

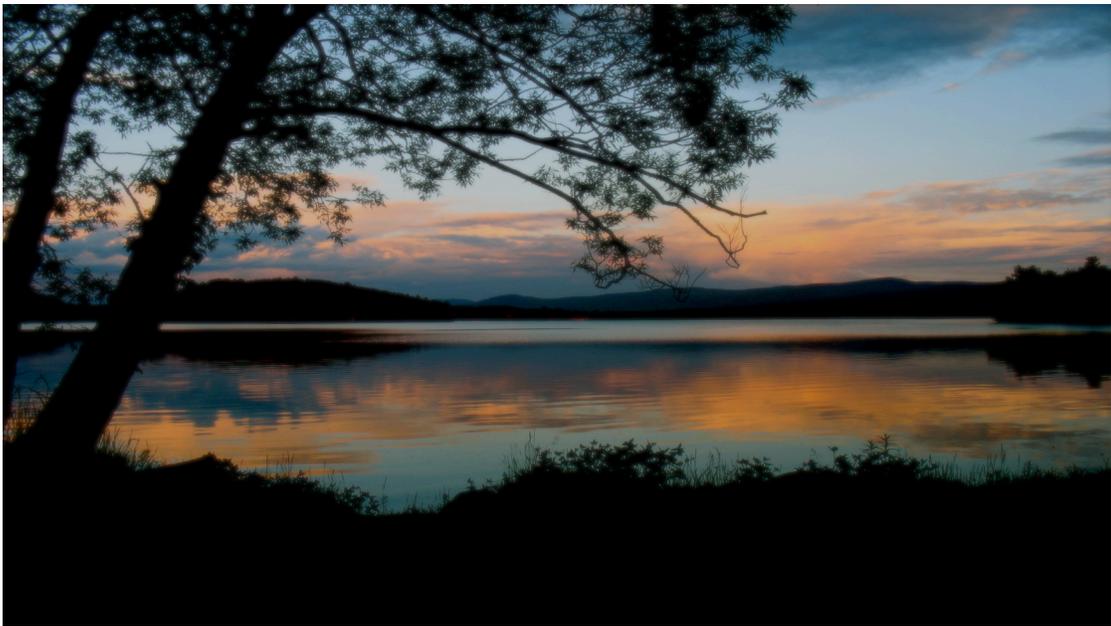
**THE NORTHERN FOREST CANOE TRAIL:
ECONOMIC IMPACTS AND IMPLICATIONS FOR
SUSTAINABLE COMMUNITY DEVELOPMENT**

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Abstract

Recreation and tourism are increasingly promoted as a means of diversifying economies in the Northern Forest, yet few studies have quantified how visitors' recreational activities affect local businesses. This research examines the economic impact of paddler recreation along the waterways of the Northern Forest Canoe Trail (NFCT), a 740-mile route traversing New York, Vermont, Quebec, New Hampshire, and Maine. The Northern Forest Canoe Trail association has been working with communities to develop campsites, signage, and portage trails, as well as to promote the trail in the media. This project helps communities better understand the potential economic impacts of these endeavors.

The objectives of this research are to assess the group and trip characteristics of paddlers recreating on Northern Forest Canoe Trail waterways, to quantify the economic impact of paddlers in regional communities, to identify potential social and environmental impacts, and to highlight current success stories and challenges for businesses and communities along the NFCT.

Use levels were monitored in six regions utilizing registration kiosks at public boat launches and with staff assistance at campgrounds, checkpoints, and lodging establishments. Visitor demographics, trip characteristics, and expenditure data were collected at registration kiosks, and through in-person and mail surveys. 1,024 paddler surveys were completed. MGM2, an input-output model developed by the National Park Service, was used to model direct and indirect impacts. The spatial extent of impacts was mapped using ArcGIS software. Discussions with regional land managers and business owners helped identify potential social and environmental concerns, success stories, and challenges for communities seeking to attract new paddlers to the area.

Results indicate that approximately 90,000 visitors paddled the waterways in the six study regions. Their spending in local communities created \$12 million in total economic impacts and supported about 280 jobs. The median paddler group spent \$215 per trip, primarily at lodging establishments, restaurants, grocery stores, and service stations. Non-locals spent an average of \$414-498, or \$46 per person per day. However, use levels, types of users, average expenditures, and resulting economic impacts vary significantly between regions. The analysis suggests trip lengths, lodging types, group size, travel distances, and use of outfitters drive economic impacts. Communities with developed tourism infrastructure situated close to well-traveled waterways appear most successful at capturing visitor dollars. While increases in paddler recreation raise several social and environmental concerns, land managers and business owners are supportive of the NFCT where proactive management and paddler educational efforts are in place.

The results of this study suggest that the Northern Forest Canoe Trail has potential as a tool for diversifying local economies. As economic impacts are modest within the regional economies, rather than creating new markets, the trail will better benefit existing businesses by presenting them with an opportunity to provide additional food, lodging, and outfitting services to paddlers drawn to the area.

Acknowledgements

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Chapter 1: Introduction

“True wealth is family, friends, and place. True wealth, if you’ve ever paddled a kayak for six days in the rain, is watersong, bear tracks, and dry socks...” - Kim Heacox

1.1 Recreation and Rural Economies

Recreation and tourism are being increasingly promoted as a tool for rural economic development. In this “advocacy platform,” (Gartner 1996) providing recreational opportunities and services for visitors is seen as a method of diversifying local economies. This approach to economic development is promoted by state agencies, local chambers of commerce, and by other advocacy groups (Ramaswamy and Kuenzel 2005). Specifically, nature, culture, and heritage based recreation is seen as a source of jobs and income while creating few public or environmental burdens (Power 1996). Collaborations and partnerships are often key to these endeavors (NFA 2002).

1.2 The Northern Forest Canoe Trail

One emerging collaborative approach to recreational development is the Northern Forest Canoe Trail (NFCT), a 740-mile canoe and kayak route that traverses New York, Vermont, New Hampshire, Quebec and Maine. Following waterways historically used by Native Americans and early settlers, it includes 22 rivers and streams, 56 lakes and ponds, and 62 carries. The trail passes through both remote wilderness and populated areas; 45 towns and villages are situated on the route.

The NFCT is varied both in its character and use. Through paddling is an arduous undertaking as the route includes technically demanding sections that require negotiation

of whitewater, long portages, and sections where canoes must be “lined,” or walked. As opposed to long distance excursions, the majority of users paddle sections of the trail.

Visitation rates and tourist infrastructure varies significantly between regions. In New York, the trail follows the well-known Fulton Chain of Lakes and the Saranac River through the Adirondack Park. While some sections in Vermont and New Hampshire are well traveled, including the Androscoggin and the Connecticut Rivers, others sections might only see a handful of paddlers a season. Many of the lakes and rivers of Maine are also well known, especially the Rangeley Lake area, and the Allagash Wilderness Waterway. Some towns, including Old Forge, New York, and Rangeley Lake, Maine, have been vacation destinations for many years. Others have not historically hosted visitors, and have limited lodging and service facilities.

The NFCT was first conceptualized in the late 1970s by Native Trails, an organization that studies historic trade routes. In 2000, a membership-based organization was formed that promotes the trail, publishes maps, and works with local groups and individuals to coordinate trail stewardship. Access and campsites have been established by landowner permission. The goals of the organization are to facilitate waterway stewardship, foster community economic development, and to celebrate and share the arts, recreation, and heritage of the region. The trail was officially inaugurated in 2006 (NFCT 2006).

1.3 Study Purpose, Goals, and Objectives

The Northern Forest Canoe Trail membership association has been working with communities along the trail to develop campsites, signage, portage trails, and other amenities for visitors. Yet the potential implications of these initiatives are unclear. This

research is designed to help communities form realistic expectations regarding the potential economic impacts of these endeavors, and to identify social and environmental impacts that may arise as waterway use increases. This study's objectives are to:

- Assess group and trip characteristics of paddlers recreating on Northern Forest Canoe Trail waterways;
- Quantify the current economic impact of paddlers in regional communities;
- Identify potential social and environmental impacts of increased waterway recreation;
- Report on opportunities and challenges for businesses and communities along the NFCT.

1.4 Document Contents

Chapter two reviews the literature analyzing rural community change, sustainable development, and the economic, social, and environmental impacts of recreation and tourism. It establishes a conceptual model for analyzing these impacts. Chapter three provides an overview of the survey and data analysis methodology used to meet the research objectives. Chapter four summarizes the results of this study, highlighting trip profiles, visitation levels, and economic impacts. Chapter five analyzes these results, and assesses their implications for sustainable community development. Lastly, chapter six presents conclusions, recommended implementation strategies, and future research needs.

Chapter 2: Literature Review

2.1. Community Change in the Northern Forest

Over the last 100 years, rural communities in the twenty-six million acre Northern Forest bioregion of northern New York and New England have experienced significant socio-economic changes. Traditionally, industries such as agriculture, forestry, and mining figured prominently in local economies and cultures. Yet their role has steadily decreased due to technological innovations and improved transportation systems, among other factors. As a result, fewer people live directly off the land (White and Hanink 2004).

In the mid 1900s, many communities turned toward manufacturing facilities, such as paper mills, as steady sources of employment. The availability of cheap land combined with the interstate highway system presented new opportunities for these industries (NFA 2002). However, over the past twenty years these industries have also been declining (BEA 2005). For example, in the timber and paper industry the combination of global competition and a rising non-timber value of forests has led to significant land sales in the Northern Forest. In fact, three companies sold over four million acres in a ten-year period (White and Hanink 2004).

These economic changes have shaped the region's culture. As road networks become more efficient, functions are centralized, leading to a decrease in services in rural communities (Johnson and Beale 2002). In the last thirty years, several Northern Forest counties, including Coos, New Hampshire, and Aroostook, Maine, have experienced

population decline, with some villages no longer functioning as centers for residential settlement (White and Hanink 2004).

2.2. Recreational and Amenity Driven Development

Despite these trends, population decline and negative economic changes are not occurring in all rural areas. While communities predominately dependent on manufacturing, mining, energy, and timber are witnessing population declines, “amenity rich” communities are growing, particularly those close to the coast, mountains, lakes, and in forested areas (McGranahan 1999, Nelson 1997, Shumway and Otterstrom 2001) that have both “a desirable physical environment and a relaxed small town atmosphere” (Rudzitis and Johnson 2000). This trend is apparent in the Northern Forest counties with accessible environmental amenities (White and Hanink 2004). Tourism development and immigration are two factors that are contributing to the more successful local economies.

While rural areas have long been used for tourism and recreation, these activities are becoming increasingly important to local economies (Towner 1996, Mowfort and Munt 2003). Worldwide, tourism has expanded significantly while other industries have declined (Cloke 1993). Consequently, tourism and recreation development is now a significant component of rural economic development policy (Butler, Hall, and Jenkins 1998).

Nature and heritage based tourism is presented as an environmental and culturally respectful form of tourism development. As Power (1996, p.215) writes,

Communities contemplating their economic development tend to search for clean industry; economic activities that will provide employment and income without environmental burdens...Recreation and tourism may be attractive options. After all, they seek to capitalize on a region's natural beauty, and thus it is in their interest to preserve the landscape. Tourism is

non-extractive. What the local community provides is the services that make access to the landscape and local culture possible.

Immigration is an additional factor affecting local economies in amenity rich rural communities. In a study of rural communities in the northwestern U.S., Rudzitis and Johnson (1999) found that outdoor recreation was the second most important reason for immigration, with social and physical environment factors consistently outweighing employment considerations. Rudzitis and Johnson (1999, p.22) call this the “quality of life” model:

“This approach...essentially argues that people migrate...for non-economic reasons. Firms also follow people to seek out high amenity physical and socio-cultural environments. Population growth around wilderness areas is to be expected if people value these areas and want to live near them.”

The growing use of rural areas for recreation presents a new draw for potential migrants (Cromartie and Wardwell 1998). Efficient transportation and communication networks in rural areas give workers the flexibility to live and work outside of urban centers (Butler et al. 1998). The aging U.S. population and an increase in disposable income have also caused rural communities to become important destinations for retirees seeking amenity-rich areas (Macouiller and Green 2000, Johnson and Beale 1994). As seen in Figure 2.1, retiree income has become a significant important component of the Northern Forest economy.

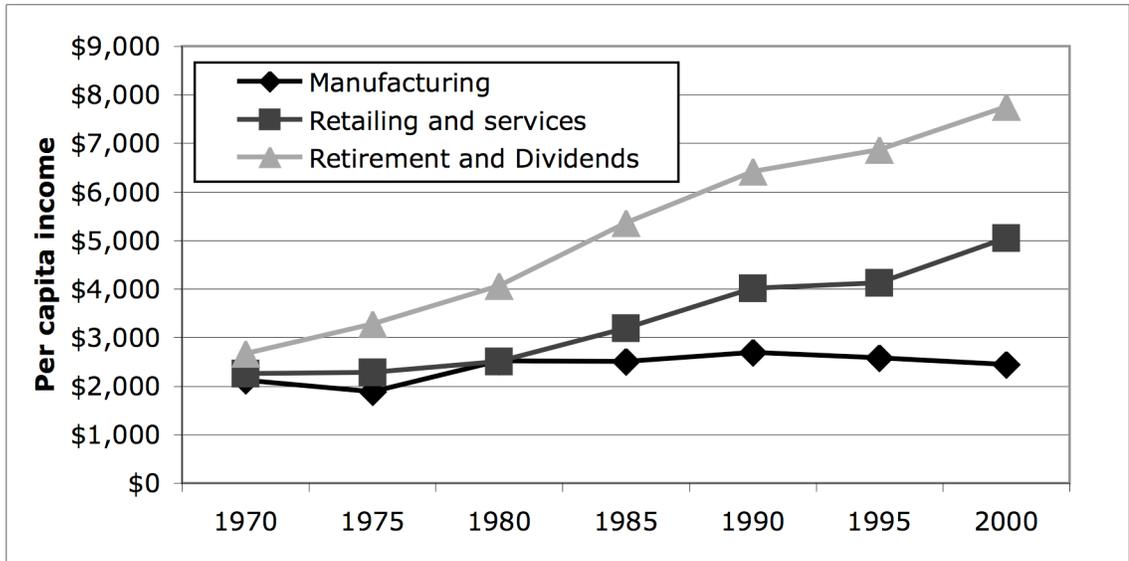


Figure 2.1. Economic trends in the Northern Forest. Data in 1996 dollars. Adapted from White and Hanink (2004).

2.3. Greenway Development

Greenways are one form of recreation development. There are several types of greenways, including urban waterfront parks, recreational paths following natural and man-made corridors, natural corridors protected for wildlife, and scenic and historic routes along roads and waterways (Cordell, Betz, Bowker, English, and Shela 1999). By providing access and opportunities for both locals and tourists, greenways are envisioned as a tool for economic development and as a social service for local residents (Butler et al. 1998, Hiss 1990).

Greenways have historic roots. In the mid 19th century, Fredrick Law Olmsted advocated for linking communities with a network of parks together with walkways (Cordell et al. 1999). While the Appalachian Trail (AT) is one of the most well known greenway in the United States, thousands of other greenways have been developed paralleling the AT's model by drawing on partnerships between public land managers

and private trail stewardship groups. Because of their linear nature, greenways commonly cut across public and private lands and through political jurisdictions. This creates a situation where coordinated planning and public-private partnerships are important in greenway development and stewardship (Cordell et al. 1999).

Water trails are greenways that contain a route with specific access points, campsites, and other lodging opportunities. The National Park Service's Rivers, Trails and Conservation Assistance program has identified over 200 water trail initiatives (Johnson 2002). Their development has been spurred by a growing interest in water sports. An estimated 29 million Americans participated in canoeing or kayaking activities in 2001, up from 2.6 million in 1960, and kayaking has become the fastest growing water sport in the nation (Cordell, Betz, Carter, and Green 2002).

2.4. Assessing Opportunities for Community Development

Greenways, including the Northern Forest Canoe Trail, are increasingly promoted for the economic development they can bring to communities. As Cordell et al. (1990, p.59) writes "protecting and managing rivers for outdoor recreation may provide a clean, economically viable means for enhancing local economic development." Similarly, as Johnson (2002, p.57) states,

Water trail development can help achieve goals of economic diversification and improved quality of life in communities. Paddle trails are an effective approach to rural economic development and recreational access while enhancing natural and cultural qualities of a community.

Yet there are critics who argue that focusing only on positive economic impacts is shortsighted. They caution that communities seeking to implement tourism and recreational development need to take an integrated approach that considers the full range of economic, social, and environmental impacts at multiple spatial and temporal scales (English,

Macouiller, and Cordell 2000, Warren, Pihema, Taylor, Gough, Blashke, and Baily 2003).

According to Warren et al. (2003, p.1),

It is apparent that a successful management approach will also need to recognize the finite capacity for some activities at some sites, as well as the potentially competing requirements of cultural and amenity values, tourism/recreation activities and other economic activities.

Essentially, these critics are calling for sustainable community development, an approach that includes two elements. First, development focuses on increasing residents' quality of life. Generally defined as the ability of individuals and groups to meet their needs and achieve satisfaction and well being, quality of life is driven by a suite of economic, social, and environmental factors (Costanza et al. 2006). Second, sustainable development is holistic and integrated. It recognizes the linkages between economic, social, and environmental spheres within a regional context (Naiman, Bison, and Turner 1997). Using this "knowledge-based platform" (Gartner 1996), the following section explores the potential positive and negative impacts of recreation and tourism development, and methodologies for assessing them.

2.5. Economic Impacts

Greenways are credited as having positive economic impacts by attracting visitors, who then patronize local restaurants, motels, gas stations, and other stores. Their expenditures lead to increases in personal income for residents, tax revenue for local governments, as well as additional job opportunities in the community. This extra revenue can maintain the profitability of retail stores in a time when rural businesses are being increasingly consolidated. By diversifying the local economic base, recreation development can help stabilize economic conditions in communities previously reliant on single industries (Blakely and Bradshaw 2002).

The “Granola Myth”

Despite the potential economic benefits of greenway development, rural communities hesitate to invest in infrastructure and services without an understanding of a positive return on their investment. In several Northern Forest communities, there is a perception that nature trail based tourism brings little to communities. For example, in an editorial in the Adirondack Explorer (June 2001, p 26), a town supervisor made the comment that “[Hikers] bring their water bottles and granola bars, and that’s it .” As Omohundro (2002, p.27) writes,

The ‘granola’ myth, as it is known, is that the typical non-motorized recreationist enters the park with what he needs in his pack, then paddles or hikes for the day and returns home without ever spending any money.

Because of this perception, town administrators often promote motorized recreation, such as snowmobiling and ATV riding, more aggressively than other forms of outdoor recreation, as it is perceived that motorized users are more likely to patronize local businesses (Reiling, Kotchen, and Kezis 1997, Morris, Allen, Rubin, Bronson, and Bastey 2005).

Economic Base Model

Economic impact models, which assess commerce attributable to recreational activities (Stynes 1999), can help communities better understand how recreation affects their local economy. The “Economic Base Model” is a useful tool for conceptualizing monetary flows. In this model, all economic activity is derived from the power of industries exporting goods and services to other communities (Blakely and Bradshaw 2002).

Money enters the local economy through export earnings, re-circulates among local businesses, and eventually leaves the economy to buy goods and services the community does not produce. Circular flows attributed to a specific economic engine are considered indirect and induced impacts (Moore and Barthlow 1998). Indirect impacts result from “the purchases of supplies by the directly affected business to produce goods and services demanded by consumers” (Southwick and Rockland 1990). Induced impacts are “further ripple effects created by employees in impacted firms spending some of their wages in other businesses” (Propst, Stynes, Lee, and Jackson 1992, p.8). The structure of the regional economy and exchange networks directly influences the degree of circular flow and the amount of recirculation within the local economy.

A modified version of the economic base model (Figure 2.2) expands the concept of economic engines to include more than traditional export earnings. Expenditures by tourists also have the similar effect of bringing “new money” into the local community.

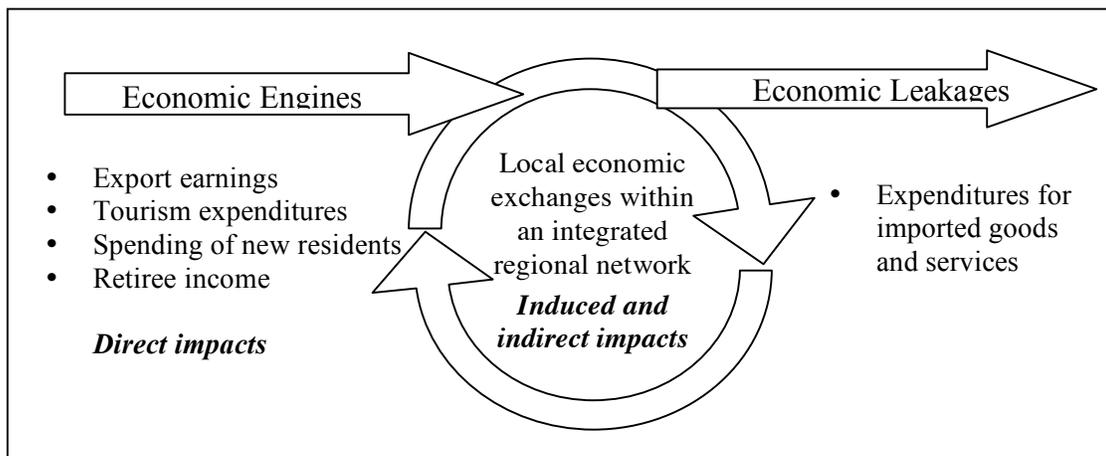


Figure 2.2. Modified Economic Base Model. (Adapted from Power 1996).

For example, a paddler may travel to an area and purchase a meal at a local restaurant. This expenditure is considered a direct impact as it is bringing new money

directly into the community. The restaurant's purchase of food from a local supplier as a result of the paddler's visit is considered an indirect impact. Lastly, an employee's expenditure at other local businesses is considered an induced impact of the original paddler's expenditure. As rural communities are rarely self-sufficient, the money eventually "leaks out" of the local community to pay for imported goods and services.

Input-output models

Input-output (I/O) models, which combine user expenditure data with regional, industry-specific multipliers, are used for estimating economic impacts. (Blakely and Bradshaw 2002). They quantify indirect and induced impacts by calculating the "multiplier effect," or the degree of monetary recirculation within the local economy.

Several input-output models have been developed for trails and park economic impact studies. MGM2, developed by the National Park Service, is a spreadsheet-based program that includes generic multipliers that control for the study area's geographical and demographic characteristics (Moore and Barthlow 1998). IMPLAN, developed by the United States Department of Agriculture Forest Service, segments the economy into 582 sectors, and uses county-level multipliers to estimate total impacts. Privately developed multipliers, such as the Southern Ontario multiplier (Schutt 1997) have also been developed to estimate regional induced and indirect impacts. Each model also computes an estimate of the number of jobs and personal income supported by visitor expenditures.

Methods for estimating economic impact of recreational resources

Several studies have assessed the economic impacts of recreational resources, a challenging undertaking in areas with a large geographic range, poor use records, multiple access points, and great variation in users and visitation rates (Moore and Barthlow 1998).

While researchers have developed a variety of methods to conduct impact studies, the methodology generally includes three components: a calculation of visitation rates, an estimate of visitor expenditures, and an input-output model (Table 2.1).

Table 2.1. Previous methodologies used to estimate visitation rates and economic impacts of recreational areas

Study area	Recreation type	Visitor use estimate	Visitor expenditures estimate	Economic Model
The Bruce Trail (Schutt 1997)	750 km. hiking trail	Self registration booths	Visitor intercept surveys	Applied multiplier factor
100 Mile Wilderness (Anderson et al. 2005)	Wilderness Area	Self Registration booths	Qualitative interviews with stakeholder groups	N/A
Overmountain Victory Trail (Moore and Barthlow 1998)	Heritage Roadway	Visitor Centers	Visitor intercept and mail back surveys	IMPLAN
Algonquin Provincial Park (Bowman and Eagles 2002)	7000 sq. km park	Visitor Center Records	Visitor intercept surveys	Provincial Economic Model
North Carolina Coastal Plains (Thigpen et al. 2001)	Several paddle trails	Statewide survey and demand modeling	Mail survey to paddlers who requested information from visitor centers, and to outfitter lists, and paddling association mailing lists	IMPLAN
Adirondack Park (Omohundro 2002)	Several trailheads	Projected total based on a randomly taken sample	In-person intercept surveys	N/A
Kickapoo River (Anderson et al. 1999)	30 mi. river Valley	Projected total based on a randomly taken sample	Visitor intercept and mail back surveys	IMPLAN

Factors influencing economic impacts

Conceptually, the economic impact of recreational use is affected by four key variables:

- The number of users
- The relative mix of local and non-local users
- The quantity and pattern of visitor expenditures
- The degree of multiplication and leakage within the local economy

The volume of visitors significantly influences economic impacts. For example, the Crow River in Wisconsin receives a moderate amount of use that leads to moderate economic impacts. Blank and Simonson (1982) estimated that 12,000 paddlers contributed \$148,000 to the local economy in one season. In contrast, an estimated 76,750 paddlers, spending about \$2.1 million in local economies, visited a comparably sized section of the upper Delaware River (Cordell et al. 1990).

The percentage of non-local users must also be considered. According to economic theory, expenditures by non-local visitors are seen as “economic engines” (Stynes 1999). Local expenditures, on the other hand, are seen as “a recycling of money that already existed...a transfer of resources between sectors of the local economy” (Crompton 2006, p.70).

Yet not all researchers agree with this approach. Blank and Simonson (1982, p. 8), for example, argued that spending by local residents “is a legitimate return... for having recreational resources and resource access points available, since this money might have otherwise been spent for recreational purposes outside of the area.” In this perspective, spending by locals represents a form of import substitution. As a general rule, Stynes (1999) suggests that local spending should be excluded unless import substitution is empirically demonstrated.

The quantity and pattern of visitor expenditures within the local economy also dictates economic impacts. This factor is influenced by the types of users recreating on the waterway (often characterized by their choice of accommodation), the use of guiding services, trip lengths, group sizes, travel distances, and visitor income levels (Stynes 1999, Moore and Barthlow 1998). Average visitor expenditures vary widely between recreational areas. Stynes and Sun (2003) estimated Grand Canyon river runners spend \$224 per person, per trip, in the local communities.¹ New River Gorge paddlers, on the other hand, spend an average of \$31 per person, per trip (Manni, Lee, Littlejohn, and Hollenhorst 2005). Thigpen, Avent, and Siderelis (2001) reported a wide range in average expenditure levels in their nine study regions, due to a mix of visitor types.

Overnight users often have significantly greater impacts than day users. A study of three rail trails indicated that trails used predominately by local day users have lower economic impacts than those used by tourists (Moore, Graefe, Gitelson, and Porter 1992). Bowker and Gill's (2004) reported that Virginia Creeper Trail day users spent \$12 per person, per trip in local communities, while overnight users spent \$87. Schutt (1997) reported relatively low average expenditures for Bruce Trail hikers, a 725 km. trail that traverses the Niagara Escarpment in Ontario. Most hikers are day users, spending an average of \$25.26 per user, or \$75.77 per group per trip (in Canadian dollars). And in a survey of Appalachian Trail hikers, researchers found that overnight hikers spent almost three times as much on their trips as day users (Manning, Valliere, Bacon, Graefe, Kyle, and Hennessey 2000).

¹ All expenditure values presented in 2006 dollars

The type of overnight accommodations utilized also is an important factor in driving economic impacts. Omohundro (2002) reported user expenditures in the Adirondacks ranging from \$28-45 per visitor, with wilderness campers having the lowest expenditures. In contrast, in Algonquin Provincial Park, lodge visitors spent \$1,783 per group per trip, or \$256 per person per night (Bowmans and Eagles 2002).

The characteristics of the local community and visitors' expenditures also affect economic impacts, represented by the "multiplier effect." Multiplier effects are driven by several factors. Of key importance are the types of visitor expenditures. For example, expenditures on gasoline lead to little indirect and induced spending, as fuel is not produced or processed locally. Expenditures at local restaurants and guide services have higher multiplier effects, primarily due to the labor-intensive nature of those industries. Of secondary importance is the character of the local economy. In general, more opportunities exist for induced and indirect spending in larger and more urbanized economies, while rural areas have higher job-to-sales ratios (Stynes, Propst, Chang, and Sun 2000).

On a regional basis, given sufficient visitors, the cumulative economic effects of visitors can add up. While average per person per day expenditures are often lower than more traditional tourists, the steady stream of visitors has been shown to have significant cumulative effects, particularly in small rural communities. Bowman and Eagles (2002) estimated spending by Algonquin Provincial Park visitors supported 300 jobs. Gross impacts of the Bruce Trail were estimated at \$33,510,109, creating 632 full time jobs (Schutt 1997). Recreational use of Kickapoo River had an estimated \$3,250,000 in annual economic impacts, supporting 85 jobs (Anderson et al. 1999). In 2004, the estimated

100,870 users of the Virginia Creeper Rail Trail spent \$1.6 million in local economies, creating close to 30 jobs. Net economic benefits were estimated at \$2.3-3.9 million (Bowker et al. 2004).

Shortcomings to economic impact analysis

While commonly used, traditional economic impact analysis has several limitations. First, it does not assess long-term impacts. Tourism and recreation development can bring economic changes that may not become apparent for decades, including increases in retirees, second homes, and immigration. These factors can greatly exceed the initial impacts of visitor spending (Power 1996, Blank and Simonson 1992, Rudzitis and Johnson 2000). Second, obtaining accurate data on visitor spending and multiplier rates can be difficult. Visitor surveys are often plagued with problems of measurement and sampling errors (Stynes 1999, Moore and Barthlow 1998).

Lastly, impact analysis does not include the economic costs due to recreation and tourism development, in part due to the difficulty of quantifying them (Crompton 2006). These costs include installing and maintaining infrastructure (such as roads and access facilities), providing law enforcement and other public services, and increased living costs (Crompton 2006, Stynes and Sun 2003). Tourism development also raises several economic concerns, including the predominance of low wages in service sector employment, and high economic leakages due to the reliance on a seasonal workforce (Deller, Sai, Marcouiller, English 2001). The seasonality of recreational employment can also be a drawback for workers (Gibson 1993).

2.6. Social Impacts

Recreation development has both positive and negative social impacts in gateway communities (Alavalapati and Adamowicz 2000, Shaw and Williams 1994). Researchers have used several approaches to assess social impacts, including regression analysis of community variables and visitor and resident surveys.

Several studies report positive social impacts due to recreation development. Reeder and Brown (2005) used regression analysis to assess differences in social variables between “recreation and non-recreation” counties. They found that recreation communities had lower poverty rates and higher education and health levels. Greenways provide accessible, free, and safe fitness areas for residents (NYPCA 2001). The development of recreational opportunities can build community pride, and provide stewardship opportunities that can enhance social capital and foster a sense of place (Johnson 2002). Greenways have also served as catalysts for community restoration projects, bringing people and business together as they revitalize a part of their community (Anderson et al. 1999).

On the downside, recreation development can have negative social impacts. Reeder and Brown (2005) report that the population in recreation communities grew at triple the rate of non-recreation communities. While growth can have a positive impact in areas with declining populations, it also raises housing costs, increases traffic, and leads to a loss of the communities’ “sense of place.” Value-laden conflict between newcomers and more established residents may arise, particularly regarding land use planning issues (Walker and Fortmann 2003).

As recreational areas become popular, user conflicts and concerns about crowding increase. Social interference theory suggests that crowding occurs when “actual or perceived use levels exceed desired levels” (Tarrant, Cordell, and Kibler 1997). User surveys can assess these issues. For example, Anderson et al. (1999), found that crowding was a concern on the Kickapoo River, with 37% of canoeists reporting that the waterway was moderately or extremely crowded on weekends. Bowker and Gill (2004), reported that users of the Virginia Creeper Trail felt crowding was an important issue.

Inter-group crowding is often more of a concern than intra-group crowding (Ramthun 1995). Anglers, for instance, may have less of a tolerance for increased paddling use than other canoeist and kayakers. This appears to be the case on the Kickapoo River, where fishermen reported a need for better management of boat traffic and river etiquette (Anderson et al. 1999).

While crowding should be addressed, several studies indicate that user’s perception of crowding can remain consistent as recreation levels increase (Shindler and Shelby 1995). Visitors appear to cope with crowding by moving to less crowded areas and by changing their expectations for their experience (Tarrant et al. 1997).

The literature suggests that while landowners adjacent to trails and waterways experience some negative impacts due to recreational use, they generally accept the activity. Blank and Simonson (1982) reported that unruly river users disturbed some landowners on the Crow River, Minnesota. Nevertheless, 90% were satisfied with the level of use. In a survey of landowners adjacent to three rail-trails, Moore et al. (1992) identified landowner concerns with roaming pets, illegal motor vehicle use, litter, noise, and loss of privacy. However, in general, landowners experienced relatively few

problems, and most were satisfied with the presence of the trails. Finally, Johnson (2002), surveyed landowners adjacent to water trail systems in Minnesota, Wisconsin, and North Carolina, and found landowner conflicts and concerns to be minimal.

2.7. Environmental Impacts

Recreation development can have both positive and negative environmental impacts as well. For example, outdoor recreation can increase environmental awareness. Dunlap and Heppernan (1975) found that nature appreciation activities increased environmental concern among visitors. Bright and Barro (2000) reported that nature-appreciation and backcountry-adventure activities were strongly correlated with “pro-environmental behavior,” and suggested these activities foster environmental values. Recreational activities can also catalyze a connection to a particular landscape, which has been shown to be a strong determinant of environmental concern (Vorkinn and Riese 2001).

Yet recreation can also have negative environmental impacts. Researchers allude to localized environmental impacts, including improperly disposed human waste, bank erosion, illegal camping and fire building (Johnson 2002). Leung and Marion (2002) identified 33 potential direct and indirect impacts of wilderness visitors on soil, vegetation, wildlife, and water conditions. Barry (2001) suggested that paddler impacts could be best managed through appropriate signage and education, active removal of illegal campsites and fire pits, and provision of alternative waste disposal options. Many environmental impacts correlate with level of use; McCool and Lime (2001, p.373) suggest land managers focus on the “biophysical conditions desired or appropriate,” and

manage user levels to maintain those conditions.

At the regional level, recreation development can bring new land development pressure to the region, as recreational development is often a precursor to population growth and second home construction (Reader and Brown 2005). As Blank and Simonson (1982, p.32) write,

As a recreational resource develops, ownership patterns change. High amenity areas are sought out by private owners as sites for recreational property and rural residences. Proliferation of these ownership types poses yet another problem in management of the area's natural qualities.

Anderson et al. (1999) raised similar concerns, reporting that 42% of the anglers indicated a desire to acquire recreation land in the area. Yet while it appears that recreation opportunities can set the stage for population growth, national economic, social, and demographic trends appear to control the actual rate and timing of immigration and new residential development (Kuentzel and Ramaswamy 2005).

Chapter 3: Research Methods

3.1. Study Regions

This study focuses on six distinct regions of the NFCT to study the economic, social, and environmental impact of paddlers (Figure 3.1). With the assistance of NFCT staff and local land managers, sites were selected to generate a diverse sample of paddling destinations. Regions were selected from each state with different waterway characteristics, a range of visitation rates, and varying levels of tourism infrastructure (Table 3.1). To ensure adequate sample sizes, all chosen sites have consistently navigable waters.

Table 3.1. Study region selection criteria

Region	State	Waterway characteristics	Perceived visitation rates	Level of tourism infrastructure
Adirondacks: Moose and Raquette Rivers	New York	Linked flat-water lakes and rivers	High	High
Missisquoi River Delta	Vermont	Slow moving river in wildlife refuge	Low	Low
Northeast Kingdom: Clyde and Connecticut	Vermont	Narrow winding rivers, small ponds, and swift Class I rapids	Medium	Low
Androscoggin River	New Hampshire	Fast-moving Class I and II rapids	Medium	Medium
Rangeley Lake	Maine	Large lake bordered by protected land and vacation cabins	Medium	High
Allagash Wilderness Waterway	Maine	Long, remote waterway with numerous backcountry campsites	High	Medium

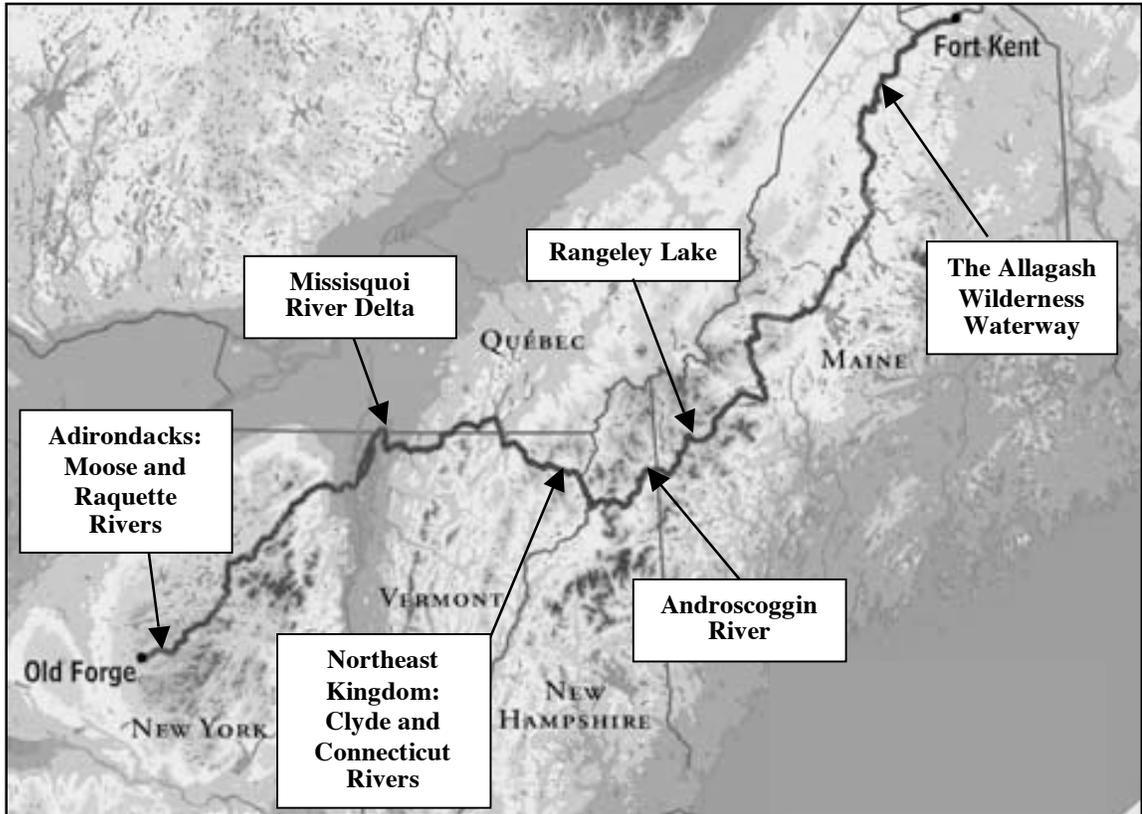


Figure 3.1. Study regions

The Adirondacks: The Moose and Raquette Rivers, NY

This area marks the western terminus of the Northern Forest Canoe Trail in the Adirondack Mountains of New York. It encompasses 58 miles of paddling along the Moose River’s “Fulton Chain of Lakes” and the Raquette River. Three public campgrounds, dozens of remote campsites, over fifty lodging establishments, and three canoe outfitters are located on the waterway. This section of the waterway falls primarily within Hamilton County, and includes the villages of Old Forge, Inlet, Raquette Lake, and Long Lake, home to 3,170 residents (Table 3.2). The majority of Hamilton County is protected as part of New York State Adirondack Forest Reserve. With a population density of only three people per square mile and a population of only 5,160, Hamilton

County is the least populous county in the state. In fact, the year round population has declined by 2.2% percent since 1990 (Census 2000). In the four waterway towns, 75% of the work force holds managerial, service, or sales occupations (Table 3.3). Tourism is the primary industry in the region, and ample goods and services are available for visitors.

The Missisquoi: The Missisquoi River Delta, VT

The Missisquoi River, in northwestern Vermont, flows through a series of wetlands before discharging into Lake Champlain. The delta is protected as part of the Missisquoi Wildlife Refuge, which is managed by the US Fish and Wildlife Service. While camping, lodging, and outfitter services are nearby, none are directly on the waterway in this ten-mile section. The Missisquoi River marks the town boundaries of Swanton and Highgate in Franklin County. The two towns have a combined population of 12,000, the largest of all study regions (Table 3.2). Unlike the adjacent Champlain Islands, tourism does not play prominently in the area's economy. Instead, manufacturing is the most important industry in the county (Census 2000).

The Northeast Kingdom: The Clyde and Connecticut Rivers, VT

In this 38-mile section, the NFCT traverses Vermont's rural "Northeast Kingdom" on the Clyde, Nulhegan, and Connecticut Rivers. Two campgrounds, two remote campsites, and two lodging establishments are located along the waterway. The trail winds through a mosaic of farms, forests, and boreal wetlands, passing through the towns of East Charleston, Island Pond, and Bloomfield, and Maidstone in Orleans and Essex Counties, Vermont, and North Stratford, in Coos County, New Hampshire. 3,600 residents inhabit these towns, which have the highest percentage (15%) of individuals

below the poverty line, lowest per capita income (\$14,116), and lowest median home value (Census 2000).

The Androscoggin River, NH

The NFCT follows the Androscoggin south from Lake Umbagog for nineteen miles. The selected study site, located near the town of Errol, NH, flows through Class I and II rapids in the “Thirteen Mile Woods” recreation area. This section includes several lodging establishments, outfitters, campgrounds, and remote campsites. Coos County is sparsely populated, with significant land area preserved in national and state forests. The waterway towns of Errol, Cambridge, and Dummer have a combined population of only 617, lowest among the study regions. 6% of the workforce is engaged in forestry, more than twice that of other regions (Census 2000).

Rangeley Lake, ME

Eleven miles in length, Rangeley Lake is a large body of water, bordered by a mix of protected wetlands and forests, a state park, hotels and rental cabins. Public access is provided at boat launches in the town of Rangeley, Oquossoc village, and at Rangeley State Park, in Franklin County. Rangeley Lake is home to only 1,052 year round residents. It is a well-established tourist destination, with 13% of the work force directly employed in arts, entertainment, recreation, accommodation and food services (Census 2000).

Allagash Wilderness Waterway, ME

Near its eastern terminus, the NFCT follows the remote Allagash Wilderness Waterway for over ninety miles. While access is managed by North Maine Woods, an organization of private landowners, the undeveloped shoreline is owned by the state of Maine, which maintains dozens of campsites. The vast majority of users embark on multi-day camping trips. The Allagash River primarily flows through sparsely populated townships in Aroostook and Piscataquis counties, which have a population density of 10.6 people per square mile. Near the Canadian border, the towns of Allagash, St. John, and Fort Kent provide goods and services for paddlers. The Aroostook county population has declined by 16% since 1990, one of the largest decreases in the region (Census 2000).

Table 3.2. Socio-economic variables of waterway towns, by region

Region	Population	Per capita income (\$)	Median home value (\$)	Unemployment rate (%)	Individuals below poverty level (%)
Adirondacks	3170	19,940	111,844	5	11
Missisquoi	12148	17,640	97,804	5	11
Northeast Kingdom	3603	14,116	65,838	5	15
Androscoggin	617	19,597	83,721	4	10
Rangeley Lake	1052	19,052	96,900	3	11.7
Allagash	5607	15,720	65,240	3	15

Adapted from Census 2000

Table 3.3. Workforce occupations, by region

Region	Management/ professional	Service	Sales and office	Farming, fishing, and forestry	Construction, extraction, and maintenance	Production, transportation, and material moving
Adirondacks	31%	22%	24%	2%	12%	9%
Missisquoi	25%	12%	26%	2%	11%	24%
Northeast Kingdom	24%	14%	18%	4%	11%	28%
Androscoggin	19%	11%	25%	6%	15%	24%
Rangeley Lake	29%	18%	25%	2%	14%	11%
Allagash	29%	16%	24%	3%	7%	20%

Adapted from Census 2000

3.2. Paddler Survey Methodology

Sampling Design

A half page paddler intercept survey was used to obtain data use and expenditure data necessary for modeling economic impacts. The study population was defined as all paddling groups (canoers and kayakers) who used the waterways that make up the NFCT, in each study section, during the summer and fall of 2006.² This population is diverse, varied, and difficult to sample. As no representative contact list exists for these paddlers, intercept surveys are considered the most appropriate sampling approach (Dilman 2000). Due to the length of the canoe trail and the paddling season, the population of users is both geographically and temporally dispersed. Furthermore, the light use of many of the waterways and the abundance of potential access points makes surveying an arduous undertaking.

To efficiently obtain a comprehensive and representative sample, multiple methods were used to distribute the survey to paddler groups, including boat launch registration kiosks, in-person surveys administered by campground staff, in-person surveys administered at public boat launches by student researchers, and mail-back surveys distributed at North Maine Woods checkpoints (Table 3.4)

² Adequately sampling homeowners with waterside vacation homes was beyond the scope of this study, and were only sampled if they used public access points.

Table 3.4. Paddler survey locations

Study Region	Survey Location	Location Type	Distribution Method
Adirondacks	Old Forge	Boat launch	Kiosk
	Forth Lake	Day use area/campground	Staff, in-person
	Seventh Lake	Boat Launch	Kiosk
	Eight Lake	Day use area/campground	Kiosk
	Raquette Lake	Boat Launch	Kiosk
	Forked Lake	Day use area/campground	Kiosk
	Long Lake	Boat Launch	Kiosk
Missisquoi River	Missisquoi NWR	Boat Launch	Kiosk
	Town of Swanton	Boat Launch	Kiosk
Northeast Kingdom	10 Mile Sq. Rd	Boat Launch	Kiosk
	5 Mile Sq. Rd	Boat Launch	Kiosk
	Island Pond	Boat Launch	Kiosk
	Debanville Landing	Boat Launch	Kiosk
Androscoggin River	Errol	Boat Launch	Kiosk
Rangeley Lake	Rangeley Town	Boat Launch	Kiosk
	Beach		
	Oquossoc Landing	Boat Launch	Kiosk
	Rangeley State Park	Day use area/campground	Staff, in-person survey
Allagash Waterway	Telos Checkpoint	North Maine Woods Checkpoint	Staff, mail-back survey
	Caribou Checkpoint	North Maine Woods Checkpoint	Staff, mail-back survey

Registration Kiosks

Registration kiosks (Figure 3.2) were the primary method for survey distribution. Seventeen kiosks were installed at all un-staffed public boat launches in each study region during the second week of June, 2006.³ A display contained information on the research study and the canoe trail, as well as a posted paddler map. “Paddlers: Please Sign In” was stenciled prominently on each box. Blank survey cards and pens were kept in a main compartment, and completed cards were placed in an attached drop box. Researchers, land managers, and community members monitored the supply of survey cards, writing implements, and the condition of the kiosks. Kiosks were removed during the second week of October, 2006. Over the course of the season, paddlers using the kiosks completed 885 usable surveys.

³ The Androscoggin River kiosk was added on July 10th.



Figure 3.2. Registration kiosk

In-person boat launch surveys

To estimate registration rates, boat launches were observed on twenty-five days throughout the paddling season. Observations were made on both weekdays and weekends. Monitoring was conducted loosely proportional to use patterns and levels, and each boat launch was observed for one to three days. All groups returning from a paddling trip were asked if they had completed the survey. The registration rate (Table 3.5) was estimated to be 35% (n=78). To check for nonresponse biases, all non-registering groups were also asked to complete a survey, administered by the researchers, with a 98% response rate (n=54).

In-person campgrounds surveys

Staff at 4th Lake and Rangeley State Park Campgrounds also administered in-person surveys. Staff members were asked to distribute the survey to every group entering the park. Paddling groups were identified by the presence of canoes or kayaks on their vehicle. Surveys were completed during the campsite registration process. In practice, not every paddler group was asked to complete the survey, particularly during times when the staff were busy with other responsibilities. However, when approached, sampled groups were willing to participate 90% of the time (n=51).

North Maine Woods mail-back surveys

Following a procedure used by Daigle (2004), surveys were distributed to paddlers at two North Maine Woods checkpoints. Staff were asked to distribute the survey to every paddler group whose destination was the Allagash Wilderness Waterway.

A letter describing the study and a self-addressed, stamped envelope were provided with each survey.

189 surveys were distributed in this manner. The response rate (21%) and sample size (n=40) were disappointing, in part because surveys, distributed as paddlers embarked on lengthy, remote camping trips, were easily lost or forgotten. Due to North Maine Woods staff time constraints, creating a list of contact information for sampled groups was deemed infeasible, preventing follow-up contacts of non-respondents. However, results were crosschecked with the results of a previous Allagash study, and paddler demographics and trip characteristics were very similar.

All completed surveys were checked for completeness and consistency. Attempts were made to contact respondents to clarify questionable responses, particularly those with inconsistencies relating to accommodation types, trip lengths, and expense estimates. Surveys that were unable to be clarified were excluded from the data analysis.

Table 3.5. Survey response rates

Sample Elements	Survey source	Response Rate (%)	n
Paddlers	Registration kiosks	35	885
	In-person, non-response	98	52
	Campgrounds	90	51
	North Maine Woods checkpoints	21	40
Lodging establishments	Adirondacks	72	18
	Rangeley Lake	75	6
	Northeast Kingdom	50	1
Campgrounds	All regions	100	6

Paddler Survey Instrument

The paddler intercept survey (Figure 3.3) was designed to collect key information relating to demographics, trip characteristics, use levels, and NFCT knowledge and importance. Respondents were also requested to provide an estimate of how much money their group would spend on the trip, within twenty-five miles of the waterway⁴. As paddler groups were intercepted mid-trip, they were asked to include what they expected to pay before leaving the region.

Survey cards were customized to explicitly describe the spatial boundaries of each paddling section. The backside of each card was left blank to provide room for additional comments. To maximize participation, the survey was kept to a half page form, and took groups one to three minutes to complete. A preliminary version of the survey instrument was pre-tested in the field during the month of May, 2006.

⁴ Due to its remote nature, expenditures made within fifty miles of the Allagash were included.

Northern Forest Canoe Trail Survey and Registration

Thanks for helping with this paddler study! Only one person per group, per year should complete this survey. Fully completed forms will be entered into a raffle for trail maps and t-shirts, and will support trail development. All information will be kept confidential. Thanks!

Date: _____ Group Size: ____ Adults ____ Children

Length of trip in region: ____ Days

Estimated time on water: ____ Days *OR* ____ Hours

Types(s) of accommodation: _____
(Primary home, second home, hotel, campground, remote campsite, etc.)

E-mail or phone # (for raffle): _____

Hometown, State/Country: _____

On average, how many padding trips do you take to Island Pond, or the Clyde, Nulhegan, and N. Connecticut Rivers, per year? ____ trips

How much do you know about the Northern Forest Canoe Trail?

a lot a few things not very much nothing

Was paddling part of the Canoe Trail a reason for this trip? Yes No

Please estimate how much money your **entire group** will spend on this trip **within 25 miles of the waterway**, in the categories below. If your trip is not yet complete, include **what you expect to pay before returning home**.

\$ _____ Lodging \$ _____ Restaurants \$ _____ Groceries

\$ _____ Transportation \$ _____ Access Fees \$ _____ Guide/Outfitters

\$ _____ Other Retail (Equipment, souvenirs) \$ _____ Entertainment

\$ _____ Other: *Please specify:* _____

In which towns are you making these expenditures?

Please estimate your total household income in 2005: (In thousands)

Under 20 20-34 35-49 50-64 65-79 80-94

95-109 110-124 Over 125

Please place additional comments on the back of this form. Thanks!

Figure 3.3. Paddler intercept survey

3.3. Lodging and Campground Survey

Survey Design

In several of the study regions, paddlers stay in lodging establishments and campgrounds situated on the waterway. As paddlers staying in these locations do not use the public boat launches with the survey kiosks, use data necessary for conducting a comprehensive economic impact analysis was collected primarily through in-person surveys of the managers of lodging and campgrounds with waterway access in each study region.

Because of the many lodging establishments in the Adirondack section, a stratified random approach was used to sample 50% of the population. First, a list of all hotels, motels, and rental cabins with water access was tabulated and sorted into four geographic locations. Every other business from this list was chosen for the study sample. An attempt was made to visit each selected lodging establishment. If an owner or manager was not available, follow-up visits, phone calls, and emails were conducted as necessary.

Follow-up phone calls were conducted in November to obtain end of the season use data as needed from the campgrounds. A mail back questionnaire was distributed to businesses to obtain more detailed quantitative data (Appendix 1). 48 lodging establishments and six campgrounds were approached. 37 lodging and campground surveys were administered, with a response rate of 77% and 100%, respectively.

Survey Instrument

The primary purpose of the lodging and campground survey was to obtain an estimate of the number of paddler groups entering the waterway via staffed locations and to determine the importance of paddlers to area accommodations (Appendix 1).

Additional questions quantified business owners' knowledge and impressions of the NFCT and paddler tourism, and identified any concerns over the potential social and environmental impacts of increased paddler tourism and recreation.

3.4. Outfitter and Land Manager Interviews

Outfitter Interviews

Managers of ten canoe outfitters were visited in person, using a “general interview guide and standardized open-ended interview” approach (Patton 1990). Interviews were framed around a common set of questions on the importance of paddlers to their business and their impressions of the NFCT as an economic development tool. To obtain additional quantitative business data, follow-up questionnaires (Appendix 2) were mailed to five outfitters that rented canoes and kayaks.

Land Manager Interviews

In-person interviews with regional land managers were used to identify potential environmental and social impacts of increased paddler tourism and recreation. Experts were identified using a “snowball sampling” method (Patton 1990). Contacts in each community suggested land managers with knowledge of the area and recreation patterns

(Table 3.6). An interview guide and set of open-ended questions were used to frame the discussions.

Table 3.6. Interviewed land managers

Study region	Interviewed land managers
Adirondacks	NY Department of Environmental Conservation ranger, county patroller
Missisquoi	Missisquoi NWR rangers
Northeast Kingdom	NorthWoods Stewardship Center ecologists, Nulhegan National Wildlife Refuge ranger
Androscoggin & Rangeley	Rangeley Lake Heritage Trusts staff and volunteers, Northern Waters staff
Allagash Wilderness Waterway	North Maine Woods director

3.5. Data Analysis

Data Categorization

To aid in the data analysis, several new variables were created, including group composition, user types, travel time, and travel distance. Four group compositions were created that were based on the number of adults and children. One adult was defined as a solo paddler. Two to four adults were identified as a small adult group. One or two adults, with one to three children were defined as a family group. Lastly, six or more adults and/or children were labeled as a large group.

Survey respondents indicated their hometown and state/country. Google Maps, an online mapping program, was used to obtain travel distance and times between the respondents' hometown and the access point where the survey was completed. ArcGIS software was used to map the home state of respondents.

Six user types were created based on the survey data. Local day users live within 25 miles of the access point. Non-local day users live farther than 25 miles from the access point, and were only in the region for a day. Four different classifications of overnight users were created, based on their accommodation types: hotel/cabin renters, campground campers, canoe campers (staying at remote campsites along the waterway), and second homeowners. If users reported more than one type of accommodation, they were assigned the code for the accommodation they primarily used while in the region. Groups staying as guests were assigned to the second homeowner category, as recommended by Stynes (1999).

Respondents indicated the towns in which they were making expenditures. In each study region, a frequency table was created based on the number of instances in which towns were listed on the survey cards. A map was created in ArcGIS with towns delineated as polygons. Each town was assigned its corresponding frequency value. Frequencies were split into quintiles and were color-coded accordingly.

Non-response Bias

As paddlers completing the survey through the registration kiosks were self-selecting, analyses were conducted to determine the presence of non-response biases. The literature recommends several approaches to checking and correcting for this type of error. Leeworthy, Wiley, English, and Kriesel (2001) compared race, income, gender, and home origin of tourists visiting the Florida Keys to those participating in the survey. Weights were assigned to the responses to correct for the actual population proportions of user groups. Another study used repeated contacting of non-respondents to create a subsample from which comparisons were made (Vistein 2006). Yet both of these

approaches require initial contacts with a representative sample of the study population. The second approach also requires contact information for non-respondents. Due to limited staffing, the low intensity of use, the wide geographic distribution of the population, and the long paddling season, intercepting an adequate proportion of the population was not feasible.

Instead, a non-response sample was taken by approaching and surveying non-registering groups. For key variables, responses were compared between self-registering and non-registering groups. For variables in which significant differences between the two groups were found, in-person responses were assigned weights equal to the inverse of the response rate multiplied by the ratio of self-registering surveys to in-person surveys.

No significant difference was found between mean total trip expenses, group sizes, travel times, or median household income levels. While there appeared to be differences between the types of users, the relationship was weak ($n=952$, $p<.05$). However, self-registering groups ranked their knowledge of the NFCT higher ($n=968$, $p<.01$), and were twice as likely to report the NFCT as a reason for their trip ($n=968$, $p<.01$). Table 3.7 summarizes these comparisons.

Table 3.7. Results of nonresponse analysis

Variable	Statistic	Significance
Total trip expenses ⁵	$z=-1.252$.211
Total group size	$t=-1.357$.177
Travel time (hours)	$z=-1.02$.274
Income	$z=-1.063$.288
Knowledge of NFCT	$z=2.752$.006**
NFCT as reason for trip	$z=-4.39$.001**

3.6. Estimation of Visitation Rates

An important component of economic impact modeling is an estimate of the visitation rates in the region. Use levels also need to be delineated between the different types of users (local day users, non-local day users, second home owners, hotel or cabin renters, campground campers, and canoe campers). Multiple methods, which incorporated data obtained in the paddler, lodging, and campground surveys, were used to estimate visitor rates. Several assumptions underlie this methodology. First, user types are mutually exclusive. That is, users fall into only one user category, and user estimates for each category can therefore be calculated independently. Second, it was assumed that visitors would only complete one survey over the course of the season, as directed on the survey instrument. Third, if users indicated multiple trips to the region in one season, it was assumed that the characteristics of future trips would be similar to the present trip.

⁵ The natural log of the total trip expenses was used to normalize the data.

Registration Kiosks

Surveys gathered in registration kiosks were the primary instrument for estimating visitor use. The formula for calculating total user days was as follows:

Total group-days: $(\sum_{(R,u)} d_i * n_i) * (1/r) * (1/v_{(R,u)}) * (1/o_{(R)})$, where:

- R = Study region
- u = User type
- d = Number of days in region
- i = Survey element (each survey response)
- n = Number of paddling trips to the region in season, on average
- r = Estimated response rate
- v = Percent valid responses
- o = Percent operational kiosks

Variable v (% valid response) is the percentage of completed surveys that had the necessary responses to conduct this analysis. Variable o (% operational kiosks) is a region specific calculation for the percent of the season the kiosks were fully operational. Vandalism, pen theft, and weather damage reduced the percentage of operational days for each kiosk. Kiosks were also installed and removed on different days, and this variable factored in these discrepancies.

Lodging and Campground Surveys

Data obtained in the lodging and campground surveys were used to form estimates of the number of hotel/cabin renters and campground campers in the Adirondack and Rangeley Lake study regions. The methodology was customized based on the data availability of each establishment (Table 3.8). For example, several cabin rental establishments had detailed records and knowledge of every group registered to stay at their facility for the summer season. In these situations, an establishment specific estimate was calculated by simply adding up the number of paddler groups registered. At

other lodging establishments, such as motels, this approach was not feasible. Instead, the following formula was devised to form an estimate:

$$T = \sum(s) N * O_s * L_s * P_s / A_s, \text{ where}$$

T= Total paddler groups, per establishment
 N= Number of rooms and cabins
 P= Percentage of groups that are paddlers
 A= Average length of stay
 O= Average occupancy rate (percentage of rooms occupied)
 L= Length of the season (days)
 S= Season (summer or fall)

For campgrounds, estimates of total paddler groups were obtained by multiplying staff estimates of the proportion of campers and day users that are paddler groups with the number of camping and day user groups recorded using the facility over the course of the 2006 season. Finally, total group days for each region, per user type were estimated using the following formula:

$$G = (\sum(i)T) / o * a, \text{ where}$$

G= Total group days, per region, per user type
 T= Total groups, per establishment
 i= Survey elements (Each lodge or campground)
 o= The percentage of lodges or campgrounds successfully surveyed
 a= Average trip length for lodging/cabin renters or campground campers for the region, obtained through the paddler survey

Allagash Wilderness Waterway

North Maine Woods keeps records of all the number of groups using the Allagash Wilderness Waterway. These records were subdivided into the different user types by using the proportions established by the paddler survey.

Table 3.8. Methodologies used to estimate visitation rates

User Type	Adirondacks	Missisquoi	Northeast Kingdom	Androscoggin	Rangeley Lake	Allagash
Local day users	Kiosks	Kiosk	Kiosks	Kiosk	Kiosks	North Maine Woods
Non-local day users	Kiosks	Kiosk	Kiosks	Kiosk	Kiosks, campground Survey	North Maine Woods
Second homeowners	Kiosks	Kiosk	Kiosks	Kiosk	Kiosks	North Maine Woods
Hotel, cabin renters	Lodging survey	Kiosk	Kiosks	Kiosk	Lodging survey	North Maine Woods
Campground campers	Campground survey	Kiosk	Kiosks, campground survey	Campground survey	Campground survey	North Maine Woods
Canoe campers	Kiosks	Kiosk	Kiosks	Kiosk	Kiosks	North Maine Woods

Weighting

As surveys were primarily administered at public boat launches, hotel/cabin renters and front country campers were underrepresented. Furthermore, in some regions, sampling was not proportionate to actual use. The Allagash, for example, was under-sampled relative to other regions. In visitor economic impact studies, weighting survey results is often necessary to avoid biased estimates of key demographic and economic variables due to sampling procedures (Wilton and Nickerson 2006). To correct for these biases, a system of weights was assigned to each user group within each region by first dividing the total number of estimated groups by the number of groups in the sample, and then rescaling these values to reflect the actual sample size (Table 3.9)

Table 3.9. Survey element weights, by region and user type

	Local day users	Non-local day users	Second home owners	Hotel/cabin renters	Campground campers	Canoe campers
Adirondacks	0.874	0.999	0.658	2.516	0.540	0.284
Missisquoi	0.517	0.775	0.287	0.280	0.300	N/A
Northeast Kingdom	2.348	0.673	0.465	0.274	0.580	0.178
Androscoggin Rangeley	N/A	1.991	0.267	0.142	2.930	1.031
Lake	1.078	3.073	0.540	2.715	0.580	0.318
Allagash	N/A	N/A	N/A	N/A	5.466	5.208

Economic Impact Modeling

Modeling the economic impact of visitor spending was an important component of this research. The relationship between spending and total income, personal income, and jobs depends on both the types of business expenditures and the characteristics of the local economy. “Input-output” software contains the suite of industry and regional multipliers necessary to make these conversions. The University of Michigan’s “Money Generation Model (MGM2)” software program was used to model the economic impacts of visitor spending. It requires four inputs: an estimate of the number of user-days, segmented by user type, average expenditures, also segmented by user type, local tax rates, and pertinent economic multipliers. Multipliers can either be imported into the program, or chosen based on the study area’s characteristics (rural, small metro, large metro, or state). As MGM2’s set expense categories were slightly different from the categories included on the survey, a reclassification was first conducted (Table 3.10). Rural multipliers were selected for the analysis. Economic impacts were calculated for each region independently.

Table 3.10. Conversion of survey expense categories to MGM2 categories

Survey Categories	MGM2 Categories
Lodging (Hotel/cabin renters)	Motel, hotel cabin or B&B
Lodging (Campground campers)	Camping fees
Restaurants	Restaurants and Bars
Groceries	Groceries
Transportation	Gas & oil
Access fees, guide/outfitters,	Admission & fees
Other retail	Sporting goods
Entertainment	Admission & fees
Other	Souvenirs and other expenses

Statistical Analysis

The statistical analysis software, SPSS 14.0, was used to conduct univariate and bivariate analysis. 95% confidence intervals were created for key variables, including group sizes, trip lengths, and expense estimates. Chi-Square, median, Kruskal Wallis, and Mann-Whitney tests were conducted to assess variation in group composition, user types, trip lengths, and travel times among regions. Lambda and Phi coefficients were used to determine the strength of any significant relationship. Kruskal-Wallis tests evaluated variations in knowledge and importance of the NFCT among regions and user types. A two stage, Tobit regression analysis was used to assess variables affecting total group expenditures.

Chapter 4: Results

4.1. Trip and User Profiles

Group Composition

The average paddler group had 4.12 persons (95% CI: 4.06-4.18). The highest proportion (40%) of paddling groups consisted of two adults. Paddling was a family activity for 24% of the users. Large groups, including scout troops, were 17% of the sample. Solo paddlers and groups of three to five adults made up 8% and 11% of the respondents, respectively (Figure 4.1).

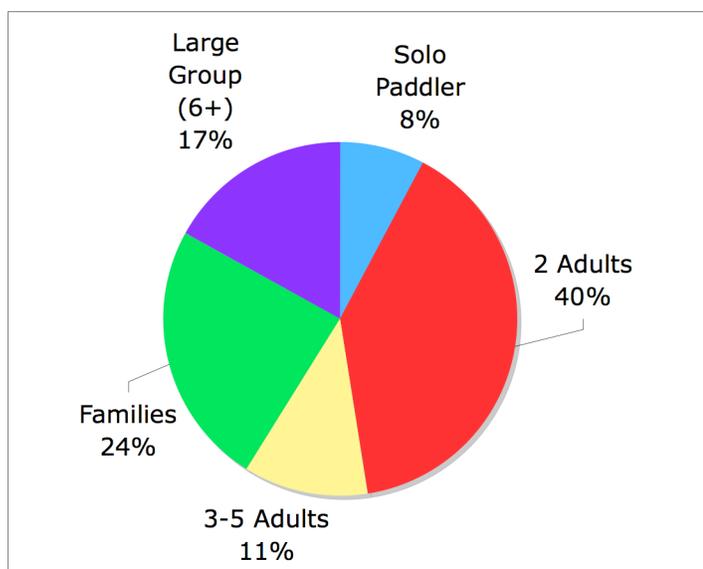


Figure 4.1. Composition of paddling groups (n=952)

As seen in Figure 4.2, the group composition varied significantly between regions (n=952, $p < .001$). Small adult groups and solo paddlers were prevalent in the Missisquoi. The Androscoggin and the Allagash appear more popular with large groups than other

regions. No significant differences in group composition were found between the different user types.

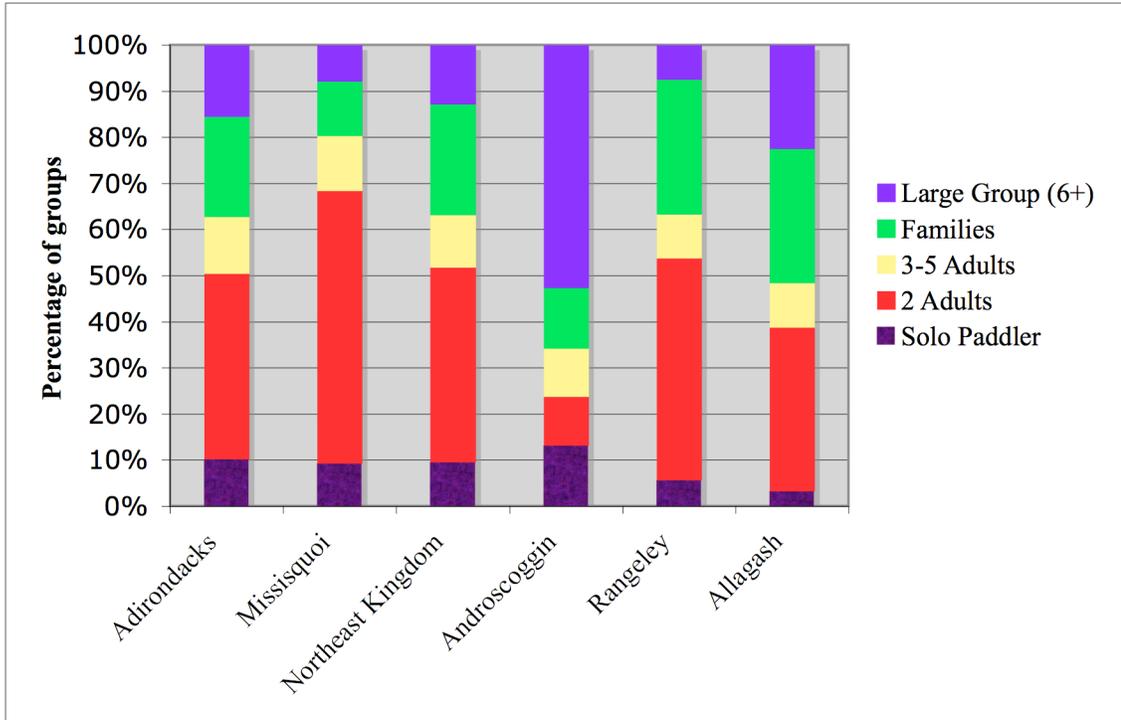


Figure 4.2. Variations in group composition between regions (n=952)

Length of Trip

The median length of stay in the region was three days (mean: 3.6, 95% CI: 3.4-3.8). 35.6% of groups were on a day trip. Of these day users, 56% were locals, living within 25 miles of the waterway. 25% of the groups were in the region for 2-3 days. 31% reported stays of 4-7 days. 8.4% were vacationing in the area for longer than a week.

Length of trip varied significantly by region (n=954, $p < .001$). As seen in Figure 4.3, Allagash visitors had the highest average trip lengths, followed by paddlers visiting

Rangeley Lake, the Adirondacks, the Androscoggin, the Northeast Kingdom, and the Missisquoi ($z=-7.6$, $p<.01$).

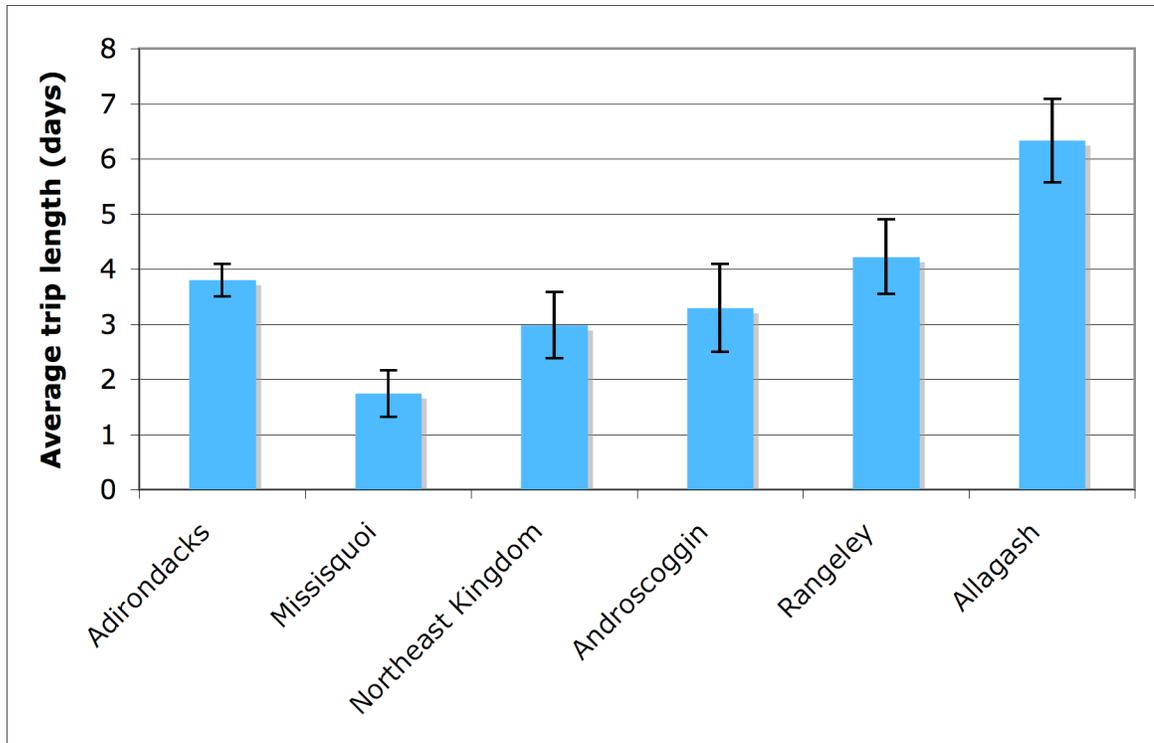


Figure 4.3. Mean trip lengths, by region. Error bars indicate 2 S.E. (n=954)

Length of Time on Water

While the median paddler spent six hours on the water (mean: 15.18, 95% CI: 12.9-17.5), the time spent varied widely (Figure 4.4). 37% of paddler groups were on the water for less than four hours. 53% were on the water for eight hours, or one day. The median paddler group took two paddling trips to the region in a season.

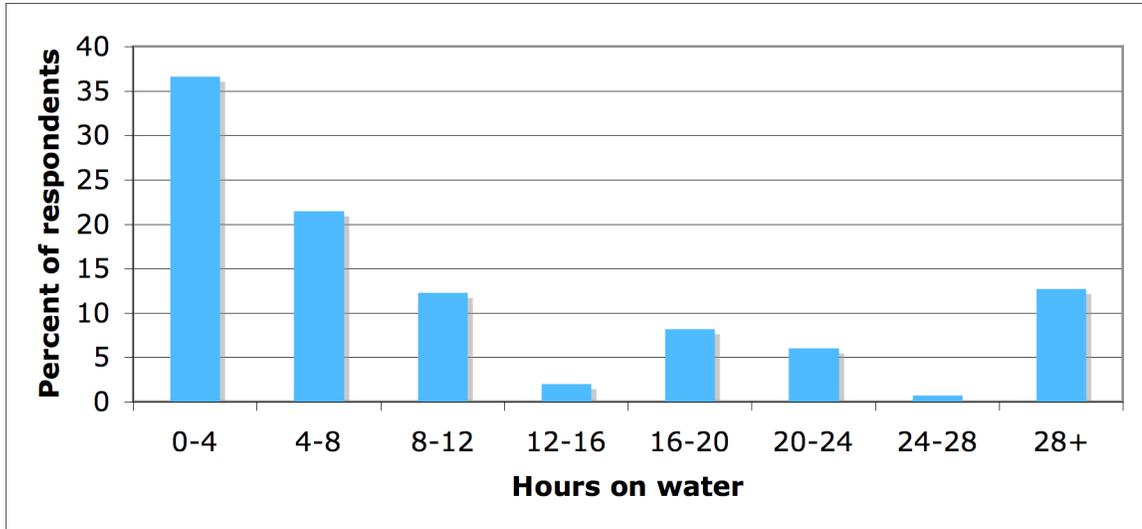


Figure 4.4. Hours spent on the water (n=919)

User Types

Figure 4.5 reveals the distribution of user types, delineated by their choice of accommodation. Canoe campers, staying at remote, water accessible sites, made up the largest proportion of users (24%), with campground campers the second largest user group (19.7%), followed by hotel/cabin renters (19.7%), local day users (17.2%) non-local day users (13.2%), and second homeowners (6.3%).

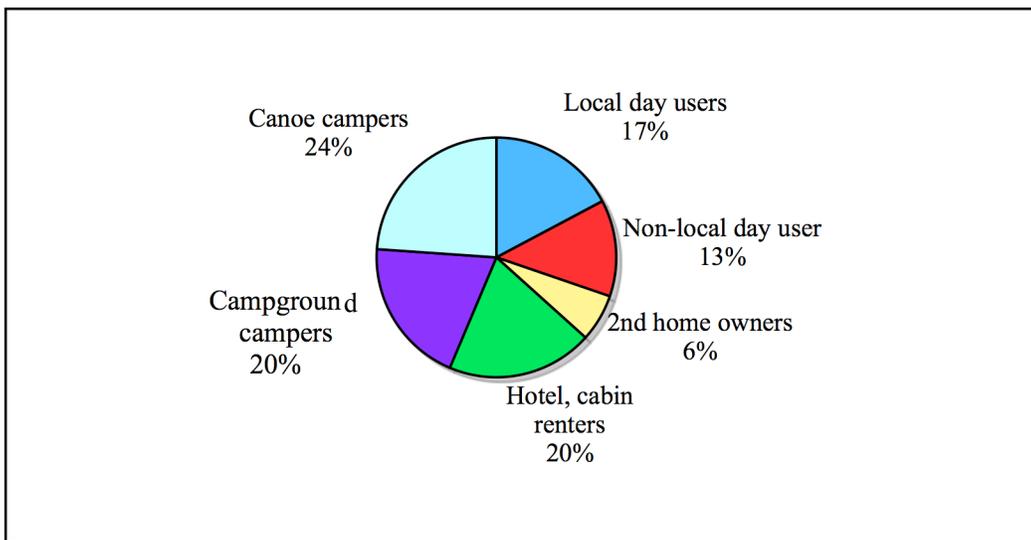


Figure 4.5. Distribution of user types, by choice of accommodation (n=965)

User types varied significantly between regions (n=965, p<.01). In the Adirondacks, the majority of users stayed at campgrounds, hotels, and cabins (Figure 4.6). A similar pattern was found at Rangeley Lake, although a higher proportion (52.3%) of users rented hotel rooms and cabins than in any other study region. While the Clyde and the Connecticut Rivers in the Northeast Kingdom attracted a variety of users, they also had the highest proportion (36.7%) of local paddlers. The Androscoggin attracted a wide diversity of users, with campers predominating, but very few local day users. Allagash paddlers seek a remote experience; 90% of the respondents were canoe campers. Non-local day users, who made up 46% of the paddler groups, were most prevalent on the Missisquoi. None of the respondents in this region were canoe campers.

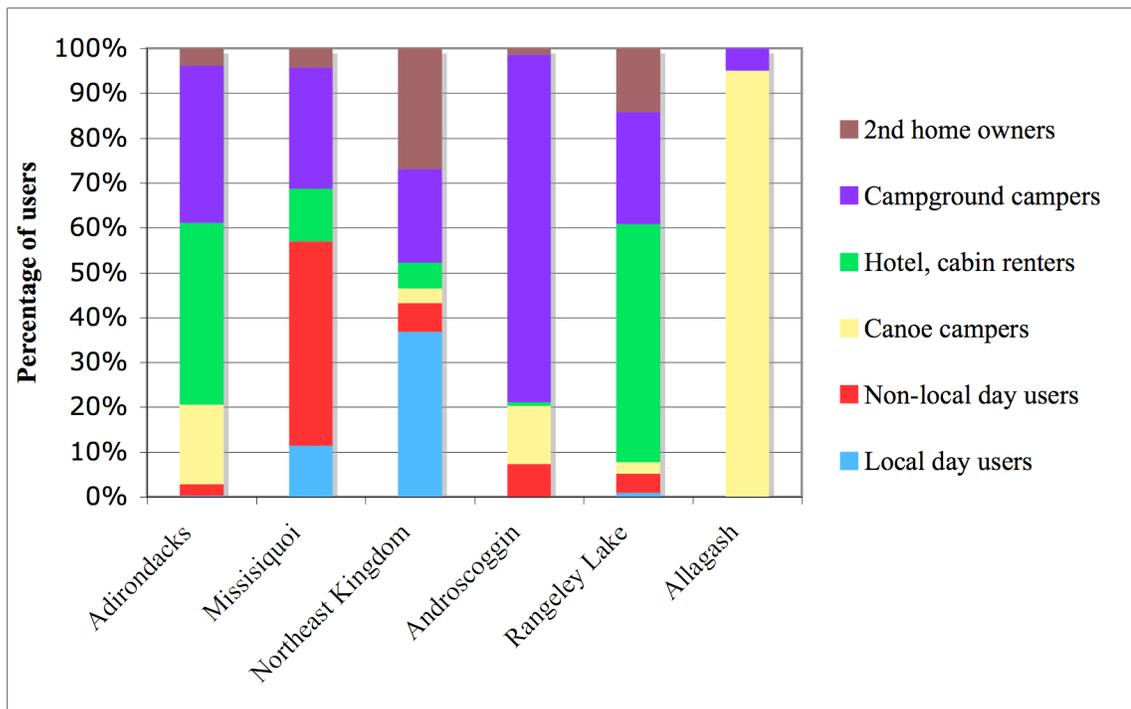


Figure 4.6. User types, by study region (n=965)

Distance Traveled

The median paddler traveled 3.5 hours to reach the waterway. International users made up less than one percent of the sample. As seen in Figure 4.7, average travel times varied significantly between regions ($n=924$, $p<.001$). Groups traveled the greatest distance to reach the Allagash. At between 2.8 and 4 hours, average travel times were not significantly different for visitors to the Adirondacks, the Androscoggin River, and Rangeley Lake. Vermont's rivers appear to receive more local use, with average travel times for the Missisquoi River and in the Northeast Kingdom at 1.6 and 1.7 hours, respectively, significantly less than in other regions ($n=924$, $p<.001$).

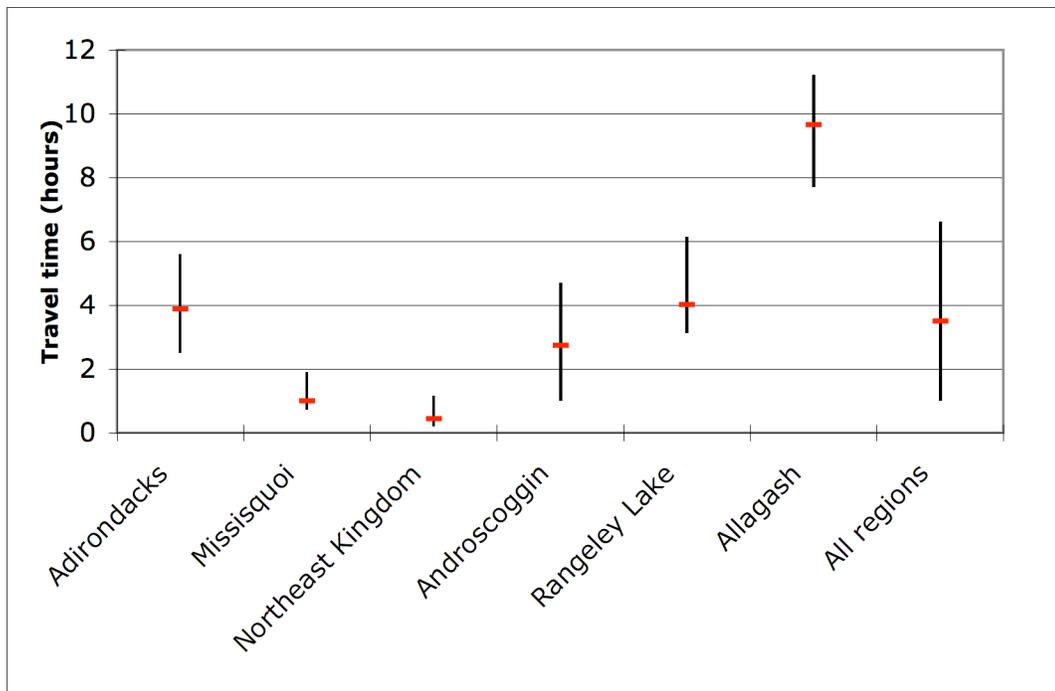


Figure 4.7. Median travel times. Error bars indicate 25th and 75th quartiles. ($n=935$)

Paddler Home States

While paddlers came from a variety of locales, most live in the northeastern U.S. (Figure 4.8). The majority (69%) of Adirondack paddlers were from New York. 7% were from Pennsylvania, and 4% were from Vermont. New England states accounted for most of the Missisquoi paddlers, with 66% from Vermont, and 9% from New York. Although the majority (74%) of paddlers in the Northeast Kingdom were from Vermont and New Hampshire, the region attracts a wide range of visitors, particularly along the eastern seaboard. Visitors from New Hampshire (36%), Vermont (17%) and Maine (16%) dominated use on the Androscoggin River. 31% traveled from other states. Rangeley Lake attracts paddlers from every northeastern state (Figure 4.8). 45% of paddlers were from Maine and 19% were from Massachusetts. Allagash paddlers are mostly from Maine (33%), Massachusetts (23%), and New Hampshire (20%).

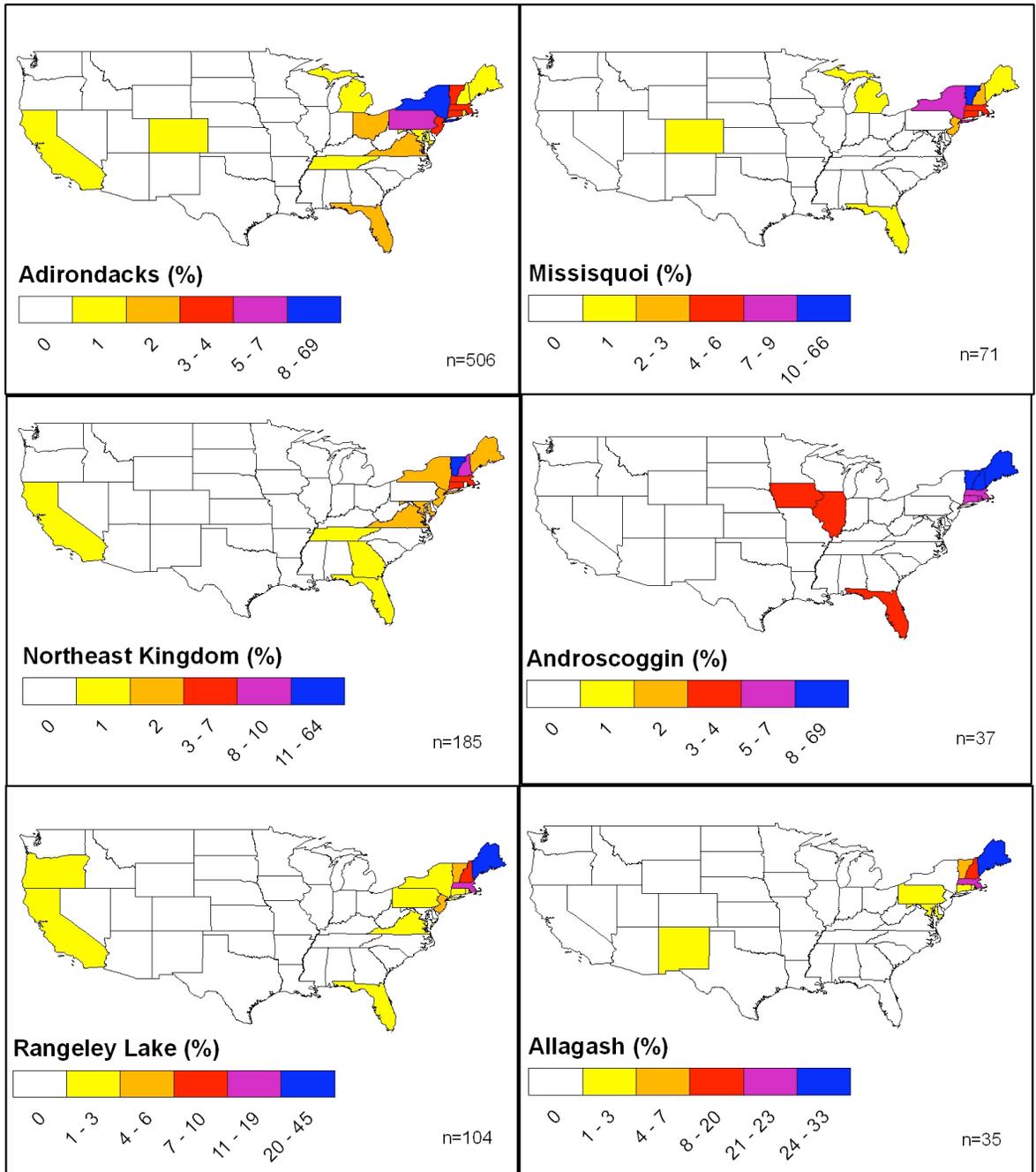


Figure 4.8. Home states of paddlers

Household Income

While paddler groups fell within a wide range of income categories (Figure 4.9), the median family income was between \$65,000 and \$79,000. This estimate is notably higher than the 2005 US median household income of \$46,242. Household income varied significantly between user types ($n=751$, $p<.001$) and regions ($p<.05$). As seen in Figure 4.9, second homeowners had the highest incomes, and local day users had the lowest. Paddlers in the Adirondacks, Allagash, and Rangeley Lake generally had higher incomes than those visiting the Missisquoi, Northeast Kingdom, and Androscoggin (Figure 4.10).

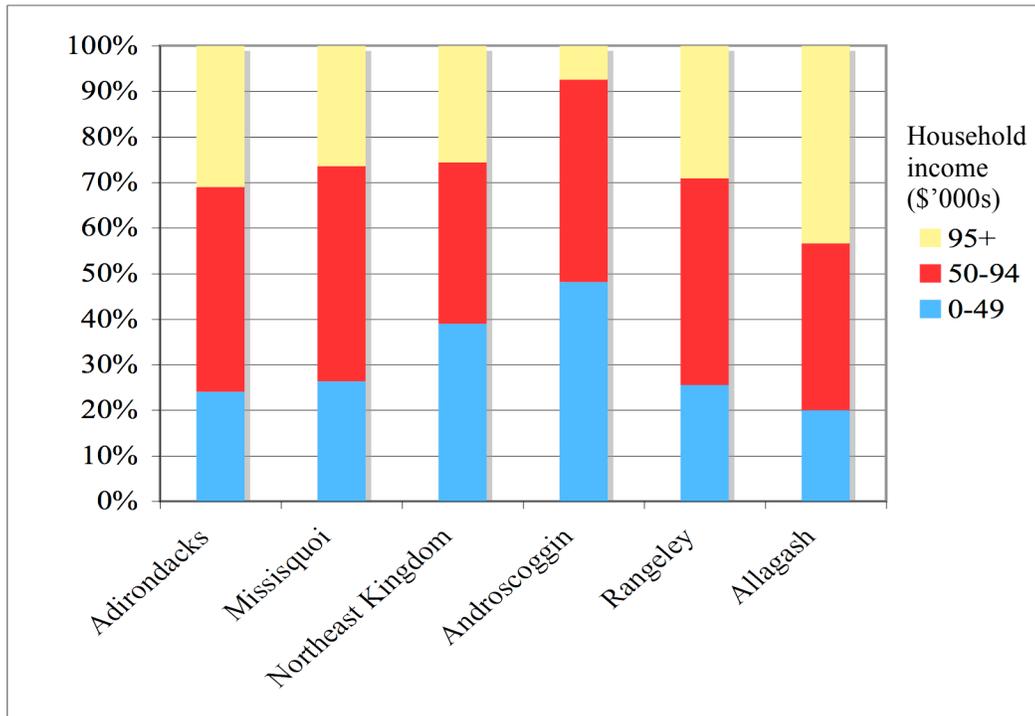


Figure 4.9. Distribution of household incomes among paddler types ($n=751$)

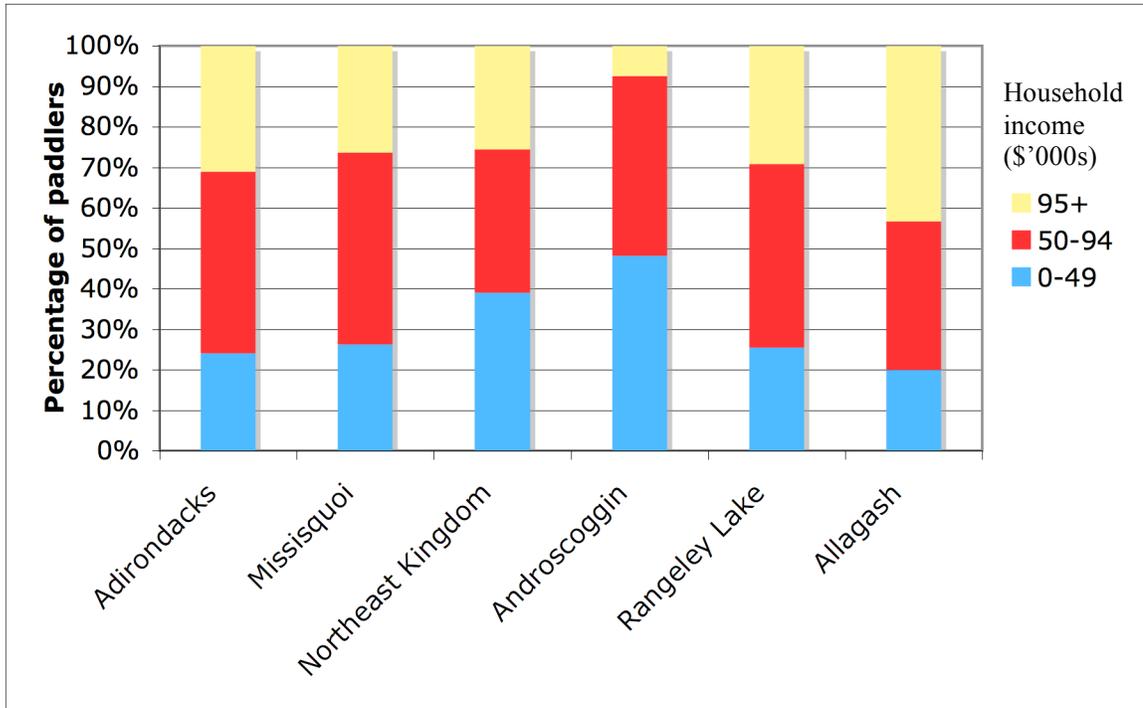


Figure 4.10. Distribution of household incomes among study regions (n=751)

4.2. Outfitters

There are striking variations in the importance of the canoe and kayak outfitting businesses in the different regions. Six businesses rent and sell canoes and kayaks in the Adirondack section. The primary outfitter, “Mountain Man,” has 56 rental boats on stock in the town of Inlet, sells paddling boats and gear, and repairs damaged boats. Tinkners, in Old Forge, is also a well-established outfitter. However, the majority of their business serves a section of the Moose River that is not part of the NFCT.

No outfitters are located near the Missisquoi River Delta, although one guide, based in Vergennes, VT, is licensed to lead river trips in the Missisquoi National Wildlife Refuge. However, he reported no river business during the 2006 paddling season. The primary “outfitter” on the Clyde and Connecticut Rivers is the NorthWoods Stewardship Center, in East Charleston, VT. For over a decade, they have been running guided trips

on the Clyde and Connecticut Rivers, including an “end to end” program in which, over the course of the season, participants paddle the entire length of the Clyde. They also run monthly “full moon” trips, and have been instrumental in river stewardship in the region. In Island Pond, two outdoor stores sell paddling apparel. However, paddlers only account for about five percent of their business.

Errol, New Hampshire has two outfitters. One business, which started as a hardware store, caters to a diversity of outdoorsmen and rents and sells canoes and kayaks. The other, Northern Waters, has provided canoe and kayaking instruction for over thirty years. In addition, the business runs shuttle services and manages campsites. Other guides also take groups on the Androscoggin.

In Rangeley Lake, in addition to several outdoor stores, two outfitters rent canoes and kayaks. Much of their business serves area rivers and lakes that are not part of the NFCT, with the exception of Ecopelagicon, which offers guided trips on Rangeley Lake and other NFCT waterways. Families staying in lakeside cabins are their primary customers.

Six outfitters provide boat rental and shuttling service along the Allagash, and several other guides run trips on the river. Due to its remote, linear nature, a higher percentage of Allagash paddlers enlist the services of guides and outfitters than in any other region along the canoe trail.

Outfitters were generally knowledgeable about the NFCT. Several had assisted in designing area maps, and were strong supporters of the canoe trail. However, it does not appear that the NFCT has brought very many new customers. Business managers reported that, on average, only one percent of current business came from groups

specifically paddling the NFCT this summer. 50% thought it likely that the NFCT would bring them new business as the trail gains in popularity.

4.3. Lodging

Canoeing and kayaking is an activity for an estimated 47% (95% CI: 33-61%) of the guests staying at waterway lodging establishments in the study regions during the paddling season. In a testament to the popularity of paddle sports among area visitors, 52% (95% CI: 42-62%) of the facilities have boats available for guests to use. 35% of the lodging managers reported either knowing a lot or some things about the NFCT. 29% thought the canoe trail was likely or very likely to bring them new business, while 71% reported it was unlikely or very unlikely. Lodging owners were generally knowledgeable about the paddling opportunities in the area. In the Adirondacks, spring and fall canoe races and festivals bring a much-appreciated surge of business.

4.4. Visitation Estimates

Table 4.1 presents estimates of visitation rates across all study regions. An estimated 22,074 groups (89,399 users) paddled the waterways in the six study areas. Measured in user-days, the Adirondacks received the heaviest use, followed by the Allagash, the Northeast Kingdom, Rangeley Lake, the Androscoggin, and the Missisquoi River. Standardized by waterway miles, Rangeley Lake and the Adirondacks appear to have the highest use intensity, due to the presence of state campgrounds and waterway lodging establishments.

Table 4.1. Visitation rates across study regions

Region	Groups	Group-days	Visitors	User-days	Trail miles	User-days/mile
All areas	22,074	80,609	89,399	329,881	219	1510
Adirondacks	7,889	30,030	27,374	104,020	58	1809
Missisquoi	888	1,254	2,424	15,345	10	1535
Northeast Kingdom	4,686	8,389	16,870	55,504	33	1682
Androscoggin	1,799	5,642	13,939	24,255	17	1427
Rangely Lake	2,834	10,095	8,503	25,340	11	2304
Allagash	3,978	25,200	20,565	86,785	90	964

Use distribution

Users enter the waterways primarily at public boat launches, campgrounds, and hotel or rental cabins. Across the six study regions, public boat launches account for 59% of the use, followed by campgrounds (22%), and hotels and cabins (19%). As illustrated in Figure 4.11, the relative importance of each access type varies by region. In the Adirondacks and Rangely Lake, users are evenly split between types of access points. On the Androscoggin, waterway campgrounds are most important. On the Missisquoi, in the Northeast Kingdom, and in the Allagash, boat launches serve the majority of the paddler population.

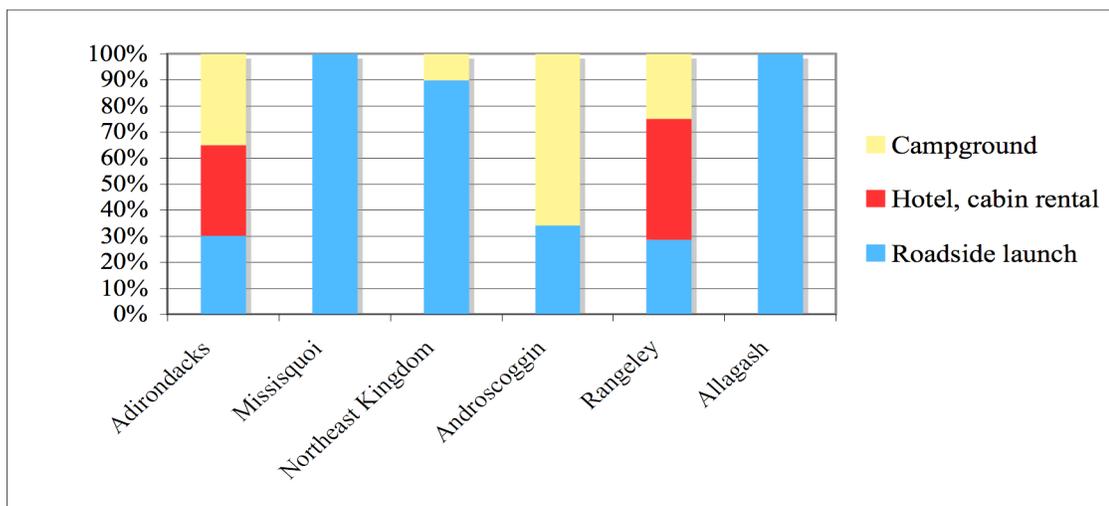


Figure 4.11. Distribution of user-days by access category

4.5. Impact of the NFCT

Two questions were used to gauge the relative impact of the Northern Forest Canoe Trail:

- How much do you know about the Northern Forest Canoe Trail? (a lot, a few things, not very much, or nothing)
- Was paddling part of the Canoe Trail a reason for this trip? (yes or no)

It appears the NFCT is fairly visible, with 65% reporting some knowledge of the NFCT (Figure 4.12). The canoe trail is also beginning to attract users; 17.7% indicated the NFCT was a reason for their trip⁶.

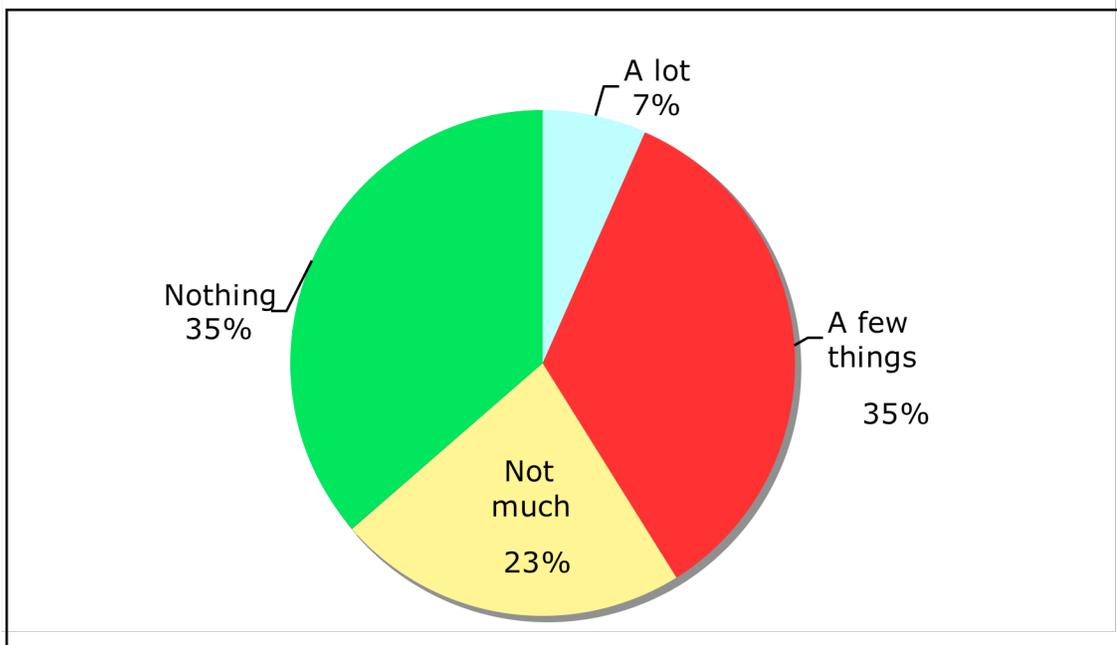


Figure 4.12. Respondents knowledge of the Northern Forest Canoe Trail (n=968)

The relative impact of the NFCT varied by region and user types (Figure 4.13 and Figure 4.14). The NFCT was most likely a reason for a paddling trip in the Adirondacks and least likely on the Missisquoi River (n=899, p<.001). Familiarity of the NFCT also

⁶ Both statistics were weighted to correct for nonresponse bias. Allagash responses were excluded from this analysis, due to small sample size and lack of nonresponse surveys.

varied significantly by region (n=968, p<.001), appearing greatest among Androscoggin paddlers, and least among Rangeley Lake paddlers. Knowledge of the NFCT also varied significantly among user types (n=968, p<.001), with local day users reporting the most knowledge of the NFCT, followed by non-local day users. It appears the NFCT attracts hotel/cabin renters and campground campers more than other user types (n=899, p<.001).

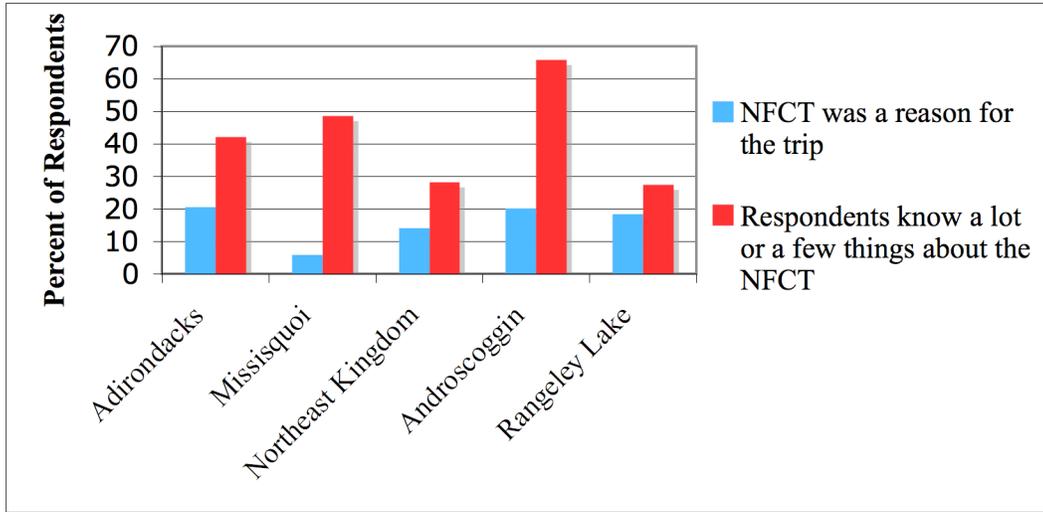


Figure 4.13. Knowledge and importance of the NFCT, across study regions (n=899)

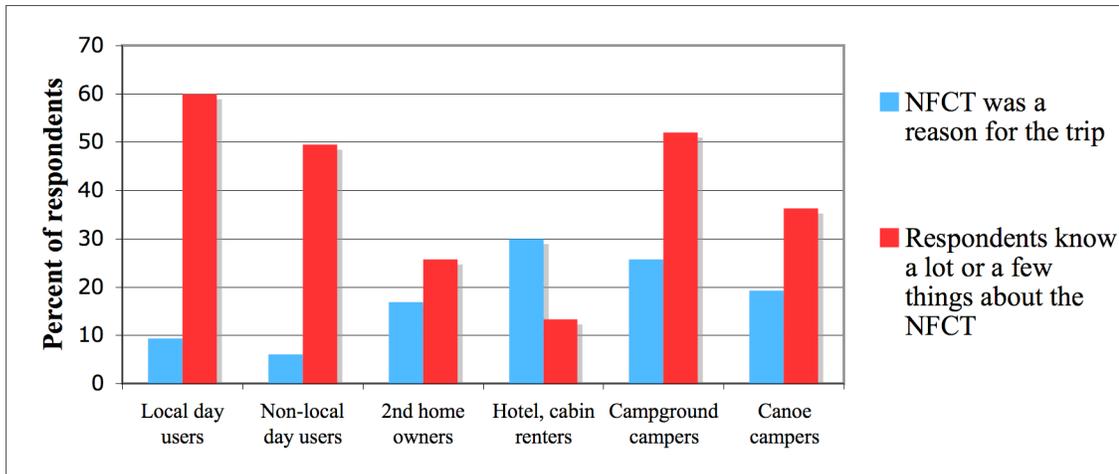


Figure 4.14. Knowledge and importance of the NFCT, across user types

4.6. Visitor Expenditures

Figure 4.15 summarizes the probability of expenditures across different categories. The most common expenses were lodging (48.6%), restaurants (57.4%), groceries (60.9%) and transportation (54.7%). 11.9% of paddlers used guides or outfitters. 27.1% reported other retail purchases.

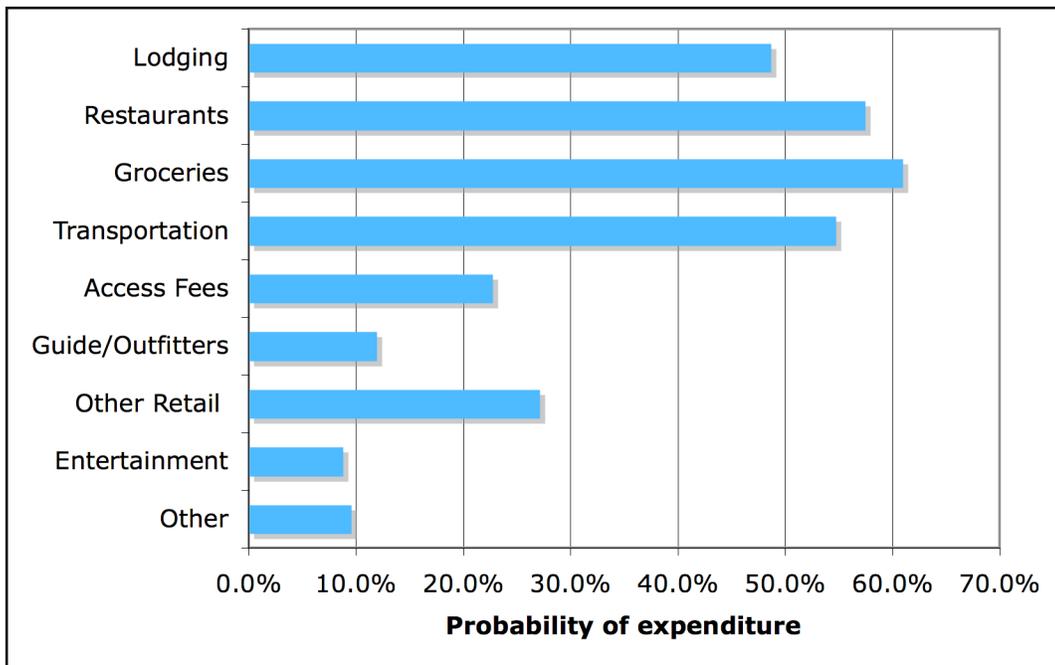


Figure 4.15. Probability of expenditures, per category

Across all study regions, the average paddler group reported spending \$343-416, or \$39 per person per day, within twenty-five miles of the waterway during the duration of their trip. Expenditure levels varied widely between groups (Figure 4.16), and the median per group per trip expenditure was \$215. Local groups spent a mean of \$12-28, or \$5 per person, per day, non-local groups a mean of \$414-498, or \$46 (median= \$23) per person, per day (Table 4.2).

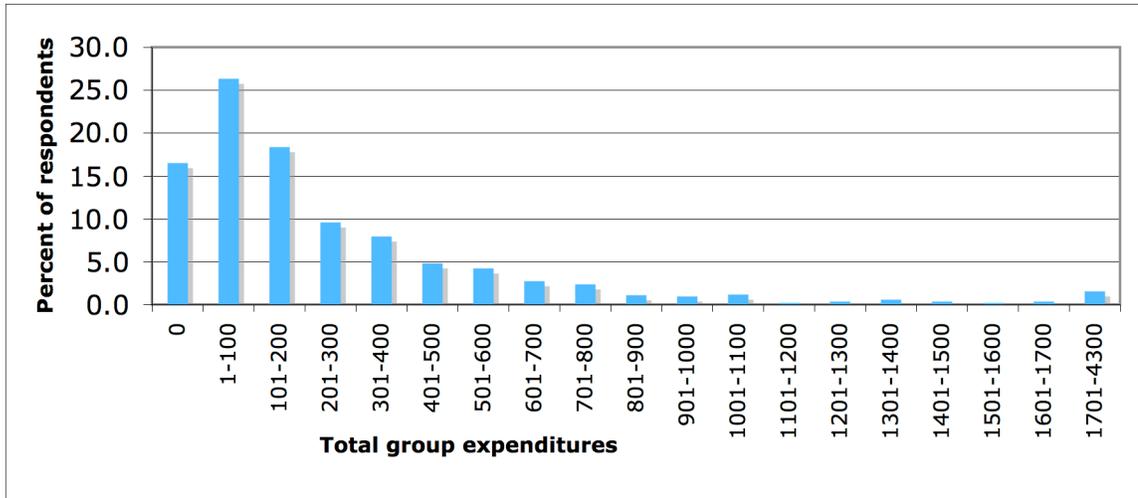


Figure 4.16. Distribution of expenditure levels (n=831)

Table 4.2. Average paddler expenses: local and non-local paddlers

Paddler type	Average group expenses	Per person, per day expenses	n
All paddlers	\$380	\$39	831
Local paddlers	\$20	\$5	79
Non-local paddlers	\$456	\$46	752

As seen in Table 4.3, expenditures varied significantly between user types (n=831, p<.001). Guided campers (\$564-936) and hotel and cabin renters (\$613-929) had the highest average expenditures, followed by campground campers (\$282-392), canoe campers (\$166-240), second home owners (\$181-309), non-local day users (\$29-73) and local day users (\$9-29).

Table 4.3. Average paddler expenses, across user types

User Type	Mean group expenditures (\$)	95% Confidence Interval (\$)	Median (\$)	n
Local day users	20	9-29	0	73
Non-local day users	51	29-73	20	104
Second home owners	243	181-309	150	85
Hotel, cabin renters	771	613-929	565	79
Campground campers	332	166-250	225	236
Canoe campers	203	166-240	99	153
Guided campers	750	564-936	800	66

Table 4.4 summarizes average per trip, per group expenses across expenditure categories and regions. Groups reported the highest lodging expenses in the Adirondacks. Rangeley Lake paddlers had the highest restaurant expenses. Outfitter transportation services, and guided trips were most common in the Allagash and the Adirondack (Table 4.5). Lodging, guide, and outfitter expenses accounted for roughly half of the direct impact of paddlers in the local economy.

Average expenses (Table 4.4) varied significantly across regions ($n=831$, $p<.001$). Allagash respondents had the highest expenses followed by Rangeley Lake ($z=3.63$, $p<.001$). Average expenses in the Adirondacks and the Androscoggin study regions were statistically indistinguishable, but less than Rangeley Lake ($z=3.69$, $p<.001$) and greater than the Northeast Kingdom. ($z=2.87$, $p<.01$). Expenses by paddlers visiting the Northeast Kingdom were not statistically different than those made by Missisquoi paddlers.

Table 4.4. Mean per group, per trip, expenditures. Standard errors are in italics.

Expense Category	Adirondacks	Missisquoi River	Northeast Kingdom	Androscoggin	Rangeley Lake	Allagash	All Regions
Lodging	\$235.16 <i>\$29.13</i>	\$17.44 <i>\$13.25</i>	\$17.68 <i>\$9.32</i>	\$94.55 <i>\$15.86</i>	\$181.40 <i>\$24.33</i>	\$68.92 <i>\$6.42</i>	\$127.86 <i>\$11.06</i>
Restaurants	\$81.11 <i>\$6.14</i>	\$12.85 <i>\$4.29</i>	\$13.03 <i>\$2.85</i>	\$14.24 <i>\$3.05</i>	\$94.86 <i>\$10.41</i>	\$54.93 <i>\$3.73</i>	\$54.62 <i>\$2.88</i>
Groceries	\$45.79 <i>\$4.13</i>	\$13.96 <i>\$6.74</i>	\$20.95 <i>\$4.07</i>	\$68.07 <i>\$11.50</i>	\$83.19 <i>\$9.28</i>	\$62.30 <i>\$7.85</i>	\$48.69 <i>\$2.80</i>
Transportation	\$36.33 <i>\$3.76</i>	\$8.11 <i>\$3.06</i>	\$10.96 <i>\$2.32</i>	\$46.65 <i>\$7.38</i>	\$39.19 <i>\$4.04</i>	\$159.81 <i>\$10.12</i>	\$54.13 <i>\$3.07</i>
Access fees	\$2.20 <i>\$0.59</i>	\$0.24 <i>\$0.44</i>	\$0.30 <i>\$0.31</i>	\$2.26 <i>\$1.28</i>	\$0.49 <i>\$0.21</i>	\$97.56 <i>\$8.18</i>	\$19.27 <i>\$2.01</i>
Guides, outfitters	\$18.30 <i>\$4.92</i>	\$1.03 <i>\$1.17</i>	\$1.78 <i>\$2.59</i>	\$3.39 <i>\$1.63</i>	\$0.76 <i>\$0.76</i>	\$266.69 <i>\$85.75</i>	\$56.70 <i>\$16.41</i>
Other retail (equipment, souvenirs)	\$37.50 <i>\$6.97</i>	\$3.44 <i>\$2.59</i>	\$10.86 <i>\$4.90</i>	\$12.28 <i>\$3.35</i>	\$27.07 <i>\$4.58</i>	\$25.97 <i>\$4.38</i>	\$24.57 <i>\$2.82</i>
Entertainment	\$7.56 <i>\$1.44</i>	\$0.12 <i>\$0.22</i>	\$1.19 <i>\$0.58</i>	\$0.00 <i>\$0.00</i>	\$14.24 <i>\$3.23</i>	\$0.00 <i>\$0.00</i>	\$4.69 <i>\$0.68</i>
Other	\$7.95 <i>\$2.56</i>	\$0.00 <i>\$0.00</i>	\$6.84 <i>\$2.28</i>	\$14.85 <i>\$7.49</i>	\$3.42 <i>\$3.74</i>	\$32.67 <i>\$8.28</i>	\$11.77 <i>\$1.99</i>
Total expenses	\$470.45 <i>\$37.40</i>	\$56.76 <i>\$21.62</i>	\$83.44 <i>\$17.16</i>	\$255.58 <i>\$31.93</i>	\$443.92 <i>\$39.21</i>	\$750.35 <i>\$93.23</i>	\$400.34 <i>\$24.18</i>
n	430	68	171	34	95	33	831

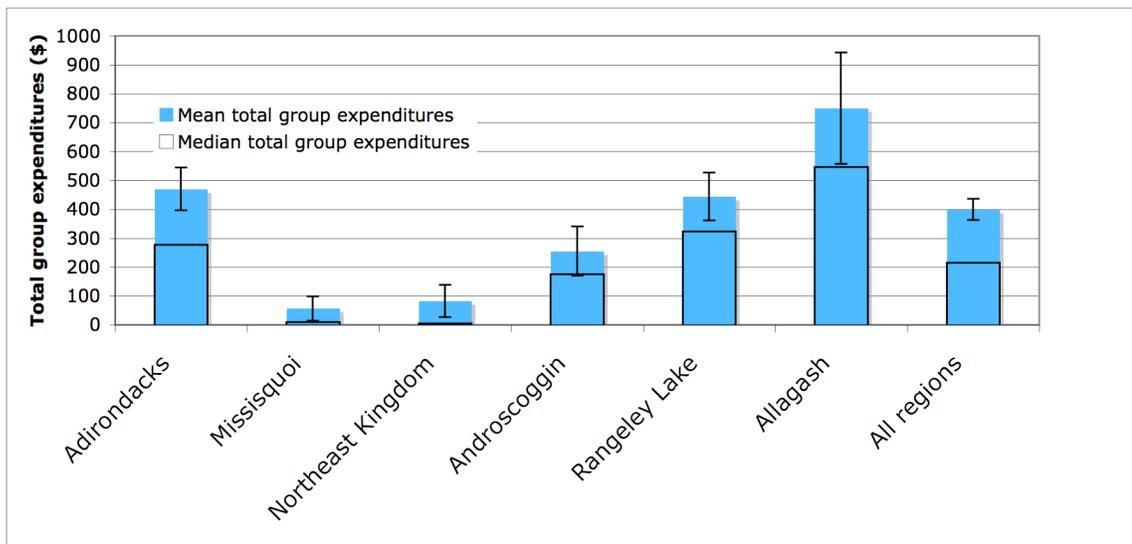


Figure 4.17. Average per group, per trip expenditures. Error bars: 2 SE, n= 832

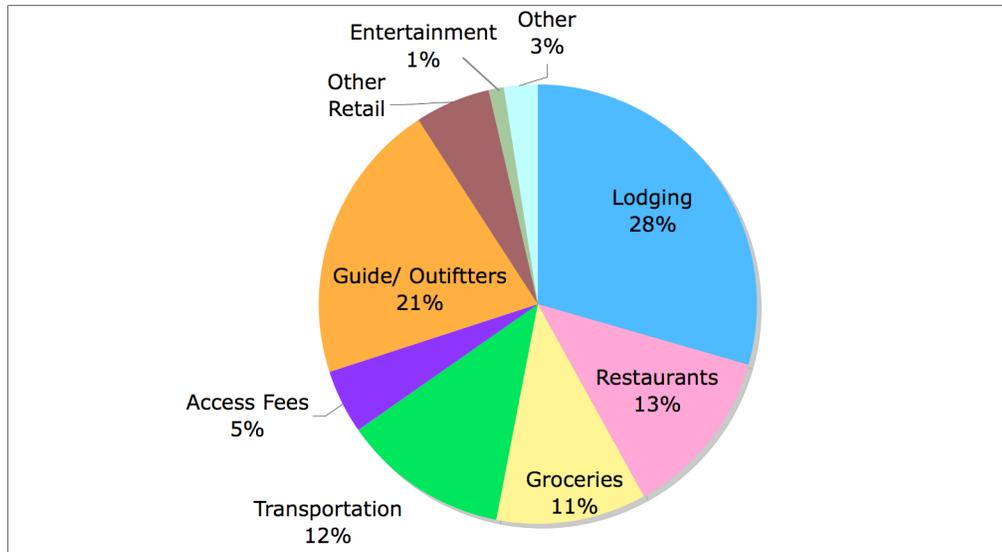


Figure 4.18. Distribution of total paddler spending across expenditure categories (n=831)

Table 4.5. Reported use of guide and outfitter services, by region

Study region	Percentage utilizing guide or outfitter services	n
All regions	12%	828
Adirondacks	11%	430
Missisquoi	3%	67
Northeast Kingdom	1%	171
Androscoggin	6%	34
Rangeley Lake	1%	94
Allagash	38%	32

Tobit Regression

A Tobit regression model was used to determine variables driving total group expenditures. The Tobit model, developed by J. Tobin in 1958, is a two-stage regression that assesses the importance of independent variables in driving a dependent variable when the dependent variable is greater than zero (Tobin 1958). This approach was chosen as over 15% of the paddler groups reported no expenditures in local communities.

The results of the Tobit regression analysis suggest trip length, travel distance, the use of hotel or cabins, and guides or outfitters are significant variables in explaining total

trip expenses. However, they explain less than a third of the variation ($r^2 = .27$) Group size, household income, and number of annual paddling trips in the region were not significant variables in the analysis (Table 4.6).

Table 4.6. Results of Tobit analysis

Variable	b	p-value
Length of trip in region	50.15	0.00
Travel distance (miles)	0.099	0.02
Hotel/cabin renters	496	0.00
Guide or outfitter users	278	0.00
Household income	0.09	0.75
Number of paddling trips	-2	0.26
Group size	4.12	0.28

4.7. Economic Impact

An estimated \$8.8 million was spent in local economies by paddlers in the six study regions. After accounting for multiplier effects, these expenditures created \$6.6 million in value added to the local economy, \$12 million in total economic impact, supported an estimated 283 jobs, and provided \$4.1 million in personal income.

Table 4.7 summarizes the economic impacts in each study region. Total impacts were greatest in the Adirondacks, Rangeley Lake, and the Allagash, due to a combination of relatively high visitation rates and high proportions of non-local paddlers staying in the region for several days. Local communities in the Northeast Kingdom and near the Androscoggin received modest benefits from paddler tourism and recreation. Due to relatively low use levels, particularly among tourists, paddlers on the Missisquoi contributed the least even after accounting for variations in the size of the study regions.

Table 4.7. Economic impacts of visitor spending across study regions

	Output/sales (000's)	Personal income (000's)	Value added (000's)	Total jobs	Income per trail mile (000's)
All regions	\$12,039	\$4,143	\$6,626	283	\$19
Adirondacks	\$6,089	\$2,104	\$3,342	134	\$37
Missisquoi	\$64	\$21	\$33	2	\$2
Northeast Kingdom	\$557	\$195	\$305	15	\$6
Androscoggin	\$452	\$156	\$252	12	\$9
Rangeley Lake	\$1,919	\$624	\$998	51	\$57
Allagash	\$1,880	\$408	\$1087	29	\$5

Table 4.8 summarizes the marginal impact of increased paddler tourism and recreation. Every \$1,000 in paddler spending leads to \$338 in personal income and .027 jobs. Using these values, an additional 85 non-local paddler groups, spending roughly \$37,000 in local communities, will support the equivalent of one new job.

Table 4.8. Marginal impacts of increased spending and paddler groups

	Change of \$1000 in visitor spending	85 additional paddlers
Direct personal income	\$253	\$9,488
Direct value added	\$385	\$14,438
Direct jobs	0.023	0.86
Total personal income	\$338	\$12,675
Total value added	\$542	\$20,325
Total jobs	0.027	1

Location of direct expenditures

Survey respondents were asked in which towns they were making their expenditures. Figure 4.19-Figure 4.24 represent their responses. The majority of paddlers in the study regions spent money in towns adjacent to the waterway access points and major roads. In the Adirondacks, the towns of Webb (Old Forge), Inlet, and Long Lake were most frequently mentioned. Near the Missisquoi River, Swanton was frequently

referenced, followed by several towns on the Champlain Islands, a popular vacation destination. While economic impacts were less concentrated in the Northeast Kingdom, the towns of Brighton (Island Pond) and Burke were popular locations for expenditures.

Errol, NH appears to be the key gateway community for paddlers utilizing the Androscoggin. However, several towns to the south also capture visitors' expenditures, including Berlin and Melan. Survey responses confirmed Rangeley Lake's image as a destination community, as the majority of paddlers made use of Rangeley's businesses during their stay. Paddlers also made stops nearby, including in Farmington, Maine. The geographical extent of economic impacts in the Allagash was dispersed along the outskirts of the study region. Several towns appear to serve as gateway communities, including Allagash, Fort Kent, Millinocket, and Ashland.

Adirondack study area Location of paddler expenditures

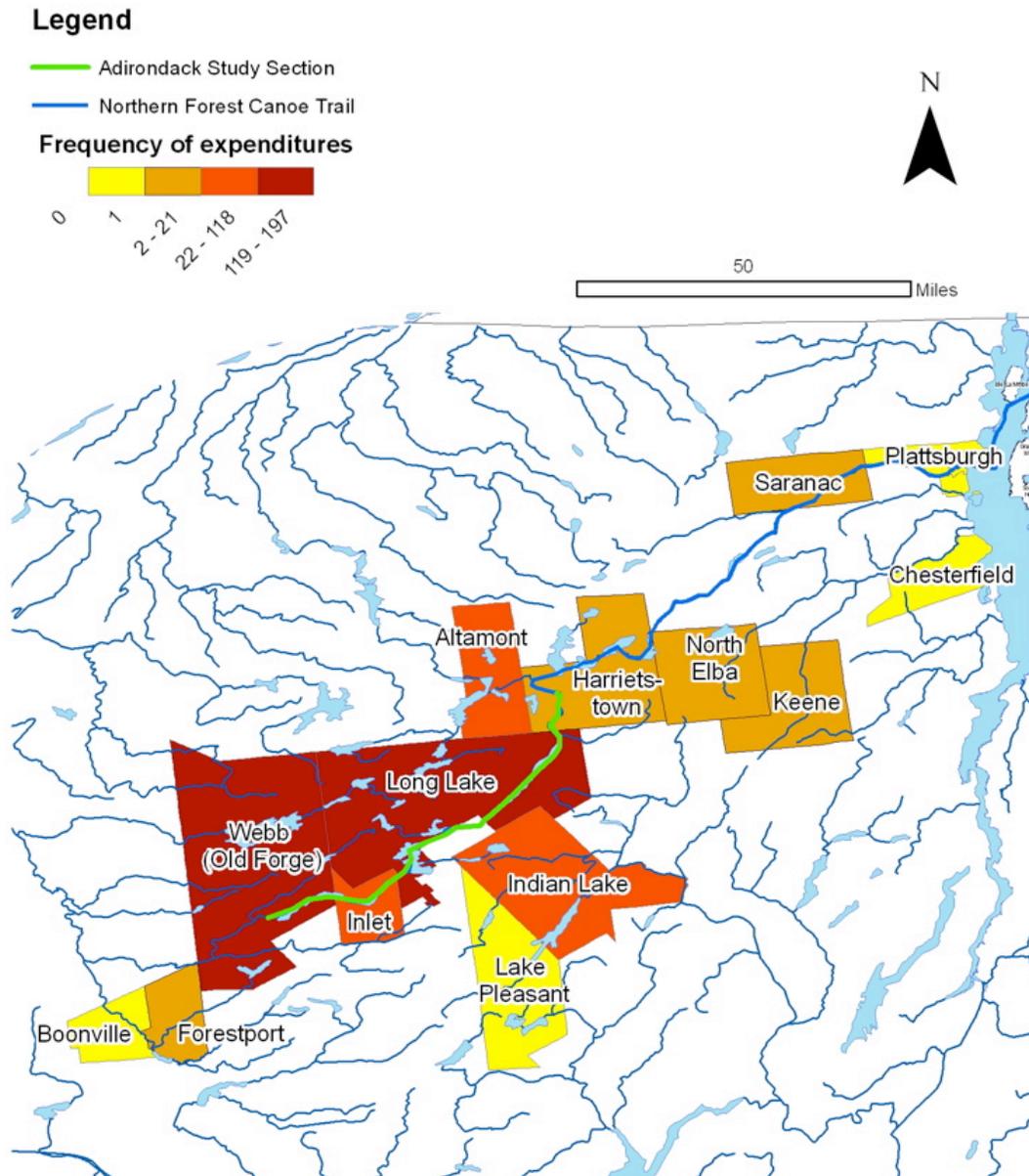


Figure 4.19. Adirondack study area: location of paddler expenditures

Missisquoi study area Location of paddler expenditures

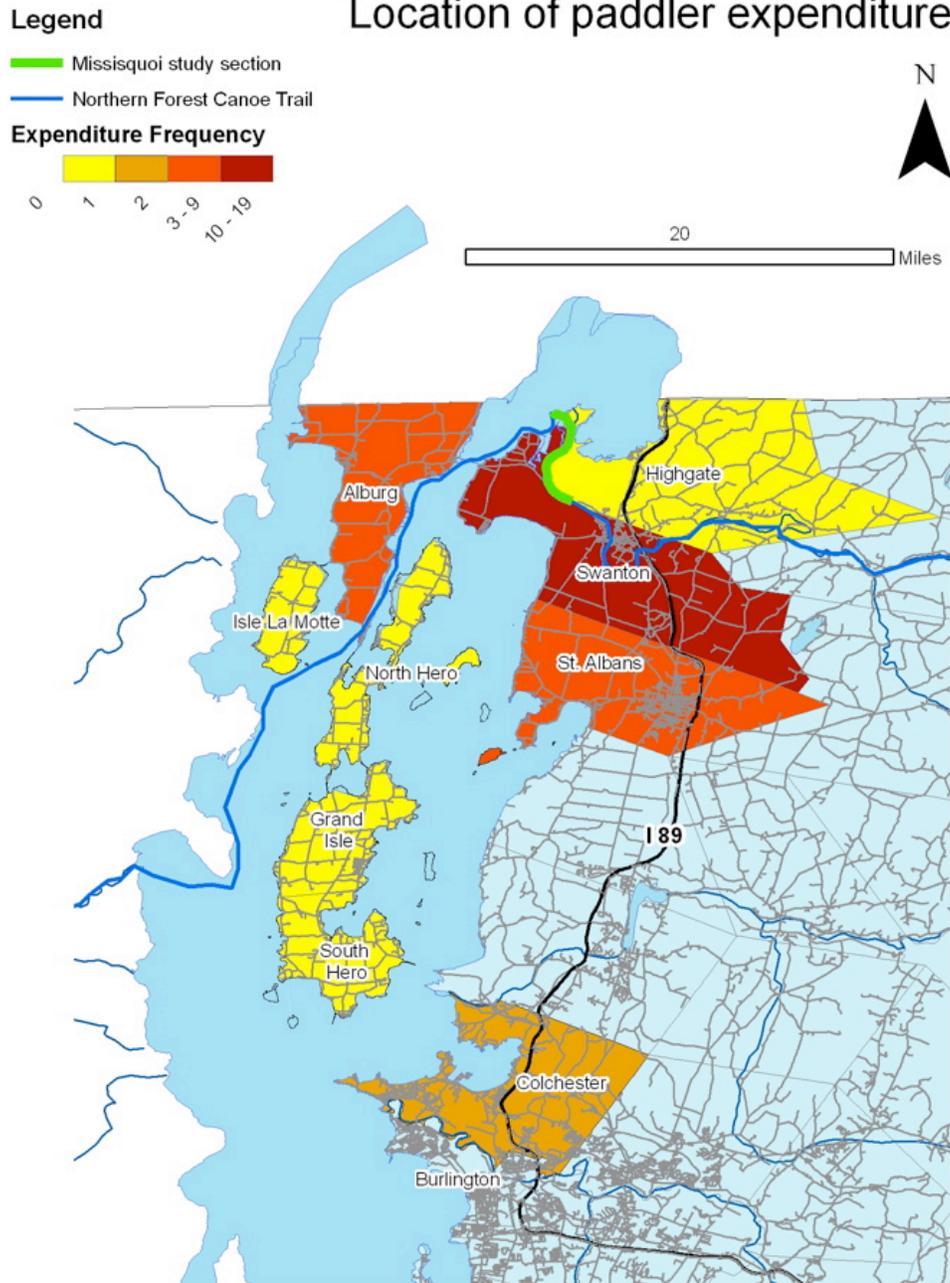


Figure 4.20. Missisquoi study area: location of paddler expenditures

Northeast Kingdom Study Area Location of paddler expenditures

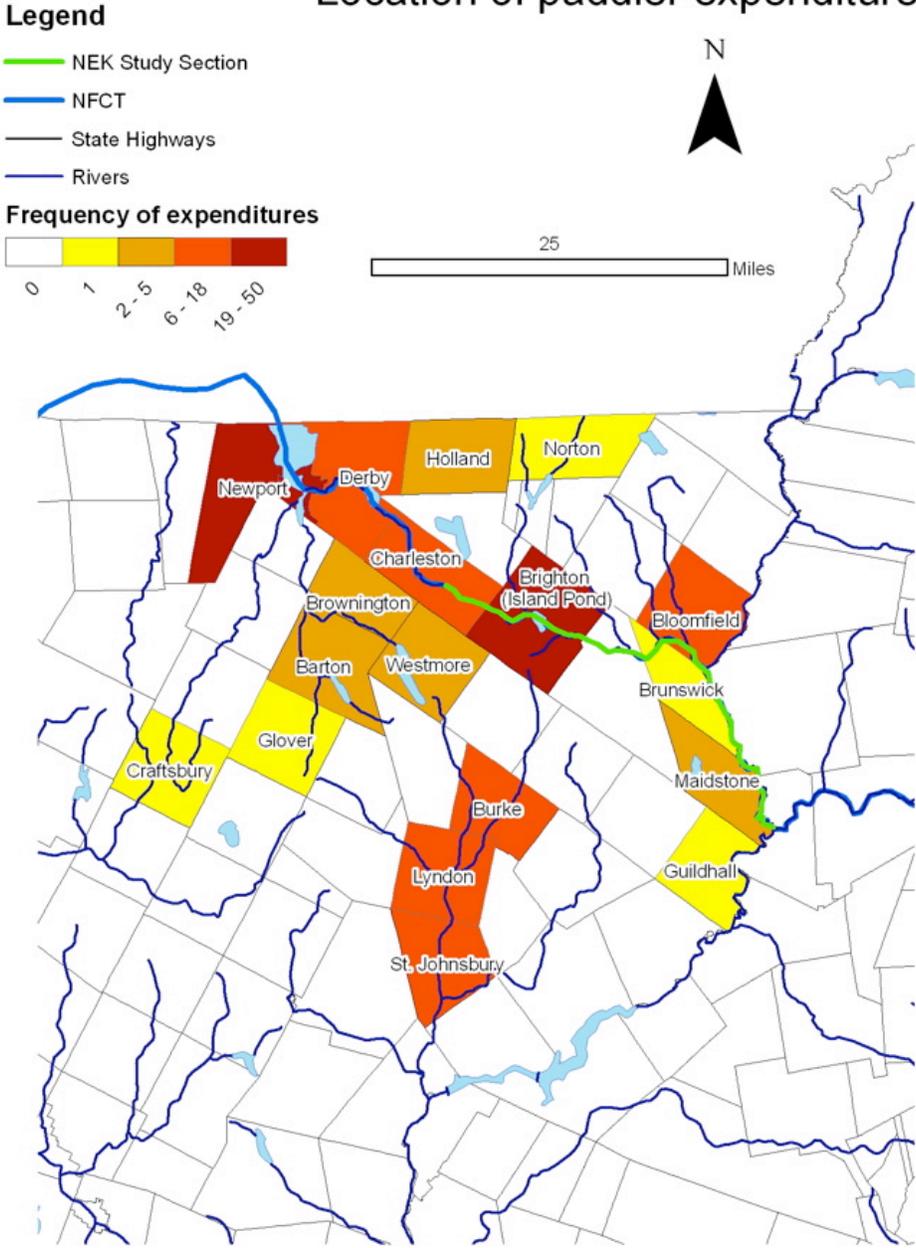
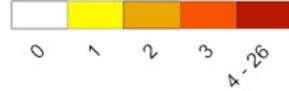


Figure 4.21. Northeast Kingdom study area: location of paddler expenditures

Legend

- Androscoggin Study Section
- Roads
- Androscoggin River
- Northern Forest Canoe Trail

Location and frequency of expenditures



Androscoggin study area Location of paddler expenditures

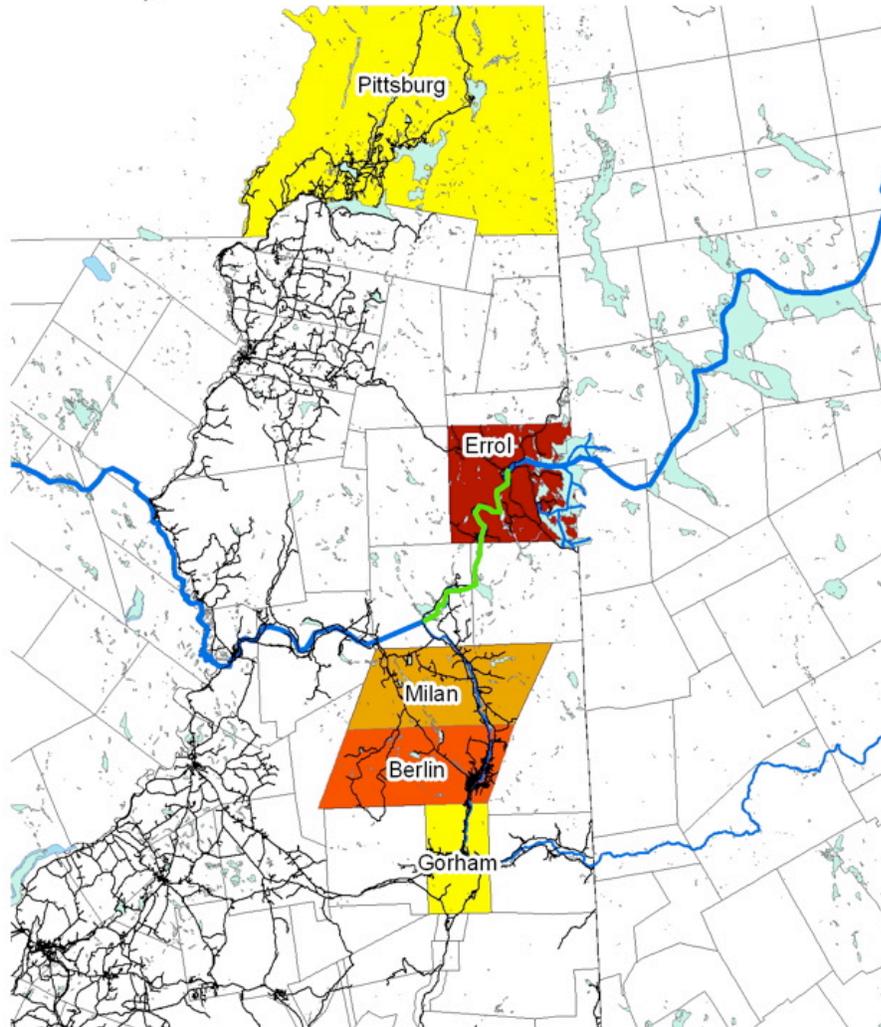
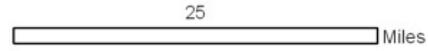


Figure 4.22. Androscoggin study area: location of paddler expenditures

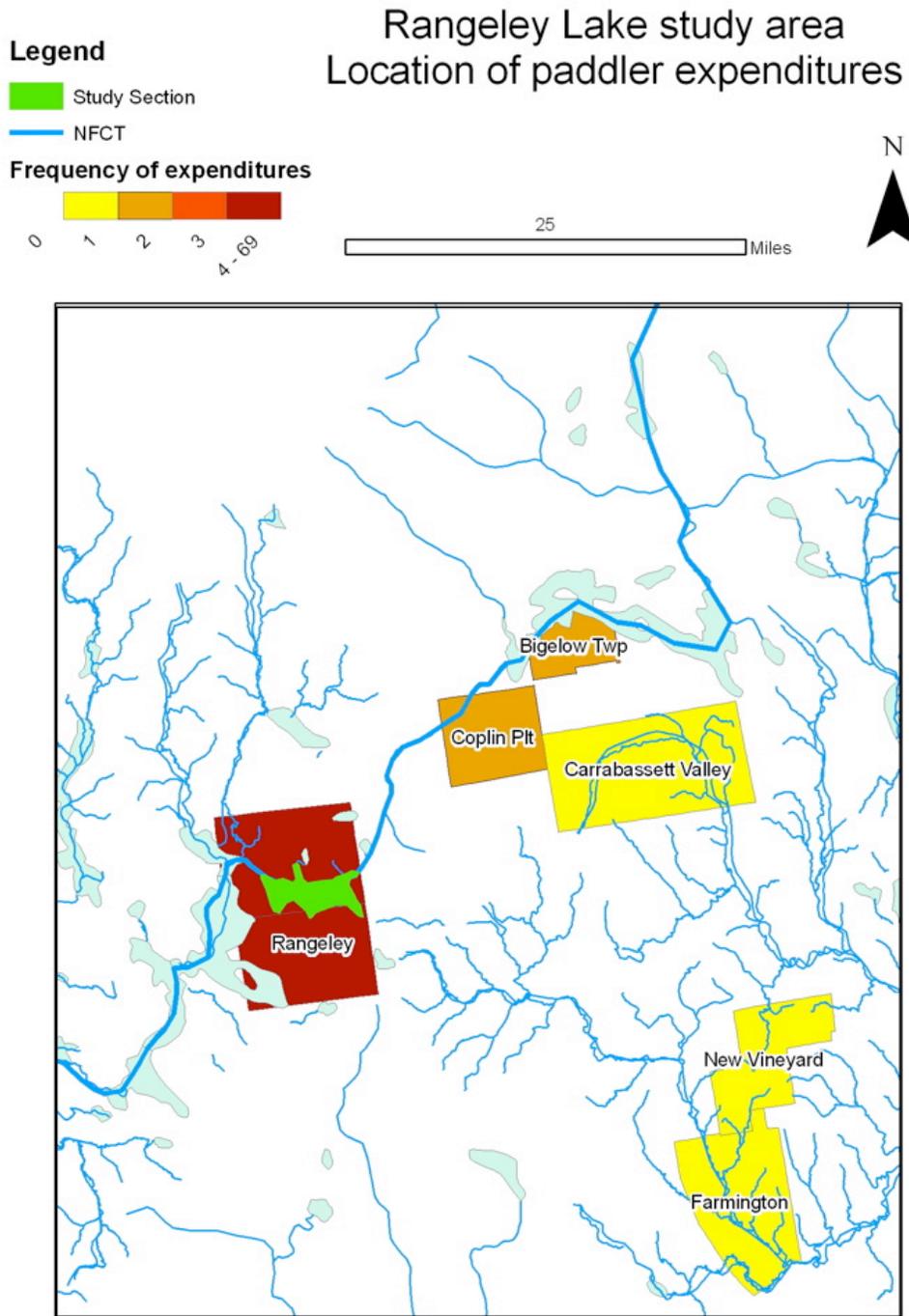
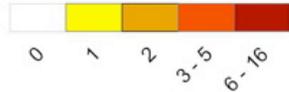


Figure 4.23. Rangeley study area: location of paddler expenditures

Legend

- Allagash Wilderness Waterway
- NFCT
- North Maine Woods Road
- Other roads
- Rivers

Frequency of expenditures



Allagash Wilderness Waterway Locations of paddler expenditures

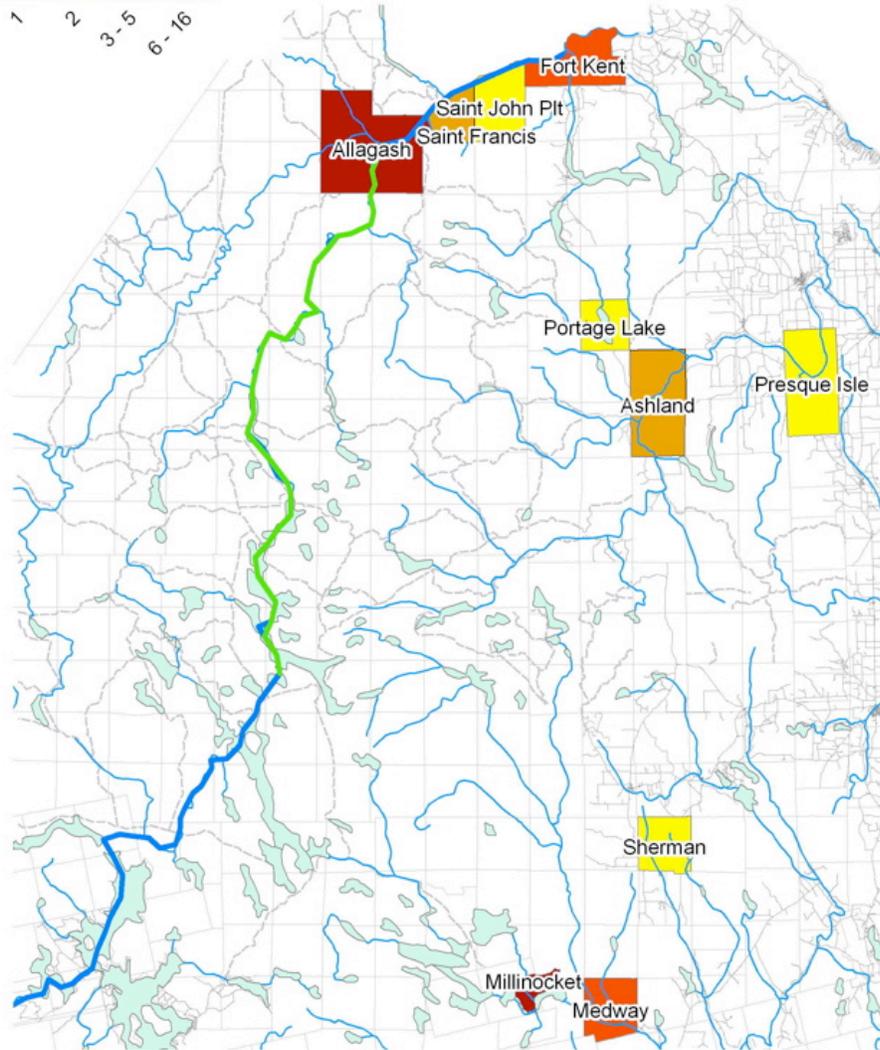
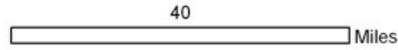


Figure 4.24. Allagash study area: location of paddler expenditures

4.8. Social and Environmental Impacts

Through land manager, business owner, and paddler surveys, complemented by an analysis of town and agency reports, several potential social and environmental impacts of increased paddler recreation were identified (Table 4.9), and are presented in the follow section.

Table 4.9. Potential social and environmental impacts of increased paddler recreation

Social impacts	Environmental Impacts
Cultural and historical appreciation (+)	Increased environmental awareness (+)
Community sense of pride (+)	Prioritized land conservation (+)
Overcrowding of waterways (-)	Land degradation at campsites (-)
Traffic/disturbance in towns and private lands (-)	Wildlife disturbance (-)
Tourism dependence (+/-)	Increased development pressure (-)
	Spread of invasive aquatic species (-)

Cultural and historical appreciation

As one of the NFCT’s main goals is to celebrate and share the arts and heritage of the region, paddler recreation along the NFCT may play a part in fostering a greater cultural and historical appreciation in waterway communities. The NFCT is working to connect visitors to the region’s cultural and historical landscape through a system of information kiosks, paddler maps, and a companion book, all of which highlight the role waterways have played in shaping the regions’ culture and economies.

Community sense of pride

Recreation and tourism provides an impetus for revitalizing access points and connecting communities to their waterfront. This can be seen throughout the Adirondacks, where public beaches and waterfront parks are heavily used. The canoe trail is being developed with a decentralized, “bottom up” approach that seeks to engage local community members. This process may help build a community’s sense of pride. For

example, the Errol Historical Society was instrumental in designing the information kiosks installed on the Androscoggin River. Outfitters in Rangeley Lake designed the original NFCT trail map. Lastly, partner organizations and community members are charged with managing sections of the canoe trail, fostering local ownership and buy-in.

Overcrowding

Waterways have a social carrying capacity as there are thresholds in which additional users lead to perceptions of crowding (Tarrant et al. 1997). Complicating matters, user thresholds differ, making management challenging (Manning 1985). While an in-depth analysis of user's perceptions of crowding was not feasible in this study, increased recreation may lead to crowding, particularly in areas that already receive heavy use, on narrow waterways, and in areas popular with other types of users, such as anglers.

In the six study sites, land managers generally did not perceive crowding to be a problem on most waterways. However several paddler comments indicated there are some user conflicts. In the Adirondacks, island campsites on Raquette Lake have become popular sites for parties, disturbing visitors seeking a wilderness experience. Motorboat and Jet Ski traffic on the Fulton Chain of Lakes is frustrating to many paddlers (Appendix 3)⁷. According to regional land managers, the number of through paddlers on the chain has dropped dramatically in recent years as the lakes have become increasingly developed and motorboat traffic has increased.

Several fishermen on the Clyde River expressed dislike of the increased advertisement of their quiet waters (Appendix 3). The combination of a narrow

⁷ In her journal, through paddler Nicole Grohowski listed the first lakes of the Fulton Chain as their least favorite of the trip, due to motorboat traffic and shoreline development (NFCT 2007)

waterway and a high proportion of local users creates a situation in which overcrowding and user conflicts is more likely, even at relatively low use levels.

The Androscoggin and the Missisquoi seem wide enough to accommodate motorboat traffic from both anglers and paddlers. Due to its' large size and myriad of small coves, crowding on Rangeley Lake also does not appear to be a problem. However, outfitters and land managers expressed concern about increasingly crowded conditions on the nearby Kennebec and the Rapid Rivers. In 2005, the University of Maine conducted a study of paddlers utilizing the Allagash Wilderness Waterway. 75% indicated they had a very positive paddling experience, and less than 3% indicated they felt the waterway was too crowded (Daigle 2004).

Traffic and disruption in towns

Visitors inevitably cause traffic and disruption in towns. On weekend days traffic swells in the towns of Long Lake, Inlet, Old Forge, and Rangeley Lake. While increased traffic irritates some locals, there appears to be a general understanding of the importance of tourism in many of the local economies, which compensates for this impact. Some land managers voiced concern that the paucity of camping sites in sections of the NFCT sets the stage for illegal camping on private land.

Tourism Dependence

The literature suggests tourism dependence can be problematic for local communities, leading to higher costs of living, increased rates of drug abuse, and undesired population growth. Interviews with land managers, business owners, and community members suggest there are some problems, particularly in the Adirondacks and at Rangeley Lake. On lakefront lots, second homes are proliferating. On the Fulton Chain, lodging owners report a steady conversion of rental cabin establishments into second homes. The rising cost of housing is a burden to residents who may leave the area. Alcohol and drug use is a concern among locals, particularly in the winter when job opportunities decrease.

Increased environmental awareness

Outdoor recreation is credited with increasing environmental awareness (Bright and Barro 2000, Dunlap and Hepperman 1975). While a quantitative assessment of increased environmental awareness was beyond the scope of this project, the types of recreation activity prevalent on the NFCT waterways are consistent with the models Bright and Barro (2000) reported most likely to increase environmental appreciation. In fact, the majority of paddler comments reflected their appreciation of the natural surroundings (Appendix 3).

Prioritized land conservation

Recreation can be credited with helping shape land conservation policies and practices in the region. For example, the Vermont River Conservancy, an institution focused on conserving lands near waterways, has made conservation action a priority in the Nulhegan Basin, and is working to ensure lands adjacent to the NFCT are protected.

The Rangeley Lake Heritage Trust has protected a sizable acreage on and surrounding Rangeley Lake through a system of nature preserves and conservation easements. Lastly, the Missisquoi River Basin Association brings together community members and outdoor enthusiasts in restoration and educational efforts designed to restore the health of the area's waterways.

Wildlife Disturbance

Concerns were voiced by several land managers about the potential impacts increased paddler recreation would have on local wildlife populations. Often paddlers will approach and unintentionally disturb wildlife. This is a particular worry in the Missisquoi River Delta, a breeding territory for the threatened Eastern Spiny Softshell turtle. Concerns were also voiced about impacts in the unique wetland complex adjacent to the Clyde River. In particular, due to its narrow width, passing paddlers inadvertently disturb Great Blue Herons and other waterfowl.

Land degradation at campsites

Land degradation at campsites did not appear to be a significant concern for land managers at campsites in the six study regions. While the Adirondacks and the Allagash receive the heaviest use among backcountry paddlers, permit systems are in place in both areas to manage use, and campsites are patrolled regularly. Concerns were raised about localized impact on the Rapid River, near Rangeley Lake, which receives heavy, unregulated use during seasonal dam releases. Land managers reported illegal fires and camping outside designated sites during these periods. In fact, in July of 2007, a forest fire was narrowly averted when local outfitters spotted and extinguished a growing blaze near an illegal campsite.

Increased development pressure

Longitudinal studies have demonstrated recreational development is often a precursor to both population growth and second home construction (Reeder and Brown 2005). An analysis of census data and interview with land managers and business owners indicate significant second home development pressures in the Adirondack and Rangeley Lake study regions (Figure 4.25). While developmental pressures are not as significant in the Northeast Kingdom, local land managers lamented the lack of local master plans and zoning ordinances to regulate growth, particularly in sensitive riparian corridors.

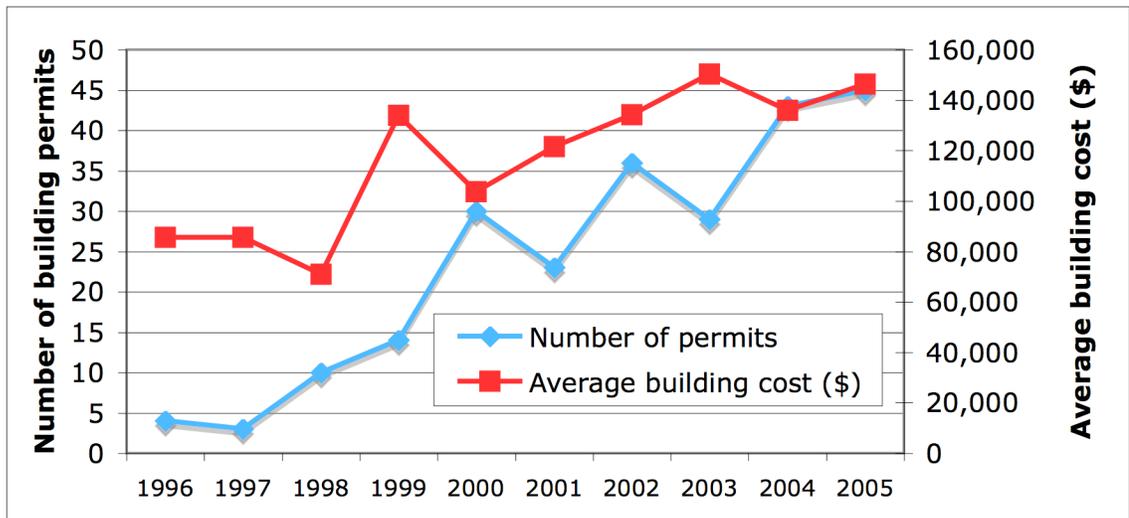


Figure 4.25. Indicators of increasing development pressure in Rangeley Lake, Maine (CD 2006).

Invasive aquatic species

The spread of invasive aquatic species, including Eurasian milfoil, variable-leaf milfoil, curly leaf pondweed, water chestnut, and didymo algae is a major concern for land managers across the study regions. While many of the region's waterways currently remain free of invasive species, paddlers visiting from infested waters may inadvertently transmit species into the area. In Rangeley Lake, for example, it was estimated that 15%

of the boats launched in the lake have also been in infested waterways (RLHT 2005). Eurasian milfoil has been detected in some waterways in the Adirondack study region (ANSMP 2006). Controlling infestations comes at significant economic costs; a three-year program to removal milfoil from Saranac Lake, NY, will cost \$1.5 million (RLHT 2005). Recently, didymo algae was spotted in the Connecticut and Batten Kill Rivers. Didymo is an invasive species that can decimate a river's insect population, which are critical for trout survival (Page 2007).

Invasive species management is underway in all six study regions. Rangeley Lake has taken the most proactive approach, enlisting trained volunteers to check boats entering Rangeley Lake for plant fragments. "Milfoil stickers," required for all motorboats, help fund the program. In Vermont, the Department of Environmental Conservation has developed educational materials and an early detection program. Volunteers also monitor boat launches at Island Pond, VT, during summer weekends. In the fall of 2006, the Adirondack Park Agency approved a management plan for aquatic invasive species. The plan seeks to develop policies to both prevent new infestations and limit the spread of established populations (ANSMP 2006). Yet across all study regions, the myriad of access points combined with limited program funds have restricted the effectiveness of these efforts.

Chapter 5: Discussion

This research had several objectives: to assess group and trip characteristics of paddlers recreating on Northern Forest Canoe Trail waterways, to quantify the economic impact of paddlers in regional communities, to identify potential social and environmental impacts, and to highlight current success stories and challenges for businesses and communities situated along the NFCT. This section elaborates upon the results of this study to address these objectives.

5.1. Group and Trip Characteristics

As shown in Chapter Four, paddler groups range widely in size. Solo paddlers share a waterway with small adult groups, family groups, and large groups. The relative size of the group appears to vary across regions. In part, this variation is due to the physical characteristics of the waterway. The Missisquoi Delta and the Clyde River are generally slow moving waters, where returning to the starting destination is possible for solo paddlers and small groups.

On the swiftly moving Androscoggin, round trips are difficult, making logistical arrangements more challenging. In addition, due to the concentration of remote campsites and minimal portages, multi-day camping trips are easily arranged. These characteristics make the Androscoggin very popular with summer camps and scout troops. Other studies have also demonstrated a range of group sizes. Omohundro (2002) reported average group sizes of 2.3 paddlers in the Adirondacks, while Blank and Simonson (1982) record 7.3 people per group on the Crow River.

A larger proportion of non-local destination travelers were found in this study than reported elsewhere; almost 65% were on overnight trips, compared to only 30% on the Kickapoo River in Wisconsin (Anderson et al. 1999). The variation in trip lengths, with longer trips more common in Rangeley Lake, the Allagash, and the Adirondacks, reflects the variation in users types and is correlated with the availability of lodging establishments on the waterway. Near the Missisquoi River Delta, there are no campgrounds or lodging establishments with direct water access, and day users predominate. The Adirondacks, Rangeley Lake, and the Allagash, on the other hand, are better established as paddler centered tourist destinations, with more supporting lodging, campsites, and service infrastructure.

Calculating the amount of time paddlers spend on the water helps define the waterway's characteristics. On the Kickapoo, Farmington, Crow, and New Rivers, almost all paddlers were on the water for less than a day (Bowker 2004, NPS 2001, Blank and Simonson 1984, Anderson et al. 1999), as are paddlers utilizing the Missisquoi, Clyde, and Connecticut Rivers. However, in the Adirondacks, on the Androscoggin, on Rangeley Lake, and on the Allagash, the majority of paddlers are on multi-day trips. Similar findings were reported for Lake Superior paddlers (LSWT 2001) and on Tupper Lake and the St. Regis Canoe area in the Adirondacks (Omohundro 2002).

Long Distance Paddling

Internationally, through traveling on long-distance trails is becoming increasingly popular (Figure 5.1, ATC 2007). Several businesses, including hostels, cater to through hikers. Yet even on these well-known trails the proportion of "end to enders" is surprisingly low. Of the three to four million people that use the Appalachian Trail (AT)

each year, only about 2,500, or 0.07%, attempt a through hike. Section hikers, on the other hand, are much more common – about 14.5% of AT users. Anderson et al. (2005, p. 41) suggest that while through travelers may not contribute very much to the economy of a region themselves, they may create “the cachet of the region which generates interest in a host of other activities that produce significant additional expenditures in the region.”

Long distance paddling trips are still a rarity on the NFCT waterways. About 5% of all paddling trips were greater than a week, and only two groups through paddled the entire trail over the course of the season. Future monitoring is needed to assess if long distance through paddling will increase due to the promotion of the canoe trail. It is likely that section paddling will remain more common. It is important to note that the NFCT is a young trail, and it took decades for the AT to reach its current popularity (Figure 5.1).

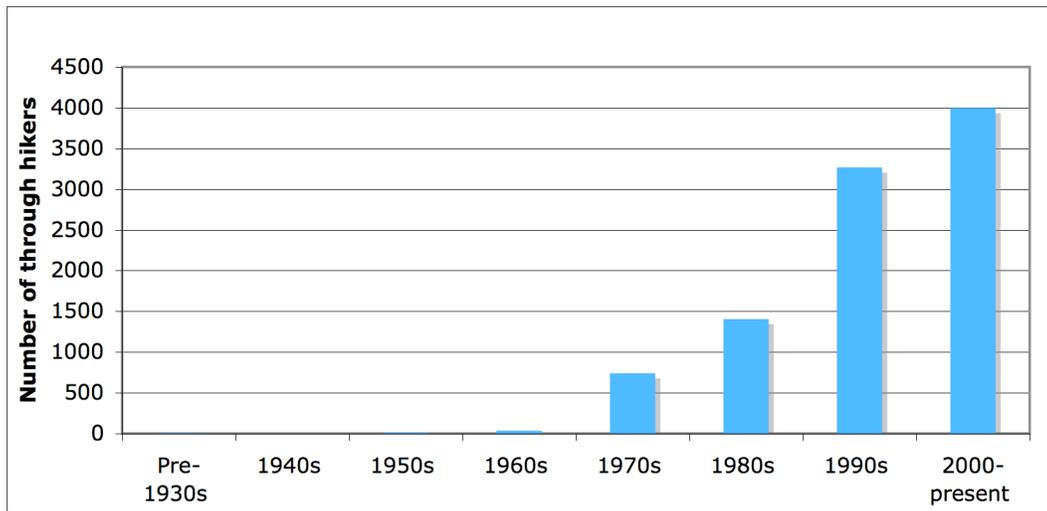


Figure 5.1. Appalachian Trail through hikers, per decade (ATC 2007)

Analysis of user types demonstrates that camping is the most important choice of accommodation, with only a minority (20%) utilizing lodging establishments. Other studies reported similar findings (LWST 2001, Thigpen et al. 2001). The difference in the

relative importance of hotel and cabin renters between regions is clear. This user type tends to choose lakeside destinations, primarily in the Adirondacks and at Rangeley Lake.

At only 17.2%, local day users made up a surprisingly small proportion of the visitors. Other studies (Bowker et al. 2004, Blank and Simonson 1982, Schutt 1997) reported higher proportions of local use of trails and waterways. The relative mix of locals and non-locals is a key-defining characteristic of recreational areas.

The variation across regions in this study was unambiguous, with the Missisquoi and the Northeast Kingdom having the highest proportion of local users. The intraregional variations in travel distances confirm this pattern, with local paddlers significantly outnumbered by non-locals on the Androscoggin, the Allagash, in the Adirondacks, and on Rangeley Lake. This ratio may correlate with the societal acceptance of increased tourism and recreation in the region. (The only surveys with negative comments about paddler tourism were collected in the Northeast Kingdom.) Interestingly, only the Missisquoi registration kiosks were vandalized. Further study is needed to examine this hypothesis.

Analysis of paddlers' home states reveals most paddlers take trips in their home states. A similar pattern was found in other studies. For example, Connecticut residents made up 80% of users on the Farmington River (NPS 2001). International visitors, at less than one percent, were surprisingly few. Even among out of state users, the majority were from northeastern states (Figure 4.8) suggesting that the area serves primarily as a regional resource. Other studies report similar findings (Bowker et al. 2004, Moore and Siderelis 2001), implying that paddling opportunities are not well marketed abroad and are logistically challenging for international visitors.

Given the high proportion of local use, there was a large geographic spread of users across the eastern seaboard in the Northeast Kingdom. It appears that this geographic spread comes primarily from second homeowners, who have gained enough local knowledge and equipment to recreate on waterways not strongly promoted as a tourist destination.

Household Income

The results of this study suggest that paddlers attracted to the waterways of the Northern Forest Canoe Trail have higher household incomes than the average American family. This finding is supported by other studies (Thigpen et al. 2001, Anderson et al. 1999), which also found the majority of paddlers to be well-educated professionals. The required investment in gear, vehicles for transportation, and a location for boat storage may partly explain this phenomenon. In addition, the cost of traveling to remote destinations may be a factor. As seen in Figure 4.9, local paddlers had, on average, lower income than other user types. This suggests that maintaining quality paddling opportunities for local users should be an important goal for waterway managers.

Outfitter Services

Very few canoe rental and shuttling services are available among substantial sections of the canoe trail. It appears that shuttle services are a difficult business opportunity, with high labor, capital, and time investments. Due to these constraints, several outfitters in the Adirondacks and the Northeast Kingdom have stopped offering shuttling services along lightly used waterways. Only in the Allagash, where nearly 40% of groups utilize shuttling services, is the volume of users high and consistent enough to

support several shuttling businesses. Because of these obstacles, as opposed to creating new markets, the canoe trail is more likely to benefit existing canoe liveries.

Yet even in study areas with existing outfitters, the use of their services was quite low among survey respondents. The majority of users appear to be self-supported. Interviews with outfitters confirmed this finding. The use of shuttling services is more common along rivers, where out and back trips are more difficult, and among users renting lakeside cabins. This finding is supported by other studies. On the Kickapoo River, for example, where the majority of users are engaged in relatively short, one-way trips, 80% of groups utilize paddling services (Anderson et al. 1999).

Of the six study areas, guides are most successful in Maine, with the highest proportion of guided trips occurring on the Allagash. In Rangeley Lake, several guides take visitors to more remote lakes and rivers. Maine guides are particularly distinctive due to a licensing program started by the state in 1897. While most cater to hunters and fishermen, over 95 guides also offer wilderness canoe trips. A searchable, online database makes it easy for visitors to contact licensed guides. Other states also have guide associations, but they do not carry the same cachet as Maine's guides, renowned for their professionalism and wildlife knowledge.

In the Northeast Kingdom, many credit the NorthWoods Stewardship Center for being instrumental in promoting paddling opportunities along the Clyde and Connecticut Rivers. Their programs primarily serve regional school groups and families. However, the economic impacts of these trips are fairly modest, as users report generally few expenditures in local communities while in the region. By assisting with campsite and launch access development, the center has become an active partner with the Northern

Forest Canoe Trail. In collaboration with the Stewardship Center, the NFCT association may be able to attract more distant visitors, bringing greater economic impacts to the region.

5.2. Use Estimates

While nearly 90,000 visitors paddled the waterways in the six study sections, use varied significantly by region, even after accounting for variations in the waterway length. High relative use levels in the Adirondacks, Rangeley Lake, and the Allagash can be attributed to a combination of ample camping and lodging and well known, high quality recreational opportunities. Estimated use levels in the Northeast Kingdom were higher than expected based on discussions with NFCT and NorthWoods Stewardship Center staff. Yet unlike other regions, two-thirds of this use is attributed to local paddlers who take frequent trips throughout the season.

The results of other studies show a dramatic range in use levels across rivers and lakes (Table 5.1). An estimated 12,500 visitors paddled the north shore of Lake Superior in 2000 (LSWT 2001), or 83 per mile. 77,000 visitors paddled the Delaware Water Gap in 1990, or 1,100 per mile (Cordell, Bergstrom, Ashley, and Karish 1990). With about 200,000 annual visitors and a use density of 167 paddlers per mile, the Boundary Waters deserves its reputation as both a popular paddling destination and as an uncrowded one (FBWCA 2006). In contrast, Abel Tasman National Park, in New Zealand, currently receives about 40,000 annual paddler visits, with a use intensity of nearly 1,300 paddlers per mile (TIANZ 2006).

Table 5.1. Variation in visitor numbers between paddling destinations

Study Region	Year of use estimate	Waterway miles	Paddlers	Paddlers per mile
All NFCT Study areas	2006	219	89,675	410
Adirondacks	2006	58	27,374	476
Missisquoi River	2006	10	2,424	242
Northeast Kingdom	2006	33	16,870	511
Androscoggin River	2006	17	13,939	820
Rangeley Lake	2006	11	8,503	773
Allagash Wilderness Waterway	2006	90	20,565	229
Kickapoo River, WI	2001	20	16,000	800
Lake Superior, MN	2001	150	12,500	83
North Carolina Coastal Plains	2001	1200	109,326	91
Crow River, MN	1982	75	12,400	165
Upper Delaware, NY, PA	1990	70	76,750	1,097
Delaware Water Gap, NJ, PA	1990	40	44,550	1,114
New River Gorge, WV	1990	53	33,000	623
Boundary Waters Canoe Area, MN	2006	1200	200,000	167
Grand Canyon gorge, AZ	2003	87.5	22,000	251
Abel Tasman National Park, NZ	2006	31	40,000	1,290

(Anderson et al. 1999, LSWT 2001, Thigpen et al. 2001, Blank and Simonson 1982, Cordell et al. 1990, Manni et al. 2005, FBWCA 2006, TIANZ 2006)

5.3. Economic Impacts

Average expenditures

The combination of visitor numbers, user types, and expenditure patterns shapes the impact visitors have on the local economy. Users employing guide and outfitters service and those staying in hotels and cabin rentals had the highest levels of expenditures. Although these types of users were comparatively few in numbers, they account for a disproportionate share of economic impacts. The highest average expenditures were reported in a study of river runners in Grand Canyon, where guided trips predominate (Stynes and Sun 2005). Estimates of average expenditures calculated in this study are among the upper range reported in other studies (Table 5.2). Likely explanations for this variation include relatively long trip lengths and proportions of non-

local use compared to those observed in other study regions, and recent increases in transportation costs.

Table 5.2. Comparisons of average paddler expenditures across study regions

Region	Per person, per trip expenditures (\$)*	Per person, per day expenditures (\$)*
All NFCT Study areas	133	39
Kickapoo River, WI	93	36
Lake Superior, MN	78	39
Coastal Plains, NC	88	44
Crow River, MN	25	8
Grand Canyon Gorge, AZ	412	206
Upper Delaware, NY & PA	30	N/A
Delaware Water Gap, NJ & PA	64	N/A
New River Gorge, WV	31	N/A
St. Regis Canoe Area, NY	91	N/A
Farmington River, CT	41	N/A

*All values are reported in 2006 dollars (Anderson et al. 1999, LSWT 2001, Thigpen et al. 2001, Blank and Simonson 1982, Cordell et al. 1990, Omohundro 2002, Moore and Siderelis 2001, Stynes and Sun 2005)

Economic impacts and regional economies

While \$12 million in economic impacts is significant, it is small relative to the regional economy. For example, paddler recreation on the Clyde River and the Connecticut was estimated to support fifteen jobs, while the former Ethan Allen plant in Randolph, VT had 154 employees. In the Adirondacks, paddler tourism and recreation in the study region was estimated to support 49 jobs. The towns of Webb, Inlet, and Long Lake, which captured the majority of the paddler expenditures, have a combined population of 3,170.

These small relative impacts are due to the diffuse, low intensity, and seasonal nature of paddler tourism. Similar results were found in other studies. In the North Carolina coastal plains, the \$55 million in paddler economic impacts represented only 4% of the estimated economic impact of the region's tourism. These results indicate that, as

opposed to creating entirely new markets, the NFCT will mainly benefit existing businesses by helping diversify and expand their customer base.

There is a striking difference in economic impacts due to paddler recreation across study regions. For example, the total income generated due to paddler expenditures in the Adirondack study region was nearly 40 times greater than in the Missisquoi River study region. The Adirondacks and Rangeley Lake appear most well suited to capture visitor expenditures. As discussed earlier, these communities rely more heavily on tourism than other regions, and have a range of goods and services available for visitors.

Economic impacts must also be considered within the region's social and economic context. While the total economic impacts were modest in the Androscoggin, due to the region's sparse population, local business owners indicated that visitors accounted for the majority of their customer base. In contrast, the higher population in the Missisquoi River gateway communities (Table 3.2) dilutes economic impacts. In fact, a restaurant manager in the town of Swanton reported serving only a handful of out of state paddlers during the summer.

Proximately, the variation in economic impacts is explained by differences in visitor numbers, trip lengths, available goods and services, and user types. Ultimately, it relates to variations in environmental and social factors that shape a region's appeal as a paddling destination. Tourism demand models propose that a combination of attractions, promotion, adequate transportation networks, available information, and services drive the popularity of a destination (Gunn and Var 2002).

Most studies show that clean water, scenic beauty, and opportunities for nature observation attract paddlers to waterways (Table 5.3). Good previous experiences and a love of an area shape outdoor enthusiasts' destination choice. The lack of time and personal knowledge of paddling opportunities are seen as barriers to increased recreation.

Table 5.3. Paddlers' rationale for choosing destination waterway

Important considerations for users	Reasons for recreation in the region	Barriers to increased recreation
Clean water	Good previous experience	Lack of time
Scenic beauty	Love of the area	Intervening opportunities
Safe environment	To be close to nature	Lack of personal knowledge
Good public access	To get away from the city	Poor restrooms
Sufficient water quantity	To relax physically	
Available campsites	For social experiences	
Fishing opportunities		
Peace and quiet		

(Bowker 2004, Blank & Simonson 1984, Moore and Siderelis 2001, Anderson et al. 1999, Thigpen et al. 2001)

Comparison between impacts of paddlers and other tourists

Contrary to the granola myth, the expenditure patterns of paddlers appear similar to other tourists (Table 5.4) particularly among overnight users. A 2003 study of Vermont visitors reported average per visitor expenses of \$192, similar to this study's estimate of \$185. It appears that longer average trip lengths compensate lower average daily expenses. Day users, on the other hand, spend less money than typical Vermont tourists, who are more likely to be visiting urban areas, ski areas, and fee based attractions (EPRI 2003).

Table 5.4. Average expenditures of NFCT paddlers compared to Vermont visitors

Visitor Type	Average (mean), per person, per trip expenses	Median trip length (days)
NFCT non-local day visitor	\$25	
Vermont day visitor	\$58	
NFCT overnight visitor	\$186	4
Vermont overnight visitor	\$193	3

Expenditures in 2006 dollars. Vermont visitor data from EPRI (2003).

There is much politically charged debate over the relative economic impact of non-motorized and motorized forms of recreation throughout the Northern Forest. Several snowmobile and ATV associations have sponsored economic impact studies to validate and promote their trail systems (Elvans 1995, Chugh 1998, Schneider 2005, Morris et al. 2005). Due to differences in methodology, assumptions, and spatial scale, comparisons across studies are difficult. For example, a widely cited study on the economic impact of snowmobilers in VT asked for expenditure data for the whole season within the entire state of Vermont. The author also included the price of real estate and vehicles (McElvany 1995). While the results of different studies vary, expenditure patterns for studies with comparable methodology appear similar (Table 5.5). To better compare true economic impacts, more study is needed on relative user numbers, user types, and patterns of expenditures within a given community.

Table 5.5. Average expenditures of NFCT paddlers compared to snowmobilers in Minnesota and the Adirondack Park, NY

	Average group expenditures (\$)	Average per person, per day expenditures (\$)
Paddlers (NFCT)	352-448	39
Snowmobilers (Minnesota)	305-395	44
Snowmobilers (Adirondacks)	N/A	91

Expenditures are in 2006 dollars. Snowmobile data are from Schneider 2005, and Chugh 1998.

Impact of canoe races

The several, multi-day canoe races hosted in the Adirondacks bring a surge of visitors to the region. Interviews with area lodging establishments in the Adirondacks suggest that paddlers are more inclined to stay in lodging establishments during the races than during the rest of the season. Surveys conducted during the fall “90 miler” race revealed racers and their support crews were mostly non-locals, with 38% staying in local

lodging establishments. Groups made substantial expenditures in local communities during the race weekend. The median, per group, per trip, expenditures of racers was \$375, nearly 75% greater than the study average. In addition, several racers reported making pre-race reconnaissance trips to the region, and attend the race every year, providing a consistent source of revenue in an industry otherwise strongly impacted by weather conditions.

5.4. Potential Impact of the NFCT

The canoe trail can serve as a tool for community economic development by bringing new paddlers to the region, by changing the trip patterns of current users, and by affecting the balance of user types on the waterway. The canoe trail already is drawing more paddlers to the waterways, including hotel and cabin renters.

Other areas have understood the economic impact of hotel and cabin renters, and have targeted their marketing appropriately. On the Bruce Trail, in Ontario, over twenty-five bed and breakfasts have teamed up to offer “inn-to-inn” hiking trips. Similar trips are promoted for cross-country skiers on the Catamount Trail in Vermont, and for sea kayakers traveling along the Maine coastline (Bumsted 2000).

Yet it can be challenging to increasing the numbers of this visitor type. Summer occupancy rates are nearly 100% at lakeside accommodations in Rangeley Lake and in the Adirondacks. Furthermore, lodging establishments often require an extended stay, which would not suit paddlers seeking to travel from inn-to-inn. Promoting this type of trip may be most practical during the spring and fall when occupancy rates are lower. In fact, in Old Forge, a local lodging establishment reported higher occupancy in the spring

by visitors in town to paddle the Moose River, but preferring not to camp due to the cold weather.

The NFCT has a potential to increase both the number of paddling trips and average trip lengths. As previously shown, total group expenditures are strongly related to trip lengths. By expanding their knowledge of paddling opportunities within the region, visitors may be more inclined to take longer and more frequent trips.

Other studies have documented similar changes as a region's recreational resources became more utilized. Between 1994 and 1999, Kickapoo River angler expenditures rose by 50-80% and the average paddler trip length increased by 0.3 days. Notably, there was a 600% increase in the use of lodging among canoeists (Anderson et al. 1999). On the Crow River, between 1967 and 1978, Blank and Simonson (1982) reported a 25% growth in person-days of use, and a 300% growth in paddler expenditures. The authors of both studies credited this growth to both an increased interest in paddle sports and a greater awareness of the region's paddling opportunities.

The NFCT appears to be attracting primarily non-local visitors to the area. Economic impact analysis stresses the importance of non-local visitors as economic engines in the local economy. Non-local visitors are also more likely to utilize lodging, outfitter, and other services during their trip. The results of this and other studies demonstrate expenditure levels are linked with travel distances. By collectively branding the region's waterways as one entity, the NFCT is able to gain more national media coverage than local marketing organizations and potentially draw more distant visitors. These tourists, particularly international travelers, are more likely than others to stay in

the region longer and to employ outfitter and guide services, increasing economic impacts.

Several studies support this assertion. According to the US Office of Travel and Tourism Industries, the average overseas visitor travels for fifteen nights, compared to three nights for domestic visitors (OTT 2007). Bowman and Eagles (2002) reported that international day visitors and car campers visiting Algonquin Provincial Park spent, on average, \$238 and \$87 per person per night respectively, compared to the sample averages of \$150 and \$37. Long distance trails, in particular, are seen as attractions for international tourists. Magill (1992) advocated for clustering of attractions and joint marketing as a method for reaching this market. Appropriately, an Adirondack outfitter asserted that the NFCT would raise economic benefits if it could attract international travelers to the region.

The NFCT may also impact the distribution of paddlers across the trail, redistributing economic impacts within the region. While several sections receive relatively heavy use by paddlers, other sections of the NFCT are rarely traveled. By providing maps, portage trails, campsites, and signage in these relatively unknown regions, the NFCT may shift some recreation from more popular areas to the more lightly used waterways, increasing economic benefits in communities not currently affected by paddler recreation and tourism.

The literature assessing the economic impacts of recreation primarily views communities as serving as “gateways” to recreational activities. In this perspective, economic impacts occur at either end of a recreational trip into wild, undeveloped regions. Yet substantial sections of the NFCT travel through private land. As paddling

the NFCT becomes more popular, opportunities may arise for enterprising landowners and business owners in local communities to provide additional camping, lodging, food and outfitting services.

Some businesses already specifically cater to paddlers. A general store on the Clyde River has developed plans to clear a boat access and a primitive campsite on their property. On the Connecticut River, a grocery store occasionally provisions college groups with supplies, and provides a secure place for boat storage. Owners of another general store in the region plan to sell canoe trail maps. A Champlain Islands entrepreneur is considering marketing and outfitting inn-to-inn canoe trips along the NFCT. And an outfitter in Rangeley Lake has begun offering guided paddling trips on several sections of the NFCT.

The construction of rustic camping shelters, common on long distance hiking trails, may attract additional users. In the Adirondacks, many of the more popular waterway campsites include three sided lean-tos that provide protection from rain, wind, and minimize the campsite's ecological footprint. A system of rustic huts, such as the popular 10th Mountain Division Huts in Colorado, may be appropriate for sections of the NFCT. In particular, rustic huts could help fill in gaps between existing lodging establishments to facilitate inn-to-inn traveling.

5.5. Addressing Social and Environmental Impacts

This research identified several potential social and environmental impacts of increased paddler tourism. Some of these impacts, such as greater cultural appreciation, community pride, environmental awareness, and prioritized land conservation, are positive. Others are negative, including crowding, traffic, wildlife disturbance, the spread of invasive aquatic species, and increased development pressure. These impacts need to be addressed through proactive management to ensure sustainable development.

There are several challenges to addressing these negative impacts. First, many impacts cannot be isolated as a result of paddlers using the NFCT. All forms of tourism produce development pressure in local communities. Both non-motorized and motorized boaters spread invasive aquatic species. Second, temporal time lags are associated with many of these concerns. Community change is often a slow, piecemeal process, driven by a multiplicity of factors, including regional economic trends (Ramaswamy and Kuentzel 2005). This makes identification of cause and effect relationships difficult. In systems as complex as the Northern Forest, it is challenging to isolate the affects of NFCT management decisions from other impacts. A myriad of actions by disparate groups, which by themselves appear to have little impact, can collectively add up to disturbances that no one entity previously envisioned or desired.

Third, the NFCT connects a broad range of communities, each with different cultural elements, waterway values, and environmental concerns. Land managers also have a variety of goals and objectives. The NFCT may have to face the task of

reconciling different ideas of waterway use and concerns while strategically focusing their economic development efforts.

Further complicating the situation is the NFCT's lack of staff, resources, and authority for integrated management and planning. Like many small nonprofit institutions, the NFCT has a small staff and primarily relies on grants and donations to fund their operations. Integrated management, however, is time and personnel intensive.

Although addressing these impacts is challenging, the NFCT can play an important role. By serving as an important conduit of information for waterway users, the NFCT can educate paddlers on methods of minimizing the spread of invasive species and low impact camping practices. Working with community, state, and regional partnerships, the NFCT can participate in holistic, collaborative efforts designed to address these impacts.

Chapter 6: Conclusions

The primary goal of this research is to assess the ability of the Northern Forest Canoe Trail to stimulate sustainable community development. The results suggest that, to a modest degree, paddler recreation and tourism positively impacts local economies. While there are challenges and concerns, through targeted strategies and coordination efforts, the NFCT can create additional benefits at the business, community, and regional levels. This chapter summarizes the implications of the canoe trail to benefit local economies, and provides strategies for best communicating and implementing sustainable community development. Lastly, it lays out a system of indicators and future research needs to aid in the process of studying community change.

6.1. Implications for Sustainable Community Development

The results of this research project clarify the quantity, quality, and dispersion of economic impacts associated with paddler tourism and recreation. Ultimately, the question is not if the NFCT will have economic impacts, but how much, where, and in what contexts. This study highlights the stark contrast in economic impacts of paddler recreation across six study areas. While many variables are responsible for this variation, the number and types of users largely drive economic impacts. The greatest impacts were witnessed in well-used regions with either a significant proportion of paddlers staying in hotels and cabins or utilizing guide and outfitter services.

There are significant challenges to utilizing the NFCT as a tool for economic development. While business owners are positive about the trail, their expectations of economic impact were restrained, as the majority of paddlers prefer to camp and because summer accompany rates are at nearly 100% at many lakeside accommodations. Marketing fall or spring trips may be a useful approach.

As opposed to concentrating in key “gateway” communities (Stynes and Sun 2003) the NFCT may create a dispersed impact because of its linear nature. Virtually all paddlers destined for the Boundary Waters pass through Ely, Minnesota. This supports a vibrant mix of outfitters, lodging establishments, and other service sector businesses. The NFCT, on the other hand, passes through forty-five towns. While the results of the GIS analysis demonstrate that the majority of local expenditures occur in these waterway communities, the linear nature of the trail creates a situation where impacts are divided among several localities. Services such as canoe shuttling and rentals have high labor and equipment costs that necessitate a relatively high volume of customers. Therefore, gateway effects may ultimately be best realized in communities with other recreation and tourism resources that complement the presence of the NFCT. In the Adirondack and Rangeley Lake study areas, for example, a wide range of recreation and cultural opportunities attract a diversity of visitors, who collectively provide the demand for local goods and services in area communities.

The seasonal nature of the sport poses challenges to community economic development. In particular, non-local workers fill seasonal jobs, which is associated with significant economic leakages (Godfrey and Clarke 2000, Galston and Baehler 1995). The majority of paddlers made their trip during July and August. Therefore, developing

paddler-based infrastructure and services may be most appropriate in communities where winter recreation is already popular.

Sustainable community development goes beyond economics. An integrated approach should address likely social and environmental impacts that may result from increased paddler recreation. Positive impacts should be cultivated, and negative impacts need to be addressed through proactive management to ensure sustainable development. While addressing many of these impacts may be challenging, the NFCT can play an important role because of their contact with paddlers, and by participating in community, state, and regional efforts designed to address these impacts.

6.2. Implementation Strategies

Local communities have a key role to play in guiding the development of the Northern Forest Canoe Trail. Building campsites, signage, and portage trails, and promoting the trail in the media are collaborative efforts. Local communities will ultimately bear the costs and reap the benefits of increased waterway use. A key purpose of this research is to guide local communities considering collaborating on these endeavors.

An analysis of economic trends in the Northern Forest highlights the changing economic and cultural conditions in local communities. Traditional, extraction-based industries continue to decline in importance, and service sector jobs that rely on the amenity rich landscape are growing. Counties that have tapped into their recreational resources as tools for development have done better economically than other counties.

Yet in many communities, there is a perception that paddlers contribute little to local economies. This study demonstrates that, in many contexts, this assumption is inaccurate. While many paddlers are self-supported, paddling opportunities also attract higher spending

clientele who utilize guide and outfitter services, hotels, and cabin rentals. In fact, the average expenditure pattern of paddlers can be similar to other tourists, particularly in regions where diverse lodging and services are available. This research shows that paddlers make expenditures at a variety of business establishments. Most expenses are related to the provision of food, lodging, and transportation services. In some areas, these expenditures directly support stores struggling with out-migration, the centralization of rural services, and a declining customer base. While the economic impacts of paddlers are tangible, the relatively low use levels compared to other recreational uses in the region combined with a wide geographical dispersion of impacts may limit opportunities for new businesses.

The research also suggests that economic impacts vary widely by user type. Through paddlers may be high profile users, but their current economic impact is insignificant. Investing time and resources to capture expenditures from these users should be done as one component of a larger, more regional tourism development strategy. The greatest impacts will come with a creative, coordinated approach that reflects the economic realities of paddler spending profiles.

Communities have the opportunity to learn from one another. Other states can learn from the Maine guide approach. Maine's ability to train, certify, and market local guiding services, not matched in any other study area, creates significant direct and indirect economic impacts. The lean-to structures along Adirondacks waterways are well utilized. A larger network of rustic camping shelters, similar to those found on long distance hiking trails, may attract additional users, filling in the gaps where little formal lodging is available. The multi-day canoe races, boat festivals, and sales events in the

Adirondacks attract thousands of visitors, and create significant economic impact.

Communities should consider hosting similar events in other sections of the canoe trail.

Local communities have a clear role in guiding development in a way that minimizes economic, social, and environmental costs. Towns contemplating investment in tourism infrastructure must be particularly mindful of the social and ecological ability of the local waterways to absorb additional users. As use levels increase, a proactive, integrated management strategy will need to be implemented.

6.3. Measuring and Monitoring Outcomes

As the NFCT grows in popularity, changes may be noticeable at individual, community, and regional levels. As an example, a Wisconsin study on the economic impacts of anglers and paddlers stimulated the formation of community partnerships to more effectively capture visitor expenditures (Anderson et al. 1999). A system of monitoring and indicators is needed to assess these changes.

Business Impacts

Enterprising businesses may benefit from increased paddler tourism and recreation by expanding and diversifying their offerings. In some cases, the extra revenue may help keep retail stores profitable in a time where rural businesses are being increasingly consolidated. Examples of this are already visible in the area's waterways. L.L. Cote's, a hardware store in Errol, NH, has diversified their offering to tap into the recreational market. They have been renting and selling canoes and kayaks for over fifteen years.

In Kickapoo River communities, increases in paddler recreation led to the establishment of an additional canoe livery, as well as an increased stock of boats available for rent at existing liveries (Anderson et al. 1999). Expanded offerings at area outfitters are a possibility along the NFCT as well, particularly if it attracts a broader geographical range of paddlers.

Already businesses are beginning to notice the potential opportunities that may arise as paddler tourism increases. Monitoring business level impacts may be achieved through maintaining a database of outfitters and guiding operations throughout the canoe trail. Periodic surveys of these businesses will provide a longitudinal assessment of the impact the NFCT has on their livelihoods. While outfitters only represent a small fraction of businesses impacted by paddler recreation, they appear most willing to participate in more extensive monitoring. The primary indicators utilized should include the number of boat rental transactions and a manager's assessment of the relative importance of the NFCT (Appendix V). Several lodging owners expressed their desire to become members of the NFCT. Therefore, the number of local businesses holding trail memberships would be an additional indicator.

Community Impacts

This research suggests a variety of impacts will accrue at the community level. Expenditures by new users may help stabilize and diversify the local economy, supporting a greater mix of businesses. If these economic benefits are realized, there will be stronger connections and appreciation of the value of the waterways. This appreciation may lead to expanded efforts for land protection and community planning.

There may be potential negative outcomes witnessed at the community level as paddler recreation increases. Similar to events that occurred in the Boundary Waters, user conflicts may surface that highlight the multiple and potentially conflicting values associated with the region's waterways.

There are several methods of monitoring changes at the community level. One possibility is a future comprehensive economic impact study. Monitoring collaborative efforts relating to the NFCT would be an alternative and less labor-intensive approach.

Most economic impact analysis primarily explores the effects visitor expenditures have on local economies. Yet the community change literature suggests that ultimately the largest effect of protecting natural areas and creating access to them is spurring both the retention of residents and the attraction of newcomers (Power 1996). Unfortunately, the multiplicity of factors involved and the associated temporal lags with this impact make isolating changes due to the NFCT a difficult endeavor.

Regional Impacts

Measuring and monitoring the impacts of the NFCT at the regional level is challenging but feasible. At this spatial scale, the ultimate impact of the NFCT may be as a force catalyzing integrated management that cuts across traditional administrative and jurisdictional lines. The Appalachian Trail has served in this regard, developed gradually over its 85-year history. As their 2005 management plan describes,

“Its’ remarkably decentralized, volunteer-based cooperative management system further sets it apart as a premier example of a partnership program involving all levels of government and private citizenry engaged in the cooperative management of a nationally significant public resource.”
(NPS 2005, p. 3)

The National Park Service maintains records of public stewardship on the AT. The Appalachian Trail Conservancy publishes statistics on through hikers. Maintaining a record of similar statistics would be useful for the NFCT as well.

The National Park Service, the Appalachian Trail Conservancy, and other stakeholder groups collaborate to draft management plans. The formation of a similar plan along the NFCT trail corridor would be an indicator of its success. Such an approach would build upon the linkages apparent between the region's forests, waterways, and communities, and would help shape a regional approach to sustainable community development and ecological stewardship in the northern forest.

6.4. Future Research Needs

Future research is necessary to improve our understanding of the impacts of the Northern Forest Canoe Trail and help communities capture potential benefits while minimizing economic, social, and environmental costs. This research should explore why certain paddling destinations are more popular than others, increase our understanding of the impact of second home owners, develop a generalized approach to assessing economic impacts, expand the inventory of guide and outfitter services, identify local and landowner perceptions of paddler tourism, assess current motorized and non-motorized user conflict areas, highlight critical areas for minimizing wildlife disturbances and the spread of exotic species, assess the feasibility of suggested methods of expanding economic impacts, and replicate this study's approach to monitor changes in economic impacts and the NFCT's importance.

Popularity of Paddling Destinations

This research highlights the broad range in visitation levels and economic impacts across the NFCT. Paddlers choose to visit certain sections for a variety of reasons, including their knowledge of the waterway resource, its reputation, characteristics, surrounding landscape, availability of services and other amenities, transportation infrastructure, and distance from their hometown. A more detailed exploration of their destination choices is necessary to assess the relative importance of these factors and can help expand paddler recreation to sections that currently see light use.

Economic Impacts of Second Homeowners and Immigrants

The rural development literature suggests second homeowners and newcomers who seek recreation rich communities have significant economic impacts. But assessing these impacts was beyond the scope of this study. Indeed, the focus on per trip visitor spending does not capture the full economic impacts of these users. For example, a study of long-term cottage renters in Algonquin Park, Canada, reported the average leaser spent about \$10,000 annually on leasing fees, repairs, and local goods and services (Bowman and Eagles 2002). More research is needed to assess second homeowners' and newcomers' positive and negative impacts, and the importance of paddling activities in their choice of home location.

Generalized Approach to Assessing Economic Impacts

This study focuses on six regions of the NFCT that encompass about one-third of the canoe trail's length, an approach that allows for detailed site assessments and interregional comparisons. However, as the study sections were not randomly chosen,

generalization to the entire canoe trail is difficult. A more generalized research methodology that broadens the scale of impacts could be conducted through either a random sampling approach, or by developing a site specific, economic impact index based on the results of this research. The site-specific index would use expert interviews and site assessments to categorize sections of the waterway into different typologies based on estimated use, trip characteristics, user types, and other variables. It would use the results of this study to create an economic impact profile for the different typologies.

A second generalization would look at each region as a whole, and not limit its analysis just to paddler tourism on the NFCT waterways. Limiting analysis to just the NFCT fails to provide an accurate view of the role paddler tourism plays in local economies, which are often close to a myriad of paddling and other recreation activities.

Expanded Outfitter Inventory and Survey

Monitoring the business activities of local guides and outfitters has been identified as a cost effective, interim method of assessing changes in economic impacts, due to their interest in the canoe trail as well as their direct contact with paddlers. This research established a database of outfitters in the six study regions. Expanding this database to the entire length of the canoe trail would improve the robustness of the analysis.

Additional social and environmental impacts

To assess community social and environmental impacts, this study surveyed business owners, land managers, and paddlers. Conflict was identified between motorized and non-motorized users and between paddlers and anglers. A more comprehensive

exploration would assess local resident and waterway landowners' perceptions of paddler tourism. Concerns over the spread of exotic species and wildlife disturbance were also identified. Further research would be useful to better understand these dynamics, the level of concern and their spatial scope, as well as to help the NFCT and communities develop proactive management strategies.

Water Recreation Opportunity Spectrum (WROS) analysis

The NFCT could benefit from an analysis utilizing the water recreation opportunity spectrum, which provides a framework for understanding the recreational opportunities and characteristics of waterways (Hass, Aukerman, Lovejoy, and Welch 2004). By classifying regions by their current land use, management, and use character, the WROS helps planners better understand the recreational use mosaic, and manage for a diversity of recreational opportunities.

Feasibility Studies

This research recommends several approaches to expanding economic impacts, including a system of rustic shelters, advertised inn-inn trips, organized canoe races, and guided outings. These approaches may be most feasible and appropriate along specific sections of the trail, and have associated costs. Feasibility studies would be helpful for the NFCT and interested local communities and businesses.

Longitudinal Economic Impact Assessment

Few studies of recreation's economic impacts have been replicated over time. Yet longitudinal assessments are very valuable. Anderson et al. (1999) reported several

significant changes in visitation levels and economic impacts in their replicated study of the Kickapoo River, Wisconsin. The development of NFCT also presents a unique opportunity to study changes in economic impacts as the trail grows in popularity.

Peak Oil, Climate Change, and the Tourism Industry

A broader, parallel research project would identify the potential effects of peak oil and climate change on tourism and recreation in the Northern Forest. Little research has explored how rising transportation costs will affect visitation to the Northern Forest region, or how a changing climate is affecting the tourism industry. In addition, most studies that identify environmental impacts of tourism and recreation do not consider the impacts of visitors' energy use. These topics have important implications for business and communities that rely on tourism and recreation for their livelihoods.

This research explores the impacts paddler tourism and recreation has in the Northern Forest. Its primary goal is to help communities, businesses, and stewardship organizations form realistic expectations of the impacts the development of the NFCT will have in their local economies. The formation of the NFCT provides a unique opportunity to study community change early in the process. Continued monitoring of changes at the level of business, community, and region may shed new insights on how recreation shapes the Northern Forest.

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Appendix 1. Lodging Survey

University of Vermont Paddler Economic Impact Study: Lodging Questionnaire

Name of business:

If you are not open year round, when do you open and close for the season?

How many rooms/cabins do you have available? _____ rooms/cabins

Do you have canoes or kayaks available for guests to use? Yes No

If yes, how many boats? ___ canoes ___ kayaks

Please complete the following table:

	Summer Season (Mid June-August)	Fall Season (September-mid October)
Average Occupancy rate (%)		
Average length of stay (Days)		
Percentage of parties for whom canoeing or kayaking is an key part of their stay		

This study is being conducted in communities along the Northern Forest Canoe Trail, 740-mile water trail from Old Forge, New York, across Vermont, Québec and New Hampshire, to Fort Kent, Maine. Your business is situated along the canoe trail.

How much do you know about the Northern Forest Canoe Trail?

a lot a few things not very much nothing

Comments:

How likely do you think the canoe trail will bring you new business?

Very Likely Likely Unlikely Very Unlikely

Why?

Appendix II. Outfitter Follow-up Survey

University of Vermont Paddler Economic Impact Study: Follow-up Questionnaire for Outfitters

Name of business:

About how many boats do have available for rent? ___ canoes ___ kayaks

Please estimate the **number of groups** you rented boats this season that:

1) Put in at directly at _____ groups

2) Took rented boats to a cabin, other access points, etc: ___ groups

Please group your rental customers into the following categories:

___ % Locals (Live within 25 miles of your business)

___ % Visiting day users, coming from over 25 miles away

___ % Staying at area hotels, motels, or in rental cabins

___ % Camping at area campgrounds

___ % Camping at remote, water accessible campsites

___ % Other (*Describe*)

How likely do you think the canoe trail will bring you new business?

Very Likely Likely Unlikely Very Unlikely

Why?

Feel free to provide additional comments about this project . Thanks!

Appendix III. Paddler comments

Adirondacks

This Forked Lake is beautiful we're planning on doing some camping here. Nice to be away from motorboats and have some quiet especially good since we're beginning paddlers.

We had a wonderful time at Arnold's Rock as usual. We door on outhouse (someone probably used for firewood- unprepared campers). The other outhouse at 12-man lean-to was great, had a door and facing the other way from the campsite. Thanks for your time!

6th-Long Lake maintenance of carry from 8th to Brown's Tract is much appreciated

8th lake should not have motor boats-gas/diesel
Based on the reservation system for campsites we expected to see a lot more people, perhaps they were scared away? We like to through canoe and the reservation system with its 2-day minimums makes it difficult

Beautiful area! What a wonderful find, we will be back to bring others with us!

Beautiful! Life treasure being with family!

Concerned about Decrease Loon Population, Great area

Could you please send me more info on your Organization? If there is something I could do help you while I'm here I would be more than Happy, Thanks Eric Kune

Eat at Adirondack Mountain Grill! Wonderful people in area, especially the park ranger and office

Eight Lake should be motor free, the motor boars going back and forth with tubes and skiers are very annoying and dangerous since some operators do not watch out for paddlers and nearly hit them. There is plenty of room on 7th lake for the motor boats, we need more quiet lakes for paddlers that have good access or boat launches

Forked Lake is gorgeous!

Great activity of limited income families

Great Job on the kiosks! Need a canoe register book here. It's fun to see who goes thought! Thanks!

Hope to reach VT

How can Whitney Park Legally block accessible waterways into little forked lake? I was planning on being on the water for 30 days. I was doing the trip solo, and during one of the portages my entire pack of gear was stolen while I portaged my canoe. I made just short of Lake Champlain (approx 130-140 miles) in about 6 days. I spent approximately \$800 on food and gear in

Saranac Lake and Lake Placid. The gear stolen from me was worth upwards of \$5000. Please contact me if I can be of any further assistance.

I would spend more locally (bring less stuff for home) if local businesses didn't use their profits to lobby against environmental interests.

In the region to scout hunting possibilities. During hunting season, they often stop for a meal, and sometimes stay in motels "When it is cold out!")

Info about canoe trail should be linked to Rangeley websites ex Maine SP's etc.

Maps of trail should be more easily available, we like the prospect of the trail! We're kayakers

Interested in 2nd day of 90 miles canoe race from Old Forge to Saranac Lake in September

It is a wonderful facility, I am surprised you allow speed boats and skidoos which pollute the water and make noise and air pollution

It looks great here!

Lean-tos in great shape along route. Trail along cold river take out to pine point in poor shape hard to find in places and some blown down trees that could be cleared. Overall excellent trip.

Leave eighth lake to paddling and small fishing boats

Lots of great water around. Thanks!

Lots of trash at campsites. Lots of nice rivers to paddle that come off of Raquette Lake. High Use area.

Love it here!

Love the Northern Forest Trail idea-will look into it more.

More info on campsites remoteness, descriptions, areas least likely to encounter motor craft travelers logistics of one way travel, who offers shuttle services etc. safety (vandalism of parking areas)

Would like to see more restrooms, a good local map, and places to rent sailboats

Peaceful, quiet, calm water!

Please keep me posted about the trail. Hope to do points each year! Thank you

We ran into some crazy, drunken kayakers. Sea planes are kind of annoying as they fly by every couple of hours.

We stayed at the Adirondack Hotel on Long Lake for one night at the beginning of the trip and stayed 2 nights at Motel near the airport in Albany after we completed our canoe trip. This is the third such canoe trip we have taken since 1993 over the same route. We start at Blue Mountain Lake and end up at Tupper Lake.

Reservation systems are nice as you don't have to worry about a site.

So pretty in October, quite populated compared to Northern Ontario.

Tell the kids on jet skis to respect others, some created such wake we were almost swamped

The lake needs a bit of clean up like garbage pick up

This year it was most disturbing to have so many powerboats pulling rafts or tubes on 8th lake, too much speed boat noise and air pollution from power engines did not make this trip as enjoyable as in past years. This was definitely the worst year. Can anything be done?

Took a seaplane ride in long lake had pilot fly us up to Saranac lake village where we started to old forge so we could see the route we did, awesome view stayed at long lake hotel to take a shower and spend 1 night 1/2 way through

We like the recycling toilets. Aurorws AWC

WE love the campground and appreciate it being available after the season, Thanks!

We mostly paddle the Saranac/St. Regis Lakes Region. But plan to expand our ventures to this area, as it is not as far to drive from Albany.

Allagash Wilderness Waterway

For us, the remote campsite is the draw. We just love Allagash lake because it has no motorboats, personal watercraft etc. The silence and natural beauty are spectacular.

I was surprised to see an increase of the number of campsites along the Allagash waterway. I hope that this isn't a trend. Too many will change the experience. Also, to truly follow the principles of 'Leave No Trace' group size should be limited to 10, not 12 as mentioned in publications that cover the regulations of the North Maine woods.

My husband and I kayaked and camped for 10 days in the Allagash waterway. We had the most inspiring and cleansing experience together, we say that we saw more moose than people! IT was a pilgrimage for us and nature was our teacher. Thank God there are still places like this in the U.S. The campgrounds were pristine, giving the eyes and the spirit a much-needed rest from the "civilized" world. Please preserve its quiet and remote nature!

Great river, keep it clean and green!

Androscoggin River

Have stayed at campground in the past. Good place to practice whitewater - it's a reliable waterway. Have considered renting house in the area instead of coming up for day trips.

Interested in tube and helmet rentals!

Keep it Up!

Love the NFCT! Great Maps! I want to through-paddle. Thank you. Thank you.

Wouldn't mind canoeing the whole route!

Missisquoi River

Bathrooms could use some attention... But happy to have them.

Great place!

Great, nice and calm

NFCT, Nice concept; much portage

Nice kayaking spot. Fun, a bit windy on lake, like backwater streams, plenty of bird viewing

Nice place!

No place to land near lake. Awful toilet.

Paddling to the sea!

Thanks for the picnic area up towards the bay

Went down Missisquoi turned right on Lake Champlain had trouble finding mouth of Dead creek. Paddled to houses and asked directions. Was a great trip.

Would like to see campsites more available equally spaced along route

Northeast Kingdom

This used to be our quiet water. Stop advertising. Go F* yourself.

Canoe Trail very welcome

Clyde River impassable from here

Cool survey. Hope it helps the NFCT. Happy to help!

Fine Paddle, Would like more info on trail

Fishing is really good on the pond. It is a safe pond. Also visit Maidstone State Park during the summer.

Glorious 1st Day of Sept. 2006!

Great trip, nice pristine waterway. Hope it stays that way. Cliff.

I find the fishing and hunting worth the money spent my last 17 years here on the river. We do have photos of nice browns and brookies and rainbow trout fishing. All the people I've met here have learned a great deal through me. This place is limitless for conservation. My name is Joe Lipolla, most everyone around here knows who I am. I love teaching the younger generation of what to look for in waterfowl, too. Of best interest. Those can't be beat, Looking forward to hearing from you. Joe Cipolla, P.S. We camp here.
It would be great to have a description of river conditions (rapids, current) We happened to stop on our travel to Island Pond. Which direction is Island Pond- left or right? Great river!

Just learned about the NFCT- great idea! Will continue to explore it.
My husband has camped in island pond since he was 7y/o (1966) we have been visiting w/our children for the last 2-3 years. Now his siblings(7) and their families are returning as well(total number this year 54) for an informal reunion. Thanks for all the hard work in preserving the beauty of these areas for all to enjoy!

Site really relaxing

Stop turning everything into a park. F* You.

Thanks to Jen for the great help, Tom + Jen + Gabe
This is wonderful thank you for providing such a beautiful activity, Next years goal is to bring garbage bags and clean up the cans. If you have a clean the river day call us... We are in Derby VT all summer, 802-334-1301, Thanks Pat Blank
Vermont Natives do not seek economic support from our rivers. It all just another way white man can exploit nature to gain wealth

Rangely Lake

Friendly, welcoming place. "Actually has everything you need...so surprised to not have to drive to have everything you need...For a small town, amazing historical society. Stay at cabin right across the street...

Great Job!

Here for bird-watching and relaying
I have found the information on your maps to be useful, for the local canoeing but I have been canoeing here for over 40 years. I am very pleased with the entire set of Northern Forest Canoe Trail maps.

Love this area! Hope it always remains the same, peaceful, quiet, etc.
Over the years my sons and I have paddled Vanbagog, Aziscohas, Mooselook, Upper Richardson, Lower Richardson and lived or vacationed on Rangely Lake. I am available by email or phone for additional survey. (50) 395-5751

Terrific effort next year will check out other sites thank you!

We had a great time and look forward to doing more sections of the trail soon.

We love it here and hope that the area will preserve it's natural beauty and character

Would like to see more info on website for rental locations of Canoes & Kayaks also Campgrounds

Appendix IV. Outfitter Contacts

Study Region	Business	Contact	Address	Phone	Email
Adirondacks	Rivett's Marina		PO Box 601 South Shore Road Old Forge	315 369 3123	
Adirondacks	Mac's Canoe Livery	Brian MacDonald	5859 State Rt. 30 Lake Clear, NY 12945	518 891 1176	macadk@northnet.org
Adirondacks	Mountain Man Outdoor Supply Company	Anne	PO Box 909	877 226 6369	sales@mountainmanoutdoors.com
Adirondacks	Tickner's Canoes	Dan Tickner	Riverside Drive, Box 267 Old Forge, NY 14320	315 369 6286	
Adirondacks	Adirondack Outfitters and Hardware		Rt 30, Long Lake	518 6245 998	
Allagash	Allagash Outfitters		PO Box 149, Allagash, Maine	207 398 3277	
Allagash	Allagash Guide Service	Sean Lizotte	RR1-Box131D Allagash, ME 04774	207 398 3418	allaquide@ainop.com
Allagash	Pelletier's Campground		PO Box 67 St. Francis, ME 04774	207 398 3187	pellcamp@nci2.net
Allagash	Allagash Guide Inc.	Blaine Miller	292 River Road, Norridgewock, ME 04957	207 634 3748	bmiller@allagashguide.com
Allagash	Allagash Sporting Camps	Mike Paquette	101A Milton Rd Rochester N.H. 03868	603 335 1320	
Allagash	Katahdin outfitters		PO Box 34, Millinocket, ME 04462	207 723 5700	
Androscoggin	Northern Water's Outfiiters	Ned McSherry	P.O. Box 120, Rte. 16, Errol, NH 03579	603 482 3817	beoutside@megalink.net
Androscoggin	LI Cote Sports Center		7 Main St, Errol, NH 03579	603 482 3375	
Missisquoi River	Brooks To Bays Nature Tours	Jeremy Brooks	238 Sleepy Hollow Lane, Vergennes, VT	802 318 1956	brookstobays@yahoo.com

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Northeast Kingdom	Clyde River Outfitters		10 Cross Street Island Pond	802 723 6500	
Northeast Kingdom	Northwoods Stewardship Center	Luke O'Brien	PO Box 220, East harleston, VT 05833	802 723 6551	info@northwoodscenter.org
Northeast Kingdom	Northern Exposure	Pete Rodin	PO Box 107	802-723- 4084	
Northeast Kingdom	River Excitement	John Marshall	PO Box 65 Hartland Four Corners VT 05049	802 457 4021	rvrxcitmnt@aol.com
Northeast Kingdom	Simon the Tanner		Cross & Main St, Island Pond, VT	802 723 4452	ipstore@simonthe-tanner.com
Rangeley Lake	Ecopelagicon Nature Store	Linda Dexter	7 Pond St Rangeley ME	207 864 2771	
Rangeley Lake	Oquossoc Marine		RR 4 Carry Rd	207 864 5477	
Rangeley Lake	River's Edge Sport Shop	Gerry White	Route 4 PO BOX 346 Oquossoc Maine 04964	207 864 5582	

Appendix V: List of Interim Indicators

Outfitter indicators

- Total revenue
- Percentage of revenue from non-local paddlers
- Number of employees (full time, part time, seasonal)
- Months open for business
- Number of boats available for rent
- Number of boat rental transactions
- Percentage of revenue from sales, rentals, shuttling services, and other services
- Manager's assessment of percentages of customers for whom the NFCT was a reason for their trip.
- Manager's assessment of changes in the impact of the NFCT, compared to the previous years

Other indicators

- Number of NFCT memberships
- Number of local businesses holding NFCT memberships.
- Number of NFCT maps sold
- Number of through paddlers