,

I = annual income.

The Greek letters, the _ (beta) and _ (delta), are regression coefficients, _ (alpha) is the constant term, and e is the error term.

The observed DAYS are conditional on the annual incomes, daily trip expenses, and the annual equipment expenses of participants as well as the predicted probabilities from the selection model. It is anticipated that if the expenditure model is to work an inverse relationship must exist between the amount of days spent participating in a nature-based activity and daily trip expenses. Including a series of interaction terms just introduces a degree of flexibility in the recreation expenditure model. The interaction terms are products of the inregion values multiplied by the different participant expenses and their annual incomes. The interactions allow the responses about both local and nonlocal trip expenses and the slopes of the demand curves to vary (Bowker & Leeworthy, 1998).

From the previous discussion, there are two parts to estimating the shares of onsite days demanded by the different local and nonlocal participants: Choosing the size of the use area to which the size of the local impact region is proportional and choosing a proportionality factor. Ultimately, the aim of estimating the local share of on-site days from nonlocal shares is to separate the direct and indirect economic contributions made to a local economy. The expenditures by local participants are treated differently from those expenses by nonlocal participants with the economic multipliers applied to nonlocal expenditures, only (Donnelly, Vaske, DeRuiter, & Loomis, 1998). Wang (1997) discusses measuring recreation economic impacts, types of multipliers, and evaluates the reliability of multipliers.

Recreation modelers prefer the type I multiplier, which consist of the direct and indirect economic effects divided by the direct effects (Donnelly, et al., 1998; Stynes, et al., 2000). The direct effect is an importance measure of spending by participants on local sales for lodging, food, retail, and other expenses to businesses in a region. The indirect effect results from businesses using money spent by water trails users to pay employee wages and purchase additional goods and services to support their businesses. This re-spending of money from sales by business owners in a region to pay employees and purchase other goods leads to a multiple increase in the sales of all other businesses.

Type I IMPLAN multipliers for coastal plain regions are canoe, kayak, and equipment purchases, 1.424334 and trip expenses, and 1.23872. Recreation spending was an average of the multipliers for the following service sectors: lodging, 1.391227; restaurant meals, 1.294184; gas, oil, and auto repair, 1.064001; food, ice, and beverages, 1.118533; other retail purchases, 1.138148; boat rentals and access fees, 1.371358; and guide or outfitter services, 1.293589.

Multipliers are interpreted as follows: For every dollar of income generated from nonlocal participants on the sales of onsite services or goods, the economic measure of impact on the paddling use area is an additional $1.23 of created income to local participants.

The local share of days is assumed to be proportional to the number of potential participants living in the use area with the proportionality factor equal to the elasticity of the instrument variable containing the probabilities L*. (Elasticity is a unitless measure of demand response for on-site days to changes in the probabilities of participants being local.) Computations involve the estimate of the days from the recreation expenditure equation multiplied by the relevant number of potential participants in the use area multiplied by the proportionality factor or one minus the proportionality factor for nonlocal participants.

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