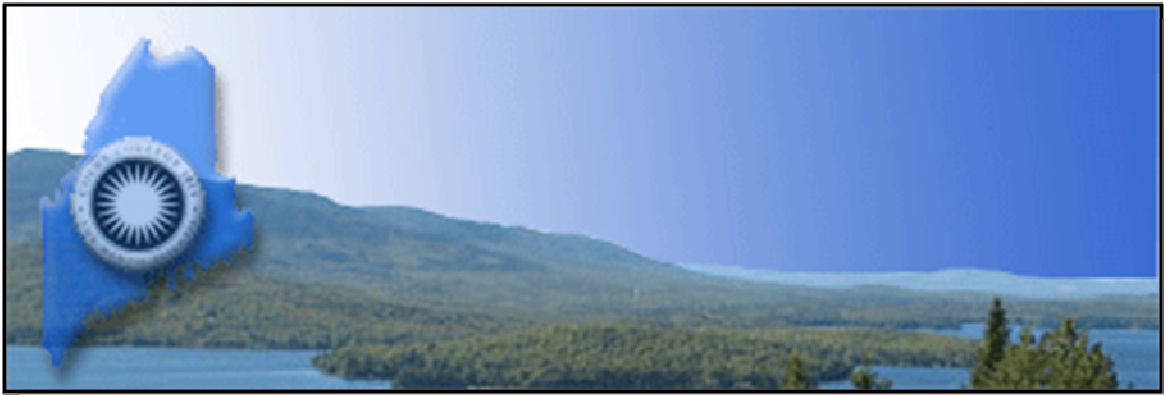


# State of Maine's Environment 2005



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**The *State of Maine's Environment* is a series of reports written and produced by the Colby Environmental Policy Group, senior environmental policy majors at Colby College in Waterville, Maine. This is the fourth *State of Maine's Environment* report created by students enrolled in *ES 493: Environmental Policy Practicum* taught by Philip J. Nyhus, Assistant Professor of Environmental Studies at Colby College.**

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## Executive Summary

*The State of Maine 2005: The Future of the North Woods* is a collection of research papers produced by senior environmental policy majors at Colby College in Waterville, Maine. This collaborative final report provides an in-depth and comprehensive look at the issues facing Maine's northern and western forestlands. After gathering background information on the past and present state of the North Woods, we toured Piscataquis County, from the gateway community of Greenville, through Lilly Bay and Baxter State Park, stopping to talk with local officials, conservation activists, and business owners. In order to gain an understanding of state-wide issues at play in the North Woods, we also visited Acadia National Park and engaged in a discussion of land-use and development pressures in the area surrounding Acadia. Individually, we conducted research on selected issues and outlined policy options.

**The Timber Industry:** Maine has the highest percentage of forested land of any state in the US. Forests cover ninety percent of the land base in Maine. The forest products industry is one of the most important sectors of the state economy. Over a third of Maine's total manufacturing revenue is generated by the forest products industry every year. While it remains a prominent fixture of the economy, the traditional structure of the timber industry has been evolving in the last fifteen years. Industrial competition due to globalization has resulted in mechanization, modernization, and downsizing. In only half a decade industry employment declined by almost a quarter. Emerging trends of rising land values, decreasing parcel size, and fragmentation of timberlands are threatening the industry's productivity and profitability. To secure the future of the timber industry in the Maine North Woods, forest management should aim to balance conservation and sustainable resource use through strategies similar to those used in current national forest practices, which simultaneously protect the forest land base and sustain the timber industry.

**Demographics:** Maine has the third highest proportion of its residents living in rural areas of all the states in the US. The low population density of Maine's North Woods presents the local communities with unique challenges and opportunities. These communities must strive to maintain stable populations that can support schools, hospitals, local police, fire stations, and other public services. Currently, parts of rural Maine faces declining populations. Meanwhile, urbanization and sprawling development are increasingly prevalent across the southern and coastal areas of the state. This population trend is out of sync with the "rural rebound" occurring in other parts of the country. In order to attract and retain residents, Maine's rural areas must evaluate their major attractions, such as access to outdoor recreation, and proactively plan for sustainable, vibrant communities.

**Development Sprawl:** One growing concern that challenges the character of both the national and local landscape is sprawl. Over the last thirty years the

fastest growing Maine towns have been “new suburbs” situated 10-25 miles from town centers or commerce areas. The effects of sprawl have created segregated communities, increased demands for infrastructure, produced pollution, diminished productivity, and degraded habitats and ecosystems. The implications for sprawl in the North Woods are uncertain, but trends in other popular recreation areas, such as Sebago and Belgrade have shown fast growth rates. In order to maintain the current character of Maine’s northern and western landscapes, communities need to utilize “smart growth” alternatives and proactive development planning as a means to prevent sprawl.

**Wildlife Conservation:** Maine supports a variety of wildlife, including 61 mammal species, due to its unique variation in habitat types. These species, as an important component of biodiversity within the region and Maine’s wildlife recreation industry, require habitat protection from human influences to persist into the future. When considering road density, Maine has habitat suitable for the reintroduction of wolves and maintenance of other large mammal populations dependent on large tracts of land. In particular, the North Woods remains the largest tract of undeveloped land east of the Mississippi. The future of this area is uncertain; however, the region is crucial habitat for Maine’s wildlife. The impacts of development and the need for wildlife conservation must be taken into consideration when planning for the future of the Maine North Woods.

**Outdoor Recreation:** Sportsmen and wildlife-watchers are a larger proportion of the tourist and resident populations in Maine than the regional and national average. As a result, wildlife-related recreation accounts for an estimated five percent of Maine’s gross state product. Sportsmen have played a vital role in shaping the quality and availability of outdoor recreational opportunities statewide. Fish and wildlife based recreation in generate over two million dollars annually in federal funding and produce tens of millions of dollars for state-level wildlife management. Sporting associations form public-private partnerships that maintain landowner relations benefiting all outdoor recreation participants. However, current state and federal funding is inadequate to support the changing demands of outdoor recreation. Resident sporting populations remain stable within the state. Yet the agencies that manage wildlife-related recreation are increasingly being required to manage for non-traditional recreation. In light of changing land-use patterns and recreational trends, there is growing concern for the availability of recreation land in northern and western Maine. State-based initiatives are already in place to relieve some of this concern and assure the continued viability of traditional forms of recreation in the North Woods. The future of the North Woods depends on continued state-level cooperation with sporting constituencies and landowners.

**The State Park Model:** Maine has the policy tools to promote a large state park based conservation effort in the North Woods. Precedent for such a state initiative exists in the Adirondack State Park in New York, which utilizes a mosaic system that integrates both public and private lands for the greater goal of landscape level conservation. Pursuing such a model would allow Maine to

protect the working forest values and recreational opportunities that have been and continue to be an important part of Maine's economy and culture. An examination of the institutional framework and policy conservation tools in Maine as well as a study of the Adirondack State Park in New York demonstrates how this can be achieved in Maine's North Woods.

**Funding Conservation:** Maine has a low percentage of state conservation lands at 5% compared to the rest of the country. While the Land for Maine's Future Program has been effective, it lacks the funding necessary for the purchase of large scale conservation lands such as those in the Maine North Woods. In addition Maine already has high funding per capita making it necessary to implement alternative funding mechanisms in order to conserve the Maine North Woods. Some possible options may include the diversion of tax revenue from other sources using Minnesota's funding strategies as a guide, encouraging local government action through local bonds as New Jersey has done, and looking to the federal government and the Land and Water Conservation Fund for help. With more funding as well as the proper allocation of this funding, Maine would be capable of purchasing lands for large-scale conservation in the Maine North Woods and beyond.

**Comprehensive Planning:** The Land Use Regulation Commission (LURC) is responsible for administering over ten million acres of land not populated enough to warrant local government. Despite the low population of the area, four regions, The Rangeley Lakes, Carrabassett Valley, Millinocket-Baxter State Park, and Moosehead Lake, have seen some of the highest growth rates in the state. As a result, LURC has designated them high-priority areas where growth and natural resource protection must be balanced. However, only two of these regions have land use plans under way. The Rangeley comprehensive plan, effective as of 2001, was developed by LURC after six years of planning. An analysis of building permits issued by LURC found that growth has remained steady in the area, with an average of 35 new dwellings per year, compared with 33 per year before the plan. Growth has been effectively concentrated in areas designated by the comprehensive plan. In contrast, the proposed Plum Creek plan for the Moosehead Lake region is a landowner-initiated plan known as a Lake Concept Plan. While the Plum Creek proposal has been controversial in part because of the large role of a private landowner and the development it would include, concept plans require fewer public costs than comprehensive plans. To balance the interests of private landowners and development with conservation, Maine residents should consider the amount of resources they are willing to invest in comprehensive planning.

For more information please visit our website:

The State of Maine 2005: The Future of Maine's North Woods  
<http://www.colby.edu/enviro/courses/ES493/stateofmaine2005/>



## About Us



*From left: Kristin Blodgett, Hillary Langer, Cait Cleaver, Jenny Venezia, Nate Dick, Scott Shahverdian, Sandy Beauregard, Randa Capponi*

**Kristin Blodgett** grew up in East Wallingford, Vermont. As a senior at Colby College she studies both international relations and environmental policy. Earlier this year Kristin spent five months in Tanzania learning about conservation and wildlife ecology in East Africa. Upon graduating from Colby she hopes to do more traveling, and perhaps to return to Africa, before attending graduate school.

**Hilary Langer** grew up in Boxford, Massachusetts. At Colby, she is a double major in International Studies and Environmental Policy and recently spent the semester in South Africa studying rural development programs. After graduation, Hilary hopes to pursue a career that would allow her to combine her interest in the environment and human rights. She loves running, sailing, and going on adventures.

**Cait Cleaver** from Kennett Square, Pennsylvania came to love the environment from summers at the beach and hiking in New England. At Colby, she has been involved with Colby Women's Volleyball and was able to study wildlife ecology in Tanzania for a semester. In the future, she hopes to pursue climate change or wildlife management. In her spare time, she enjoys snowboarding, traveling, and drinking coffee.

**Jenny Venezia**, originally from Wilton, Connecticut, has been calling the Green Mountain State home since her junior year of high school. She splits her down time between the dirt roads, open fields, and wooded hills of Poultney and

Waitsfield; and the Green mountains anytime there's snow. At Colby, she has found her dogs away from home at the Waterville Humane Society, brought some multicultural flair to campus as the publicity chair for the Pugh Community Board, and had an excellent time as the lead jumper for Oakland Elementary school's jump rope club. She is thankful that Colby is only an hour or so away from Sunday River and Sugarloaf and that, as an Environmental Policy major, she got to spend an entire JanPlan snowboarding and working as an environmental intern at Sugarbush Ski Mountain in Vermont.

**Nathaniel Dick** grew up in North Attleboro, MA. He is an Environmental Studies major with a focus in environmental policy. His love for the environment stemmed from fishing trips with his father in Alaska, where he was born and lived for a brief time. At Colby, he is involved with Colby Men's Basketball. After graduation, Nate plans on living in the Boston metropolitan region and hopes to pursue a career combining his interests in the environment and sustainable development. In his spare time he enjoys bike riding, being with friends, and watching movies.

**Scott Shahverdian** grew up in Canton, CT. He is an Environmental Studies major with a focus in environmental policy and recently had the opportunity to study abroad in Costa Rica where he focused on local sustainable development issues and development pressures in developing countries. After graduation Scott hopes to work for environmental advocacy groups and pursue his love of the outdoors climbing and backpacking.

**Sandy Beauregard** grew up in Rangeley, Maine. She is an Environmental Policy major at Colby and spent her junior year studying engineering at Dartmouth College. She recently traveled to Kenya with the Dartmouth chapter of Engineers Without Borders to install a well with a solar-powered pump in a rural village. Following graduation she will return to Dartmouth for one year to complete a degree program in Mechanical Engineering. In the future, Sandy plans to pursue a career that combines her environmental interests and technical, engineering knowledge.

**Randa Capponi** grew up in the town of Steep Falls, Maine where as a young girl she enjoyed venturing through the woods with her dad to look for wildlife. It was these experiences with her father that led her to become an Environmental Policy major at Colby. Randa, also an Italian studies minor, spent spring semester of her junior year in Florence, Italy where she lived with a little Italian woman who taught her how to cook delicious and authentic Italian meals. After completing her studies at Colby she plans to continue her interest in the environment by going back to school for environmental law. She enjoys celebrating holidays, hanging out with friends and family, watching sports, camping, and cooking Italian food.

# **Conserving the North Woods: The Sustainability of Maine's Forests and Timber Industry**

Kristin R. Blodgett

## ***Introduction***

The forests of Maine have special significance for residents of this state. With 90% of its land base covered in forests, Maine has the highest percentage of forest lands of any state in the country.<sup>1</sup> With such extensive forest resources, it is clear why the state's economy and a cultural heritage have been so greatly influenced by forest resources, and how Maine and its residents have come to place such a high value on the presence of the timber industry in this region. The State itself recognizes the importance of the industry to the future of Maine and is taking an active role in promoting the sustainability of the resource and the persistence of the industry.<sup>2</sup> However, the pressures of globalization have catalyzed an evolution in the structure of the timber industry in recent years and the familiar face of timber in Maine is changing as a result of mechanization and modernization.<sup>3</sup> The demands of global competition to improve efficiency and increase output, the expansion of development in the region due to the sale of large tracts of timberland to private owners, and changes in land use patterns are all factors that have contributed to the transformation of Maine's traditional timber industry.

In the face of all of these pressures, residents of Maine are concerned for the future of the forests in their state and what this could mean for the economy and their valuable natural resources. Fragmentation of timberlands due to development has been shown to have negative effects on the productivity and profitability of the timber industry, as will be seen in the example from New Hampshire. Given the current trends in Maine towards land sales, it appears that fragmentation and parcelization of the state's timberlands are becoming increasingly present threats. In this chapter I explore the benefits and disadvantages of acquiring these timberlands, specifically the Maine North Woods region, for a national forest as a means of combating fragmentation and securing the futures of Maine's forests and its timber industry.

I begin the paper with a brief section on the history of the timber industry in Maine, and then transition into a discussion of the status of the timber industry in the economy today. I go on to discuss the concerns related to the current trends and patterns in the timber industry, and finally conclude with an exploration of national forests as an ownership model that could potentially provide a balance between the state's conservation needs and its economic needs.

## ***Context: Maine's Traditional Model of Private Industrial Ownership***

### **Historical Background**

The timber industry has had a profound and lasting influence on the intrinsic character of the state of Maine. The arrival of the first settlers to New England as early as the 1620's introduced what would soon become the state's most profitable industry.<sup>4</sup> Lumbering, along with fishing, trapping, and shipbuilding, was such a successful industry at the time that agriculture was rarely practiced in the region.<sup>5</sup> By the turn of the 18<sup>th</sup> century, people were already raising concerns about the sustainability of the forests under such harvesting pressures, but the industry continued to grow throughout the 1700's.

In the years following the Revolutionary War, populations of settlers began to increase dramatically, and land conversion due to agriculture and unsustainable harvesting began to take its toll on timber supply in the early 1800's.<sup>5</sup> By mid-century over 30% of Maine's forests had been logged, and with increased mechanization and the introduction of more efficient logging practices over the next half century, the early 1900's saw the near elimination of all the original forests.<sup>4</sup>

Another significant contributor to the massive wood supply shortage at this time was the poorly-timed and overwhelming onslaught of the spruce bud-worm which, between the years 1909 and 1918, killed 70% of all the spruce and fir stands in the state of Maine.<sup>5</sup> In addition, any timber that was not already disease-ridden or previously logged was virtually decimated by a string of wildfires that swept through the region between 1904 and 1908.<sup>6</sup> Thus, by the 1920's the timber industry was severely suffering, and with timber such a scarce commodity, loggers were harvesting almost two times as much wood as was allowed to grow.

The 1970's found the timber industry somewhat recovered. The migration of the industry to the western states after the spruce bud-worm epidemic alleviated pressure on the devastated forests in the East and allowed timberlands to regenerate.<sup>6</sup> Panic seized loggers again in this decade, however, with the return of the spruce bud-worm. This marked the beginning of the era of the clearcut, as loggers rushed to harvest the crop before it became infected. With timber supply and costs of harvesting increasing while consumer demand and market prices decreased, and the industry found itself in a slump once again.

The 1980's brought a revival of the industry with the end of the bud-worm threat and new technology and modernization to forest products manufacturing.<sup>3</sup> In 1989 the Maine Forest Practices Act was implemented as the initial attempt to promote sustainability within the industry by setting strict limits on clearcutting and imposing new requirements for reporting logging practices.<sup>6</sup> The timber and pulp and products industries once again thrived in Maine, resuming their place as the foremost contributors to the state economy.

The decades following this recovery have been characterized by massive land sales as large parcels of timberlands have traded hands, first among large industrial owners and, more recently, to private non-commercial interests.<sup>3</sup> While

the timber industry continues to play a very significant role in the state's economy and culture, there have been profound changes in manufacturing in recent years as globalization and world markets introduce worldwide competition.

### The Economics of the Timber Industry

Today there is a great deal of concern, both among the public and within the timber industry itself, that forestry in the state of Maine is failing. While the timber industry has undergone some significant changes in recent years, the Maine Forest Service maintains that it continues to make a significant contribution to the economy.<sup>7</sup> Forest products manufacturing provides more than a third of total manufacturing gross state product for Maine, with paper manufacturing accounting for three quarters of all forest products revenue. (Table 1)

**Table 1. Revenue generated from manufacturing in forest products industry in Maine<sup>8</sup>**

Manufacturing Sector	Revenue	
	(Millions of Dollars)	Percent
Wood products	\$312	6.7%
Furniture and related products	\$94	2.0%
Paper	\$1,192	25.5%
Total forest products manufacturing	\$1,598	34.2%
Total manufacturing in Maine	\$4,671	100%

Interestingly, while Maine is the most heavily forested state in the nation, only a very small percentage of its vast forest lands are under federal ownership as national forests.<sup>9</sup> While Maine has more forest cover than either Vermont or New Hampshire, Maine's national forest lands account for less than one percent of its total land area compared to Vermont's 8.5% and New Hampshire's 15%.

**Table 2. Extent of forest and national forest lands in Maine relative to Vermont and New Hampshire<sup>8, 10-14</sup>**

State	Total Forest Land		National Forest Land	
	Acres	Percent	Acres	Percent
Maine	17.8 million	90%	53,006	.30%
Vermont	4.6 million	78%	392,577	8.53%
New Hampshire	4.8 million	84%	731,555	15.24%

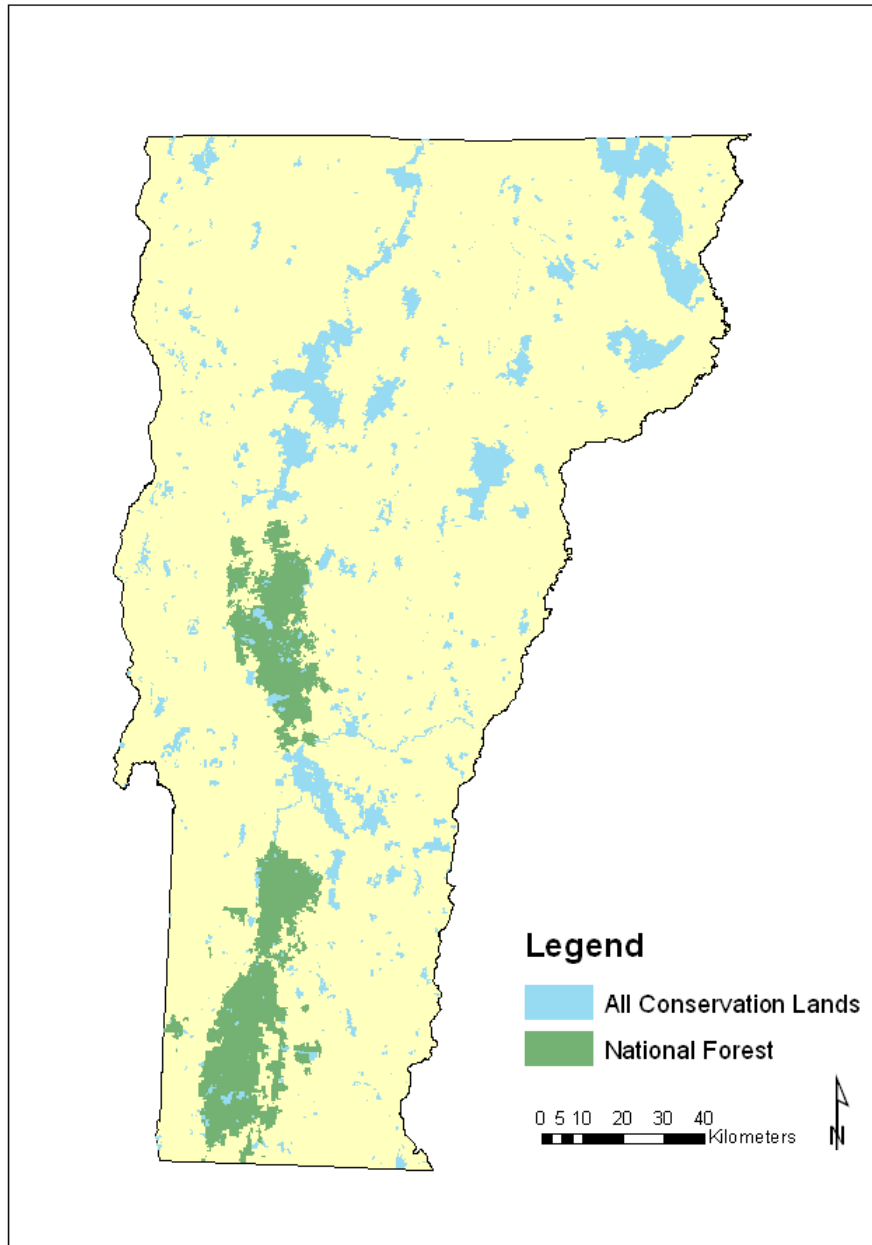


Figure 1. National forest lands in Vermont<sup>14</sup>

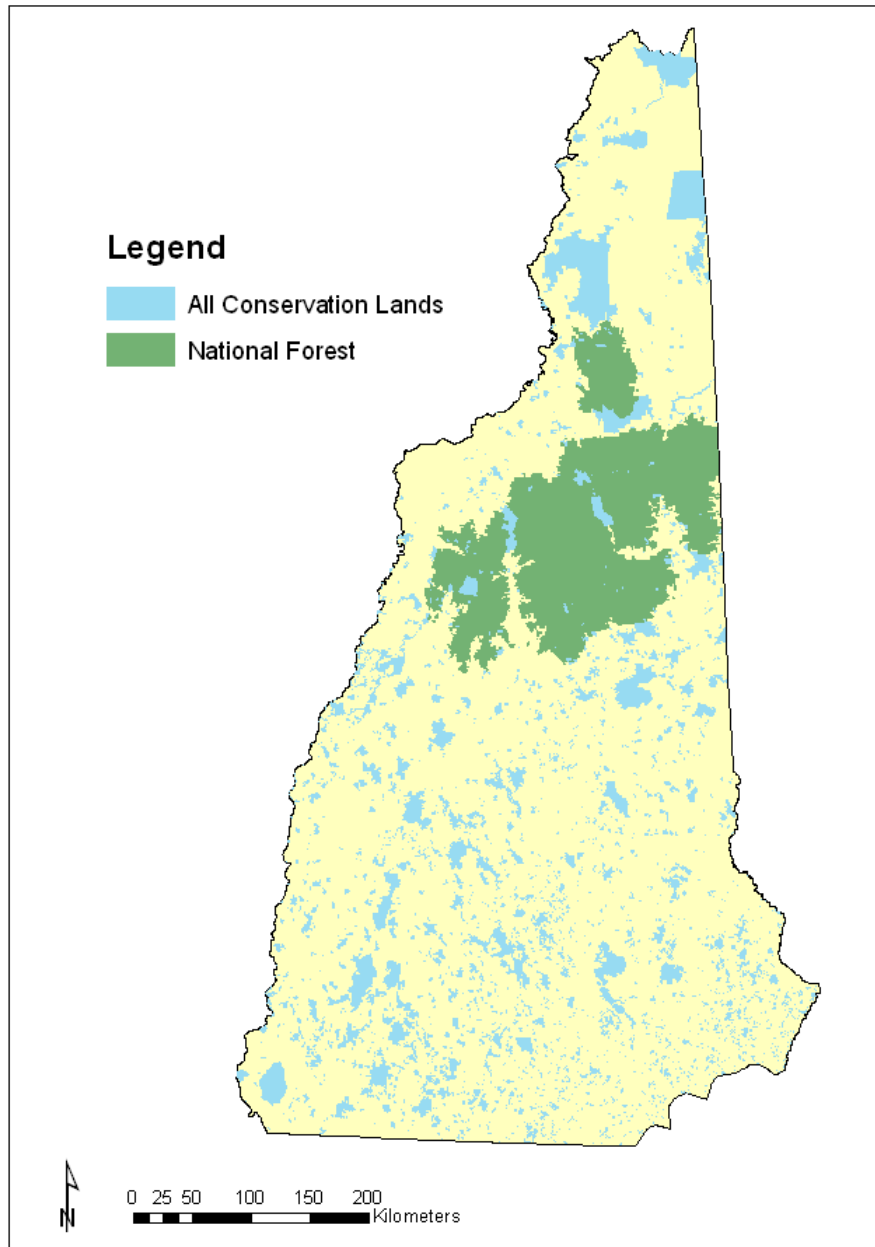


Figure 2. National forest lands in New Hampshire<sup>13</sup>

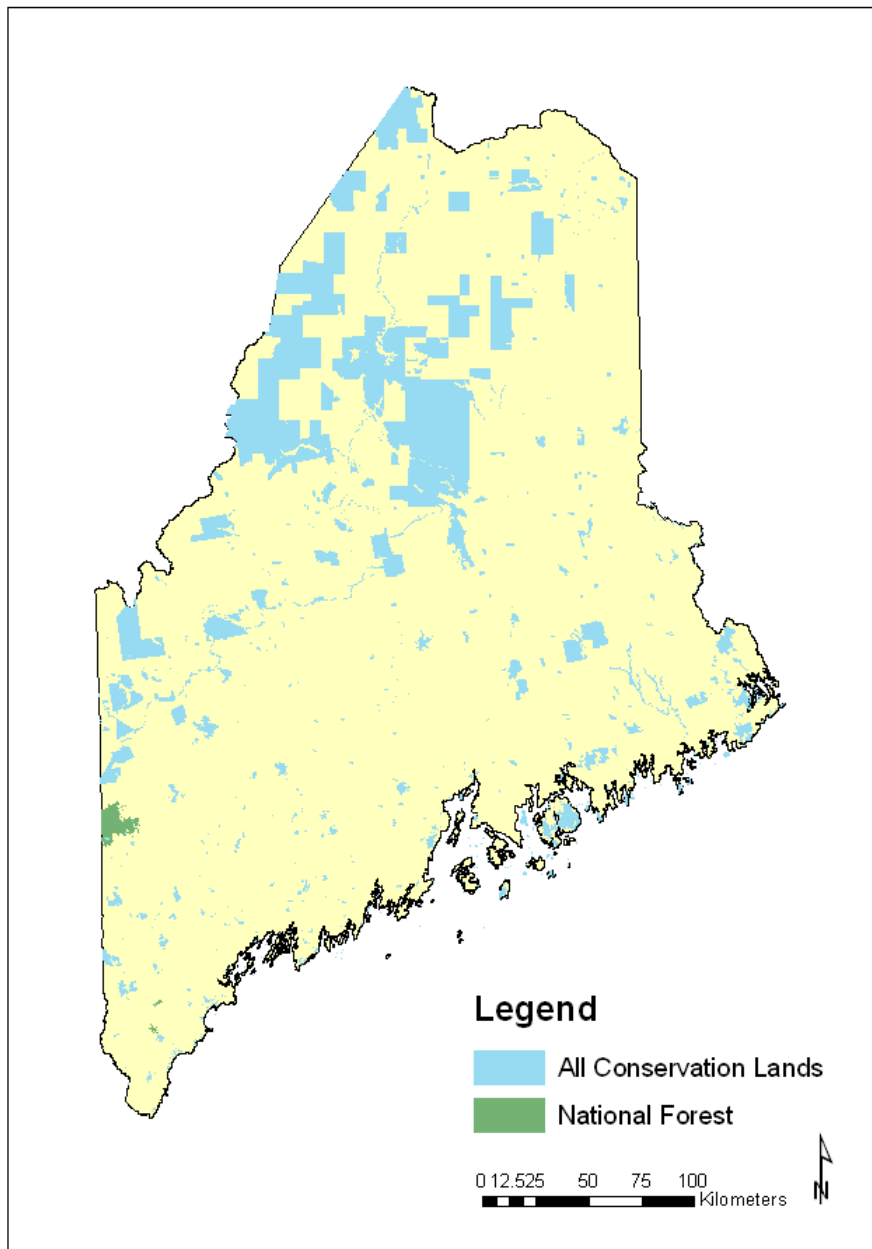


Figure 3. National forest lands in Maine<sup>12</sup>

The availability of Maine's extensive forest resources has allowed the state's timber industry to remain very competitive with other states in the region. However, in recent years the industry has had to expand its focus beyond a regional or even national scope; with global demand for forest products on the rise, Maine is now forced to compete with manufacturers from all over the world.<sup>3</sup>

The evolution of the timber industry in the state over the last decade reflects this shift from local competition to global competition, as firms increase efficiency in an attempt to keep pace with global markets. Modernization in manufacturing in Maine has brought about a decline in employment in the forest products industry, although the volume of paper and lumber production is near record levels.<sup>7</sup> Since 1992 employment in the forest products industry has been steadily declining. Between 1992 and 2003, the number of jobs fell from 26,785 to 19,333. Over 5,000 of those jobs were eliminated between 1997 and 2002, representing a 23% decline in the industry's labor force. This trend is likely to continue as competition in the global market increases; the Maine Department of Labor predicts an overall decrease in manufacturing jobs between 2000 and 2010.<sup>7</sup>

Despite a decline in employment in recent years, the industry has seen a substantial increase in the average wage. As firms downsize to increase production efficiency, the jobs that are retained require more skill and, thus, offer higher pay. Between the years 2000 and 2003, wages in the industry rose from \$42,000 per year to more than \$47,000 per year. Experts predict this pattern will persist as employment continues to decline.<sup>7</sup>

While wages and employment have seen drastic fluctuations, the volume of production by paper mills and sawmills has maintained some stability. In fact, in conjunction with an increase in growth of the state's timberlands, output of lumber has been steadily rising in Maine in recent years (Figure 4). Softwood production in the state has increased by 250% since 1975, while hardwood production has seen a 400% increase. Although there has been a slight decline in this upward trend since the year 2000, output levels are still hovering near record highs.<sup>7</sup>

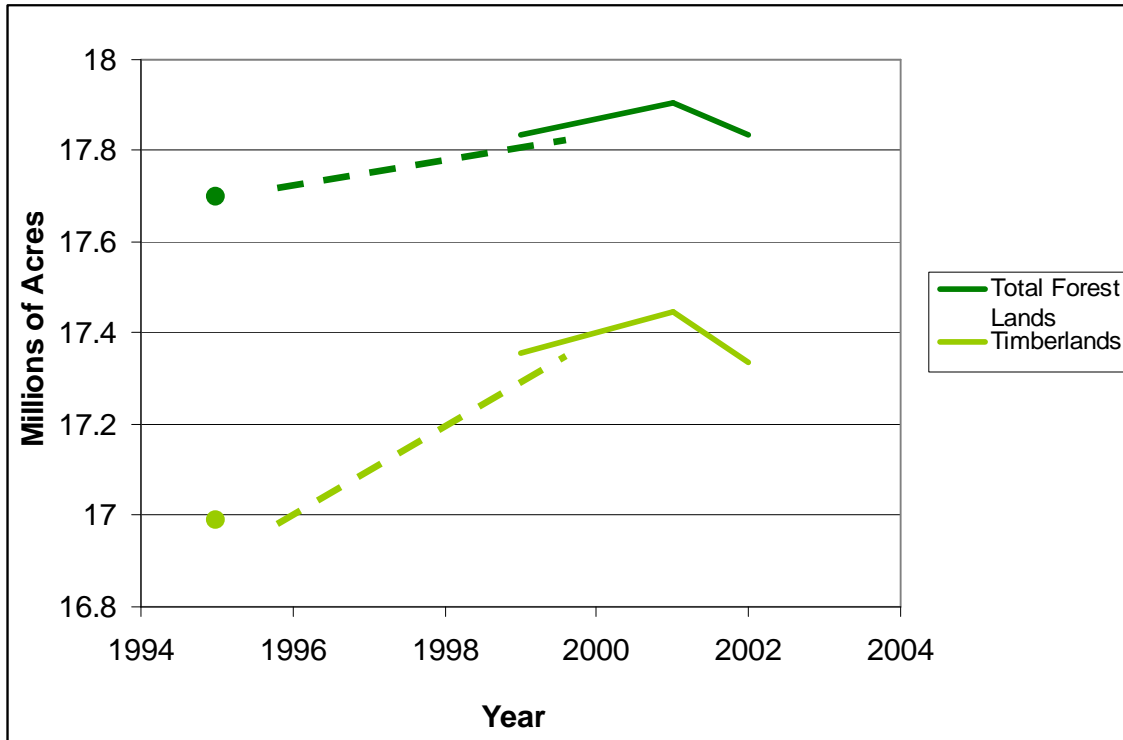


Figure 4. The growth of forest and timber lands in Maine within the last decade<sup>15-18</sup>

### The Future of Maine’s Forests: The State Takes Action

Because the Maine Woods represent a truly distinctive feature of the state’s historical and cultural identity and an important fixture in its economy, the State is taking significant steps to guarantee their longevity. However, it is a challenge to simultaneously protect and conserve these resources while continuing to utilize them for their economic value. Although conservation and resource extraction are two concepts that initially appear to be in conflict, the State is responding with the implementation of new forestry certification standards designed to both promote resource sustainability and advance the timber economy.

As a tool to ensure sustainable use, forest certification programs employ third party auditors to assess and evaluate the management of forest lands under standards of sustainability that are specific to each different program. While there are currently few economic incentives that come directly from the certification process, the State and commercial landowners recognize the public’s interest in protecting the future of Maine’s forests through ecologically conscious harvesting practices.<sup>19</sup> Theoretically, then, the timber industry will benefit from higher revenues from certification as a result of consumer demand for sustainable forest products. In practice, however, this has not yet proven to be the case, and accounts for the voluntary nature of most certification programs.

In an effort to promote the practice of these sustainable management techniques in the timber industry, the State launched the Maine Forest Certification Initiative in 1993.<sup>2</sup> The goals of this proposal were two-fold: to

“increase the amount of certified forestland in Maine to at least 10 million acres by the end of 2007” and to “increase the volume of wood from certified sources to 60 percent of the statewide total by 2009”.<sup>20</sup> As of 2003, Maine could boast a total of 7 million acres of certified forest land under both public and private ownership.<sup>20</sup> Secondary goals of the Initiative included plans to increase the demand for certified forest products in Maine and the global market, and revise certification standards to more effectively promote sustainable forestry. By simultaneously addressing issues of sustainability and economy, these forest certification goals represent a critical link between resource conservation and resource use. They will certainly have implications for the future of the Maine woods.

The governor’s direct involvement in this issue demonstrates the degree to which forests are a priority for the state, and sustainability initiatives will no doubt improve future prospects for the Maine woods. However, with global competition exerting increasing pressure on the timber industry, the traditional Maine model of forest ownership and management is evolving. As it changes, there is doubt as to whether certification and sustainable use will be enough to adequately protect the resource.

## ***Discussion***

### **A Changing Industry**

While private industrial ownership of timberlands has been the model in Maine since the 1600’s, the changing nature of the timber industry both locally and globally begs this question: is this traditional model of ownership adequate to sustain the character of Maine’s forests and its timber industry into the future? International competitors are transforming the tradition of lumbering in Maine such that lands once owned and managed by timber companies are being sold to non-industrial owners as the timber corporations abandon the industry.<sup>21</sup> This incredible surge in the sale of timberlands to the “investor” class has come to characterize the last two decades of the life of the timber industry in Maine, causing concern in the state about the future of the land base and the valuable natural resources found on it.<sup>9</sup> In just the last seven years, 3.5 million acres of industrial timberlands have changed hands.<sup>7</sup> In fact, between the years 1995 and 2003, land ownership by members of the forest industry decreased by 1.6 million acres, while non-industrial private ownership increased by 1.9 million acres.<sup>22</sup> (Figure 5)

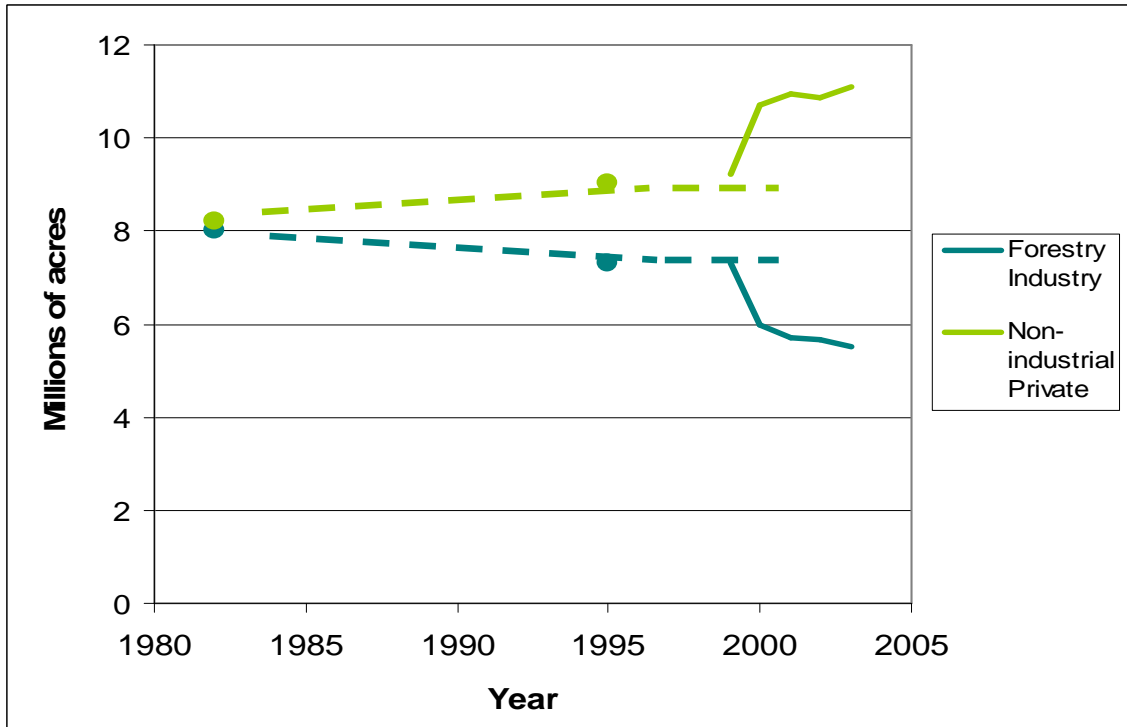


Figure 5. Changes in ownership of timberlands within the last decade<sup>15-18</sup>

As more land falls into the hands of non-industrial investment owners under whose management intact timberlands are not necessarily the priority, the public can no longer safely guarantee the persistence of its productive forests nor, subsequently, the survival of a healthy forest products industry. A study done in New Hampshire, conducted in 2001 by the Society for the Protection of New Hampshire's Forests (SPNHF), examines the various effects of fragmentation of timberlands on working forests and the timber industry.<sup>23</sup> The results of their research have some interesting, and very relevant, implications for Maine's current situation. The SPNHF found that New Hampshire is losing 13,000 acres of forest land every year due to population growth and land consumption per person. Fragmentation of timberlands is increasing, with a decline in average industrial parcel size from 114 acres in 1960 to only 37 acres in 1997. This decrease translates to higher costs of production in the timber and related products industries. First, it is not economical to manage small parcels of forest land for the long term because of the discrepancy between the cost of hiring a professional forester and the returns from the timberland. Second, stumpage prices were shown to be positively correlated to increasing parcel size, resulting in higher returns to the landowner for larger parcel sizes. Profitability is also compromised with a small parcel because transportation costs, equipment costs, operating costs, and communications costs are dramatically higher relative to revenue. Increasing rates of forest fragmentation also discourage timber companies from investing in smaller lots because of concerns about encroaching development in surrounding areas. This, known as the "abutter edge effect",

effectively reduces the amount of productive forest land available for timber harvesting.

Thus, with New Hampshire as a case study, it becomes clear why forest fragmentation and parcelization can be very detrimental to the forest land base and the profitability of the timber industry. Under the current trend of land sales and fragmentation of timberlands in the North Woods, Maine could easily be moving in a similar direction. The concerns related above resonate loudly for Maine residents today as their forest lands, once protected under the ownership of industrial corporations, are now being parceled off and sold by private firms like Plum Creek, whose investment interests extend beyond timber production. Given the findings of the New Hampshire study, it is important for the people of Maine to carefully consider to whom they are entrusting the future of their forests. With the goal of preserving the state's valuable forest resources and its long tradition of lumbering, employing an alternative to the traditional ownership model could be in Maine's best interests.

In the past, when timberlands were concentrated in the hands of industrial owners, there was no perceived need for forest conservation because timber companies both sustained the resource and offered free and unrestricted public access to the forests.<sup>24</sup> Today, with dramatic changes in land ownership and growing threats of development, the need for a new model of forest conservation is increasingly evident.

## **National Forests**

Operating under a mandate that encompasses literally 100 years of Congressional legislation, the extensive responsibilities of the US Forest Service to protect and manage our national forests prove to be many and complex.<sup>25</sup> Since 1905, when the Forest Service was established, goals for forest management have continued to evolve with our national priorities.<sup>26</sup> Changes and amendments of management policies for national forests reflect this evolution, and are also indicative of the difficulties of keeping up with new management demands, economic strains, scientific research, and ecological concerns. Thus, maintaining national forest lands that are at once economically productive, environmentally sustainable, and ecologically balanced is a constant effort and, inevitably, a source of controversy. Although competing interests between the forest industry and environmental groups frequently conflict over issues of managing national forests, no one would disagree that some elements of the national forest system are very valuable. The following discussion explores the benefits and disadvantages of a national forest as a system that could more effectively balance resource protection and resource use than the traditional model, thereby securing the survival of both the forests and the timber industry in Maine.

## **Organization and Process**

Any national forest established in the United States falls under the jurisdiction of the US Forest Service, a division of the Department of Agriculture.<sup>25</sup> The Forest Service has the challenging responsibility of managing

its lands under a multiple-use policy, striving to balance environmental quality and resource protection with human use and resource extraction. While its first priority is timber management, the Forest Service is also required to consider tourism, wildlife management, and research issues when formulating its management policies.<sup>27</sup> Including all of these elements in management directives is important to maintaining a balanced ecosystem, but such a broad range of responsibilities makes it difficult to develop management strategies that will effectively protect each area of interest.

In the US today, national forest lands total about 191 million acres, which is approximately eight percent of the total land area of the US.<sup>28</sup> There are currently 155 national forest units in the United States located in 44 different states and Puerto Rico, with additional lands proposed for acquisition all the time.<sup>29</sup> The process for creating new national forests is a lengthy one and involves a number of onerous but necessary steps. First, the Forest Service enters into a purchase agreement with a landowner following the appraisal of the proposed property. Congress must approve this sale and allocate monies from the Land and Water Conservation Fund (refer to Land Acquisition chapter for more information) to finance the acquisition, which was established in 1965 using fees paid by oil companies for offshore drilling and was created expressly for the purpose of acquiring new federal lands.<sup>29</sup> Then, once the proposal receives congressional approval, it must be formally accepted by the Forest Service. After this time deeds are prepared and payment is made. Because none of these phases of acquisition can be bypassed, the legal and administrative logistics of establishing new federal lands can restrict the timely realization of new acquisition plans. This translates to a long waiting period for valuable forest lands that are currently eligible for and in need of federal management and protection.

## **Land Management**

The first federal protection of forest lands dates back to 1891, at a time when concern about the rapid rate of deforestation prompted a congressional mandate to allow the creation of national forest reserves by the president.<sup>25</sup> 1897 brought the congressional implementation of management regulations for these reserves in an effort to more effectively manage these lands. Many of these regulations, created in the infancy of federal forestry policy, provided the basis for the guiding principles of today's resource management under the Forest Service. One such piece of legislation was the Organic Administration Act of 1897. This law, along with the Multiple-Use, Sustained-Yield Act of 1960 and the National Forest Management Act (NFMA) of 1976, still comprises some of the most significant legislation guiding federal management of national forests (Table 3).<sup>30</sup>

**Table 2. Summary of important legislation governing national forest management<sup>25, 30</sup>**

Year	Legislation	Mandate
1897	Organic Administration Act	Authorized the regulation and management of national forests by the Federal Government (1) Established guiding principles of forest management policy.
1960	Multiple Use Sustained Yield Act	(2) Broadened management priorities for national forests to include natural resources other than timber (i.e. fish and wildlife, watershed areas, recreation lands, etc.). (1) Required Renewable Resource Assessments of national forest lands by the Forest Service. Assessments must be updated every 10 years.
1976	National Forest Management Act	(2) Forest management policies must be kept up-to-date based on the findings of the assessments. (3) Each national forest unit must have its own individual management plan

The Organic Administration Act was the first law that mandated management of national forests by the federal government. The law stipulates that forests reserved and protected by the government must be controlled and regulated (Laws Handbook) because the simple act of acquiring those lands did not guarantee sound timber harvesting practices.<sup>25</sup> While this Act established the need for the implementation of land management policies, more recent legislation explicitly outlines these specific current policies. The Multiple-Use, Sustained-Yield Act of 1960 redefined both the purpose of national forests and the means by which they should be managed.<sup>30</sup> The Act states that the administrators of these lands should consider outdoor recreation, range, timber, watershed, and fish and wildlife as priorities for creating management policy. In addition, use of the resources within these protected areas should be guided by principles of multiple use, defined as “the management of all the renewable surface resources...to meet the needs of the American people”, and sustained yield, the “achievement and maintenance of a high-level regular output of the renewable resources...without impairment of the lands productivity”.<sup>30</sup>

The National Forest Management Act (NFMA), passed in 1976, is the most important legislation directing forest management policy for national forests (Law Handbook). The Act has three basic components, the first of which requires the Forest Service to compile a Renewable Resource Assessment of national forest lands every ten years. The second element of the Act mandates that the results of the assessment be used to revise the system’s management program, all while maintaining the principles of multiple-use and sustained yield. The third aspect of NFMA outlines directives for creating individual management plans for every unit within Forest Service jurisdiction. The law states that, in general, the management of national forests should take into account such contributing factors as timber, wildlife, and public recreation. Secondary regulations of the NFMA include specifications for timber harvesting and reforestation, which place a limit on the timber sales from each national forest unit at a quantity the forests can sustain every successive year. It also requires the government to provide the

Forest Service with up to \$30 million a year for purposes of reforestation of federal timberlands. In total, Congress provides \$200 million annually to ensure that the regulations set forth in NMFA are being met.<sup>30</sup>

The ultimate goal of the Forest Service is to allow human use of national forests while preserving the environment for the future. Thus, the underlying goal of all Forest Service management policy is the achievement of resource sustainability through multiple-use activities. Regulation of forest use according to this objective helps to guarantee the survival of the ecosystems and the resources for generations to come, and limits pressures on the land from development, land conversion, unsustainable harvests, and other concerns relevant to the private industrial ownership model.

In addition, the extensive research and evaluation of national forest units required by Forest Service makes certain that management agencies are fully apprised of the health and condition of their lands and provides a strong scientific basis for designing management strategies for the future. As the “largest forestry research organization in the world,” the Forest Service sponsors and generates scientific research that is critical to furthering its goals of multiple-use and sustainability.<sup>31</sup> Unfortunately, it can be difficult to guarantee that forest management strategies stay current with scientific data due to the legislative procedure involved in updating and amending management policy. The process of revising management plans can require as many as seven years to complete.<sup>28</sup> Thus, while the Forest Service has access to abundant scientific feedback about the efficacy of its management practices, the availability of the information does not necessarily promise its immediate implementation.

## **Administration**

Legislation governing Forest Service policy has caused a great deal of controversy in the past as a result of the issue of “administrative discretion.”<sup>32</sup> In a publication on administrative rulemaking, Martin Nie discusses how Congressional legislation provides only vague guidelines for forest management and creates confusion about the mission and goals of the Forest Service. Nie cites the Multiple Use Sustained Yield Act (1960) and the National Forest Management Act (1976) as examples of legislation that have placed responsibility for management decisions entirely in the hands of the Forest Service, which can cause serious conflict when any legal complaint is brought against the agency. Because the laws do not explicitly outline the Forest Service’s policies and practices as mandated by Congress, it is difficult for judges to make clear and decisive rulings due to the content of the legislation being altogether too flexible and vague. Nie argues that these litigation battles inhibit the ability of the Forest Service to act on policy changes in a timely manner but that they could be avoided if the legislation communicated clearer and more explicit directives from Congress.

## **Economy**

The ongoing discussion about the potential for economic growth through conservation raises questions about the economic implications of national forest

lands for Maine. Given the role that the timber industry occupies in the state, it becomes important to address the ways in which the presence of a national forest might support local economies.

One of the largest financial contributions that a national forest can make to a state economy after timber is tourism. While monies from recreational fees are retained by Forest Service to finance management programs and maintenance services, local restaurants and hotels in the areas around national forests benefit from the external source of revenue provided by tourists.<sup>33</sup> The White Mountain National Forest, one of the most highly visited federal forests in the country, receives more than 6 million tourists ever year.<sup>34</sup>

National forests also support the local forest products industry through the sale and harvest of federally owned timber stands. Employing local foresters and lumber mills to conduct the harvest and the processing on national forest land generates revenues for the economy and promotes local industry and manufacturing.<sup>35</sup> In addition to supporting these already existing local jobs, some say that the presence of a national forest will provide additional employment opportunities for local residents. However, one study by David Lewis disputes the notion that communities acquiring new conservation lands experience significant job growth as a result.<sup>36</sup> On the other hand, based on research conducted throughout the 1990's, Lewis's study concluded that conservation lands have no negative effects on the availability of employment in surrounding communities.

In addition to being concerned about job opportunities, many opponents of conservation are also wary of the effect of national forest lands on property taxes. Because federally owned land is not taxable by local governments, that land is removed from the tax rolls and is often seen as an additional cost to the community.<sup>35</sup> To compensate for this burden on local residents and governments, the Payment in Lieu of Taxes Program was established in 1976 which mandates that federal funds be paid to local governments to help offset the costs of higher property taxes.<sup>37</sup> Aside from these payments, there are cases in which the Forest Service will direct 25% of the revenues generated on national forest lands to local communities as additional compensation.<sup>29</sup>

## **Conclusion**

The forest products industry in Maine is undergoing a transformation. While it remains a prominent fixture of the state economy, the traditional structure is evolving. Globalization and competition have motivated modernization and new efficiencies that are permanently changing the industry, and with it, the landscape of the northern forests. Under current trends of rising land sales, increased parcelization, and greater development pressures, the future of the Maine North Woods is uncertain. Historically, Maine residents relied on timber companies to conserve and protect their vast tracts of forests and the public's free access to that land, but this traditional model is changing with the gradual but persistent withdrawal of those timber companies from the North Woods region. As was demonstrated by the example from New Hampshire, the fragmentation of timberlands has detrimental effects on the profitability and

productivity of the timber industry. Thus, with changing trends in land ownership away from the industrial class and towards the investor class, Maine must begin to look to a new model of forest ownership that will simultaneously protect the forest land base and promote the timber industry.

This review discusses the national forest model as a potential alternative strategy for timberland ownership that could promote both Maine's goals of securing the timber industry and its natural forest resources. It outlines some of the benefits and disadvantages that national forests bring to local communities. The national forest model is one that strives to reconcile resource conservation with resource extraction by maintaining ecologically balanced forest ecosystems while also supporting the timber industry, a notion that holds promising potential for the Maine North Woods. However, challenges of federal ownership, legislative and administrative process, and policy disputes are disincentives to support the application of this model in Maine. Perhaps the establishment of a state forest would be a more effective alternative, limiting some of the difficulties that arise as a result of federal land ownership. Perhaps conservation easements would be a more practical route, allowing landowners to maintain timber rights while protecting the land from development. However, the national forest model is one that has been effective at balancing conservation with industry in other states, and it is a model that Maine should consider for the future of the North Woods. By exploring methods that are both economically and environmentally sustainable, Maine can begin to pursue the strategies that will guarantee the survival of its timber industry and its forests far into the future.

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# Population Changes in Maine's North Woods

Hilary H. Langer

## *Introduction*

Rural America faces unique opportunities and challenges for providing a high quality of life. With dispersed residents and amenities, rural areas can provide easy access to natural resources and distance from stresses of urban life. However, they may lack services available in urban centers and, because their economies often depend on only a few industries, economic downturns may hit rural areas particularly hard.<sup>1-3</sup> Attracting and retaining a stable population, balancing appropriate development with conservation, and offering quality services are all issues that rural communities must address. Despite these difficulties, positive beliefs about rural life convince one quarter of all Americans to live in these communities.

The United States Census Bureau defines rural areas as places outside of urbanized areas or clusters. Population density never exceeds 1,000 people per square mile and rural census blocks average fewer than 500 people per square mile.<sup>4</sup> The issues rural areas confront are particularly acute in Maine, which has the third highest rate of rural dwellers in the United States and is dependent on the timber and tourism industry. Currently, much of rural Maine faces declining populations, a trend which is out of sync with the "rural rebound" occurring in other parts of the country. Urbanization and sprawl are increasingly prevalent across the state. Maine's rural communities must strive to maintain stable populations that can support schools, hospitals, police and fire stations, and other public services. To attract and retain rural residents, Maine must evaluate major attractions such as access to outdoor recreation and proactively plan for vibrant communities.

In this paper I explore both the historical and modern composition of rural Maine and the issues that the state faces as it plans for the future. Understanding the reasons for rural population changes in other regions of the United States can inform community planning in Maine.

## *Methods*

This study was conducted during the Fall of 2005 in Waterville, Maine. The majority of the information comes from domestic and international journals and articles in edited volumes. In addition, data were drawn from town, county, state sources available through the US Census Bureau, the Raymond H. Fogler Library at the University of Maine. Site visits were made to the Maine's North Woods and interviews were carried out with local residents, planners, and developers.

## **Context: History of Rural Settlement in Maine**

In Maine, rural populations have played a major role in shaping the state's character. Early settlement in Maine's rural areas is attributed to economic and social conditions across America and the scenic beauty of Maine itself. When first settled by Europeans, Maine was described as a place of limitless land coupled with daily hardships. Historian Moses Greenleaf wrote,

*"the climate and soil of Maine have been represented as harsh and rugged, unfavorable to the successful pursuit of agriculture, or to the comfortable support of a dense population."*<sup>5</sup>

Accounts from this time cite the cold climate's as an obstacle to agricultural production but an important suppressor of disease that ultimately benefited the health of settlers. For a subset of Americans, Maine provided opportunities for land ownership and a labor-intensive living. The prospect of obtaining very inexpensive land provided enough of an incentive for many to brave the cold.<sup>5</sup> Greenleaf notes the appeal of Maine's large tracts of sparsely inhabited land,

*"...immense tracts of uncultivated and fertile land, with which Maine abounds, have afforded room for the population to diffuse itself at pleasure, as inclination or convenience dictated; so that no occasion has existed for the population of any part of the State, to condense itself beyond the degree most convenient for its comfortable support..."*<sup>6</sup>

Even before it separated from Massachusetts in 1820, Maine developed a reputation as a remote area with strong willed inhabitants.<sup>6</sup>

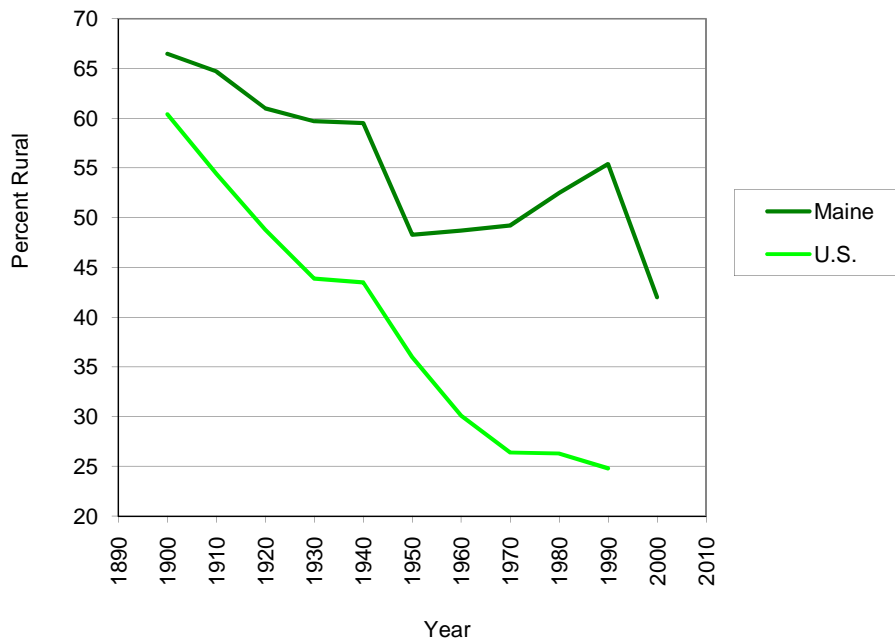
In the late 18<sup>th</sup> century, many settlers were motivated to move to Maine in order to minimize the risks of the revolutionary war.<sup>6</sup> The influx of immigrants during this period increased talk of rural Maine as an unexploited region with fertile soils. This sparked land speculation and general interest in the state<sup>6</sup>. Enthusiasm was tempered, however, when settlers confronted the winter climate and suffered losses during the unusually severe weather of 1816 and 1817.<sup>6</sup> The hardships of settlement in Maine distinguished it as an area where only the most resourceful of individuals settled as pioneers.<sup>7</sup> Nonetheless, the war compelled a significant number of men to establish themselves in Maine and ultimately send for their wives and children. This contributed to the early population growth in the region. When Maine broke from Massachusetts and became the nation's 23<sup>rd</sup> state in 1820, the population was estimated to be between 240,000 to 300,000.<sup>7</sup>

In comparison to other areas of New England, Maine offered individuals the freedom to live with very few government controls. In the late 18<sup>th</sup> and early 19<sup>th</sup> centuries, settlers moved to Maine's Unorganized Territories to escape the burden of taxation. Unorganized Territories, which have no local incorporated government, allowed settlers to live their lives away from government interference. Although many of the Unorganized Territories supported a large and wealthy enough population to be incorporated as towns (and thus subject to

taxation), citizens resisted the Legislature's pressure to become incorporated. Independence from the government was stressed as an important aspect of life in these rural parts of Maine.<sup>6</sup> Today, there are over 400 townships in the Unorganized Territories; they cover more than half of the state. Under modern laws, the Maine Legislature and the county in which an Unorganized Territory is located organize taxation and public services such as schools. Despite changes in government structure of Maine's Unorganized Territories, early settlers established an ethos of independence and self reliance that is still evident today.

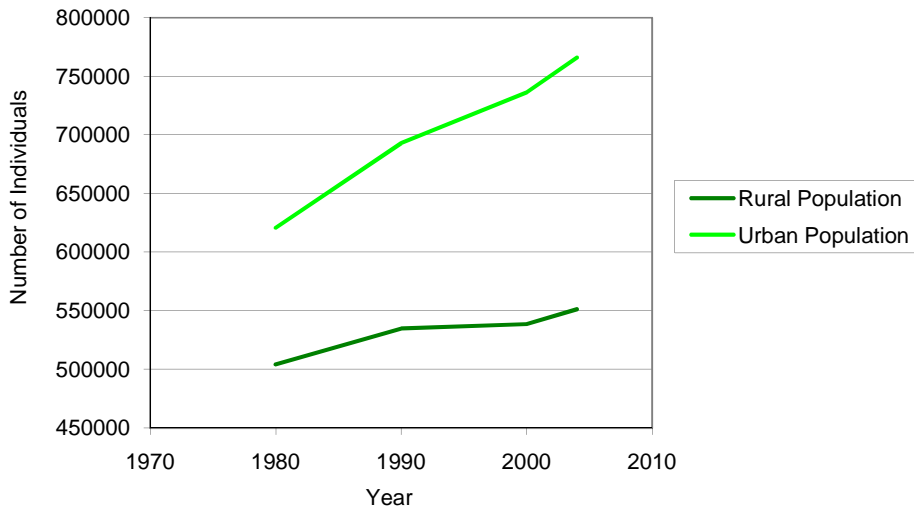
### **Contemporary Population Trends in Maine**

Currently, over 1.26 million people live in Maine. Despite increasing urbanization in Southern Maine, the state continues to have one of the highest proportions its population living in rural areas. Analysis of data from the US Census Bureau shows that in 1990 Maine had the third highest percentage of its total population residing in rural areas (55.4%). Only West Virginia (63.9%) and Vermont (67.8%) had higher proportions. Currently, many rural areas across America are considered population "rebound" areas that expect a population revival.<sup>8</sup> Maine, however, has not been experiencing an influx of rural residents. Although data for 2004 reflect a significant decrease in the proportion of Maine residents in rural areas (42%), Maine continues to have significantly more of its population living in rural areas than most states. This demands that state government and local communities work to promote rural interests.<sup>4</sup> Figure 1 shows Maine's historically high percentage of rural residents compared to the rest of the nation.



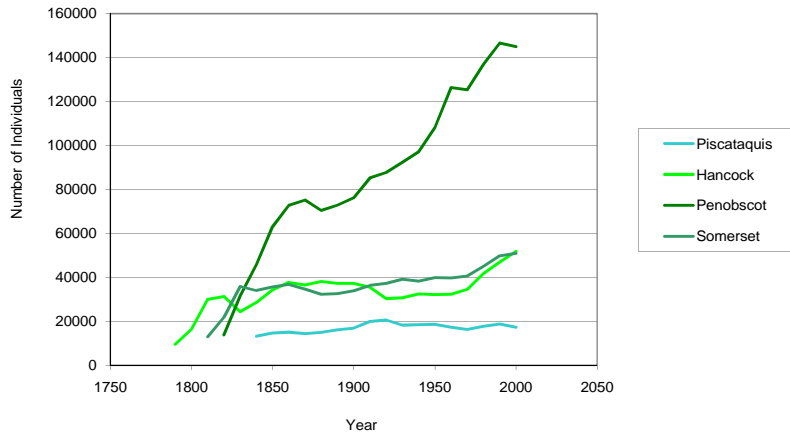
**Figure 1. Percent of Maine and United States Population Residing in Rural Areas: 1900-2000 (no data point available for the US in 2000)**

The increase in Maine’s total population has been dominated by growth in urban and suburban regions of the state. Planning for these changes is necessary for promoting vibrant urban and rural centers while avoiding sprawl. Figure 2 shows that despite an increase of over 145,000 residents in urban areas between 1980 and 2004, population increases in rural areas increased by only 47,000 individuals.



**Figure 2. Maine's Rural and Urban Population Change: 1980-2004**

When population growth is considered at the county level, disparities in rural versus urban population changes are evident. Figure 3 shows the differences in population growth between 1800 and 2000 in four different counties. These counties were chosen to highlight the differences in population growth between counties that are more urban and those dominated by rural areas. It shows that Penobscot County, which includes the city of Bangor, experienced the highest population growth rate. During this same period the county of Piscataquis, which includes the town of Greenville, a gateway to Maine's North Woods, increased only slightly

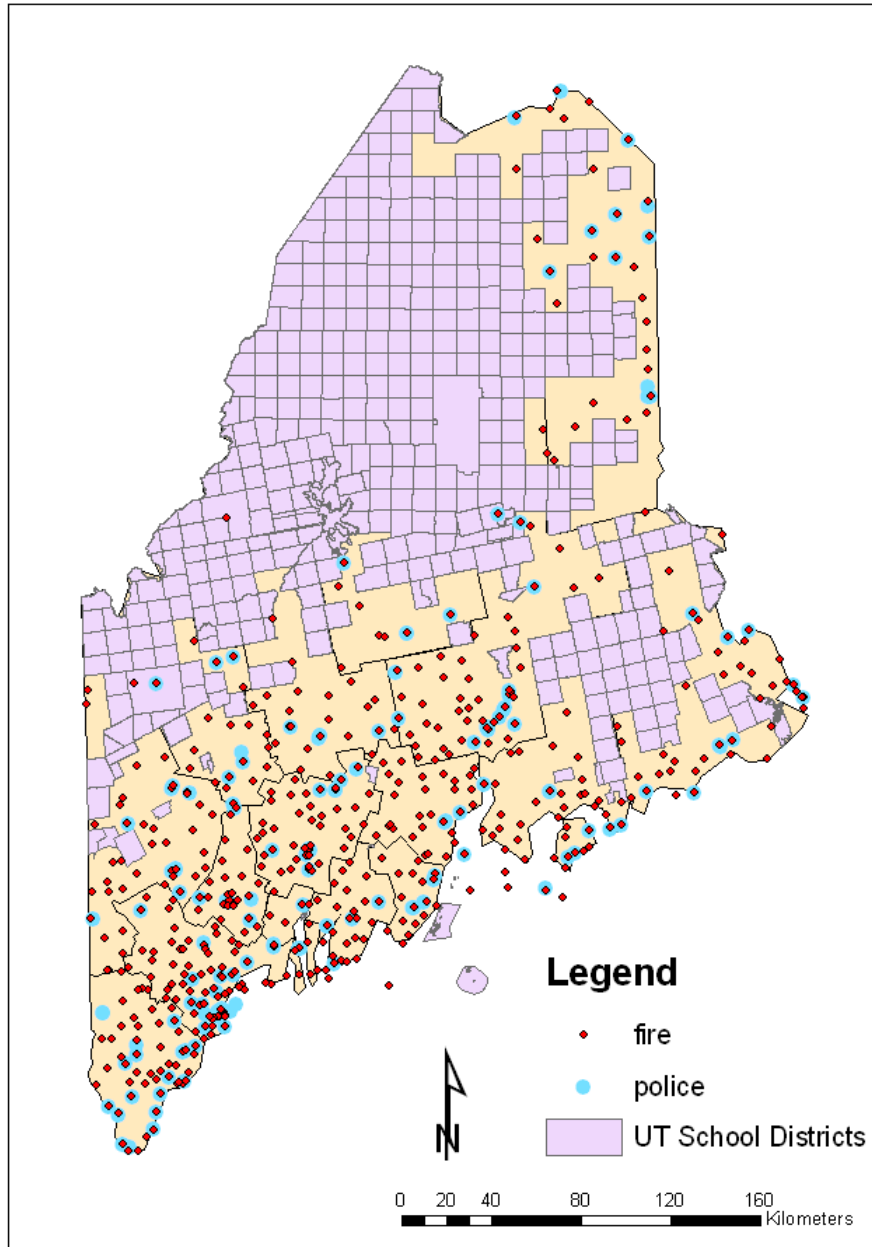


**Figure 3. County Population Change: 1840-2000. Illustrates the large range in population growth patterns of different Maine counties**

### Challenges for Rural Communities

Low population density can present challenges for rural areas, particularly if the total number of residents declines. Communities must work to maintain relatively stable population levels, provide high quality social services, and provide job opportunities for residents. Sustaining the total number of residents is crucially important for stabilizing the tax base and ensuring that high quality services can be provided. Planning budgets for schools, hospitals, and fire and police services is complicated by population fluctuations. Schools are particularly affected by population changes. Without enough school aged children, some communities are forced to consider closing local schools and busing students to other areas.

Figure 4 illustrates the distribution of school districts that fall under Unorganized Territory jurisdiction and the related scarceness of police and fire facilities. It suggests the distribution of services based on population density. The map indicates the distribution of services provided.



**Figure 4. Comparison of the distribution of fire and police stations and school districts in Maine's Unorganized Territories**

## **Lessons from the Rural Rebound in Western US States**

Regions in the western United States have undergone a rural rebound that offers lessons for Maine's rural communities. Experiences there suggest that demographics, economics, and ecosystems form a dynamic relationship in rural America.<sup>4, 9</sup> For example, natural resources and scenic beauty can generate site specific economies and provide employment for rural populations.<sup>2</sup> However, environmental degradation or economic downturns may result in rural population decreases as individuals move to urban areas in search of employment.<sup>4, 10</sup>

Studies also suggest that a move away from resource extraction industries and towards technology-based or recreation-based industries initially reduces negative environmental impacts.<sup>11</sup> Job opportunities, no longer limited by resources, may support a larger working community. Increases in population follow employment opportunities and provide incentives for undeveloped or agricultural land to be converted to residential developments. Thus, technology-based or recreation-based industries have been shown to produce a greater environmental impact than industries based on natural resource use.<sup>4</sup> Importantly, the growth of any recreation-based industries makes the preservation of an area's "sense of wilderness" a significant factor for maintaining economic stability.

In addition to population changes associated with new industries and employment, land use changes challenge traditional beliefs about natural resources and economic growth. Locations that have historically depended on industries such as farming, mining, and logging may view land conservation efforts as an attack on economic security and population stability.<sup>4</sup> As rural job opportunities change, areas attract residents with different social and educational backgrounds.<sup>4, 12, 13</sup> These new residents may feel less economic dependence on natural resources and can be more comfortable with changes in how land is used.

Over the last decade, the Western United States has experienced land use change more intensely than anywhere else in the country. Increasingly, agricultural or open land is being converted into seasonal and year round residences. Residents in this region have experienced changes in jobs from those based on natural resources to technology-based and tourism and recreation-based employment. Studies of new rural populations in Idaho, Montana, and Wyoming indicate an adjustment in the way that rural residents value nature. Unlike previous populations, which valued natural resources based primarily on their economic potential, new residents state scenic beauty and a sense of wilderness are the most compelling reasons for living in rural areas.

Interestingly, scenic beauty is an even more important indicator of population growth than economic opportunities.<sup>4</sup> Studies comparing the natural amenities index of regions to their population growth rate during the period from 1970 to 1996 examine "natural amenities" of rural areas, a term categorized in an index by the Economic Research Service of the US Department of Agriculture as reflecting an area's climate, topography and water area. To rank an area's natural amenities, these three characteristics are assessed and scored.

Locations with a high natural amenities score provide scenic beauty and opportunities for outdoor recreation.

The natural amenities index of rural areas was significantly correlated with the levels of population growth experienced there. Strong correlations were also found between communities experiencing rural population rates that exceeded national averages and proximity to wilderness areas. Interviews conducted with new rural inhabitants and business owners echoed previous studies and discovered that the environment and quality of life were more powerful incentives for rural migration than economic opportunities.<sup>12, 14, 15</sup> The researchers also found that the education level of residents, the number of jobs available in the service industry and the presence of an operating airport were major contributors to population growth. The study concluded that these socioeconomic factors combined with environmental factors accounted for 79% of the rural population growth in Idaho, Montana, and Wyoming.<sup>4</sup> Such findings highlight the need to plan for population change<sup>16, 17</sup> and to consider the positive impact that access to undeveloped land can have on population levels.

### **Maine's Population Trends in Comparison to National Trends**

Population trends in Maine's North Woods do not correspond with national patterns. Rural Maine has seen little recent population growth. In contrast, since 1990, most rural areas across the United States have witnessed an influx of residents and a revival of their economies and social services.<sup>18</sup> Between 1990 and 1994, three quarters of rural counties across America experienced population growth.<sup>1</sup> This pattern has meant that 25% of all Americans live in non-rural areas that are serviced by a metropolitan center.<sup>10</sup> Although rural areas are not growing as rapidly as metropolitan areas, positive growth represents a shift from the 1980s when the average American rural area experienced population decline. This growth echoes similar trends in the 1970s when rural areas faced an increase in their populations and the amount of services demanded.<sup>10, 9</sup> Recent migration to rural areas is a result of several factors: a shift in land use, improved options for working from a computer home, a growing appreciation for the values and morals perceived to be common in rural areas, and rising prices in city and suburban real estate.

Nationally, regions experiencing the rural rebound have witnessed the conversion of agricultural land to full time or seasonal residences. Encouraged by rising real estate values, many rural landowners sell and develop their land for far higher returns than can be obtained by agricultural use. In contrast, land ownership and use changes in rural Maine have been characterized not by a shift from agriculture to residential use, but by a shift in timberland ownership. The Plum Creek Company, one of the larger landowners in the state of Maine, provides an example of that trend in Maine. Although the company was previously focused on the harvest of timber, the appreciation of land values has encouraged a re-examination of their holdings and, in western states, has prompted the sale of their land for development. Thus, it is possible that Maine's

future land use changes will be characterized by a shift from timber use to development.

In addition to land use changes, the rise of computer-based information sharing is cited as a second factor in the rural rebound. Such technology has enabled many Americans to live outside of urban areas and “telecommute”, or work from home. It is responsible for some of the population shift to rural areas and the ability for residents to continue to live in non-metropolitan areas despite economic changes.<sup>19</sup> Telecommuting is a new phenomenon that was not present during the last national rural population gains of the 1970s. Today, some rural communities view telecommuters as particular assets and try to attract them in part because they do not depend on local industries and can provide a buffer in times of economic downturns. Individuals who are able to work from home in industries unrelated to the local economy can play important roles in non-urban areas that faced economic downturns in the 1980s. These residents bring with them an income that translates into local spending and tax revenues. Many rural areas feel that opportunities to telecommute make rural lifestyles more accessible to urban migrants. Generally, rural areas that are within several hours driving distance of a metropolitan area and are serviceable by an airport are most attractive to telecommuters.

One challenge for rural communities hoping to attract telecommuters is the development of necessary technological infrastructure.<sup>15</sup> Rural areas may be encumbered by their distance from communications headquarters and often face more expensive rates for phone, internet, and cable television service and poor reception on cellular networks.<sup>20</sup> Moreover, mergers between large telecommunications firms threaten to slow the development of sufficient infrastructure in rural areas. The Telecommunications Act of 1996 was developed to address these issues in both rural and urban areas and encourage industry competition and lower rates. This Act minimizes federal regulation to promote market deployment of higher quality service.<sup>21, 22</sup> Unfortunately, the Act may engender negative long-term consequences for rural areas. Because rural areas lack the buying power of urban centers, telecommunication companies have little incentive to deploy the best and most expensive infrastructure in these locations. Reduced federal regulation may be appropriate for metropolitan areas, but is expected to have detrimental effects on rural areas trying to develop infrastructure and attract telecommuters. Subsequent legislation is likely to face more pressure for telecommunications laws that consider the unique needs of rural America.

In the Maine’s North Woods, telecommuters may form a portion of a demographic from which rural communities in need to more residents could benefit. Communities in this region may choose to follow the example of other rural communities and market themselves as desirable locations for individuals who are able to work from home.

The idealization of rural life and values has been cited as a third driving force behind the attractiveness of exurban migration.<sup>23</sup> In American literature and popular culture, rural areas are generally portrayed as locations that are isolated from the domestic and social stresses of urban life. Although it is

impossible to fully assess the impact of positive notions of rural life on the ability for such areas to attract and retain residents, studies indicate that anecdotal evidence shows a strong link. Particularly, families with children cite rural values, morals, and ways of life as important factors in their decision to move to or continue living in rural areas. In Maine's North Woods, the idealization of rural life combined with the scenic beauty of the region may be a catalyst for attracting both year round and seasonal residents.

Over the last decade, property values in urban areas have increased at higher rates than values in rural areas. This trend is a fourth driver in the increased number of individuals moving to rural areas. Because of the extent of relatively inexpensive land in Maine, it is possible that rural communities in and surrounding the Maine's North Woods have not experienced the same influx of residents due to urban real estate prices.

## ***Conclusions***

Maine's North Woods is characterized by low population density and limited access to urban service centers. The rural character of this area presents opportunities for a high standard of living in a place of natural beauty. However, the potential shift away from natural resource based industries, particularly timber, will be accompanied by a change in the individuals who make their living in this rural area. The demographics of Maine's North Woods and surrounding areas can be expected to correlate strongly with land use decisions made in the next decade. Lessons learned from areas of high rural population growth in other parts of the United States can help Northern Maine develop programs to attract and retain the residents that would be best suited for life in Maine's rural communities. Ensuring access to natural amenities may help rural Maine attract new residents, but these individuals are likely to have values that differ from those of current residents

The need to maintain population levels that support schools, hospitals, and public services is crucial to rural Maine. Any changes in population will influence the type and nature of local social services and environmental health.<sup>11</sup>  
<sup>24</sup> Understanding potential population changes and their implications associated with various land use options will help inform the assessment of any proposal for Maine's North Woods. The land use decisions for this area will carry profound implications for future demographic trends across the state.

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# **Sprawl and the Future of Maine's North Woods**

Nathaniel H. Dick

## ***Introduction***

A growing concern that challenges the character of the American landscape is sprawl. Sprawl, or dispersed, auto-dependent development outside of compact urban and village centers, along highways, and in rural countryside, has the potential to permanently change the landscape of the United States.<sup>1</sup> Between 1994 and 2002 real estate developers constructed approximately 1.5 million new units of housing each year, a majority of them being suburban single family homes.<sup>2</sup> The expansion and migration of the public from urban centers to rural communities has focused attention on the challenge of managing and controlling this sprawl. Out of the entire 225 year history of the United States, in the last 15 years a quarter of the nation's available land has been developed.<sup>1</sup> Communities once densely assembled around the amenities of a typical town or city have transformed into communities that now stretch far from the centers of commerce.

The problem of sprawl is an increasing concern for Maine also. Over the last thirty years the fastest growing Maine towns have been "new suburbs" situated 10-25 miles from metropolitan areas.<sup>3</sup> In 1990 to 1991 local governments in Maine spent \$800 million more from 1980-1981 in order to service widely dispersed households, an increase of 60% or \$1,700 per household.<sup>3</sup> On a per unit basis, costs are much higher to service homes spread across the land than costs to service traditional, densely settled neighborhoods.

During the 1980's the population of Maine increased by less than 10%, but the vehicle miles driven increased by 57% or 40 million miles per year.<sup>3</sup> The stress placed on the Maine Department of Transportation (MEDOT) to maintain new and old roads has increased to a level that requires higher taxes on the public. From 1987-1994 Maine municipalities were developing new roads at a rate of 100 miles per year to accommodate the spread of communities across the state.<sup>3</sup>

Similarly, there is a greater need for protection and police coverage for the larger more dispersed communities. From 1980-1993 the crime rate dropped by 17%, yet during the same time period the number of police officers increased by 10%.<sup>3</sup> This expansion correlates to the spread of people to rural areas. The price of one patrol, a combination of a cruiser and four officers, costs taxpayers on average \$175,000 per year.<sup>3</sup>

The Maine taxpayer is charged for redundant infrastructure costs for the construction and renovations of schools associated with sprawl. Despite a decrease of 27,000 in enrollment in Maine's primary and secondary schools enrollment from 1970-1995, \$727 million were collected from taxpayers for new school construction during 1975-1995.<sup>3</sup> Almost half the money was used to build new school capacity in fast-growth regions, while schools in denser populated regions are under-used and still in need of money for renovations. Busing costs

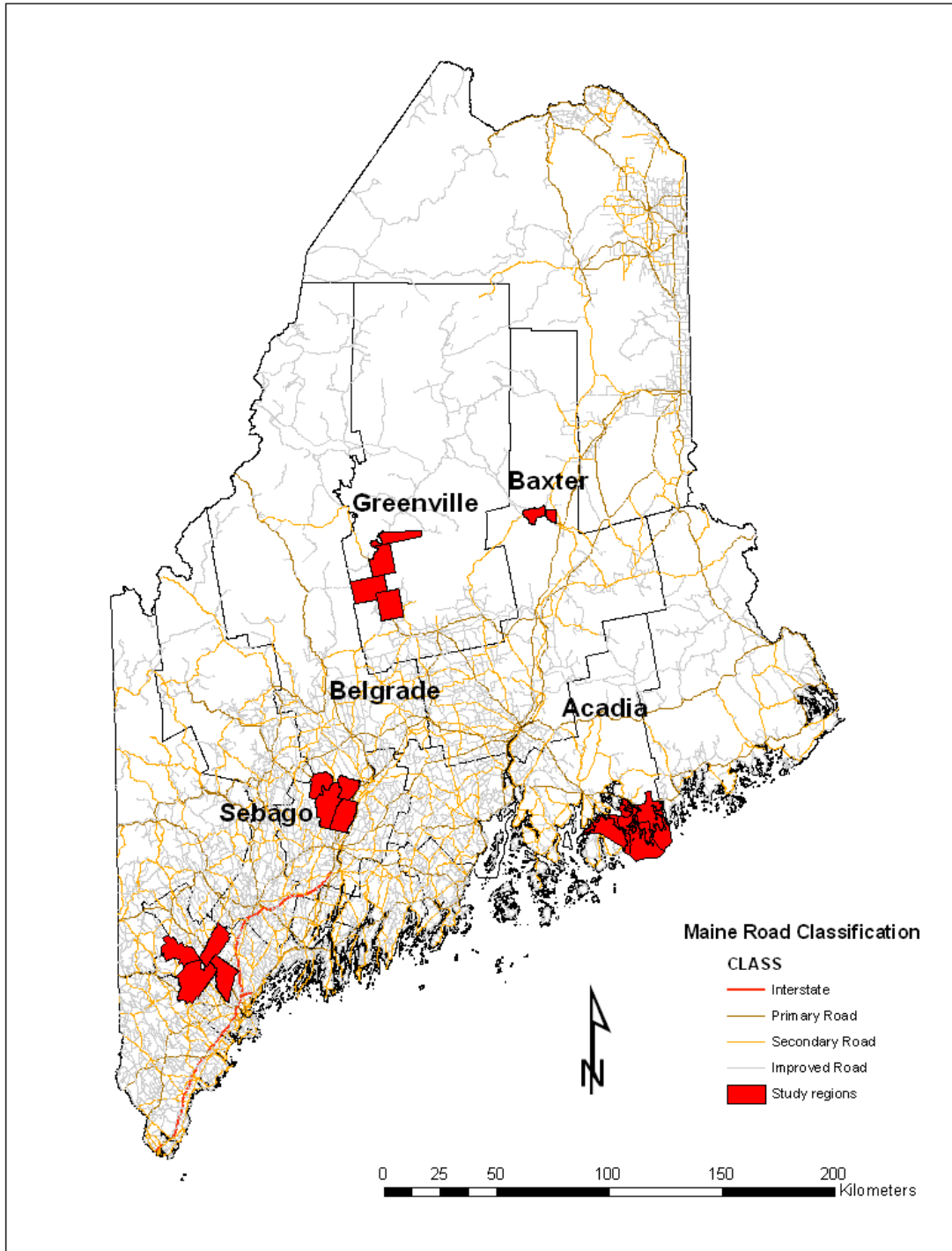
have risen from \$8.7 million in 1970 to a staggering \$54 million in equivalent dollars even though the enrollment has decreased.<sup>3</sup>

The implications for sprawl are not easily quantifiable, but most of the effects of sprawl are easily observed. Sprawl creates segregated communities, degrades landscapes, pollutes air and water, increases taxes and diminishes economic productivity.<sup>4</sup> Sprawl requires lengthening of service routes for police, fire, emergency, road maintenance, and plowing. Also, sprawl neglects older cities and town centers, leaving them with declining populations and unused infrastructure.

Sprawl also drives the need for car use, which increases air pollution and obesity. People in sprawling communities are more likely to be trapped in traffic and suffer diminished productivity. Real estate analysts in the United States have noted that denser cities that boast car alternatives, primarily public transportation infrastructure, have seen better returns on investments in recent years than sprawling suburban agglomeration.<sup>4</sup>

Not only are the effects of sprawl anthropocentric, or seen or felt by the human population, they also stretch into the ecological realm. Over the last decade, according to the United States Department of Agriculture (USDA), Americans have converted open space to developed land at a rate of 2.2 million acres per year or 252 acres per hour.<sup>5</sup> Increased population creates the need for more infrastructure, which in turn detrimentally affects ecosystems. The increase of impervious surfaces such as roads, parking lots, and buildings, enhances the rate of surface runoff and erosion, which compromises the integrity of habitats and ecosystems.<sup>5</sup>

My research focuses on the issue of sprawl in Maine and the potential implications it has for Maine's North Woods. To determine the potential effects of sprawl on undeveloped portions of Maine, I carried out an analysis comparing fast-growth and slow-growth communities. The analysis focused on the transitions the communities have made over a 20 year period from 1980-2000. I compared five regions to explore similarities, differences, drivers, and effects of different growth patterns. The five primary areas used in the study include Acadia, Baxter, Belgrade, Greenville, and Sebago (Figure 1). The primary indicators of sprawl I used in my analysis measure compactness (density) and connectivity (accessibility of one place to another) for each region. I then use these criteria to assess the vulnerability of the study regions, in particular, and the Maine North Woods, in general, to sprawl.



**Figure 6: Study regions and class 2-4 roads in Maine based on data from the Maine Office of Geographic Information Systems (MEGIS) from the years 1984-1986<sup>6</sup>**

## **Context**

The search for more natural amenities such as pure air and pure water, along with employment opportunities has brought many people from clustered, noisy urban centers to Maine.<sup>7</sup> The promise of lower prices, cheaper lands, lower taxes, and privacy along with powerful government subsidies on mortgages entices young couples and retired workers alike to come to Maine.

The search for the “triple dream” of house, land, and community, is a realization that drives the public to keep expanding out onto the fringes of towns and villages across the state.<sup>2</sup> The truth behind the “triple dream” is that, over time, expenses increase with distance from community centers rather than decrease.

The Augusta metropolitan area is representative of sprawl in Maine. A couple deciding between purchasing a home in Augusta or Windsor must consider real estate expenses. In 1997 property taxes were \$600 more in Augusta versus a comparable home in Windsor.<sup>3</sup> Most likely the choice of a private and secluded home in Windsor, which is situated in a rural setting, will be favored by the couple. The trouble with purchasing a home in Windsor is that costs to service a home in a rural setting increase property taxes, similarly raising transportation costs for the family. Eventually the rising property taxes and transportation costs more than offset the initial savings the couple received.

## **Methods**

### **Case Selections**

I selected five regions to represent areas with and without sprawl, areas near protected areas, and regions with lakes. I defined the Acadia region as the towns of Bar Harbor, Gouldsboro, Sorrento, and Winter Harbor, which are adjacent to Acadia National Park. I selected this area to provide perspective into the formation and development of towns around Maine’s only national park. The Acadia region is a very popular area in Maine because of the attractions provided by the park and the implications for growth in this region are substantial.

I define the second region, Baxter as the two towns in Penobscot county, East Millinocket and Millinocket. I selected this area because these communities are situated in close proximity to Baxter State Park, Maine’s largest and most popular state park.

The Belgrade region in Kennebec County includes the towns of Belgrade, Rome, Oakland, and Sidney. I selected this region to incorporate perspective from a fast-growth community. The potential for growth in the Belgrade region is high because it is situated near a regional service center, Waterville, and provides recreational opportunities and real estate for people in search of summer or year round homes.

I defined the Greenville region of northern Maine to include Beaver Cove, Greenville, Munson, and Shirley all in Piscataquis County. The Greenville region, much like the Belgrade region, has implications for growth because of the recreational attractions, including Moosehead Lake and Lily Bay State Park. The

growth of this community has been relatively calm in past years, but interest has blossomed recently with the proposal by Plum Creek Timber Company to develop over nine-hundred lots, along with a number of sporting camps around Moosehead Lake.<sup>8</sup>

The final region I selected was the Sebago Lake region, including the towns of Raymond, Sebago, Standish and Windham. I chose this region to examine community that is situated around a recreational haven, much like Belgrade and Greenville that has experienced a large amount of growth, in the past and is today heavily developed.

## Indicators

The indicators of sprawl that I use in this analysis include compactness (density), represented by total population, population density, number of housing units, and housing density; and indicators of connectivity (accessibility of one place to another), represented by road length, road density, kilometers of road per person, and average commute time (Table 1). I analyzed each indicator based on available data for the years 1980 to 2000 and assess the growth trends for the period in each region. The indicators are based on population and housing data from the U. S. Census Bureau for the years 1980, 1990, and 2000.<sup>9,10</sup> Similarly, transportation data was analyzed from the Maine Office of Geographic Information Systems (MEGIS) from the years 1984-1986.<sup>6</sup>

**Table 3. Definition of indicators used in analysis of five study regions**

Indicator	Definition
Population	Sum of people
Population Density	Sum of people divided by square kilometers of land area
Housing Units	Sum of housing units
Housing Density	Sum of housing units divided by square kilometers of land area
Road Length	Sum of roads in kilometers
Road Density	Sum of roads divided by square kilometers of land area
Km.Roads/Person	Sum of roads in kilometers divided by sum of people
Average Commute Time	Average commute time to work in minutes

## Data Analysis

To tabulate road data I downloaded transportation data from MEGIS 1984-1986 based on Maine roads.<sup>6</sup> In ArcGIS I calculated the total road lengths and road types for each of the five regions. For calculating road densities I divided the total sum of roads in the region and the total sum of class 2-4 roads in each of the five regions by total land area to produce two road densities.

## Results

### Compactness

In three of the five regions population density increased, while two regions, Baxter and Greenville decreased. The largest change in population density occurred in Sebago, which increased 47.7% from 1980-2000, while Belgrade increased 31.5% and Acadia increased 6.9%. Baxter decreased 27.8% and Greenville decreased 12.5%.

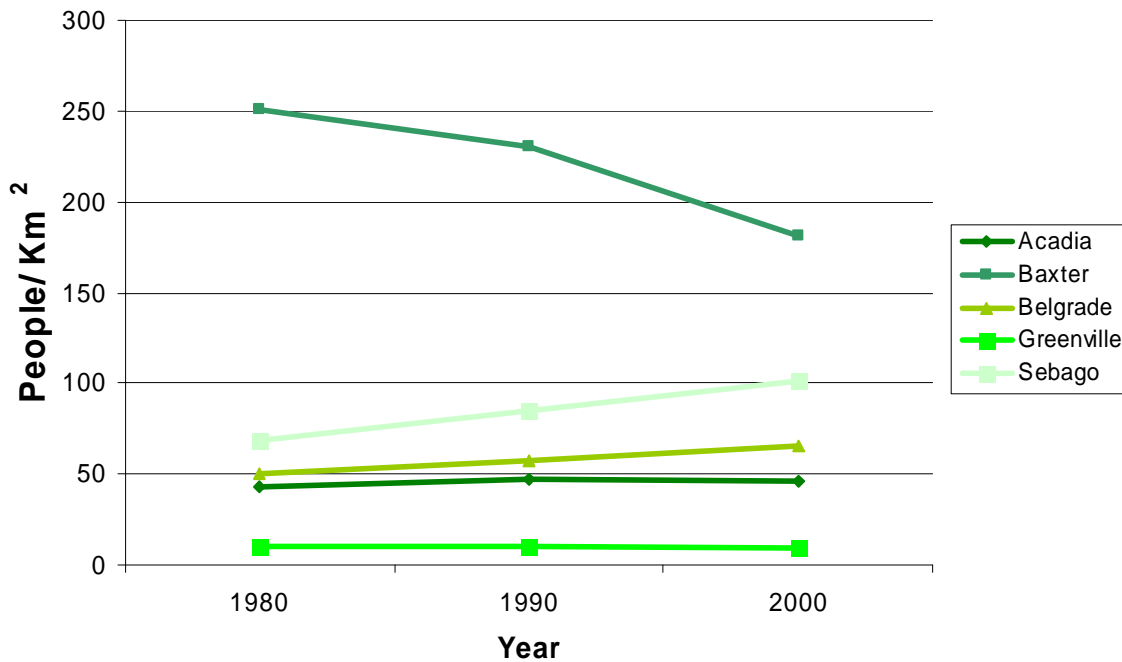
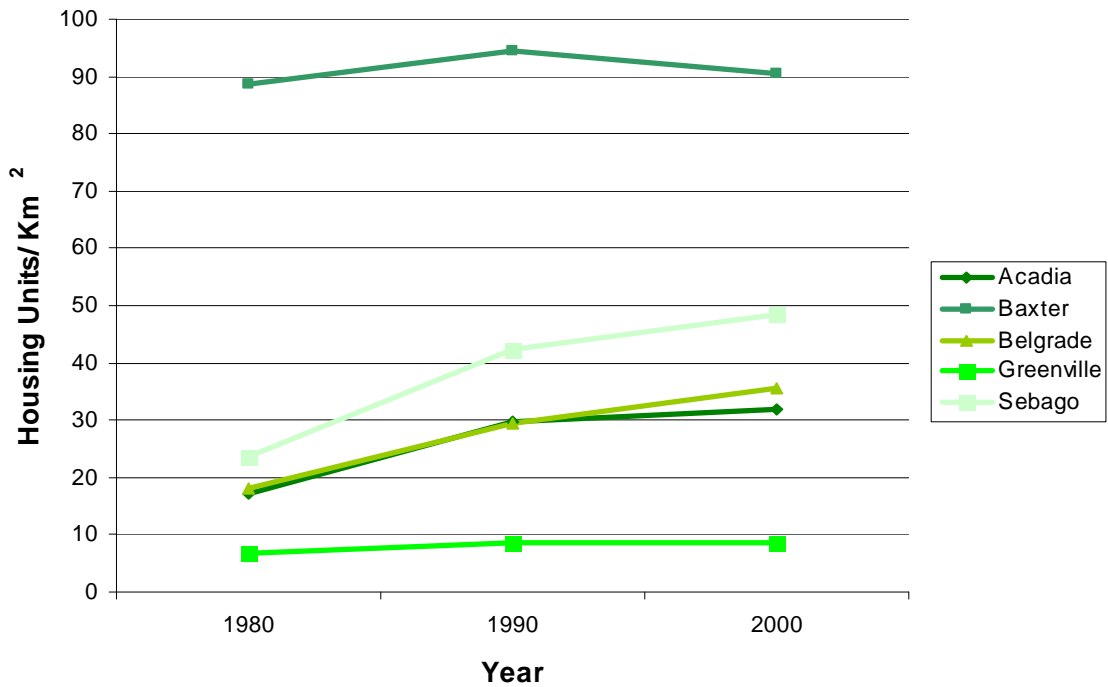


Figure 7: Average population density for each of the five study regions. Population data and area are derived from the US Census Bureau<sup>9,10</sup>

In terms of sprawl in urban areas, higher densities are positive changes because they encourage smaller lot sizes and efficiently utilize current infrastructure. In rural areas, however, population density can reflect expanding suburbanization. For the sake of this study high population densities and housing densities will be considered indicators of growth and potential signalers of sprawl. The Sebago, Acadia, and Belgrade regions all exhibit sprawling tendencies, while the Baxter and Greenville regions do not.

The number of housing units in each town for the five regions was compiled as well. The housing trends, excluding Baxter, show trends similar to changes in population density, but show an overall increase in housing density in each region from 1980-2000. The region with the largest percent increase in housing density is Sebago (104.2%), while both Belgrade (97.2%) and Acadia (86%) made substantial increases. The Greenville and Baxter regions increased only slightly, 28.8% and 2.3% respectively.



**Figure 8: Average number of housing units per square kilometer or each of the five study regions. Population data and are from the US Census Bureau<sup>9, 10</sup>**

## Connectivity

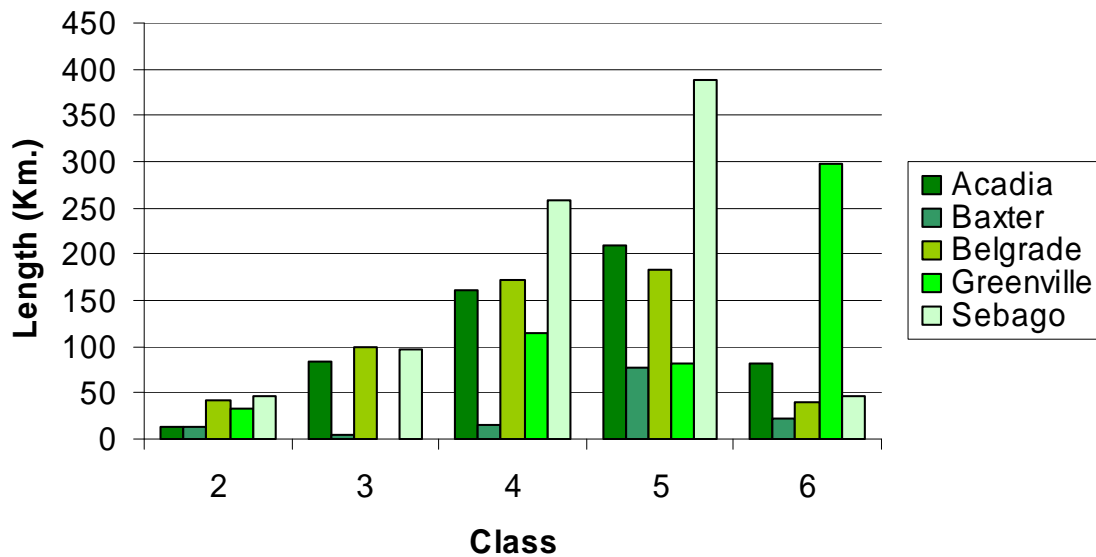
To analyze the connectivity of the different regions, I examine road length, road density, types of roads, kilometers of roads per person, and average commute time to work in each of the five regions. The road types are categorized by class in Table 2. I first look at the road length in each region per class. To account for the different size of each region, I converted road length to road density (Figure 4). Consequently, I analyzed the road densities for all roads and for only roads class 2-4, the primary road types (Figure 5). There were no roads classified as “interstate” or “footbridge” in my study area.

**Table 4. Road classes as categorized by MEGIS from 1984-1986<sup>6</sup>**

<b>Class</b>	<b>Definition</b>
1	Interstate
2	Primary Road
3	Secondary Road
4	Improved Road
5	Unimproved Road
6	Trail
7	Footbridge

Road densities are good indicators of sprawl because connectivity is a primary issue related to sprawl. The more populations migrate to rural areas the more infrastructure is required to facilitate transportation between homes and services. Higher road densities reflect a well-organized, accessible community. For the sake of this study, I consider higher road densities to reflect greater sprawl.

The results of the road density analysis suggests that the Baxter region has both the highest total road density, 4.8 kilometers of road per square kilometer, and class 2-4 road density, 8.5 kilometers of road per square kilometer. The Sebago region is the second highest, barely higher than the Acadia region, while the Belgrade region has the fourth highest density followed by the Greenville region.



**Figure 4: Length of roads by all classes for each of the five study regions based upon transportation data collected from MEGIS from 1984-1986<sup>6</sup>**

To devise a means of road length per person, I divided the total length of roads by the total population for each region. The result was a measurement of kilometers per person for each region. Population data was found from the census surveys of 1980, 1990, and 2000, while the road length data was taken from the period of 1984-1986.<sup>6, 9, 10</sup> Therefore the kilometers of road per person analysis uses only road length data from one period versus population data from three different periods (Figure 6). The accuracy of this comparison is therefore limited. Nevertheless, this measure does provide a reasonable comparison across regions.

Similarly, data providing road length does not account for all infrastructure related to roads. Particularly, other impervious surfaces that are associated with roads include parking lots, driveways, and other parking spaces, are not accounted for in this data set.

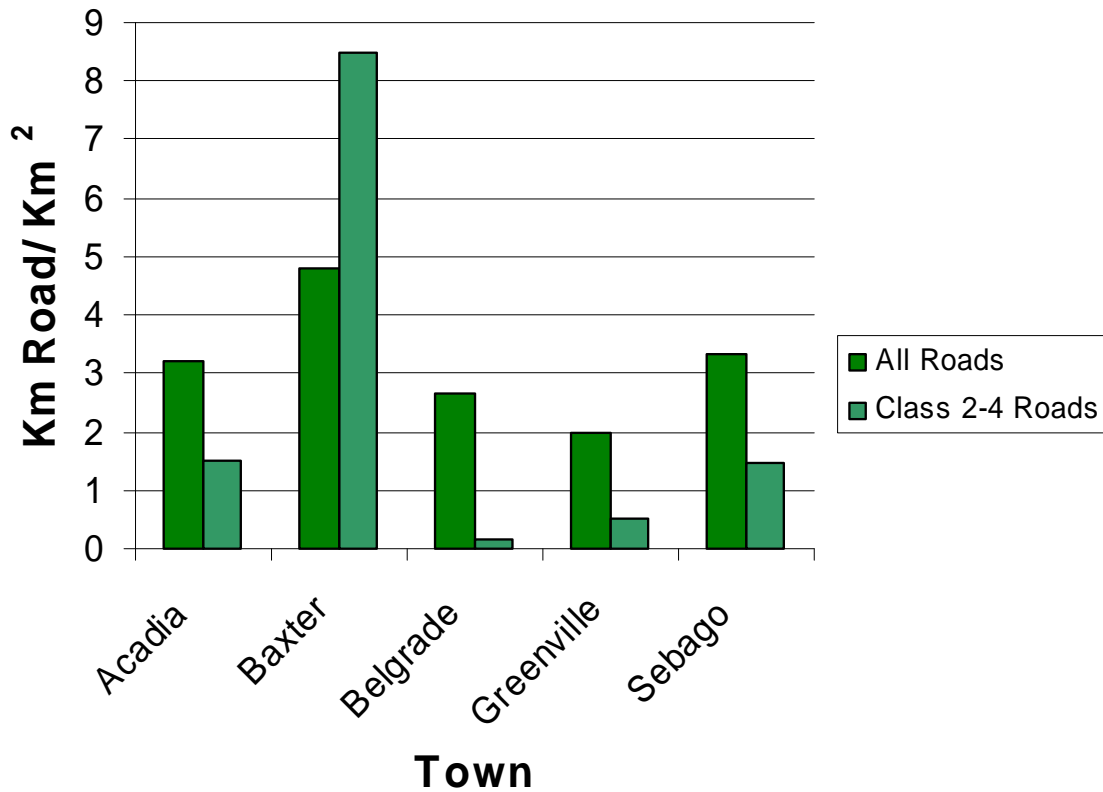


Figure 5: Road densities in the five regions for all roads and class 2-4 roads based on data from MEGIS 1984-1986<sup>6</sup>

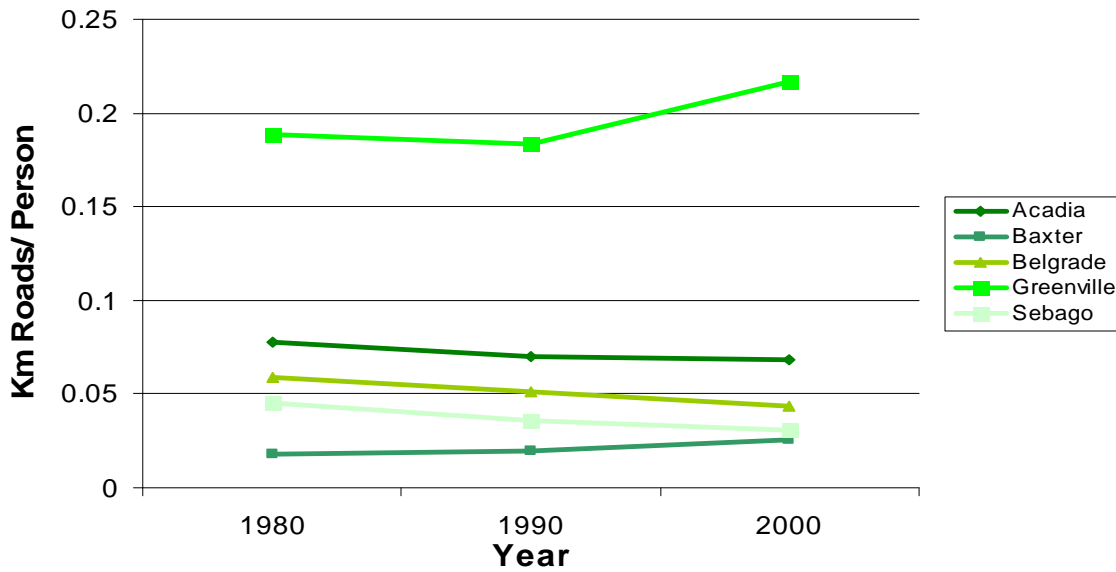


Figure 6: Kilometers of road per person in the five regions of study based upon transportation and population data collected from both the MEGIS from 1984-1986 and the US Census Bureau from 1980, 1990, and 2000, respectively<sup>6, 9, 10</sup>

The final compilation of data for comparing connectivity of each region was the average commute time to work (Figure 7). Data for this comparison was taken from the 2000 US Census from each town within the five regions of study.<sup>10</sup>

The results of the average commute data reveal that the Sebago region (31.2 minutes) and the Belgrade region (27.2 minutes) have the longest average commutes to work. This suggests that both communities are not in close proximity to their centers of commerce and the primary employment opportunities for their population. Furthermore, both average commute times in these regions are above the national average of 25.5 minutes. The Acadia region has an average of 20.5 minutes to commute to work, while the Greenville region has an average time of 19.9 minutes. The Baxter region has the shortest average commute to work at only 13.4 minutes.

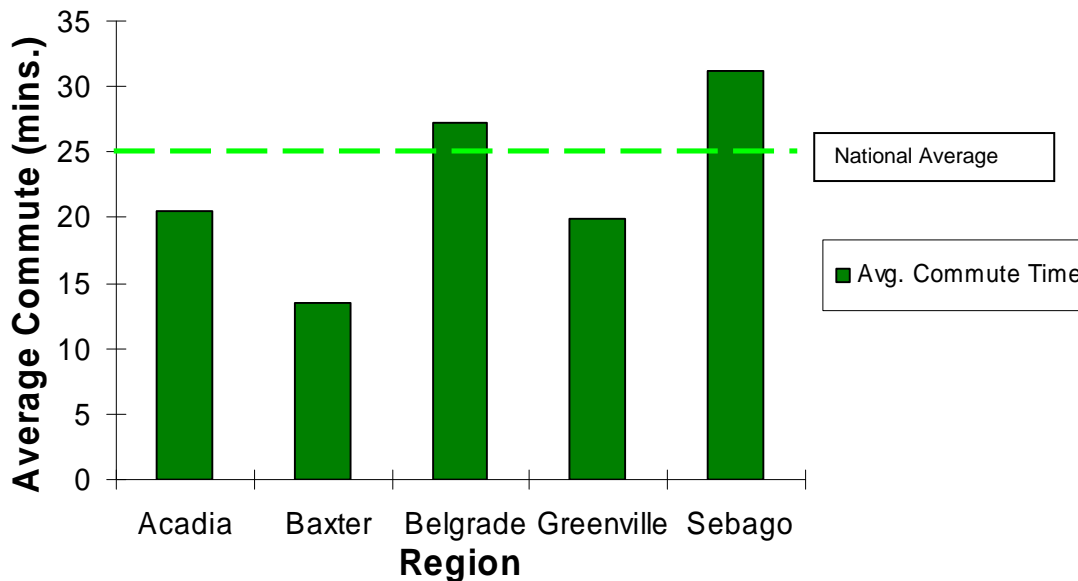


Figure 7: Average commute time to work in the five regions based on US Census Bureau data from Census 2000<sup>10</sup>

Commute time to work was a category in the United States census that was recently added. The 1980 and 1990 Census Surveys did not include this data as part of their survey. No comparison can be made between the three time periods regarding this category.

### ***Relative Sprawl Comparisons***

To produce a relative sprawl index, I devised a five point scale to rank the categories where one represents the best or least sprawling and five the worst or most sprawling. I was unable to determine the percent change in road length, kilometers of road per person, road density of all roads, and road density of class 2-4 roads because of a lack of data available to allow comparison of these categories. The index is a sum of the rank of five different indicators: population

density, housing density, road density of all roads, road density of class 2-4 roads, and average commute time (Table 3).

**Table 5. Five variables used to calculate the sprawl indicators and rankings. Rankings for each variable, indicated in parentheses, are based on a scale from 1-5 with 5 the best or least sprawling and 1 the worst or most sprawling.**

Region	Population Density (%Δ)	Housing Density (%Δ)	Road Density (total)	Road Density (class 2-4)	Avg. Commute Time	Sprawl Indicator	Sprawl Rank
Sebago	47.7 (5)	104.2 (5)	3.3 (4)	1.45 (3)	31.2 (5)	.88	#1
Acadia	6.9 (3)	86 (3)	3.2 (3)	1.49 (4)	20.5 (3)	.68	#2
Belgrade	31.5 (4)	97.2 (4)	2.7 (2)	0.15 (1)	27.2 (4)	.60	#3
Baxter	27.8 (1)	2.3 (1)	4.8 (5)	8.5 (5)	13.4 (1)	.56	#4
Greenville	12.5 (2)	28.8 (2)	2 (1)	0.52 (2)	19.9 (2)	.36	#5

Sebago was clearly the most sprawling region. Population and housing densities had the largest percent changes over the span of twenty years than any other region studied in Maine. The average commute time to work also suggests that more families in this region are traveling to work from rural homes or areas distant from regional service centers or centers of commerce. Road density was second behind the Baxter region, while road density of class 2-4 roads was third behind the Baxter and Acadia regions.

Surprisingly, the Acadia region was the second most sprawling region studied. Despite the Belgrade region's higher percent change in both population density and housing density, the Acadia region had higher road densities, 3.2 km of road per square kilometer in total road density, and 1.5 km of road per square kilometer in class 2-4 roads. The average commute time to work for the Acadia region was just about a half minute longer than the Belgrade region at 20.5 minutes on average.

The Belgrade region was the third most sprawling region. The Belgrade region had significant growth in population and housing densities, a 31.5 percent increase and a 97.2 percent increase from 1980-2000 respectively. The Belgrade region is very interesting because there has been so much growth, yet the road densities are relatively low at 2.7 kilometers of road per square kilometer in total road density and .15 kilometers of road per square kilometer in class 2-4 road density. The study indicates at this point that road densities have correlated to growth in population density and housing density for the Sebago region and Acadia region. This suggests either that the Belgrade region has utilized current infrastructure and roads, planned their growth, or it may be that the Belgrade region has added much more infrastructure and the data in this study is outdated.

The Baxter region experienced the largest percent decrease in population in the study, (27.8%). Furthermore, this region experienced the smallest percent increase in housing density, an increase of 2.3%. Both road density of total roads and road density of roads class 2-4 were the highest in the study, yet the average commute time in 2000 was only 13.4 minutes. The Baxter region is a

contradiction. Despite having the highest road densities, the region has the highest rate of decrease in population density and smallest rate of increase in housing density. The Baxter region was a thriving community during the time when Great Northern Paper Company owned and operated their paper mill in Millinocket.<sup>11</sup> The mill had been declining since the late eighties and the company filed for bankruptcy in 2002 then sold and opened as the Katahdin Paper Company. The close of the mill may explain the density decrease along with the small increase in housing density. Similarly, the high road densities suggest that infrastructure was built around the mill and was not needed to access other regions, since the mill was the heart of the community. The average commute time suggests that there was not a great need to travel outside the community since the mill was the center of commerce. As a consequence, the second least sprawling region studied was the Baxter region

Finally, the least sprawling region studied was the Greenville region. This region has the second least percent decrease in population density, 12.5%, also the second smallest percent change increase in housing density, 28.8%. The road density for total roads was the least in the study, while the road density for roads class 2-4 was the second least. The average commute time for the Greenville region was 19.9 minutes, roughly a six minute longer commute than the Baxter region, which had the shortest commute time.

## ***Conclusions***

The results of my analysis suggest that southern and coastal regions of Maine are currently experiencing the fastest growth rates. The areas of fast growth in my study, Sebago, Acadia, and Belgrade, share similar recreational opportunities and are all situated around regional service centers. Greenville, a gateway community to Maine's North Woods, also shares similarities to these fast growth communities through the recreational opportunities they provide. Based on my research Greenville also currently has low population density, low housing density, low road density, and a low sprawl index. As a result the area is very likely to present a growth opportunity in the future based on the results collected from other popular lake regions, like Sebago and Belgrade. In order to maintain the current character of Maine's North Woods growth controls must be implemented.

Some "smart growth" alternatives that could help sustain the character of Maine's rural northern communities should focus on encouraging growth towards established communities, increasing development density, and orienting development around transit.<sup>12</sup> Building upon towns and cities already in place limits expansion outward and decreases costs for infrastructure renovation. Similarly, other "smart growth" tools that should be considered include residential development caps, litigation, and impact fees.<sup>13</sup>

By setting a development cap, a limit is placed on the rate of growth an area can achieve. Development caps can be instituted by local governments and can have the potential to give voters the authorization to approve development permits. In 1999, more than 240 jurisdictions nationwide considered antisprawl

initiatives.<sup>12</sup> For example, Petaluma, California, limits the number of new residential unit approvals by the city council to no more than 1,500 in any consecutive three-year period, or an average of 500 per year.<sup>12</sup>

Litigation, similarly, is considered a “smart growth” tool. People that are disapproving of new development and suffer intangible costs still have the liberty to question the law. For example, towns neighboring Shelbourne, Vermont, sued Shelbourne, saying that they would suffer the costs of a new subdivision that was authorized for construction by the city.<sup>12</sup>

Another “smart growth” tool that has been effective in Cook County, Illinois is an impact fee. Impact fees are charges that are given to a developer by a municipality or other government unit to compensate the municipality for infrastructure alterations made as a result of new development.<sup>13</sup> The use of impact fees shifts the burden of paying for new infrastructure fees to the developer instead of the local government assuming costs.

By utilizing these “smart growth” tools, there is a hope for low-density sprawl to be avoided in the future, while preserving the character of Maine’s North Woods at the same time.

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# Wildlife Conservation and the Maine North Woods

Caitlin M. Cleaver

## *Introduction*

Loss and degradation of habitat are principal causes leading to species endangerment and extinction.<sup>1</sup> Large tracts of land are needed particularly to maintain viable populations of large carnivores.<sup>2</sup> This conflict between wildlife conservation and land use practices has a number of implications for land resource policy. In the United States, legislation is in place to protect populations and habitats of certain species; however, this legislation frequently only protects those populations that are in critical need of attention.<sup>1</sup> Economic interest often supercedes habitat protection.<sup>2</sup> This holds true because many people believe that conservation efforts will interfere with and diminish economic activities and result in significant costs through loss of jobs and income.<sup>2</sup> This mindset and increasing development remains an obstacle to conserving large tracts of land that would best maintain viable populations of large mammals and top predators.<sup>2</sup> In Maine, wildlife contributes to the economy through wildlife-related recreation such as hunting, fishing, trapping, and viewing.<sup>3</sup> Thus wildlife should be valued and protected for its economic contributions, but also its scientific, educational, aesthetic, and intrinsic values.<sup>3</sup>

Maine's unique habitat supports high diversity of wildlife. Conservation is needed to preserve wildlife and reduce the negative impacts humans can have on species.<sup>3</sup> Currently only 15% of Maine is considered conservation land, including land under "working forest" conservation easements, multiple use public lands, private conservation lands, state Ecological Reserves, and others.<sup>3</sup> Fifty-five percent of the land in Maine is privately owned and is regulated by the Land Use Regulation Commission (LURC).<sup>4</sup> Because of private ownership, no large scale conservation areas aside from Baxter State Park exist. Acadia National Park and other small state parks are not large enough to support large, wide-ranging mammals.<sup>5</sup> However, Maine has the potential to support wide-ranging wildlife like the wolf as well as other species in need of large habitats due to a low population density and little development in the northern region. These species may not be able to persist without adequate habitat protection.<sup>5</sup> Approximately one percent of the land in Maine is federally owned; the potential for a national park to be implemented is limited.<sup>3</sup> Ninety percent of Maine is rural and not highly populated, the implications of sprawl may limit the amount of quality habitat that is potentially available for future conservation.<sup>3</sup> The state will need to integrate landscape conservation into its agenda due to the lack of federal jurisdiction combined with the opportunity to set aside vast lands in the North Maine Woods.

In this paper, I begin by describing the context of wildlife conservation by reviewing the history of land use, attitudes towards large mammals, and the federal and state legislation in place for the protection of wildlife. I then examine the ecological context of human threats to wildlife. I look at the reintroduction and

expansion of wolf populations as a case study for an example of the need for large landscape conservation efforts which can be applied to the vast Maine North Woods. I then use GIS maps to assess the possibility of wolves recolonizing Maine. I conclude with recommendations for wildlife conservation in Maine.

## **Methods**

I collected information from journal articles concerning large carnivore conservation, wolf reintroduction, and habitat fragmentation; and visited websites for federal and state government agencies that work with habitat and species protection, such as the US Fish and Wildlife Service and Maine Department of Inland Fisheries and Wildlife.

To analyze the potential for large land area conservation in Maine, I created GIS maps showing road density in mostly northern Land-Use Regulation Commission (LURC) areas versus mostly southern Non- LURC areas. Data were downloaded from the Maine Office of GIS. Arc9 was used to calculate road lengths, area of designated lands, and road densities, which were calculated for LURC, Non-LURC, the proposed Maine Woods National Park boundary, and the Plum Creek proposed development area boundary in order to assess the possibility of these areas supporting large mammals.

## **Context**

### **Historical**

During the period of western expansion in the late 1800s in the US, the federal government did not have policies to protect large tracts of land. Federal policy suggested efforts to settle wilderness areas and to exploit the resources these areas had to offer.<sup>6</sup> This period of expansion was a time when the federal government wanted to promote development of newly explored lands by shifting ownership of public lands and resources into private hands.<sup>7</sup> Natural resources were seen as a way to gain wealth.<sup>7</sup> These federal policies of privatization exhibited using land for economic gain and efficiency while ignoring the ecological and intrinsic values of publicly owned land.

Changing notions of public ownership over natural resources came to the forefront in the 19<sup>th</sup> century. This shift was partially due to the evidence that natural resources were being rapidly depleted; wildlife populations were not what they once were.<sup>7</sup> As a conservation ethic began to emerge, land policies addressed ecological values and concerns for recreation and wildlife.<sup>7</sup> In 1964, Congress showed support for the preservationist ideas and passed the Wilderness Act, which designated wilderness areas on public lands.<sup>7</sup>

The philosophy behind protecting land in the past was not necessarily for the ecological and resource benefits, but rather for factors involving “opportunity, aesthetics, local economic impacts, surrounding land uses, and political support.”

<sup>6</sup> Land is protected for reasons ranging from historical significance to biological importance.<sup>6</sup> Recently, management agencies increasingly recognize the need

to conserve biodiversity and link networks of already preserved land to ensure the survival of wildlife.<sup>7</sup>

Balancing conservation and economic objectives can be controversial and cause a lack of public support for environmental policies. Rasker and Hackman<sup>2</sup> conducted a study in Montana of the difference between the economic status of counties with protected lands and those counties dependent on resource-extraction over a three decade time period; the economic status was measured by number of jobs and income growth and diversification.<sup>2</sup> Because the extraction of resources from areas designated as national parks or wilderness is illegal, surrounding counties must survive on other economic means. In this study, counties near these natural areas have not experienced economic loss in comparison to resource extraction dependent communities.<sup>2</sup> They found counties with protected lands had higher rates of employment and higher incomes than the rest of the state and country. These findings emphasize that carnivore conservation and preservation of lands may help the economy although carnivores can still negatively affect the income of a few, specific individuals, mainly livestock owners.<sup>2</sup>

The public view of large carnivores, for example wolves and bears has paralleled the views of wilderness and was initially negative. The first European settlers saw the wolf as a dangerous animal to oneself or livestock.<sup>8</sup> Persecution of the wolf and human settlement of wild areas reflected pioneers' ability to overcome obstacles and transform the landscape into economic use.<sup>8</sup> Even President Theodore Roosevelt, a respected environmentalist, considered the wolf "the beast of waste and desolation".<sup>8</sup>

During the 20<sup>th</sup> century, ideas began to shift. The wolf and other large mammals became symbol of wilderness and of the destruction of wildlife, because of their increasing rarity as numbers dwindled.<sup>8</sup> At this point, many people support the conservation of charismatic wildlife, because of their educational, aesthetic, scientific, and ecological values.<sup>8</sup> However, others continue to believe large carnivores are a threat to their livestock.<sup>8</sup> Unfortunately, those who negatively view large carnivores often live near suitable habitat for or populations of these animals.<sup>8</sup> In particular, some rural livestock owners do not support large carnivore protection because carnivores cause economic loss when they attack livestock.<sup>9</sup>

## **Legislation**

### *Federal*

At the federal level, a species-specific approach to protection has been taken with the enactment of the Endangered Species Act (ESA).<sup>10</sup> This legislation is one of the most stringent environmental laws enacted and embraces recent reforms to natural resource conservation objectives.<sup>10</sup> The act was adopted by the federal government in 1973 and an Endangered Species Committee was created with a 1982 amendment. This committee designed a complex set of qualifications for designating the status of a species as endangered or threatened; locating critical habitat for protection; enforcing

recovery plans for each species listed; and regulating agencies' actions that affect species and their habitats.<sup>10</sup>

The Act protects only those species that are nearing extinction and require immediate attention for preservation. In order to gain listing, a species must serve as evolutionary significant units (ESU), meaning their lineage must be isolated. This excludes the protection of hybrids.<sup>1</sup> The listing of a species requires scientific and commercial data. Once a species is listed, the US Fish and Wildlife Service (USFWS) must designate critical habitat and develop a species recovery plan. The ESA requires all federal agencies to consult with the USFWS to ensure the maintenance of critical habitat; that other agencies actions will not in any harm the habitat of an enlisted species.<sup>11</sup> Furthermore, the removing of a listed species from either public or private land is illegal. Private land owners are still able to make decisions that may affect a species as long as the landowner develops an impact assessment and earns federal authorization.<sup>5</sup> Despite the ESA's lack of a landscape approach, the Act works to protect species that serve as umbrella or flagship species. A flagship species is a popular species in such as the grizzly bear. The high profile of charismatic species can be used to guarantee public support and secure funding for conservation. Umbrella species are those species that have a large habitat requirement. By protecting the habitat of an endangered, umbrella species, many other species are included within that ecosystem, thereby gaining protection.<sup>1</sup>

Problems with the ESA involve a lack of funding, insufficient data to create effective recovery programs, lack of cooperation among related agencies, delayed listing of species until populations have reached critically low levels, and inability to protect critical habitats.<sup>1</sup> Currently, 81 mammal species are listed as endangered or threatened under the federal ESA.<sup>12</sup> Many other avian, amphibian, reptilian, and fish species are listed and 1,041 of those species have approved recovery plans.<sup>12</sup> In 2002, the US Fish and Wildlife Service had to suspend the listing of some species due to a lack of funding. The Act has had success in conserving some of the nation's charismatic species such as the American bald eagle.<sup>10</sup> However, only 73 species have been "de-listed". De-listing can occur if a species goes extinct, there is a taxonomic change, or more research of the species recovers unknown populations and individuals.<sup>12</sup> As of 2002, only 12 species were de-listed as a result of taxonomic changes. Only 14 species were de-listed because the species had sufficiently recovered from declining populations.<sup>13</sup>

### *Maine*

In the US, wildlife is considered the property of the state, unless the species is protected under the Federal ESA. The state is thus responsible for maintaining species populations.<sup>11</sup> Maine's Endangered Species Act was enacted in 1975. The Act provides a mandate for the Maine Department of Inland Fisheries and Wildlife to protect all Maine species and the ecosystems in which they persist. The Federal Act evaluates the status of a species across the nation while the Maine-specific Act is concerned only with species at risk within the state. Also the Maine Act only protects animal species; endangered plant species

are covered under the Maine Natural Areas Program. As of 2003, 49 species found in Maine are listed under the Maine ESA, the federal ESA, or both (Appendix I).<sup>14</sup> Species are designated as threatened, endangered, extirpated, or special concern (Table 1).

**Table 6. Description of categories under the Maine Endangered Species Act<sup>14</sup>**

Terms for Listing	Description
Endangered	Any species of fish or wildlife determined by the commissioner of the MDofFW to be close to extinction throughout its entire or a significant portion of its home range.
Threatened	Any species of fish or wildlife determined by the commissioner to become an endangered species in the near future throughout its entire or a significant portion of its home range
Special Concern	An unofficial list and species are not protected under any legislation but includes any species of fish or wildlife that may be vulnerable to endangerment or could become threatened
Extinct	A species that has completely died out and no longer exists on Earth
Extirpated	A species that no longer exists within the state of Maine but persists elsewhere
Endemic	Native to/ only found within a certain area or region and nowhere else on Earth

Maine’s mammal species that are listed under the ESA include the larger mammals and predators (Table 2). Of the three cat species, two are listed under both the federal and state’s ESAs. Also, the gray wolf, one of the four canine species and one of the larger canine species has been extirpated. Those species that are listed, with the exception of the Northern Bog Lemming, tend to be the larger and top predator species, rather than the smaller mammals that can persist within smaller habitats.

**Table 7. Maine mammal species listed under the Federal Endangered Species Act and/or the Maine Endangered Species Act<sup>14</sup>**

Species	Federal Listing	State Listing
Northern Bog Lemming		Threatened
Gray Wolf	Endangered	Extirpated
Bobcat	Threatened	Special Concern
Puma (Eastern Cougar, Mountain Lion)	Endangered	Extirpated
Caribou	Endangered	Extirpated

In order to improve state protection of wildlife species, Congress enacted State Wildlife Grants in 2001.<sup>15</sup> The amount of funding received by each state is based upon human population as well as land area of the state.<sup>15</sup> The grant requires states to develop a comprehensive wildlife conservation strategy. Different agencies collaborate in order to formulate this plan which addresses the future conservation strategies and defines the roles of involved actors. The main focus of the plan requires protection of the species and habitats most at risk as

well as maintaining common species' populations and strengthening political actors, such as nonprofit organizations and conservation agencies.<sup>15</sup> Maine has received over \$2.5 million in grant money to put towards projects and research ensuring the survival of wildlife and the protection of important habitat.<sup>15</sup> Funded projects are researching lynx, moose, and bald eagle populations as well as developing habitat management plans for listed species throughout the state.<sup>15</sup> Another source of funding for these types of projects and others is Maine's Endangered and Non-game Wildlife Fund which was established in 1983 beginning with a check off option on state income tax forms. With revenue from taxes and limited federal funding, the Maine Endangered Species Program was started. To generate more funds, the Loon License Plate registration was started in 1994. Any funding generated from these activities plus private donations go directly to helping wildlife through research projects.<sup>14</sup> Figure 1 shows that the public initially supported funding wildlife but then the trend decreases slightly for the tax form check-off, perhaps due to the introduction of the license plate registration. The license plate registration probably slowed because the number of new cars registered decreased over time.

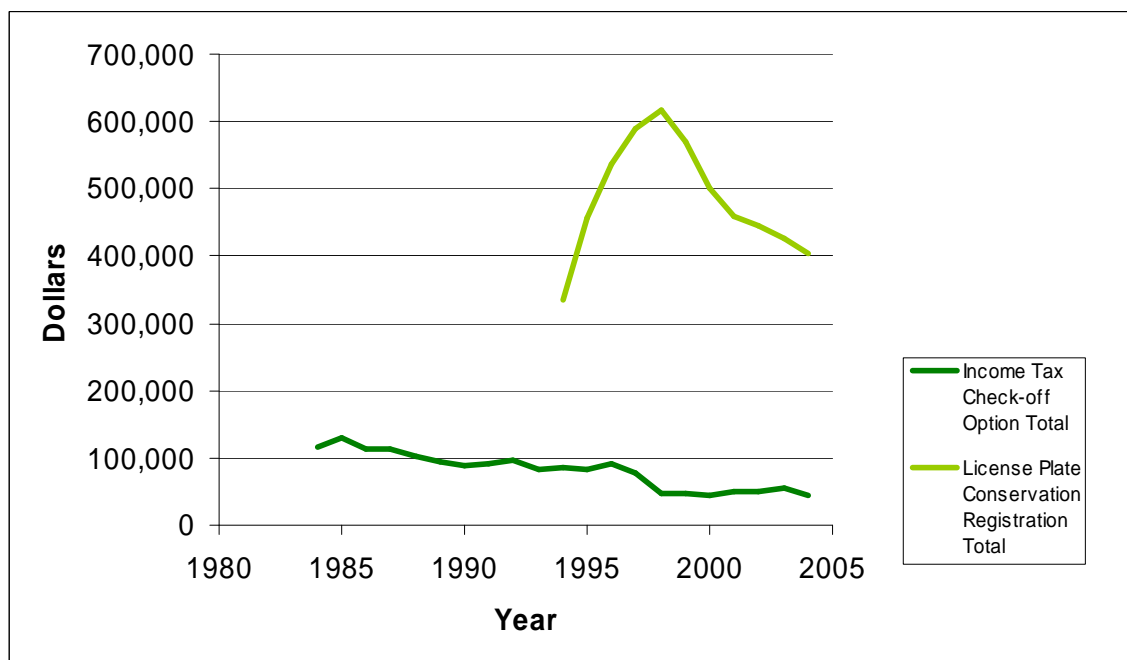


Figure 9. Funding for Maine's Endangered and Nongame Wildlife Fund<sup>14</sup>

### ***Ecological Context: Threats to Wildlife***

Habitat degradation and fragmentation are the major threats to biodiversity.<sup>16</sup> Fragmentation targets most species. Specifically, larger mammals and carnivores are negatively affected by fragmentation because they have extensive habitat requirements. In particular, the development of roads and other infrastructure has the potential to alter vegetation and soil composition, restrict wildlife movement, increase mortality by vehicle collisions, and increase edge

effect.<sup>17</sup> Edge effect is the exposure of habitat to roads or other barriers occurring when habitat is divided and fragmented, which can have a negative impact certain species.<sup>18</sup>

Roads create barriers to the dispersal of individuals within a species. Specific species are more susceptible to the barrier effect and habitat degradation. More vulnerable species include those that are long-lived, have large home ranges, low population densities, and low reproductive rates.<sup>19</sup> These characteristics typically fit large carnivores. If a population cannot disperse across roads or in the presence of roads (barrier effect), separation of individuals could potentially lead to isolated populations and eventually to genetic problems and subdivision within those populations.<sup>17</sup> Smaller populations are unstable and more susceptible to local extinction.<sup>19</sup>

Because of the general shape of roads, forest interior species are more susceptible to the impacts of roads. Roads cut directly through interior habitat creating larger tracts of edge. Increased edge can lead to easier access to the interior by humans, predators and invasive species as well as potentially increasing the spread of disease. Generally, large carnivores and ungulates (animals with hooves) avoid buffer areas around roads and the heavier the traffic volume the higher the rate of avoidance.<sup>17</sup>

Not only does the physical existence of roads pose a problem, but the volume of traffic may also negatively affect wildlife populations, in particular by increasing mortality rates from vehicle collisions of certain populations. In some cases, vehicle mortalities exceed the rate of natural death caused by disease or predation. Mammals experience the second highest mortality rate from collisions after avian species.<sup>17</sup>

Landscape connectivity is another important factor for wildlife. Individuals need to be able to roam freely through suitable habitat in order to colonize other areas or enhance the gene pool of declining isolated populations.<sup>17</sup> Roads prevent connectedness between habitats and create barriers throughout habitat matrices. Hence large roadless areas are ideal for wildlife populations.<sup>17</sup> Protected habitats within a developing landscape are often too small and usually too isolated to support large carnivores.<sup>20</sup> The theory of island biogeography, which suggests that more species will be lost from smaller, more isolated islands in comparison to larger, more connected islands.<sup>20</sup> Thus larger areas must be planned for in areas where development is fragmenting the habitat and creating patches.

Human impact goes beyond road development to include deforestation. For example, clearing or thinning of forests degrades habitat by increasing edge effect and altering the vertical stratification of the forest.<sup>16, 21</sup> Forests after a clear-cut are structurally simple and usually consist of one uniform canopy layer, with limited tree species and understory vegetation; vegetation composition dictates fauna composition.<sup>21</sup> In contrast, the logging practice of thinning areas rather than clear-cutting may actually increase biodiversity by creating structural habitat diversity. A study conducted by Sullivan et al. found that forests will support the same forest floor small mammal species as young un-thinned forests if properly managed after thinning.<sup>21</sup> The composition of small mammals is

important in that they support larger carnivores as prey populations. Other human-induced threats to wildlife include overexploitation through the practices of hunting, trapping, and trade and impacts of human-generated pollution on critical habitats.<sup>18</sup>

## **Maine**

With more than 17.5 million acres of forest, more than 5,600 lakes and ponds, 5 million acres of wetlands, 31,800 miles of rivers and streams, Maine offers diverse habitats that support many mammal species.<sup>3</sup> The Maine North Woods region is made up of a combination between boreal and temperate forests across a range of elevations.<sup>3</sup>

Maine supports a total of 61 non-marine mammal species (Appendix I). Maine's mammals are extremely diverse in part due to the state's combination of boreal and temperate forests as well as the Hot Continental Division in southern Maine which allows for species typically found further south to persist within the state such as the New England Cottontail.<sup>3</sup> The larger mammals and carnivores include the bobcat, black bear, eastern coyote, gray fox, red fox, white-tailed deer, woodland caribou, moose, gray wolf (no known breeding populations, but recorded sightings), and Canada lynx.<sup>3</sup>

The bobcat inhabits most of the state and is hunted and trapped. The Bobcat Management System, overseen by the Maine Department of Inland Fisheries and Wildlife, ensures maintenance of the population.<sup>3</sup> Currently, the population is believed to be increasing due to the increase in their major prey's population, the snowshoe hare.<sup>15</sup> The Canada Lynx was listed in 2000 as a threatened species under the federal ESA and is considered a species of Special Concern in Maine due to a lack of population size and distribution data. Originally lynx were found throughout the state but more recently they have only been sighted in the northern and western regions. The population found in this region is known to be reproducing and may be genetically connected to populations in Canada. In 2006, the lynx will be considered for a listing as endangered or threatened under the Maine ESA.<sup>15</sup>

The gray wolf is federally listed as endangered for Maine by the federal ESA and as extirpated under the state's ESA. Currently, there are no data about the existence of a viable population within the state.<sup>3</sup> The eastern coyote is found throughout the state and is abundant. The coyote brings about controversy because of its impact on deer populations and public pressure to control or eliminate some populations.<sup>3</sup> The American black bear is the only bear species found in the state. An estimate 23,000 individuals are distributed throughout the state. The population has been managed since 1981 and continues to be hunted and trapped.<sup>3</sup>

The moose is a major game species in Maine. The moose reached its lowest population numbers, estimated at 2,000 individuals, in the early 1900s due to over-hunting and habitat loss. However the population has recovered to approximately 29,000 individuals in response to protection from overexploitation and improved habitat.<sup>3</sup> The white-tailed deer is also a popular hunted species. The deer population has increased over the century due to a decrease in

predatory species including the extirpation of the wolf and cougar, a decrease in the severity of winters, and the modification of habitat by logging and clearing. Currently some areas of Maine need an increase in the deer population but others require a decrease.<sup>3</sup>

Large mammal and carnivore species that have been extirpated (i.e. those that once existed in Maine but no longer do) from the state include the eastern cougar, gray wolf, woodland caribou and the wolverine.<sup>3</sup> These species may no longer persist here due to overexploitation, destruction of their habitats, or natural causes.<sup>14</sup>

In the Maine North Woods the majority of lands are privately owned and considered unorganized territories with zoning laws enforced by the Land Use Regulation Commission (LURC).<sup>4</sup> LURC oversees any development that is proposed for the Maine North Woods (see Chapter by Sandy Beauregard). In contrast, the southern region of the state is continually being developed. Without the protection of these unorganized lands and enforced legislation, the Maine North Woods is subject to development and ownership by small land holders. The unorganized territories of Maine provide excellent opportunities for landscape level wildlife conservation.

### ***Case Study: Reintroduction of Wolves***

Protection of large carnivores can be controversial, because an increase in carnivore populations or the recolonization of an area, an increase in carnivore-human conflict is likely. Ecological needs do not always coincide with economic needs.<sup>22</sup> Minnesota and Wisconsin, for example, have been experiencing an increase in wolf populations leading to an increase in livestock kills by wolves, particularly due to the fact that wolves are now expanding into areas with increased human development. This is leading to tension with local landowners.

The wolf once inhabited much of North America and now only persists in three percent of its former range following a huge increase in logging, land clearing and human settlement.<sup>23</sup> During this time, it became extirpated in the state of Maine; however, the state still has large tract of quality habitat and reintroduction could be possible.<sup>3</sup> With protection under the Endangered Species Act, the wolf has started to make a comeback despite some continued public persecution.<sup>23</sup> Because wolves have extensive territorial behavior and metapopulation dynamics require hundreds of square kilometers to maintain viable populations, wolves are an extremely complex species to protect and manage. They are an excellent example of an umbrella and flagship species that highlights the need for a landscape scale conservation approach and the challenges of development.<sup>23</sup>

### **Favorable Habitat**

Favorable habitat for the wolf depends on many factors including road density, existence of different land types including public and industrial forests and persistence of prey populations.<sup>22</sup> The wolf exhibits large-scale territorial behavior based on interacting subpopulations considered a pack; packs are a

breeding unit that have the potential to become locally extinct.<sup>23</sup> Pack territory size in Minnesota during mid-winter is approximately 166 km<sup>2</sup>.<sup>23</sup> Dispersing individuals that are colonizing a new area can range over many hundred kilometers. Interbreeding packs are important to maintain the overall population.<sup>23</sup>

In a study conducted by Mladenoff et. al., wolf pack ranges are most prevalent in mixed forests and areas with more public lands and private industrial forests as compared to areas with more agricultural and deciduous lands with large bodies of water.<sup>23</sup> Wolves are known to colonize areas with a road density of 0.7 km/km<sup>2</sup> or less; however, core pack areas do not exist if the road density exceeds 0.23 km/km<sup>2</sup>.<sup>23</sup> Although wolves avoid roads and areas with high traffic volume, they do use lower traffic volume roads for movement corridors, which are crucial to the dispersal of individuals.<sup>9</sup> Road density, which serves as a measure of human contact and minimal human impact, is important for core pack areas where dens are located in order to protect breeding populations.<sup>23</sup> This selection of core habitat areas is important for population success if the individuals are trying to utilize marginal habitat and no other breeding populations are within dispersal distance.<sup>23</sup> Areas with fewer humans are favored in pack areas (1.52 humans/ km<sup>2</sup>) in comparison to non pack areas which had a density of humans to area at ranging from 5.16- 7.43 humans/ km<sup>2</sup>.<sup>23</sup>

Mladenoff et al.'s findings support that wolves are selecting habitats most remote from human influence, which is defined in part by road density. This indicates habitats that are less fragmented by human development are most desired. Also abundance of prey populations is a strong indicator of quality habitat.<sup>23</sup>

If wolves must inhabit areas with higher human densities, public attitude and amount of legal protection in place are important indicators of how a population will survive.<sup>23</sup> Generally, high quality habitat is extremely fragmented and human dominated, thus the future of wolf populations depends on human ability to protect a network of core habitat areas.<sup>9</sup>

## **Human-Wolf Conflict**

As populations of carnivores expand under the protection of legislation or human encroachment upon habitat increase, more encounters with livestock occur.<sup>22</sup> This leads to more human contact with wolves; human contact is the major source of wolf mortality due to accidental, legal or illegal killings.<sup>23</sup> Because wolves prey on any ungulate in their home range, continued conflict with humans owning livestock can induce a higher wolf mortality rate and potentially cause local extinction in areas where they come into repeated contact with humans. A study conducted by Treves et. al. found that wolves attacked livestock in similar habitats across the states of Wisconsin and Minnesota.<sup>22</sup> Those townships with higher deer density (a major prey species of wolves) as well as a higher percentage of pastureland mixed with dense vegetation experienced higher numbers of livestock kills.<sup>22</sup> The deer density may have

increased livestock predation because wolves may have been following the deer population.<sup>22</sup>

In Minnesota, wolves are now colonizing areas previously believed to be too highly developed; however recolonization of these areas is possible with a change in public attitude and legal protection.<sup>22</sup> Even so, areas without humans are needed for recovering and maintaining wolf populations since humans are the main cause of mortality and wolves are known to select habitats with less human influence.<sup>23</sup> With this data, wildlife managers should define zones where the number of human-wolf conflicts would be greatest thus implementing strict control over these areas.<sup>22</sup> To reduce conflict, wolves and humans should be kept separate whenever possible.

### **Efforts to Eliminate Conflict**

Because human-carnivore conflict, specifically wolves killing livestock, can cause economic damage, people tend to respond by killing or poisoning the animals. This often kills non-targeted species and completely undermines the legislation in place. In order to maintain effective legislation as well as protect the interests of humans, wildlife managers must implement a strategy that limits carnivore contact with humans.<sup>22</sup> The cost of conserving carnivores falls on a limited number of individuals, typically livestock owners in rural areas. The majority of people who do not come into contact with carnivores regularly, support conservation measures and enjoy the aesthetic benefits of such efforts.<sup>24</sup> Compensation programs are the most widespread attempt to minimize costs although they are often inadequate and do not provide incentives for livestock owners to reduce the risk of predation by wolves.<sup>3</sup> Also, these programs do not take into account attitude changes people affected by wolves may experience, which may lead to an increase in kills out of a negative attitude.<sup>3</sup> In Naughton-Treves et. al.'s study, compensation programs do not lessen an individual's animosity towards wolves had a pet or livestock animal been lost to predation.<sup>3</sup> Thus compensation programs may not reduce illegal killings of wolves. These compensation programs reimburse livestock owners with a variety of funding sources, from state and private sources and typically compensates for 100% of the market value of livestock lost to wolf predation.<sup>9</sup> They are implemented in most US jurisdictions as well as in some areas of Canada.<sup>9</sup> If a livestock animal survives a wolf attack, owners are fully reimbursed for veterinary charges.<sup>9</sup> The cause of death of livestock must be obvious in order to receive payment. Some unique species of livestock, for example llama, may not be compensated by these programs.<sup>9</sup>

Another method to reduce human-wolf conflicts and increase wild herbivore populations in some parts of Minnesota and Canada is to cull wolf populations.<sup>9</sup> This method does not have much public appeal. Because of this opposition, some culling programs have ended.<sup>9</sup> In Canada, where wolf populations are stable, people are allowed to kill wolves without restrictions that are on or within eight kilometers of their property if the wolf is threatening their property.<sup>9</sup> In some states, landowners are allowed to kill wolves that are physically in the act of killing livestock; often wolves are shot illegally.<sup>9</sup> It is illegal

to poison gray wolves within the US and the US Fish and Wildlife Service enforces these laws.<sup>9</sup> The existence of humans within an area remains the most important factors in the survival rates of wolf populations.<sup>9</sup>

Recently, the US Fish and Wildlife Service is looking to remove protection under the Federal Endangered Species Act for the wolf in some regions of the United States, because populations are recovering.<sup>25</sup> By de-listing or lowering the wolf's status before populations have reached recovery plan goals, these goals may be compromised with more management responsibilities dependent upon the state.<sup>25</sup>

## ***Reintroduction of Wolves in Maine: Is it possible?***

### **Favorable Habitat**

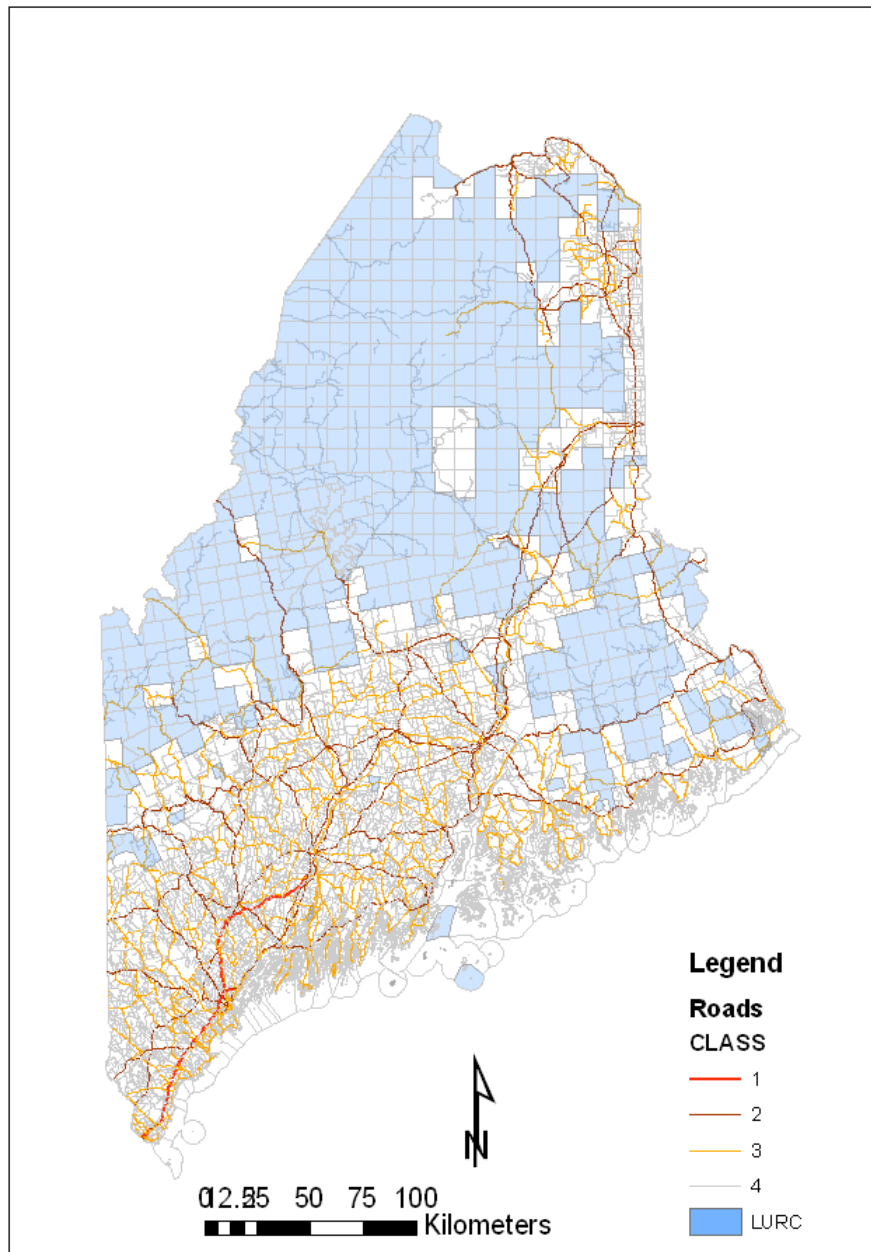
Because Maine once supported wolves, favorable habitat does exist for this species.<sup>3</sup> Maine is included in the historic range of the gray wolf.<sup>25</sup> They were completely eliminated as a result of hunting by the end of the 19<sup>th</sup> century and now, no known populations exist.<sup>25</sup> A major obstacle to their potential reintroduction is the spread of humans and infrastructure throughout their historical range. If wolves were reintroduced into their initial range within Maine, potential for an increase human-wolf conflict exists.<sup>5</sup>

Maine has necessary land types crucial to wolves' survival, including agricultural and pastoral lands, coniferous forests, open water, and wetlands.<sup>5</sup> To determine the density of roads within throughout Maine, I used GIS analysis. I used road densities as a measure of human encroachment upon or human contact with habitat. Road densities were calculated for areas within LURC jurisdiction (northern Maine, Figure 2), non- LURC jurisdiction (southern Maine, Figure 2), the proposed Maine Woods National Park boundary (Figure 3), and the proposed Plum Creek development boundary (Figure 4). All road classes were used in one calculation and only classes 1-4 for another calculation (Table 3).

Road densities are visibly higher in southern Maine indicating habitat fragmentation and a high presence of humans (Figure 2). If wolves were to be reintroduced within this region, human-wolf conflicts would be expected. The road densities in northern Maine are much less than those in the southern region (Figure 2). In this region, less habitat fragmentation exists and fewer human-wolf conflicts are likely.

**Table 8. Road classes as defined by Maine Office of GIS**

Road Class	Description
1	Interstate and highways
2	Primary, paved roads
3	Secondary roads
4	Improved roads
5	Unimproved roads
6	Trails
7	Footbridge



**Figure 10. Roads in LURC and Non-LURC jurisdictions (Maine Office of GIS)**

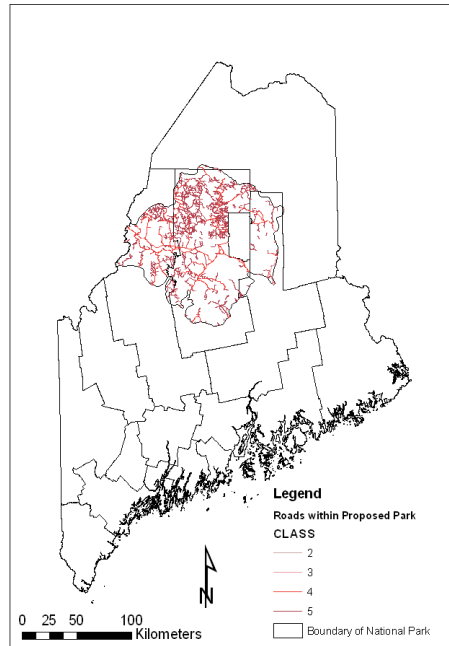


Figure 11. Roads in the proposed Maine Woods National Park (Maine Office of GIS)

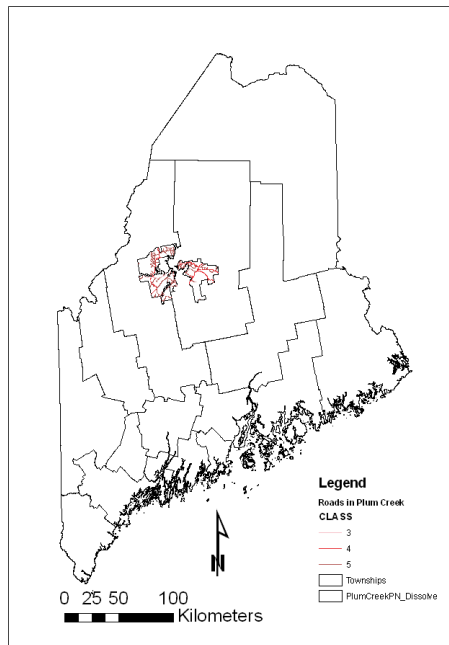


Figure 12. Roads within the proposed Plum Creek Development area (Maine Office of GIS)

The road densities in LURC areas, non-LURC areas, and the proposed Maine Woods National Park area all exceed Mladenoff's road density threshold for a viable wolf population of  $0.7 \text{ km/km}^2$  (not certain of which road classes were included in this study).<sup>26</sup> The area where the Plum Creek Timber Company is proposing to develop has a road density of  $0.66 \text{ km/km}^2$ ; the only area where road density would allow for a viable wolf population when considering all road classes. None of these areas would support core habitats which are important to breeding populations for den sites.<sup>26</sup>

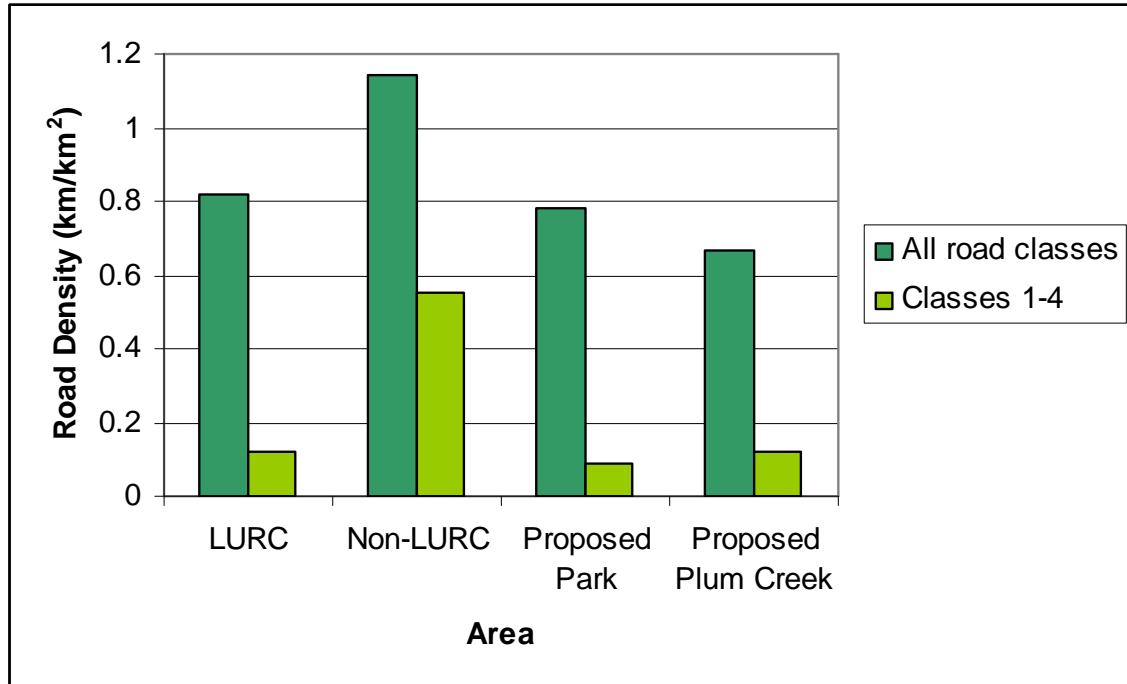


Figure 13. Road densities in specified areas

Other studies have found that wolf populations can survive with higher road densities than Mladenoff's findings. Merrill conducted a study of a specific wolf population found at Camp Ripley located in northern Minnesota where road densities have been calculated at  $1.42 \text{ km/km}^2$  (including all paved roads, highways and other unimproved surfaced roads) or a density at  $3.7 \text{ km/km}^2$  including all road classes even smaller roads excluded in the previous calculation, which were included in my GIS analysis.<sup>27</sup> This camp apparently has supported a "surviving population" with high road density as well as heavy vehicle traffic for over half of the year. Many of the wolves dispersing from this area are killed by vehicle collisions. Even so, litters have survived and individuals have dispersed.<sup>27</sup> Perhaps this population is surviving because of the high wolf populations throughout Minnesota.<sup>25</sup> With many populations, it is possible that the Camp Ripley pack has many source populations. Individuals dispersing from other populations could build up Camp Ripley's population to account for vehicle mortalities. Camp Ripley may be an exception to Mladenoff's study but it still provides an example where the wolf may be able to adapt to human presence.

Using Merrill's road density criterion as a threshold for viable populations and the ability of an area to support a wolf population, the Plum Creek area would best support a population followed by the area proposed for a national park, LURC areas, and lastly, non-LURC areas.

Evaluating road densities, including only road classes 1-4 (Table 3), all areas would support wolf populations in comparison to Mladenoff's and Merrill's road densities (Figure 5). Also, LURC, the proposed park, and the proposed Plum Creek areas would all support core habitat for breeding wolf populations (0.23 km/km<sup>2</sup> road density).

If a large reserve such as a national or state park were feasible, this could limit human access to habitat, decreasing traffic volume and hunting as well as over time, eliminating some industrial roads that would no longer be in use. A park would allow for the preservation of a large tract of land which would in turn allow for the conservation of many large carnivores, like wolves and other species.

The Plum Creek Proposal could further fragment the landscape in certain areas and require the construction of new infrastructure. Furthermore, the proposed conservation areas for the Plum Creek proposal do not necessarily offer a connected network of large tracts of land but rather scattered, potentially isolated patches. The potential for conflict between wildlife and humans would be high for people living within these new development areas.

## **Human-Wolf Conflict and Land Ownership**

If the state conserves an adequate area of land specifically for wolves without any human contact, human-wolf conflicts could be reduced.<sup>5</sup> If human influence is not restricted, conflicts could occur at a high rate, leading to wolf mortalities.<sup>5</sup> A major obstacle to wolf reintroduction is the lack of public land and the prominence of privately owned land within the state. Only six percent of Maine's land base is within public ownership (see Chapter by Randa Capponi). With the majority of land under the ownership of private timber companies, like Plum Creek, the potential habitat of wolves is subject to the decisions made by these companies.<sup>5</sup>

## ***Recommendations for Conservation***

Large protected areas in Maine would allow large carnivores to persist over time by maintaining their vast home ranges, supporting larger populations and reducing human-wildlife interactions which typically results in an increase in wildlife mortality through vehicle collisions, hunting, and trapping.<sup>1, 16</sup> The existence of top predators is important in that they dictate lower level species composition by controlling prey populations.

With the threat of human-wildlife conflict, enforcing and maintaining legislation is crucial to ensure survival of viable populations as in the wolf example. The wolf populations experienced a rapid decline related to human impact. The federal and state governments must have consistent policies in order

to sustain populations over the long-term.<sup>25</sup> Inconsistencies will lead to species receiving less protection than they need to maintain populations and persist into the future.

In Maine, there is not a large enough protected area to maintain the habitat requirements of top predators like the wolf and other large mammals. However, optimal habitat does exist in the northern part of the state with a low human population and low road densities. Because these areas have fewer roads than the southern region of Maine, less fragmentation exists providing a more contiguous habitat. With a contiguous tract of land, individuals of a species can move freely within their home range possibly preventing local extinctions and genetic problems associated with isolated populations, a result of the patchwork pattern of habitat created by fragmentation.

Because of these circumstances and the optimal opportunity provided by the Maine North Woods to protect wildlife species, landscape conservation measures should be considered. The proposed Plum Creek development area offers some of the most suitable habitat for the reintroduction of wolves when considering road density yet it is under the threat of development. Conservation considerations for the future are necessary within this area before the opportunities are lost to development and the habitat degraded by fragmentation.

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# Outdoor Recreation in Maine: Implications for land-use policy in the North Woods

Jennifer E. Venezia

## *Introduction*

Wildlife-related recreation has social, political, and economic importance in Maine and in the rural communities surrounding Maine's North Woods.<sup>1</sup> Hunters and anglers in particular represent a large portion of the residents in northern and western Maine. The town of Greenville in the northern county of Piscataquis is ranked thirteenth in the state for having 38% of its population licensed as hunters.<sup>2</sup> Sportsmen have historically exercised substantial political influence and continue to have economic importance throughout the state. Their political influence derives in part from the economic significance of hunting and fishing related fees and taxes. This revenue goes directly toward state-level wildlife management and land conservation. Outdoor recreation influences land-use policy, environmental conservation, wildlife management, and the economy on a state-level and on a local-level.

In 1998, 22% of Maine residents were licensed hunters, fishermen, or trappers.<sup>3</sup> According to the most recent US Fish and Wildlife national survey, the proportion of sportsmen has increased to over a quarter of Maine's population<sup>a,4</sup>. A Maine Warden Service Report issued in 1999 describes the growing demand for outdoor recreation and the changing user-trends in Maine. For example, the use of snowmobiles and ATVs has increased the rate and extent of access into remote areas previously accessible only by foot, canoe, or aircraft.<sup>3</sup> Such access poses new threats to landowner relations and creates more work for the Warden Service. The report found that wardens are spending larger amounts of time dealing with non-wildlife issues. They were being called increasingly to investigate or assist with motorized vehicle accidents and, as a result, have had less time to spend towards their primary duties such as fish and wildlife protection.

Maine's North Woods are currently facing ownership changes, shifting recreational trends, and proposals for development. These changes will directly impact the future use of the area, the quality of available recreational opportunities, and the economic health of the surrounding communities.<sup>5</sup> Recent proposals for commercial and residential re-zoning have implications specifically pertaining to the traditional recreational uses of the North Woods. The lands in question have historically been privately held but publicly enjoyed. The traditional uses of hunting, fishing, and non-consumptive wildlife-related recreation such as birding, have relied on public access to privately owned timberlands in this region. The primary concern of the sporting community is the possible loss of this tradition of public access.<sup>6</sup>

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<sup>a</sup> The figure is from 2001 and includes only anglers and hunters, see references.

In this paper I examine the importance of outdoor recreation in northern New England and its implications for the future of Maine's North Woods. I begin with a demographic overview comparing Maine to New Hampshire and Vermont. I then describe the national trends in outdoor recreation and compare them to my selected states. Next, I discuss regional trends in outdoor recreation, the benefits to conservation and the economy, and the current problems facing those who participate in wildlife-related recreation. I conclude with a discussion of current initiatives and potential solutions for preserving the availability of recreational opportunities in the North Woods for both sportsmen and wildlife-watchers. The discussion addresses the issues of public access, land conservation, licensing systems, and partnerships for sustainable tourism.

## **Methods**

In order to compare wildlife-related recreation trends in Maine to national trends and regional trends in northern New England, I have used statistics compiled by the federal government and state agencies pertaining to participation rates primarily between 1991 and 2001. I have compared recreation statistics in Maine to those of New Hampshire and Vermont because they have similar demographics, outdoor recreation trends, and tourism industries. I have used data from Piscataquis County, Maine for some examples because it is representative of rural Maine and North Woods' communities.

The majority of data used to compare state license sales, land-use policies, and revenue generated by sportsmen comes from the US Fish and Wildlife Service, individual state fish and wildlife agencies, US census data, current state-level policy proposals, and professional opinions. The data has been used to determine state-level participation primarily in hunting and fishing and their specific economic impacts.

## **Context**

In 2004, the estimated population of Maine was 1.3 million people. The state covers an area of 30,862 square miles and according to the 2000 census, has an average population density of 41.3 persons/mile<sup>2</sup>. Approximately 42% of state residents live in rural areas, the rest of the population is categorized as urban (See Chapter on Demographics). The average per capita income in 2003 was \$29,164. Maine's population density is half the national average and its per capita income is slightly below the national average (Table 1).<sup>7,8</sup>

Maine's North Woods contains over three million acres of forestland and stretches over Piscataquis, Aroostook, Penobscot, and Somerset counties. With the exception of Penobscot, these counties are all far below the state average population density (Figure 1).<sup>7</sup> The 2005 Maine County Economic Forecast describes the disproportionate population densities and imbalanced economic development among the different regions within the state. The forecast states that Maine's coastal counties are experiencing greater population and economic growth than either the central counties, such as Penobscot, or the Canada-

bordering rim counties such as Piscataquis, Aroostook, and Somerset.<sup>9</sup> These North Woods' counties all have below-average population growth and economic development.

Piscataquis County is one of the slowest growing counties in Maine.<sup>9</sup> It contains roughly 13% of the land area of the entire state. This county has the lowest population, the lowest per capita money income, and the lowest average population density of the four North Woods' counties.<sup>7</sup>

New Hampshire has a population approximately the same size as Maine. The total land area is less than a third the size of Maine, resulting in a population density that is more than three times higher (Table 1).<sup>7</sup> Despite the significantly higher population density, the state has only a slightly smaller percentage of rural population than Maine. And New Hampshire has a higher per capita income, which unlike Maine, is above the national average.<sup>7</sup>

Vermont's population is less than half that of both Maine and New Hampshire (Table 1). Similar to New Hampshire, the land area is approximately a third the size of Maine. Consequently, the population density is over a third larger. Vermont also has a higher percentage of rural population than Maine. Vermont has a slightly higher per capita income but, similar to Maine, it is below the national average.

**Table 9. Comparison of demographic variables for the US, Maine, New Hampshire, Vermont, and Piscataquis County, Maine<sup>7, 8, 10</sup>**

<b>Demographic Variables</b>	<b>United States</b>	<b>Maine</b>	<b>New Hampshire</b>	<b>Vermont</b>	<b>Piscataquis County</b>
Population, 2004	293,655,404	1,317,253	1,299,500	621,394	17,525
Rural Population, 2004	49,698,662	551,244	490,183	416,909	n/a
Percentage Rural	17	42	38	67	n/a
Per Capita Income, 2003	\$31,472	\$29,164	\$35,140	\$30,888	\$20,962 <sup>b</sup>
Land Area (sq. mi), 2000	3,537,438	30,862	8,968	9,250	3,966
Persons per sq. mi, 2000	79.6	41.3	137.8	65.8	4.3

<sup>b</sup> Piscataquis County per capita income is a 2004 average estimate of the four poorest Maine counties: Piscataquis, Somerset, Oxford, and Washington. See *References* for source information.

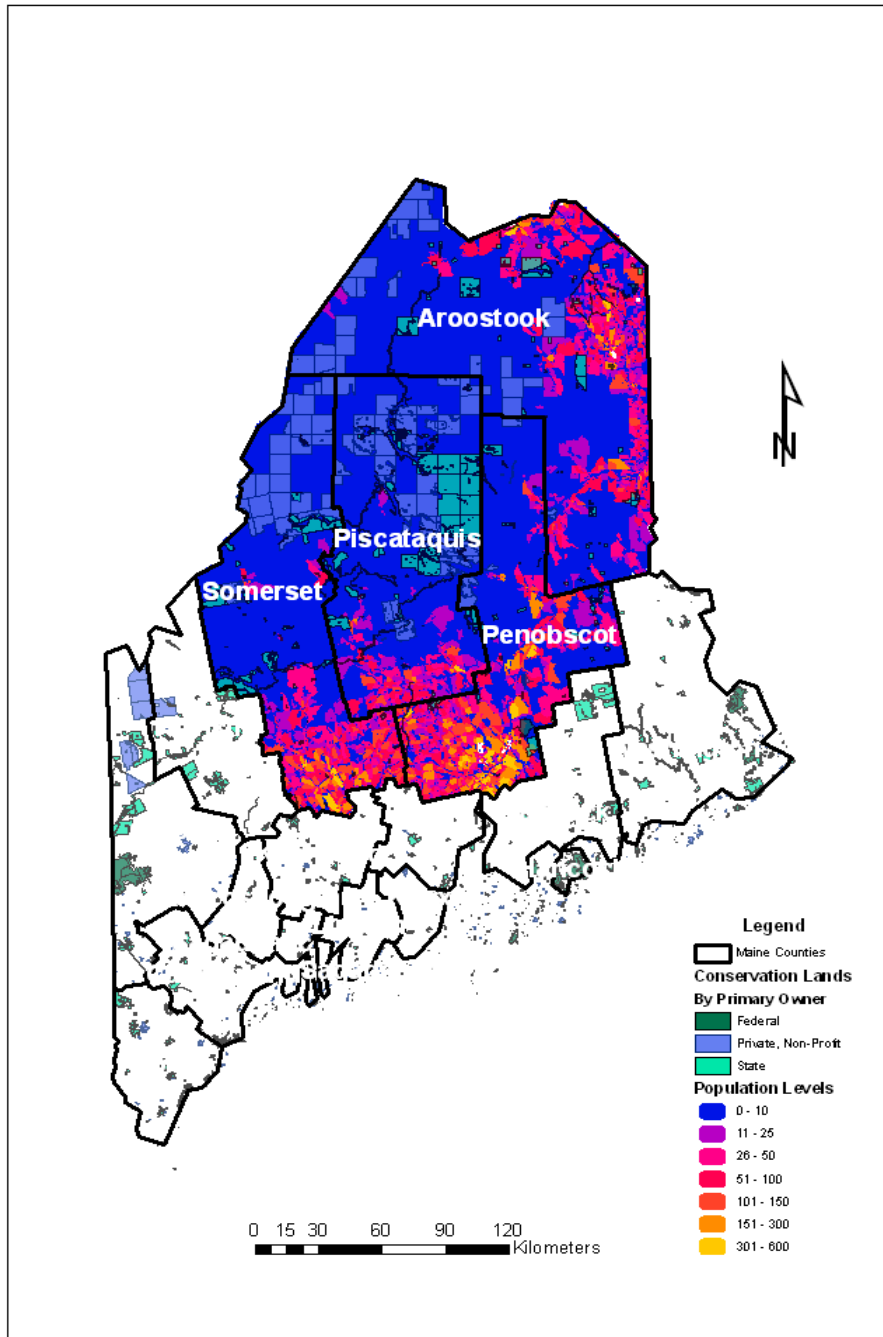
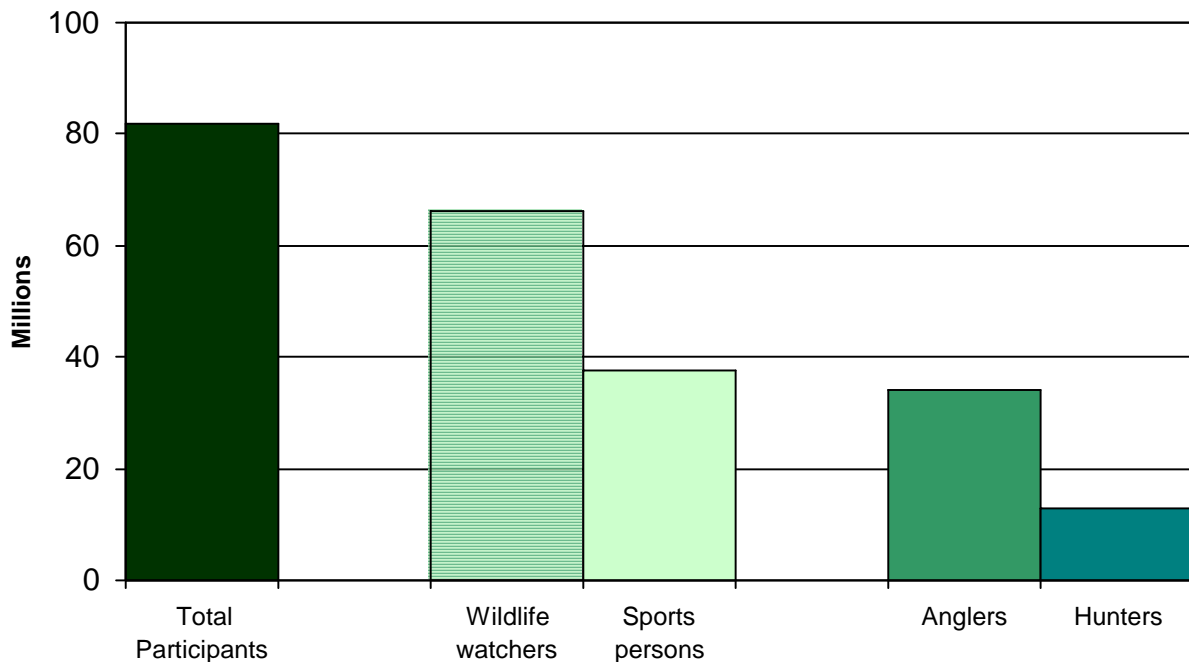


Figure 14. Conservation land throughout Maine and population density in the four North Woods' counties<sup>11</sup>

## Wildlife-Related Recreation in the US

According to the latest survey by the US Fish and Wildlife Service (USFWS), over 82 million Americans participated in wildlife-related recreation during 2001 (Figure 2). This amounts to 39% of the total US population 16 years old and older that hunted, fished, or watched wildlife. Out of this total, 37.8 million were sportspersons and 66.1 million were wildlife-watchers. Of the total number of sportspersons, 34.1 million fished and 13 million hunted. Note that categories of participation overlap so that the sum of all participants from each category is greater than the total number of wildlife-related recreation participants.<sup>12</sup>



**Figure 15. The number of wildlife-related recreation participants 16 years old and older in the US in 2001<sup>12</sup>**

Anglers, hunters, and wildlife-watchers spent a total of \$108 billion dollars towards their recreational activities. Roughly two-thirds of this spending was attributed to sportsmen and the other one-third was spent by wildlife-watchers. Of this expenditure, 26% was trip-related, this includes money spent on food, lodging, and transportation. Equipment purchases amounted to the majority of wildlife-related recreation spending totaling 60% of all expenditures. The total spending represents 1.1% of the US gross domestic product in 2001.<sup>13</sup>

The USFWS survey highlights significant shifts in participation and recreation spending. The number of anglers and hunters has declined since 1991 (Figure 3 and 4), but their total expenditures increased from \$53 billion in 1991 to \$70 billion in 2001. And, although the number of hunters declined over that ten-year period, the number of big game hunters, those hunting deer, bear, and moose, and migratory bird hunters remained constant. From 1991 to 2001,

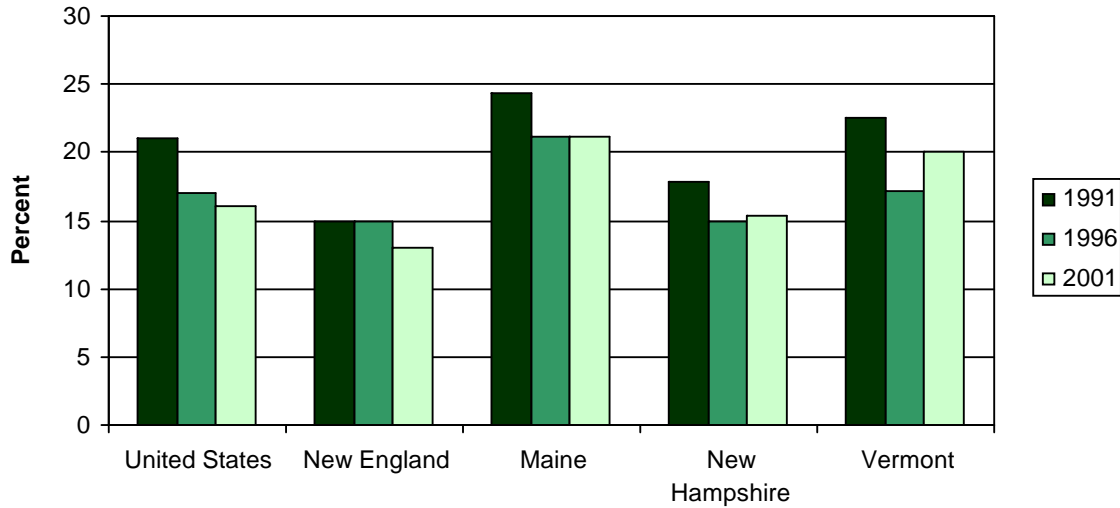
fishing expenditures increased by 14% and hunting expenditures increased by 29%.

Wildlife watching is a complex category because of the differentiation between those participating around their home and those actually taking trips away from home to watch wildlife. In 2001, 31% of the US claimed to participate in wildlife watching. Yet, the number of respondents taking trips away from home to watch wildlife has actually decreased by 27% between 1991 and 2001. Similar to sportsmen, wildlife-watching expenditures increased as well. Over the same ten-year period, expenditures by wildlife-watchers increased by 41%. The more recent shift in wildlife watching was a slight increase in total participants of five percent from 1996 to 2001. However, nonresidential wildlife-watchers, those who took trips away from home, decreased by eight percent over that five-year period.

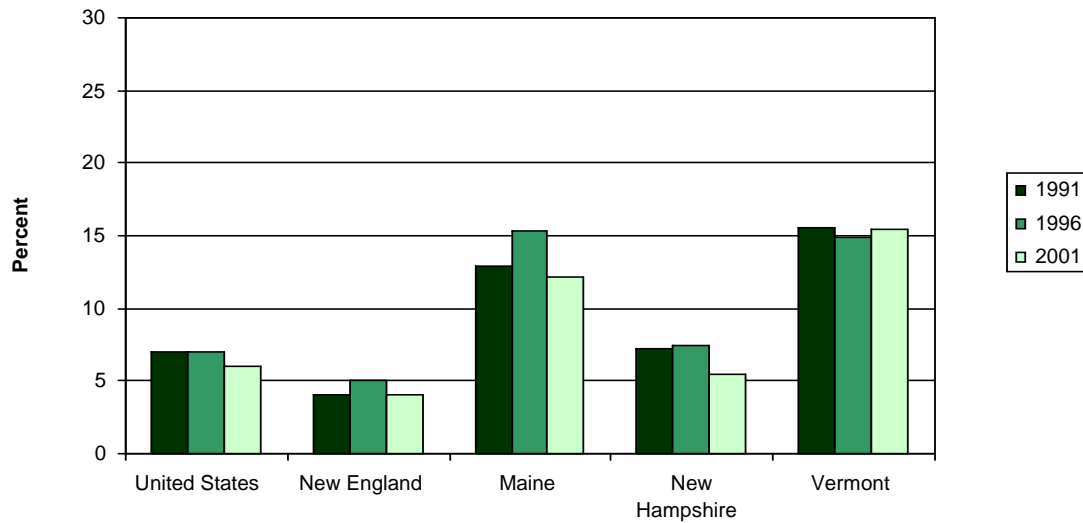
The USFWS has conducted national wildlife-related recreation surveys of hunters and anglers since 1955.<sup>12</sup> Between 1955 and 2001, the number of anglers has increased by 130%. The number of hunters has increased by 31%, but unlike fishing participation rates, this does not represent an increase in participation exceeding the nation's 71% population growth and thus does not equal an increased proportion of hunters in the national population. The inclusion of wildlife watching as a survey category began in 1980. As noted before, the trend for wildlife-watchers has varied by type of wildlife watching. Nonresidential participation has decreased by 19% since 1980. Residential wildlife-watchers, referred to as "residential feeders" by the USFWS, meaning participants who feed wildlife around their home, has decreased by 18% since 1980.

### ***Wildlife-Related Recreation in Maine, New Hampshire, and Vermont***

In 2001, New England had resident participation rates of 13% and four percent for fishing and hunting respectively (Figure 3 and 4).<sup>14</sup> At the same time, Maine's resident anglers were 21% of the total population and resident hunters were 12%. Though Vermont had a comparable percentage of anglers at 20% of its population, and a larger percentage of hunters of 15.4%, its population is approximately one third the size of Maine's. New Hampshire had 15.4% anglers and 5.5% hunters in its population. Therefore, compared to the US and New England, Maine has a much larger proportion of sportsmen in its population. And the state has a much larger overall number of sportsmen than either Vermont or New Hampshire.



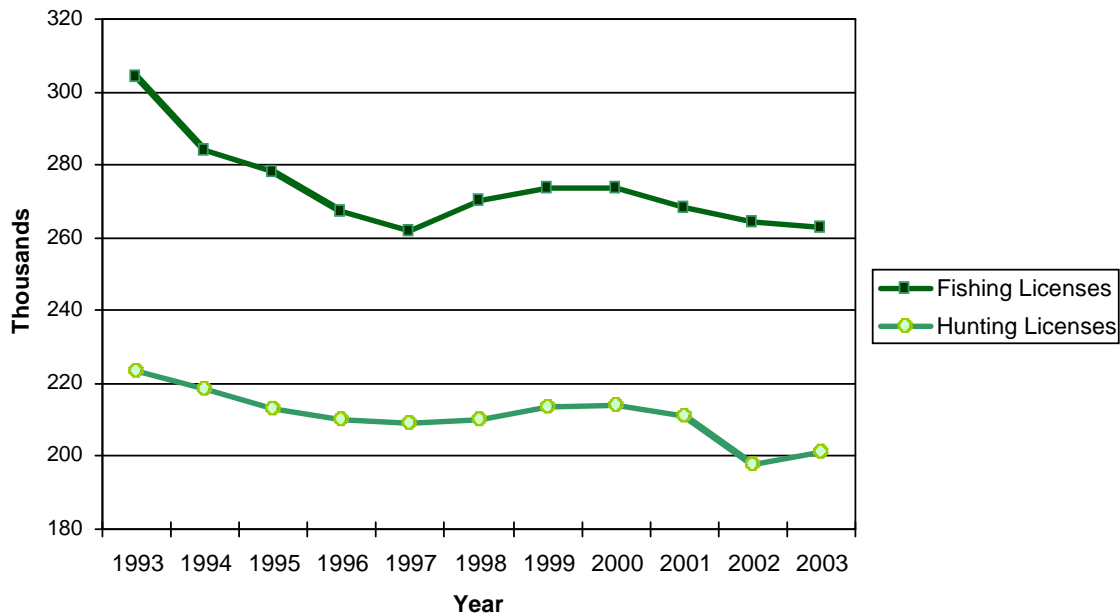
**Figure 16. Percentage of resident anglers 16 years old and older in the US, New England, Maine, New Hampshire, and Vermont reported in the past three USFWS national surveys for 1991, 1996, and 2001<sup>12</sup>**



**Figure 17. Percentage of resident hunters 16 years old and older in the US, New England, Maine, New Hampshire, and Vermont reported in the past three USFWS national surveys for 1991, 1996, and 2001<sup>12</sup>**

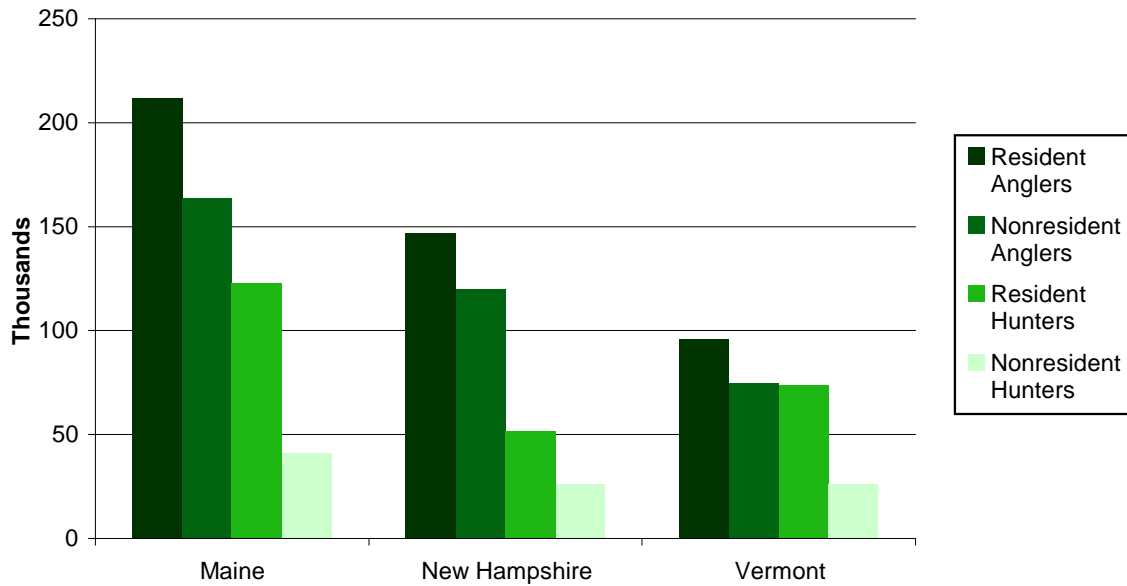
As of 2004, over 37 Maine towns had a 30% or greater portion of residents holding hunting licenses.<sup>2</sup> As mentioned earlier, these towns are often located in rural areas of Maine such as the North Woods region. In addition to the 38% of registered hunters in Greenville, the town of Jackman, which is another gateway community to the North Woods, had a 59% portion of its population holding hunting licenses. The number of fishing and hunting licenses purchased in the state over the past ten years has fluctuated up and down, though the overall trend has been decreasing (Figure 5). Fishing licenses show an overall

decrease of 16% and hunting licenses, an overall decrease of ten percent from 1993 to 2003. A 2004 report by Vermont’s Fish and Wildlife Department notes a similar finding, the report states that Vermont’s hunting license sales continue to follow the nationwide decreasing trend.<sup>14</sup> In spite of this, the 2004 fiscal year report by Maine’s Department of Inland Fisheries and Wildlife (DIFW) shows a slight increase in total license sales from the previous year.<sup>15</sup> An additional 16,000 resident hunting licenses were sold in 2004, compared to in 2003. Total licenses sold for 2004 was 411,633. The increase in license sales resulted in an increase in license sale revenue totaling just under one million dollars.



**Figure 18. Hunting and fishing licenses purchased in Maine from 1993-2003<sup>16, 17</sup>**

Maine has the greatest number of anglers and hunters out of the three states, in terms of resident sportsmen recreating within their state of residence and in the total number of resident and nonresident sportsmen licensed in the state (Table 2 and Figure 8). When considering the proportion of residential to nonresidential sportsmen, all three states have a similar percentage of resident anglers out of the total number of in-state anglers. Maine and Vermont have a similar percentage of resident hunters, though New Hampshire has a slightly lower percentage.



**Figure 19. Resident and nonresident anglers and hunters 16 years old and older in Maine, New Hampshire, and Vermont in 2001<sup>12</sup>**

**Table 10. The total number of anglers and hunters 16 years old and older in Maine, Vermont, and New Hampshire in 2001 including the number and percentage of resident anglers and hunters out of the total; in thousands<sup>12</sup>**

	Maine	New Hampshire	Vermont
Total Anglers	376	267	171
Resident Anglers	212	147	96
Percentage	56	55	56
Total Hunters	164	78	100
Resident Hunters	123	52	74
Percentage	75	67	74

The USFWS surveyed participants by their participation within a specific state, and, separately, calculated the sum total of resident sportsmen participating within their state of residence plus resident sportsmen taking out-of-state trips for recreation (Table 3). All three states have a slightly higher number of resident anglers when counting sportsmen who participated either in or out-of-state. Maine had four thousand more anglers, New Hampshire had 17 thousand more, and Vermont had eight thousand more. The total number of resident hunters participating either in or out-of-state did not differ at all in Maine and was only an additional one thousand people in New Hampshire and Vermont.

Compared to the regional percentage of sportsmen in New England, both Maine and Vermont had higher-than-average percentages. New Hampshire had exactly the same percentage as the regional average for both hunters and anglers (Table 3). Maine and Vermont both had 17% resident anglers. Maine's

population of hunters was 10% of its total state population. Vermont had a slightly higher percentage of resident hunters at 12%.

**Table 11. Resident participants 16 years old and older in wildlife-related recreation both in- and out-of-state in 2001 and a regional comparison, in thousands<sup>12</sup>**

	<b>New England</b>	<b>Maine</b>	<b>New Hampshire</b>	<b>Vermont</b>
Total population, 2000	<b>10,575</b>	1,275	1,236	609
Resident anglers	<b>1,402</b>	216	164	104
Percentage of anglers out of total population	<b>13</b>	17	13	17
Resident hunters	<b>386</b>	123	53	75
Percentage of hunters out of total population	<b>4</b>	10	4	12
Resident wildlife-watchers		520	450	287
Percentage of wildlife-watchers out of total population		41	36	47
Total participants in wildlife-related recreation: resident and nonresident		975	892	569
Total regional sportspersons	<b>1,504</b>			
Regional percentage of sportspersons out of total regional population	<b>14</b>			

### ***Wildlife-Related Recreation and Tourism in the North Woods***

The Maine Highlands is known as a region for wildlife-related tourism in inland Maine. This region encompasses a large portion of North Woods' Maine. The region contains Baxter State Park, Moosehead Lake, and the three destination towns of Bangor, Greenville, and Millinocket. A 2003 study of tourism in the Maine Highlands found that the area attracts about four million visits annually. This amounts to three million day visits, 0.8 million overnight stays, and 0.2 million visitors stopping in the region en route to another destination.<sup>18</sup>

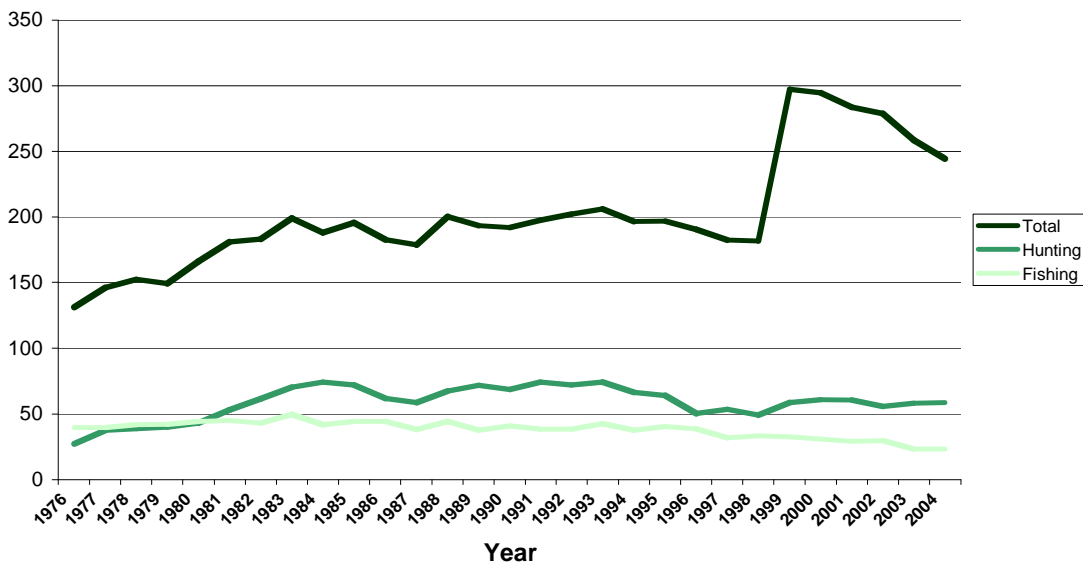
One out of every ten visits to Maine includes some time spent in the Highlands region. The study noted that the primary drivers for recreation in this area were the availability of wilderness, wildlife, parks, and countryside.<sup>18</sup> Additionally, visitors' survey responses ranked the area far above the US norm in terms of the quality of sports and recreation opportunities. Of the largest destination drivers, Bangor receives around 50% of all Highlands' overnight stays, the Moosehead Lake-Greenville area receives 15%, and the Baxter State Park-Katahdin area attracts around 14%.

The North Maine Woods Incorporated is a tourist and recreation destination within the Maine Highlands. This area is managed under the specific name "The North Maine Woods (NMW)."<sup>19</sup> Management of the area began as an informal landowner committee in the 1960's and it became legally established as a non-profit organization in 1981.<sup>19</sup> Multiple owners manage this area containing over three million acres of commercial timberlands, conservation lands, campsites, sporting camps, and access points into the NMW. This organization

of large and small landowners, corporations, conservation organizations, and government agencies such as the Maine Warden Service, manages the woods through a program of multiple-use.

This area of forestland within the greater northern and western forests of Maine, hosts over 200,000 visitors per year to the region’s woods, rivers, and sporting camps. Visitors pay day or overnight fees to hunt, fish, canoe, camp, hike, picnic, and guide. Visitors are charged and inventoried at numerous, seasonally staffed checkpoints located around the boundary of the woods. Several additional checkpoints are located at the Canadian border. The NMW, Inc records the number of visitor days and the purpose of each visit, and compiles an annual report on usage. From 1976 to 1997 there was a 72% increase in visits. Then from 1997 to 2001, the total number of visits increased by another 64% (Figure 8).<sup>3</sup> However, visitor days have been decreasing since 1999. The large jump in visitor days can, for the most part, be attributed to the addition of 0.7 million acres of land in 1999.

The NMW Inc. tracks visitors-use within the activity categories of camping, fishing, hunting, canoeing, hiking, picnicking, guiding, visiting, and “other” (Figure 7).<sup>20</sup> Hunting was the only activity with an overall increase in total visitor days, though the increase was 1.1% from 1976 to 2004. Hunting has averaged 24.1% of the total number of visits annually. Visiting private camps in the area is the most popular reason for coming to the NMW, it amounts to 30.6% of all visits. Fishing accounts for less visitor days, but similar to hunting, has had little change in the total number of fishing visits. Total visits for fishing only declined by 0.8% over almost three decades.



**Figure 20. Total number of visitor days to the North Maine Woods Incorporated and visitor days for the purpose of hunting and fishing from 1976-2004<sup>20</sup>**

Compared to the millions of acres of land managed as the NMW Inc., Vermont’s national forest contains only 3.2 thousand acres of recreational land.

Yet the national forest receives between two and three million visitors annually.<sup>21</sup> Similar to the decreasing trend in visitor days in the NMW Inc., New Hampshire's national forest has also experienced a decrease in visitors. The state instituted a fee demonstration program for its national forest in 1998 to address increasing management costs. A 2003 annual report noted that total fee revenue was the lowest since the initial year of implementation. Additionally, New Hampshire has experienced a decrease in tourism throughout the entire state.<sup>22</sup>

While many external factors affect tourism trends, hunting and fishing in Maine's North Woods appear to be fairly stable. Overall decreases in hunting and fishing statewide can be attributed to decreasing tourism overall and decreasing sporting opportunities available in more densely populated and sprawling urban areas as rural populations decrease.

## ***The Benefits of Wildlife-Related Recreation***

### **Benefits to the state economy**

Just this past October, Maine's DIFW reported that hunting associated activities resulted in more than \$450 million in economic activity.<sup>23</sup> Hunting, by itself, is responsible for retail sales totaling \$329.9 million, \$129.9 million in household income, and over 6,000 jobs. The DIFW had similar findings in 1996.<sup>1</sup> Additionally, in 1996 the DIFW found that sales tax and income tax from hunting amounted to approximately \$27 million that year.

The 2001 USFWS National Wildlife-Associated Recreation Survey summary for the state of Maine reported that the total in-state spending on wildlife-related recreation was \$916 million.<sup>24</sup> The majority of that expenditure, \$504 million, was on equipment purchases, \$297 million was trip-related, and \$115 million was for licenses, fees, and other miscellaneous costs. Another figure reported by the Citizens Advisory Committee to Secure the Future of Maine's Wildlife and Fish in January of 2001 was \$1.4 billion in total economic output resulting from wildlife-related recreation.<sup>25</sup> This figure was 4.9% of the state's gross state product in 2001. This proportion of gross state product attributed to wildlife ranked Maine fifth below Alaska, Montana, Wyoming, and Vermont. Based on the figures generated by the committee, wildlife-related recreation had far more economic significance than the recreation industries of downhill skiing, valued at \$250 million, and snowmobiling, valued at \$225 million.

### **Benefits to tourism**

Tourism and wildlife-related recreation are closely tied. Tourism represents a large industry group, encompassing several different industries. Outdoor recreation is part of this tourism industry group and contributes to the employment and revenue generated by tourism (Figure 8). In 2003, the Maine State Planning Office reported that tourism was one of the most significant industry groups in Maine, bringing in large amounts of money and providing possibly the highest number of jobs of any other sector of the economy.<sup>26</sup> The

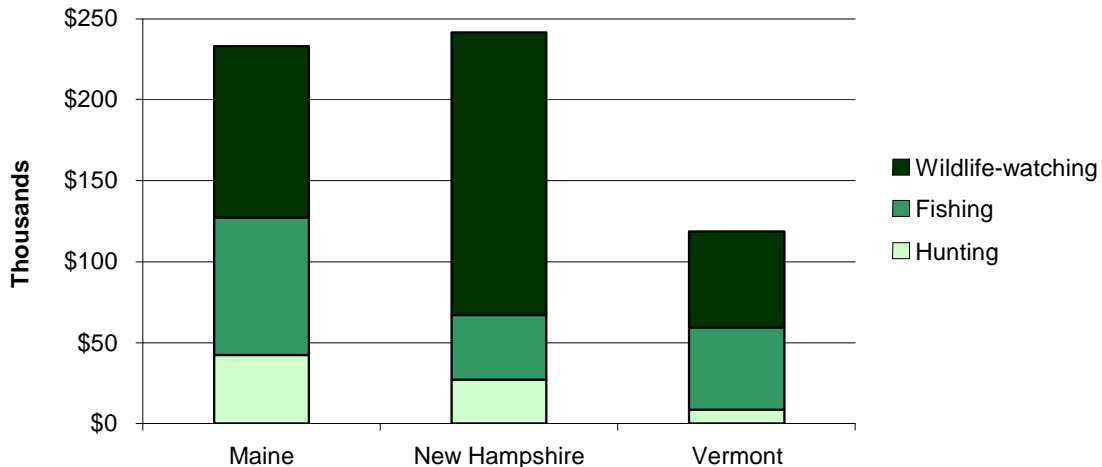
Maine Department of Labor defines the tourist industry as arts, entertainment, recreation, accommodations and food service. A recent labor market report ranked Maine's largest industries according to several different criteria. Several of the industries associated with tourism ranked in the top ten. As of 2003, "food services and drinking places" was the highest employing industry. Accommodations was ranked second after textile mills in the category of industries having the greatest growth in hiring. Scenic and sightseeing transportation was ranked as the highest industry in terms of greatest growth in average monthly earnings. In the category of industries with new or expanding businesses that are adding the greatest number of jobs food services ranked first, amusement, gambling, and recreation industries ranked third, and accommodations ranked ninth.<sup>27</sup>

David Vail, Professor of Economics at Bowdoin College in Brunswick, Maine cites tourism as the second largest sector of Maine's economy with a value of \$5.4 billion, the total amount spent by resident and nonresident tourists.<sup>28</sup> Maine's tourism industry exceeds the combined economic contributions of agriculture, marine fisheries, and aquaculture.<sup>6</sup> Tourism accounts for nearly seven percent of Maine's gross state product and over ten percent of its employment<sup>c</sup>. Tourism creates the equivalent of over 70,000 full-time jobs. This direct employment from tourism is greater than the combined employment of the sectors of agriculture, marine fisheries, and aquaculture plus the forest products industry. Twenty-six million nonresident tourists visit Maine annually. And, in total, Maine hosts approximately 44 million tourists per year.

Surveys conducted by Maine's Office of Tourism have gathered information concerning the drivers of tourism particular to the state of Maine. Survey respondents claim that "beautiful scenery and excellent resources for outdoor activities away from the coast" are the primary attractions in northern and inland sections of the state.<sup>6</sup> Vail also notes that "a key marketing advantage is that lake and mountain landscapes in the Unorganized Territories retain the mystique of places both wild and accessible from the northeast megalopolis." Resources drawing tourists up north and inland include fishing villages, open farm landscapes, and forests such as the North Woods.

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<sup>c</sup> Excerpted from Vail's conference paper, p4: *A sector's direct contribution to gross state product, or value added, equals its total sales minus expenditures for inputs from outside Maine. It also excludes multiplier effects. (Estimation techniques are discussed in Vail and Heldt 2000, Vail 2003.)*



**Figure 21. Tourist expenditures for wildlife-related recreation in Maine, New Hampshire, and Vermont in 2001; tourist expenditures include food, gas, and lodging<sup>12</sup>**

### Benefits to conservation

Hunters across the nation spend \$200 million annually in excise taxes on hunting equipment and ammunition. These taxes are a major source of funding for state fish and wildlife agencies. State agencies then put these funds toward hunter education and safety, land acquisition, and wildlife management. The Federal Duck Stamp, required for the hunting of migratory waterfowl, has generated funds for the purchase of over five million acres of national wildlife refuge lands. As a result, hunters have much influence in supporting the interests of outdoor recreation and conservation in our state and federal governments.<sup>29</sup>

According to Maine's DIFW, approximately 75% of the cost of the state's wildlife management programs comes from the Pittman-Robertson Act. This act, part of the Federal Aid in Wildlife Restoration Act, imposes an 11% excise tax on firearms, archery equipment, ammunition, and a 10% tax on pistols and revolvers. Each state receives funds based on land area and the number of hunting licenses sold. Maine receives an average of \$1.7 million annually. The funds go toward both game and nongame species management, landowner relations programs, and habitat management projects. In 2004, that amount rose to \$1.8 million.<sup>15, 30</sup>

Other funding for conservation efforts comes from hunting and fishing licenses, permits, fines, and other fees. In 2004, hunting and fishing licenses alone, purchased from Maine's DIFW generated over \$13 million. By itself, the moose lottery generates one million dollars annually.

Vermont's Department of Fish and Wildlife Service also depends heavily on the revenue generated by hunting and fishing fees, excise taxes on sporting equipment, and taxes on boating fuels, for funding its management programs.<sup>31</sup> The department noted that hunting and trapping license revenue, along with Pittman-Robertson funding, support the management and administration of the state's wildlife management areas.<sup>21</sup>

The New Hampshire Fish and Game Department is heavily reliant on revenue from license fees as well. These fees generated \$9.4 million in 2002. This amount of money accounted for 58% of the total department's revenue, which included funding received from federal sources. Federal funds from the Pittman-Robertson excise tax accounted for 25% of total funds. Off-highway recreational vehicle registration, such as ATVs and snowmobiles, accounted for five percent, and another five percent came from the Unrefunded Gas Tax Transfer. In the 2005 fiscal year, the department collected \$9.9 million in hunting and fishing license fees and permits, which amounted to 42% of the year's total revenue.<sup>32</sup>

Sportsmen also influence conservation measures through alliances and sporting clubs. Minutes from the September 6, 2005 meeting of the Sportsman's Alliance of Maine (SAM) recorded the decision of the alliance to evaluate Plum Creek's re-zoning proposal in terms of its conservation measures (See Chapter on Comprehensive Planning).<sup>33</sup> Additionally, the members voted to stay active in the entire Land Use Regulation Commission's evaluation process.<sup>2</sup>

Funds from hunting and fishing comprise a majority of state wildlife management budgets. Moreover, the funds accruing from these license fees have recently increased. Funds from excise taxes are also increasing as a result of the growth in spending by sportsmen. However, expenditures of state agencies managing the demands of outdoor recreation participants and wildlife protection are also growing. More resources need to be found to fund activities such as wildlife watching, which do not generate revenue accruing directly to these state agencies.

## ***Issues Facing Outdoor Recreation in the North Woods***

### **Ownership of recreation and conservation land**

Only six percent of Maine's total land area is public conservation and recreation land. The state controls about 75% of these public conservation and recreation areas. The DIFW manages only seven percent of this state-owned land while the Department of Conservation, through the Bureau of Parks and Lands, manages 51%.<sup>16</sup>

Eighty-eight percent of Maine's state-owned conservation and recreation land is within its most rural counties. Piscataquis County has the largest amount of conservation and recreation acreage in the state. The majority of the county's 371,000 acres of conservation and recreation land are located within Baxter State Park, most of which is not open to hunting (See Chapter on the State Park Model).

The Bureau of Parks and Lands manages Maine's Public Reserved Lands. Maine's Public Reserved Lands add up to approximately 0.5 million acres, which are divided into 29 units of varying sizes. The lands are maintained and remain free of charge and open to the public through timber management income. However, fees are charged in a few cases where land is managed by a neighboring landowner. Many of the recreational areas are accessible only by private, unpaved roads.<sup>34</sup> The reserves are categorized into seven Dominant

Resource areas with designated allowable activities that are ranked by natural resource sensitivity.<sup>35</sup> Hunting and trapping are grouped as one type of use and fishing is listed as a separate use. Hunting and fishing are allowed on almost all the same types of land. Both are listed as secondary uses in areas designated for special ecological protection. Secondary Use is defined as a use or activity allowed where no other reasonable alternatives exist and they do not conflict with the dominant resource category values. Fishing is also listed as a secondary use for special historic or cultural protection areas. Hunting, however, is generally prohibited in these areas. Hunting is also prohibited in developed recreation areas, though fishing is an allowed activity. Both hunting and fishing are allowed in all other categories of Public Reserved Lands. These other areas are classified as backcountry areas, wildlife management areas, recreation areas, visual consideration areas, and timber management areas.

In 2001, the Bureau of Parks and Lands developed a new category of classification for Public Reserved Lands called ecological reserves. The reserves protect ecosystems in their natural state, maintaining native plant and animal species while also allowing for the traditional uses of hunting, fishing, and hiking. These reserves also permit the use of existing snowmobile and ATV trails if the impact is found to be minimal. The 2003 Maine State Comprehensive Outdoor Recreation Plan listed 68,974 acres of Public Reserved Lands designated as ecological reserves. A monitoring plan is under development through the Maine Natural Areas Program in conjunction with the DIFW.<sup>16</sup>

Maine has an extensive amount of land under private conservation. Non-profit organizations and land trusts hold approximately 1.3 million acres of land, this is slightly more than the 1.29 million acres of conservation and recreation land held by the state. A substantial 77% of this private conservation land is held in easement by statewide organizations and trusts. For the most part, these lands are open to hunting and fishing. Restrictions usually apply in the case of motor vehicle and off-road vehicle access.<sup>16</sup>

Land trusts and the USFWS have worked together in Maine to acquire lands for national wildlife refuges. Currently, Maine has ten refuges located throughout the state. Four of these refuges are open to hunting. Of those same four refuges, three allow fishing.<sup>36</sup>

Vermont has 800,000 acres of conserved wildlife habitat open to public hunting. The state has a large part of its public recreation lands located on 380,000 acres of national forest. Approximately 60,000 acres are designated as wilderness areas, the rest are open to timber management, recreation and other activities. Additional recreational opportunities are available on wildlife management areas that cover 118,000 acres of the state within 85 separate management units. These areas are state owned and managed by Vermont's Fish and Wildlife Service. There is only one national wildlife refuge located in the state of Vermont, it allows both hunting and fishing. New Hampshire's national forest covers 751,000 acres, which equals ten percent of the land area in the state. Nearly all of this land is open to both hunting and fishing. Additionally, New Hampshire has four national wildlife refuges, one of which allows fishing and two of which allow hunting.<sup>37</sup>

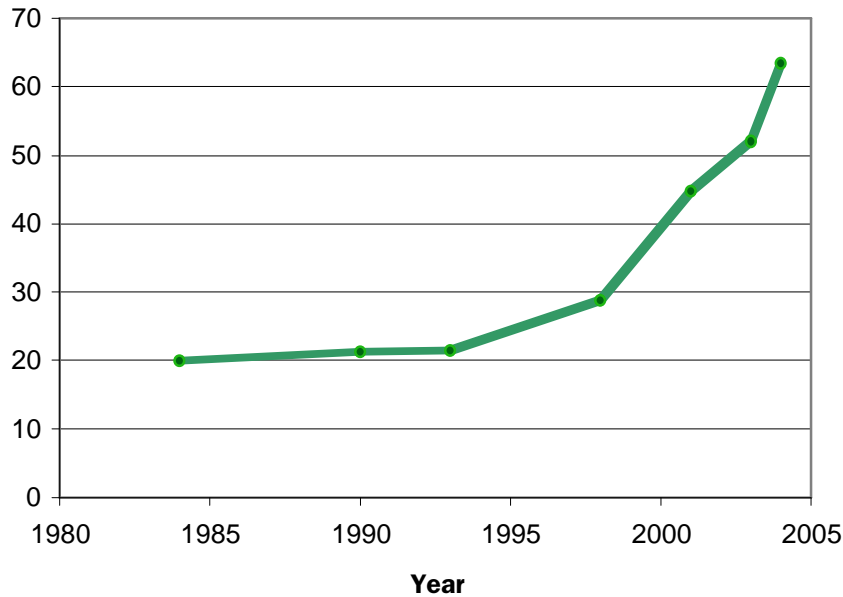
The amount of public recreation lands in Maine is low at six percent of the entire state land area, additionally, the DIFW only manages seven percent of all of this land. Most of this land is located in the rural areas of Maine, and furthermore, a sizeable portion of this land, around 200,000 acres, is within Baxter state park. Of this two hundred thousand acres, only 28.6 thousand acres allow hunting.

Maine's Public Reserved Lands depend on revenue from the timber industry, an industry whose future is uncertain in Maine. In some cases, access to these public reserved parks is through private lands that often charge access fees. The state is making efforts to expand available recreation land, which is evident through the addition of the public ecological reserves. However, private organizations continue to hold more land under conservation than the state. And the majority of this land is held by easement rather than complete ownership. Vermont and New Hampshire, both only a third the size of Maine, have a relatively similar amount of land held by the state for conservation and recreation. A study conducted in 2001 found that Maine had the smallest proportion of conservation land among seven states, a calculation of 5.4% compared to the highest ranking state with 37% conservation land.<sup>38</sup> In addition, while Vermont has one third less land area than Maine, it has 85 separate wildlife management units while Maine has only 51.<sup>39</sup> The proportion of available lands, amount and sources of funding, and the management ability of the agencies responsible for Maine's recreational facilities are all concerns for outdoor recreation participants. In order to sustain current levels of recreation and, if possible, increase participation, the state needs to re-evaluate funding levels, sources of funding, and the needs of each management agency.

### **Public access to recreation land**

Landowner relations have been a prevalent issue in the North Woods for at least the last ten years.<sup>40</sup> In 1992 the DIFW addressed the growing tension between hunters, anglers, and landowners. The DIFW Committee for the Study of Access to Private and Public Lands in Maine noted that the decentralized legislation relating to trespass law and landowner liability, in addition to the lack of an identifiable enforcement agency, frustrated communications between sportsmen seeking permission for recreational use of private land.<sup>41</sup> Maine landowners have liability protection against potential lawsuits if they choose to give permission for hunting and fishing. Yet, landowners have remained uncertain of this protection.

More recently, changing user trends are creating additional problems for maintaining public access. Maine's ATV-registrations have increased over 200% from 1984 to 2004 (Figure 9).<sup>3, 15</sup> The increase in ATV-use has created concerns by landowners of trespassing, liability, and environmental damage.



**Figure 22. ATV registrations in Maine since legislation was enacted in 1984 up until the most recent Department of Inland Fisheries and Wildlife financial report for fiscal year 2004<sup>3, 15</sup>**

As mentioned previously, the majority of outdoor recreation in Maine occurs on private lands.<sup>42</sup> Public access to lands for recreation is a growing issue in New England as a whole. In Vermont, the record at town clerks offices shows the amount of registered posted land more than doubling over the last thirty-five years, an increase from 106,007 acres to 214,329 acres. And that does not include the unregistered lands posted against trespass.<sup>14</sup> Sportsmen in Maine, Vermont, New Hampshire, and all throughout New England have relied on common law for access to inland waters, but there are no written laws guaranteeing this tradition of publicly-accessible, private lands and the colonial ordinance does not mention forestlands for hunting.<sup>43</sup>

Conservation activists, such as Jym St. Pierre from the organization *RESTORE: The North Woods*, and Maine's game wardens have noted an increase in no-trespassing signs and gated roads on once-open land.<sup>44</sup> In Maine, more land is being gated, gate charges for day-use are increasing, and lease fees for sporting camps are also increasing. In addition to these changes, kingdom lots are being purchased and posted against recreational access by people with land-use values that conflict with traditional users. Proposals for subdivisions also pose significant reductions in public access to forestland and inland waters.<sup>6</sup>

Relationships between forest landowners and SAM, for example, are institutional based landowner-user agreements that help to sustain access to private lands for public recreation.<sup>42</sup> In this specific case, the Sportsman's Forest Landowners Alliance maintains access for vehicle-use for the purpose of sporting recreation.<sup>2</sup> An additional example of cooperation for public access is the role of the DIFW in coordinating the sportsmen-landowner relations program.<sup>2</sup>

The New Hampshire Fish and Game Department has addressed the issue of increased posting with its "Cooperative Sign Program." This program offers landowners several sign options for posting their land to allow for hunting purposes. Some examples are "Hunting by Permission Only," "Caution - Horses," or "Keep Out - Safety Zone." The program addresses landowner concerns, educates landowners about liability issues, and promotes positive sportsmen-landowner relations while protecting public access.<sup>43</sup>

Maine's alternative posting program, run by the DIFW's Warden Service appears to be successful in establishing open lands and maintaining positive landowner-sportsmen relations. The program has secured a total of 266,306 acres for public access.<sup>45</sup> These efforts have included opening lands previously posted against access and securing lands with the potential for posting against access.

### **Funding for Maine's Department of Inland Fisheries and Wildlife**

Differences in the cost of licenses for fishing and hunting in Maine, New Hampshire, and Vermont may be limiting the amount of revenue received by Maine's Department of Inland Fisheries and Wildlife. The hunting and fishing licenses in these three states follow a relatively similar pricing system with generally higher costs for nonresident licenses and similar cost-levels for most license categories. However, certain licenses are offered to nonresidents in Maine that Vermont and New Hampshire do not sell. The major discrepancy was between the multiple-day licenses. All of the information gathered on state licensing systems can be found on each state's fish and wildlife department website.

Maine offers one-day fishing licenses to both residents and non-residents for \$12. New Hampshire and Vermont offer only nonresidents one-day licenses at \$15. All three states sell seven-day nonresident fishing licenses. However, Maine also offers a 15-day nonresident fishing license.

If a visitor wanted to fish for more than seven days in New Hampshire or Vermont, they would find it cheaper to purchase a full season nonresident license, than to buy two seven-day licenses or a seven-day plus multiple one-day licenses. After purchasing a full season license, they would have the incentive to fish in that state more often because there would be no additional license fees. Maine's system does not create the same incentive. If a visitor plans on fishing in Maine for more than one week they have the option of purchasing a 15-day fishing license for only four dollars more than the seven-day license, at \$41. Therefore, they have less incentive to buy the \$53 full-season license. Thus it follows that they would have less incentive to go fishing in Maine again during that season.

Price differences in resident licenses can be attributed to the per capita income of each state, as noted in the demographic overview. New Hampshire has the highest resident license prices, Maine is in the middle, and Vermont has the lowest prices. Nonresident licenses also differ in price. If Maine updated its nonresident license prices to reflect the higher prices of its neighboring state,

New Hampshire, it would gain over \$700,000 in additional revenue. In order to attain this level of additional revenue, Maine would have to discontinue the sale of its 15-day nonresident fishing license. The estimate of \$700,000 was calculated by assuming that those people who purchased 15-day licenses would instead purchase the full season license at only twelve dollars more. These calculations were done using the 2004 Fiscal Year Report of Maine's DIFW, which lists the number of licenses sold by category of license. The number of licenses sold in each category was multiplied by the New Hampshire license costs, and the number of 15-day licenses was multiplied by Maine's full season nonresident license costs.

### ***Policy Initiatives and Recommendations***

Participants in wildlife-related outdoor recreation have been shown to experience a larger willingness to pay for their recreational experiences than they are usually charged.<sup>46</sup> The 2004 USFWS study of the National Wildlife Refuge System, found that refuge visitors experienced over a billion dollars in consumer surplus from their visits. In 2003, a conference on Maine's Natural Resource-based Industries led to policy decisions concerning ecotourism, natural resource dependent communities, and ways to capture more income for conserving the landscapes and traditions of rural Maine. Governor Baldacci introduced the "Maine Woods Initiative" shortly after. The initiative combined policy promises and proposals such as expanding the role of Maine's Office of Tourism in promoting regional, sustainable tourism.

As a result of the governor's initiative, the New Markets Tax Credits program is being used by conservation and recreation organizations to fund sustainable tourism projects. These organizations are using the tax policy for projects that, to give one example, support the local economies of rural Maine by encouraging traditional recreation and sustainable forestry. In January of 2005, the Appalachian Mountain Club (AMC) partnered with Citizens Bank to obtain discounted, long-term financing for a project encouraging ecotourism, sustainable forestry, traditional recreation, and educational programming in Piscataquis County and the surrounding regions. This project involves a 37,000-acre parcel of the North Woods formerly owned by International Paper and acquired by the AMC in December of 2003.

The AMC currently runs a sporting camp on this property and is working towards a comprehensive forest management and recreation plan, including a 10,000-acre ecological reserve. The remaining 27,000 acres will be open for forestry and recreation. The club has already hired a local Maine logging crew and plans to supply state saw mills with the harvest. The US Treasury Department's Community Development Financial Institutions Fund controls allocation and management of the tax credits program.

The Maine Woods Initiative has created a resounding impact on tourism, conservation efforts, and the value of Maine's natural resources. The company Fermata Inc., an experiential-tourism consulting group, was contracted by the Maine Department of Economic and Community Development in 2004 to create a "Strategic Plan for Implementing the Maine Nature Tourism Initiative."<sup>47</sup> The

plan was released in September of 2005 with prescriptions and priorities for action. Top priorities include comprehensive natural resource inventories, branding regions of Maine, specifically the Maine Highlands, and increasing the quality of guided tours and lodging facilities.<sup>48</sup> Maine's Office of Tourism has been given an expanded role as a marketing tool for the entire state and as a certification agency for ecotourism services.

Fermata already carried out three regional inventories of natural, historical, and cultural resource. One pilot area included Greenville, Millinocket, and southern Piscataquis County. The strategic plan calls for a feasibility study or corridor management plan in the interest of creating a scenic byway through the Moosehead-Katahdin area. In its list of actions, Fermata noted that the state should try to cross-market to the local resident or traditional user, as well as to the eco-tourist in order to prevent resource-use conflicts and to optimize the use of natural resources. The plan includes many insights on the proper approach to sustainable tourism. Preliminary work for a regional itinerary guide has included requests to private landowners for permission to list their sites in the guidebook. The plan emphasized the importance of landowner relations and conveying the benefits and impacts of public use. Another prescribed action involving private landowner relations is the provision of compensation for public access. Most importantly, Fermata mentioned the need to define the carrying capacity of natural resources and communities in the regions under question.

As an alternative to the sportsmen-criticized national park model, the strategic plan mentions the work of the Maine Mountain Heritage Network. In November 2004, the network began the promotion of a plan for heritage-based tourism that markets the North Woods as a heritage landscape. The Heritage Network asked the National Park Service in July of 2005 to consider the North Woods for national designation as a heritage site. Proponents of this proposal note that it balances tradition, conservation, resource-use, and tourism without the burden of federal ownership.

## ***Discussion***

Compared to the proportion of participants in wildlife-related recreation in the nation, regionally, and in neighboring states, Maine has far greater numbers of sportsmen and wildlife-watchers. Nevertheless, the current focus of tourism initiatives toward wildlife-watching and other non-consumptive forms of outdoor recreation should take into consideration the general trend of decreasing participation in wildlife-related activities and traditional forms of outdoor recreation, which is occurring throughout the New England region the nation as a whole. Wildlife-watching, following the same downwards sloping movement as fishing and hunting, has decreased significantly since its peak in 1980. And comparatively, non-consumptive outdoor recreation does not generate as much overall spending as traditional sporting activities. Although wildlife-watchers do have higher participation rates than sportsmen, their total expenditure amounts to just over one-third of the total spending on wildlife-related recreation.<sup>12</sup> This can be explained primarily by the much higher expenditures by sportsmen on equipment purchases.

A unique characteristic of Maine's sporting population, which emphasizes the recreational importance of the North Woods, is the finding that in comparison to New Hampshire and Vermont, Maine has the least number of sportsmen traveling out of state for recreational purposes. Maine's population not only has a large amount of sportsmen but, more significantly, it has a large amount that depends on the resources within the state for recreation. And the characteristics that attract tourists to the North Woods are these qualities of wilderness, wildlife, and recreational opportunities that keep sportsmen in rural Maine. Another point of fact is that tourism in the NMW, Inc area is actually decreasing. Hunting and fishing remain stable, but the general notion of the executive director is that increased tourism would be generated by an increase in infrastructure development and amenities, which the landowners do not currently intend to invest in.<sup>20</sup>

The issue of development has only recently become a threat to the recreational use of land in northern and western Maine (See Chapter on the Timber Industry). Large parcels of timber industry land is changing hands, the demand for upgraded vacation facilities is increasing statewide, and real estate values are rising. As a result, the diminutive Land Use Regulation Commission is being pressed to make decisions that will affect 10.4 million acres of land, an area covering over half of the state of Maine (See Chapter on Comprehensive Planning).

Out of all the states in the nation, Maine has the highest proportion of housing units listed as vacant, seasonal, recreational, or occasional-use. Maine's 15.6% is far above the US average of 3.1%. The state ranks just above Vermont at 14.6% and New Hampshire at 10.3%. In relation to county level seasonality issues, the southernmost York County is the highest in terms of numbers while Piscataquis has the highest proportion of seasonal homes at 40% of its total residences.<sup>18</sup> This element of seasonality contributes to numerous economic issues facing the rural communities in the North Woods' counties and should be a consideration when deciding on the type of recreational activities and development the region wants to promote. The governor's initiative in 2004 and the actions so far resulting from the Natural Resource-based Industries Conference, have all focused on sustainable tourism. Specifically, this is tourism that will generate revenue in rural communities and stays in the community. Development for this type of tourism should not negatively impact community in terms of environmental quality or quality of life. But rather, they should embrace traditional values already present in the area.

In terms of the North Maine Woods Initiative it may be helpful for the Office of Tourism to look into Vermont's strategies for attracting tourists. While Vermont ranks just behind Maine in the amount of seasonal housing that exists within the state, its national forests experience a much higher rate of visitation compared to the amount of land open for recreation. Meanwhile, New Hampshire reports that its White Mountain National Forest tourism is at an all-time low. More attention should be paid to the varying state strategies for attracting use of public recreation land.

Sportsmen's contribution to conservation can be superficially measured in terms of the two million dollars in federal aid from excise taxes and over \$13 million in license fees alone that support the DIFW. These monetary inputs leave out the significant public relations, education, lobbying, and private-public relationships that sportsmen commit their time to maintain. For example, SAM and other sporting groups are trying to improve the public opinion of hunters through an educational program supported by the Maine Outdoor Heritage Fund, a half dozen local sporting associations, and in partnership with the DIFW.<sup>2</sup>

Sporting associations do not always hold the same views on recreation policy. George Smith of SAM testified in February of 2005 to the Joint Standing Committee on Inland Fisheries and Wildlife in support of the increased budget for the DIFW.<sup>49</sup> This budget included the authorization of Sunday hunting, which is allowed in New Hampshire and Vermont but illegal in Maine. Smith spoke in favor of this action but, ultimately the proposal was taken off the budget because of the opposition of several landowner and sporting associations. Those opposed included the Maine Bowhunters Association, the Small Woodland Owners Association, Maine Farm Bureau, Maine Forest Products Council, Maine Trappers Association, and the Maine Professional Guides Association.<sup>50, 51</sup>

SAM represents only one sporting group, but it appears to be very active in its appeals to influence public opinion. SAM has publicly announced its support for the Plum Creek development proposal.<sup>52, 53</sup> However, it is unclear as to the influence that SAM's support will have in shaping the decisions of the Land-Use Regulation Commission on Plum Creek's proposal for re-zoning. George Smith has also published an article titled, "No National Park" on the SAM website, in reaction to the national park proposal championed by the non-profit conservation organization *RESTORE: The North Woods*.<sup>54</sup> Smith's article cites the low quality of seasonal tourism jobs, the lack of property tax revenue generated by federally owned land, and the decrease in timber industry jobs that would occur. He also cites a general dislike of federal control in mentioning just a few of the negative aspects he sees in the national park proposal. SAM, local sporting associations, and landowner organizations all influence state conservation, recreation, and land-use policy. Thus, the state must take all recreation participants, landowner associations, and public interest groups into consideration. The state legislature needs to be informed of the individual roles that sporting and landowner constituencies play in providing public recreational opportunities and keep these interests in mind when forming land-use policy for the North Woods.

Initial state efforts have been taken to address the changing needs of Maine's sportsmen. The addition of ecological reserves to the Public Reserved Lands system has been one favorable action for both hunters and anglers. These lands have been set aside for conservation with guaranteed fishing and hunting opportunities and management in conjunction with the DIFW and the Bureau of Parks and Lands. However, the majority of conservation and recreation lands continue to be held by private conservation organizations. With over three-quarters of these lands held under easement, much control over the use and restrictions for access to the land remain in the hands of the primary landowner.

Another important note is that the state has made strides toward tracking ownership changes and towards addressing funding needs for the DIFW.

## **Conclusion**

Despite the decreasing nationwide trend in wildlife-related recreation, Maine appears to have a fairly stable population of resident anglers and hunters. Outdoor recreation is a valuable niche in the tourism industry that should continue to attract over a half million participants and produce hundreds of millions dollars in gross annual revenues.<sup>6</sup> Furthermore, hunting and fishing continue to be essential to Maine's state and local economies both in the revenue and jobs they generate, but also in their social and political influences, especially in the rural communities of the North Woods. The current status of state-level conservation management, the economic variations of the timber and real estate industries, and the values assigned to natural resources, combined with the constant fluctuations of recreation trends, make planning for the future a collaborative task between public and private interests.

Hunter and anglers have proved to be far more valuable than I expected. I feel this analysis and descriptive study is a helpful perspective for assessing the current attention being given to the concepts of ecotourism and sustainable tourism. An important finding in this study is that residential participation rates in consumptive wildlife-related recreation are far more economically valuable and more stable than they appear when looking at nationwide and statewide trends. Also important, is the clarification that wildlife watching as a recreational activity is not increasing in popularity, but rather, has been decreasing for more than a decade. Nevertheless, the sporting constituency appears to be a very stable and influential portion of Maine's population. It constitutes over a quarter of the state's residents, which are primarily located in rural Maine. Sportsmen should be given the utmost consideration when determining future uses of Maine's North Woods for their past, present, and future contributions to wildlife-related recreation.

The Warden Service Report from 1999 provided an interesting and valuable glimpse into the stressful lives of Maine's game wardens. The amount of wardens in service continues to be insufficient given the expanse of land that they are asked to patrol and the amount of calls that come in when wardens are supposedly off-duty. The report conveyed a comprehensive understanding of the role of game wardens, their job, perceived duties, actual duties, and changing roles in Maine's sporting law enforcement. From the report, it seemed that game wardens were a largely undervalued resource. Instead, the state should increase the number of game wardens and increase the amount of input they provide pertaining to current recreational needs and uses of the North Woods, changing ownership patterns, and changing attitudes toward land-use.

In 2001, the Committee to Study Access to Private and Public Lands recommended two tax policies for revision. The revisions were intended to provide landowners some incentive to maintain their lands for public recreational use. Both of these policies provide decreased taxes to landowners who fulfill certain requirements such as maintaining working forests or open land for conservation. However, these tax laws do not require the landowner to allow

public recreational use free of charge. One of the suggested requirements was to add an additional level of tax savings in exchange for the landowner guaranteeing public access without charge.<sup>41</sup> Previous public policies regarding public access to private lands have been successful, resulting in the creation of a governor's council on sportsmen-landowner relations.

Another policy success was mentioned in the *Final Report of the Citizens Advisory Committee to Secure the Future of Maine's Wildlife*. The report mentions land-use plans created under the DIFW's Landscape Planning program, *Beginning with Habitat*, which was initiated in 2000. The planning program addresses habitat fragmentation and species loss through a combination of proactive GIS planning, national biological data from the USFWS, and local data from the Maine Natural Areas Program.<sup>25, 55</sup>

The DIFW depends largely on revenue from sportsmen to provide both environmental and legal services. Sportsmen in turn depend on the success of state wildlife management, sporting safety education, and landowner relations programs to ensure quality recreational opportunities. In order to preserve the resources currently available throughout Maine, the state needs to keep in mind the particular interests that exist within its populations. Sportsmen represent just one set of interests but they are vital in the conservation of land and wildlife, and in the public enjoyment of outdoor recreation.

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# Conserving Maine's North Woods: The Potential for a State Park based Conservation Effort

Scott M. Shahverdian

## *Introduction*

The Maine North Woods encompasses over 3 million acres of unprotected forests in Northern Maine.<sup>1</sup> It provides for a variety of land uses, ranging from recreation in the form of hunting, fishing, hiking, and snowmobiling to large scale forestry and timber extraction. Currently the majority of the Maine North Woods is privately owned by large timber companies.<sup>1</sup>

The last decade has seen an unprecedented amount of land ownership changes in Maine. Approximately six million acres, constituting nearly one-third of Maine's commercial timber lands, changed hands from 1998-2003.<sup>2</sup> These changes have precipitated concern about development and public access. They have spurred action by many interest groups dedicated to preserving public access, ecological integrity, and traditional forestry uses, particularly timber.

Two of the proposals currently facing Maine's North Woods are the RESTORE Maine Woods National Park (MWNP) proposal, and the Plum Creek proposal. Proponents of a large scale conservation effort in the Maine North Woods like the advocacy group RESTORE have proposed a Maine North Woods National Park. However this proposal has faced strong opposition from many sportsmen and private landowners who dislike the idea of federal presence in the North Woods. Furthermore there is concern that a National Park would limit traditional land use practices in the region including hunting and forestry, uses that have been a part of the regions livelihood for centuries. In December 2004 Plum Creek Timber Company submitted a plan for development that seeks to rezone over 400,000 acres in the Moosehead Lake region. This proposal is a manifestation of a very different vision of the North Woods, one dominated by development and the continuation of industrial forest practices. Historically there has been an informal agreement between large landowners and private citizens that recreation can take place on private lands, and the "it's not ours but we own it" mentality of many recreationists has been the prevailing ideology in Maine's North Woods. Consequently both the Maine Woods National Park and Plum Creek proposals are viewed by some as threats to traditional land uses.

This paper uses this context explore one possible alternative for the Maine North Woods, a state park conservation system. To do so I examine the structure of state parks in Maine, their funding and management, and land acquisition and funding programs in Maine. I use Baxter State Park and Adirondack State Park in New York as a case study to demonstrate how a state park initiative has been used to conserve a vast tract of forest comparable to Maine's North Woods. I draw on this analysis to examine whether a state park based conservation system could be developed in Maine to preserve the North Woods' traditional

forest uses, including public recreation, hunting, fishing, hiking, and camping as well as large scale forestry practices on private lands.

## **Context**

### **Maine State Parks**

There are 34 state parks scattered throughout Maine that are managed by the Bureau of Parks and Lands (BP&L) under the Department of Conservation (Appendix). Together these parks total roughly 64,000 acres.<sup>3</sup> The smallest of these parks are Owl Head State Park and Damariscotta Lake, encompassing 13 and 19 acres respectively. Baxter State Park is the largest state park in Maine, encompassing approximately 200,000 additional acres and is unique in that it is managed by the Baxter State Park Authority.<sup>4</sup> I examine Baxter State Park as a separate entity because it is independently funded, managed, and not under the jurisdiction of the Bureau.

State parks in Maine are managed primarily for visitor enjoyment and public recreation or conservation purposes.<sup>5,6</sup> The Integrated Resource Policy (IRP), first drafted in 1985 and revised in 2000 is the Bureau's guiding document for managing all lands under its jurisdiction, including state parks.<sup>6</sup> The IRP characterizes state parks as having such characteristics as a swimming beach, picnic tables, playgrounds, watercraft access sites, and day hiking trails.<sup>6</sup> The IRP classifies all lands under its jurisdiction in a "resource allocation system;" that determines the sensitivity of the land to development, from most sensitive and therefore those most unsuited for development to lands appropriate for moderate to heavy development (Table 1). Additionally, each classification is managed for dominant and secondary uses. The classified areas, in order of most sensitive to least, are listed as: special protection, backcountry recreation, wildlife dominant, remote recreation, visual consideration, developed recreation, and timber management.<sup>6</sup> According to the IRP, the overwhelming majority of state parks can be classified as developed recreation areas. Even though state parks are usually listed under the less-ecologically-sensitive classification of developed recreation areas, the Bureau does have policies, dictated by the IRP, for managing lands that are more sensitive to recreation and development.

In addition to state parks, the Bureau manages historic sites and public reserved lands. Public reserved lands are managed on a multiple-use system, as dictated by the IRP, for uses ranging from recreation to timber harvesting. While use of these lands for recreation is encouraged, visitors should be prepared for a rugged, remote, backcountry experience.<sup>7</sup> Management and recreational use of these lands is funded by revenues gained from timber management. Generally there is neither an entrance fee nor staff available to users. The Bureau manages over 29 Public Reserve Units that encompass approximately 400,000 acres (Appendix).<sup>3</sup> A map of all state conservation lands and more specifically all lands owned by the can be seen in figure 1.

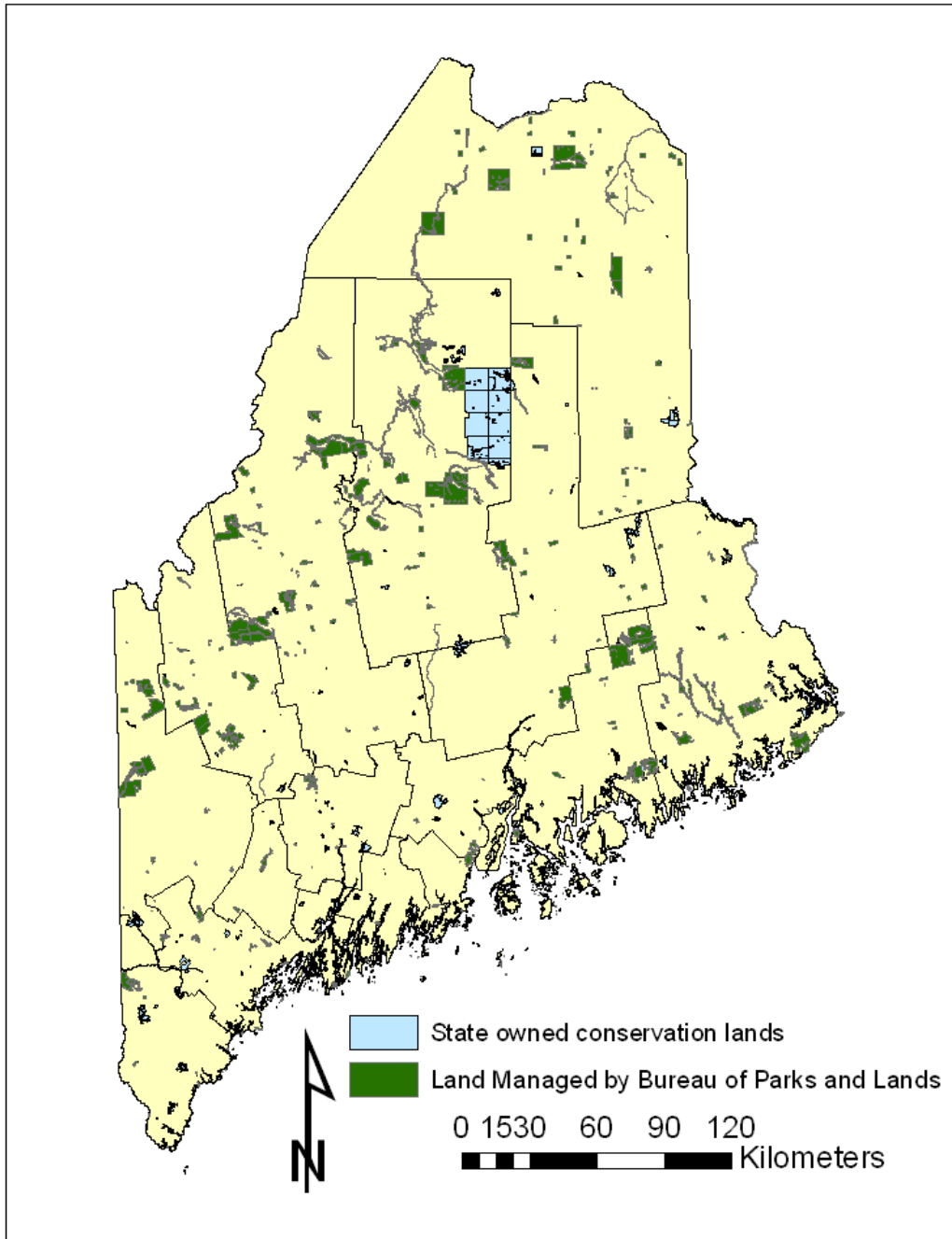


Figure 23. State owned conservation lands and areas managed by the Bureau of Parks and Lands<sup>8</sup>

**Table 12. Land classifications of areas managed by the Bureau of Parks and Lands under the Integrated Resource**

<b>Land Classification</b>	<b>Description</b>	<b>Basic Management Guidelines</b>
Special Protection Areas	Areas allocated for the protection of values associated with unusual, important, representative, and native vegetation or wildlife habitat; geological formations or historic/cultural areas	Special protection areas cannot accommodate active manipulation or intensive use of resources
Backcountry Recreation Areas	Areas allocated for dominant recreation use for the values associated with scenic quality, remoteness, wild and pristine character, and capacity to impart a sense of solitude	Allow trails and primitive campsites for dispersed recreation and hunting, fishing, and trapping where they do not adversely impact the safety of other users
Remote Recreation Areas	Areas allocated to protect natural/scenic values as well as recreation, generally smaller than backcountry areas	Allow significant opportunities for low-intensity, dispersed, non-motorized recreation; multi-aged management of timber is allowed
Wildlife Dominant Areas	Areas allocated to protect values associated with essential, significant, and specialized wildlife habitat areas	Manage habitat for wildlife to enhance populations, also recreation and timber are allowed where they will not have a negative impact on wildlife habitats
Visual Consideration Areas	Areas that have natural settings in which visual attributes enhance the enjoyment for recreational users	Maintain visual aesthetic of area by limiting management activities in area
Developed Recreation Areas	Areas that typically have intensely developed recreation facilities, including campgrounds, parking lots, and modern sanitary facilities	Recreation is primary concern, secondary usages include wildlife management and visual considerations
Timber Management Areas	Timberlands	Will be managed primarily for timber under the Bureau's timber management policies and also wildlife management and dispersed recreation

Baxter State Park is an anomaly among Maine state parks. The park's mission is not only the visitor recreation experience but also the preservation of the natural integrity of the land. The Baxter State Park Authority manages the park and it is their duty to ensure that the park, "shall forever be kept and remain in the Natural Wild State."<sup>4</sup> Whereas parks managed by the Bureau are managed primarily for recreation, and whereas public reserved lands are managed primarily for conservation of resources with recreation limited to the

more adventurous, Baxter State Park does both. It has the wildness of public reserved lands alongside the infrastructure of state parks. Baxter State Park's unique history and mission, a product of its donor, Governor Percival Baxter, has allowed it to fill such a valuable niche in conservation areas. The park's ability to balance recreation with preservation is important as a model in the conservation of Maine's North Woods. This balance of recreation and conservation in Baxter State Park bridges the gap in management policies between state parks and public reserved lands.

## **Funding and Land Acquisitions**

State parks in Maine have been acquired by government purchase and by philanthropic donations from private citizens. Government land acquisitions have used both federal and state funding programs in purchasing lands for state parks, including the Land and Water Conservation Fund, United States Forest Service Forest Legacy Program and the Land for Maine's Future program. On a state level the Land for Maine's Future, under the State Planning Office, is the agency responsible for facilitating land acquisitions in Maine. It is important to note that each of these programs, while instrumental in providing funding, do not put forth proposals for land purchases, they only evaluate and fund them. The proposals for land acquisitions come from both governmental agencies such as the Bureau of Parks and Lands as well as a number of private land trusts.

Land for Maine's Future (LMF) was created in 1987, based on recommendations from the Special Commission on Outdoor Recreation. The program was charged with "responding to growing threats to Maine's natural heritage and tradition."<sup>9</sup> Since its creation the LMF has protected over 192,000 acres through a combination of fee-title purchases and conservation easements.<sup>10</sup> Early land acquisitions using LMF funds were retained by the state, but today many efforts are led by private land trusts. The LMFP is based on a partnership system whereby private land trusts or government agencies apply for funds to purchase lands with the understanding that they will have to match the LMF's contribution. The minimum contribution is fifty cents to every dollar spent by the LMF, though actual contributions are often much more significant.<sup>9</sup> (Since 2000 partner groups have contributed \$2.40 for every dollar spent by the LMF.<sup>10</sup>) The LMF works with a diverse group of actors, and while they are a government agency, they are not limited to conserving lands only for state ownership.

The LMF is funded by bonds issued by the legislature. In 1987 and 1999 these bonds totaled \$35 million and \$50 million respectively.<sup>10</sup> The erratic nature of funding for LMF has been recognized as a limiting factor of the program's land acquisition efforts. Appeals for a continuous funding mechanism have been made but so far unmet. Tim Glidden, director of LMF, suggested that an annual budget of \$15-20 million would be an effective amount and consistent with the ambitious land acquisition program that Maine needs.<sup>11</sup>

The call for an ambitious land acquisition program was reiterated in the 1997 Land Acquisition Priorities Advisory Committee (LAPAC) report,

commissioned by Governor Angus King, to, “help chart the course for future land acquisitions initiatives in Maine.”<sup>12</sup> The LAPAC report set three goals for the state regarding land acquisition: to increase Maine’s public and private conservation lands by 10% by the year 2000 and double conservation lands by 2020; to establish long term, state acquisition funding; and to operate land acquisition programs in a way that benefits all of Maine.<sup>12</sup>

The report prioritized future land acquisitions in Maine, and gave the state a strategic plan in terms of what lands the state should acquire. Lands with access to water, lands in Southern Maine, ecological reserves, river systems, and undeveloped coastline were determined to be the highest priorities for Maine.<sup>12</sup> The conspicuous omission of lands in the North Woods demonstrates that, at the time, the North Woods was not a major concern for state land acquisition despite the report’s recognition of the recreational, economic, and ecological importance of the area and the anticipated development pressures. The lack of a land acquisition program directed at the North Woods can therefore be traced back to this 1997 report.

There are two notable federal programs that have been used to acquire conservation lands in Maine, the Land and Water Conservation Fund and the US Forest Service Forest Legacy Program. Unlike LMF acquisitions however, fee title lands or easements purchased using these funds must be owned by the state.

The Land and Water Conservation Fund (LWCF), under the National Park Service, has traditionally been the major federal fund for state land acquisition grants. (See chapter by Randa Capponi) Since its creation in 1965 it has provided over 40,000 grants and \$3.6 billion to protect over 2,600,000 acres nationwide.<sup>13</sup> The LWCF was created to maintain a nationwide legacy of high quality recreational areas stimulate non-federal investments in the protection and maintenance of recreation resources.<sup>13</sup> However, the importance of the LWCF has decreased as federal funds for state conservation have decreased. Beginning with administration cuts during the Reagan administration and continuing with budget downsizing in the 1990’s, to the point that today LWCF funds are “virtually nonexistent.”<sup>14</sup> This can be seen in the history of federal funds for the LWCF since its inception in 1965 and its high point of \$369 million in 1979 to \$0 from 1996-99.<sup>13</sup> The fund has since recovered, but only minimally, and in Fiscal Year 2006 President Bush proposed \$0 for the fund, that amount has since been increased to just over \$28 million.<sup>13</sup> Similarly to the LMFP, it is a partnership program requiring extensive state participation and funding. In Maine, LWCF funding reached a high in the late 1970’s when LWCF contributions were just over \$2.5 million. However from 1980 through 2000 LWCF funding in Maine never exceeded \$.5 million per year.<sup>15</sup> Funding has declined steadily from 2002-2005 (Figure 2).

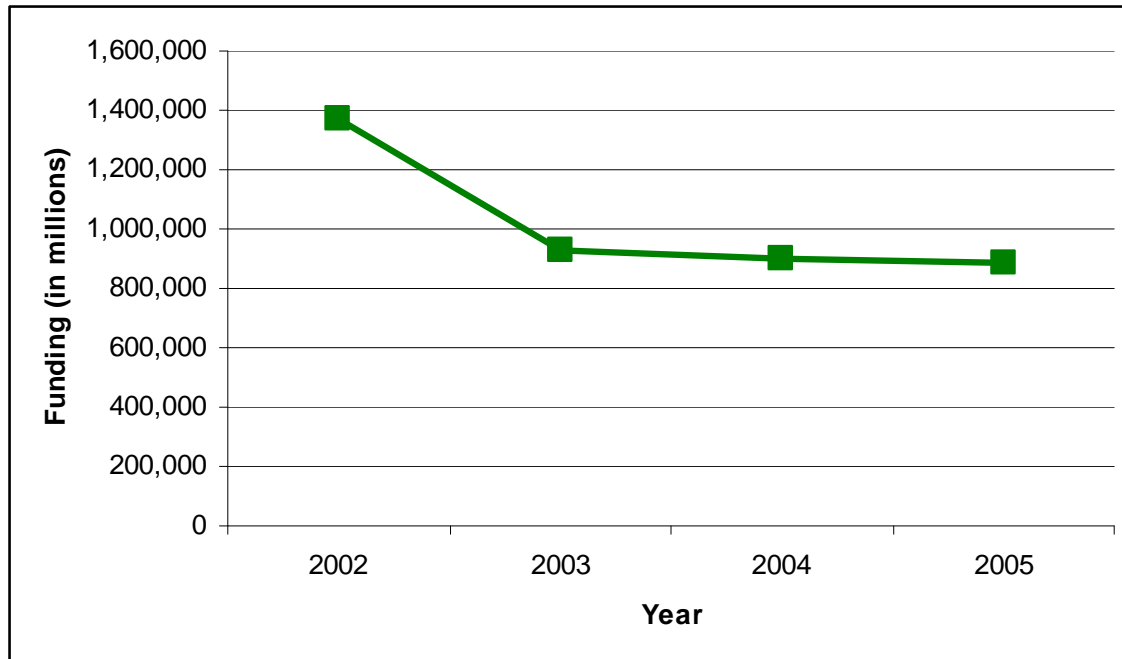


Figure 24. Land and Water Conservation Fund obligations in Maine, 2002-2005<sup>15</sup>

The USFS Forest Legacy Program (FLP) is another federal fund that has been used to purchase public lands in Maine and offers potential funding for conservation in the Maine North Woods. This program is dedicated to the conservation of large tracts of forest land from conversion to non-forest uses, most notably development, one of the threats to the North Woods. The FLP seeks to preserve working forests and other, “traditional forest uses” including: public access, timber, hunting, fishing, trapping, hiking, camping, skiing, and boating. Since 1993 the FLP funds have conserved a total of 59,465 acres in Maine with a total expenditure of \$9.7 million.<sup>15</sup>

Before proposals are received by the USFS FLP they must be submitted to the Maine FLP, which prioritizes proposals and submits those most worthy to the USFS FLP. Prioritization is based on a number of criteria. The most important are: the threat of conversion to non-forest uses, threatening traditional usages and also that 50% of the forest must be used for commercial timber.<sup>2</sup> These criteria demonstrate the commitment to the multi-use approach embraced by the Maine FLP program. On a federal level proposals are evaluated based on four key components: 1. Importance, the “public benefits gained from protection and management of the property” 2. Threat of conversion to non-forest uses 3. Strategic importance and 4. Readiness.<sup>16</sup> One of the major concerns about the future of the North Woods is its continued use as commercial timberland. The FLP provides one way through which forests can be preserved for both recreation and forestry.

There is a strong link between the specific funding program and the type of land management practices pursued on acquired lands. Lands acquired with federal Land and Water Conservation funds are generally managed for recreational purposes, while lands acquired using Forest Legacy funds are

maintained to promote traditional forest uses, namely forestry. In Maine, these lands would tend to be managed as state parks and public reserve lands, respectively, each by the Bureau of Parks and Lands, but within different land classifications and subject to different management policies. Funds from the Land for Maine's Future, unlike the two federal funding programs, are used to purchase lands for a variety of uses ranging from recreation to more traditional forest uses. Also, since Land for Maine's Future works with private actors, such as land trusts, land management policies after acquisition may be case specific, catering to conservation ideals of the individual partnership organization.

Similarly to many government agencies and organizations dedicated to land use management, the Maine Bureau of Parks and Lands is under funded. While the general fund does provide some money for park management, the Bureau is forced to seek outside funding. One mechanism that has helped Maine state parks avoid a major financial deficit is private trust funds. State parks that are the result of private donations often also have private trusts to fund their management. Baxter State Park is an example of such a park. While effective, this funding mechanism is not an institutionally sound way to ensure funding for state parks; it is too case specific, and relies too heavily on private interests. In order that all state parks receive the best possible management the government must find additional sources of funding or allocate more money from the general fund to state parks. Management costs of Public Reserved Lands have a twofold advantage over state parks. First, less funding is necessary since there are fewer to no staff and/or facilities, and second, "funds generated from careful timber management cover the cost of managing recreational use."<sup>7</sup> The result is that public reserved lands are more self-sufficient economically and do not require the amount government financial resources needed by state parks.

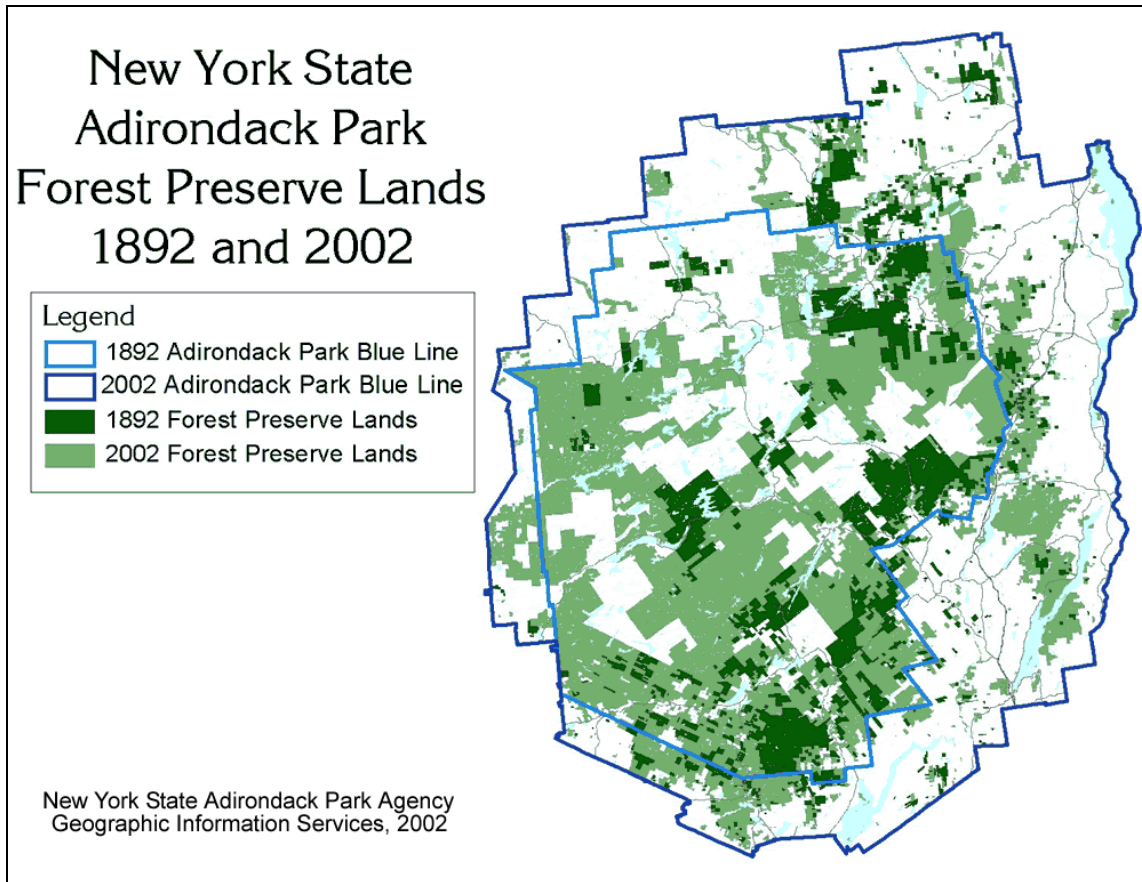
### **Adirondack State Park**

Adirondack State Park (ASP) in New York is an excellent example of a state park based conservation effort, and provides valuable lessons for Maine's efforts to conserve the North Woods. There are a number of similarities between the Adirondack region and Maine's North Woods. Both northern New York and northern Maine are predominantly forested, mountainous, and contain numerous ponds, lakes, streams, and rivers. Also, population in each area is low and dispersed throughout a large geographic area.

A unique feature of Adirondack State Park is its pattern of land ownership: it is comprised of a checkerboard of private and public lands. Of the approximately six million acres encompassed by the park, just over three million are privately owned.<sup>17</sup> In Adirondack State Park state lands are protected as "forever wild" and any development that does take place, whether on public or private lands, is closely monitored and regulated to fit with the parks overall goal of conservation. An examination of the history, policy processes, and agencies involved in Adirondack State Park reveals the ways in which state park can be an effective management and conservation tool.

Adirondack State Park was founded in 1892 and has gone through

numerous phases of expansion. The original park was delineated by a “blue line” within which the state was to focus its land acquisitions. This original boundary encompassed 2,807,760 acres only 551,093 of which were state owned and therefore officially part of the park.<sup>18</sup> It wasn’t until 1912 that the state realized it would never be able to accomplish its goal of obtaining all of the private lands within the blue line and therefore it classified all lands, public and private, within the blue line as part of the state park. Major expansions in Adirondack State Park occurred in 1912, 1931, 1956, and 1972.<sup>18</sup>



**Figure 25. Adirondack Park Forest Preserve Lands 1892 and 2002<sup>19</sup>**

State owned forest preserve lands, which currently make up 98% of state owned lands in the park, experienced a surge in recreational use in the early 20<sup>th</sup> century. This spurred an increase in the development of facilities by the Department of Environmental Conservation in order to accommodate visitors.<sup>18</sup> The trend of increasing visitation and development continued into the 1960's which drew attention to the fact that both public and private lands within the park were under intense pressure for development and that no land use regulations were in place.

In 1968, a temporary commission was appointed by the governor to assess the status of the park and the future outlook for both public and private land holdings. The commission recommended the creation of an Adirondack

Park Agency (APA) to regulate land use, to create a comprehensive plan for the area, and to regulate land use practices on public and private lands. In 1971 the APA was created by the Adirondack Park Agency Act, and was given a mandate to create a master plan for public lands, as well as create a land use and development plan for the privately owned lands within the park.

The goal of the Adirondack Park Agency Act is to, “insure optimum overall conservation, protection, preservation, development and use of the unique scenic, aesthetic, wildlife, recreational, open space, historic, ecological and natural resources of the Adirondack Park.”<sup>20</sup> A year after the Adirondack Park Agency Act passed the Private Land Use and Development Plan was submitted to the state. There was strong opposition from private land owners to the proposed power of the APA to regulate private lands within the park. In an effort to appease opposition a local government board was created to review, advise, and assist the Adirondack Park Agency. Also, there was an increase in funds for local planning. The role of the local review board is to monitor the administration and enforcement of the land use and development plan and report recommendations to the governor and legislature. This ensures a level of local participation in the policy process that allows local voices to be heard and acted upon when dealing with land use management policies.

The 1973 amendment to the 1971 Adirondack Park Agency Act gave the Agency the ability to regulate land uses on private land. This legislation was groundbreaking in that it delegated the authority to manage private lands to a governmental agency. It provided a concrete mechanism through which the state could exercise the power to ensure that private lands within the park were managed with the overarching concern of conservation in mind. From the perspective of private landowners, the Act was an attack on private property rights, but from a conservationist view it was a monumental piece of legislation.

The goal of the Land Use Development Plan is to channel future growth around existing communities, where basic infrastructure such as roads, utilities, and services exist.<sup>21</sup> To do so the plan classifies all lands within the park into different categories . [http://www.apa.state.ny.us/About\\_Park/history.htm](http://www.apa.state.ny.us/About_Park/history.htm))The plan classifies state and private lands within the park into different categories of use. Private lands are grouped into six categories: hamlet, moderate intensity, low intensity, rural use, industrial use, and resource management (Table 2). Specific limitations on development are assigned to each category. Current policy requires that any private landowner wishing to develop his or her lands must submit a plan to the APA. The agency reviews the proposed development and either accepts or rejects it. State owned lands are classified into nine categories: wilderness, primitive, canoe, wild forest, intensive use, historic, state administrative, wild, scenic, and recreational rivers, and travel corridors (Table 3). Each classification has a set of rules designating acceptable forms of development.

**Table 13. Private land classifications and acreages in Adirondack State Park<sup>22, 23</sup>**

Private Land Classification	Acreage	Description	Basic Management Guidelines
Hamlet	53,415	Varied communities that contain a sizeable permanent, seasonal and transient populations, with a high level of public services and facilities	Hamlet areas will serve as the service and growth centers in the park and are intended to accommodate a large portion of the necessary and natural expansion of the park's housing, commercial and industrial activities
Moderate Intensity Area	101,968	Areas where the capability of natural resources and the anticipated need for future development indicate relatively intense development, primarily residential, is suitable and desirable	To provide for development opportunities in areas where development will not significantly harm the relatively tolerant physical and biological resources
Low Intensity Area	269,833	Readily accessible areas, within reasonable proximity to hamlet areas where physical and biological resources are fairly tolerant and withstand development at a slightly lower level than hamlet and moderate intensity areas	To provide for development opportunities for residential housing for park residents and also seasonal home market
Rural Use Area	1,015,962	Areas where natural resource limitations and public considerations necessitate stringent development restraints, characterized by shallow soils, severe slopes, significant ecotones, critical wildlife habitats and proximity to key public lands	To provide for and encourage rural land uses consistent with the relatively low tolerance of the areas' natural resources and to prevent strip development along major travel corridors, development should be residential and occur in small clusters on carefully selected sites
Resource Management Area	1,553,594	Lands where the need to protect, manage, and enhance forest, agricultural, recreational, and open space resources is of paramount importance because of overriding natural resource and public considerations	To protect the delicate physical and biological resources, and encourage economic management of the forest, agricultural, and recreational resources essential to the character of the park
Industrial Use Area	122,909	Areas substantial in size where land uses are predominantly of an industrial or mineral extraction nature and have potential for new industrial development	To encourage the continued operation of existing industrial and extraction uses important to the economy of the Adirondack Park region

**Table 14. Public land classifications in Adirondack State Park<sup>22, 23</sup>**

Public Land Classification	Acreage	Description	Basic Management guidelines
Wilderness	1,071,217	An area of state land or water having a primeval character without significant improvement or human habitation	To achieve and perpetuate a natural plant and animal community where man's influence is not apparent
Canoe	17,634	An area where the watercourses or the number and proximity of lakes and ponds make possible a remote and unconfined type of water-oriented recreation in an essentially wilderness setting	To protect the quality of water and fishery resources while preserving a wilderness character on the adjacent lands
Primitive	45,670	Essentially wilderness in character but contains structures or uses inconsistent with wilderness or is contiguous to private lands that are of size and influence to prevent wilderness designation	To achieve and maintain as close to wilderness as possible
Wild Forest	1,288,528	An area where the resources permit a higher degree of human use than in wilderness, primitive, or canoe areas while retaining an essentially wild character	To protect the natural wild forest setting and to provide those types of outdoor recreation that will afford public enjoyment without impairing the wild forest atmosphere
Intensive Use	19,508	An area where the state provides facilities for intensive forms of outdoor recreation by the public	To provide the public opportunities for recreation that are in harmony with the relatively wild character of the park
Historic	530	Locations of buildings/structures that are significant in the history or culture of the Adirondack Park, the state, or the nation	To preserve the quality and character of the historic resources
State Admin.	1,554	Areas where the state provides facilities for a variety of purposes that are not primarily designed to accommodate visitors to the park	To provide facilities for the administration of state lands or programs
Wild, Scenic, and Rec. Rivers	n/a	A river or section of river that is free of diversions and impoundments, with a river area primitive in nature and free of any man-made development	No river or river area will be managed or used in a way that would be less restrictive in nature than the requirements of the Wild, Scenic, and Recreational Rivers Act
Travel Corridors	n/a	A strip of land constituting a roadbed and right-of-way for state and interstate highways in the park	To achieve a park-like atmosphere on state lands within the travel corridor that complements the total Adirondack Environment

The Adirondack Park Agency Act and the Master Plan created by the APA recognize the unique pattern of land ownership within the park and attempt to forge policies that are equitable to private land owners. The Plan recognizes the economic importance of private lands and their timber and mining operations, which are vital to the economic well being of the park territory. The Master Plan for the APA also prioritizes land acquisitions to be pursued by the agency. Land acquisitions are focused on large, contiguous tracts of forested land, with emphasis on lands that will connect existing state lands as well as tracts of land with unique features, such as higher elevations, native plant species, or specific ecological, scenic, or geological interest.<sup>23</sup> The Master plan further recognizes the importance of the forest products industry in the Adirondacks and recommends against acquiring highly productive timber lands, although conservation easements that allow sustainably managed timber lands are encouraged.

Adirondack State Park is funded primarily through the New York’s general fund, with limited additional funding coming from the federal special revenues fund (Table 4).

**Table 15. Adirondack Park Agency funding, 2002-2005<sup>24</sup>**

Source	2000-01	2001-02	2002-03	2003-04	2004-05 (recommended)
New York General Fund	4,015,700	4,345,000	4,237,000	4,177,000	4,177,000
Federal Special Revenues Fund	300,000	0	900,000	900,000	0
Total	4,315,700	4,345,000	5,137,000	5,077,000	4,177,000

Additionally, from 2002-2005, \$50,000 was allocated annually to the Adirondack Park Local Government Review Board.

## ***Discussion***

Adirondack State Park provides a model for what is achievable in Maine through a focused state initiative. The major lesson to be learned from the Adirondack State Park model is that private and public lands can coexist with a common goal of conservation. Also, there are major benefits to streamlining the conservation process, and creating a single agency whose sole aim is the conservation of Maine’s North Woods. Currently there are a number of agencies and funding mechanisms used for land acquisitions and management in Maine’s North Woods: the Land for Maine’s Future Program, the Land and Water Conservation Fund, and the Forest Legacy Program are all used to purchase

fee-title or easement lands; there are also a number of management agencies and groups, including the Bureau of Parks and Lands, Department of Inland Fisheries and Wildlife, and numerous private groups such as the Appalachian Mountain Club and Nature Conservancy. There are different land use classifications, such as state parks, public reserve lands and furthermore lands are classified as wildernesses, backcountry recreation areas, developed recreation areas etc. While the diversity of actors has allowed Maine to acquire and conserve wide range of lands, many of which are state parks, the decentralized nature of the system is not conducive to a single, large scale conservation effort as would be required in the North Woods. Therefore the creation of a single government agency whose sole purpose is the acquisition and management of lands in the North Woods is a crucial to the conservation of the region.

The creation of an agency similar to the Adirondack Park Agency could facilitate communication between the diverse actors involved in the North Woods as well as bring resources from all groups together, utilizing the strengths of each particular group. A North Woods Agency would also focus on acquiring lands in the Maine North Woods for public uses. Similarly to the “blue-line” of the Adirondack Park a North Woods Agency in Maine could bring together financial resources from the multiple actors interested in conserving the North Woods and work systematically to acquire lands for conservation. A focused land acquisition effort in the North Woods has never been attempted, and consequently land acquisitions, while plentiful, have been dispersed across the state. One promising sign for the North Woods is the re-prioritization of the region for land acquisition, especially conservation easements. Today the North Woods is second in priority only to coastal properties in southern and coastal Maine for land acquisitions to be pursued with the 12 million dollar bond issue for the Land for Maine’s Future Program that passed in November 2005.<sup>25</sup>

Under the guidance of a single government agency, a patchwork of public and private lands could be united in a greater conservation area. In accordance with the current Integrated Resource Policy used by the Bureau of Parks and Lands, a North Woods Agency could classify all land in the Maine North Woods in terms of acceptable land uses and manage them accordingly. The ability of the Adirondack Park Agency to manage lands within Adirondack State Park are rooted in its land classification system. That a similar classification system is already in place in Maine is a promising step in managing the North Woods.

A Maine North Woods State Park would emulate Baxter State Park, different areas within the park could still have very different character, ranging from facilities and staff that characterize state parks to the wilderness and forestry practices that characterize public reserved lands. In addition to user entrance fees, permits for hunting and fishing could be required, providing additional sources of funding. The model exemplified by Baxter State Park should be pursued to balance a wilderness character with user friendly facilities, enabling both rugged outdoor enthusiasts in search of a backcountry experience as well as day use visitors who don’t venture more than a few miles from their car to enjoy the recreational opportunities provided by the park. Baxter State Park,

while primarily funded by a private trust fund does also charge user fees (only to out-of-state citizens) that help to manage the park. Other states such as Nebraska and Indiana obtain 65% of their operating budget from user fees.<sup>26</sup> While funding concerns are at the forefront of management concerns for state parks, and need to be considered the potential for user fees to be a major source of funding should not be underestimated.

Commercial timber could also aid user fees in funding a state park, thereby combining practices currently employed by state parks and public reserve lands. A great advantage of having a park encompass working forests would be that revenue generated from such forests would be a source of revenue for managing recreation opportunities. However stronger government funding would also be required. The success of the Adirondack Park has been due in part to the funding its managing agency, the APA receives. The funding comes from the state's general fund and covers operating costs such as management and maintenance of facilities and also provides money to the local review board. While user fees and forestry revenues are important potential funding mechanisms for a state park in the North Woods, strong government funding is also essential.

Funding for land acquisitions to create a state park would come from existing programs, both state and federal, since programs such as the Land and Water Conservation Fund and Forest Legacy Program would each be applicable to the diverse land uses encompassed in the area. While LWCF funding has decreased in recent years, strong environmental advocacy and a change of administrations could change that and Maine needs to be poised to take advantage of federal funding mechanisms when and if they increase. Another promising sign is the bond that passed for the Land for Maine's Future Program in 2005. The bond, which passed 66%-34%, demonstrates that Maine citizens realize that conserving land for public access and recreation is crucial to Maine's future. Although the 12 million dollar bond is a far cry from the 50 million dollars that was originally proposed it demonstrates strong political leadership goals of conservation and acquisition of public lands. Strong political leadership will be crucial to a state based conservation effort to conserve the North Woods.

The greatest potential conflict would come from timber companies with a strong economic interest in the area. Furthermore, outlining a region that prioritizes land acquisitions for the state may cause landowners in the North Woods to feel targeted. However, involving landowners in a review board, similar to the Adirondack Review Board, or within the North Woods Agency itself, the state could foster a relationship between landowners that would promote the interests of all parties. A North Woods Agency would benefit landowners by providing technical expertise and facilitating natural resource inventory to give landowners a better understanding of their lands and how to manage them, whether for timber or recreation. An example of a potential agreement between the state and private landowners is that in exchange for allowing public recreation on their lands and harvesting timber sustainably, the state would give a portion of user fee revenues to private landowners, thereby increasing their incentive to provide public access while still maintaining a working forest.

A Maine Woods State Park would have numerous advantages over a Maine Woods National Park. Beginning with land acquisition, a national park would require a massive mobilization of federal funds for the outright purchase of the land, and would not take advantage of the numerous groups dedicated to conserving Maine's North Woods. Also, whereas a state park based initiative could incorporate conservation easements and public-private agreements about access on privately owned lands a national park would preclude such possibilities. Additionally the loss of local control over land and acceptable land uses would likely spur great resentment and protest from many citizens. One key to conservation in the Maine North Woods will be the preservation of local control and input, a top-down federal government initiated conservation effort is likely to be seen as authoritarian and therefore more likely to be unsuccessful unless it involves local communities and landowners. A decentralized system based on a patchwork of private and public lands, with different land classifications and acceptable lands uses, as in Adirondack State Park is more likely to succeed. Also, a state park based conservation effort will provide more incentive to stakeholders in Maine to take initiative and create and provide for recreational opportunities if they know they will be the primary financial beneficiaries, whereas in a National Park revenues would go to the Federal government, and local groups would not be stakeholders in the park and have little incentive to become involved.

## ***Conclusion***

Creating and fostering relationships between public and private lands and landowners is essential to a conservation effort in Maine's North Woods. There do not need to be heavy handed regulation mechanisms over private lands, such as those exercised by the Adirondack Park Agency if conservation and timber are allowed to co-exist and private landowners are allowed to benefit from public recreation on their lands. As in the Adirondacks, acquiring the entirety of the North Woods is an insurmountable task, yet by using a variety of conservation tools from easements to informal and formal partnerships with landowners to fee-title ownership and user fees for recreation, Maine can protect the North Woods from development, and maintain the character of the North Woods as both a haven for recreation as well as a working forest. An innovative state park initiative that incorporates lessons from Adirondack State Park, as well as from Baxter State Park could accomplish such a feat and conserve the Maine North Woods for future generations.

## Appendix

**Table 16. Maine state parks managed by the Bureau of Parks and Lands acreage statistics<sup>3</sup>**

State Parks	Acreage
Allagash Wilderness Waterway	22,840
Aroostook	664
Birch Point	62
Bradbury Mountain	590
Camden Hills	5,710
Cobscook Bay	871
Crescent Beach	244
Damariscotta Lake	19
Ferry Beach	117
Fort Point (Pownal)	156
Grafton Notch	3,192
Holbrook Island Sanctuary	1,345
Lake St. George	358
Lamoine	55
Lily Bay	924
Moose Point	146
Mt. Blue	7,489
Owls Head	13
Peacock Beach	93
Peaks-Kenny	813
Penobscot River Corridor	12,500
Popham Beach	605
Quoddy Head	541
Range Ponds	740
Rangeley Lake	870
Reid	770
Roque Bluffs	274
Sebago Lake	1,342
Shackford Head	87
Swan Lake	67
Two Lights	41
Vaughan Woods	165
Warren Island	70
Wolfe's Neck Woods	244
<b>Total Acreage</b>	<b>64,017</b>

**Table 17. Public Reserved Lands Acreage Statistics<sup>3</sup>**

Public Reserved Lands	Acreage
Bald Mountain	1873
Bigelow Preserve	36,700
Chain of Ponds	1141
Chamberlain Lake	9557
Cutler Coast	12,170
Dead River	4771
Deboullie	21,871
Dodge Point	506
Donnel Pond	14,498
Duck Lake	25,220
Eagle Lake	23,882
Four Ponds	6,015
Gero Island	3,845
Great Heath	6,067
Holeb	19,651
Little Moose	15,047
Mackworth Island	100
Mahoosucs	27,253
Moosehead Lake	12,673
Nahmakanta	42,818
Pineland	600
Richardson	17,757
Rocky Lake	10,904
Round Pond	20,349
Scraggly Lake	9,057
Seboeis	12,902
Squapan	17,985
Telos	22,806
Wassataquoik	2,340
<b>Total Acreage</b>	<b>400,358</b>

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# Funding for the Acquisition of State Conservation Lands in the North Woods

Randa A. Capponi

## *Introduction*

There is a growing concern over the nearly two million acres of land that are developed each year in the United States.<sup>1</sup> One measure of this public concern is the success rate of conservation initiatives. In 2004, voters across the country approved 75% of all bond proposals, resulting in an additional four billion for conservation.<sup>2</sup> Another is the growing involvement of federal, state, regional, local and private actors.<sup>3</sup> Even though states have conserved land for various reasons since the mid-1800's, today many states are implementing policies and supplying funds for land conservation at a far greater rate.<sup>3</sup> For example, in the 2000 and 2002 elections California voters approved three bond initiatives totaling \$6.7 billion to fund the purchase of parks and open space. Overall most states have developed new programs or have expanded existing ones to fund the acquisition of lands for conservation.<sup>3</sup>

Maine has not been as aggressive as some states in acquiring land for conservation. Currently only five percent of the total land area is owned by the state, not including conservation easements.[4] This proportion of state ownership is a concern because the Maine North Woods, the largest tract of undeveloped land east of the Mississippi, is now facing tremendous development pressure.<sup>4</sup> Maine's major program is the Lands for Maine's Future Program which has acquired nearly 140,000 acres of land since its creation in 1987 through the funding of two voter approved bonds of \$35 and \$50 million. In addition to these funds, the LMF has acquired nearly \$50 million dollars from private and federal dollars. Recently, voters passed a third bond that will provide the LMF with an additional \$50 million for land acquisition.<sup>5</sup>

In this paper I explore the array of factors that affect the acquisition of lands for conservation and recreation in Maine. I first describe the historical context of land acquisition in the United States and the current role of federal agencies, laws, and funding. I have chosen three states with higher proportions of conserved land in order to examine the factors that may be responsible for differences in the amount of land under conservation. To conduct a systematic study, I identify five criteria that appear to be important determinants in the process of state-level land conservation and use them to compare these three states to Maine. I use this analysis to identify key trends that are common among the states larger proportions of land under conservation. I conclude with some final lessons and recommendations that may help Maine increase its proportion of state conserved lands.

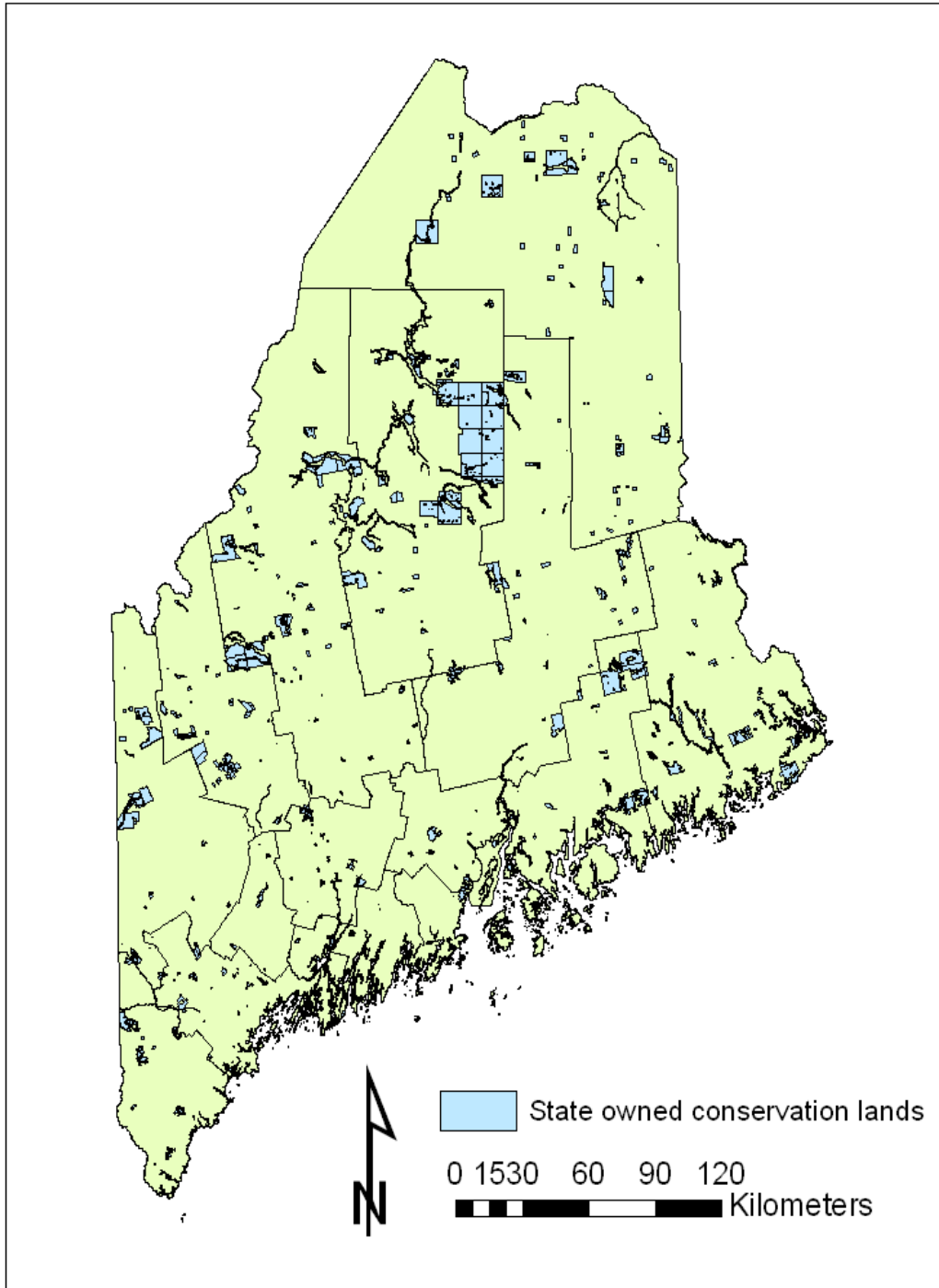


Figure 26. State owned conservation lands in Maine<sup>6</sup>

## **Methods**

To identify factors that are positively or negatively associated with the conservation of land in a state, I examined two books, three academic studies, four government reports and three non-profit organization reports. In particular, I used a 2005 report by the Trust for Public Land and the Land Trust Alliance which describes the outcome of the state and county referendum and initiatives in the 2004 election to demonstrate the growing public support for land conservation.<sup>2</sup> I used a study by Charles Malone to show state government involvement in ecosystem and natural resource management.<sup>7</sup>

I define state conservation lands as state parks, state forests, state natural areas, state historic sites, and wildlife areas.<sup>6</sup> I do not consider conservation easements because I chose to focus my research on state-owned and acquired conservation lands. I chose Florida, Minnesota and New Jersey as case studies to compare to Maine because all three are known for aggressive land acquisition programs and also have a significant percentage of state conservation lands.

## **Context**

### **Historical**

There have been three broad phases of federal land ownership in the United States. The period from 1781-1862, known as the “acquisition era,” saw a great surge in the acquisition of federal public domain lands. By the end of 1867 the federal government had acquired 1.8 billion acres of land which accounts for 81% of the United States land area.<sup>8</sup>

Following the “acquisition era” was the “disposition era,” from 1862-1891, as the General Land Office of the newly established Department of the Interior used various policies to transfer lands in the public domain to the private domain. The Homestead Act of 1862 encouraged the sale of public lands to individuals to live on and cultivate.<sup>9</sup> The final vestiges of this did not end until 1976 after 12% of the public domain in the West had become privately owned. Land was also transferred to the states and the railroads through land grants.<sup>9</sup>

This third period was the management era which lasted from 1891-1964. It became evident that many of the disposed lands were being exploited, which created public demand for the preservation of the remaining public lands, especially those that were prized scenic areas.<sup>10</sup> A precursor to this management period was the formation of Yellowstone National Park in 1872. Soon after, the Forest Reserves Act of 1891 gave the president the power to create national forests for the public good. Presidents Harrison and Cleveland were the first to use this Act to collectively conserve 17.5 million acres of national forest.<sup>9</sup> In a relatively short period of time following the Forest Reserves Act Congress created several new agencies to manage federal lands. The National Forest Service was established in 1911 through the Reserves Act, the National Park Service was created in 1916, and the US Fish and Wildlife Service was created in 1940. The Bureau of Land Management (BLM) was not created until 1946, but

it initially contained many conflicting laws which made the new bureau ineffective in managing lands. It was not until 1976 with the passage of the Federal Land Policy and Management Act that BLM was given its own legislative mandate that included a unified set of laws to manage public lands. Today these four agencies manage nearly all of the federal lands in the United States (Table 1).<sup>11</sup>

**Table 18. The four major federal agencies in charge of managing public lands and natural resources throughout the United States and the amount of acres they own and manage today**<sup>10, 11, 12, 13</sup>

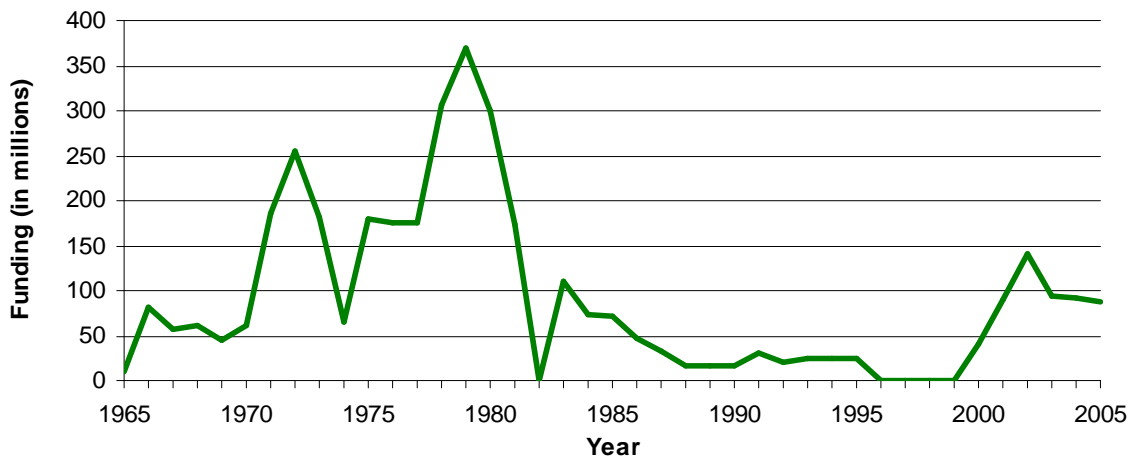
<b>Federal Agency</b>	<b>Date Created</b>	<b>How is was created</b>	<b>Area Owned 2005 (Millions of acres)</b>
National Forest Service	1911	The Forest Reserves Act of 1891	191
National Parks Service	1916	The National Parks Organic Act of 1916	84
US Fish and Wildlife Service	1940	Merger of the Bureaus of Fisheries and Biological Survey in 1939	93
Bureau of Land Management	1946	Merger of the Grazing Service and the General Land Office in 1946	261

## Political

All branches of government, including the legislative, the judicial and the executive branches are responsible for making policy and laws for public lands. Congress is given certain powers over public land and natural resources. The Property Clause (Article 4, Section 3, Clause 2 of the United States Constitution) gives Congress the power to make rules regarding property owned by the United States.<sup>10</sup> The courts have often used their judicial review power in conjunction with The Endangered Species Act or the National Environmental Policy Act (NEPA) in their procedures and decision making. NEPA contains “judicially enforceable procedural standards” that allow the courts to affect or promote public land policy. The president has constitutional and legislative powers that allow him set the agenda. Through the Constitution he is given the right to be the “federal property owner” of federal.<sup>10</sup> The president has “inherent executive withdrawal power” that he can use to protect lands that he deems necessary. Also, the Antiquities Act of 1906 gives the president the authority to use federal lands to create national monuments.<sup>14</sup> President Clinton used this act to preserve 5.9 million acres of federal lands.<sup>14</sup> Many presidents have taken advantage of this power to protect and preserve public lands.

There is also specific federal funding that is available for purchasing new land for conservation. The Land and Water Conservation Fund (LWCF) is one source of federal funding that was established in 1965. The LWCF is a trust fund that acquires money from federal outdoor user recreation fees, federal motorboat fuel tax, surplus property sales, as well as from oil and gas leases on the outer continental shelf. Annually these revenues total about \$900 million, yet not all of

this is appropriated to fund conservation. Instead a large portion of the revenue often remains in the federal treasury and is used for other federal projects. These funds are allocated by the federal government either to the federal agencies: The National Forest Service, the National Park Service, the US Fish and Wildlife Service, and the Bureau of Land Management or to states. The president decides what part of the annual federal budget should go to this fund every January when he presents his budget proposal to Congress. Congress then decides how much of the funds are allotted to each group. Since 1965 around 40,000 projects have been completed using LWCF funds.<sup>15</sup>



**Figure 27. The amount of funds dispersed by the Land and Water Conservation Fund between 1979 and 2005<sup>16</sup>**

Historically, Congress has unevenly allocated this federal funding between the federal agencies and states. From 1965 to 2005, of the total \$28.1 billion appropriated from the fund, only \$3.7 billion went to states, which is less than 30% of the total allocation. Figure 2 shows the sporadic funding that states have received from LWCF from 1965 to 2005. In 1979 LWCF dispersed a record amount of \$369 million. Following another peak in 2002, the amount has been declining<sup>15</sup> Also, notice that in 1982 and between 1996 and 1999 states received no funding from the LWCF.<sup>16</sup>

In addition to the uneven allocation between the states and federal agencies, there has also been uneven allocation of federal funding among the states themselves. Funding is allotted to state based on individual state reports that are generated by each state every five years. These reports are called Statewide Comprehensive Outdoor Recreation Plans (SCORPs).<sup>15</sup> Because the funds are allocated by Congress the amount of funding to each state can be influenced by the amount of intensity of lobbying by special interest groups. Most of the funds have gone to a total of eight states in the West and the South: California, Florida, Washington, Oregon, Nevada, Georgia, Louisiana, and Texas.<sup>3</sup> From 1965-1998 California received a total of \$600 million dollars which is 20% of the total state allocation. Florida received \$230 million, or 8% of the

total. Since the Land and Water Conservation Fund has been funding for conservation is often left in the hands of the individual states.

## ***Results and Discussion***

### **Five criteria for analysis**

To produce a systematic study of state-level land acquisition, I identify five criteria that appear to be important determinants of the proportion of state land under conservation. These factors are summarized in Table 2.

#### *Public Opinion*

According to LandVote 2004, a yearly report on the outcome of ballot measures for conservation, there is evidence that the public values land conservation. In 2004 voters approved measures for conservation that totaled four billion.<sup>2</sup> The LandVote 2004 report also points out that the voting results were non-partisan; demonstrating that land conservation is a common value among the electorate. Part of this is due to the tangible results received from conservation lands.

#### *Initiators*

This is the group of issues that usually trigger the process of land acquisition. At times the land acquisition process is influenced by the need for environmental protection. Endangered species may influence land use policy in an area. An example of this occurred in the Pacific Northwest with the conflict between protection of the spotted owl and the interest of the timber companies. Here the Endangered Species Act was used to reduce the amount of logging allowed in the “old growth” forests where the species’ habitat is located.<sup>7</sup> In this case, land was not acquired, but it was conserved in order to protect the habitat of the spotted owl. In other cases the land may provide an ecosystem service to society making it in society’s best interest to preserve the land. An example of this is New York City’s decision to preserve the aquifers around the city’s water supply as opposed to building a water treatment plant. It in fact turned out to be much cheaper to preserve this land than to build a new plant.

One of the most common initiators of the process of land acquisition is the pressure of development. Many states are losing open space to development causing public access to be restricted. Consequently, the public realizes the need to acquire lands for conservation.

#### *Actors*

Actors involved in the land acquisition process may include federal and/or state agencies, non-profit groups, individuals such as wealthy patrons, state governors, and the president. Wealthy patrons sometimes buy land outright and donate it to the state for conservation, such as what Governor Baxter did for Maine when he created Baxter State Park.<sup>17</sup> These individuals are not common.

Governors can be influential in drawing up and proposing initiatives for land acquisition within a state. The last governor of New Jersey, Christine Whitman, set a target in 1998 of how much land the state needed to acquire. By 2002, her targeted was exceeded. In Maine, the governor is responsible for the original bond proposal that eventually goes to fund the LMF if first passed by congress, then by voters. The higher the governor sets the amount of the proposal, the larger chance there is for the LMF to receive considerable funding.<sup>18</sup>

The same thing applies to the President. A somewhat recent trend is that a Democratic president is more likely to propose legislation or create executive orders for the benefit of the environment. President Clinton is an example of this. While in office he used his power to preserve land.<sup>14</sup> An exception to this idea is Theodore Roosevelt, a Republican president, also conserved land for recreation during his presidency.<sup>14</sup>

### *Legislation*

The aspect of the process that involves a broad range of laws, acts, initiatives, executive orders or plans involving land acquisition and management. Legislation may involve acts that mandate or set up a funding program for the state. These acts are often initiated by the governor and approved by the state congress.<sup>14</sup>

### *Funding*

This is often one of the most difficult obstacles that states face. The state government or the public may want to acquire land, but lack sufficient funds. The amount of local, state and federal spending for land acquisition varies from state to state.<sup>3</sup>

**Table 19. A summary of the five factors that I determined affect the land acquisition in a state**

Factors	Examples
Public Opinion, demand, and values	-In 2004 voters from across the nation approved 75% of the 217 conservation measures on ballots which totaled four billion dollars for new conservation <sup>2</sup>
Initiators	-The Spotted Owl and the Endangered <sup>7</sup> Species Act in the Pacific Northwest
a. Environmental protection	-Preservation of aquifers in New York City <sup>7</sup>
-Endangered species	-Prevention of additional CO2 emissions
-Biodiversity protection	Protection of public access <sup>2</sup>
-Deforestation prevention	
b. Development pressure	-Increased property values as a result of nearby open space <sup>19</sup>
c. Economics	
Actors	-Structure, number, and influence of agencies
a. Agencies- Federal or State	-Land-trusts <sup>1</sup>
b. Non-profit organizations	-Wealthy patrons, state governors, the president <sup>10, 18, 20-22</sup>
c. Individuals	
Legislation and Programs	-Land Use Policies <sup>17</sup>
	-Zoning
	-Comprehensive planning
	-Executive orders and initiatives <sup>14</sup>
	-Statutes
	-Acts <sup>9</sup>
Funding and Finance	-Federal funding- LWCF <sup>15</sup>
	-Public bonds <sup>2</sup>
	-Non-Profit funding <sup>1</sup>

## **Case Studies**

### **Maine**

Maine's North Woods are being threatened by development. Over the past seven years nearly seven million acres of the state's 17 million acres of forestland has changed ownership. <sup>23</sup> This has caused alarm among the public over public access to forestland in the state. Historically, the timber companies that have owned and harvested forestland in North Woods have allowed the public to access their lands for recreation, but due to the globalization of the timber industry and the changing of ownership, this unwritten agreement is being threatened.<sup>4</sup> With development comes the potential for restricted public access as well as the degradation of the land that is developed.

Tim Glidden of the Maine State Planning Office stresses that Maine needs to buy this land in order to assure public access to some of Maine's most beautiful places.<sup>5</sup> State funding for land acquisition in Maine is administered mostly through the Land for Maine's Future Program. This program was created by the legislature in 1987 by the recommendation of Governor Brennan's Special Commission on Outdoor Recreation in response to public support to preserve land in Maine.<sup>18</sup> Since its creation there have been two major bonds passed by

public vote that provided the funding program with \$35 million in 1987 and \$50 million in 1999. The last of this money was used in January of 2004 and has been put into over 120 projects around the state to acquire and protect natural resources in Maine<sup>5</sup>. The next bond vote was passed in the 2005 election. The question asked if \$12 million should be used to purchase land and conservation easements. Originally this bond measure started out in the legislature as \$50 million but was cut down to \$12 million before it was put on the ballot. The bond passed with 65% in favor.<sup>24</sup>

Although \$12 million provides a good start for LMF to invest in more projects again after a full year without funding it isn't as much as what the program has worked with in the past. In just four years following the 1999 vote for \$50 million, all the funds were invested.<sup>5</sup> That breaks down to almost \$13 million each year for land purchases.

Due to a lack of funding, Maine has a small percentage of state conservation lands compared to the other fifty states. In 2000 the state was ranked 23rd.<sup>6</sup>

## **Florida**

The state of Florida provides a model of a successful public land acquisition program due to the cohesiveness of the program and the amount of lands it has acquired. As a result of these aggressive programs, Florida's state conservation lands account for 14.6% of the total state land area.<sup>25</sup> Florida is also one of the most rapidly developing states as 945,000 acres of land were developed from 1992-1997. This ranks the state fourth in the country in the amount of total acres developed.<sup>26</sup> This development pressure has been a motivating factor in getting the public and the state government to come together to use land acquisition programs to purchase conservation lands.

The program "Preservation 2000" was originally proposed by Governor Martinez in 1990 in response to public pressure to conserve lands. It includes a fund of \$3 billion collected from real estate transfer tax revenue, which is allotted over ten years for land acquisition projects. In addition, state and local governments match these funds.<sup>27</sup> Since its creation "P2000" has acquired nearly 1.75 million acres of land. This program was closely followed by the "Florida Forever" program in 1999 which basically extended "P2000" for another ten years. In the last five years the Florida Forever program has acquired more than one million acres of lands.<sup>27</sup>

In addition to its land acquisition programs, a study of the fifty states showed that Florida also has the most extensive and comprehensive ecosystem management plan. Ecosystem Management attempts to preserve natural resources and maintain economies for present and future human generations.<sup>7</sup> The plan was developed using Florida's "Environmental Reorganization Act," which was passed in 1993. This act created a new office in the state's Department of Environmental Protection called the Office of Ecosystem Management (OEM). The OEM combines natural resource management with environmental protection. Here we see another example of partnership through a merger of two state environmental agencies. Other states that have integrated agencies like Florida include Georgia, Illinois, Maryland, Minnesota, New York,

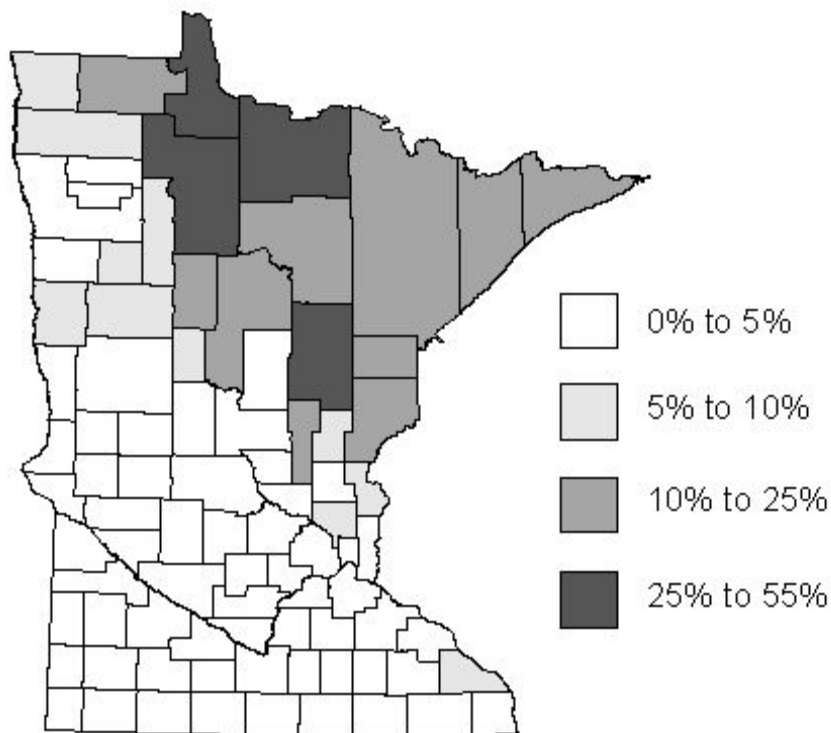
North Carolina, and Wisconsin. The office is mandated to acquire new public lands relying heavily on public participation through public hearings. Of all the states with ecosystem management, Florida is the only state that actually mandates the acquisition of lands for ecosystem management.<sup>7</sup>

## **Minnesota**

Minnesota is a second example of a state with a sound conservation funding program. Effective funding strategies have greatly increased state conservation lands to 17% of the total state land area, or 8.4 million acres.<sup>28</sup> The state is also experiencing development pressures and the rapid changing of hands of forestland similar to Maine. A study of conservation lands and state population growth between 1990 and 2000 showed that although total conservation lands increased by 1.8% to 5.3 million acres or 10.6% of the total state land area, state population increased at a faster rate. This in turn reduced the number of acres of conservation lands per person in the state.<sup>29, 30</sup>

Minnesota's aggressive funding includes the use of general bonds for conservation, which is 46% above the national average. The state also uses lottery revenue, cigarette taxes and environmental license plate revenue.<sup>31</sup> Environmental and Natural Resources Trust Fund is a permanent fund for land acquisition that was approved by voters in 1988. The trust receives 40% of its funding from annual state lottery revenue. From 1991-2003 the trust fund provided \$174 million for 287 projects.<sup>31, 32</sup> The aggressive funding continued in January 2004 with a statewide bond proposed by Governor Tim Pawlenty for over \$20 million dollars for land conservation<sup>33</sup>.

Minnesota provides parallels to Maine because it also has a large area of forested lands. The map below indicates the amount of conserved forestlands in the northern part of the state, which varies from 10-55% in northern counties. Minnesota has 57 state forests totaling nearly 4 million acres.<sup>28</sup> In addition to state forests, Minnesota also has two large national forests-Chippewa and Superior located in the northern part of the state.<sup>29</sup>



**Figure 28. Approximate percentage of state owned land by county in Minnesota<sup>28</sup>**

## **New Jersey**

New Jersey is a third example of a state with aggressive and extensive funding programs for land acquisition. From 2000 to 2005 state conservation lands in New Jersey increased from 739,000 to nearly 1.1 million acres. State conservation lands now account for 22% of the state's total land area.<sup>34</sup>

Similar to the other three states, New Jersey has seen large increases development in recent years. From 1992-1997, developed land in the state increased by 15%. Through bond voting, the residents of New Jersey have shown that they are concerned about development pressures and are willing to help fund land purchases to prevent the loss of open space in the state.<sup>2</sup> In the 2004 election, New Jersey had 44 county and municipal conservation measures on the table throughout various counties and cities in the state. Of these 44 local measures, 73% passed adding up to more than \$270 million to fund programs for the acquisition of open space. In the 2005 election 210 municipalities from all 21 counties in New Jersey voted on measures that would allot tax revenue for the acquisition of conservation lands.<sup>22</sup>

Many of these funding programs raised money by increasing local property taxes. The revenue from these various taxes went to acquisition and/or

improvement of open space, parks, recreation, water, farms, and historic properties. New Jersey had the highest number of these measures on county and municipal ballots in the country. Michigan had the second highest amount with 20.<sup>2</sup>

Not only has the public voiced their opinion on land conservation, the governor has also taken a firm stance on this issue. In 1998, Governor Whitman set preservation targets for 2002, 2008, and 2010. The target for 2002 was set at 1,004,000 acres of open space to be preserved. Due to the governor's support as well as with the state's successful voting measures, the 2002 target was exceeded by 62,000 acres. As of 2002, 20% of the state of New Jersey was preserved as open space.<sup>35</sup>

In terms of statewide funding programs, New Jersey created the Green Acres Program in 1961.<sup>22</sup> From 1961 until 1995 the Green Acres Program passed 9 statewide bond issues totaling \$1.4 billion.<sup>22</sup>

In 1989 legislation was passed that allowed counties in New Jersey to create voter approved Open Space Trust Funds. Money is acquired for these funds through property taxes. By February of 2002, 19 of the total 21 counties in New Jersey approved this fund through a referendum. Since its creation, the fund has acquired a total of 48 million for land acquisition.<sup>19</sup>

Also, in 1999 the state legislature passed the Garden State Preservation Trust Act which provided for a stable source of funding for preservation efforts.<sup>22</sup> With this act the state uses a portion of sales tax revenues to set aside \$98 million a year for land acquisition. The act also allows for the allocation of one billion dollars in public revenue bond proceeds each year.<sup>36</sup>

### ***Comparison of Case Studies***

My analysis of the role of these five factors in the four states examined suggests some key trends. Table 3 below gives a summary of the factors present or not present in each state.

**Table 20: A summary of the criteria for land acquisition in each of the four case studies.**

State	Public concern	Development Pressure	Governor and State Gov.	Local Gov.	Key state programs	State and local grants (1965-98) <sup>3</sup>
Maine	Yes	Yes <sup>d</sup>	Yes	No <sup>e</sup>	Land for Maine's Future Program	\$30 million
Florida	Yes	Yes	Yes	No	P2000 Florida Forever	\$100 million
New Jersey	Yes	Yes	Yes	Yes	Green Acres Open Space Trust Fund Garden State Preservation Trust	\$100 million
Minn.	Yes	Yes	Yes	Yes	Environment and Natural Resources Trust Act	\$58 million

### Public concern

The public was one of the initial drivers in all four states considered. Across the country we see that public voting consistently supports the acquisition of conservation lands. Conservation voting has become a non partisan issue as both blue and red voters are supporting these measures. One reason for this may be the fact that it is a tangible issue that voters perceive to be in their “backyards,” which causes the voters to vote “green.”<sup>2</sup> The report also suggests that this support is being motivated by the growth in the population that is resulting in the loss of open space and public access.<sup>2</sup>

### State governors

State governors have the potential to greatly influence land acquisition. They have shown this through the initiation of programs, bond proposals, and general goals and targets for land conservation. The Land for Maine's Future program was created by Governor Brennan's Special Commission on Outdoor Recreation.<sup>18</sup> In Florida, Minnesota, and New Jersey policies and bond proposals were initiated by the state's governors. Florida's Preservation 2000 was initiated by Governor Martinez in 1990. The follow up program to P2000, Florida Forever, was initiated by Governor Bush in 2000. Governor Whitman in New Jersey set the standard for the state to acquire 1 million additional acreage of open space by the year 2010.<sup>21</sup> In conjunction with public approved bond

<sup>d</sup> In Maine, the coast and the south have already experienced development pressure. The Maine North Woods is now starting to see some of this same pressure.

<sup>e</sup> In any given category, if a state is listed as “No,” it does not mean that the state has none of this characteristic; it means that there is not a significant amount.

funding, the Green Acres Programs, the Garden State Preservation Trust Act, and the Open Space Trust Funds, New Jersey is well on their way to meeting the governor's target.<sup>22</sup>

## **Local governments**

Local governments can have a big impact on land acquisition. New Jersey is the national leader in local action due to the amount of county and municipal bonds on the ballot.<sup>2</sup> In the 2004 election, New Jersey voted on the highest amount of local conservation bonds than any other states in the country. There are also many local funding programs in local communities in New Jersey that raise money for conservation by increasing local property taxes. The revenue from these various taxes went to acquisition and/or improvement of open space, parks, recreation, water, farms, and historic properties.<sup>2</sup> Local citizens are more likely to fund land conservation in their communities due to the tangible returns they receive.

## **Funding programs**

States with considerable land under conservation have established aggressive funding and land acquisition programs to purchase land for conservation. In conjunction with these programs, I found that states have a variety of funding tools available for land acquisition. Some of the more common mechanisms used are taxes which vary from sales taxes, income taxes, real estate transfer taxes, local taxes, property taxes, and cigarette taxes. Bonds appear to be a popular funding mechanism among states. States also use lottery and license plate revenue for conservation funding.

Maine had the least aggressive program in terms of total funding of the states that I studied. Maine's major source of funding for land acquisition comes from the Land for Maine's Future Program. Since 1987 Maine voters have approved three bonds totaling \$97 million, which is comparatively small to other states such as California, where voters have approved three bonds that totaled \$6.7 billion.<sup>3</sup> The other three states studied provide examples of aggressive funding programs.

First, Florida's land acquisition program is known as one of the most aggressive and largest land acquisition programs in the United States. The programs of P2000 and Florida Forever use real estate transfer tax revenue to fund land acquisition, then state and local government match the funds for purchasing land for conservation. Together these programs have acquired nearly 2 million acres of state conservation lands.<sup>37</sup>

Second, Minnesota voters approved the Environment and Natural Resources Trust in 1998 as a permanent fund for land acquisition. This trust receives 40% of its funding from annual state lottery revenue. Minnesota is known to have one of the most effective funding strategies with funding coming from a variety of sources such as cigarette taxes, conservation license sales, state

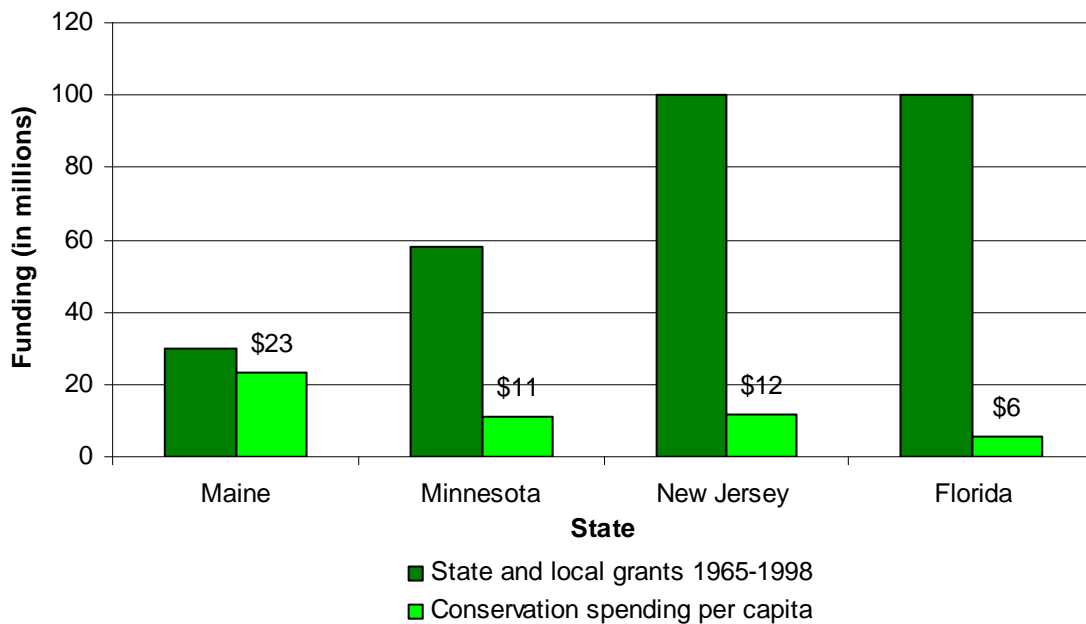
lottery revenue, sales taxes, as well as from general bonds. Minnesota's use of general bonds for conservation is 46% above the national average.<sup>31</sup>

Third, New Jersey was ranked second in 2001 for conservation funding.<sup>22</sup> New Jersey has three state funding programs for conservation. In 1961, the Green Acres Program was established. From 1961 to 1995, this program received money from the passage of nine statewide bonds totaling \$1.4 billion. The Open Space Trust Fund which has received \$48 million from local property taxes since its creation in 1989. New Jersey's third program, the Garden State Preservation Trust, was established in 1999. This program provides a stable source of funding for preservation efforts from sales tax and public bond revenue. Each year the trust acquires nearly \$98 million dollars.<sup>38</sup>

A study done on conservation lands ranked the fifty states in terms of total federal and state spending from 1965-1998. In this study Florida ranked 2<sup>nd</sup>, New Jersey 10<sup>th</sup>, Minnesota 21<sup>st</sup>, and Maine was 35<sup>th</sup>. In this same time period Maine spent \$31 million on open space protection whereas Minnesota spent \$58 million and both Florida and New Jersey spent around \$100 million.<sup>3</sup>

### **Funding per capita**

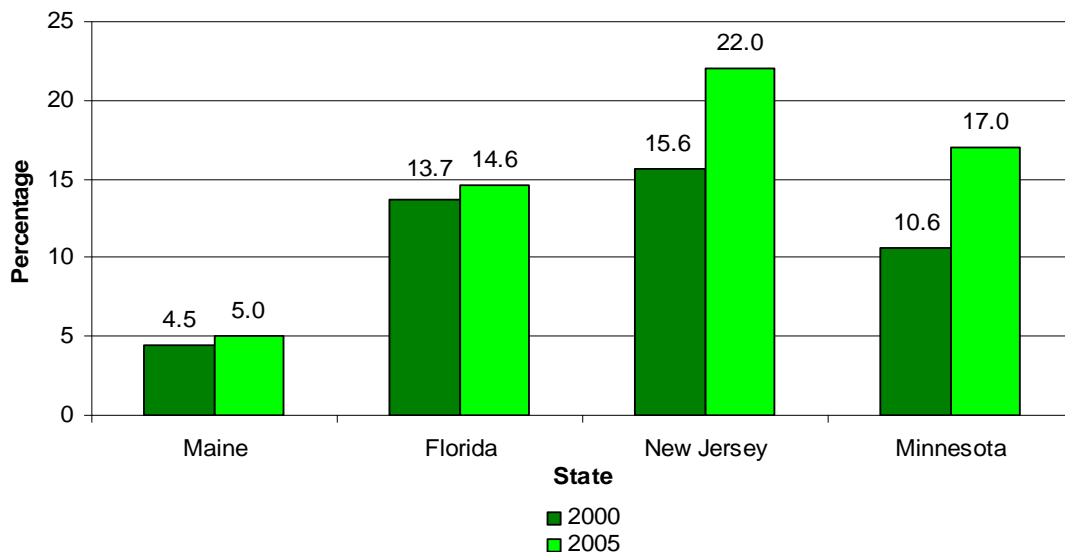
However, I must also point out that state conservation funding may be misleading unless population is taken into consideration. Figure 4 demonstrates that Maine has the smallest amount of state and local grants (as seen in the dark green column). However Maine state conservation spending per capita is the highest at 23 dollars per person as seen in the light green column. Conversely, Minnesota and New Jersey spend 11 dollars per person and Florida only spends less than 6 dollars per person on conservation. One reason for this is the relatively low population density compared to the other three states. Maine has only approx 1.3 million people whereas Florida has 17.4 million people to disperse the tax burden between. Also, as mentioned before, Florida receives a significant amount of funding from the federal government.



**Figure 29. A comparison of total state and local conservation spending and conservation spending per capita in Maine, Minnesota, New Jersey, and Florida<sup>3</sup>**

### State conservation lands

Figure Finally, as Figure 5 shows, Florida, Minnesota, and New Jersey each have a larger percentage of state conservation lands compared to Maine. A lot of this is due to the more successful funding strategies that have been used by these three states. In addition, both Minnesota and New Jersey have a larger increase over the five year period. Minnesota's increase is due in part to the array of funding tools used to acquire land in the state. New Jersey has the largest increase in state conservation lands as well as the largest overall percentage of total state land area of at 22%. This large percentage and overall increase is a result of the success of local bond initiatives in the past elections, especially in 2004 when a total of \$270 million was approved to fund land acquisition in local communities around the state.<sup>2</sup>



**Figure 30. Percentage of total state land area that is set aside as state conservation lands in Maine, Florida and New Jersey in 2000 and 2005<sup>6, 25, 29, 38</sup>**

## **Conclusion**

Maine has a low percentage of state conservation lands at five percent. While the Land for Maine’s Future Program has been effective to date, it still lacks the funding necessary for the purchase of large-scale conservation lands such as those in the Maine North Woods. In addition Maine already has high per capita spending on conservation at 23 dollars per person, making it necessary to implement alternative funding mechanisms in order to conserve the land in the Maine North Woods. Although funding is one of the major obstacles of land conservation for many states, Maine could learn from the wide variety of funding tools that have been successful in other states. Here are some possible options that we have seen in my case studies:

### **Minnesota**

Minnesota provides parallels to Maine because it is also less-densely populated and contains an abundant amount of lakes and forestland. Minnesota is also experiencing the privatization and development pressures in their northern woods. Unlike Maine, Minnesota has one of the most effective funding strategies in the country. For these reasons Maine may want to look at some of funding policies in Minnesota and perhaps use more revenue from the state lottery or cigarette tax to purchase lands.

### **New Jersey**

New Jersey is the national leader of local government action for conservation funding. Local voter bonds have been a successful funding mechanism in the acquisition of state conservation lands. This is one of the

reasons that state conservation lands in New Jersey have increased from 15.6% to 22% in the last five years. The initial step to getting more bonds on the ballot is under the authority of Maine's local mayors in addition to other representatives of local communities. The public help this process by writing to the mayor or local representative regarding the need for more state conservation lands. Lobbying the legislature for statewide bonds is another tool the public has access to.

## **Florida**

Florida could be used as a model to set up programs such as Florida's P2000 and Florida Forever which together have acquired two million acres of state conservation land. Both of these programs have been greatly supported by the state governor and funded by tax programs that are then matched by state and local funds. Florida also receives a lot of help from the federal government. To potentially tap into some of these federal funds, Maine needs to increase its' lobbying of Congress. Also, Maine should demonstrate the need for more state conservation lands in Maine to the Land and Water Conservation Fund in order to receive more federal funding.

With more funding as well as the proper allocation of this funding, Maine would be capable of purchasing lands for large-scale conservation in the Maine North Woods and beyond.

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# Comprehensive Planning and the Land Use Regulation Commission

Sandy J. Beauregard

## *Introduction*

Unlike most states in New England and the Mid-Atlantic, all of Maine's land is not part of a municipality or incorporated town; the majority of Maine's land area is classified as Unorganized Territories.<sup>1,2</sup> The Unorganized Territories are townships and plantations that are not populated enough to warrant a local government; they account for 10.4 million acres of Maine's land area and fall under the jurisdiction of the Land Use Regulation Commission (LURC).<sup>2</sup> LURC is responsible for administering planning and zoning regulations for the land within its jurisdiction.

On April 5, 2005 Seattle-based Plum Creek submitted a resource plan for their lands in the Moosehead Lake region. The plan encompasses 426,000 acres, 382,000 of which will remain as commercial timberlands where residential development will be prohibited. The plan also includes 3,755 acres for residential development, 5,100 acres for commercial development, and 10,890 acres of conservation easements. It is the largest proposal LURC has seen.<sup>3</sup>

The most important aspect of the Plum Creek proposal is that it is a Lake Concept Plan, a long-term, landowner initiated planning alternative that is encouraged by LURC.<sup>2</sup> Lake Concept Plans must balance public and private interests and be as resource-protective as the LURC districts for which the plan is proposed. A Concept Plan is subject to public review and, if requested, public hearings. Upon approval by LURC it becomes part of the Commission's regulatory framework and the plan continues to apply to the extent specified in deeds or other legal contracts.<sup>2,3</sup>

In this paper I examine the use of comprehensive planning in Maine and discuss what the implications of this might be for the North Woods. I begin with an introduction to comprehensive planning and then describe the Land Use Regulation Commission (LURC) and its role in the determining the future of the North Woods. I then analyze the Rangeley Plan, the only comprehensive plan completed for a subregion of the LURC jurisdiction, and conclude with an analysis of the Plum Creek resource plan for the Moosehead Lake Region.

## **Context**

### **Comprehensive Planning**

In 1961, Hawaii became the first state to pass growth management legislation, giving a State Land Use Commission the power to determine the location and type of development throughout the state. While functionally different from subsequent management laws adopted by three other "pioneer"

states it reflects the same goals of protecting natural resources and the environment and preventing indiscriminant growth. Since then, as environmental concern and development pressures have increased across the nation, ten other states have adopted growth management programs and in 2000, 32 governors referenced smart growth in their state of the State speeches.<sup>4, 5</sup>

The most recent trend in growth management policies is state level comprehensive planning.<sup>5</sup> Comprehensive planning is a growth management tool that allows governments to balance competing land use interests and direct development into appropriate areas. It differs from traditional zoning practices in that it doesn't necessarily segregate uses and also addresses a variety of issues relating to growth including land use, transportation, population, open spaces, resource protection, agricultural lands, and places of cultural or historical importance.<sup>5, 6</sup>

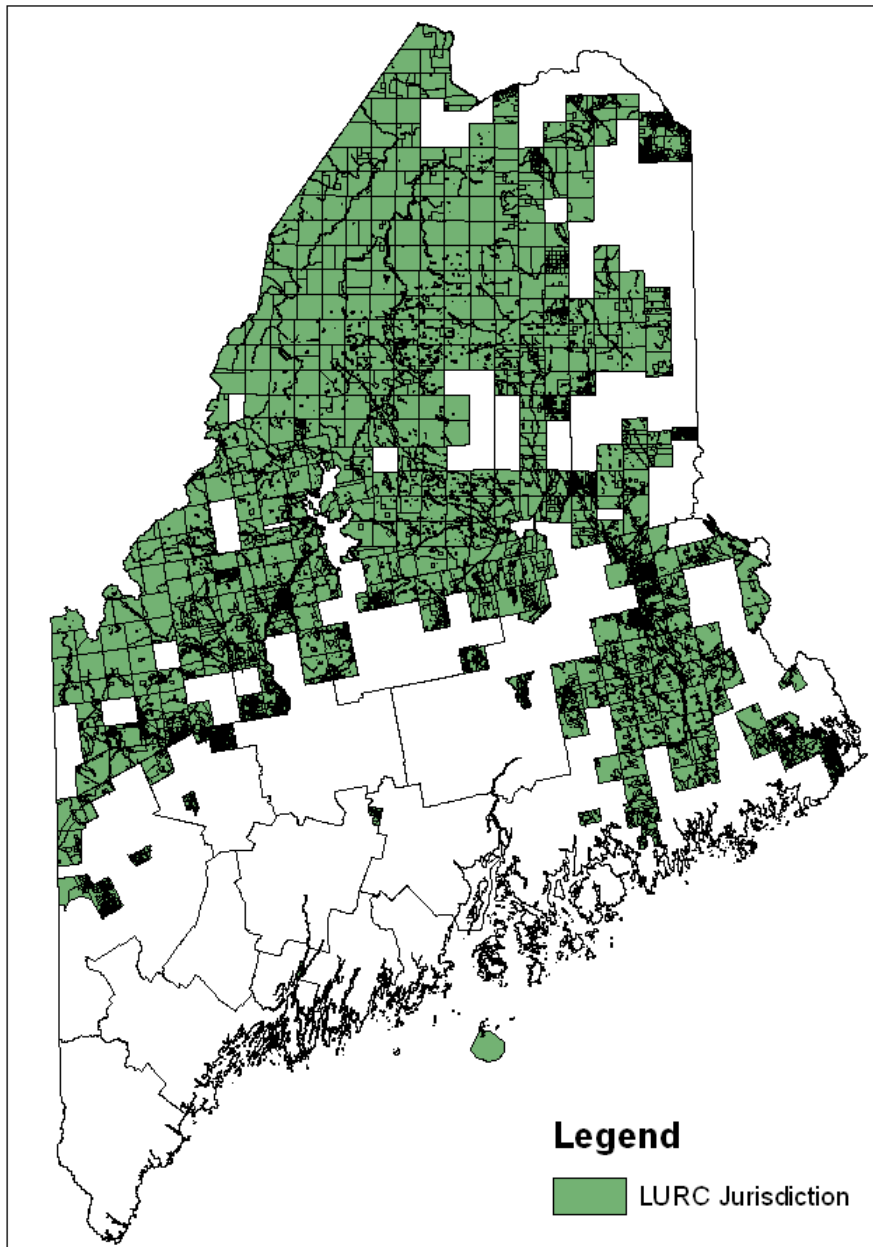
Through the 1950's and early 1960's Maine's economy and population were fairly stable; this began to change in the late 1960's as more people left urban areas in favor of Maine's rural way of life and unique natural character. This growth reached a sort of critical point in the 1980's when the state population grew by 9.8 percent while the national population declined. Many local governments found themselves unable to appropriately manage and plan for development and residents called for a stronger State role.<sup>7</sup>

In response, the Maine legislature passed the Comprehensive Planning and Land Use Regulation Act in May 1988, which mandates that every municipality in the state develop a comprehensive plan and land use management programs.<sup>8</sup>(**title 30-A chapter 187 section 4312**) Plans are intended to address regional as well as local needs and are required to include a natural resource inventory, implementation methods, current and anticipated population and employment information, and to define the general policies and goals.<sup>7</sup>(**title 30-A chapter 187 section 4312**) The Act also established ten state goals to be incorporated into municipal plans to provide an overall direction and ensure consistency. (**title 30-A chapter 187 section 4312**) All plans must be reviewed at the state level by the Office of Comprehensive Planning under the Department of Economic and Community Development and must be officially approved to be in compliance with the Act.<sup>7, 8</sup>(**title 30-A chapter 187 section 4312**) Both technical assistance and state grant funding are available to help local governments meet the planning requirements, however, the Act makes no provisions for plan implementation.<sup>8</sup>

## **The Land Use Regulation Commission**

High growth rates during the 1960's not only challenged local governments, but also threatened Maine's undeveloped regions. Over half the state of Maine was without a government body to establish or enforce development and land use controls. To protect these areas from inappropriate development the state legislature approved a statute that created the Land Use Regulation Commission (LURC) in 1971.<sup>2</sup>(**title 12 section 683**) LURC is responsible for developing and administering planning and zoning measures in the Unorganized Territories, a 10.4 million acre jurisdiction (Figure 31). The

Commission is comprised of seven members that are appointed by the governor and approved by the legislature. Two members must reside within the jurisdiction and, to ensure that all interests are represented, one member must have expertise in conservation, one in fish and wildlife, one in forestry, and one in commerce and industry.<sup>2</sup>



**Figure 31.** The jurisdiction of the Land Use Regulation Commission. It totals 10.4 million acres, over half of Maine's land area

LURC adopted the Comprehensive Land Use Plan (CLUP), which details the Commission's missions, goals, and policies, in 1976 and the most recent revision to the plan was completed in 1997. As defined in the CLUP, LURC's mission is to use planning and zoning to protect public welfare and safety, to maintain and provide for multiple land uses, ensure orderly and appropriate development, and preserve natural resources. To do this, three general zoning districts that determine allowable uses were created. Management zones are commercial forestry and agriculture lands where future residential and recreational development is unforeseen; these account for 80 percent of the land within LURC jurisdiction. Protection zones include wetlands, wildlife habitat, aquifers, hiking trails, remote lakes and ponds, and other areas where land use could have a significant impact on the natural and cultural resources. Eighteen percent of LURC land is within this zoning district. The smallest district within the jurisdiction is Development, which accounts for only two percent of LURC lands. Development zones are areas with existing patterns of high industrial, commercial, residential, and recreational use. Areas considered to be most appropriate development are close to population centers, accessible by major roads, able to provide the necessary infrastructure, have a demonstrate demand for growth, and where development, as defined above, will not seriously detract from the natural resource value of the region.<sup>2</sup> The small size of the Development zoning district compared to that of the Management district reveals an institutionalized belief in the timber industry and its position as the largest landowner in the state.

In accordance with LURC's designation of areas that are most appropriate for development, the CLUP identifies four high-priority regions within the jurisdiction where the need to balance growth and natural resource protection is particularly important. The Rangeley Lakes, Carrabassett Valley, Millinocket-Baxter State Park, and Moosehead Lake regions experienced some of the highest growth rates within the jurisdiction and all have very high natural resource value. For these reasons, LURC determined that regional prospective zoning plans should be completed for each.<sup>2</sup>

There is little in the planning literature regarding prospective zoning but LURC distinguishes it from traditional comprehensive zoning practices by emphasizing its locality-specific nature. It involves creating new zones particular to a region to ensure that development is located where it will not detract from the natural character and resource value.<sup>2</sup> Of the four regions identified for prospective zoning in the CLUP, Rangeley is the only area for which a plan has been completed.

## ***Methods***

I began my research by contacting the Rangeley and Greenville Town Offices and the LURC Central Office in Augusta. I received over 30,000 building

permit data from LURC, which was classified by Geocodes rather than by the names of the townships in which the development had occurred. I used GIS to extract the permits that had been approved in the townships and plantations covered by the Rangeley Plan and those adjacent to and subsumed by the Plum Creek plan (Figure 32). I then coded each by the type of development, either permanent or seasonal residence, and analyzed ten years of residential development in the two regions.

To supplement my analysis I researched the history and current application of land use planning in the United States and reviewed literature regarding plan implementation and evaluation. While this was useful in informing my thoughts, the most valuable references were LURC's Comprehensive Land Use Plan, the Rangeley Plan, and the Plum Creek Resource Plan.

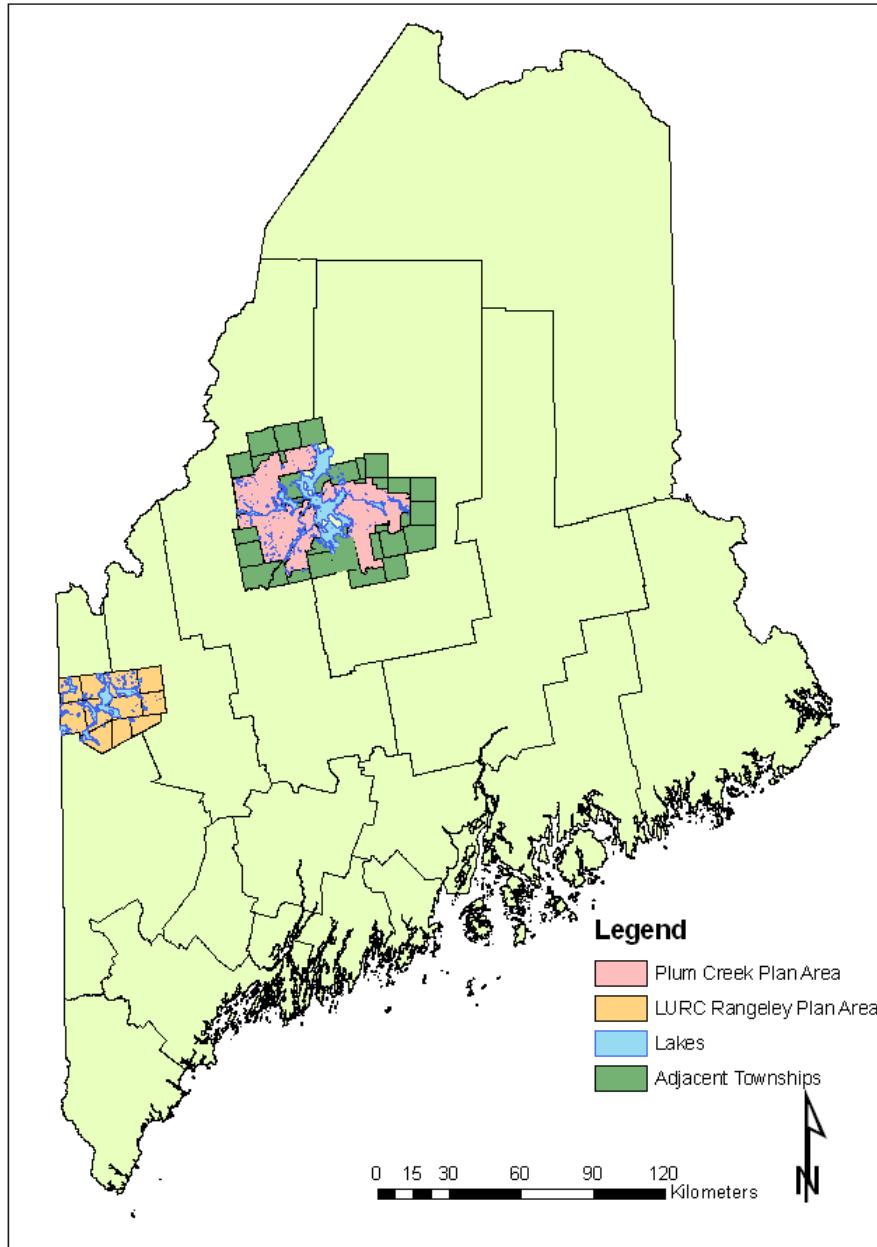


Figure 32. The Rangeley Plan area and the Plum Creek plan area and adjacent townships

## ***Discussion***

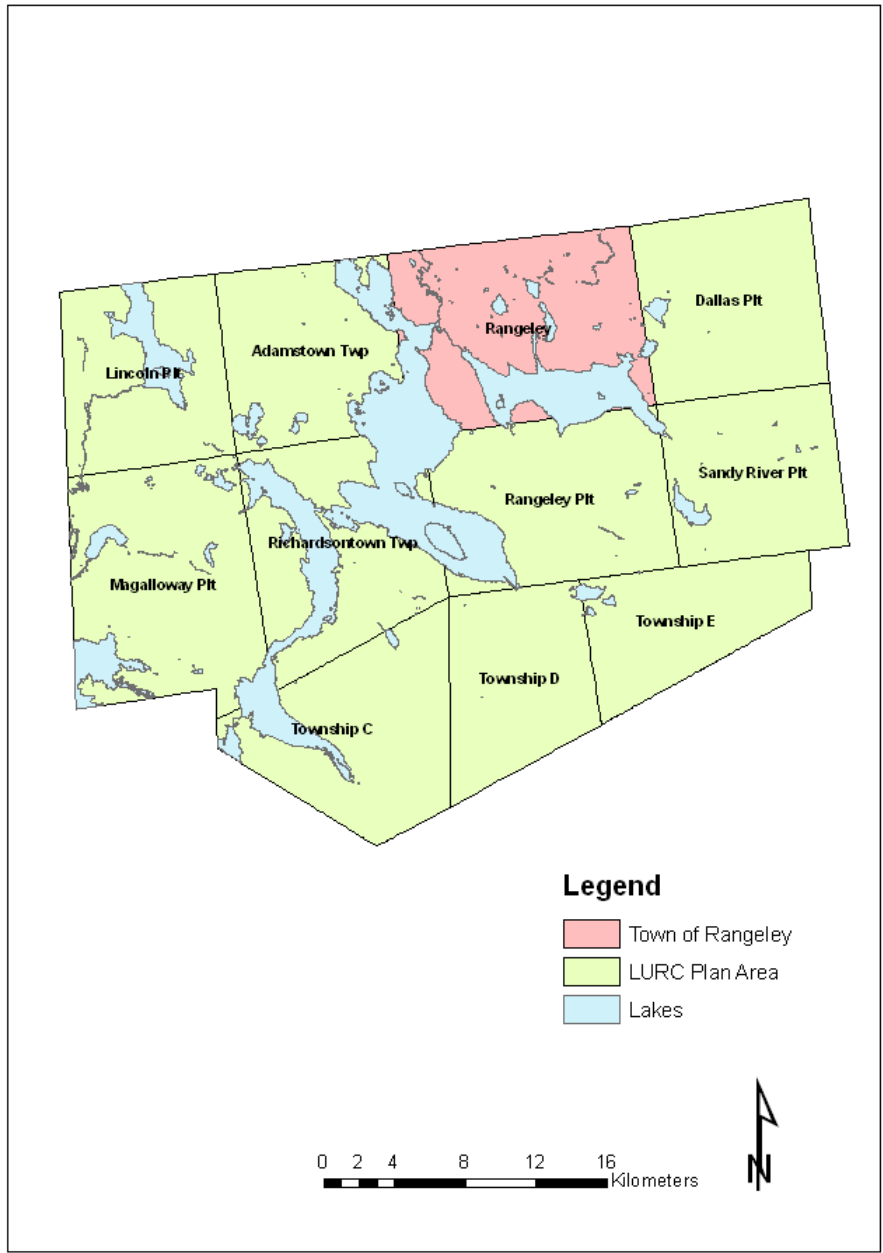
### **The Rangeley Plan**

The Rangeley Plan is the only regional comprehensive plan that has been completed for an area within LURC's jurisdiction. The Rangeley region was given highest priority for prospective zoning because it is the most rapidly growing area in the jurisdiction, followed by the Moosehead Lake region.<sup>2</sup> The type of development also raised concern as the trend shifted towards permanent homes and camps rather than seasonal dwellings.

The planning process began in 1995 with a natural resource inventory, which was then assessed by LURC staff in 1996. From 1997-1999 the Commission held over 30 public meetings and conducted public opinion surveys to ensure that the community's vision for the region was appropriately reflected in the plan. In 2000 a final public hearing was held at which the plan was approved and the Rangeley Plan came into effect on January 1, 2001.<sup>9</sup>

The plan area includes five plantations and ten outlying townships (Figure 33). The goal of the plan is to direct development to minimize sprawl and maintain the natural character of the region and it was designed to accommodate 20 years of anticipated growth. The town of Rangeley is to continue to serve as the economic center for the region with most new development located in the adjacent plantations of Sandy River, Rangeley, and Dallas. Limited development is to be permitted in the outlying townships and plantations. This is intended to allow the region to continue to be a year-round, recreational tourist destination by maintaining the diverse lake experiences and working forest which are integral parts of the region's character and highly valued by the community.

To accomplish these goals LURC created six new zones that are essentially combinations of existing LURC zones tailored specifically to the Rangeley Lakes region. Five of the new zones are Development subdistricts and one is a Protection zone that applies to semi-remote lakes in the region. See Appendix A for a more complete description of these zones. The creation of these new zones eased the permitting process within the development zones, relative to that for existing LURC zones, and made it more difficult to be granted zoning variances. Because of the more stringent rezoning policies, the plan identified three specific properties that may require special consideration in the future including land adjacent to Saddleback Ski Area.



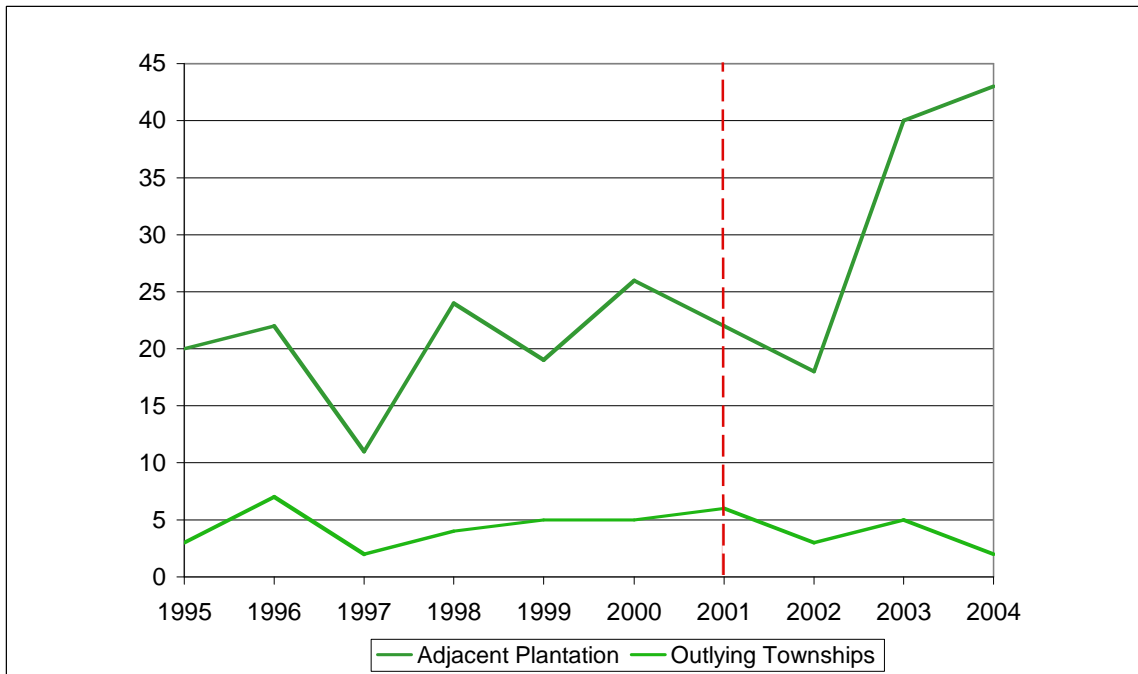
**Figure 33. The Rangeley Plan area. It includes three adjacent plantations of Dallas, Sandy River, and Rangeley and seven outlying townships and plantations**

**Analysis of the Rangeley Plan**

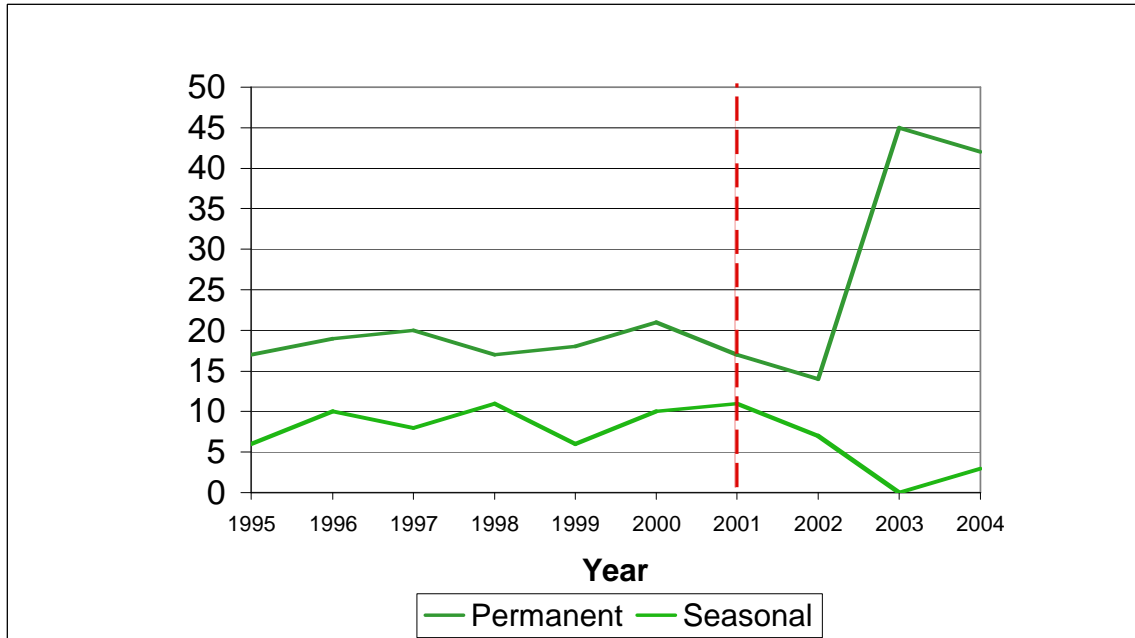
Assessing the effectiveness of land use plans is very difficult because there are many factors unrelated to the plan that may influence growth and

development patterns. Also, many plans have very vague goals, making it even more challenging to establish causal relationships.<sup>10</sup> One area in which the Rangeley Plan has obvious advantages over is that many of its goals can be quantitatively assessed.

During the planning process area residents said that they would like to see development rates remain fairly consistent with historic rates; also this development is to primarily occur within Sandy River, Dallas, and Rangeley Plantations. In the last 20 years, approximately 650 residential dwellings were built in the plan area, an average of 32.5 new dwellings per year.<sup>9</sup> In the four years since the plan has been implemented an average of 34.75 new dwellings have been constructed each year, showing that growth has remained fairly consistent with the historic rates, meeting the plan goals. If this can be maintained for the 20-year plan period a total number of 695 new dwellings would be constructed during that time. Building permit data also shows that the majority of this development has occurred within the adjacent plantations (Figure 34). The data also shows a significant increase in the construction of new permanent homes while the number of new seasonal dwellings has declined (Figure 35). This trend cannot be attributed to the plan but highlights the need for continued monitoring and evaluation.



**Figure 34. The number of new dwellings per year in both the adjacent plantations and the outlying townships**



**Figure 35. New seasonal and permanent dwellings in the plan area. The Rangeley Plan was implemented in 2001**

While this is not sufficient evidence to classify the Rangeley Plan as a success, it does indicate that the plan has effectively helped direct development into appropriate areas. Further assessment of the plan could also include non-residential development and a discussion of the population and economic trends in the region. If the information about the specific location of each approved permit is available, it would also be helpful to use GIS to conduct a spatial analysis of development patterns.

### **The Moosehead Lake Region**

Moosehead lake is the largest lake in Maine and is also the headwaters to the Kennebec River, one of the state's major waterways. The region has long been valued for its natural resources and has historically been known as a great and impressive wilderness.<sup>11</sup> While this description may not be entirely accurate as over 30,000 miles of logging roads now crisscross through the woods, the area is certainly more wild than most places in the nation. Because of this cultural and natural resource significance the Moosehead Lake region was identified by LURC as one of the four regions for prospective zoning. The region is second to the Rangeley Lakes region in terms of growth rates within the LURC jurisdiction and on the priority list for prospective zoning.<sup>2</sup> However, a regional plan has not been completed for the area.

In the absence of any LURC-initiated planning in the region, Plum Creek, a Seattle-based timber management company, has proposed a 426,000-acre resource plan for a portion of their land holdings around Moosehead Lake (Figure 36). The plan includes a significant amount of development, primarily residential and recreational, as well as conservation measures including easements and the maintenance of a working forest. Plum Creek's plan is not a typical request for

rezoning, but is a Lake Concept Plan, a lake management tool that provides an alternative to traditional LURC regulations.<sup>2 3</sup>

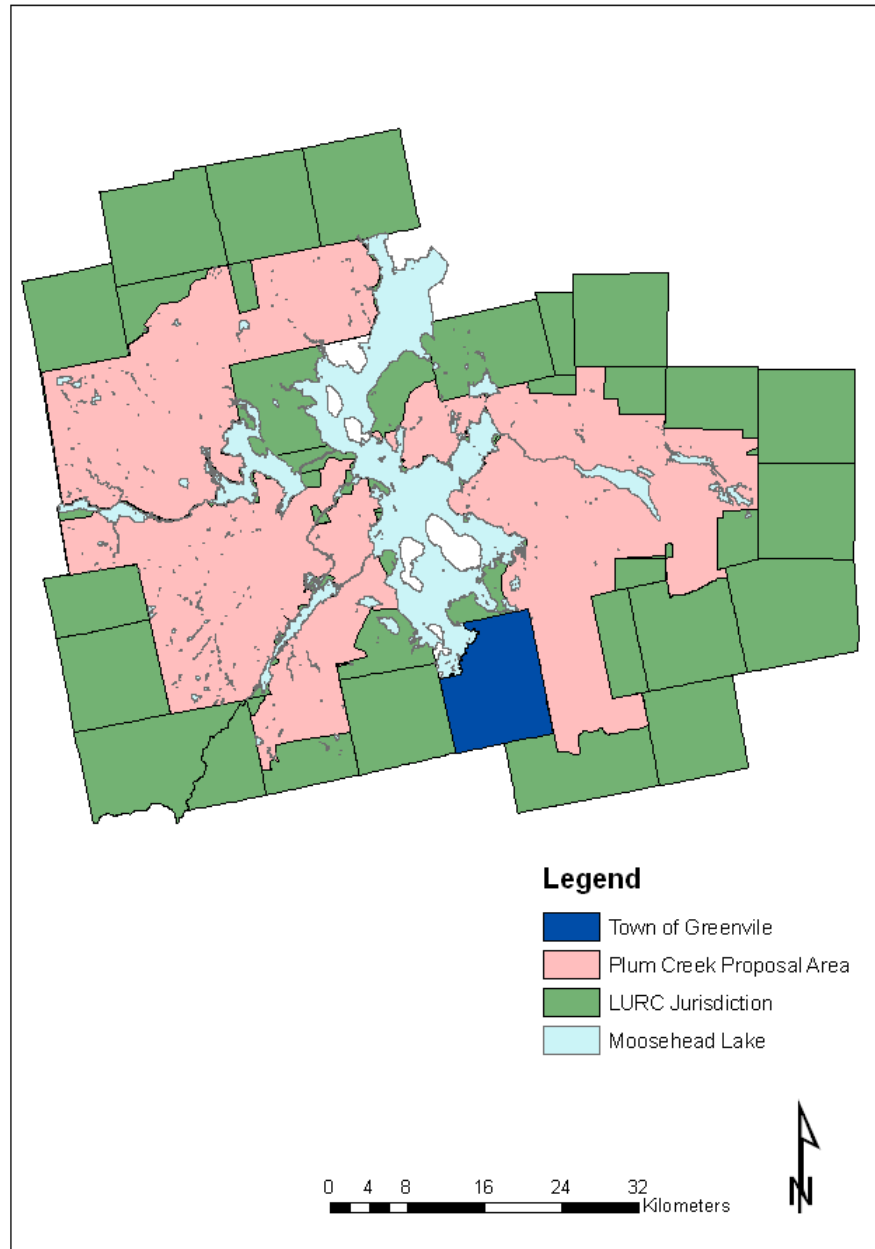


Figure 36. The Plum Creek plan area and the adjacent townships

## **Lake Concept Plans**

Lake concept plans are one of four ways in which LURC addresses major development proposals. They are encouraged as a means of achieving a publicly beneficial balance between conservation and development. Concept plans are voluntary and landowner-initiated but, once approved by the Commission, are binding and incorporated into LURC's regulatory framework by changing the existing zoning.<sup>2</sup> The Plum Creek plan is the fifth lake concept plan that has been proposed; the other four were approved.<sup>12</sup>

A plan must identify the areas that are intended to be developed and those to be protected, the means of achieving this conservation, and the life span of the plan. Ten years is the minimum allowed life span and anything under 20 years is discouraged. Once a plan has been approved its life span can be extended if LURC and the landowner agree on the new time period. A plan should also specify the conditions under which it will be terminated. If this happens, LURC will rezone the land in accordance with its comprehensive plan but components of the plan including conservation easements and subdivision restrictions will remain in place to the extent specified in contracts and deeds. LURC encourages the landowner to solicit public opinion during the planning process and also establishes a public review and comment period; if the Commission believes it is appropriate, or at the request of more than five people, LURC will hold a public hearing about the proposal.<sup>2</sup>

The Commission primarily uses four criteria to evaluate proposed concept plans: that they are consistent with the Comprehensive Land Use Plan, balance conservation and development, are as environmentally protective as the LURC subdistricts that it replaces, and are clearly and significantly publicly beneficial.<sup>2</sup> <sup>12</sup> All conservation measures are expected to apply in perpetuity, particularly for the highest value natural resources.<sup>12</sup> In terms of the Plum Creek concept plan, this means that the conservation measures included in their proposal are permanent.

## **Conclusion**

Approximately 50 percent of Maine is the responsibility of the seven member Land Use Regulation Commission. Within LURC's Comprehensive Land Use Plan, the Commission identified four places with special planning needs and for which prospective zoning was to be done. Only one of those four plans has been completed. In my analysis of the Rangeley Plan I determined that the plan has effectively directed development into the desired and most appropriate areas. The plan has also helped to maintain the historic growth rate in the region.

One of the major drawbacks to comprehensive planning is that it is a very time-consuming process. The planning process for the Rangeley region began in 1995 but the plan did not come into effect until January 2001. Because planning such as this is so resource intensive LURC also allows landowners to create concept plans such as the one proposed by Plum Creek. This is an entirely reactive approach to land use planning as LURC has limited involvement in the process, its main function is to either approve or reject the plan. Two of the key factors that LURC considers in assessing these proposals is that the plan

balances conservation and development and is significantly publicly beneficial. While both of these are extremely important features of any land use plan, the process leaves it to a private entity to determine what is an appropriate, publicly beneficial balance. Comprehensive planning such as that completed for the Rangeley region includes significant amount of public participation, evidenced by the over 30 meetings held by LURC, ensuring that the final plan is not only publicly beneficial but fully reflects the community vision for the region in the future.

Concept plans are useful in that they provide an opportunity for long-term regional planning without the associated costs to the public and do not require considerable human resources from LURC. Also, the conservation requirements in the plan ensure long-term and perpetual resource protection, which is not included in comprehensive planning. The Rangeley Plan discusses existing and proposed conservation in the region but it does not explicitly include protection measures.

The Plum Creek concept plan will have lasting effects on both the character of the Moosehead Lake region and the people that live there and, while the plan strives to be publicly beneficial, it is still a plan created by a private interest. LURC admittedly does not have the capacity to carry out prospective zoning plans for all of the appropriate areas within its jurisdiction, nor is this the ideal course of action considering the length of time that would be needed for this to be completed.<sup>2</sup> However, allowing a private landowner to complete these plans is not necessarily appropriate either. Maine residents and government officials may need to reconsider the role of the Unorganized Territories, if the future of these areas will strongly influence the future of the entire state, perhaps more human and capital resources could be devoted to their management.

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