

CENTRO

Center for Tourism Research and Outreach

Staff Paper

**A Joint University, Industry, and State Venture
A Member of the University of Maine System**

Procedures for Evaluating the Potential Regional Economic Impacts of Conservation Lands in the 100-Mile Wilderness Region¹

By:

Mark W. Anderson
Kevin J. Boyle
Kathleen P. Bell

Department of Resource Economics and Policy,
University of Maine

Final Report -- August 17, 2005

¹ Support for this project was provided by the Sudbury Foundation, the Jesse B. Cox Charitable Trust, and Sara K. deCoizart Article TENTH Perpetual Charitable Trust. Additional in-kind support was provided by the Maine Department of Conservation and the Sierra Club. The authors thank Julia McGuire, undergraduate research assistant at the University of Maine, and John Holden of the Eastern Maine Development Corporation for their assistance in the research for this project.

Table of Contents

1.	INTRODUCTION	4
2.	The 100-MILE WILDERNESS “REGION”	5
3.	ECONOMIC IMPACTS OF CHANGES IN LAND MANAGEMENT	9
3.1	<i>Economic Values and Economic Impacts</i>	10
3.2	<i>Economic Impact Example</i>	12
3.3	<i>Enhanced Recreation Opportunities in the 100-Mile Wilderness Region</i>	13
4.	STUDY DESIGN	15
4.1	<i>Stakeholders</i>	15
4.2	<i>Elements of the Study Design</i>	18
4.3	<i>Constraints</i>	19
5.	CURRENT CONDITIONS	20
5.1	<i>Conservation Ownership in the 100-Mile Wilderness Region</i>	20
5.2	<i>Current Recreation Use</i>	23
5.3	<i>Illustrative Example</i>	29
6.	ECONOMIC IMPACTS OF ENHANCED RECREATIONAL OPPORTUNITIES	31
6.1	<i>Key Recreational Assets</i>	31
6.2	<i>Measuring Potential Economic Impacts</i>	33
7.	CONCLUSIONS	39
	REFERENCES	44
	APPENDIX: POTENTIAL RECREATION ASSETS INVENTORY	47

List of Tables

1. Long-Distance A.T. Hikers Registering at Baxter State Park25
2. Hikers Registering with ATC Ridge Runner at Gulf Hagas26
3. Recreation Expenditure Patterns Relevant to 100-Mile Wilderness37
4. Sample Expenditure Data from USDA NVUM38

List of Figures

1. 100-Mile Wilderness Region8
2. Borestone Mountain Hikers' States of Residence, 2003 & 200427
3. Reported County of Residence of Maine Hikers at Borestone Mountain
2003 & 200428
4. Model of Recreational Use Intensities40

1. INTRODUCTION

The Maine Department of Conservation (DOC) contracted with the Department of Resource Economics and Policy of the University of Maine to assess the regional economic impacts of new recreation opportunities provided on conservation land holdings in the 100-Mile Wilderness region of Maine. The focus of this report is on new and improved recreation opportunities in this region of the state and on what these opportunities might contribute to the regional and state economies. As no specific recreation management plan is in place for the conservation land holdings it was not possible to compute economic impacts. What this report does is lay out the framework for conducting such analyses as new recreation assets are developed on conservation lands in the 100-Mile Wilderness. Potential recreation opportunities/assets are discussed in this report.²

The combination of increased conservation land holdings and significant changes in the forest products industry and related sectors has raised numerous questions concerning the maintenance of the economic health of the communities that comprise Maine's Northern Forest region, a region broader in scope than the 100-Mile Wilderness "region." Central is the question of how the contributions to local economies will change as land ownership, land management objectives, and land use change. This project contributes to this line of inquiry by considering the potential economic impacts of conservation land holdings in the 100-Mile Wilderness Region. Specifically, this project explores a

² This study complements other recent research, current tourism studies, and the activities of community and business leaders in the region. Other studies are considering nature-based tourism (Fermatta), local strategies to promote tourism development (Piscataquis County Tourism Task Force), and business opportunities in the larger tourism region (Maine Highlands Lodging & Restaurant Study). There are also proposals for significant tourism development in the region (Plum Creek).

framework for examining the potential economic impacts of enhanced recreation opportunities associated with conservation land holdings adjacent to the Appalachian Trail (A.T.) in the 100-Mile Wilderness.

While removing land from traditional industrial forest management may have adverse effects on the economic base of the region, this study focuses on the potential economic impacts of tourism stimulated by enhanced recreation opportunities. Consideration of the net benefits (total benefits minus total costs) of these conservation land holdings is beyond the scope of this project. Without detailed and specific management objectives for conservation lands and adjacent private lands in the region it is impossible to characterize and quantify all of the potential the benefits and costs.

The remainder of this report is divided into 6 sections. Section 2 describes the 100-Mile Wilderness and the study area. Section 3 introduces a conceptual framework to gauge the potential economic impacts of changing land management objectives. Section 4 provides an overview of the initial study design. Section 5 describes current land management and recreational use of the lands in the region. Section 6 posits a framework for measuring the economic impacts of enhanced recreation opportunities in the region. Finally, Section 7 offers conclusions.

2. THE 100-MILE WILDERNESS “REGION”

The 100-Mile Wilderness section of the Appalachian Trail (A.T.) is famous among hikers as the longest portion of the trail that does not cross a paved roadway. This section of the trail begins just north of Monson, Maine on the east side of highway Route 15/6, and extends generally northeastward until it reaches the famed northern terminus of the Appalachian Trail, the summit of Mount Katahdin in Baxter State Park (BSP). In the past, most of the trail corridor has passed through private forest lands, primarily managed

for industrial, multiple-use forestry. The trail corridor itself is on land or easements owned by the National Park Service (NPS) or the Maine Department of Conservation (MDOC).

While not legally designated as a wilderness area under the provisions of the Federal Wilderness Act, the 100-Mile Wilderness provides unique hiking experiences for through hikers (those hiking the A.T. from Georgia to Maine) and for others wanting a challenging multi-day hiking experience or a unique day hike. The 100-Mile Wilderness provides a hiking experience that is unparalleled in the eastern U.S. The trail passes through or skirts numerous spectacular natural features including Barren Mountain, Gulf Hagas and the Hermitage, White Cap Mountain, the Debsconeag Lakes, and the southern portion of Baxter State Park. There is no similar hiking experience east of the Mississippi.

While there is no formal definition of the 100-Mile Wilderness region of Maine, for the purposes of this project the region was defined as a rough oval extending from Greenville south to Monson, Guilford, and Dover-Foxcroft; East to Milo and Brownville; North to Millinocket; Northwest to Ripogenus Dam; and then Southwest back to Greenville. The highway routes roughly defining this region would be Route 6 from Greenville to Milo, Route 11 from Milo to Millinocket, and the Golden Road from Millinocket to Ripogenus Dam to Kokadjo to Greenville. Figure 1 displays various aspects of this region, including gateway communities, the Appalachian Trail, water bodies, conservation land holdings, mountains, and township boundaries.

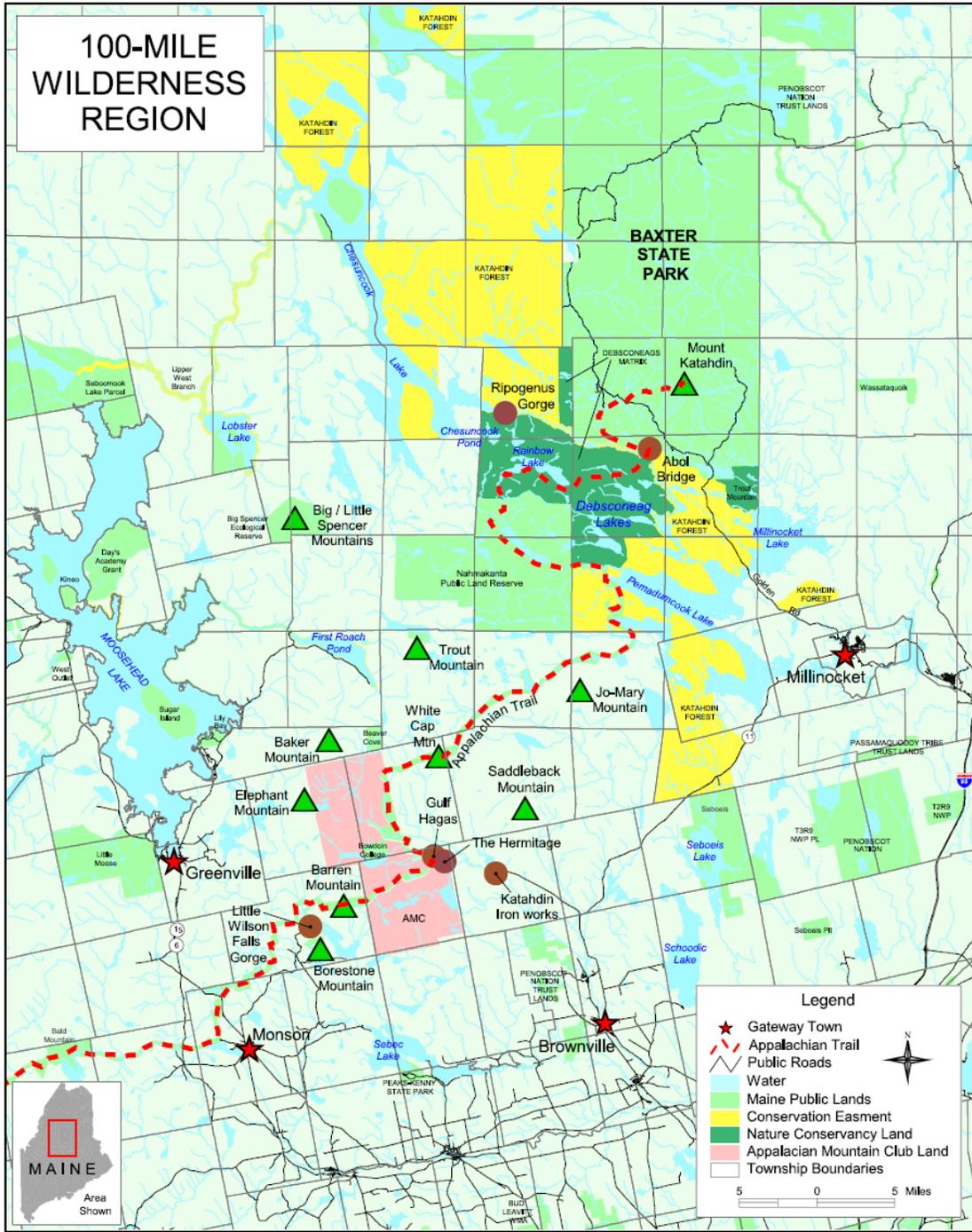
The majority of the land in this region is still in private ownership and is managed as industrial multiple-use forest. Different owners manage the lands with different objectives, with commercial timber harvesting generally being a primary objective.

However, in recent years, both public and private entities have purchased significant land holdings and conservation easements in the region with long-term conservation as a primary management objective. These acquisitions and their diverse motivations have changed land management within the 100-Mile Wilderness region and will affect the economic dynamics in the surrounding communities for years to come. Among the significant conservation land acquisitions are:

- The Nature Conservancy's (TNC) acquisition of development rights and easements on timber management practices south of Baxter State Park and South of Pemadumcook Lake as part of its larger Katahdin Forest Project.
- The Nature Conservancy purchased of lands south and southwest of Baxter State Park, known as the Debsconeag Lakes Wilderness.
- Establishment of the Nahmakanta Public Land Preserve, mostly with Land for Maine's Future funds, southwest of the TNC Debsconeag Lakes Wilderness.
- The Appalachian Mountain Club's (AMC) purchase of townships on either side of the A.T. near Gulf Hagas, including the Little Lyford Ponds Camps, one of the historical sporting camps in the region.
- Elliotsville Plantation, Inc.'s purchase of part of Elliotsville Plantation to establish the Big Wilson – Seven Ponds Sanctuary.

These transactions have placed tens of thousands of acres of forest lands, ponds, lakes, streams, and mountains into conservation holdings of one form or another. In addition, various parties have expressed interest in acquiring additional conservation holdings in this region.

Figure 1. 100-Mile Wilderness Region



June04_100mile_8x11_apr

B. Jackson

3. ECONOMIC IMPACTS OF CHANGES IN LAND MANAGEMENT

Changing land management practices can have significant impacts on any regional economy. Forest lands in the 100-Mile Wilderness region traditionally provided economic benefits for local communities from extractive forest products such as pulp wood, dimensional lumber, and hardwood stock and from traditional outdoor recreation such as hunting and fishing. More recently, non-extractive uses such as snowmobiling and ATV riding have grown in popularity and in terms of their economic contribution to the region (Reiling, Kotchen and Kezis, 1997; Morris *et al.*, 2005).

When land management changes, activities on and uses of land also change. Some activities will be favored; others may be discouraged or perhaps precluded. The nature of such changes is central to the characterization of the potential economic impacts of increased land conservation holdings. Some lands purchased for various types of conservation ownership may now have restrictions on timber harvesting. Other restrictions could reduce access for existing recreation activities such as hunting, snowmobiling, and ATV riding. These potential effects reflect the fact that even multiple use forest management may result in the preclusion of some activities in favor of others. Conservation ownership generates opportunity costs from the recreational activities that are precluded only if the traditional users stop participating in an activity all together. If the traditional users substitute/switch their activities to other lands within the region then there is no economic loss. In this study we do not estimate possible economic impacts from any loss of timber harvesting or existing recreational opportunities.

Conservation acquisitions can have positive regional economic impacts if new recreational users are attracted to the area if existing users are induced to spend more when they visit the region or if existing users return to the region for future visits. New

alternatives that could induce these changes include new hiking trails, designated areas for wildlife watching and photography, and other non-motorized recreation opportunities in all four seasons of the year.

It is beyond the scope of this study to estimate the net economic impact of the increase in conservation lands in the 100-Mile Wilderness region; there is simply not enough information at the present time to do this. Rather, this study investigates how conservation acquisitions might generate new regional economic impacts through increased tourism in the area.

3.1 *Economic Values and Economic Impacts*

Economists in other regions of the U.S. have considered questions similar to those facing Maine's Northern Forest. Empirical research on the larger Appalachian region suggests that there may be positive net income and employment effects of Federally-designated wilderness lands on rural counties throughout the region (Rosenberger, 2004). Much of economic activity from wilderness lands extends from increased recreation opportunities, and the Rosenberger study indicates that the impacts of recreation expenditures on a regional economy can be significant. Conservation acquisitions can have positive regional economic impacts through recreation activities if new recreational users are attracted to the area, if existing users are induced to spend more when they visit the region, or if local residents stay in the region to recreate instead of traveling elsewhere to do so. Enhanced recreation infrastructure would increase the local economic impacts of current conservation land and potential new conservation land resources. Infrastructure that would enhance economic impacts include coordinated marketing, consistent signage to direct people to sites once they are in the area, improved

infrastructure (parking, toilets by trail heads, viewing areas, on-site interpretation, etc.), and the human capital of tourism service providers.

It is important to note that the economic activity from increased recreation opportunities identified in the Rosenberger study are economic impacts resulting from recreation expenditures and are very different from the concept of economic value that would be used in any assessment of the net economic benefits of recreational use of conservation lands. Extensive research has been conducted to estimate the economic value of recreational use of forest lands and other natural resources. Rosenberger and Loomis (2001) summarize recreation value estimates from over 150 studies completed between 1967 and 1998 and demonstrate how these benefit estimates might be transferred to other recreation resources to estimate their value. However, these studies estimate what economists call consumer surplus, the excess benefits that consumers' enjoy from an activity above the costs they incur to participate. Such a value estimate is certainly relevant to the question of how much land should be held in conservation ownership within the 100-Mile Wildernesses region, but it is not the same as regional economic impact.

Consumer surplus and economic impact are closely related economic concepts. The more desirable a resource is for recreation, the higher will be the economic value (consumer surplus). The larger the consumer surplus, the more likely people are to visit a recreation site and spend more money in local communities, which enhances economic impacts. Thus, high quality recreation opportunities generate large consumer surplus to visitors, which means more people will visit, stay longer, and be more likely to return. All of these effects translate into enhanced expenditures by recreationists in local economies, hence enhanced economic impacts.

Three key features of a resource like the 100-Mile Wildernesses are likely to influence consumer surplus and thereby the economic impacts of this land area on local communities:

- The quality of the natural resource.
- Access to the resource, including land ownership and infrastructure.
- Public knowledge of the resource and its attributes.

Establishing conservation ownership can affect the future quality of the land for recreation, as well as access and public knowledge.

The focus of this study is to consider changes in regional economic impact, the change that the increased expenditures by recreationists have on employment and income in the communities surrounding the 100-Mile Wildernesses. Such increases can come from attracting new visitors from outside of the region to recreate, from inducing current visiting recreationists in the region to stay longer and/or visit more frequently, and from inducing local residents to stay within the region for recreation.

3.2 *Economic Impact Example*

To further clarify the distinction between economic value and economic impact, consider the hypothetical construction of a new hiking trail in a scenic area. Assume that the new trail attracts families to the area for day hiking. The costs of the recreation experience will include any fees charged to use the trail and the expenditures for travel, meals, lodging, and supplies that families make when they use the trail. The benefits to the families would be measured by their willingness to pay for the hiking experience. Those who hike at any given time enjoy benefits at least equal to their expenditures, otherwise they would not engage in the activity. Recreation use value (or consumer

surplus) is an estimate of the value of benefits enjoyed in excess of the expenditures families incur while using the hiking trail. In other words, many of the families that hike would have been willing to pay more for the experience than they needed to. That greater amount that they were willing to pay is a “surplus,” a measure of the value of the resource in excess of the costs to the user of accessing it.

The economic impact on the region from the families using the new trail deals with the effect of expenditures made within the area for the purposes of the hiking trip. Essentially the region is exporting a recreation service to people from outside of the region, which brings new money into the local/regional economy. So a visitor’s expenditures in the region during the trip stimulate employment and income, both directly and indirectly. Usually residents from within the region who use the hiking trail do not have a similar effect, the assumption being that their expenditures in the region would have been the same in the region whether or not the trail existed. Thus expenditures by residents bring new money into the region only if they substitute local recreation for trips outside of the region they otherwise take. The focus of this study is on the potential regional economic effects of increased non-motorized recreation use of lands put into some type of conservation ownership within the 100-Mile Wilderness region. We do not address the question of the economic value of additional conservation lands, a value we suspect is considerable.

3.3 *Enhanced Recreation Opportunities in the 100-Mile Wilderness Region*

This study investigates how conservation land acquisitions in the 100-Mile Wilderness may generate new regional economic impacts in the communities surrounding the 100-Mile Wilderness - Greenville, Monson, Guilford, Dover-Foxcroft, Milo, Brownville, and Millinocket - through increased recreation and tourism. Land

conservation acquisitions encompass a range of actions, including fee-simple purchases of land parcels as well as purchases of conservation easement on other land parcels. Acquisitions that change land management objectives can affect recreation opportunities. Our framework for considering these regional economic impacts focuses on four types of changes in human behavior:

- Increases in recreation use of conservation lands by **new visitors** to the region generate economic benefits in terms of increased expenditures for meals, lodging, and supplies by new visitors.
- **New residents** to the region drawn by the designation of conservation lands (interested in living near conserved land resources and taking advantage of the associated recreational amenities).
- Expanded recreation opportunities (e.g. various types of day hikes and camping opportunities) may induce **current visitors** to spend more during current visits, stay longer and/or return to the region for future visits.
- Substitution of current recreation outside of the region by **current residents** with activities within the region.

The magnitude and relative size of these behavioral responses will depend on characteristics of the region itself as well as the infrastructure and marketing of the region's amenities. In short, enhanced recreational opportunities will depend on:

- the quality of the natural resources and amenities in the region;

- the access to the natural resources and amenities, which is affected by land ownership and infrastructure; and
- public knowledge of the natural resource and amenities.

Simply put, establishing conservation ownership can affect the quality of recreation experiences on lands, influence the access to resources and amenities, and change public awareness of these recreational assets. The extent that these actions occur depends on the management of the conservation lands and cooperation between conservation owners, local businesses and communities, and the state.

4. STUDY DESIGN

To build on our conceptual framework required input from current and potential land owners, experts within the recreation and tourism industries of Maine, and local businesses, government officials, and citizens of the communities in the 100-Mile Wilderness Region. Lacking data tracking recreational use and expenditures, we turned to these stakeholders for guidance in considering potential regional economic impacts. The study was designed to incorporate the feedback of these stakeholder groups with available data from the region and other areas to arrive at estimates of regional economic impacts based on estimates of increased visitation and expenditures.

4.1 Stakeholders

The study relied on the collective expertise of two different groups of stakeholders: a Project Oversight Committee (POC) and a Local Advisory Committee (LAC). The Project Oversight Committee (POC) includes representatives from stakeholders in the Maine conservation community. While individuals representing these groups varied from meeting to meeting, the groups represented included:

- The Maine Department of Conservation
- Maine Sierra Club

- Appalachian Mountain Club
- Appalachian Trail Conference
- Natural Resources Council of Maine
- Maine Audubon
- The Nature Conservancy, Maine Chapter
- Elliotsville Plantation, Inc.
- The Wilderness Society

Representatives of these organizations were asked to share insights on potential land management strategies, on current and potential recreation opportunities on conservation lands in the region, and, most importantly, on potential recreational resources that might be acquired for conservation in the future. For example, the representatives were asked to identify unique natural resources of potential recreation value in the region. In addition, these groups also provided information on current constraints of recreational use, such as lack of awareness, signs, guide-books, and public access.

Discussions with representatives of these groups are important because these organizations are the owners or managers of many of the current conservation lands in the 100-Mile Wilderness region, and these organizations are likely to be involved in the acquisitions of additional conservation lands within the region. As such, land-management actions by these groups will determine the extent of the economic contributions of conservation lands to the surrounding local communities. Land-management actions may include enhanced access such as the development of new trails, limitations on certain types of uses or the number of users in selected areas, or production of improved information to attract visitors and direct different types of visitors to different natural resource attractions on the conservation lands.

The Local Advisory Committee is made up of individuals from local governments and businesses in the 100-Mile Wilderness region. Eastern Maine Development

Corporation (EMDC) assisted in the organization and coordination with the LAC.

EMDC has played a role in economic and tourism development in the region for some time. EMDC's role here was to assist in identifying representatives from the communities in the region and engaging them in the research project. Participants in the LAC were:

- John Chase, A Fierce Chase X-C Skiing, Monson
- Sylvia Black, Down Home B&B, Milo
- Harry Anderson, Guilford B&B, Guilford
- Ronald Bolduc, O&R Lumbra, Inc., Milo
- Reuben Lumbra, O&R Lumbra, Inc., Milo
- Galen Hale, Nicasou Outfitters, Medway
- John Wentworth, Moosehead Manufacturing, Monson
- Scott Hersey, Greenville Steam Co., Greenville
- Marcia McKeague, Katahdin Timberlands, LLC., Millinocket
- Matt Pollstein, New England Outdoor Center, Millinocket
- Bruce McLean, Millinocket Area Growth and Investment Council, Millinocket
- Jonathan Pratt, Moosehead Lake Region Chamber of Commerce, Greenville

The LAC also provided input on the potential recreation opportunities on conservation lands within the 100-mile Wilderness region. These individuals were also asked to react to the plausibility of ideas about the potential economic impacts of recreation opportunities that would be enhanced or developed on conservation lands within the 100-Mile Wilderness. Discussions with the LAC are important because it will be the reactions of local business to the management of conservation lands in the 100-Mile Wilderness region that will allow the communities to reap the economic benefits of the conservation lands. Business actions could include expanded services by restaurants and lodging establishments, development of new guiding business, and increase in sales of equipment and supplies to new recreationists. While the attractions on conservation

lands can attract visitors to the region, economic impacts can only be realized if local businesses provide goods and services to accommodate the visitors.

4.2 *Elements of the Study Design*

The study began with a careful review of the existing literature. There were no studies that related specifically to the study area and only a few that related to the specific area of investigation. This was followed by the collection of existing data on recreational use within the 100-Mile Wilderness.

The central component of the study involved interaction with the POC and LAC in the following steps:

1. Identify key natural resource attractions in conservation ownership within the region that might generate additional recreational use, including acquisition of new resources (in conjunction with the LAC and POC).
2. Identify management plans and allowable uses that would be applied to current and new conservation lands that would define the types and locations of recreation opportunities (in conjunction with the POC).
3. Estimate likely increases in recreation participation attributable to conservation lands that result from changes from activities that occurred under the previous ownership. (LAC)
4. Use data on expenditures by visitors engaged in similar recreation activities elsewhere to estimate potential expenditure increases attributable to the new recreational uses of the land.
5. Use these estimates of increased expenditures in a regional economic model to estimate potential increases in income and employment in the region.

The first two items in the above list were crucial to the accomplishing the objective of the study. That is, changes in recreation use are required to bring new money into the local economy that will lead to new jobs and enhanced income.

To see the importance of the first two bullets, consider the acquisition of Little Lyford Pond Camps by the Appalachian Mountain Club (AMC) as an example.

Purchasing the camps and surrounding land by the AMC is not sufficient in and of itself to enhance economic activity. Enhanced economic activity arises if:

- A new clientele is attracted to the camps that spend more money than previous visitors. This could be from spending more money per day or from staying at the camps for a longer period of time.
- New visitors are attracted to the area that increases the occupancy rate of the camps.
- New activities are created for day visitors that attract new people to the area for the day or who stay at other lodging establishments in the area.

It would not be appropriate to count all expenditures generated by Little Lyford Camps as the economic impact of conservation ownership because these camps were generating economic activity in the area prior to conservation ownership. It is only appropriate to count the increased (marginal) expenditures by visitors as new money to the region.

4.3 Constraints

The first and second steps in this process proved to be the most difficult to complete. The organizations owning conservation lands in the region are diverse in terms of their objectives and in terms of the stages they are at in their internal management planning for holdings in the region. Some organizations were not yet prepared to provide information on recreation attractions on their lands and their plans for allowing access to these attractions. This lack of consensus is not necessarily surprising, given the diverse objectives of the different land-owners. Nor are these disparate land management objectives necessarily problematic. Rather, these differences in perspectives complicate the achievement of regional land management as well as regional recreation and tourism planning. In addition, it also became clear to the project team that few of the

conservation organizations had substantially considered the issue of infrastructure needed to support recreation in terms of planning or funding. Perhaps most significantly, participants did not identify new land resources in the region that might be targets of future acquisition for conservation holdings. Consequently, it was difficult for the LAC to respond and estimate likely impacts on the regional tourism economy (step three in the study design) given the lack of specificity developed in the first two steps of the process.

In reaction to these constraints, a formal survey instrument was developed and sent to POC and LAC members to generate information for the first two study elements listed above. The survey was also used to elicit information about the third study element from the LAC. The results of this survey are summarized in subsequent sections of this report. While the response to this survey was also disappointing, the study team was able to assemble information that will allow state agencies, local governments and conservation groups to make decisions about the management and acquisition of conservation lands to generate positive economic impacts for the communities of the 100-Mile Wilderness region.

5. CURRENT CONDITIONS

5.1 *Conservation Ownership in the 100-Mile Wilderness Region*

The 100-Mile Wilderness Region (Figure 1) is a diverse landscape of ponds, lakes, streams, wetlands, mountains, and northern boreal forests. Virtually all of the forest lands in the region historically have been managed as industrial forests with much of the land in multiple use management. Some lands have been in family ownership for over 100 years with management provided by some of Maine's oldest professional forest management firms. Others have been in industrial ownership. Recently, the ownership

of this land has changed dramatically with conservation ownership becoming a substantial feature of the landscape.

Timber harvested in the region has provided raw materials for paper production, saw mills producing dimensional lumber, furniture manufacture, and other forest products firms. This land has traditionally had permissive access for recreation. Recreational access to much of the Eastern portion of the region has been managed by North Maine Woods under contract with the KI-Jo Mary Multiple Use Forest unit. Recreation activities include hunting, fishing, hiking, snowmobiling and other activities.

The Appalachian Trail (AT) gives this region its name since the trail winds approximately 100 miles through the region, the longest stretch of the trail without crossing a paved road. The trail follows an easement managed by the National Park Service, starting just north of Monson and continuing to Baxter State Park, the northern terminus of the AT. From Monson the trail goes roughly northeast, passing north of Borestone Mountain, across Barren Mountain, and on to Gulf Hagas, which is sometimes called the Grand Canyon of Maine. Gulf Hagas is owned and managed by the Park Service as part of the A.T. corridor. From Gulf Hagas, the trail heads almost due north until heading northeast again to cross White Cap Mountain. After passing north of Jo-Mary Mountain the trail winds through a portion of the Katahdin Forest, Nahmakanta Public Land Preserve, and the Debsconeaq Lakes Wilderness Preserve, finally reaching Baxter State Park at Abol Bridge.

Significant conservation holdings dot the region. Starting again near Monson, Elliotsville Plantation, Inc. has several parcels that are designated as sanctuaries. These include Big Wilson-Seven Ponds Sanctuary which provides an extensive northern buffer and smaller southern buffer for the A.T. just East of Routes 6 and 15. Smaller Elliotsville

Plantation, Inc. parcels provide partial buffers around Big Greenwood Pond and Little Greenwood Pond, south of Borestone Mountain. Bart DeWolf, Science Director for Elliotsville Plantation, Inc. says of the lands:

“The Sanctuary was purchased in 2000 and 2002 to protect a portion of the central mountain region of Maine along the Appalachian National Scenic Trail corridor in Elliotsville Township, to provide protection for its native plants and animals, and to ensure continued public access for compatible, low-impact recreational and educational use. The significance of the Sanctuary lies in its protection of (1) an outstanding example of a type of forested glacial landscape and its associated natural communities found at intermediate elevations in central Maine, (2) a rich assortment of upland, wetland, and aquatic habitats with over 30 mi of brooks and streams, 7 ponds larger than 8 acres in size, and numerous slate ridges and small hills, (3) evidence of early settlement in Elliotsville Township, including the remains of Savage’s Mill, established by Nelson Savage in 1824, and (4) lands adjacent to a 7-mi stretch of the hundred-mile wilderness section of the Appalachian National Scenic Trail, including a 3-mi stretch of the original route of the Trail. Parts of the property have been logged within the past 20 years, and dozens of miles of existing logging roads and trails open the land for exploration. However, substantial areas of core forest remain intact, especially bordering the Appalachian Trail corridor.”

An older conservation parcel is the Maine Audubon’s 1600 acre Borestone Mountain Wildlife Sanctuary. Also located in Elliotsville Plantation, Borestone Mountain Sanctuary was a National Audubon property transferred to Maine Audubon in 2000 when the two organizations affiliated. The sanctuary is known for its hiking trail to the summit of Borestone Mountain and the Adirondack-style lodges part-way up the trail, where Maine Audubon hosts retreats for adults and summer camps for children.

Moving Northeast from Borestone Mountain, the next major conservation ownership is the 37,000 acre Appalachian Mountain Club (AMC) Katahdin Ironworks Tract. Called “...the first major step in the AMC’s Maine Woods Initiative,” this parcel was purchased from International Paper Co. in 2003. The parcel is divided by a 10-mile section of the Appalachian Trail and contains significant natural and cultural resources,

including Indian Mountain, Gulf Hagas, and Little Lyford Pond camps. The AMC (2004) reports that since acquisition of this property it has made improvements to the Little Lyford Pond Camps, begun development of additional hiking trails, completed an ecological assessment of the property, begun a sustainable forestry program, and begun planning for a 10,000 acre ecological reserve.

Next in the series of preserves moving northeast is the Nahmakanta Public Land Reserve, the largest reserve in Maine's public reserved lands system. (Maine Bureau of Parks and Lands.) A large portion of this 43,000 acre public land preserve was purchased in 1990 with funds from the Land for Maine's Future Fund. Fifteen miles of the A.T. pass through the reserve, and other backcountry hiking trails and remote camping sites are available for public use. Additional trails may be developed in the future.

The Nature Conservancy (TNC) has some of the largest conservation holdings in the 100-Mile Wilderness region (Woodward, 2004). In 2002, TNC reached agreement with Great Northern Paper Company to acquire conservation easements on some 200,000 acres of forest lands, the so-called Katahdin Forest. It also acquired outright ownership of 41,000 acres, what is now called the Debsconeag Lakes Wilderness. The Debsconeag holding connects Baxter State Park with the Nahmakanta Public Land Reserve. The last 15 miles of the A.T. before it enters Baxter State Park passes through the Debsconeag Lakes Wilderness.

Finally, just East of Route 11 between Brownville and Millinocket is the Seboeis Lake Public Reserve Land. This is a 13,000 reserve on the edge of the 100-Mile Wilderness Region. Current use is primarily camping and fishing on the lake. The northern end of the reserve borders the southern most portion of TNC's Katahdin Forest easement.

5.2 *Current Recreation Use*

A variety of recreation opportunities exist on the diverse lands of the 100-Mile Wilderness region. The KI-Jo Mary Multiple Use Forest with public access managed by the North Maine Woods reflects the traditional approach of public access on industrial forest land in Maine. The public is welcome to use lands for outdoor recreation by paying fees and by respecting the priority granted to logging trucks and other aspects of timber operations. Generations of Maine residents and non-residents have used these woods for hunting, fishing, camping, snowmobiling, and related activities. Katahdin Forest lands follow this traditional management pattern with additional restrictions through easements on forest management practices and subdivisions. AMC and Public Reserve Lands are managed primarily for recreational access, as is witnessed by planned expansions of hiking trails and camping or sporting camp options. Both of these holdings also have plans for the establishment of ecological reserves. Elliotsville Plantation, Inc. and TNC lands are managed with priorities for ecological preservation with recreation use as appropriate.

Since the focus of this study is on the impacts of non-motorized recreation use of the 100-Mile Wilderness, understanding baseline recreational use is very important. However, there are limited data available on the current recreation use of this region. Furthermore, collection of such data would be complicated by the multiplicity of recreation activities and many access points, some of which are monitored and some of which are not.

The Appalachian Trail provides a good example of the challenge of obtaining use data. There are through hikers, section hikers, and day hikers who use the A.T. section that crosses the 100-Mile Wilderness region. Since there is no requirement for

registering to use the trail itself, use only can be inferred from other sources. In this case, the entrance to Baxter State Park offers one opportunity to estimate A.T. hikers. Table 1 shows the numbers of long-distance hikers who register at Abol Stream Campground entering Baxter State Park (Hoekwater, 2004). These data show that the numbers of hikers was increasing up until 2001 and have declined since that time. The biggest

Table 1. Long-Distance A.T. Hikers Registering at Baxter State Park

Year	North Bound	South Bound	Flip-Flop	Section	IAT/ Other	Total
1991	n/a**	n/a	n/a	n/a		359
1992	n/a	n/a	n/a	n/a		344
1993	177	60	27	258		522
1994	222	69	34	209		534
1995	297	148	40	492		977
1996	234	99	36	268		743
1997	370	72	34	182		658
1998	401	125	38	406		970
1999	504	206	70	478		1,258
2000	540	234	86	589		1,449
2001	599	234	79	554		1,466
2002	532	188	89	328	5	1,142
2003	541	193	60	320	3	1,117
2004	500	178	46	292	5	1,021

* North Bound hikers are those who are hiking the complete A.T. from Georgia to Maine, while South Bound are those who complete trail in the opposite direction. (The Appalachian Trail Conference (ATC) reports data on through hikers who start the trail and those who complete. See: www.appalachiantrail.org/hike/thru_hike/facts.html) Flip-flop hikers are North Bound hikers through-hikers who come to do the 100-Mile Wilderness “out of sequence.” Most often these are hikers who realize that they will not have time to complete their hike from Georgia to Maine before Baxter State Park

is closed to camping in the fall. Section hikers are those who are hiking just the 100-Mile Wilderness section of the trail in the year in question. IAT are those who are heading north from Baxter on the new International Appalachian Trail (See www.internationalat.org).

declines have been in section hikers, which leaves a question of whether this is an actual decline or if section hikers are simply not checking into Baxter State Park. These data do not include day hikers who utilize portions of the A.T. in the region.

Another snapshot on recreation use in the area is provided by a seasonal ridge runner employed by the Appalachian Trail Conference (ATC) at Gulf Hagas (Horn, 2004). These data capture both day hikers who access Gulf Hagas either from the south (from Katahdin Iron Work) or from the north (from Greenville), and hikers on the AT, including both section hikers and through hikers recorded in Table 1. Table 2.

summarizes these ridge-runner data. The data in Tables 1 and 2 collectively allow inferences of the numbers of day hikers. For example, these data suggest there were 1,554 day hikers in 2003 (2668-(1117-3)). The ridge-runner data cannot be assumed to be comprehensive but can describe relative changes over time. For example, these data suggest that the number of A.T. hikers in the 100-Mile Wilderness decreased in recent years, whereas the number of day-hikers increased in recent years.

Table 2. Hikers Registering with ATC Ridge Runner at Gulf Hagas

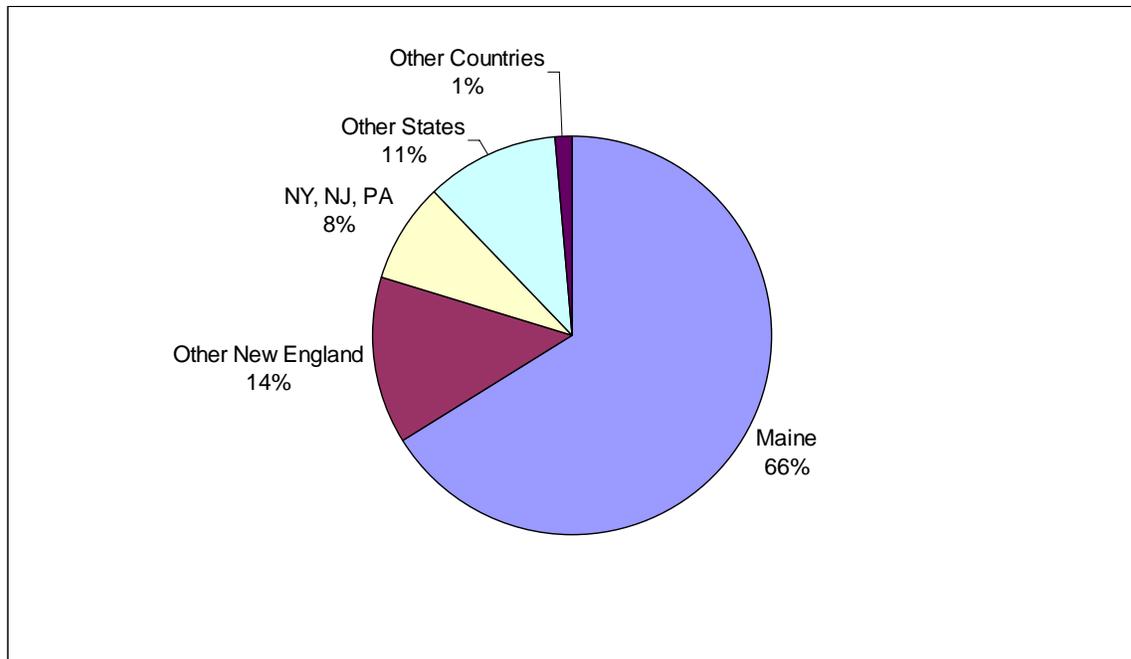
Year	Hikers
1991	2,599
2000	4,212
2001	3,883
2002	3,731
2003	2,668

Some of the best data on recreation use in the region are those kept by Maine Audubon to monitor people hiking up Borestone Mountain. In 2003, 4,222 hikers

registered at Sunrise Pond, half way up the Borestone hike, and that number was 3,142 in 2004 (Bryan, 2004). Registration data also provide residence of hikers. Figure 2 shows the distribution of residence of Borestone Mountain hikers by state and Figure 3 shows the distribution of Maine residents by region.

The data in Figure 2 indicate that one out of three hikers reside outside of Maine and money that they spend in the 100-Mile Wilderness is new money to the region that supports jobs and income. Although it cannot be inferred that Borestone is the sole purpose of these individual trips, it is evident that Borestone Mountain is one of the natural and cultural resources that attracted them to the area. Development of similar recreation opportunities on other conservations lands in the region would be expected to enhance the area for recreation.

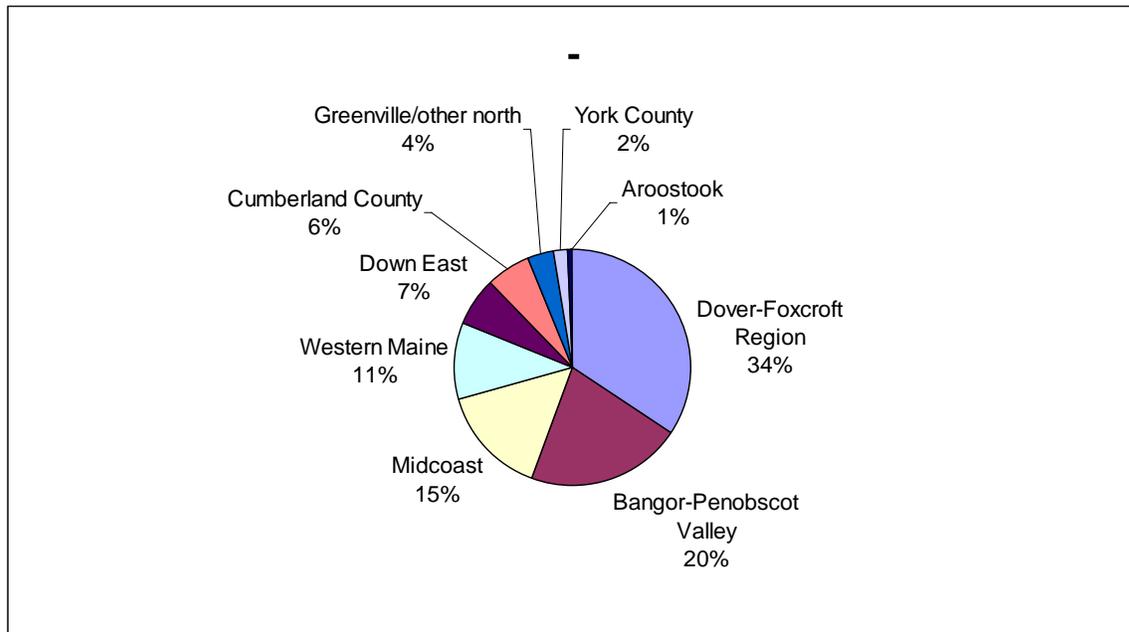
Figure 2. Borestone Mountain Hikers' States of Residence, 2003 & 2004



Among Maine residents who visit Borestone slightly more than one in three are from the local area (Figure 3). The recreation at Borestone by these people cannot be

assumed to add new money to the local economy as the money would likely be spent elsewhere in the region if the people chose not to hike Borestone. Visitation from other regions of the state does add new money to the communities surrounding the 100-Mile Wilderness.

Figure 3. Reported County of Residence of Maine Hikers at Borestone Mountain 2003 & 2004



Taken together these data provide a number of important insights. First, there are very few A.T. hikers (Table 1). Moreover, increasing conservation lands in the 100-Mile Wilderness region is unlikely to increase this number substantially. This suggestion is supported by the fact that use of the A.T. has declined at the time when ownership of conservation lands along the A.T. in the 100-Mile Wilderness has been increasing. An increase in conservation lands is likely to enhance the quality of the hiking experience for these dedicated hikers, increase what we defined as consumer surplus earlier, but will have little economic impact on local communities.

The Gulf Hags and Borestone data indicate that individual attractions on conservation lands can lead to substantial recreation use and to considerable economic impact on local communities. Visitation to attractions is likely to yield a greater economic impact than through hikers and section hikers on the A.T., not only because of larger numbers, but because these people drive to the area and are likely to spend money for travel, food, lodging, souvenirs, guide services, etc.

Comparing the data in Table's 1 and 2, at least 1,500 to 2,500 users visit Gulf Hags as day trips. (This estimate is likely low due to challenges of data collection in this environment.) The Borestone data are likely more accurate since there is a check-in point for all visitors, and here the number of users is 3,000 to 4,000 annually. This suggests that these two natural and cultural attractions are attracting over 5,000 visitors to the 100-Mile Wilderness region on an annual basis. The information presented in Figures 2 and 3 indicate that over half of the usage of Borestone is by people who are making day trips from their homes in Maine. This pattern of use is likely true for Gulf Hags as well.

A key question for future enhancement of recreation opportunities is whether other types of attractions can be developed on conservation lands that will lead to new opportunities for day trips that will increase visitation to the region and enhance economic impacts.

5.3 *Illustrative Example*

Let us assume, conservatively for purposes of illustration, that day hikers spend \$20 per day in the local communities and that overnight visitors stay one night and spend \$100 in local communities. Further assume that 60% of visitors are day hikers and the remaining 40% are over-night visitors. This stylized example suggests that Gulf Hags

and Borestone visitors spend approximately \$250,000 annually, in communities surround the 100-Mile Wilderness.

Key insights from the usage data at these two sites suggest the following:

- natural resource attractions in the 100-Mile Wilderness that are accessible and publicized do generate visitors;
- visitors to natural resource attractions do spend money in local communities; and
- use of natural resource attractions within the 100-Mile Wilderness can occur at sites near, but not immediately on the AT.

This suggests that development of natural resource attractions on conservation lands can enhance economic activity in local communities without detracting from the integrity of the A.T. experience.

A key point is that economic activity at Gulf Hagas and Borestone cannot be counted as part of the economic benefit to local communities because these resources have been generating visitors for years. The same can be said about the Appalachian Mountain Club's purchase of Lyford Pond Camps, which have been in existence for decades. However, these attractions on conservation lands provide examples of how increased usage may result from changing the management of areas within conservation lands for recreation. In the 1970's, when Borestone was owned by the National Audubon Society, very little management occurred on the land. Maine Audubon has enhanced the interpretive infrastructure and marketing of this area such that it now generates many more visitors each year. A similar change in use appears imminent for the management change at Lyford Pond Camps and this increase in use, when it occurs, can be counted as an economic benefit to local communities.

6. ECONOMIC IMPACTS OF ENHANCED RECREATIONAL OPPORTUNITIES

6.1 Key Recreational Assets

Members of the Project Oversight Committee (POC) and Local Advisory Committee (LAC) were asked to respond to a survey that asked them to identify the recreational assets of the 100-Mile Wilderness region. The goal of the survey was explained to the respondents as follows:

The extent to which changes in the management of conservation lands contribute to the economic health of surrounding communities will depend on the extent to which these changes result in increased visitation and spending in the region. Accordingly, the survey asks individuals to brainstorm about investments, activities, or policies that may be required to enhance the use of existing recreational sites as well as to characterize the use of new recreational sites.

Specifically, the survey asks for three types of information related to recreational assets:

- *identification of specific recreation opportunities;*
- *identification of whether changes (if any) are needed to promote a reasonable level of use; and*
- *characterization of expected increases in use.*

Results from this survey will help us generate estimates of future recreational activities in this region and, in turn, describe the economic impact of additional land conservation in the 100-Mile Wilderness Region.

The survey is organized to collect these types of information by activity and site. Distinct tables reference different recreation activities that are currently pursued or might be pursued in the future within the 100-Mile Wilderness study area. For each of the activities, you are asked to do the following:

- (1) *Identify “priority” sites in the 100-Mile Wilderness Region (column 1);*
- (2) *Indicate if management changes are necessary to increase visitation to those sites (columns 2,3,4); and*
- (3) *Estimate the number of new visitors who might be attracted to those sites with changes in management, access, or policy on a typical summer (winter as appropriate) week day and weekend day (columns 5 and 6).*

Responses to the survey were received from two members of the LAC and five organizations sitting on the POC:

- The Maine Department of Conservation
- Maine Audubon
- Elliotsville Plantation, Inc.
- Appalachian Mountain Club
- Maine Sierra Club

The Appendix to this report shows a summary of the recreational assets identified by the survey.

The majority of the assets identified were potential day hiking or multi-day hiking assets and virtually all of the ones identified are within existing conservation land holdings. Day hiking opportunities with potential for growth were identified on AMC land (for example Indian and Elephant Mountains), in the Nahmakanta Preserve, Elliotsville Plantation and several other locations. Potential for greater use, and thus greater regional economic impact, from day-use activities was deemed likely to come from better publicity, new trail development, and partnership among the diversity of public and private entities with interests in the region. Similar opportunities were identified for multi-day hiking, photography, wildlife viewing, paddling (both day and multi-day trips), mountain hiking, and cross-country skiing.

Virtually everyone familiar with the natural resources of the region is able to identify a resource that would be attractive to recreationists. Constraints to growth in recreation use that are identified are often not the lack of resource conservation. Indeed, most of the assets identified are already in conservation ownership. Constraints preventing increased use are a lack of information on the opportunities, a lack of

information on how to access the sites, and a lack of on-site and off-site infrastructure to support recreational uses.

Unfortunately, recommendations by the POC and LAC respondents were not extensive or detailed. In addition, the low number of responses limits the range of stakeholder perspectives reflected. The limited responses to the survey are representative of the limited responses the study team received in meetings with the POC and the LAC. Reasons for this reticence were noted in Section 3 of this report. Since attempts to have the POC and LAC elucidate recreational assets of conservation ownership in the 100-Mile Wilderness were not very successful, the study team took an alternative approach to addressing the issue of interest, measuring the economic impact of increased conservation lands in the 100-Mile Wilderness Region. A two-pronged approach to considering this question resulted. First, we developed a conceptual model useful to public and private entities that will aid in assessing the potential recreational impacts of future conservation land acquisitions. Second, we used the accumulated information gathered during the study to offer judgments about the constraints and opportunities for increased regional economic benefits from the wealth of current conservation holdings in the region.

6.2 *Measuring Potential Economic Impacts*

Lacking specific recreational assets that might be targets for conservation acquisition, and therefore potential engines of increased recreation economic benefits, we developed a generic model that might be applied by owners or managers of conservation lands wishing to estimate such economic impacts from enhancing recreation opportunities on conservation lands in the 100-Mile Wilderness region and in other similar policy situations. Such a generic model would allow someone to follow a multi-step process in estimating economic impact:

- Identify the recreational assets (mountains, vistas, streams, ponds, etc.) associated with a land parcel of interest.
- Identify recreation infrastructure improvements (road access, parking, signage, trail construction, etc.) that are necessary to enhance and support recreational use on the land.
- Compare the attractiveness of the asset and its infrastructure improvements to a “norm” with known recreational use patterns and assess how like the norm the new parcel’s assets are.
- Estimate likely increases in use from the acquisition and infrastructure development in comparison to the “norm.”
- Use estimated increases in recreation use to estimate increases in expenditures in the region using secondary data.
- Use estimated increases in expenditures to estimate regional economic impacts using standard economic models, such as IMPLAN.

To demonstrate how this approach would work, the study team asked the LAC to consider the impact of improved recreational infrastructure on use of six recreational assets in the region. The method uses the hiking trail up Borestone Mountain in the Audubon Sanctuary as the “norm.”

As seen above, Maine Audubon data show that Borestone Mountain is now attracting 3,000 to 4,000 hikers a year now. Members of the LAC generally understand the attributes of Borestone as an attraction to recreationists, including:

- signage leading recreationists to it;
- quality and proximity of approach roads;
- quality of parking and signage at the trail head; and
- the nature of the hiking experience.

The resources and management/infrastructure changes that the LAC evaluated in this manner were:

1. Elephant Mountain -- construction/upgrade of hiking trail to summit.
2. Gulf Hagas -- publicity and signage on approach from the Northwest and construction of parking and signage at trailhead from this direction.
3. Jo Mary Mountain -- construction/upgrade of hiking trail to the summit and publicity and signage for approach and parking at trail head.
4. Nahmakanta P.L.R -- publicity and signage for day hiking (Turtle Ridge and other trails).
5. Little Wilson Falls Gorge/Elliotsville Plantation Inc. -- construction of trails and trail heads.
6. Debsconeag/Nahmakanta -- multi-day paddling/hiking/mountain biking experience development/permissions.

Using Borestone as a “norm,” the idea was to get LAC members to evaluate six other recreation assets relative to Borestone. In other words, the question to them was, if “x” management or infrastructure changes were made to resource “y” (1, 2, 3, 4 or 5 above) that would generate visitors at rate (“z”) relative to the Borestone experience. The “z”, a factor that could be less than or greater than one, would then allow the estimation of visitation that would be less, the same, or more than the Borestone usage of about 3,500 hikers a year. Using other Borestone Mountain visitation data (Figures 2 and 3 above), it is further assumed that roughly 23% of the new visitors will be from within the 100-Mile Wilderness Region, 44% from elsewhere in Maine and therefore likely to be day users, and 33% from outside of Maine and therefore likely to be staying in the region overnight.

Expenditures by tourists who visit a region create direct, indirect, and induced economic impacts in that same way that any export of a good or service to consumers

outside of the region would. Bergstrom et al. (1990: 30) explain this concept as it applies to recreation:

“The direct and indirect effects of recreational spending result in an overall increase in the production and distribution of goods and services in a rural area. This increase in economic activity results in increased employment and household income. Increases in household income, in turn, increase consumer demand for goods and services. ...In order to meet this increased demand, even more multiple-round purchases of inputs will be stimulated. Economic activity stimulated by increased consumer purchases are the induced effects of recreational spending on the rural area economy.”

Therefore the visitation data estimates are useful only if there are data on expenditures by recreationists. As discussed above, most of the published outdoor recreation economics literature focuses on estimating consumer surplus (value) rather than expenditures. There are several studies in recreation literature, however, that report relevant data on expenditures (Table 3). These examples range from about \$6 per visitor day to \$46 per visitor day, with data from Alabama and Georgia, respectively. These two estimates relate to activities that might occur in the 100-Mile Wilderness region, wilderness activities and state park activities. Recent data from the USDA Forest Service National Visitor Use Monitoring project (NVUM) may also be relevant to the Maine case. (Stynes and White, 2005) A sample of these data is shown in Table 4.

These data can then be used with estimated visitation increase data to estimate total increase in expenditures from infrastructure improvements to newly acquired recreation assets. Using the Stynes and White data, which are more current, assume a newly developed day-hiking experience were to attract 1000 new users of the same profile as those who hike at Borestone Mountain: 33% from outside Maine, 44% from Maine but outside of the region, and 23% from the local region. Assuming the out of state users stayed one overnight and the out of region Maine residents were day users,

this would yield direct expenditures of \$91,080 (330 x \$276) and \$16,280 (440 x 37), or a total direct expenditure impact of \$107,360. Second, economic impact multipliers

Table 3. Recreation Expenditure Patterns Relevant to 100-Mile Wilderness

Activity	Year	State/Province	Expenditure Value	Expenditure Value in 2004 Dollars	Source
Wilderness Recreation	1987	Alabama	\$5.59/RVD	\$8.13/RVD	Clouts (1991)
Backpacking	1987-1990	Montana	\$92.61/group	\$130.25/group	Maisey & Yuan (1991)
Angling	1987-1990	Montana	\$101.44/group	\$142.67/group	Maisey & Yuan (1991)
Nature Study	1987-1990	Montana	\$83.03/group	116.78/group	Maisey & Yuan (1991)
Wild & Scenic River Visitation	2001	Connecticut	\$40.61/visit	\$42.21/visit	American Rivers (2001)
State Park visits	1986	Georgia	\$7.42 - 45.58 / day	\$11.07 - 68.30 / day	Bergstrom et al. (1990)
Hiking	1990	Maine	\$8.42 / person / day	\$10.98 / person / day	Canham (2000)
Day Hiking	1994	North Carolina	\$22.10 / trip	\$26.03/ trip	Casey et al. (1995)
Hiking	1994-1995	Ontario	C\$20.33/visit	C\$23.92/ visit	Schutt (1998)
Lake Recreation	1988	North Carolina	\$33.72 - 70.63 /person/trip	\$46.43 - 99.34 /person/trip	Cordell and Bergstrom (1990)

would need to be applied to the expenditures to obtain the direct (actual expenditures) and indirect (re-spending effects) on the local economies. A reasonable assumption might be that the multiplier would be 1.8, which converts the estimates of economic impacts of approximately \$193,000 per year.

Table 4. Sample Expenditure Data from USDA Forest Service NVUM, Dollars per Party per Trip -- 2000 - 2003 (Stynes and White, 2005)

Activity	Day Users	Users Overnight in Nation Forest	Users Overnight Outside of National Forest
Biking	--	--	\$343
Cross Country Skiing	--	--	\$346
Developed Camping	--	\$140	\$146
Fishing	\$42	\$205	\$238
Nature Related	\$52	\$213	\$225
Hiking	\$37	\$147	\$276
Other non-motorized	\$43	\$163	\$262
Primitive Camping	--	\$105	\$104

Unfortunately LAC members felt uncomfortable making specific estimates of recreation use changes so we were unable to do computations like those described in the this hypothetical case, but they were able to provide narrative insights of relevance to the focus of the study. Examples of these comments include:

- "...could more be done to direct overflow or other traffic at Baxter State Park down Route 11 to the K.I. Milo area?"
- "...Gulf Hags could have as many visitors as Borestone with additional signage."
- "Additional trails and campsites, but not increased access likely, around the Debsconeag Lakes, would generate more multi-day trips without degrading the remote quality of the resource."
- "...infrastructure development should be on state or conservation group lands – owned lands, avoiding working forests."

- “...what is needed is additional focused marketing and information about hiking areas. An example would be a comprehensive (and freely distributed) guide of hiking areas, permit information, etc. Signage is important as well.”
- “...sporting camps in the area are struggling as hunting rule changes impact their visitors. ... hunting camps need advice and guidance to make a shift to more ecotourism adventures and visitors.”
- “If Gulf Hags were more advertised its numbers would increase dramatically...promotion of the Katahdin Trail may help promote the assets as well as the communities along the way.”

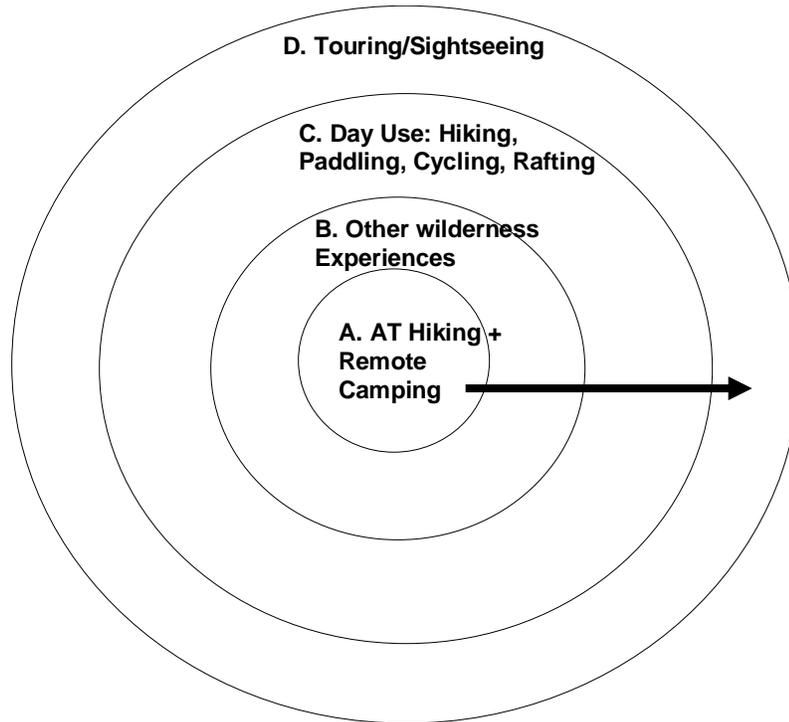
These comments support the notion that opportunities exists to enhance recreational use of conservation lands that could generate substantial economic impacts in the 100-Mile Wilderness region, but the organization, planning and cohesive knowledge is not immediately present to make this happen.

7. CONCLUSIONS

The expansion of recreational activities in 100-Mile Wilderness region could result in increased economic benefits for the communities adjacent to the wilderness. It appears, however, that the quantity of conservation lands is not the only, or perhaps even the primary constraint on increased recreation benefits for the regional economy of the 100-Mile Wilderness region. The extent and locations of economic impacts will be determined by the types of recreational uses allowed and promoted as well as by the levels and distribution of recreation infrastructure investments.

It is important to differentiate the types of uses that will be promoted in the region and allowed on the various lands in question. A simple model of the distinctions would allow different types of activities as one moves further away from the A.T. (Figure 4). While the A.T. is a wandering line through the forest, not a dot in the center of a circle, the conceptual framework could be used to think about the region adjacent to the A.T.

Figure 4. Model of Recreational Use Intensities



The current hiking and remote camping uses of the 100-Mile Wilderness are represented in the core of this model (Level A.), reflecting their centrality as a recreational asset to this region and their significant potential to complement other uses promoted away from the A.T. Recreationists involved in through hiking on the A.T. appear not to make significant expenditures within the region. Without dramatic changes in infrastructure, this activity is not likely to increase expenditures dramatically, whether or not additional conservation lands are added in the region. What this experience does, however, is create the cachet of the 100-Mile Wilderness region, which can be used to generate interest in a host of other activities that can generate significant additional expenditures in the region.

Additional recreation opportunities may be created on conservation lands outside of the A.T. corridor. Wilderness hiking and camping experiences might connect to the A.T. corridor (B in Figure 4) and provide additional opportunities for side trips for through hikers and new opportunities for segment hikers and some day use. These activities would generate economic impacts similar to the current uses of the AT, including increases in gas and food sales in communities proximate to the access points for these activities. The AMC's Katahdin Ironworks initiative might be seen in this light.

The next spatial area of uses (C) , moving out from the core, includes primarily non-motorized day-use activities , including hiking, cycling, paddling, fishing, hunting and rafting. These uses would require additional investments in infrastructure and would generate additional economic benefits, including significantly more dining and lodging activity than the current uses of the 100-Mile Wilderness. To capitalize on these opportunities requires a coordinated effort to develop hiking trails, parking lots at trailheads, toilets, signage, human capital enhancements, and information resources to help recreationists find these sites, understand and interpret the opportunities, and enjoy their experiences. Information resources need to include assistance in land use ethics, such as “carry in/carry out,” to help maintain the values of the natural resources.

The final activity type includes general touring and sightseeing, but not necessarily active direct participation in the wilderness experiences (D). These tourists (in the traditional meaning of that term) would experience the 100-Mile Wilderness through new scenic vistas from roadways in the region, interpretation materials at access points for both day-use activity and wilderness hiking, and through short “walks” adjacent to access points. Facilitating these types of opportunities also requires

additional infrastructure investments and probably would generate considerably more economic activity because they would attract and keep many more tourists.

In assessing the economic impacts of new recreational resources in the 100-Mile Wilderness, it will be important to keep in mind differences in both the necessary investments and in the likely impacts of the distinct target user audiences. Infrastructure investment needs and potential economic impacts are likely to increase with activities more distant from the A.T. core. The attractiveness of participation in these activities that are removed from the A.T. and more closely aligned with the current community infrastructure arise from the inherent beauty and the cachet of the 100-Mile Wilderness. Many potential tourists want to be “near” the wilderness but not “in” the wilderness. To many tourists activities in this outer ring will constitute being in the “wilderness”. A notable aspect of this type of recreation planning is that the maintenance of the core wilderness section is key. If that resource is tarnished, the cachet of the region is similarly diminished.

Based on our research, the following recommendations appear central to generating economic impacts from enhanced recreation on conservation lands:

1. Establish a coordinated effort by groups owning conservation lands (including the state) to formulate a recreation management plan. This does not mean that the plan applies the same principles to all land. Likely users are probably not interested in what conservation group owns what parcel of land, rather they will respond to the totality of opportunities. The plan must recognize the adjacency of different land holdings. A model of this type of collaborative effort is the Cobscook Trails Guide organized and published by the Quoddy Regional Land Trust (2000).
2. Develop cooperative relationships with private land owners. Some of the opportunities for increased recreation will occur on private lands. In other cases, enhanced recreation will require placing trail heads on private lands or establishing access via private roads.

3. Develop marketing materials to provide information to users on-site and at trail heads as well as to potential users at web-sites or tourist information centers. This will require coordination of conservation groups, private land owners, community groups, local businesses and the state.
4. Establish a critical density of attraction sites and support infrastructure (trails of various length, parking, highway pull-offs, toilet facilities, etc.) to attract families with diverse interests. This effort will potentially facilitate longer stays by these visitors.

The mechanisms to accomplish these efforts are not in place at this time. In fact, this lack of basis for regional recreation (and conservation) planning is probably the primary reason why both the POC and LAC were unable to provide the specific and detailed information required to complete this study as originally planned.

The maximization of economic benefits from conservation land holdings, including current and prospective lands, hinges on several key elements:

- Coordination among key stakeholders -- government agencies, private land owners and managers, and non-governmental organizations.
- Clear articulation by each stakeholder of desired uses and constraints so that coordination can maximize regional economic benefit without violating private property rights or adversely affecting the variety of missions of land owners in the region.
- Recognition that additions to conservation land ownership alone will not generate significant regional economic impacts.
- A strong working relationship with local communities and business to articulate plans that will attract visitors and expand local economic activity.

Only by balancing the demands of the recreation experience at the core of the region, the 100-Mile Wilderness section of the AT, with the need to develop infrastructure that will allow other users to enjoy in this “wilderness” experience indirectly, will stakeholders generate opportunities for users that will provide economic impacts to the regional economy from recreational tourism.

REFERENCES

- American Rivers. 2001. Use and Economic Importance of the West Branch of the Farmington River. Washington, D.C.
- Appalachian Mountain Club. 2004. "Progress Report on Maine Woods Initiative – November 2004" AMC web site: www.outdoors.org/conservation/maine/mwi-progress.cfm.
- Bergstrom, John C., H. Ken Cordell, Gregory A. Ashley, and Alan E. Watson. 1990. "Economic Impacts of Recreational Spending on Rural Areas: A Case Study." Economic Development Quarterly. Vol. 4. No. 1. pp. 29 – 39.
- Bryan, Rob. 2004. Personal communication. Falmouth, Maine: Maine Audubon.
- Canham, Hugh O. 2000. "Economic Impact from Forest-Related Recreational Activities in Maine." Report Prepared for Northeast State Foresters Association.
- Casey, James F., Tomislav Vukina, and Leon E. Danielson. 1995. "The Economic Value of Hiking: Further Considerations of Opportunity Cost of Time in Recreational Demand Models." Southern Journal of Applied Economics. Vol. 27. No. 2. pp. 658 – 668.
- Clouts, Howard A. 1991. "Estimating Recreational Demand: A Model for National Forests and Wilderness Areas." In Payne, Claire, J.M. Bowker, and Patrick C. Reed. 1991. The Economic Value of Wilderness. Conference Proceedings. General Technical Report SE-78. Asheville, NC: Southeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture. pp. 27 – 38.
- Cordell, H. Ken and John C. Bergstrom. 1990. "Economic Value and Impacts of Outdoor Recreation on WNC Lakes: An Assessment of Alternative Water-Level Management." Final report to Tennessee Valley Authority and North Carolina Division of Water Resources.
- DeWolf, Bart. 2004. Personal communication. Ellitsville Plantation, Inc.
- Hall, Jay. 2004. Personal Communication. Augusta, Maine: Bureau of Parks and Lands, Maine Department of Conservation.
- Hoekwater, Jean. 2004. Personal Communication. Millinocket, Maine: Baxter State Park.
- Horn, J.T. 2004. Personal Communication. Appalachian Trail Conference.
- Maine Bureau of Parks and Lands. "Nahmakanta Public Reserved Land." Augusta, Maine: Maine Department of Conservation, Bureau of Parks and Lands. www.maine.gov/cig-bin/doc/parks/

- Mikkalsen, Stacy L. and John F. O'Mahoney. (eds.) 2003. Appalachian Trail Thru-Hikers Companion. Harpers Ferry: Appalachian Trail Conference.
- Moisey, Neil, and Michael S. Yuan. 1991. in Payne, Claire, J.M. Bowker, and Patrick C. Reed. 1991. The Economic Value of Wilderness. Conference Proceedings. General Technical Report SE-78. Asheville, NC: Southeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture. pp. 181 – 190.
- Moore, Roger L. and Christos Siderelis. 2003. Use and Economic Importance of the West Branch of the Farmington River. Final report prepared for American Rivers and National Park Service. Raleigh, NC: Department of Parks, Recreation, and Tourism Management, North Carolina State University.
- Morris, Charles, Thomas Allen, Jonathan Rubin, Bronson and Bastery. 2005. "Economic Contribution of ATV-Related Activity in Maine," <http://www.umaine.edu/mcsc/Research/EcoDev/ATV%20Activity.pdf>.
- National Park Service. 1995. Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors: A Resource Book. Fourth Edition. Rivers, Trails and Conservation Assistance, National Park Service. <http://www.nps.gov/pwro/rtca/econindx.htm>
- Payne, Claire, J.M. Bowker, and Patrick C. Reed. 1991. The Economic Value of Wilderness. Conference Proceedings. General Technical Report SE-78. Asheville, NC: Southeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture.
- Power, Thomas Michael. 1991. "The Economics of Wilderness Preservation: The View from the Local Economy." In Payne, Claire, J.M. Bowker, and Patrick C. Reed. 1991. The Economic Value of Wilderness. Conference Proceedings. General Technical Report SE-78. Asheville, NC: Southeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture. pp. 175 – 180.
- Quoddy Regional Land Trust. 2000. Cobscook Trails: A guide to walking opportunities around Cobscook Bay and the Bold Coast. 2nd Ed. Whiting, Maine.
- Reiling, Stephen, Matthew Kotchen and Alan Kezis. 1997. *An Economic Evaluation of Snowmobiling in Maine*. Department of Resource Economics and Policy. University of Maine. Maine Agricultural and Forest Experiment Station Publication No. 2069. 126 pp.
- Rosenberger, Randall. 2004. "Growth Equilibrium Modeling of Wilderness Impacts in Appalachia." 3rd Quarterly Report for project, Impacts and Role of Wilderness Designation on Rural Communities in the Appalachian Region and National Wilderness Assessment. Oregon State University.

- Rosenberger, Randall and John B. Loomis. 2001. Benefit Transfer of Outdoor Recreation Use Values: A Technical Document Supporting the Forest Service Strategic Plan (2000 Revision). Rep. RMRS-GTR-72. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Schutt, Alicia M. 1998. "Trails for Economic Development: A Case Study." Journal of Applied Recreation Research. Vol. 23. No. 2. pp. 127 – 145.
- Stynes, Daniel J. and Eric M. White. 2005 Spending Profiles of National Forest Visitors, NVUM Four Year Report. Report under Joint Venture #01-JV-11130149-203. Michigan State University. Accessed July, 2005.
www.prr.msu.edu/mgm2/econ/index.htm
- Woodward, Colin. 2004. "Protecting the Heartwood." Nature Conservancy. Spring. pp. 43-50.

APPENDIX:
POTENTIAL RECREATION ASSETS INVENTORY
(Developed with assistance of the project's POC and LAC.)

Activity: Day Hiking

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Borestone Mountain	Not needed. Day hiking already nearing capacity	Land us private, but open to public use – continued trail net expansion and improvements	Currently private.	Commensurate with regional recreation growth.	Commensurate with regional recreation growth.
2. Mountains in AMC Lands (Indian, Elephant, Baker, Benson, and Roaring Brook)	Yes	No	No	X	X
3. Nahmakanta	Complete brochure.	Complete Tumbledown, Dick Falls, and Wadleigh Mountain Trails	Local sporting camps, North Maine Woods	X	X
4. Big Wilson – Seven Ponds Sanctuary	Yes – maps and other information need to be prepared.	Trail network needed – logging roads at present.	No	X	X
5. Gulf Hagas Trails and the Hermitage					

6. Number Four Mountain Trail					
7. Barren Mountain Trail and Slugundy Gorge					
8. Chairback Mountain Trail					
9. Little Wilson Falls Gorge					
10. Screw Auger and Hay Brook Falls					
11. Turtle Ridge Trail (Nahmaknanta)					

Activity: Multi-Day Hiking

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Nahmakanta	Complete brochure	Connect Debsconeag and Turtle Ridge trail systems	Yes – The Nature Conservancy	X	X
2. Moosehead Lake Regional Trail System (Lily Bay, Baker, Number Four Mountains)					
3. White Cap Mountain					
4. 100-Mile Wilderness portion of AT					

Activity: Photography / Photography Trail

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Borestone Mountain.	Perhaps mention of photography opportunities in new general day-use brochure.			x	x
2. AMC lands – entire property	Yes	No	No	X	X
3. Nahmakanta	Yes – develop brochure/map highlighting opportunities	Yes – interpretive markers	No	X	X
4. Big Wilson – Seven Ponds Sanctuary	Yes – maps and other information need to be prepared.	Trail network needed – logging roads at present.	No	X	X
5. Screw Auger and Hay Brook Falls					

6. West Chairback Pond Falls					
7. Gulf Hags Waterfalls and Hermitage Old Growth White Pine					
8. AMC property – rare plants (Mountain sweet-cicely) and eagle nesting sites					
9. Earley Landing Falls (Sebec Lake)					
10. Pollywog Gorge (Nahmakanta)					
11. Tumbledown Dick Falls (Nahmakanta)					
12. Northwest of Big Shanty along B Stream – old growth red spruce stand					
13. Debsconeag region rare plants (purple clematis, fragrant cliff fern, northern woodsia)					

Activity: Wildlife Viewing

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Borestone Mountain.	Mention in new general brochure			X	X
2. AMC Lands – entire property	Yes	No	No	X	X
3. Nahmakanta	Yes – complete brochure.	Improvements – create stations and/or blinds ?	No	X	X
4. Big Wilson – Seven Ponds Sanctuary	Yes – maps and other information need to be prepared.	Trail network needed – logging roads at present.	No	X	X
5. Debscogneag Lakes – bald eagle nests, Bicknell’s thrush, lynx, marten, mink, otter					
6. cliffs north of 4 th Debscogneag Lake – peregrine falcon nest sites					

7. Prong Pond					
8. Mud Pond – eagle nest sites					

Activity: Paddling – Day Trips

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Borestone Mountain.	Mention in general day-use brochure.		Use of Onawa Lake boat launch ramp.	X	X
2. AMC lands (Horseshoe Pond, Long Pond, Indian/Dam Pond, Big Houston Pond)	Yes	No	Yes	X	X
3. Nahmakanta	Yes – complete brochure.	No	No	X	X
4. West Branch of Penobscot - Ripogenus Gorge to Abol Bridge					
5. Roach River - from First Roach Pond to Moosehead Lake					
6. Rainbow lake region - 24 remote ponds					
7. Class 1 lakes (Debsconeag Deadwater, 1 st Debs, 3 rd Debs,					

Lower Jo-Mary, Passamagamet, Rainbow)					
8. Pleasant River West Branch					
9. Piscataqua River					

Activity: Paddling – Multiple Day Trips

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Nahmakanta/TNC Debsconeag Preserve	Yes	Yes – portage trails/signs	Yes – The Nature Conservancy	X	X
2. Debsconeag Lakes chain (Deadwater, 1 st , 2 nd , 3 rd , 4 th , and Pemadumcook)					
3.					

Activity: Mountain Biking

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark "Yes" if change is needed; "no" if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an "x" in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public "Trust" Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Nahmakanta	Yes – complete brochure/web site	Yes – develop and sign trails	No	X	X
2.					

Activity: Cross County Skiing / Snow Shoeing

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. A Fierce Chase X-C ski trails in Monson	“Moosehead Recreation Region” sign at I-95 Newport Exit -statewide listing of X-C ski areas	Low interest loans for land acquisition for conservation/recreational uses	Partnerships w/local snow mobile clubs for share use of trails	70/day	150/day
2. Borestone Mountain	Possible mention in general day-use brochure.	Potential creation of new trails.	Possible easements.	X	X
3. AMC Lands – entire property	Yes	No	Yes	X	X
4. Nahmakanta	Yes – complete brochure	Yes – plow access road, develop ski trail, improve hiking trails for snow shoeing	No	X	X
5. Big Wilson – Seven Ponds Sanctuary	Yes – maps and other information need to be prepared.	Trail network needed – logging roads at present.	No	X	X
6. Trails near Little Lyford					

Pond Camp					
7. Trails near West Branch Pond Camp					

Activity: Cultural/Historical Day Visits

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. AMC Land (Ray’s Mill Site)	Yes	No	Yes	X	X
2. AMC Land (Little Lyford Pond Camps)	Yes	No	Yes	X	X

Activity: Other Non-Motorized Recreational Activity (please specify)

Site Identification	Necessary Changes (If Any) to Increase Visitation to a Reasonable Level (Mark “Yes” if change is needed; “no” if change is not needed).			Expected Increase in Visitors Associated with Changes (Place an “x” in the box if you can not estimate use)	
Site	Publicity	Infrastructure or Management Change on Public “Trust” Lands	Partnering with Private Land Owners	Weekday Use Increase	Weekend Day Use Increase
1. Dog Sledding – entire AMC property	Yes	No	Yes	X	X
2. Debsconeag Ice Caves (north shore of 1 st Debsconeag lake)					
3. Twin Towers Cave & Moose and Squirrel Cave in Barren Mountain talus field					
4. Fishing - Rainbow Lake (landlocked Arctic Charr)					
5. Fishing - West branch of Penobscot (world class native brook trout fishery)					
6. Fishing - Spruce Mountain, Greenwood, First Little Lyford, Baker, and East and West Chairback Ponds (wild brook trout)					
7. Big Wilson Cliffs - (potential rock climbing)					

8. Fishing - Little Eddy, Big Eddy, Steep Bank and Trout Brook (Among highest rated landlocked salmon fishing in Maine)					
---	--	--	--	--	--