

Maine State Forest Assessment and Strategies



DEPARTMENT OF CONSERVATION
Maine Forest Service
Forest Policy & Management Division

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A comprehensive analysis of forest-related conditions, trends, threats, and opportunities, and strategies to achieve state forest policy goals

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An Executive Summary of this publication has been published separately. It is also available on line.

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Chapter 1: Introduction

Why we are doing this

The 2008 Farm Bill requires states to complete state forest assessments and resource strategies as a condition of receiving federal funds to support state forestry programs. The planning process has three components:

1. **Statewide Assessment of Forest Resources:** provides an analysis of forest conditions and trends in the state and delineates priority rural and urban forest landscape areas.
2. **Statewide Forest Resource Strategy:** provides long-term strategies for investing state, federal, and other resources to manage priority landscapes identified in the assessment, focusing where federal investment can most effectively stimulate or leverage desired action and engage multiple partners.
3. **Annual Report on Use of Funds:** describes how federal funds were used to address the assessment and strategy, including the leveraging of funding and resources through partnerships, for any given fiscal year.

Maine has integrated the Statewide Forest Resource Assessment and Strategy (SFAS) process into its existing forest resource planning framework. The intent of Maine's Assessment is to identify key forest-related issues and priorities to support development of a long-term Resource Strategy specific to Maine's forest needs.

The Assessment section identifies landscape areas where national, regional, and state resource issues and priorities converge. It has incorporated the best data available, work with stakeholders, and considers other state assessments, plans, and priorities as relevant.

The Assessment section addresses the three national priorities identified by the USDA Forest Service:

1. **Conserve Working Forest Lands:** conserving and managing working forest landscapes for multiple values and uses.
2. **Protect Forests From Harm:** protect forests from threats, including fire, catastrophic storms, flooding, insect or disease outbreaks, and invasive species.
3. **Enhance Public Benefits from Trees and Forests:** including air and water quality, soil conservation, biological diversity, carbon storage, and forest products, forestry-related jobs, production of renewable energy, and wildlife.

The 2010 State Forest Assessment and Strategy is a keystone of the Maine Forest Service's efforts to inform Maine citizens about the condition of and trends in Maine's forests and forest economy. Pursuant to state and federal legislative direction, the report addresses a number of topics, including, but not limited to: criteria and indicators of forest sustainability, threats and opportunities, priority forest areas, and strategies and resources needed to address threats to the state's forest resources.

Overall goals for Maine's forests

Success in implementing the strategies in this document is essential to achieving the following goals for Maine's forests:

- Maintaining the most diverse, robust and economically beneficial forest products industry possible and the jobs that this industry provides.
- Maintaining a stable or increasing flow of wood fiber consistent with sustainable forest management principles;
- Sustaining local economies;
- Safeguarding critical natural resources, particularly water resources;
- Protecting biodiversity, conserving and enhancing key fish and wildlife habitats;
- Maintaining or enhancing existing public access for the full spectrum of existing recreational uses;
- Preserving special places, e.g., old growth forests, areas with special recreational or cultural values, unique or exemplary natural features, and other similar features;
- Contributing to meeting Maine's energy needs by reducing our dependence on fossil fuels and high energy costs; and,
- Maintaining and increasing carbon storage, contributing to reducing levels of atmospheric greenhouse gases, and facilitating the adaptation of forest systems to a changing climate.

The Significance of Maine's Forests

Several things distinguish Maine's forests from others in the eastern U.S. Individually, these features are significant. In combination, they make Maine's forests unique.

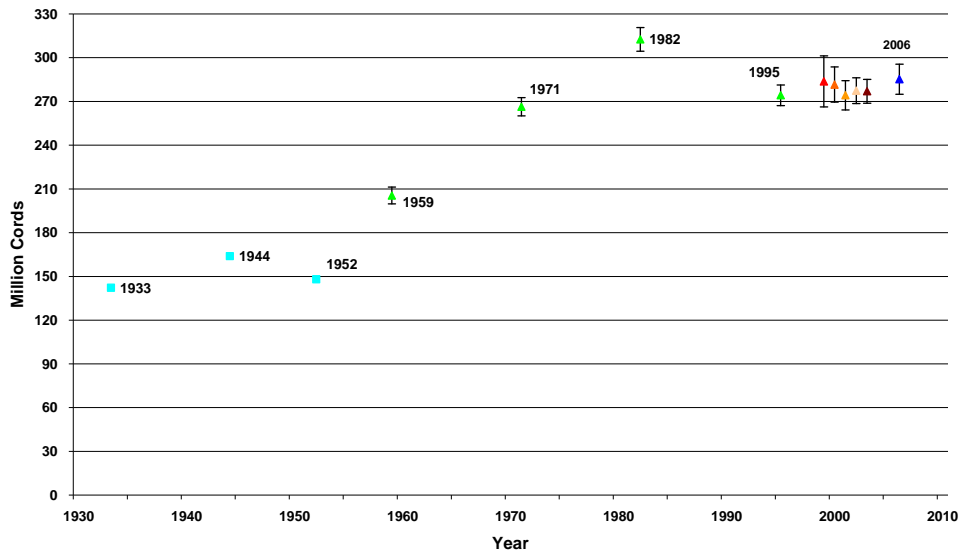
- The resilience of our forest ecosystems: Maine's forests have been harvested for wood products for over 200 years, yet 90% of the state remains forested - the highest percentage in the country. Analysis of historical records indicates that Maine has approximately 2/3 of the stocking that it did at the time when commercial harvesting began. Further, with few exceptions, Maine has largely maintained its forest biodiversity.
- The dominance of private ownership of forestland: 95% of Maine's forests are privately owned, one of the highest percentages in the country.
- The diversity and significance of our forest resources: In addition to a diverse timber resource, Maine's forests support many public resources, including 6,000 lakes and ponds and 32,000 miles of rivers and streams and abundant fish and wildlife resources.
- Maine has the largest contiguous block of undeveloped forestland east of the Mississippi: This includes approximately 10.5 million acres of unorganized

territory which remain largely undeveloped forestland, most of which is actively managed for timber production.

- The strength and diversity of Maine’s forest products industry: Maine’s forest products industry accounts for approximately half of the output of the four-state region of northern New England and New York. Even in today’s tough economy, Maine’s forest landowners have markets - somewhere - for every tree they harvest.
- A long history of multiple-use management on private land and a tradition of free public access to private land: This tradition dates to colonial times and is established in Maine common law for access to Great Ponds, navigable waters, and the coast.
- The special connection Maine citizens have with our forests: This heritage includes traditions of both consumptive and non-consumptive use. Maine people care about the forests and how they are managed.

Maine’s Forest Condition¹

Maine’s pulpwood quality inventory (chart below) is now estimated at 285 million cords - 97% more than the 1950s.

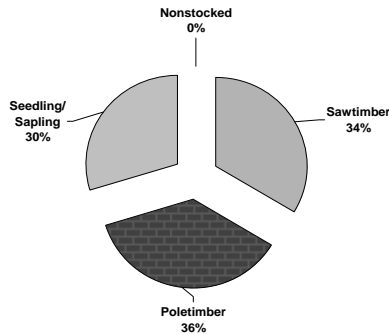


Harvesting has stabilized at around 500,000 acres per year, with a total harvest of nearly 15 million green ton equivalents per year. Over the last five years, growth at 0.37 cords per acre per year has exceeded harvest at 0.32 cords per acre per year; however, Maine’s forests have the potential to grow 0.5 cords per acre per year under improved management, and some intensively managed lands can and do produce more.

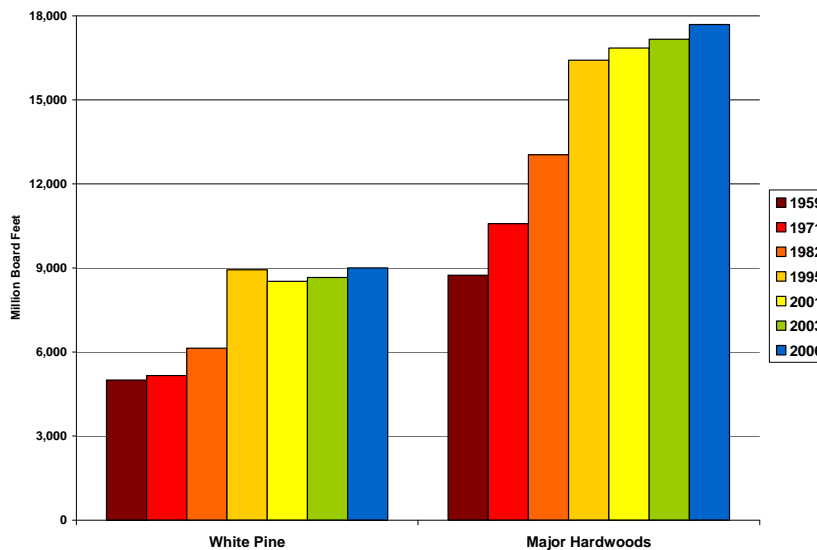
¹ Data and charts supplied by Kenneth Laustsen, MFS Biometrician.

Partial harvest methods dominate forest management, accounting for just over 50% of harvest acreage. Shelterwood harvesting accounts for 46% of harvest acreage. Clearcutting now accounts for less than 5% of harvest acreage, a significant decline over the last two decades.

The forest type composition of Maine's forest is 39% with a softwood plurality and 61% with a hardwood plurality. Maine's forest stands are roughly evenly divided between sawtimber, poletimber and seedlings/sapling size stands (chart below).



With the exception of spruce, fir, and beech, the sawtimber volumes of major species have steadily increased over the years (chart below).



MFS continues to monitor the development of young stands resulting from the combined impacts of the 1970 - 1990 Spruce Budworm Epidemic and extensive harvesting. Over the last 8 years of data collection under the annualized inventory design, annual estimates of ingrowth (new merchantable trees) have improved from 1.53 million cords in 1999 to 1.99 million cords in 2006. If current trends continue, ingrowth is expected to increase to 2.2 - 2.3 million cords per year in 2010.

Maine's Forest Based Economy - Overview

Maine has a highly diverse forest industry cluster (a mix of mutually supportive manufacturing facilities). Maine's forest products cluster provides markets for waste products from manufacturing facilities, as well as high-grade material. Landowners have markets for everything they harvest, from the lowest grades of wood that go to biomass generation to dimension lumber and high end furniture products.

Despite a very challenging global situation, Maine is still the #2 paper producing state in the U.S.; further, despite the housing slump of the last couple of years, Maine's lumber production from over 200 sawmills has more than doubled since the mid-1970's.

The forest products industry is still a key player in the state's economy. In 2007, the forest products industry directly supported 24,000 jobs, \$1.4 billion in earnings, and contributed \$1.8 billion to Maine's GDP. Including indirect effects, the forest products industry supported 55,000 jobs (6.7%), \$3.1 billion in earnings (9.9%), and contributed \$4.3 billion to Maine's GDP (8.9%) (Levert, 2009).

Forest products account for 28% of the state's manufacturing GDP (Bureau of Economic Analysis, 2007) and 28% of the state's exports (Maine International Trade Center, 2009).

Maine is also a major player in the regional forest products industry. In 2005, Maine produced over ½ of the wood output and processed over 60% of the wood volume of the four-state region that includes New Hampshire, Vermont, and New York. Our forest products industry accounted for 40% of the value of shipments in this same region (Northeast State Foresters Association, 2007).

Employment in the forest products industry has declined steadily, as mills and harvesting technology become more efficient. While employment is down, worker productivity, average wage, and capital expenditures have all increased. This is the natural evolution of a mature industry going through transition and taking steps to remain competitive in the global marketplace.

Forest based recreation also makes significant contributions to the state's economy, particularly in rural areas. Surveys show that people spend well over \$1 billion annually on forest-based recreation activities in Maine (Boyle et al., 1988 and 1990; Northeast State Foresters Association, 2007; US Department of the Interior, Fish and Wildlife Service and US Department of Commerce, US Census Bureau, 2008).

Challenges

Maine's forests, its landowners, and its industry all face significant challenges as we look to the future. MFS has identified several critical and interrelated issues that are key to the future of our forests:

- Maintaining a sustainably managed, economically viable working forest land base. This is critical to maintaining the many public values provided by

Maine's privately-held forests. For example, the habitat for many wildlife species is dependent upon active management.

- Conversion of forest land to development and parcelization. Parcelization makes good forest management less likely and more difficult, even if the land remains forested. Parcelization and forest land conversion are significant issues in southern and central Maine.
- Inadequate returns from long term forest management. The financial returns on long term forest management do not justify either retaining forest land, if other uses (e.g., development) are possible, or practicing long-term silviculture. Research at the Penobscot Experimental Forest indicates that the present value of stands managed for long-term value is about half that of stands subjected to diameter limit cutting, even though this practice diminishes the long-term productivity of the land.
- Maintaining and improving the long-term viability of the forest based economy. The state has faced the loss of mills, declining industry employment, fewer loggers, and consequent impacts on forest-based communities. At the same time, Maine excels in some sectors, and the industry has significant opportunities.
- Insect and disease threats. A number of exotic insects and diseases, some established, some not yet here, threaten significant components of Maine's forests. Existing threats include beech bark disease, balsam woolly adelgid, browntail moth, and hemlock woolly adelgid. Potential threats include Asian longhorned beetle and emerald ash borer.

Opportunities

Maine's forest landowners and the forest products industry also have a number of significant opportunities. These include:

- Conserving large areas of Maine's forests in perpetuity by capitalizing on the interest of investors to maximize their returns and purchasing conservation easements that ensure retention of undeveloped forest lands, public access, and sustainable management.
- Capitalizing on Maine's reputation for sustainable management to distinguish Maine's forest products industry in the global marketplace. In addition to demonstrated evidence that Maine's forests are sustainably managed, Maine has one of the largest percentages of certified land and possibly the largest percentage of certified harvests conducted of any state in the nation. These facts can be used to create a special niche for Maine's forest products among consumers who value sustainability - demand for such products is growing. This will require Maine to remain a leader in certification and addressing forest environmental issues, such as maintaining forest biodiversity.
- Increasing productivity. With improved management, Maine's forests have the potential to produce considerably more timber per acre while maintaining other forest values. On average, it should be possible to increase the productivity of Maine's forestland by approximately half over current levels.

- Diversifying Maine's forest products industry to be a leader in new products such as biofuels and those from biorefinery technology. With increases in fossil fuel prices, the opportunity exists to replace traditional sources of fuels and chemical feedstocks with wood and wood wastes.

Literature cited

Bureau of Economic Analysis, U.S. Department of Commerce. 2007. Gross Domestic Product by State, Regional Accounts, author's calculations.

Lever, M. 2009. The Economic Contributions of Maine's Forest Products Industry. Unpublished draft report of Maine State Planning Office. 2 pp.

Maine International Trade Center. 2009. Maine Exports by Industry, 2008. http://www.mitc.com/PDFs/me_exports_by_industry2008.pdf. Last accessed 04 January 2010.

Northeast State Foresters Association. 2007. The Economic Importance and Wood Flows from the Forests of Maine, New Hampshire, Vermont, and New York, 2007. 4 pp. <http://www.nefainfo.org/publications/2007%20Publications/NEFA4StateEconomicWood%20Flow2007FINAL.pdf>. Last accessed 04 January 2010.

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2008. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. 81 pp.

Chapter 2: Forest Condition and Trends²

Introduction

Maine's forests hold an especially important place in the hearts and minds of Maine's people. We have a long history of active management of forest resources, a place where outdoor recreation is enjoyed by many of Maine's residents and visitors, and a forest-based economy that contributes billions of dollars to the state's economy and supports over 20,000 jobs,

Several factors distinguish Maine's forests from others in the eastern U.S. Individually, these features are significant. In combination, they make Maine's forests unique:

- The resilience of our forest ecosystems: Maine's forests have been harvested for wood products for over 200 years, yet 90% of the state remains forested - the highest percentage in the country. Analysis of historical records indicates that Maine has approximately two-thirds of the stocking that it did at the time when commercial harvesting began. Further, Maine has largely maintained its forest biodiversity, with a few exceptions (e.g., caribou).
- The dominance of private ownership of forestland: 95% of Maine's forests are privately owned, one of the highest percentages in the country.
- The diversity and significance of our forest resources: In addition to a diverse timber resource, Maine's forests support many public resources, including 6,000 lakes and ponds and 32,000 miles of rivers and streams and abundant fish and wildlife resources.
- Maine has the largest contiguous block of undeveloped forestland east of the Mississippi. This includes approximately 10.5 million acres of unorganized territory which remain largely undeveloped forestland, most of which is actively managed for timber production.
- The strength and diversity of Maine's forest products industry: Maine's forest products industry accounts for approximately half of the output of the four-state region of northern New England and New York. Maine's forest landowners have markets - somewhere - for every stick of wood they harvest.
- A long history of multiple-use management on private land and a tradition of free public access to private land. This tradition dates to colonial times and is established in Maine common law for access to Great Ponds, navigable waters, and the coast.
- The special connection Maine citizens have with our forests. This heritage includes traditions of both consumptive and non-consumptive use. Maine people care about the forests and how they are managed.

² For the purpose of this document, the criteria and indicators have been organized around the Montreal Process Criteria and Indicators to facilitate federal review.

Measuring Forest Sustainability

The Maine Forest Service defines sustainable forest management as follows:

“Sustainable forest management enhances and maintains the biological productivity and diversity of Maine’s forests, thereby assuring economic and social opportunities for this and future generations. It takes place in a large ecological and social context and achieves a balance between landowners’ objectives and society’s needs.” (Maine Council on Sustainable Forest Management (1996)

Measuring forest sustainability has evolved significantly beyond a simple assessment of the balance between harvest and growth. Many comprehensive efforts to measure forest sustainability have been undertaken, at international, national, regional, and state levels. The use of criteria and indicators is widely recognized as a tool for improving our comprehensive understanding of the current situation in and possible futures for our forests. The criteria of sustainable forest management should reflect large scale public values - the big picture. Indicators are quantitative or qualitative variables that can be measured or described, and provide the means for measuring these forest conditions and for identifying trends.

The 118th Maine Legislature (1999) identified seven criteria of forest sustainability and directed the Maine Forest Service to develop standards for each criterion. The seven criteria are: soil productivity; water quality, wetlands and riparian zones; timber supply and quality; aesthetic impacts of timber harvesting; biological diversity; public accountability of forest owners and managers; and, traditional recreation.

In 2003, the USDA Forest Service and Northeastern Forest Resources Planners Association, in cooperation with the Northeastern Area Association of State Foresters, prepared a list of key indicators of forest sustainability (USDA Forest Service, 2003). This report also addresses those indicators where possible.

The following section is organized around the internationally recognized Montreal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Maine’s indicators are addressed within this framework.

Readers should consider the contents of this chapter with the following caveats in mind:

- The goals and indicators must be founded on a broader public discussion about the desired future conditions of Maine’s forests, particularly in light of the fact that Maine’s forests are 95% privately owned.
- The economic impacts of the goals and indicators have not been assessed. Performing this assessment will require the allocation of additional resources to MFS.
- Measuring sustainable forest management is a continuous learning and improvement process. The indicators used in this report may change as new scientific knowledge emerges and practical experience is gained.

Literature cited

Maine Council on Sustainable Forest Management. 1996. Sustaining Maine's forests: criteria, goals, and benchmarks for sustainable forest management. Department of Conservation: Augusta, ME. 38 pp. + appendices.

USDA Forest Service. 2003. Base Indicators of Forest Sustainability: Metrics and Data Sources for State and Regional Monitoring. 70 pp.

Criterion 1: Conservation of biological diversity

Desired Future Conditions: Forest management activities maintain healthy, well-distributed populations of native flora and fauna and a complete and balanced array of different types of ecosystems.

The term “biodiversity” refers to the variety of all forms of life - trees and other plants, invertebrate and vertebrate animals, and microorganisms - and includes the different levels on which life operates - from the level of genetic differences between individuals to the complex interactions within ecosystems (Gawler et al, 1996). Biodiversity sustains humanity. It helps provide the necessities of life: food, shelter, fiber, medicinal, recreational, cultural, spiritual, and aesthetic benefits, and ecosystem services such as air and water purification (Clarke and Downes, 1995). Conservation of biodiversity involves balancing human interactions with species and ecosystems to maximize present benefits while maintaining the potential to meet future generations’ needs and aspirations. It is a foundation for sustainable forest management (Carey et al, 1999).

Many different factors can affect biodiversity at a number of levels, including human activities and natural processes. When conducted in accordance with generally accepted guidelines for biodiversity conservation, forest management activities can have relatively few impacts on biodiversity, particularly when compared with other human activities.

Maine’s forests have undergone major changes in the nearly 400 years since the arrival of Europeans, including the removal and conversion of a significant portion of much of the forest for agriculture and industrial uses. Many wildlife species, including the wild turkey, whitetail deer, caribou, and timber wolf, were extirpated or driven to near extinction.

Exotic pest species have been and continue to be major drivers of species extirpation in Maine. American chestnut has nearly disappeared from the landscape, and American elm has been greatly reduced. Exotic species such as gypsy moth and white pine blister rust are well established.³ The major mortality of all native ash species (similar to the loss of elm experienced when Dutch elm disease went through) in current emerald ash borer infestations in the Midwest, and the expansion of this pest’s range toward Maine, provides ample demonstration that Maine’s forests continue to face the prospect of further losses of biodiversity.

The forests and forest dynamics of today bear little resemblance to those of the pre-settlement forests in which native species evolved. Whereas much of the pre-settlement forest appears to have been composed of late successional stands containing a mosaic of small disturbance patches, today’s forest landscape has largely lost its late successional component. Disturbance patterns in much of the presettlement forest seemed driven by small-scale, relatively frequent disturbances, such as tree-fall and small wind events, with

³ Some of the material in this and following paragraphs adapted from US Department of the Interior, Biological Resources Discipline, 1999.

disturbance affecting an average of approximately 1% of the forest each year (Seymour, R., A. White, P. deMaynadier, 2002). Large-scale, catastrophic disturbances such as hurricanes and stand-replacing fires affected very large acreages, but on a return time measured in the hundreds or thousands of years. Today, fire prevention and suppression efforts have reduced the acreage affected by fire to a miniscule level. Between these two extremes, native insect outbreaks (e.g. spruce budworm) can severely affect their range of hosts over large acreages on periodic cycles as short as 30-50 years. Although this translates to average annual defoliation of 2-3% of Maine's total forest acreage, the actual events are episodic. Stand mortality and replacement are much less uniform than the figure indicates. This overall disturbance pattern allowed much of Maine's forests to develop into a multi-cohort, many-layered mosaic.⁴

Timber harvesting is now the dominant disturbance factor in Maine's forests, annually affecting about 500,000 acres, or about 3% of the forest land base. In contrasting today's managed forest with the unmanaged forests of the past, Maine's forests are now much simpler - both within stands and between stands - than they were in the past. For many reasons, Maine's current forests do not have the variety and distribution of structures (e.g. large cavity trees) or landscape patterns (e.g. large contiguous blocks of late successional habitat) that were more common before European settlement.

Change seems to be the only constant in life, and Maine's forests continue to change in the face of new and different pressures. Changes in the transportation of forest products have eliminated river drives, which in some ways improved the condition of our rivers and streams but have created a reliance on an extensive interior road network. Changes in timber harvesting and wood utilization technology make it possible to obtain more economic value from smaller trees than ever before. Exotic species continue to modify the composition and structure of Maine's forests. Chestnut blight has virtually eliminated the American chestnut from its native range, including Maine. American beech is losing ground to an exotic pest/pathogen complex. In southern Maine, the hemlock woolly adelgid has established a beach head, and the Asian longhorned beetle and emerald ash borer threaten to invade from the south. Increasing abundance of some wildlife species, such as whitetail deer in some areas, could have marked influences on the future composition of Maine's forests (Abrams et al, 1999). Changing, inefficient patterns of human settlement are resulting in the loss of significant forest acreage to development in southern and central Maine, while this trend is nearly offset by farmland reverting to forestland in northern Maine⁵ (Allen and Plantinga, 1999). In addition, land parcels are becoming smaller and ownership tenure is becoming shorter and industrial owners selling to private investors. Although the least understood, global climate change has the potential to change radically the composition and structure of Maine's forests (Hong et al, 2002).

⁴ See Chokkalingam (1998), Lorimer (1977), and Seymour *et al* (2002) for more detailed discussions of the pre-settlement forest composition and dynamics.

⁵ The minimum net change in aggregate forest acreage tends to mask the impacts on range-limited species of inefficient land use patterns in southern Maine.

Maine’s forest ecosystems are remarkably resilient and have demonstrated a high capacity for recovery. Over the past half century, changes in the ways humans use and interact with the land have led to a sharp resurgence in the forest’s extent as well as the recovery of many species that once hovered near extinction, such as the whitetail deer and the wild turkey. Nonetheless, the situation is not one that should lead to complacency. Biologists generally agree that habitat loss, degradation, fragmentation, and invasive species pose the greatest current threats to biodiversity (NatureServe, 2002; Noss et al, 1995; B. Vickery, 2002, personal communication). All of these factors are at work in Maine at a scale sufficient to warrant concern.

The indicators discussed below attempt to monitor forest biodiversity at a coarse, statewide scale. The full range of information needed to fully assess the status and trends in biodiversity at all levels does not exist, and the high complexity of the information that does exist makes synthesis a difficult proposition. The primary scientific research necessary to set benchmarks precisely and with high confidence of appropriateness is still developing. Forests are extremely complex systems; therefore, it is unlikely that we will ever know the exact levels necessary to achieve any particular forest biodiversity goal. The information presented here reflect the opinions of a diverse group of scientists with experience in managed and unmanaged forests in Maine and who understand the dynamics of landscapes with long forest management histories.

Goal: Maintain healthy, well-distributed populations of native flora and fauna and a complete and balanced array of different types of ecosystems.

Maine Indicator 5.1: Number and distribution of large diameter trees, snags, and down logs (≥ 15.0 in DBH)

Table 2.1.1. Number of large diameter trees (15.0" DBH+) in Maine's forests, 1959 - 2006 (Millions of trees)⁶

		1959	1971	1982 (2003 Restate)	1995 (2003 Restate)	2003	2006
Growing Stock	Mean	62.0	68.8	82.1	103.1	104.6	103.6
	95% CI			74.6 - 89.6	93.9 - 112.3	98.4 - 110.9	95.6 - 111.6
	Significant Difference			A	B	B	B
Rough and Rotten	Mean		33.0	24.7	18.9	14.7	14.0
	95% CI					13.1 - 16.3	11.0 - 17.1
	Significant Difference					B	B
All Live Trees	Mean		101.7	106.8	122.0	119.4	117.6
	95% CI			98.0 - 115.6	111.7 - 132.2	112.7 - 126.0	109.1 - 126.1
	Significant Difference			A	A	A	A
Dead & Snags	Mean				17.1	18.2	18.5
	95% CI				15.0 - 19.3	16.2 - 20.1	15.7 - 21.3
	Significant Difference				A	A	A
All Standing Trees	Mean				139.1	137.6	136.1
	95% CI					130.2 - 144.9	126.8 - 145.5
	Significant Difference				A	A	A
Down & Dead	Mean				39.8	4.0	
	95% CI						
	Significant Difference						
Timberland Acreage (Million Acres)		17.2	16.9	17.1	17.1	17.2	17.3

⁶ As reported in periodic and annual inventory reports for the year indicated.

Table 2.1.2. Number of large diameter trees (21.0" DBH+) in Maine's forests, 1959 - 2006 (Millions of trees)⁷

		1959	1971	1982 (2003 Restate)	1995 (2003 Restate)	2003	2006
Growing Stock	Mean	8.0	9.1	9.5	13.8	13.9	14.6
	95% CI			8.1 - 10.8	11.9 - 15.7	12.2 - 15.7	12.3 - 16.9
	Significant Difference			A	B	B	B
Rough and Rotten	Mean		6.0	4.7	3.7	2.8	3.0
	95% CI					2.1 - 3.4	1.6 - 4.3
	Significant Difference					B	B
All Live Trees	Mean		15.1	14.2	17.4	16.7	17.6
	95% CI			12.5 - 15.9	15.2 - 19.7	14.8 - 18.6	15.1 - 20.1
	Significant Difference		A	A	A	A	A
Dead & Snags	Mean				2.5	3.1	3.1
	95% CI				2.2 - 2.8	2.4 - 3.8	2.2 - 4.0
	Significant Difference				A	A	A
All Standing Trees	Mean				20.0	19.8	20.7
	95% CI					17.8 - 21.9	18.0 - 23.4
	Significant Difference				A	A	A
Down & Dead	Mean				10.0	1.0	
	95% CI						
	Significant Difference						
Timberland Acreage (Million Acres)		17.2	16.9	17.1	17.1	17.2	17.3

Table 2.1.3. Frequency Distribution of large diameter trees in Maine's forests, 1995, 2003, and 2006.

Category	1995	2003	2006	Change	Change	Change
				1995 to 2003	1995 to 2006	2003 to 2006
Growing Stock Trees	43%	39%	39%	-4%	-4%	0%
Rough & Rotten Trees	15%	10%	9%	-5%	-6%	-1%
Dead Trees & Snags	17%	11%	12%	-6%	-5%	0%
Any Large Tree	53%	47%	46%	-6%	-7%	-1%

Note: The 1995 Frequency distribution is based as a percentage of all forestland conditions (2,812) on which at least one large diameter tree (15.-" DBH+) is tallied.
A grand total of 3,272 conditions were delineated on the 3,001 plots in the 1995 periodic inventory

Note: The 2003 Frequency distribution is based as a percentage of all timberland conditions (3,515) on which at least one large diameter tree (15.-" DBH+) is tallied.
A grand total of 4,490 conditions were delineated on the 3,379 plots in Panels 1-5 of the Annual inventory

Note: The 2006 Frequency distribution is based as a percentage of all timberland conditions (2125) on which at least one large diameter tree (15.-" DBH+) is tallied.
A grand total of 2,702 conditions were delineated on the 2,019 plots in Panels 1-3 of the Annual inventory

Assessment: The number of large diameter, rough and rotten live trees, dead trees, snags, and down dead trees does not attain the minimum levels recommended in "Biodiversity in the Forests of Maine: Guidelines for Land Management" (Elliott, ed., 1999). However, the potential exists to reverse this trend through active planning and management.

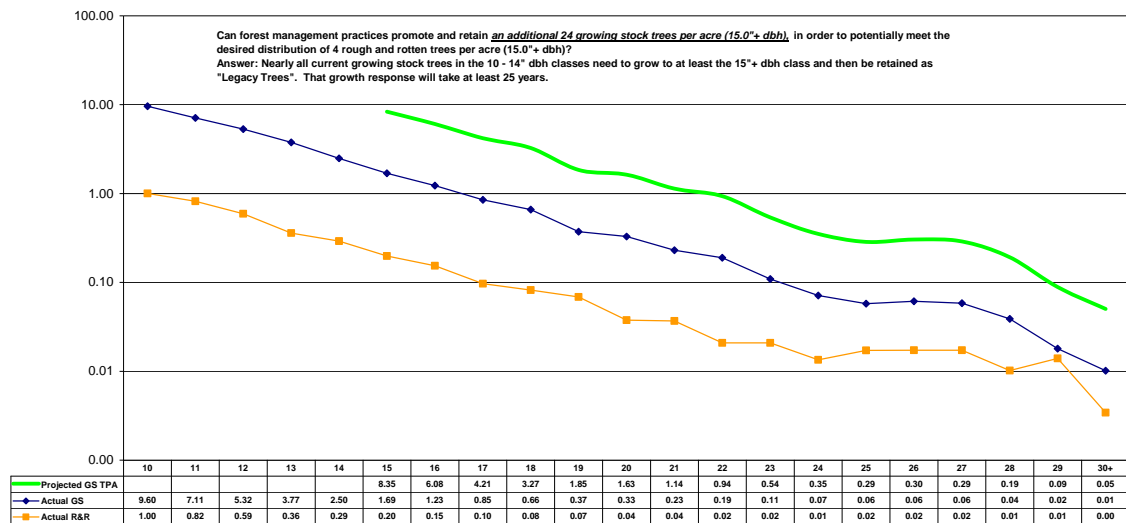
The number of large diameter (15.0"+ DBH) live trees increased from 1971 to 1995 and has been relatively stable since then. The number of large diameter (15"+ DBH), rough and rotten trees has decreased by 58% since the 1971 forest inventory; however, the statistical significance of this change is unknown. Trend data is unavailable for large diameter dead trees, snags, and down dead trees. In Table 2.1.3, the distribution of large diameter (15.0"+ DBH) trees of various qualities decreased 7% between 1995 and 2006.

The decline in the number and distribution of rough and rotten live trees, dead trees, and snags poses a dilemma for policy makers. On one hand, the decline

⁷ As reported in periodic and annual inventory reports for the year indicated.

can be seen as a positive, because it indicates that landowners are removing the legacies of past high grading operations and focusing future growth on quality trees. Quality trees provide landowners with many more marketing options than rough and rotten trees, and increase the financial viability of forest management. Snags present real dangers to timber harvesters, particularly hand crews. About 16 percent of all logging fatalities in the U.S. result from falling limbs, logs, or snags (American Pulpwood Association, 1996). The US Occupational and Health Administration's regulations for managing snags may conflict with wildlife habitat management guidelines in some circumstances.

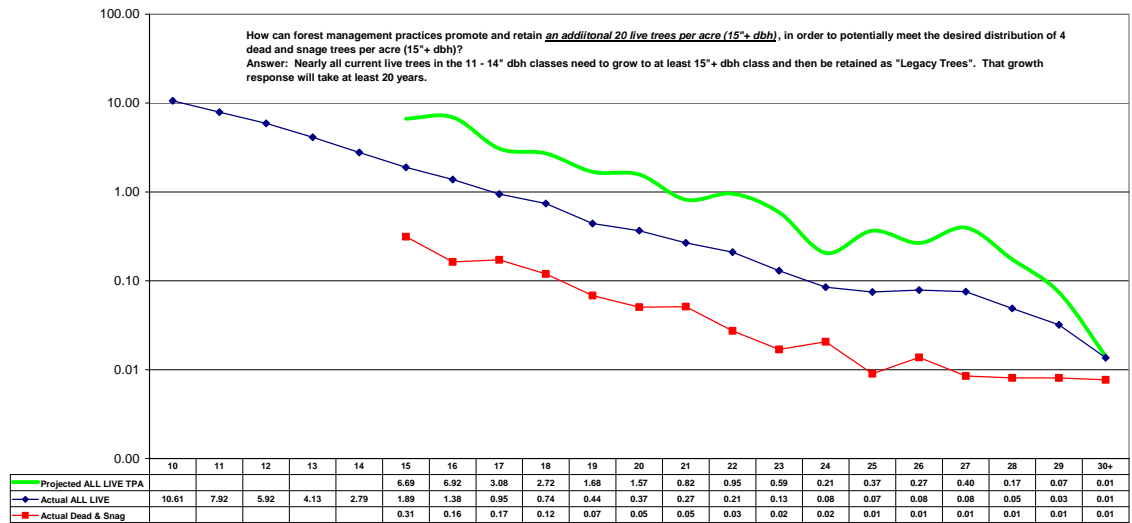
Figure 2.1.1. Current growing stock trees per acre by dbh class and the projected distribution needed to produce an average of 4 rough & rotten trees (15.0"+ dbh) per acre, logarithmic Scale on the Y-axis, Maine, 2006



On the other hand, the minor decline in large diameter, rough and rotten trees and dead trees and snags is seen as a negative for those concerned about biodiversity. Rough and rotten live trees provide the future wildlife trees, snags, and downed logs that many species need for food and shelter. DeMaynadier (2002) indicates that the percentage of dead trees and snags greater than 10 cm (4 in) in relatively unmanaged stands in the Northeast ranges from 11-13% in hardwood stands to 16% in softwood stands, up to 30% in high elevation stands. Active management and planning, including careful harvest planning and supervision, will be needed to attain minimum acceptable levels of large diameter trees destined for wildlife habitat functions. Closer examination of forest inventory data (live tree distribution by DBH class, Tables 5.1.1 and 5.1.2) indicates that under even the most optimistic scenarios, achieving the targets

identified in “Biodiversity in the Forests of Maine: Guidelines for Land Management⁸” will be a very long-term process that spans several decades.

Figure 2.1.2. Current all live trees per acre by dbh class and the projected distribution needed to produce an average of 4 dead & snag trees (15.0"+ dbh) per acre, logarithmic Scale on the Y-axis, Maine, 2006



Rationale for this indicator: Large diameter trees provide important support functions for many species, particularly species that spend a large portion of their lives in older forests and/or require older forest structures at some point during their lives, such as some lichens and some ground beetles. A widespread decline in the density of large diameter trees might cause currently well-distributed species to become limited to ecological reserves. Large diameter live trees, particularly those with injuries and diseases that allow the creation of cavities, are highly preferred by a number of species. Every stand, even those managed as even-aged, should contain some large diameter, living and dead, standing and down trees to serve as biological legacies and to provide some habitat continuity between harvests.

The density of large diameter, living, dead, standing, and down trees needed to support different biodiversity values is unknown. However, in forested landscapes with long histories of intensive silviculture, such as Scandinavia and the Pacific Northwest, policy makers and land managers are struggling to avoid extirpating forest species. In Sweden, one hundred years of increasingly intensive forestry has reduced the density of big trees and the volume of snags (Linder and Ostlund 1992). Many of Sweden’s Red-Listed species (the

⁸ This document, which represented a consensus of a wide range of forestry interests, recommended protecting as many large diameter, down logs as possible on a harvest site, as well as retaining as many live trees with existing cavities and large unmerchantable trees as possible, including a minimum of four secure cavity or snag trees per acre, with one exceeding 24" dbh and three exceeding 14" dbh.

equivalent of our threatened and endangered species) are associated with big trees, big snags, and logs. Reduction of these important components of forest structure through forest management may be extirpating many forest species from large areas of Sweden. Nearby Finland may lose up to 5% of its forest species (~1000 species) due to the loss of these features (Hanski 2001) that are commonly found in late-successional and old growth forests. Many of these are small, inconspicuous, and hard to identify species such as insects, fungi, lichens, and mosses. Harvesting can affect poor dispersers at the stand level by temporarily changing structure and eliminating critical habitat features, and at the landscape level by creating large areas of unsuitable habitat for years or decades.

The following table illustrates the values of large diameter trees at all stages of growth and decomposition.

Table 2.1.4. Values and beneficiaries of large diameter trees⁹

Value	Beneficiaries	
Super canopy trees	Raptors, songbirds, lichens, bryophytes, fungi	Kuusinen, 1996; Newton et al, 2002
Cavity trees	Large bodied mammals, woodpeckers, bats, owls, bryophytes, secondary cavity nesting birds, invertebrates	Ranius, 2002; DeGraaf and Yamasaki, 2001
Large snags	Flying squirrels, bats, woodpeckers, lichens, invertebrates	Selva, 1994; DeGraaf and Yamasaki, 2001
Logs	Lichens, mosses, invertebrates, fungi, birds, mammals, amphibians	Ódor and Standovár, 2001; Sippola, 2001; Sverdrup-Thygeson, 2001; DeGraaf and Yamasaki, 2001; deMaynadier and Hunter, 1995

Maine Indicator 5.2: Forest stand structure

Sound management of the working forest matrix is essential to the conservation of Maine's forest biodiversity. While ecological reserves and other lands reserved from management can protect some elements of biodiversity, the reality is that reserves will never be large enough, connected enough, or located to protect all biodiversity (J. Franklin, 2002, personal communication).

For the purposes of this indicator, "large sawtimber" trees and stands are used as a proxy for late successional forests. Late successional forests provide a number of goods, services, and values to society, including large, often high-value sawtimber, watershed protection, recreation, spiritual renewal, and, in some cases, a reference point against which to measure the effects of more intensive forest management.

⁹ Adapted from deMaynadier, 2002.

Late successional forests are not necessarily unmanaged. In fact, active management can accelerate the development of late successional functions and structures in forests.

However, late successional forests of all types are becoming less common in Maine. Older forests support some plant and animal habitat specialists, in part due to their heterogeneity and structural complexity, but also due to the relatively long time elapsed since a stand-replacing disturbance (Gawler, et al, 1996).

Lichens serve a number of functions in temperate forests, including nutrient cycling and as components of food webs. Epiphytic lichens are an important component of the biodiversity of many forest types. Late successional epiphytes can be dispersal limited and are often sensitive to the impacts of forest management activities. Other factors, including atmospheric deposition, also affect these organisms. The presence of adequate populations of late successional epiphytes provides evidence of the continuity of the functions and processes of late successional forests (Selva, 1994; McCune, 2000).

Table 2.1.5. Idealized structure¹⁰

Stand size class	Stand structure		
	Single storied	Two storied	Multi-storied and mosaic
High basal area in large sawtimber only ¹¹		at least 15%	
At least sawtimber ¹²		at least 25%	
At least poletimber ¹³		at least 50%	
Seedling/sapling/nonstocked ¹⁴		no more than 30%	

Stand Size Class	Stand Structure		
	Single-Storied	Two-Storied, Multi-Storied, and Mosaic	Aggregate
Only High Basal Area in Large Sawtimber	0.9%	1.3%	2.2%
At Least Sawtimber	11.2%	22.4%	33.6%
At Least Poletimber	70.3%		
Seedling/Sapling/Nonstocked	29.7%		

¹⁰ Adapted from DeGraaf, *et al* (1992), Maine Council on Sustainable Forest Management (1996) and technical working group discussions.

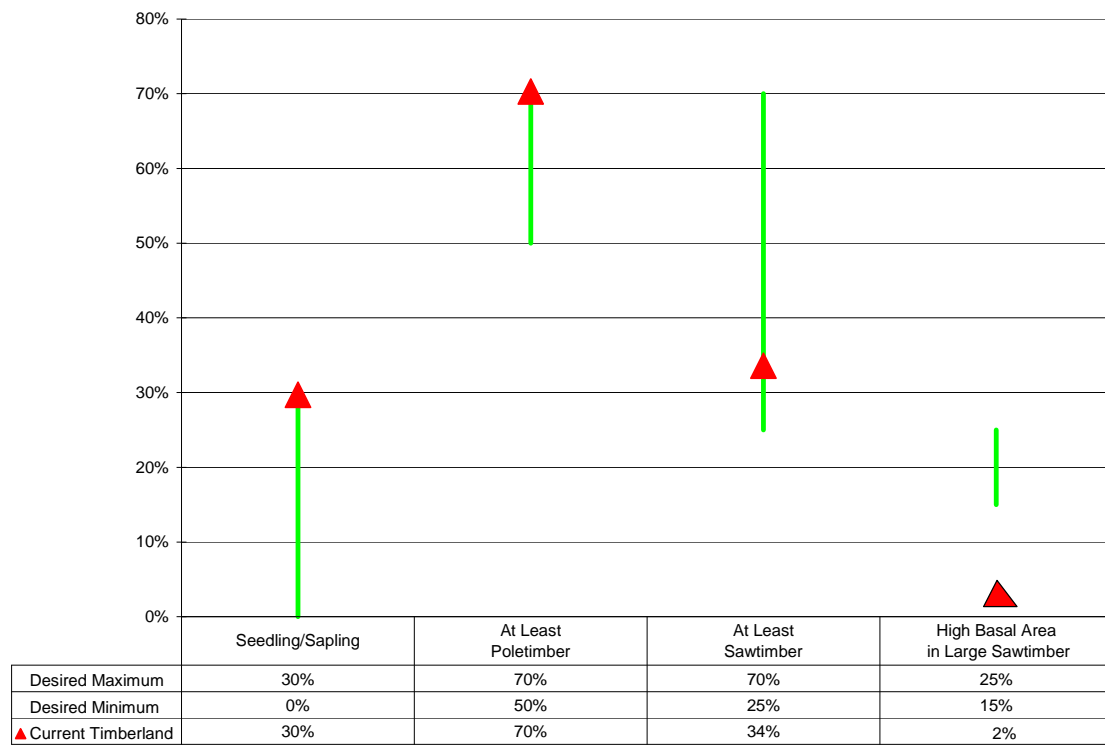
¹¹ Stands ≥ 100 ft² basal area in which trees ≥ 15.0 in DBH comprise at least 50% of the basal area. The idealized percentage is included in "at least sawtimber" category; it is not additive.

¹² Softwood stands 9.0+ in DBH; hardwood stands 11.0+ in, and the plurality of the crown cover is in trees of this size or larger.

¹³ Softwood stands 5.0 in - 8.9 in DBH; hardwood stands 5.0 in - 10.9 in DBH, and the plurality of the crown cover is in trees of this size or larger.

¹⁴ Stands 1.0 in - 4.9 in DBH, and plurality of the crown cover is in trees of this size.

Figure 2.1.3. Current timberland stand structure compared to range of idealized stand structure, 2006



Assessment: Maine’s forest appears to be relatively well distributed in terms of stand size. Using FIA protocols and algorithms, sawtimber stands represent 34% of the total acreage; poletimber stands 40%; and seedling/sapling 30%. Current stand structure is at the upper limit both for seedling/sapling and the combined grouping of poletimber and larger stands. It is near the lower limit for just sawtimber stands. However, in terms of desired stand structure for high basal area sawtimber stands, Maine’s forests fall well short of the ideal level.

Maine Indicator 5.3: Size, distribution, and representation of protected areas¹⁵

Despite recent research and management advancements, a great deal remains unknown about the biodiversity in Maine's forests, the habitat needs of its species, and the impacts of forest management. Numerous authors support the value of protected areas in conserving biological diversity (Norton, 1999, Terborgh and Soule, 1999). Protected areas serve as controls where human impacts are limited and many natural processes proceed unchecked. For example, studies in Baxter State Park conclusively demonstrated that spruce

¹⁵ A number of classification systems exist to define "protected areas," including the IUCN's six classes and Maine GAP's four classes. Each system segregates classes according to the level of land use restrictions (e.g. limited harvesting, recreational use). For the representational aspects of this criterion, "protected lands" refer to all lands on which harvesting is prohibited and include such lands as state Ecological Reserves, Nature Conservancy preserves, and State and National Parks.

suffered less damage than fir from an uncontrolled budworm outbreak, and helped researchers understand which factors predispose a stand to budworm damage (McMahon, 1991), a relationship that has been well understood since Westveld's (1954) work earlier in the 20th century. Consequently, protected areas may be compared to managed forests to improve our knowledge of how natural processes occur, and how forest management can react to or emulate such processes. Protected areas may also be designed to provide sufficient habitat for those species whose habitat needs are unlikely to be met for other purposes. The Maine legislature recognized the ecological importance of protected areas when it established Ecological Reserves (12 MRSA §1801).

Assessment: 2009 was a breakthrough year for land conservation in the state of Maine. Fifteen separate conservation projects completed in 2009 provided big boosts to ongoing initiatives. As a result, BPL has protected more than 1 million acres in conserved land and conservation easements, a 6 percent growth since 2008. Primary goals of the acquisitions include preserving working forests, opening recreational opportunities and maintaining significant wildlife habitats.

Since 2003, the percentage of conserved land throughout the state has since increased from about 6 percent to almost 18 percent (Figure 5.4.1). Most of this acreage is managed forest, including state-owned public lands, state wildlife refuges, and working forest conservation easements. A much smaller subset, approximately 670,000 acres, or 3% of the state, is restricted from harvesting (Figure 5.4.2). Most of the conservation efforts were accomplished through joint partnerships among federal and state agencies, private corporations and state and local land trusts.

BPL now owns 84,652 acres in park lands; 590,667 acres in public reserved and non-reserved lands; and 348,457 acres in conservation easements (Alan Stearns, personal communication, 2010). The total in ownership and conservation easements now is 1.023 million acres. 61 percent of the newly acquired acreage - 36,355 acres - was acquired with no public funding. These acquisitions were the result of hydropower settlements (1,334 acres); development rezoning packages (28,280 acres); or charitable donations of land (6,741 acres).

Funding for the remaining portion acreage acquired for appraised value came from private, state and federal sources including the Forest Legacy Program (\$5 million); the Land for Maine's Future fund (\$3.8 million); hydro- and wind-power cash contributions (\$910,000); and private charitable funds through The Nature Conservancy and other groups.

In 2000, BPL designated 70,000 acres of state-owned lands as ecological reserves. Since that time, BPL has acquired another 20,000 acres of reserves, and DIFW has allocated nearly 10,000 acres of state wildlife management lands (primarily wetlands) to reserve management.

Of the 29 forested natural community types in the state, at least one good example for each of 20 types is set aside from timber harvesting, and at least two good examples of 16 types are set aside.

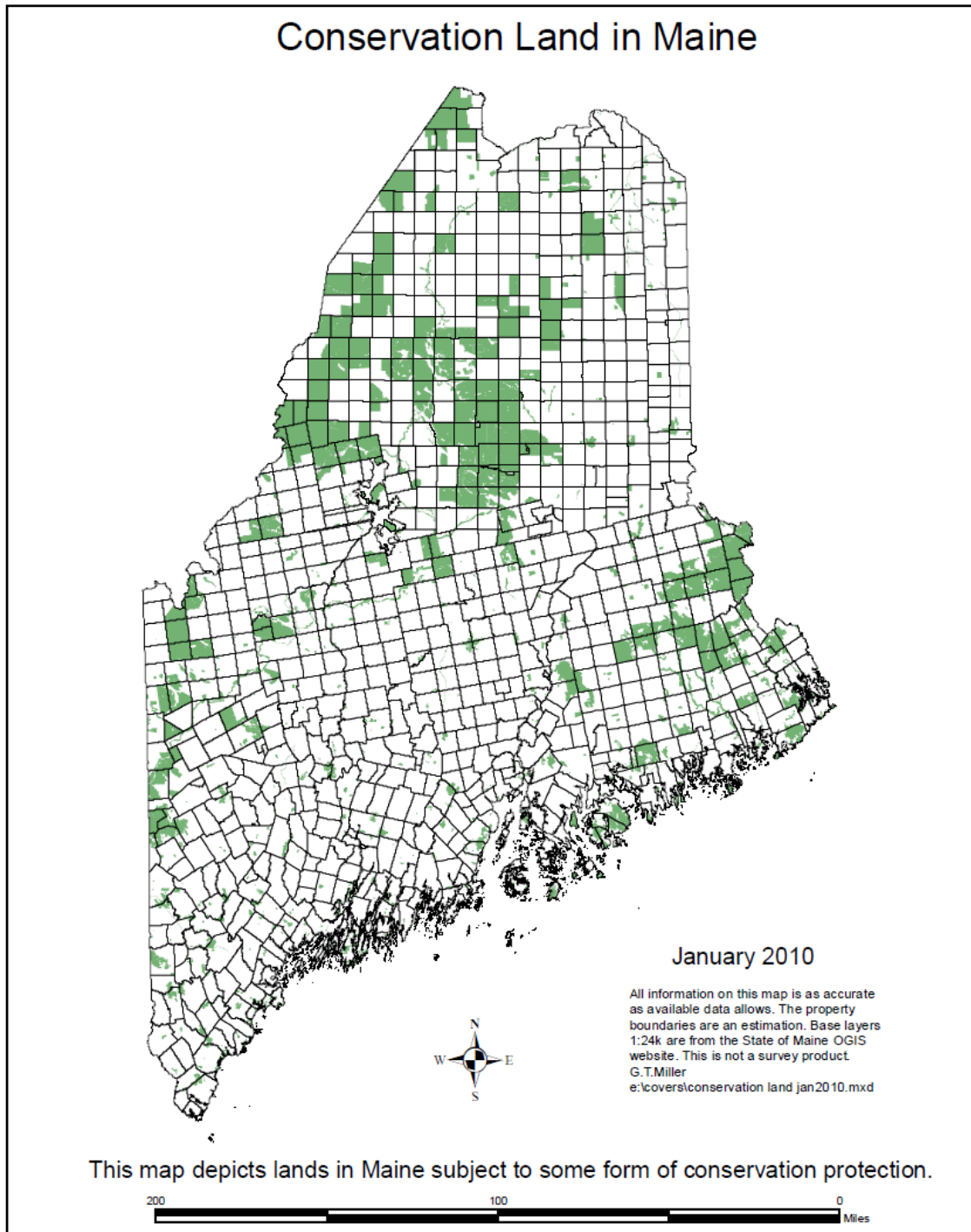
The statewide representation of protected areas refers to their geographic distribution. The accompanying map (Figure 5.4.3) depicts this representation of protected areas with regard to forest types. For each of seven geographic regions, the number of forest types with at least one protected example is divided by the number of forest types that occur in that region. For example, fifteen forested natural community types occur in the Boundary Plateau/St. John Uplands Section (northwestern Maine). Nine of those types have at least one protected example in the Section. For the entire state, Figure 5.4.3 indicates that 36% of the forest types have at least one protected example in each region where they occur, an increase from 30% in 2003.

The maps indicate a pronounced geographic disparity. The overwhelming majority of protected acres and protected forest types are in northwestern and Downeast Maine, yet a disproportionate amount of Maine's rare species and species diversity lies in southern Maine. According to the criteria explained above, only one forest type is sufficiently protected in Maine's southernmost region.

Replication of protected examples of forest communities is also lacking. Only 13 forest types have at least two examples protected in the state. The lack of protected forest types in southern and central Maine becomes more pronounced when replication is considered.

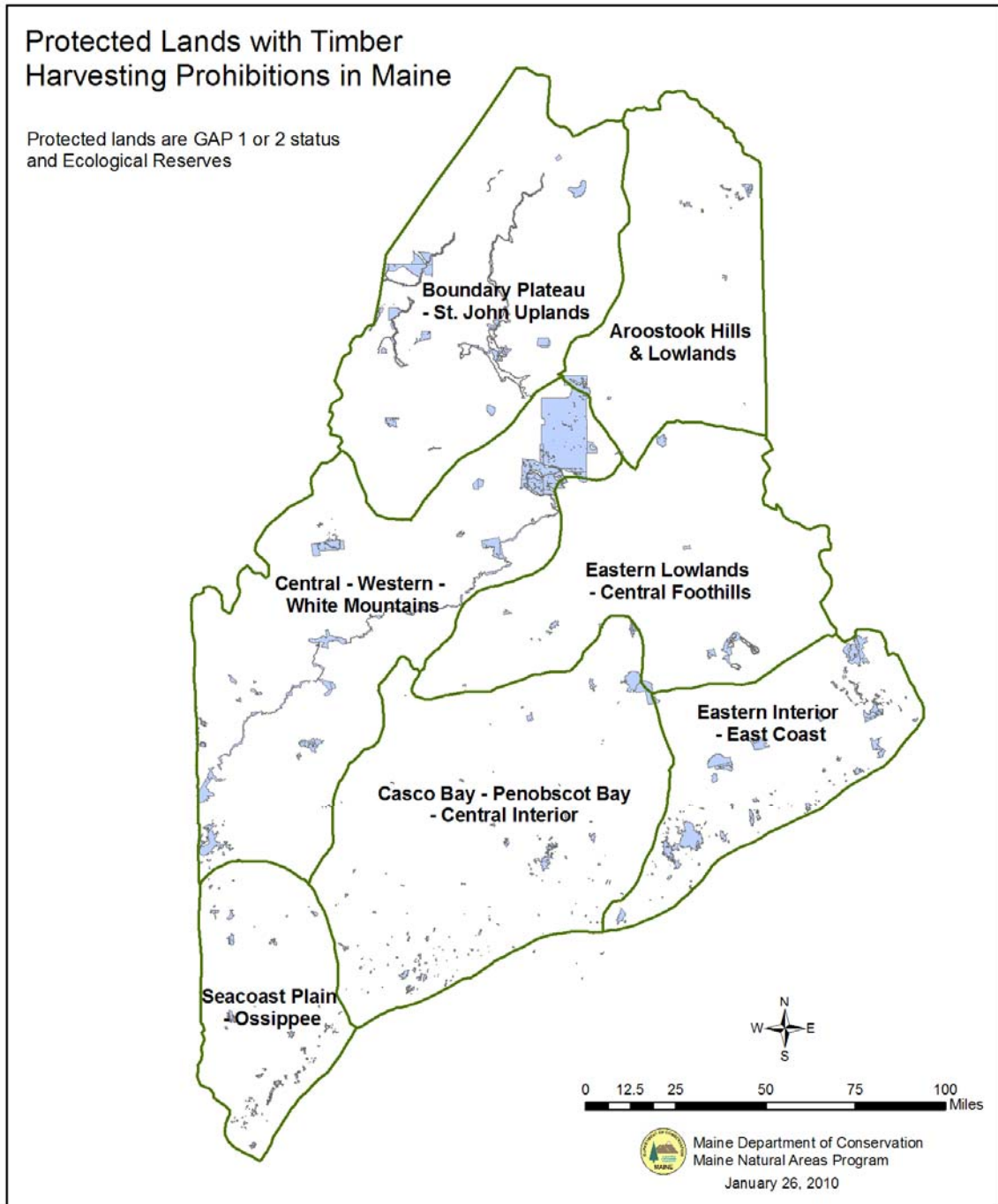
A number of private companies have internal policies regarding set-asides or special protection areas. Some of this information is public, but most is not. Nearly all companies with such policies have received third party certification. While statistics are not available for specific set-asides, the increase in third party certification suggests that the acreage of voluntary set-asides may have increased since 2003.

Figure 2.1.4. Conservation Lands in Maine¹⁶



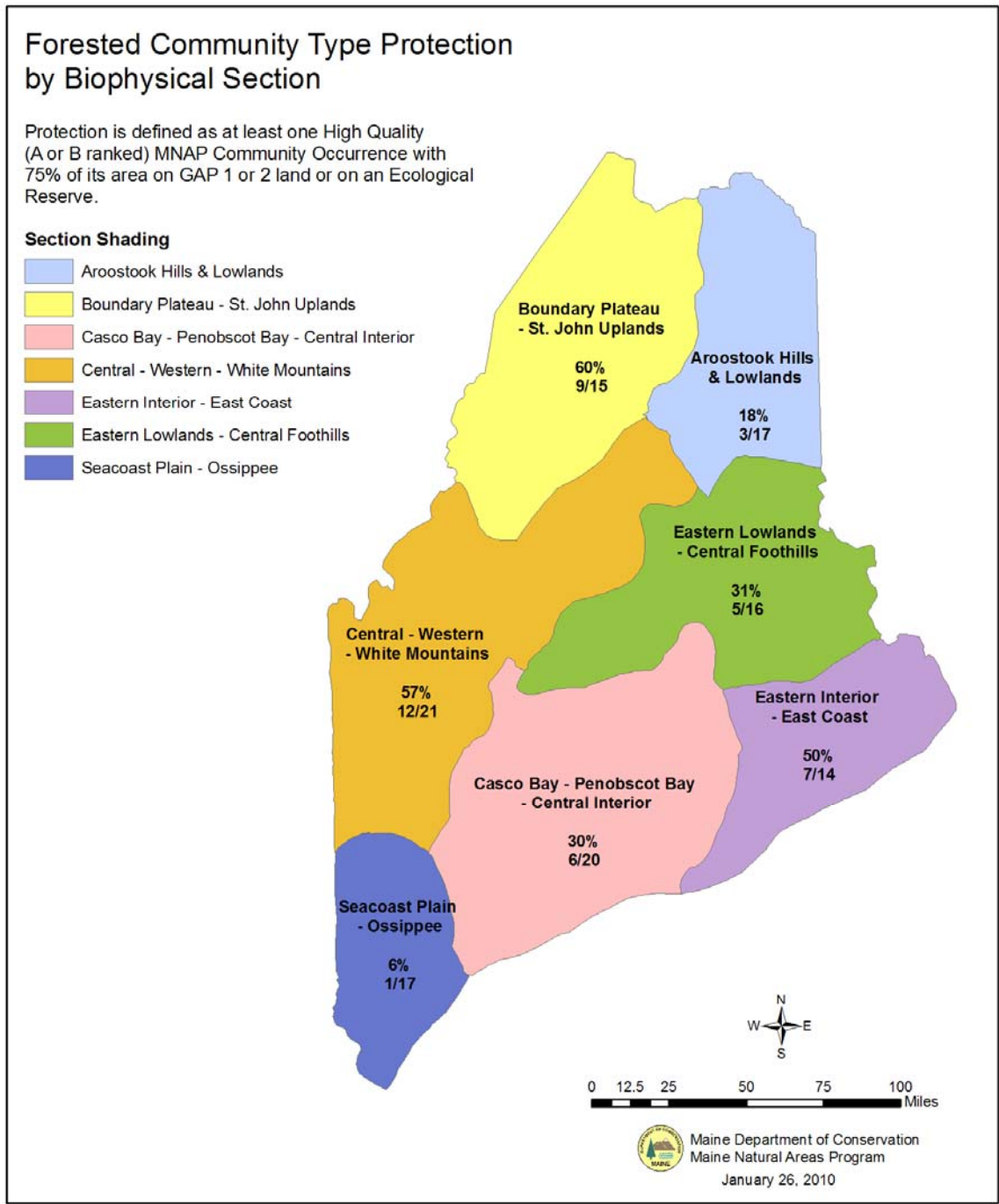
¹⁶ Data source for this figure: MEGIS

Figure 2.1.5. Protected Lands With Timber Harvesting Prohibitions.¹⁷



¹⁷ Data source for this and following figures in this section: MNAP. Note: This map overstates the acreage in this protection status. Only 46,000 acres of the St. John lands owned by The Nature Conservancy are in this status. This map also includes the Scientific Forest Management Area of Baxter State Park, which covers 29,600 acres.

Figure 2.1.6. Representation and Geographic Distribution of Protected Forest Types in Maine.



Maine Indicator 5.4: Conversion, parcelization, and roading of forest land

The size, arrangement, and connectivity of forest blocks are critical to the conservation of Maine’s forest biodiversity. “Biodiversity in the Forests of Maine” (Elliott, ed., 1999) provides an excellent treatment of this topic, and readers are directed there for more detail. The issue of fragmentation can be approached indirectly from the information above and from other sources, although it is difficult to develop a metric for it that is both understandable by lay people and relatively efficient to monitor. Large parcels, coupled with efforts such as independent third party certification and conservation easements, permit management for landscape level biodiversity values. Once large parcels are fragmented or divided into smaller parcels, society often loses the opportunity to apply the least expensive conservation strategies to a particular land base.

As with Indicator 5.1 (large trees), the issue of roads poses a dilemma for policy makers. On one hand, a widespread transportation network allows more efficient access by forest managers to make investments in forest productivity (e.g. site preparation, regeneration, and intermediate treatments, such as thinning). The transportation network also facilitates the movement of forest products to markets. Roads also reduce the skid road mileage and associated soil impacts. On the other hand, roads can significantly reduce movement of dispersal-limited species, such as salamanders (deMaynadier and Hunter, 2000). Roads also create hazards for wildlife capable of crossing them. The effects of roads on some elements of forest biodiversity can extend for hundreds of feet into the forest (Trombulak and Frissell, 2001). Maine is unique in having some of the least roaded areas in the eastern United States (Heilman et al, 2002).

Maine Indicator 5.4.1: Forest land area

Table 2.1.6. Acres of forestland, 1982-2006

Year	1982 (restated in 2003)	1995 (restated in 2003)	2003	2006	% change 1982 to 2006	% change 1995 to 2006
Acres forestland (million acres)	17.66	17.69	17.72	17.80	0.79%	0.62%

Maine Indicator 5.4.2: Acreage of forest land in parcels of 5,000 acres or larger.

Table 2.1.7.a. Maine private forest land ownership by parcel size, 2006 (Butler, 2008)

Parcel size (acres)	Number of Owners	Total Acres (thousands)	Percent of Private Maine Forest Land
1-9	151,000	451	3%
10-19	24,000	323	2%
20-49	32,000	889	5%
50-99	25,000	1,618	10%
100-499	12,000	1,843	11%
500-999	3,000	945	6%
1,000 -4,999	< 1,000	529	3%
5,000 +	< 1,000	9,888	60%
Totals*	248,000	16,575	100

* Figures may not add due to rounding.

Table 2.1.7.b. Maine private forest land ownership by parcel size, 1982 (Birch, 1986)

Parcel size (acres)	Number of Owners	Total Acres (thousands)	Percent of Private Maine Forest Land
1-9	100,800	326	2%
10-19	17,300	211	1%
20-49	28,800	856	5%
50-99	18,100	1,091	7%
100-499	14,200	2,444	15%
500-999	1,000	472	3%
1,000 -4,999	< 1,000	409	2%
5,000 +	< 1,000	10,562	65%
Totals*	180,900	16,370	100

* Figures may not add due to rounding.

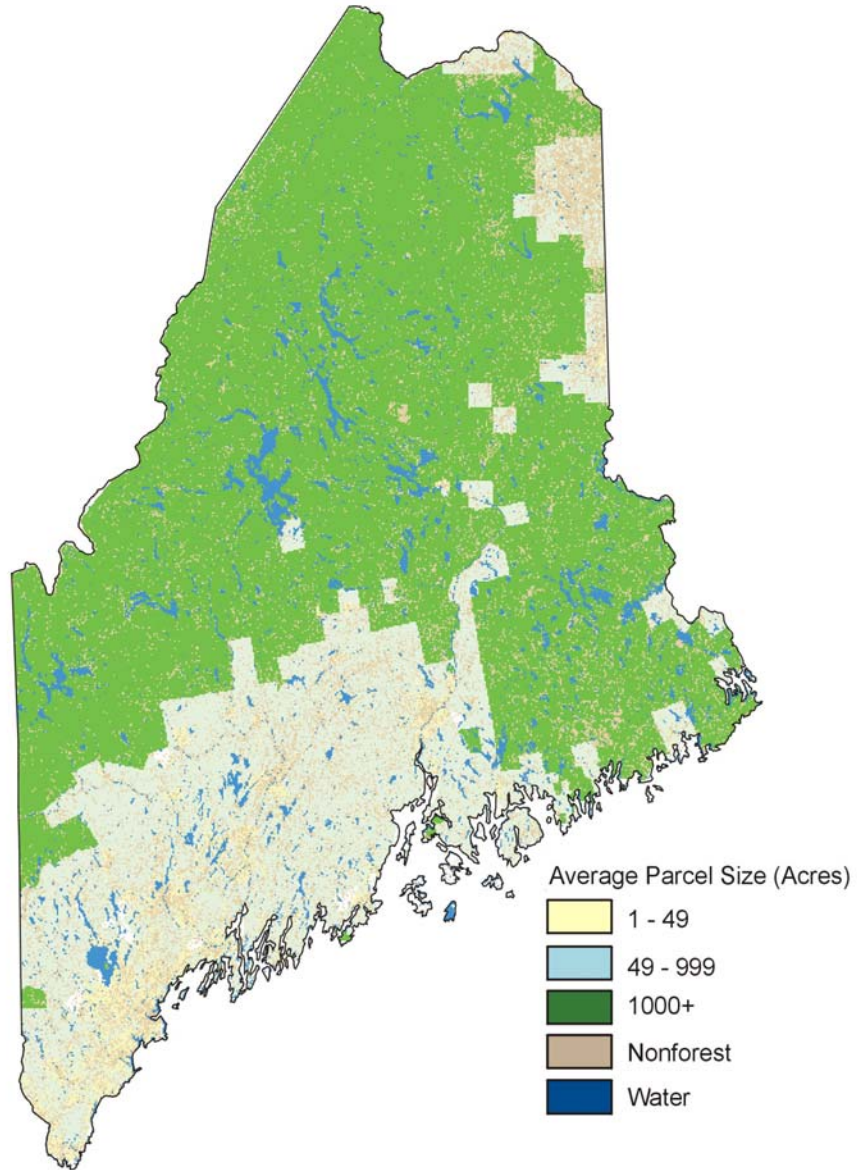
Table 2.1.7.c. Change in Maine private forest land ownership by parcel size, 1982-2006.

Parcel size (acres)	Number of Owners	Total Acres (thousands)
1-9	50,200	125
10-19	6,700	112
20-49	3,200	33
50-99	6,900	527
100-499	-2,200	-601
500-999	2,000	473
1,000 -4,999	**	120
5,000 +	**	-674
Totals*	67,100	205

* Figures may not add due to rounding.

** Cannot determine from available data.

The following presents current information in a pictorial format.
Figure 2.1.7. Distribution of land by parcel size, Maine, 2003



Assessment: This data supports the hypothesis that Maine’s forest lands have undergone parcelization over the last several decades. Whereas about 15% of the state’s forested acreage was in parcels of 100 acres or less in 1982, by 2006, this figure had increased to 20%. Parcels larger than 5,000 acres declined from 65% of the state’s forested acreage to 60% over the same period. The increase in number of owners and parcels for the 500-5,000 acre range likely can be explained by the breakup of much larger parcels (those over 5,000 acres).

Maine Indicator 5.4.3: The percentage of Maine’s forests that lie within 1,000 feet of an improved road

Table 2.1.8. Percentage of forestland inventory conditions within the specified distance to an improved road, 2006

Megaregion	Inventory Year	0 - 300 feet	301 - 1,000 feet	1001 feet - 1 Mile	> 1 mile
Eastern	2003	17.3%	24.9%	49.2%	8.5%
	2006	16.4%	26.2%	46.0%	11.5%
Northern	2003	13.7%	27.1%	43.5%	15.7%
	2006	14.7%	27.9%	45.5%	11.9%
Southern	2003	29.5%	34.5%	35.8%	0.2%
	2006	28.8%	34.5%	36.3%	0.4%
Western	2003	17.9%	26.9%	45.1%	10.1%
	2006	16.3%	30.0%	42.7%	11.0%
Statewide	2003	17.4%	27.6%	44.0%	11.0%
	2006	17.4%	28.7%	43.9%	10.0%

Assessment:

Forest land: For the first time there are reductions in forestland acreages across the state. These reductions, estimated by the change from an identical estimate in 2001 to 2006, range from a loss of 1,000 acres in the Northern Megaregion to a loss of 29,000 acres in the Eastern Megaregion. The statewide reduction in forestland over the 2001 to 2006 period is 66,000 acres.

Parcelization: Although the National Woodland Owner Surveys conducted by the USDA Forest Service in 1982 (Birch, 1986), 1993 (Birch, 1996), and 2006 (Butler, 2008) do not demonstrate statistically significant differences in a number of parameters regarding parcelization, the reported parameters indicate increasing parcelization. These parameters include average parcel size, median parcel size, and number of parcels between 10 and 100 acres. This is cause for concern, as smaller parcel size correlates strongly with reduced landowner motivation to engage in active forest management. The economic viability of timber harvesting on such lands also appears to decline, even if the landowner is inclined to manage (Thorne, 2000; Moldenhauer and Bolding, 2008).

Roads: No long term trend information is available at this time, although it is clear that large landowners invested a great deal in their road networks following the end of the river drives. Table 5.5.3a clearly indicates how much the transportation system dominates the forest landscape. It is estimated that 46% of Maine’s forestland lies within 1,000 feet of an improved road. Conversely, only 10% of Maine’s forestland lies more than one mile from an improved road. In addition to facilitating conversion of forest land to non forest uses, roads have direct and indirect impacts on biodiversity and habitats. They create permanent forest openings and edge habitats, which can both benefit and harm certain wildlife and plant species, depending on their particular habitat requirements. Roads also can facilitate the spread of invasive species; serve as barriers to movement of and the maintenance of genetic diversity in some taxa, e.g., plants that reproduce primarily by runners, salamanders, and frogs. Increased road density also can have an impact on fish and wildlife populations by allowing easier access to sportsmen (Elliott, ed., 1999).

If the scales are redone to match FIA inventory data collected in 1982, then the distribution of forestland is shown in Table 5.5.3b. Over the 25 year period, the most serious reduction occurs in the > 3 mile category, decreasing statewide from 3.5% to 0.6%.

Table 2.1.9. Percentage of forestland inventory conditions within the specified distance to an improved road, 2006

Megaregion	Inventory Year	< 1,000 feet	1001 feet - 3 Miles	> 3 miles
Eastern	1982	45.9%	51.4%	2.7%
	2003	42.3%	56.8%	0.9%
	2006	42.6%	57.2%	0.2%
Northern	1982	39.3%	54.7%	6.0%
	2003	40.8%	57.1%	2.1%
	2006	42.6%	56.4%	1.0%
Southern	1982	70.9%	29.2%	0.0%
	2003	64.0%	36.0%	0.0%
	2006	63.3%	36.7%	0.0%
Western	1982	44.0%	51.9%	4.2%
	2003	44.8%	54.4%	0.8%
	2006	46.3%	53.3%	0.4%
Statewide	1982	49.8%	46.7%	3.5%
	2003	45.0%	53.6%	1.3%
	2006	46.0%	53.4%	0.6%

The current status and trends in the sub-indicators outlined above should not result in a sense of complacency. It seems clear that the average forested parcel size is decreasing, probably to a greater extent in southern and central Maine, although the north is not immune from this trend.

The wide variation in landowner objectives can result in habitat fragmentation by itself. Other factors are also at work. It is unlikely that future reversions of farmland to forestland will continue to offset losses to development. Although policy makers have grappled with this issue (e.g. the discussions on “Smart Growth”) for several years, there is no information available that indicates a

turnaround is in sight. Keeping the working forest matrix intact and in a state conducive to the conservation of biodiversity will pose a challenge to policy makers for some time to come.

Maine Indicator 5.5: Degree to which forest management is consonant with natural forest dynamics

This indicator allows us to assess roughly the level of correlation between current forest management strategies and natural disturbance regimes. Forest ecosystems have evolved with natural disturbances, such as fire, windthrow, and pest epidemics. Forest ecosystems generally are considered resilient in the aftermath of such disturbances within the range of natural variation. Many scientists and forest managers have begun to embrace management strategies modeled on natural disturbance regimes (Crow and Perera, 2004). Maine's forests evolved within a pattern of "relatively frequent, partial disturbances that produced a finely patterned, diverse mosaic dominated by late-successional species and structures." Disturbances creating small canopy gaps were frequent. Large-scale, catastrophic (stand-replacing) disturbances were quite rare (Seymour et al, 2002).

Whereas Maine's natural forest dynamics tend to create a complex mosaic of species, types, and size classes across the landscape, timber harvesting - no matter how well planned and implemented - tends to simplify forest composition and structure (Crow and Perera, op. cit.). Most notable is the paucity of large trees, both living and dead, and other structural features that characterize unmanaged forests (McGee et al, 1998; Crow et al, 2002).

Notwithstanding the often significant differences between current forest management and natural forest dynamics, Foster (1997, 1998, 2000, and 2004) and Oliver and Larson (2004) remind us that while history can inform us about the conditions and disturbances that created today's conditions, we are now confronted with a suite of "novel environmental stresses [that] may surpass the ability of forests to control important ecosystem processes (Foster, 1997, op. cit.). Examples of such stressors include invasive and exotic species (e.g. hemlock woolly adelgid), air pollution, and abrupt climate change. These stresses are overlaid on past harvesting and land clearing patterns, and past disturbances to create a complex situation for which Foster (2000, op. cit.) suggests "there [is] no fixed 'original' landscape" against which to refer. Forest management can rarely - if ever - satisfy all interests and conserve all values; therefore, management involves tradeoffs among interests and values. The challenge to policy makers and land managers in the context of forest biodiversity is to design management strategies that involve the fewest tradeoffs (Oliver and Larson, op. cit.) and minimizing the risks of species loss.

Assessment: Since the 1980's total acreage harvested has nearly doubled, from about 250,000 acres per year to nearly 500,000 acres per year. Total harvest acreage peaked early in the last decade at around 550,000 acres per year. The modest decline since then probably can be attributed to the loss of mill capacity and economic conditions. Of greater interest are the changes in the type of harvesting. Since the 1980's the use of clearcutting as a silvicultural tool has

declined sharply, from nearly 100,000 acres to about 10,000 acres. Whereas clearcutting used to account for nearly half the harvest acreage, it now accounts for less than 5%. On the other hand, partial harvesting and shelterwood harvesting have increased significantly. This is not surprising, considering the fact that total harvest volume in the state has remained fairly steady over the years. To harvest roughly the same volume while reducing clearcutting obviously would require a commensurate increase in partially harvested acres. Total acres treated since the 1980's to improve future forest productivity (site preparation, planting, competition control, and spacing) are estimated at over 1.48 million. The total acres adjusted for treatment overlap are approximately 999,000. Again, however, the acres treated by planting, conifer release, and/or precommercial thinning have declined sharply since the peak years of the 1990's, with barely 22,000 acres treated in 2008.¹⁸

The current annual harvest footprint covers approximately 3% of the state's forestland area each year. Of the annual harvest footprint (2008 figures), approximately 51% of the acres are harvested by a partial harvest method (either individual trees or small groups of trees). The remainder is harvested using either the shelterwood (43%) or clearcut (2%) methods. From 1982 through 2008, approximately 1 million acres - 6% of the state's land area - is being managed under intensive silvicultural regimes that approximate the effects of a major or catastrophic disturbance on forest succession (effectively reset to zero every 50-70 years). The "return time" and patch size of land managed under such regimes, however, does not match that of the natural forest (Seymour et al, 2002).

Northeastern Area Indicators:

NA1. Area of total land, forest land, and reserved forest land

- a. Total land: 19.8 million acres
- b. Forest land: 17.8 million acres
- c. Reserved forest land: 311 thousand acres

NA2. Forest type, size class, age class, and successional stage

- a. Table 2.1.10 Major forest type group by stand size class provides a convenient and common cross-tabulation and distribution of the size class of trees that are the plurality in a given stand.
- b. Table NA 2.1.11 Major forest type group by stand age class provides an alternative cross-tabulation and distribution of the stand age class assigned to the FIA plots. There is not a one-to-one correspondence between stand size class and the assigned stand age class.

¹⁸ Kenneth Laustsen, 2010, personal communication, adjusted to reflect new information.

Table 2.1.10. Forest Type by Stand Size Class for timberland, Maine, 2006, (thousands of acres)

Forest Type Group	Stand Size Class				Forest Type Group Total
	Nonstocked	Seedling/ Sapling	Poletimber	Sawtimber	
White/Red/Jack Pine	-	42.9	293.2	1,028.0	1,364.0
Spruce/Fir	-	2,196.9	1,647.1	1,487.9	5,332.0
Loblolly/Shortleaf	-	-	9.2	-	9.2
Exotic Softwood Plantations	-	16.4	19.0	-	35.4
Oak/Pine	-	70.6	131.8	259.3	461.7
Oak/Hickory	-	10.6	144.2	153.2	307.9
Oak/Gum/Cypress	-	-	-	9.8	9.8
Elm/Ash/Red Maple	-	91.9	120.4	34.6	246.8
Maple/Beech/Birch	-	1,561.9	3,148.5	2,616.7	7,327.1
Aspen/Birch	-	1,143.8	843.0	241.8	2,228.6
Nonstocked	21.1	-	-	-	21.1
Total - Stand Size Class	21.1	5,135.1	6,356.4	5,831.2	17,343.7

Table 2.1.11. Forest type by stand age class for timberland, Maine, 2006, (thousands of acres)

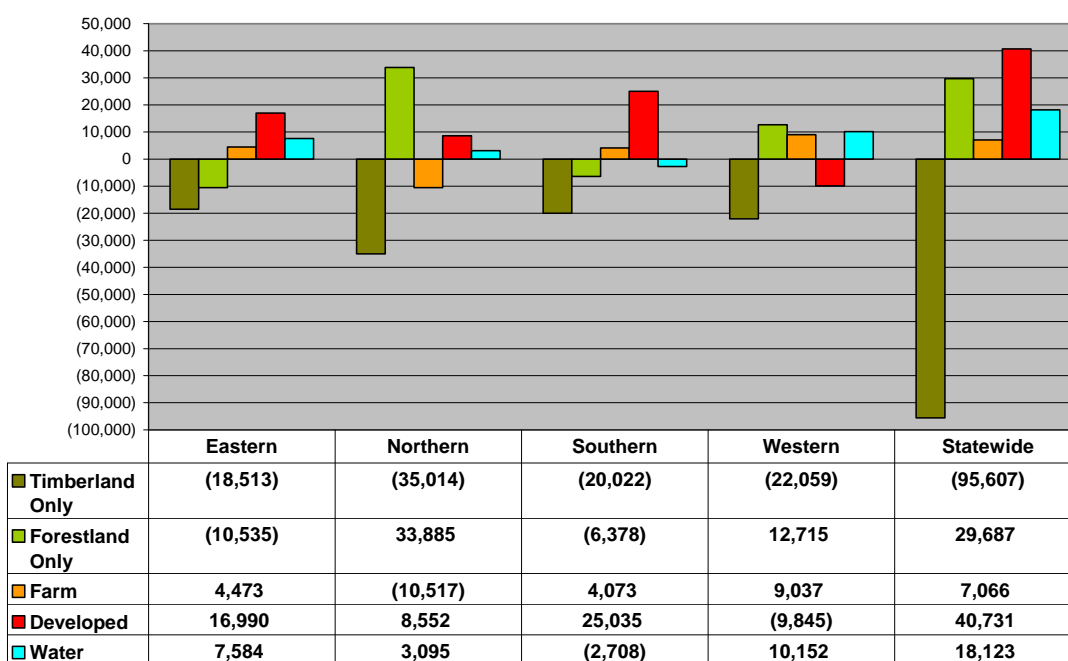
Forest Type Group	Stand Age Class (Years) & Category Name						Forest Type Group Total
	0 Non- stocked	1 - 30 Seedling /Sapling	31 - 60 Poletimber	61 - 90 Small Sawtimber	91 - 120 Large Sawtimber	120+ Late Successional/ Old Growth	
White/Red/Jack Pine	-	101.9	459.1	557.9	200.2	44.9	1,364.0
Spruce/Fir	-	1,514.7	1,379.5	1,488.9	734.0	214.8	5,332.0
Loblolly/Shortleaf	-	-	9.2	-	-	-	9.2
Exotic Softwood Plantations	-	35.4	-	-	-	-	35.4
Oak/Pine	-	71.7	168.0	203.9	18.1	-	461.7
Oak/Hickory	-	2.6	175.7	121.5	8.1	-	307.9
Oak/Gum/Cypress	-	-	-	9.8	-	-	9.8
Elm/Ash/Red Maple	-	55.3	83.6	90.8	14.6	2.6	246.8
Maple/Beech/Birch	-	1,008.9	2,329.6	3,136.1	701.4	151.2	7,327.1
Aspen/Birch	-	741.6	759.5	622.5	105.0	-	2,228.6
Nonstocked	21.1	-	-	-	-	-	21.1
Total - Stand Age Class	21.1	3,532.0	5,364.2	6,231.5	1,781.4	413.5	17,343.7

Based on Table 2.1.11, Maine currently does not have a balanced age class distribution, much like its unbalanced idealized stand structure displayed in Figure 2.1.3. Currently 51% of acres are less than a stand age of 60, while only 13% of acres are a stand age of 90+ years.

NA3. Extent of forest land conversion, fragmentation, and parcelization

- a. Land use conversion can be documented on FIA plots over the 2001 to 2006 period. These estimates are based on 3 years of data and as such each FIA plot represents a sample of approximately 10,000 acres.

Figure 2.1.8. Change in land use (FIA basis), by megaregion and statewide, 2001 - 2006



Assessment:

Eastern megaregion - estimates a combined net loss of timberland and forestland of 29,000 acres, nearly 17,000 ending up as a new developed land use.

Northern megaregion - estimates a net loss of 35,000 acres of timberland; 34,000 of these acres become new forestland, i.e. non-productive or reserved. The Farm land use estimates a nearly 11,000 acre loss with nearly 9,000 acres becoming a new developed land use.

Southern megaregion - estimates a 26,000 acre combined loss in timberland and forestland and 25,000 of those acres becoming new developed land uses.

Western megaregion - has more of a mixed change with 22,000 acres of lost timberland, 12,000 acres of new forestland, and other movements.

NA4. Status of forest/woodland communities and associated species of concern
See the discussion for Indicator 5.4 above.

Literature cited

Birch, T. 1986. Forest-land Owners of Maine, 1982. Resource Bulletin NE-90. Broomall, PA: USDA Forest Service, Northeastern Forest Experiment Station. 83 pp.

Butler, B. 2008. Family Forest Owners of the United States (corrected). Gen. Tech. Rep. NRS-27. Newtown Square, PA: USDA Forest Service, Northern Research Station (Publication Resources - Zip file download containing maps, tables, and state summaries, 12 MB).

Crow, T. et al. 2002. Effects of management on the composition and structure of northern hardwood forests in upper Michigan. *Forest Science* 48(1): 129-145.

Crow, T. and A. Perera. 2004. Emulating natural landscape disturbance in forest management - an introduction. *Landscape Ecology* 19: 231-233.

Elliott, C., ed. 1999. Biodiversity in the forests of Maine: Guidelines for land management. UMCE Bulletin #7147. University of Maine: Orono, ME. 168 pp.

Foster, D. and J. Aber, eds. 2004. Forests in time: the environmental consequences of 1,000 years of change in New England. Yale University Press: New Haven, CT. 477 pp.

Foster, D. 2000. Linking the deep and recent past to the modern New England landscape. *Rhodora* 102 (911): 278-279.

Foster, D. 2000. Conservation lessons and challenges from ecological history. *Forest History Today*, Fall 2000. 11 pp.

Foster, D. and G. Motzkin. 1998. Ecology and conservation in the cultural landscape of New England: lessons from nature's history. *Northeastern Naturalist* 5(2): 111-126.

Foster, D. et al 1997. Forest response to disturbance and anthropogenic stress: rethinking the 1938 Hurricane and the impact of physical disturbance vs. chemical and climate stress on forest ecosystems. *BioScience* 47 (7): 437-445.

Hagan, J., L. Irland, and A. Whitman. 2005. Changing timberland ownership in the Northern Forest and implications for biodiversity. Manomet Center for Conservation Sciences, Report # MCCS-FCP-2005-1, Brunswick, Maine. 25 pp.

Maine Department of Conservation. 2010. Bureau of Parks & Lands Conserved Lands Top 1 Million Acres. Media release.

McGee et al. 1998. Structural characteristics of old-growth, maturing, and partially cut northern hardwood forests. *Ecological Applications* 9(4): 1316-1329.

Moldenhauer, M., and M.C. Bolding. 2008. Parcelization at the wildland-urban interface: effects on forest operations. In: Proc. 31st Annual Council on Forest Engineering Meeting; Charleston, SC. 5 pp.

<http://www.forestry.vt.edu/bolding/08scofepaper.pdf>. Last accessed 06 January 2010.

Oliver, C. and B. Larson. 2004. Forest stand dynamics (update edition). John Wiley & Sons: New York. 520 pp.

Seymour, R., A. White, P. deMaynadier. 2002. Natural disturbance regimes in northeastern North America: evaluating silvicultural systems using natural scales and frequencies. *Forest Ecology and Management* 155 (2002): 357-367.

Thorne, S. 2000. New Hampshire Forest Land Base Survey: Report of Results. Society for the Protection of New Hampshire Forests for the New Hampshire Division of Forests and Lands, Department of Resources and Economic Development. 23 pp. + appendices.

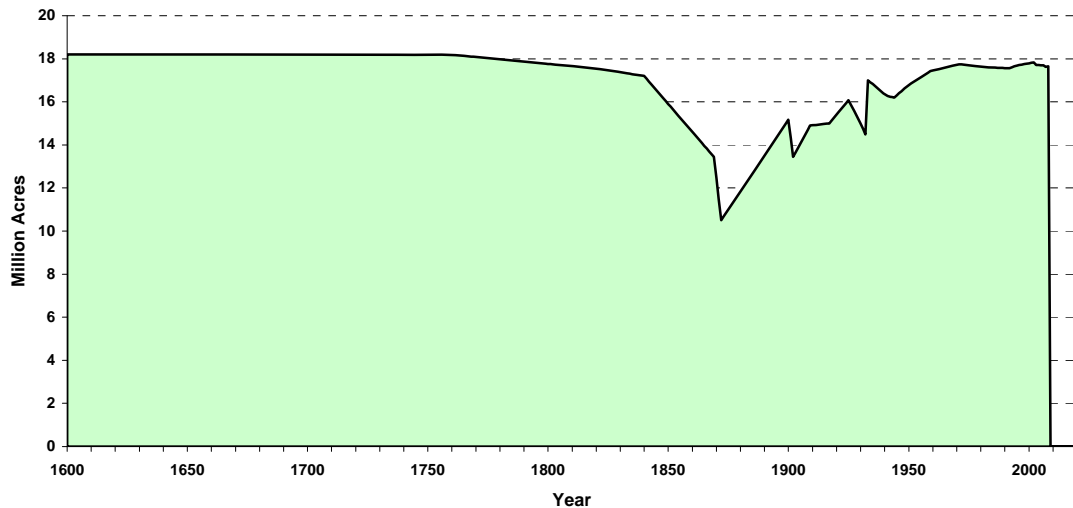
Westveld, M. 1954. A budworm vigor-resistance classification for spruce and balsam fir. *Journal of Forestry* 52 (1): 11-24.

Criterion 2: Maintenance of productive capacity of forest ecosystems

Desired Future Conditions: (1) Maine's future timber supply is of sufficient quantity and quality to support a diverse and economically healthy forest manufacturing sector; and, (2) Maine's forestry community broadens the practice of sustainable forestry and builds public confidence by establishing and maintaining reasonable accountability measures.

With 17.8 million acres of forest land, Maine is the most heavily forested state in the nation, percentage-wise, at 90%.¹⁹ 97% of the forestland is productive timberland. The state's forest land base has remained quite stable for the last several decades and is close to the estimated acreage of forest land present at the time of European settlement (Figure 2.1), but most recently timberland acreage has declined slightly.

Figure 2.2.1. Area of forest land, Maine, 1660 - 2008 (updated from Irland, 1998)



Statewide urban and community land comprised about 4.2 percent of the land area in 2000, a slight increase from 4.0 percent in 1990. Tree canopy cover averages 46.7 percent in urban and community areas. Statewide, urban or community land in Maine has an estimated 74.9 million trees. Trees in cities can contribute significantly to human health and environmental quality.

Unfortunately, little is known about the urban forest resource and what it contributes to the local and regional society and economy. The trend toward more land in urban and community land classes is expected to continue, with growth to 3.8 percent of urban land by 2050 (currently 1.1 percent) (Nowak and Greenfield, 2008). Urban and community forests will play an ever increasing

¹⁹ Much of this section adapted from Laustsen, 2009. 2006 Mid-cycle report on inventory and growth in Maine's forests. www.maine.gov/doc/mfs/pubs/2006_midcycle_inv_rpt/pdf/2006_me_midcycle_inv_grow_rpt.pdf. Last accessed 15 December 2009.

role in providing ecosystem services such as improved air and water quality, as well as a greater role in timber and pulpwood supplies.

In 2006, Maine's forests had an estimated inventory of 285 million cords of merchantable wood (pulpwood quality or better); an increase of 11 million cords since 2001. Current pulpwood quality or better volume is estimated at an average of 16.5 cords per acre, a 0.8 cord per acre increase from 2001. Since 2001, there have been no significant changes in growing stock net volume or sawtimber board foot volume in any species group.

79% of the timberland area is in desirable stocking classes (moderately stocked and fully stocked), a minor decrease of 2% from the 2001 estimate. The 2006 growth to harvest ratio for growing stock quality trees is 1.15, a substantial increase from the 2003 estimate of 0.97. Growth to harvest ratios ranged from 1.0 for the eastern and northern forest inventory megaregions, to 2.31 in the southern megaregion, and 1.35 in the western megaregion.

For the first time since 1971, Balsam fir showed a positive net change in volume. The net change of spruces is still heavily influenced by harvest and showed a slight decline of -0.02 cords/acre/year. Red maple continues to increase in prominence, with a net change of 0.01 cords/acre/year, while the sugar maple/beech/yellow birch group, which is impacted by mortality, quality degradation, and harvest, declined by -0.01 cords/acre/year.

Maine experienced a net loss of 96,000 acres of timberland between 2001 and 2006. The major losses occurred in the northern forest inventory megaregion (35,000 acres) and in the western megaregion (22,000 acres). Timberland acreage in the Corporate Investor owner class increased significantly, with an overall increase of 2.4 million timberland acres. Timberland acreage in the Forest Industry owner class declined concurrently, with an overall decrease of 2.7 million timberland acres.

Timber Supply and Quality

Goal: Maine's future timber supply is of sufficient quantity and quality to support a diverse and economically healthy forest manufacturing sector.

Maine Indicator 3.1: Ratio of projected growth and harvest, as determined by modeling current management practices and trends in forest development

Assessment: The latest findings in Maine's 2006 mid-cycle report on forest inventory estimate that the current growth to harvest ratio for quality trees (growing stock) is 1.15; for all live trees the ratio is 1.13. Both estimates reflect substantial improvement from the inventory period prior to 1995. The most current estimates of growth to harvest ratios for major geographic areas are shown in the following table.

Table 2.2.1. Growth to harvest ratio based on growing stock trees, Maine, 2006

Megaregion	1995	2003	2006	1995	2003	2006	1995	2003	2006
	Softwood	Softwood	Softwood	Hardwood	Hardwood	Hardwood	All Species	All Species	All Species
Eastern	1.10	1.02	1.23*	1.99	0.85	0.63**	1.35	0.94	1.00
Northern	0.17	0.85	1.11*	1.29	0.74	0.84**	0.42	0.80	1.00*
Southern	1.15	1.36	1.57*	1.98	1.49	3.14	1.46	1.43	2.31*
Western	0.64	0.87	1.42*	1.04	1.42	1.31	0.98	1.11	1.35*
Statewide	0.51	0.96	1.21*	1.50	1.00	1.07	0.81	0.97	1.15*

* Indicates improvement since 1995 ** Indicates area of concern

The most noteworthy change over the three displayed inventories is the response of softwood in the northern megaregion, rebounding from a 0.17 ratio in 1995 to the current 1.11. The 1995 ratio is dually impacted by the recent spruce budworm epidemic, which reduced net growth (low levels of accretion with high levels of mortality) matched against high removal rates to mitigate the epidemic impact or salvage pending losses. Concurrently in the 1990's, mills switched feedstocks to hardwood species to the extent possible because of availability and favorable economics. This switch helped existing merchantable softwood stocks to recover and allowed new softwood stocks to become merchantable over the last two inventory periods.

The growth to harvest ratios for major species and for the quality categories of all live, growing stock and sawtimber are estimated as follows:

Table 2.2.2 Growth to harvest ratio of selected major species by inventory year and by tree quality, Maine, 2006

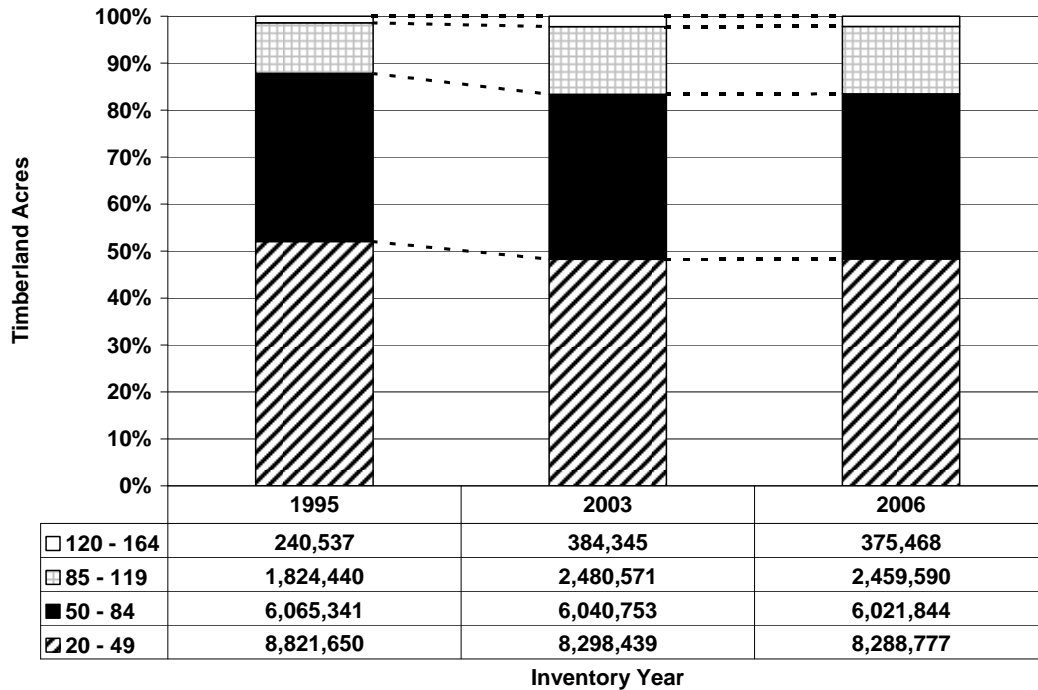
Species	1995	2003	2006	1995	2003	2006	1995	2003	2006
	All Live Trees	All Live Trees	All Live Trees	Growing Stock	Growing Stock	Growing Stock	Sawtimber	Sawtimber	Sawtimber
Balsam Fir		0.60	1.02	(0.07)	0.53	1.02*	(0.06)	0.38	0.60*
Spruces		0.90	0.70	0.40	0.85	0.80*	0.65	0.48	1.25*
White Pine		1.47	1.92	1.14	1.48	1.69*	1.14	1.39	1.40*
N. White-Cedar		0.61	1.33	1.42	0.64	1.59*	1.10	0.19	3.34*
Hemlock		2.94	1.46	0.93	2.80	1.79*	1.09	0.98	2.18*
Red Maple		1.17	1.42	1.93	1.10	1.39	1.67	1.31	1.46
Sugar Maple		1.57	1.13	2.05	1.82	1.12**	1.38	1.55	1.20
Yellow Birch		1.13	1.24	1.41	1.30	1.12**	0.99	1.21	0.91
White Birch		0.82	0.48	0.91	0.69	0.33**	0.92	0.88	0.50**
Beech		(0.12)	0.11	2.21	(0.46)	(0.11)**	0.97	(0.38)	(0.11)**
Aspen		0.61	0.84	0.99	0.55	0.84	1.58	0.18	0.73**
N. Red Oak		2.13	11.24	2.41	2.13	13.24*	1.92	1.36	36.68*

* Indicates improvement since 1995 ** Indicates area of concern

Assessment: Growth to harvest ratios overall have improved since 1995, although harvest continues to exceed growth for certain species and product categories. Nonetheless, considering the situation which engendered so much policy debate in the late 1990's, the present condition is a much better place to be. Some species and products present challenges, however. For example, beech continues its decline, largely due to mortality from the beech scale/nectria complex. Certain shade-intolerant species that rely on disturbances such as fire or heavy harvesting to regenerate, e.g. white birch and aspen are also declining.

Maine Indicator 3.2: Acres by forest type and landowner category suitable and available for management and harvest

Figure 2.2.2. Timberland acres, by inventory year, by FIA productivity class (cubic feet per acre per year), Maine, 2006



Assessment: MFS does not have a reliable method to determine the number of forest acres where forest management or timber harvesting is limited by regulation, easement, or other restrictions. A surrogate is provided in the mid-cycle inventory report, which estimated productive reserved forest land at 292,876 acres, an increase of over 49,000 acres since 2001.

Maine Indicator 3.3: Amount of tree mortality occurring that could otherwise be used through the application of sound silvicultural forest practices

The linkage of reduced mortality to specific landowner practices is difficult to assess with standardized FIA data and output. Landowner groups are coded to reflect the owner group at the time of plot remeasurement, which may or may not have been the same owner group at the previous measurement. To characterize that each owner group is directly responsible for any noted changes in mortality is potentially a flawed accounting. The correct analysis would be to examine just remeasured plots that remained within the same owner group. The table below reflects the owner group assignment at the year noted.

Tree mortality volume has increased across all ownership classes and statewide since 1995. The causes of this mortality are myriad; however, of greater concern is the inability to capture this mortality.

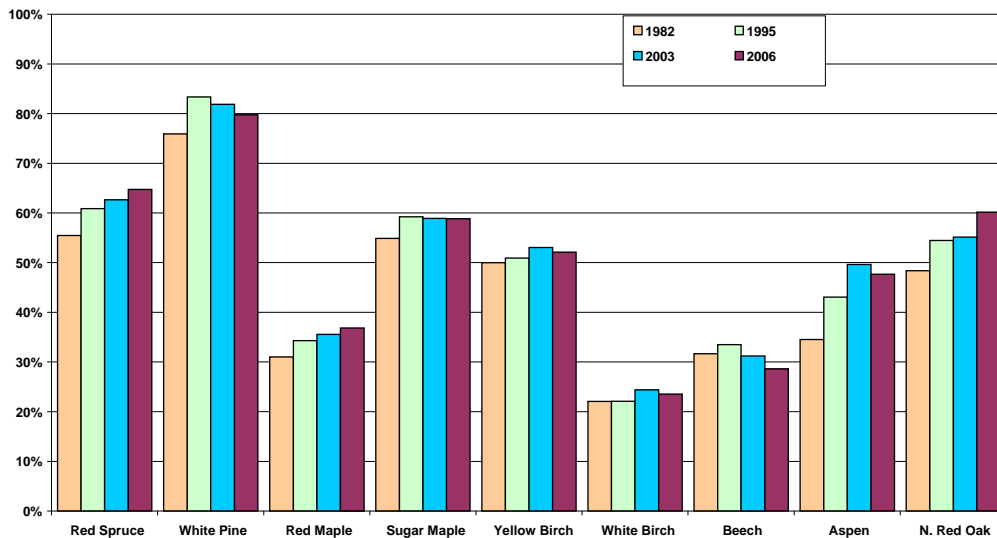
Table 2.2.4. Tree mortality volume by owner class, Maine, 2006

Owner Group	1995 Mortality cubic ft./acre/year	2003 Mortality cubic ft./acre/year	2006 Mortality cubic ft./acre/year
All Public Ownerships	(7.6)	(15.6)	(17.3)
Forest industry	(8.6)	(15.6)	(14.9)
Corporate Investors	(8.7)	(11.1)	(14.2)
NGO/Associations/Native Americans	(4.7)	(10.3)	(20.7)
Family Forests	(3.8)	(15.7)	(15.8)
Statewide	(6.8)	(14.2)	(15.2)

Owner Group	1995 Mortality board ft./acre/year	2003 Mortality board ft./acre/year	2006 Mortality board ft./acre/year
All Public Ownerships	(14)	(36)	(43)
Forest industry	(17)	(36)	(38)
Corporate Investors	(15)	(16)	(31)
NGO/Associations/Native Americans	(3)	(31)	(43)
Family Forests	(5)	(21)	(27)
Statewide	(12)	(25)	(32)

Maine Indicator 3.4: The ratio of sawlog and veneer volume to total volume for red spruce, white pine, red maple, sugar maple, yellow birch, white birch, beech, aspen, and northern red oak

Figure 2.2.3. Ratio of sawtimber volume to total volume for important species, by inventory year.



Assessment: Data from the 2006 Mid-cycle report and the “Forests of Maine, 2003” report are sufficient to assess the ratio of sawtimber volume to total volume for important species and also incorporates the restatement of the 1982 and 1995 inventory volumes. Of the nine species displayed, four species require further discussion.

- White Pine: This mature - and maturing - resource base may be at an apex. Only 4% of the current acres are in the seedling/sapling stand size; therefore, maintaining a high volume of sawtimber may be difficult to achieve without specific, focused silvicultural practices.
- White Birch: This species has rebounded from a 1995 nadir. It currently just exceeds 25% sawtimber volume. Maine's long history of fire suppression and continuing conifer release for high yield silviculture may preclude maintaining this level into the near future.
- Beech: This species suffers from multiple problems, particularly the Beech Scale/Nectria complex and drought. Given the trends in sawtimber volume over the last 20 years, it is unlikely that beech quality will sufficiently rebound any time in the near future.
- Aspen: Is also a maturing resource that may not be able to maintain its current sawtimber volume; a similar situation to that of white birch.

NA Indicators

NA5: Area of timberland. 17.3 million acres

NA 6: Annual removal of merchantable wood volume compared with net growth.

Table 2.2.5. Annualized net growth of all merchantable (All Live) wood compared to all merchantable (All Live) removals, Maine, 2006 (In thousands of cubic feet)

Formulas	Statewide	1995	2003	2006
A	All Species Ingrowth	228,141	159,253	160,308
B	All Species Accretion	318,976	700,266	681,428
A + B = C	<i>All Species Gross Growth</i>	<i>547,117</i>	<i>859,519</i>	<i>841,736</i>
D	All Species Mortality	(116,975)	(265,334)	(271,553)
C - D = E	<i>All Species Net Growth</i>	<i>430,142</i>	<i>594,186</i>	<i>570,183</i>
F	All Species Harvest	(499,515)	(519,405)	(477,486)
G	All Species Other Removals	(47,987)	(54,130)	(28,580)
F + G =H	<i>All Species All Removals</i>	<i>(547,501)</i>	<i>(573,535)</i>	<i>(506,066)</i>
E - H = I	All Species Net Change	(117,359)	20,650	64,117

Literature cited

Irland, L. 1998. Maine's forest area, 1600-1995: review of available estimates. University of Maine, Maine Agricultural and Forest Experiment Station, Misc. Pub. 736. University of Maine: Orono, ME. 12 pp.

Maine Forest Service, 2009a. 2006 Mid-cycle report on inventory and growth in Maine's forests.

www.maine.gov/doc/mfs/pubs/2006_midcycle_inv_rpt/pdf/2006_me_midcycle_inv_grow_rpt.pdf. Last accessed 15 December 2009.

Nowak, D. and E. Greenfield. 2008. Urban and Community Forests of New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont. Gen. Tech. Report NRS-38. USDA Forest Service, Northern Research Station.

Criterion 3: Maintenance of forest ecosystem health and vitality

Desired Future Conditions: (1) The various natural communities that in sum are Maine's forest resource are sufficiently healthy and resilient so that they have the capacity to respond to and recover from encountered stress, whether insect/disease, weather/climate induced, or as a result of anthropogenic disturbance; and, (2) Maine's forest resource concurrently maintains, without significant interruption, the capacity to generate sustainably desired levels of amenities and products (both traditional and new) while maintaining their capacity to provide necessary ecological process support functions.

Several natural events have influenced forest growth in Maine on a significant scale over the years; these events will occur again. In order of magnitude, these events are insect infestation (e.g. spruce budworm), major weather events (wind throw, ice and snow damage), and, on occasion forest fires. In addition, non-native pests have become an increasing threat to the future health of Maine's forests.

Insect and Disease Infestation: The most significant natural event to impact forest growth and health in the past century is the spruce budworm. Maine's spruce and fir forest will always be at risk from a spruce budworm infestation; however, the magnitude of damage to forest growth and timber loss that results from infestations varies. During the most recent outbreak of the 1970's and early 1980's, the combination of a long-term infestation and the presence of a large amount of mature balsam fir trees resulted in significant mortality and growth loss. It is reasonable to anticipate another spruce budworm infestation during the next 50 years. However, the forests we are growing today differ markedly from those of the 1960's and 1970's. The size and intensity of the next outbreak will be influenced by: 1) how much actual type exists; 2) the actual amounts and relative proportions of spruce and fir; and, 3) the age class structure. An equally important question concerns what actions land owners will take to limit the impact.

Weather Events: Wind damage, often in association with heavy snow, is common in Maine. Historically, these events have been most common at a scale of hundreds of acres. The winter of 1997-98 was an exception. The ice storm of January 1998 caused moderate to extensive damage (50% or more trees in a stand with substantial crown damage) on approximately 2 million acres. The most significant effects of the ice storm were a reduction in timber quality in the affected areas, rather than reductions in overall growth rates.

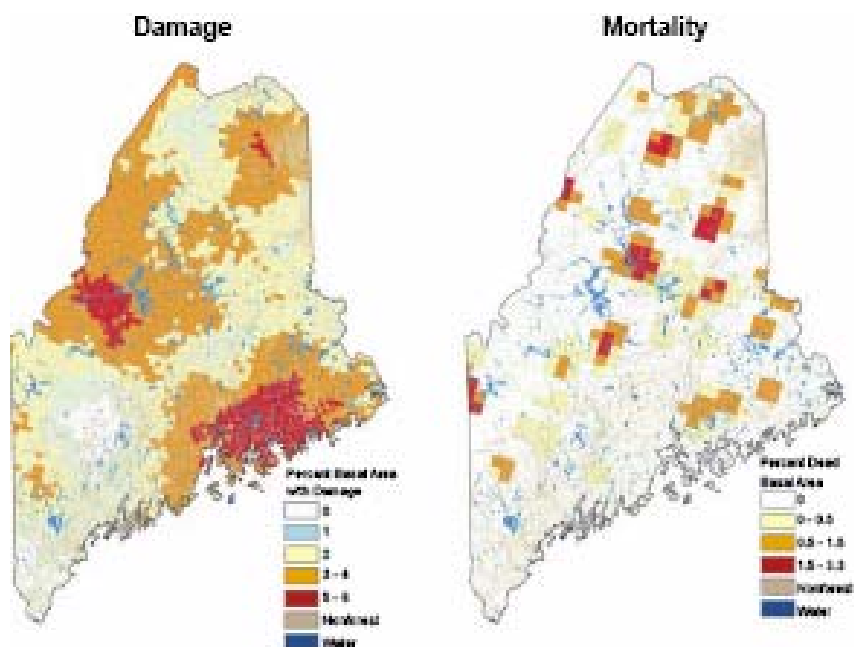
Fire: Prevention and suppression of forest fires has been Maine's most successful forest protection effort. Records back to 1903 indicate that fires frequently consumed 50,000 acres of forest per year, occasionally exceeded 100,000 acres per year, and burned 213,000 acres during the landmark year of 1947. Fire losses since the 1960's have been less than 5,000 acres per year and more typically about 1,000 acres.

Invasive species: Maine's forests face increasing threats from the potential introduction, establishment, and expansion of foreign invasive pest species. Native insects like spruce budworm periodically kill vast numbers of trees in

Maine's forests, but the ecosystem is adapted to these perturbations. Although it can take years, the forest and the forest-based economy can recover. Foreign pests can result in far more devastating and permanent situations.

Previously established nonnative pests like beech bark disease, chestnut blight, Dutch elm disease, and gypsy moth have already diminished the character and diversity of Maine's forests. The loss extends beyond just losing commercially valuable trees, also seriously impacting wildlife dependent on these trees for food and shelter. Although some of these pests (e.g. gypsy moth) appear to have attained equilibrium in the environment, some pests (e.g. beech bark disease), continue to damage and kill trees and degrade Maine's forest ecosystem. The most recent forest inventory shows that beech mortality - largely associated with beech bark disease and drought - exceeds growth, resulting in a 20% decline in beech volume since the 1995 inventory. Areas with the greatest impact are shown in dark red in Figure 2.3.1.

Figure 2.3.1. Beech damage and mortality, Maine, 2003 (McWilliams *et al*, 2005).



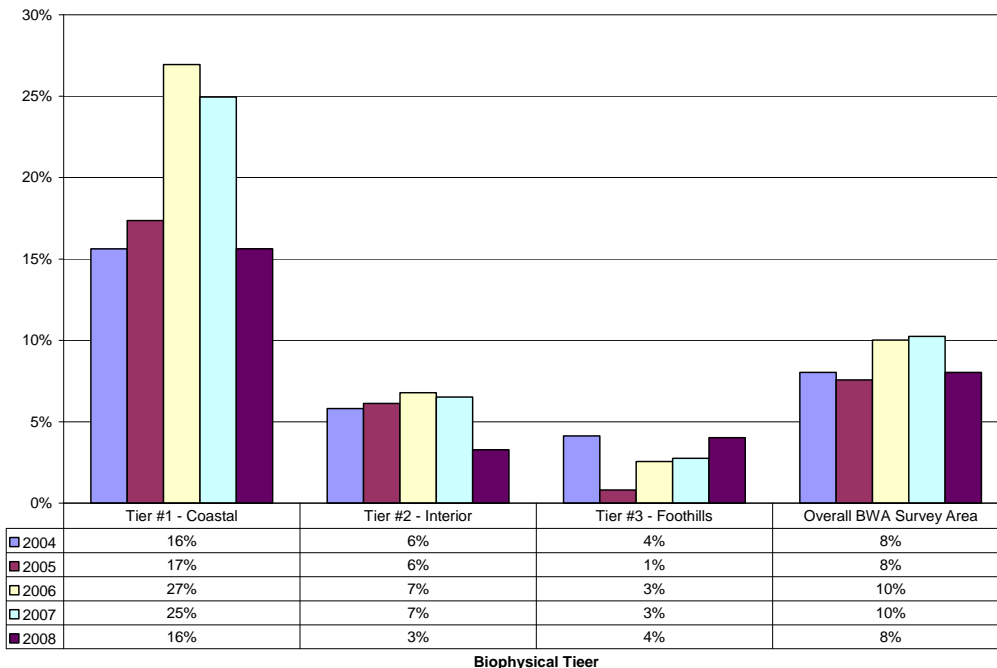
Other foreign pests like browntail moth and balsam woolly adelgid, that had been endemic in Maine for years, are resurging, intensifying and expanding their range with concurrent impacts on the forest and forest-dependent communities.

Although browntail moth infestations continue to spread inland, they are most concentrated in the towns adjacent to Casco Bay. The infestation has not yet caused a significant loss of trees. However, the extent to which this pest has stimulated specific pest response legislation provides evidence of the importance that local residents and businesses attach to the pest. The current

resurgence in Cumberland and Sagadahoc counties has begun to generate public health attention and may presage another spate of legislative activity.

While public concern over balsam woolly adelgid is minor, the current impact to Maine’s forest resources is far broader. Since 2004, the MFS Forest Health & Monitoring Division has evaluated annually the overall impact and mortality on merchantable and sapling sized balsam fir. This survey is focused on an area covering approximately 6 million timberland acres. The table below demonstrates these trends.

Figure 2.3.2. Annual assessment of BWA mortality, 2004 - 2008 (bars display mortality percentage of the total merchantable balsam fir basal area per acre)



Although BWA populations have decreased somewhat from the early years of this decade, they appear to be rebounding - and not just along the immediate coast. This has implications for the recovery of balsam fir inventories in coastal and central Washington and Hancock Counties.

Hemlock woolly adelgid (HWA) was first detected in Maine forests in 2003. Until recently, detections of the insect in established forest populations had been confined to southern and coastal York County. The mild winter of 2009-2010 allowed populations in other coastal areas to build to detectable levels, and in May 2010 HWA was confirmed in Harpswell (Cumberland County) and Phippsburg (Sagadahoc County). Infestations tend to be scattered and range from heavy to light. Detectable populations of HWA are generally confined to USDA plant hardiness Zone 5b and warmer zones. Tree damage has been noted on some adelgid-infested sites. It takes the form of increased crown transparency, seedling/sapling mortality and overstory mortality and is especially severe in areas prone to drought such as those with exposed ledge. Hemlock

woolly adelgid is one of several factors contributing to the declines on these sites. Management options for HWA in the forest are limited. MFS is pursuing efforts to establish biological control agents, which include two adelgid specialist predatory beetles, and working with researchers to develop other management techniques. Although MFS appears to be succeeding in slowing the infestation's spread and minimizing loss of trees, there is no basis for assuming that this population can be eradicated.

The organism causing sudden oak death, which has killed oak stands in California and Oregon, has been discovered in West Coast nurseries that have shipped stock into Maine. Although we have not yet detected this disease in Maine woodlands, diseased nursery stock has been intercepted here and elsewhere in New England. This pattern of sporadic reintroduction on infected nursery stock continues despite efforts of USDA and state agricultural plant health regulatory officials. There is a real possibility that it is here - at least as a disease of outplanted ornamental nursery stock. Laboratory trials have shown northern red oak (which accounts for 93% of Maine's oak trees) to be highly susceptible to this disease.

Asian longhorned beetle and emerald ash borer, although further removed, have an even greater potential to seriously impact our forest and shade tree resources should they become established here. The USDA and state and local governments in the infested areas are spending millions of dollars to contain these pests. There is evidence that the effort is at least reducing the populations and slowing the spread of Asian longhorned beetle, for which the closest known infestation is in Worcester, Massachusetts.

For emerald ash borer, the results are less reassuring. This pest was first detected in 6 counties in southeastern Michigan (surrounding Detroit) in 2002. Despite aggressive tree removal and quarantine efforts in the core infested area, emerald ash borer continues to spread into new areas. As of May 2010, 471 counties in 14 states have been put under quarantine. Additional infestations have become established in Ontario and Quebec. Currently over 200,000 square miles in the U.S. are under quarantine. Millions of trees are currently infested or are already dead (death occurs after 1-3 years). The only tools available to slow the spread of this pest are strict regulation of movement of potentially infested logs and nursery stock, and destruction of known and suspected infested material. In response to a shipment of infested ash trees into Maryland, that state destroyed all ash trees in a ½ mile radius around the nursery (more than 1,000 forest and shade trees).

Recognizing the threat posed by nonnative pest species, MFS has focused increased attention and effort on this issue. The prime example of this dynamic is the effort expended on hemlock woolly adelgid over the past several years. However, the issue encompasses far more than just a single species.

Exotic pernicious weed species represent a related but different challenge. While they do not directly kill or degrade trees, they can seriously degrade forest stands. When they become established (often following a disturbance event), they often out-compete and replace native vegetation, creating dense

monocultures. Although most of the currently established threats are understory species (e.g. Japanese barberry and Tartarian honeysuckle) they do inhibit forest regeneration and impact wildlife.

Although the Maine Forest Service provides information and education for identifying and managing exotic forest pest plants which affect forested settings, most of the statutory authority for dealing with exotic plants resides in other state agencies. MFS serves on Maine's Interagency Invasive Species Management Group and works with the Maine Department of Agriculture, Food and Rural Resources, the Department of Conservation's Natural Areas Program, and the Department of Environmental Protection to address exotic plant threat issues.

As a strategic response, MFS has engaged a broad range of cooperators to improve survey and detection capacity. To date, providing training and assessment tools targeted to the various industrial commodity groups and public outreach through the media have proven successful for detecting and intercepting specific pests. However, the state of the science varies, and waiting until the pests are at the door is an irresponsible, risky approach.

Past experience demonstrates that the most effective and efficient intervention strategies are based on assessing the risk of various potential foreign pests and their avenues of introduction, and then focusing quarantine regulations and inspection and certification of regulated materials to disrupt those high priority pests' critical pathways - preferably long before they get close to Maine.

Although the USDA Animal & Plant Health Inspection Service (APHIS) has this responsibility, the magnitude of the task exceeds the resources provided to that agency. That forest product processors and their commodities are not traditional APHIS customers exacerbates the situation. Therefore, various state and federal agencies are working cooperatively in Maine to design seamless intervention and response mechanisms:

- The 120th Legislature gave the MFS Director clear, specific authority to order disposition of forest and shade trees infested with exotic pests. This authority is similar to that granted the Commissioner of Agriculture for agricultural commodities, crops and nursery stock.
- MFS and the USDA Forest Service are actively engaged on several cooperative projects to monitor for high priority foreign pests and manage those that get in. Current efforts include:
 - Early detection monitoring for sudden oak death and hemlock woolly adelgid;
 - Development of hazard rating systems and risk maps for balsam woolly adelgid; and,
 - A cooperative Slow-The-Spread project to contain and mitigate the hemlock woolly adelgid infestation in southern York County.
- An effort by the Maine Department of Agriculture, APHIS, and MFS to retool APHIS's local Cooperative Agricultural Pest Survey to better focus on serious

invasive threats and forest pest species shows great promise as a tool to coordinate effort and secure funding.

- The 124th Legislature directed MFS to ban the importation of firewood into the state. It further directed the Bureau of Parks and Lands to prohibit uncertified firewood from out of state sources onto BPL lands. BPL is informing out of state visitors regarding the firewood prohibition on its lands, and MFS is working with the Attorney General's office to put regulation in place for the entire state.

MFS is currently developing a uniform strategy for monitoring and addressing nonnative forest pests. Any effective response to a foreign pest will require regulatory restriction and may involve condemnation and destruction of private property. If MFS is to maintain public and industry support and assure long term success, it is critical to have the decision processes publicly reviewed and in place before MFS has to invoke them.

Urban and Community Forests

Urban or community land in Maine comprised about 4.2 percent of the state land area in 2000, an increase from 4.0 percent in 1990. Statewide tree canopy cover averaged 69.1 percent and tree cover in urban or community areas was about 46.7 percent, with 7.8 percent impervious surface cover and 50.6 percent of the total green space covered by tree canopy cover. Statewide, urban or community land in Maine had an estimated 74.9 million trees (Nowak and Greenfield, 2008). The threats to Maine's urban and community forests are quite similar to those affecting or potentially affecting Maine's forests in general, although some threats are exacerbated in urban settings.

Some of the problems in Maine's urban forests are of long standing, e.g. Dutch elm disease, which has largely wiped out the majestic elms that dominated many urban landscapes just a few decades ago. The most famous example is Herbie, the former state and New England champion American elm. Herbie once stood in Yarmouth, but finally succumbed earlier in 2010 at the age of 217, notwithstanding years of tending by Yarmouth's former Tree Warden, Frank Knight.

The ice and wind storms that periodically batter Maine have a particularly devastating effect on urban forests, as urban trees are more exposed to such damaging agents than trees in forested settings, and can be more vulnerable when subjected to other stressors such as restricted root systems and mechanical damage from vehicles. Cleanup in the aftermath of such disturbances is also complicated and expensive. Whereas in a forested setting, damaged trees can be left in place or salvaged as the landowner desires, severely damaged, broken, and uprooted urban trees must be removed, and the wood disposed of properly.

Wildland Urban Interface

One area of recent concern is the increasing amount of Wildland Urban Interface (WUI) throughout the state. WUI is defined as "the area where homes meet the forest" and are at risk from wildfire. As Maine communities grow, the threat of

fire in the WUI increases as well. Fires in the WUI can originate in the forests and threaten homes or start as structural fires and threaten the forests.

On average, Maine experiences over 700 wildfires annually. Over one-third of these fires threaten structures. Maine's coast has approximately 3,000 islands, many of which are inhabited. These island communities face challenges in the WUI that mainland communities do not, such as extended response time, type of response vehicles, limited mutual aid, fire hazards created by senescent coastal spruce, lack of fresh water for aircraft, seasonal human population fluctuations, and island politics.

Maine's WUI committee was formed in 2003. The committee's first task was to develop a WUI program, an assessment strategy, and a WUI database. The committee met with Acadia National Park's fire management team to view their WHAM (Wildland Hazard Assessment Methodology) software. This software was chosen as a basis for collecting and analyzing Maine's data.

Assessments are conducted by Forest Rangers and trained staff of the Island Institute, who are familiar with Maine's island communities.

Each Maine WUI Risk Assessment and Mitigation Strategies Plan includes generalized results with recommendations, 100-200 structural assessments, 25-50 vegetative plots, a map of historical fire starts (by cause), two risk assessment maps and a Powerpoint® presentation on CD. The results of the assessments have been used to assist communities with the development of their Community Wildfire Protection Plans. There now are 42 Maine communities which have completed Community Wildfire Protection Plans.

MFS offers a free fuel reduction chipping program to communities interested in reducing the risk of wildfire near homes. The communities work with their local Forest Ranger in delivering the program. Communities' responsibilities include: publicizing the event; distributing the "Will Your Home Survive?" Firewise brochures to homeowners; collecting applications from homeowners; and, providing a crew of at least four to assist in hauling and feeding brush into the chipper. Homeowners' responsibilities include: creating defensible space within 30 feet of their homes; trimming ladder fuels at least ten feet above the ground; hauling material to be chipped close to a road; and, ensuring that the materials are clean of contaminants. The Maine Forest Service provides: a wood chipper; a modified stake body truck to haul chips at no cost to the community; and, one person to operate the chipper. MFS hauls the unwanted chips to a nearby location or, when feasible, delivers them to a wood pellet mill for recycling.

Communities benefit from this program by reducing the risk of wildfire; keeping branches, brush and other debris out of landfills; and, using the chips as mulch, landscaping material, for trails, and as biofuel.

NA Indicators

NA 7: Area of forest land affected by potentially damaging agents

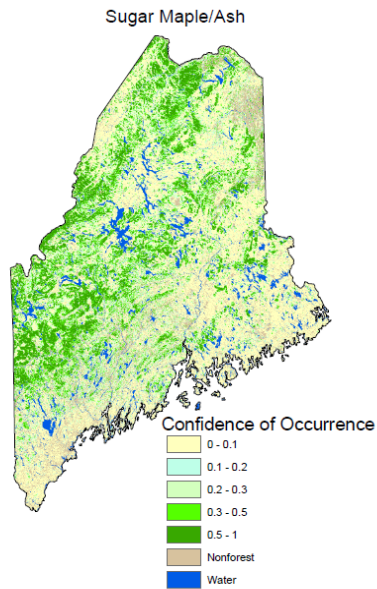


Figure 29 (continued). Distribution of forest land by habitat type, Maine, 2003.

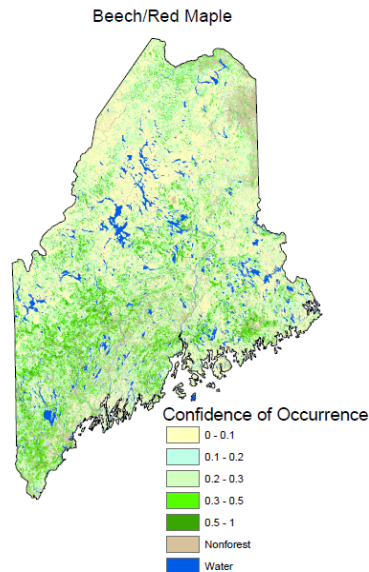


Figure 29. Distribution of forest land by habitat type, Maine, 2003.

The Beech/Red Maple and Sugar Maple/Ash maps show the areas at risk from an introduction of Asian longhorned beetle.

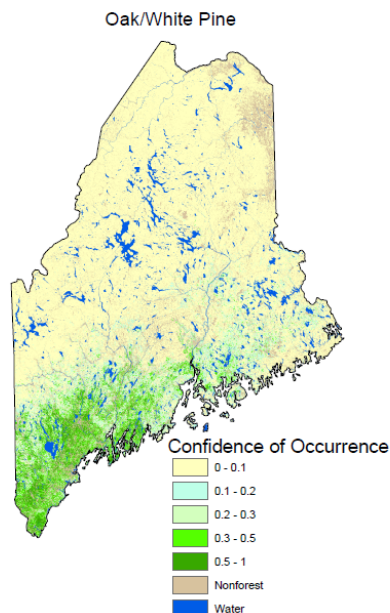


Figure 29 (continued). Distribution of forest land by habitat type, Maine, 2003.

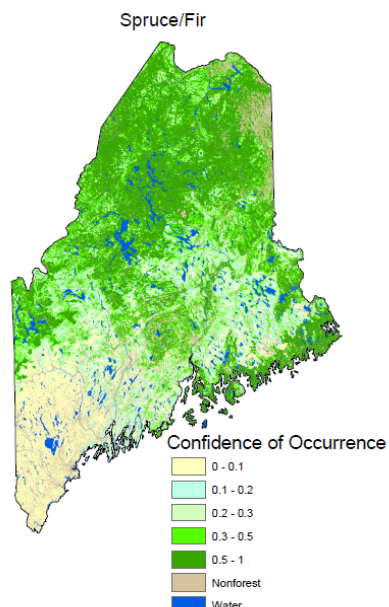
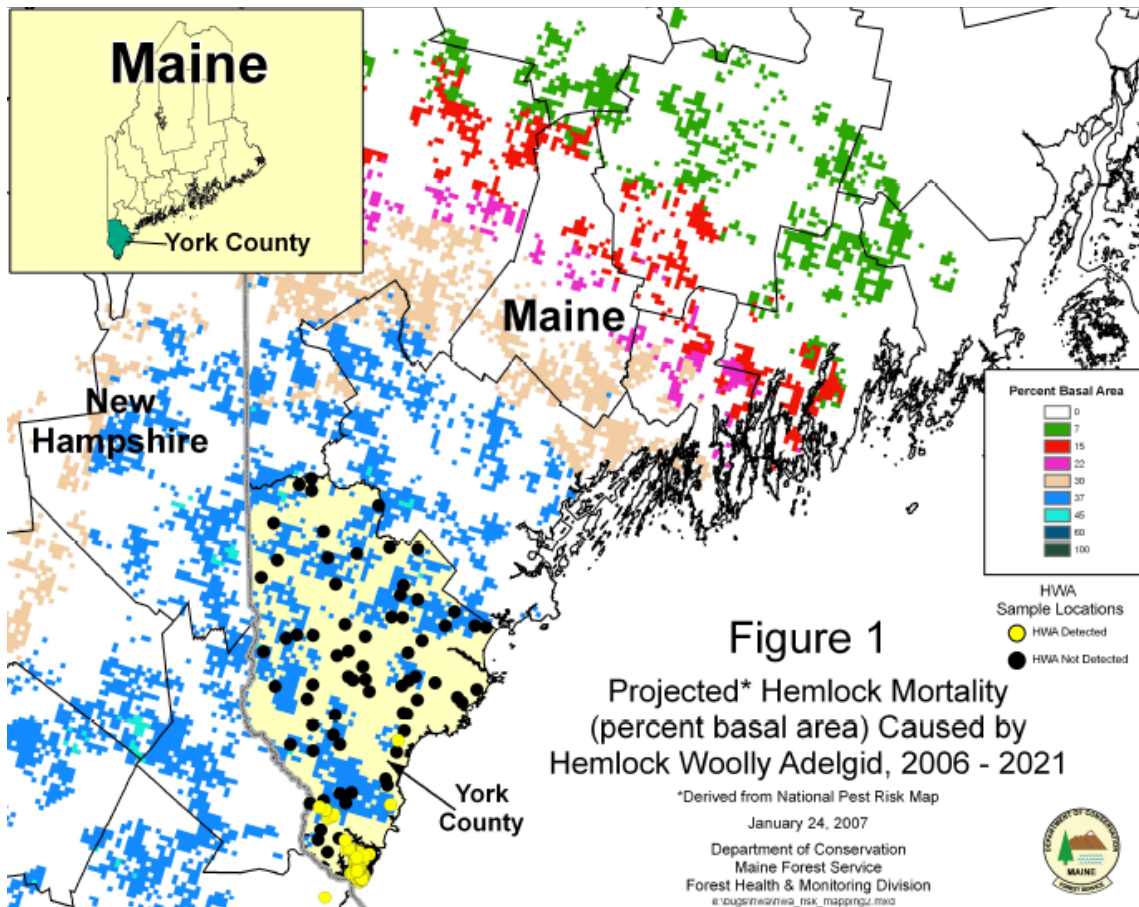


Figure 29 (continued). Distribution of forest land by habitat type, Maine, 2003.

The Oak/White pine map shows the area at risk for gypsy moth and white pine weevil. The spruce-fir map shows the area at risk for a spruce budworm infestation.



The hemlock woolly adelgid map shows the area at risk and the projected areas at risk of hemlock woolly adelgid infestation.

Literature cited

Nowak, D. and E. Greenfield. 2008. Urban and Community Forests of New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont. Gen. Tech. Report NRS-38. USDA Forest Service, Northern Research Station.

Criterion 4: Conservation and maintenance of soil and water resources

Desired Future Conditions: Forest management activities (1) maintain proper soil structure, texture, organic matter, and adequate nutrient levels for forest growth; (2) maintain or, where necessary, restore the chemical, physical, and biological integrity of aquatic systems in forested areas; and (3) protect water quality and aquatic and riparian forest biodiversity.

Maine Criterion 1: Soil productivity

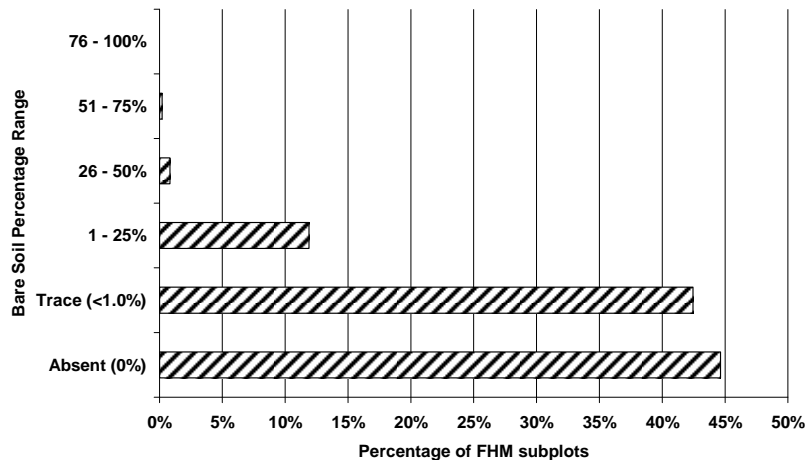
Goal: Maintain proper soil structure, texture, organic matter, and adequate nutrient levels for forest growth (aka site quality).

Metrics (status and trend): The USDA Forest Service, Forest Inventory and Analysis Program monitor Phase 3 (P3) indicators, which includes soils on a subset of the standard FIA plots. The intensity of the sampling (one plot per 96,000 acres) limits the analysis of these data to just a state-level basis. At this time, we do not have a sufficiently robust, comprehensive program or data set with which to establish an indicator. Slightly over 200 P3 sample plots were measured over the 2000-2005 period; that data is available for analysis of soil properties.

Table 2.4.1. Estimated percentage of bare soil in Maine's forestland.

Percent of bare soil	Percent of Subplots
Absent (0%)	44.6%
Trace (<1.0%)	42.4%
1 - 25%	11.9%
26 - 50%	0.8%
51 - 75%	0.2%
76 - 100%	0.0%

Figure 2.4.1. Bare soil (%) in Maine's forestland, FHM plot data 2000 - 2005.

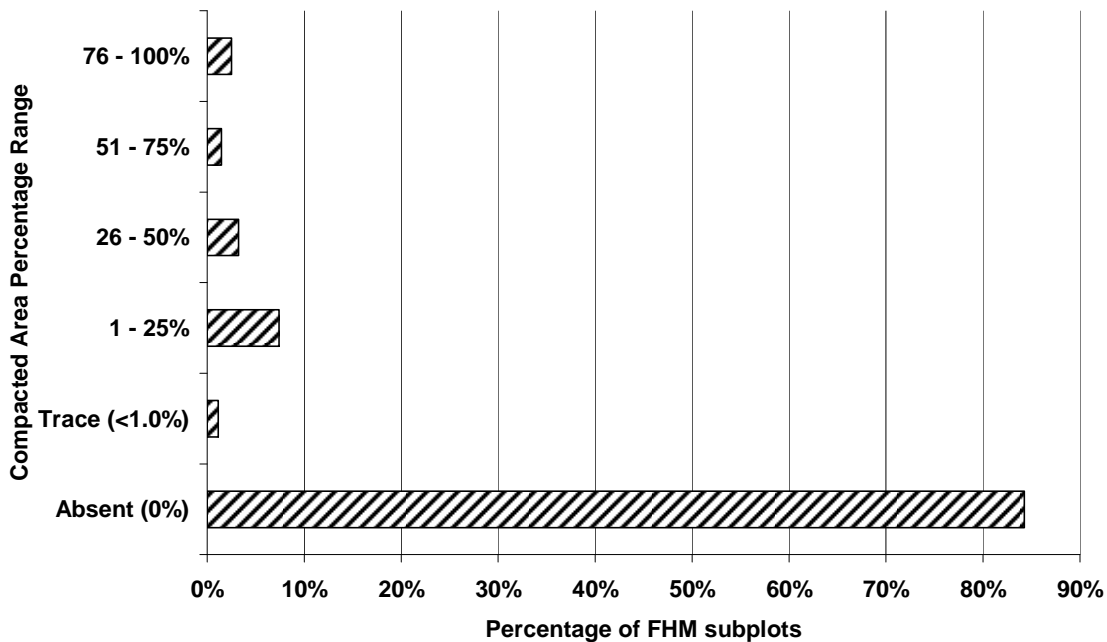


The percentage of bare soil on these subplots is minimal, with 87% coded as trace (< 1%) or absent. Since only 1% of subplots have 26% or more bare soil, it is reassuring that the risk of soil erosion is being minimized across the forested landscape (Table 2.4.1).

Table 2.4.2. Estimated percentage of compacted soil in Maine’s forestland

Percent of compacted soil	Percent of Subplots
Absent (0%)	84.3%
Trace (<1.0%)	1.1%
1 - 25%	7.4%
26 - 50%	3.2%
51 - 75%	1.5%
76 - 100%	2.5%

Figure 2.4.2. Compacted area (%) in Maine’s forestland, FHM plot data 2000 - 2005



Compacted soil is a rearranging of the soil grains, resulting in decreased void space and increased bulk density. This can result in decreased tree growth, increased water runoff, and soil erosion. Typically, the major causes are repeated applied loads, vibrations, or pressure, from harvesting equipment. While it is encouraging that over 85% of the subplots have at most only a trace

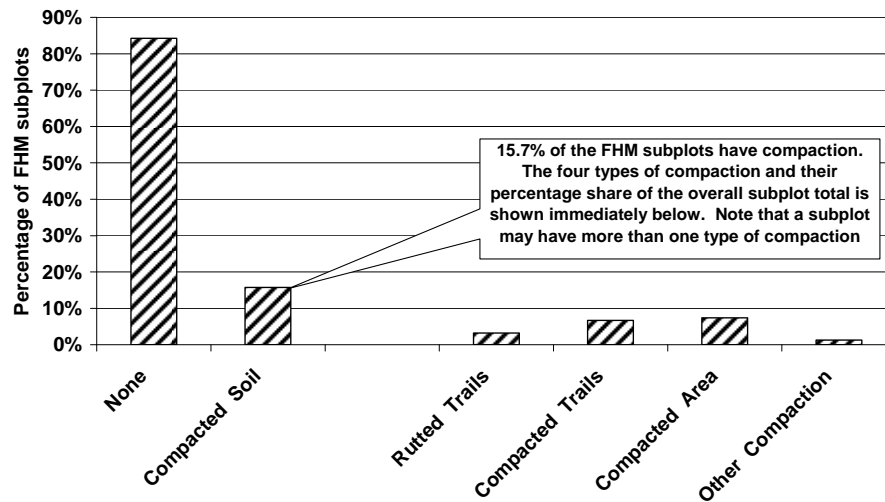
(< 1%) of compaction, the 4% of the subplots with 50% or more compacted area are a concern (Table 2.4.2).

The P3 soils data also records four types of compaction: rutted trails, compacted trails, compacted area, and other. More than one type of compaction can be coded for a single subplot. Compacted trails and compacted area each represent about 7% of the compacted subplots, and rutted trails follows with a 3% representation (Table 2.4.3).

Table 2.4.3. Estimated percentage of type of compacted soil in Maine's forestland

Type of compacted soil	Percent of Subplots
None	84.3%
Compacted Soil	15.7%
Rutted Trails	3.2%
Compacted Trails	6.7%
Compacted Area	7.4%
Other Compaction	1.3%
A subplot may have more than one type of compaction noted	

Figure 2.4.3. Types of compacted soil in Maine's forestland, FHM plot data 2000 - 2005



Two related measures also allow us to draw some inferences regarding the impacts of forest management on soils: BMP use and effectiveness and forest certification. These topics are discussed elsewhere in this report, but to summarize, MFS monitoring of BMP use and effectiveness has found that on the vast majority of timber harvests, BMPs to protect water quality are used effectively, and sedimentation events are rare. Over 40% of the state's forest lands are certified to one of three independent third party certification standards operational in the state. The standards to which these lands are audited for certification include requirements concerning the protection of site productivity.

Maine Criterion 2: Water quality, wetlands and riparian zones

Goal: Maintain or improve the chemical, physical, and biological integrity of aquatic systems in forested areas and riparian forests.

Metrics (status and trend):

Indicator 4b.1: Percent of harvested acres on which Best Management Practices for the protection of water quality are utilized effectively.

This indicator serves as a proxy for assessing water quality in forested ecosystems, based on the assumption that forest management operations effectively using BMPs, coupled with progressive management approaches, can minimize the negative effects of forest management on water quality.

Assessment:²⁰ MFS has conducted random, statewide monitoring of BMPs on timber harvesting operations since March 2000. District Foresters in the Forest Policy & Management Division collect data as part of their regular field activities.

BMPs were used appropriately at 41% of the monitored harvests in 2000. In 2008 (the last year for which data is available), BMPs prevented measurable sediment from reaching the waterbody at 72% of stream crossings and 92% of approaches to the crossings.

Key findings regarding the use and effectiveness of BMPs are:

- Of the 615 opportunities to observe soil conditions, 87% showed no sediment reached the waterbody, the same level as 2006-2007 and a 4% improvement from the 2005 reporting period.
- BMPs were not applied on 4% of crossings, the same level as 2006-2007. BMPs were not applied at 2% of approaches, also the same as 2006-2007.
- Sedimentation events were most often related to the inadequate application of BMPs rather than a lack of BMP application.
- Forty-four percent of the sample units did not have water crossings. This may be due to no water present in the sample unit or a stream crossing purposely avoided through pre-harvest planning. Pre-harvest planning and harvest layout can help identify and protect sensitive areas, reduce skid trails, and avoid unnecessary stream crossings.

²⁰ Adapted from Maine Forest Service, 2009.

- 11% more structures spanned the bankfull channel width in 2008 than 2006-2007. Stream channel bankfull width is measured from the average high water mark that is expected to occur two out of every three years. Crossings that span the bankfull width are less likely to impede the movement of aquatic organisms and are at lower risk of catastrophic failure due to high flow events.

The monitoring identified two areas that need improvement:

1. Sedimentation associated with crossing structures. Sedimentation associated with crossing structures has shown up as a consistent issue in BMP monitoring. It can be extremely difficult to keep all soil from reaching a waterbody, but siltation and sedimentation can be minimized to the point that they do not affect the biological activity of the associated waterbody. In most cases either inadequate maintenance or installation of additional BMPs was the primary cause of sedimentation at crossings. This indicates an opportunity for increased training of foresters, loggers and machine operators on the importance of maintaining BMPs once they are installed and reinforcing or installing additional BMPs as conditions change.
2. Undersized crossing structures. Although 2008 monitoring data showed an improvement over 2006-2007 in the percentage of stream crossings that spanned bankfull width, undersized crossing structures continue to be a problem. Undersized crossings can lead to conditions that limit fish passage including increased flow velocities, perched outlets and accumulated debris barriers. That undersized crossings would continue to be a problem is not surprising since upgrading crossing structures so they do not restrict the stream channel is costly and replacement of crossings would be expected to progress at a slow rate.

While the monitoring identified areas where there is room for improvement it is important to view the results in the proper historical context. Over the last several decades there has been a fundamental change for the better in how water quality is treated by forestry and logging professionals. This change has happened for many reasons but for most in the industry BMPs have become “just the way we do business.” The results speak for themselves - it is Maine’s working forests that produce the clean water that Mainers expect and depend on. In a recent analysis by the USDA Forest Service of 20 northeastern states, “Maine scored the highest in its ability to produce clean water. The majority of its watersheds received the highest possible score in this index showing a watershed’s ability to produce clean drinking water.”

Continued monitoring over the next several years will be necessary to establish that these positive developments are effective, consistent, and lasting.

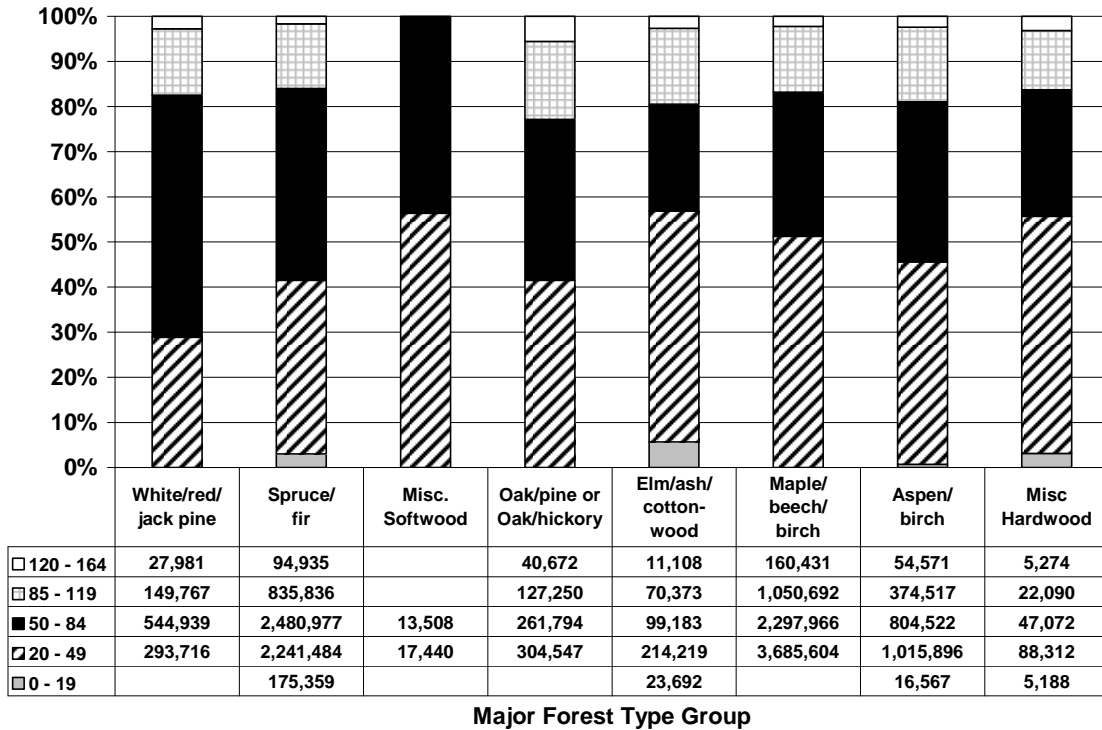
NA Indicators

NA 8. Soil quality on forest land:

The only statewide soil quality assessment available uses, as a surrogate, the soil productivity class (cubic feet per acre per year) as assigned by FIA to all forestland sample conditions. In the below chart, the data table provides forestland acres by soil productivity class within each major forest type. The

bars display the percentage distribution of soil quality by the same soil productivity classes.

Figure 2.4.4 Forestland acres, soil productivity class (cubic feet per acre per year) by major forest type, Maine, 2008



NA 9. Area of forest land adjacent to surface water, and forest land by watershed: Insufficient data and resources to provide information.

NA 10. Water quality in forested areas: Please see the narrative above regarding BMP monitoring.

Literature cited

Laustsen, K. 2010. Personal communication.

Maine Forest Service. 2009. Maine Forestry Best Management Practices Use and Effectiveness Executive Summary, 2008.

http://www.maine.gov/doc/mfs/pubs/pdf/bmp_annual_rpt/bmp_rpt_exec_summ_ry_08.pdf. Last accessed 28 December 2009.

Criterion 5: Maintenance of forest contribution to global carbon cycles²¹

Desired Future Conditions: Maine retains sufficient forest land, properly managed, and sufficient processing capacity to maintain or enhance forest carbon sequestration.

Maine's climate is now changing at an increasing rate. All three of Maine's climate divisions are warmer than 30 years ago, and sea levels have risen several inches over the last century. The seasonality of weather events also is shifting, with earlier snowmelt, peak river flows, and ice-out on lakes.

The modeling scenarios examined by the authors of "Maine's Climate Future" suggest that for the 21st century, there is a strong trend in Maine toward warmer and wetter conditions in all seasons. More winter precipitation is likely to occur as rain. Some models forecast increased storm intensities. Temperature increases could be associated with more extreme precipitation and faster evaporation of water, leading to greater frequency of both very wet and very dry conditions.

Climate change modeling suggests that Maine will continue to have abundant forests, but the composition is likely to change, e.g. a decline in the presence of boreal species such as the spruces and balsam fir, as well as northern hardwoods, and an increase in the presence of mixed oak-hickory types, white pine, and more aggressive deciduous species such as red maple (Tang and Beckage, 2010).

Forest biodiversity likely will change as well, with some species of plants and animals disappearing while new ones become established, e.g. a recession of northern species at the southern edge of their native ranges, and an advancement of southern species at the northern edge of their native ranges.

Some climate change model scenarios predict wetter than normal spring and summer fire seasons coupled with high intensity, short duration droughts (Hayhoe, et al, 2007). Should such droughts materialize, it would be cause for concern, as Maine's spring fire season is driven by the drying of fine fuels that ignite larger fuels in forested setting.

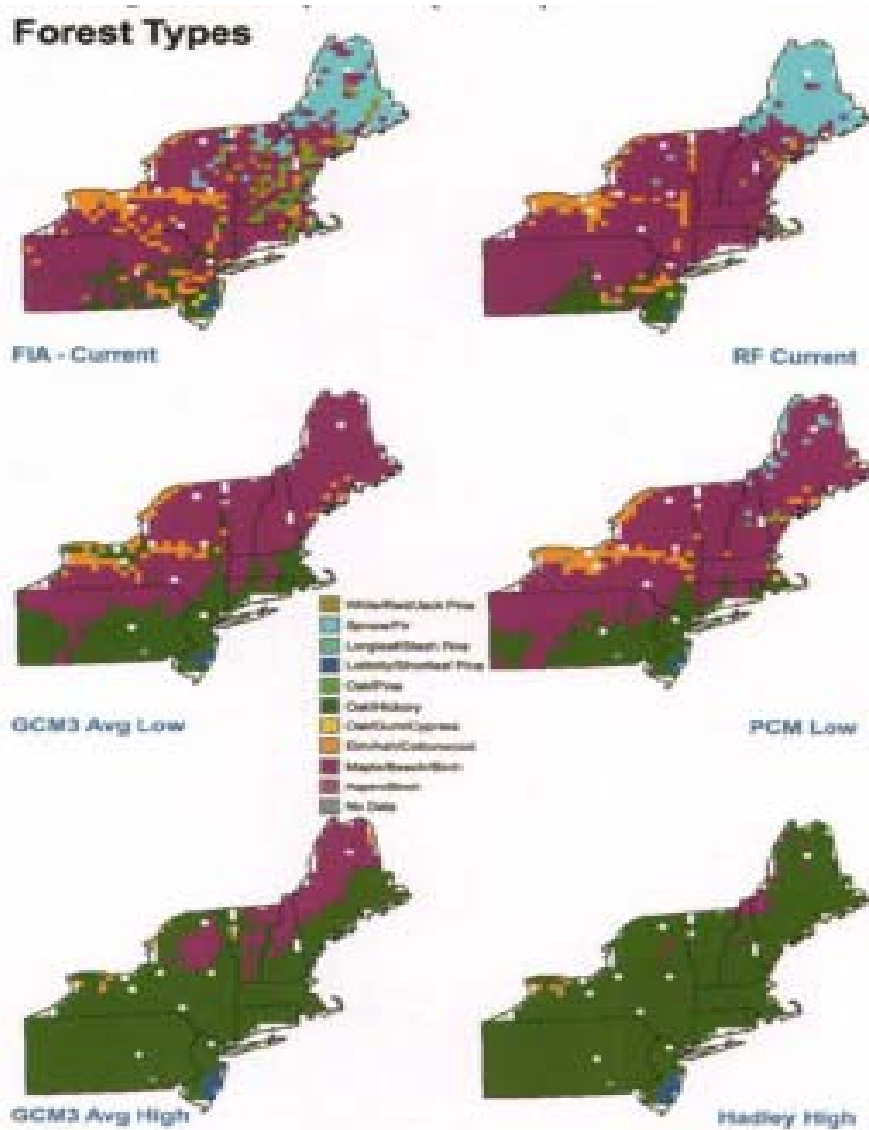
Notwithstanding these potential scenarios, the potential exists for Maine's forests to sequester additional carbon, creating a revenue stream for forest landowners should carbon markets develop under expected revenue scenarios. In addition, possible reductions in forest extent elsewhere on the continent and across the globe could generate increased demands for Maine's forest products.

Forests play an interesting and important role in the earth's carbon cycle. On one hand, the loss of forests on a global scale to other uses (deforestation) is responsible for up to 20 percent of carbon emissions to the atmosphere and ranks second only to the burning of fossil fuels as a source of CO₂ emissions. On the other hand, forests serve as a huge carbon sink: they capture CO₂ from

²¹ Much of the discussion in this section sourced from Jacobson, et al, 2009.

the atmosphere through photosynthesis and store it as carbon in wood and other carbon-based compounds in soil, in understory plants, and in the litter on the forest floor.

Figure 5.1. Projected forest type changes under climate change scenarios²²



Wood and paper products also play a role in mitigating CO₂ emissions by sequestering carbon. There are currently large stocks of carbon in forests, in wood and paper products in use, and in dumps and landfills. In 1990, 10.6% of the level of U.S. CO₂ emissions was harvested and removed from forests for products. If a substantial portion of this carbon could be prevented from returning to the atmosphere, it could make a notable contribution to mitigating

²² From Mohan, et al, 2009.

carbon buildup in the atmosphere (Joyce and Birdsey, 2000). (Also, wood substitutes for other materials with higher CO₂ emissions)

The growing emphasis on managing carbon emissions is rapidly changing the way we think about the role of forests in greenhouse gas mitigation, and the consequences of forest management decisions with respect to forest carbon sequestration. Forests store more carbon than nearly all other land uses (IPCC 2007a, 2007b). According to recent estimates, Maine forests represent 1,484 million metric tons of carbon, just over 50% of which is below ground in soils (Birdsey and Lewis 2003, Fernandez 2008, Jacobson, et al, 2009).

Large amounts of additional carbon could be stored in U.S. forests, especially on nonindustrial private ownerships, but also in developed settings, through afforestation (the establishment of forests where the preceding land use was not forest), reforestation and practices to enhance the growth rate of trees in existing forests (Moulton, 2000). In addition to the benefits of carbon sequestration, such actions have the potential to maintain or enhance public trust resources and other public values of forests, such as biological diversity, soil integrity, and water quality.

Finally, significant potential exists to sequester additional carbon in harvested wood products, particularly structural lumber. The energy embodied in wood products is lower than any other construction material. Lumber in particular requires relatively little energy to produce. Wood products requiring more steps in processing (e.g., plywood and OSB) need more energy to produce, but significantly less energy than non-wood materials. The production of lumber and wood products also requires relatively little additional fossil fuel energy, as over one-half of the energy consumed in manufacturing wood products in the U.S. is bioenergy. (Bowyer, et al, 2008). The development of carbon markets that account for harvested wood products could support a number of goals, including keeping forests as forests by making the forest enterprise more viable economically and reducing both our dependence on imported fossil fuels and increasing the long-term sequestration of carbon dioxide absorbed by trees from the atmosphere.

NA Indicators

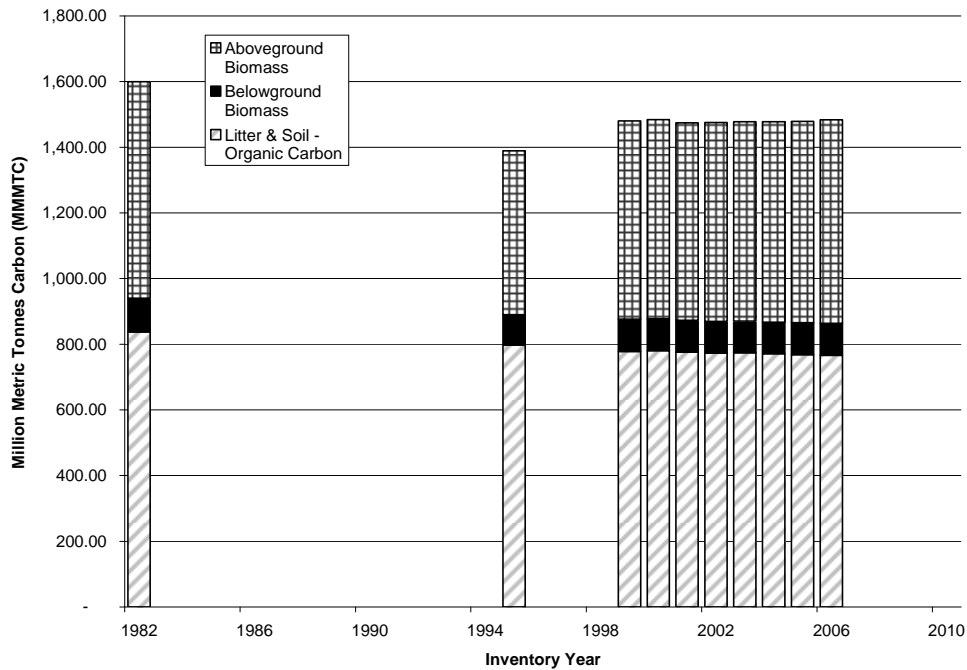
NA 11. Forest ecosystem biomass and forest carbon pools

Table 5.1. Forest ecosystem - carbon pool estimates in Million Metric Tonnes Carbon (MMTC)

Year	Above ground biomass	Below ground biomass	Litter & Soil - Organic Carbon	Statewide Total
1982	658.80	102.74	837.80	1599.33
↓	↓	↓	↓	↓
1995	499.47	92.94	797.13	1389.54
↓	↓	↓	↓	↓
1999	604.2	98.69	777.58	1480.47
2000	606.46	97.70	780.24	1484.40
2001	601.49	96.76	776.21	1474.47
2002	605.58	96.53	773.09	1475.20
2003	606.9	96.59	774.16	1477.66
2004	610.08	96.70	770.90	1477.68
2005	613.15	97.28	768.35	1478.78
2006	619.97	97.89	766.05	1483.91

Notes: Above-ground estimate includes all live and standing dead trees ≥ 1.0 " DBH from above the stump. Below-ground estimate includes the stump and coarse roots of live trees. Litter and Soil-Organic Carbon are the sum of those two separate pools. Estimates are derived from Smith et al (2006) and Jenkins et al (2004).

Figure 5.2.1. Forest Ecosystem - forest carbon pools, Maine, 2006



Assessment: Maine’s forests store a great deal of carbon and produce a great deal of material that substitutes for other materials that create more emissions during their manufacture. Maine’s forests are capable of storing more carbon and producing more low carbon products. Maine’s forests are largely intact and have significant elevation differences; therefore, they are a good place to initiate conservation efforts for climate change adaptation purposes.

Literature cited

Bowyer, J., S. Bratkovich, A. Lindburg, and K. Fernholz. 2008. Wood Products and Carbon Protocols: Carbon Storage and Low Energy Intensity Should be Considered. <http://www.dovetailinc.org/files/DovetailCarbon0408hz.pdf>. Last accessed 10 May 2010.

Jacobson, G., I. Fernandez, P. Mayewski, and C. Schmitt (editors). 2009. Maine’s Climate Future: An Initial Assessment. Orono, ME: University of Maine. <http://www.climatechange.umaine.edu/about/reports/climate-future>. Last accessed 29 December 2009.

Jenkins, J., Chojnacky, D., L. Heath, and R. Birdsey. Comprehensive Database of Diameter-based Biomass Regressions for North American Tree Species. Gen. Tech. Rep. NE-319. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. 45 pp. [1 CD-ROM].

Mohan, J., R. Cox, and L. Iverson. 2009. Composition and Carbon Dynamics of Forests in Northeastern North America in a Future, Warmer World. *Can. J. For. Res.* 39: 213-230.

Smith, J., L. Heath, K. Skog, and R. Birdsey. 2006. Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States. Gen. Tech. Rep. NE-343. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. 216 pp.

Additional Resources

Maine Department of Environmental Protection Climate Change Program website: <http://www.maine.gov/dep/air/globalwarming/index.htm>.

Northern Institute of Applied Carbon Science. <http://www.nrs.fs.fed.us/niacs/>. Last accessed 29 December 2009.

Criterion 6: Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies

Desired Future Conditions: (1) Maine's forest practitioners manage the visual impacts of timber harvesting to convey a strong stewardship ethic; (2) Maine's forestry community broadens the practice of sustainable forestry and builds public confidence by establishing and maintaining reasonable accountability measures; and (3) public policies encourage private landowners to continue to provide traditional forest recreation opportunities.

Forest economy

Maine has a highly diverse forest industry "cluster" (a mix of mutually supportive manufacturing facilities). Maine's forest products cluster provides markets for waste products from manufacturing facilities, as well as high-grade material. Landowners have markets for everything they harvest, from the lowest grades of wood that go to biomass generation to dimension lumber and high end furniture products. Despite a very challenging global situation, Maine is still the #2 paper producing state in the U.S.; further, Maine's lumber production from over 200 sawmills has more than doubled since the mid-1970's.

When compared to 28 other states with major forest products industries:

- The forest products industry's share of total jobs is bigger in Maine than in any other state except Oregon (Oregon's and Maine's shares are virtually equal) (3.01%).
- Maine has the second highest number of forest products industry jobs per capita (13.70).
- Maine's forest products industry makes the largest contribution to GDP relative to the overall size of the state economy (3.58%).
- Maine has the highest value of forest products industry output per capita (\$1,305).

Source: Maine State Planning Office, 2010.

Including indirect and induced economic impacts (i.e., multiplier effects), in 2007, the forest products industry supported 55,000 jobs, \$3.1 billion in earnings, and contributed \$4.3 billion to Maine's GDP. This represented 6.7% of all jobs statewide, 9.9% of all earnings, and 8.9% of Maine GDP (Maine State Planning Office, 2009). Forest products represent 36% of the state's total manufacturing output and 28% of the state's export value. Maine's 2008 forest products exports were valued at over \$850 million (Maine International Trade Center 2009).

Maine is also a major player in the regional forest products industry. Maine produces over ½ of the wood output of the four-state region that includes New Hampshire, Vermont, and New York. Our forest products industry accounts for 40% of the value of shipments in this same region.

Employment in the forest products industry has declined steadily over the years as mills and harvesting technology become more efficient. While employment is

down, worker productivity, average wage, capital expenditures have all increased. This is the natural evolution of a mature industry going through transition and taking steps to remain competitive in the global marketplace.

Imports and Exports of Forest Products from Maine²³

The diversity of markets for various species and product types offers many opportunities for Maine's forest landowners. Landowners and loggers generally seek the best markets for the trees they harvest; those markets may be in the Northeastern or Midwestern states, in Canada, and even overseas. The bulk of wood exported goes to Canada (largely spruce and fir sawlogs). Similarly, Maine's wood using industries draw on wood supplied not only from Maine, but from much further afield, generally the Northeastern states and Canada.

With rare exceptions, Maine generally is a net importer of wood. While a substantial portion of the sawlogs harvested, primarily spruce and fir, are exported to Canada, a much larger quantity of pulpwood is imported from neighboring states to support Maine's pulp and paper mills. Maine also imports a significant proportion (20%) of biomass chips used to generate electricity.

The tables on the following pages, extracted from the 2008 Wood Processor Report (the most recent year available) show wood flows into and out of Maine for sawlogs, pulpwood, and biomass, as well as the destinations of exports and sources of imports.

²³ Required by 12 MRSA §8879. Data drawn from Maine Forest Service Wood Processor Reports.

Table 2.6.1. Summary of Wood Flows in Maine, 2008

2008 Wood flow in Maine as reported to Maine Forest Service				
Product	Harvest, Export, Import, Instate Processing	Total Volume in 2008	Total Volume in Green Tons	
Sawlogs (in MBF)	a. Maine wood processed	586,924	2,555,814	
	b. Exported from Maine without processing	290,903	1,272,374	
	c. Total harvested from Maine's forests (a+b=c)	877,827	3,828,188	
	d. Imported from out of state	96,809	422,777	
	e. Total processed by Maine forest products industry (a+d=e)	683,733	2,978,591	
Pulpwood (in green tons)	a. Maine wood processed	6,526,445	6,526,445	
	b. Exported from Maine without processing	826,684	826,684	
	c. Total harvested from Maine's forests (a+b=c)	7,353,129	7,353,129	
	d. Imported from out of state	2,566,598	2,566,598	
	e. Total processed by Maine forest products industry (a+d=e)	9,093,043	9,093,043	
Biomass chips (in green tons)	a. Maine wood processed	2,937,150	2,937,150	
	b. Exported from Maine without processing	110,581	110,581	
	c. Total harvested from Maine's forests (a+b=c)	3,047,731	3,047,731	
	d. Imported from out of state	740,292	740,292	
	e. Total processed by Maine forest products industry (a+d=e)	3,677,442	3,677,442	
Firewood / Pellets (in cords)	a. Maine wood processed	36,371	90,928	
	b. Exported from Maine without processing	180	450	
	c. Total harvested from Maine's forests (a+b=c)	36,551	91,378	
	d. Imported from out of state	0	0	
	e. Total processed by Maine forest products industry (a+d=e)	36,371	90,928	
Totals (in green tons)	a. Maine wood processed		12,110,337	
	b. Exported from Maine without processing		2,210,089	
	c. Total harvested from Maine's forests (a+b=c)		14,320,426	
	d. Imported from out of state		3,729,667	
	e. Total processed by Maine forest products industry (a+d=e)		15,840,004	

Table 2.6.2. Import Origins for Wood Processed and Export Destinations for Wood Harvested in Maine, 2008

Import Origins

States:

Connecticut
 Maryland
 Massachusetts
 New Hampshire
 New York
 Pennsylvania
 Rhode Island
 Vermont

Provinces:

New Brunswick
 Nova Scotia
 Ontario
 Québec

Export Destinations

States:

Connecticut
 Illinois
 Michigan
 New Hampshire
 New York
 Vermont

Provinces:

New Brunswick
 Nova Scotia
 Québec

Countries:

China
 Japan
 Thailand

Recreation

Maine's outdoor recreation values are deeply rooted in tradition. Maine's vast, largely privately held forest lands have been a renowned recreational resource since the era of the pioneer vacationers of the mid-1800s. The quality of Maine's natural environment contributes to the quality of people's outdoor recreation experiences as well as to their quality of life (Commission on Maine's Future, 1989; Maine Audubon Society, 1996).

A majority of Maine residents enjoy some form of forest-based recreation, including fish- and wildlife-related activities, hiking, camping, and snowmobiling. These activities comprise an essential component of the state's recreation and tourism industry. Surveys show that people spend well over \$1 billion annually on forest-based recreation activities in Maine (Boyle et al., 1988 and 1990; Northeast State Foresters Association, 2007; US Department of the Interior, Fish and Wildlife Service and US Department of Commerce, US Census Bureau, 2008). Hunting and fishing traditionally have been the favorite activities; however, a wide array of nonconsumptive activities attracts increasing numbers of people to the Maine woods each year. Specialty guiding services for bird watching, hiking, and other activities have proliferated as the demand for such activities increases. Many of these recreational activities are big business and provide an opportunity for local economies to diversify.

Through tradition and goodwill, Maine's private landowners largely have maintained free and open public recreational access to their lands for responsible recreation. A consortia of large landowners (North Maine Woods, Inc.) charge day use and camping fees to access 3.7 million acres of forest land in the northwest part of the state, but the fees are used to cover the costs of managing the use and are not a profit center for the landowners. While some public access rights are prescribed in law (i.e., the Great Ponds Act), public recreational access to private lands is generally a privilege. In many states, forest landowners charge for or lease recreation rights. Yet, in spite of the pressures to generate additional revenue to cover the annual carrying costs of land, most large landowners in Maine continue to maintain an open recreational access policy. Changing landowner attitudes and land management goals, negative landowner experiences with poaching, trash dumping, unauthorized vehicle use, and other abuses have led to some recreational access restrictions; however, these privileges continue on most properties. In addition, the state has instituted programs to assist landowners with resolution of some of the problems that lead to recreational access restrictions, such as poaching, hunting without permission and littering.

Inherent tensions exist among a number of factors affecting forest based recreation, including:

- Intensive forest management and traditional recreational uses of the Maine woods;
- Conversion of forest land to nonforest uses, such as development, and the maintenance of traditional open access to the forest; and,

- A society that makes increasing demands for a myriad of goods and services from the forest and the capacity of the forest to supply them.

Conflicts also arise between what are generally accepted as traditional recreational uses and newer, often more intensive recreational uses.

As recreational use of larger forest land ownerships and the public's expectations about recreation have increased, so have pressures on the owners of this land to provide more of what are generally accepted as public values - but not public trust rights, such as scenic views, a sense of wildness and remoteness, and a quality recreational experience. People also have deep concerns about the loss of access to forest land for traditional recreational uses, particularly in the southern part of the state. However, preemptive moves by some interests to change the balance between private rights and public expectations may be counterproductive.

The Farm and Open Space Tax Law (36 MRSA §1101 et seq) provides options for landowners to receive a reduced valuation on their properties in return for maintaining or providing public values, such as scenic views, recreational access, and permanent conservation protections. Eligible landowners who allow reasonable public use may receive at least a 45% reduction in the assessed value of their property.

Sporting camps help manage some of the increasing demand for traditional recreation, particularly hunting and fishing, and can help accommodate certain compatible and appropriate newer uses. However, low-intensity recreationists (e.g. backpackers, canoeists, and cross-country skiers) may demand a different type of experience that sporting camps cannot provide. The marketplace currently does not accommodate this demand adequately, although some proposals are in the works. Finally, the sheer number of people seeking forest recreation opportunities increases the possibility of conflict between different uses, and diminishes the quality of the experience for many users.

In the last decade, the state and numerous land trusts have obtained conservation easements from the private owners of hundreds of thousands of acres of Maine land. These easements have been acquired through a variety of means, including direct purchase at fair market value or bargain prices, (e.g. the Forest Legacy and Land for Maine's Future Programs) or by donations from generous landowners. Many of these agreements permanently protect public recreational access.

Aesthetics

Forests cover 90% of Maine's total land area. The visual amenities of this vast, forested landscape contribute to the state's character and identity. Whether in the wildness of the northern regions or the settled landscape of southern regions, the visual quality of Maine's forests is a key asset of our quality of life.

Commitments to aesthetic management differ widely among landowners, from the rigorous criteria applied by public land management agencies to less aggressive measures on private lands. This is due in large part to the different land management objectives of different landowners. Despite these differences,

it is clear that people assess the forest's health and integrity based on what they see. This is particularly important where private lands are open to the public, and where forest management is highly visible. Maine people have often expressed their concerns over the condition of Maine's forests through this filter of aesthetics (Northern Forest Lands Council, 1994). With so much of Maine's private forest land open to the public, forest management is highly visible. Roadside accumulations of harvest residues, large numbers of bent or broken trees, excessive rutting of the ground, unnatural, geometric harvest edges, and other visual impacts of timber harvesting often heighten the public's concerns about the management of Maine's forests.

Most people agree that forest management can profoundly impact the forest aesthetic, up close and from a distance (Palmer *et al.*, 1995); the degree of impact varies with the individual. While some activities, such as pruning and early thinning, can have pleasant aesthetic impacts, many have an unavoidable, immediate negative impact that heals over time. Minimizing the negative, short-term impacts of timber harvesting is an important step in communicating a strong stewardship ethic to the public.

A number of the certification programs (notably SFI, FSC, and Northeast Master Logger Certification) have criteria and objectives associated with aesthetics. Certified landowners and land managers, therefore, must generally address aesthetic issues in their harvest planning and implementation. SFI also has addressed the issue by developing a logging aesthetics training program. Several hundred loggers, landowners, and foresters have received this training since 2002. MFS strongly encourages all forest landowners and land managers to adopt as standard practice operational techniques that address both foreground views and views of forest canopies to minimize the short term negative visual impacts of timber harvesting. MFS recognizes that these techniques should be applied with consideration of individual site conditions, but forest landowners should consider the goal of minimizing negative visual impacts when making management decisions.

NA Indicators

NA 12. Wood and wood products production, consumption, and trade

Production	14,320,426 green tons ²⁴
Consumption:	15,840,004 green tons ²⁵
Trade:	\$855,159,843 ²⁶

Assessment: As noted earlier in this section, Maine's forest products industry remains a major player in the state's economy. It provides a diversity of markets and opportunities for forest landowners to manage their land, obtain a financial return on their investment and keep the land in active management as opposed to converting it to other uses that would compromise the forest's values.

²⁴ Maine Forest Service, 2009.

²⁵ Ibid.

²⁶ Maine International Trade Center, 2009.

NA 13. Outdoor recreational facilities and activities

Outdoor recreation is an integral part of Maine life. Maine people participate in outdoor recreation activities above national and New England levels (Green et al, 2009). Outdoor recreation is a key component of quality of place, which recognizes that special attributes, such as Maine’s woods and waters, make the state an attractive place to live and visit. Access to quality outdoor recreation experiences is an important economic development tool, which Maine can use to compete to lure employers and employees. In addition, Maine’s natural resources and recreation opportunities are central to its tourism industry. Outdoor recreation is listed as the primary purpose for between 18% and 23% (depending upon season) of all overnight leisure trips in Maine.²⁷

Comprehensive data on outdoor recreation facilities is incomplete and is not reported in this assessment. Maine’s State Comprehensive Outdoor Recreation Plan (2009) discusses the various types of recreation available on both private and public lands; readers are referred to that document (available at <http://www.maine.gov/doc/parks/programs/SCORP/index.html>) for more information.

The data are clear, however, regarding participation in nature-based activities, many of which rely on the existence and availability of forested settings.

Table 2.6.3. Participation in Nature-based Land Activities²⁸

Activity	Percent participating	Number of participants (1,000s)
Visit a wilderness or primitive area	47.1	506
Day hiking	41.3	444
Visit a farm or agricultural setting	35.2	378
Developed camping	34.5	371
Mountain biking	27.7	298
Primitive camping	27.3	293
Drive off-road	26.7	287
Hunting (any type)	18.8	202
Backpacking	18.3	197
Big game hunting	17.3	186
Mountain climbing	15.9	171
Small game hunting	11.3	121
Horseback riding on trails	5.2	56
Rock climbing	3.3	35
Orienteering	1.7	18
Migratory bird hunting	1.4	15

²⁷ Maine SCORP 2009-2014, Executive Summary

²⁸ Ibid, Appendixes, page A-38.

Assessment: The supply of outdoor recreation opportunities in Maine is based largely on the state's diverse natural landscapes. Public and private facilities expand outdoor recreation possibilities. Federal, state, municipal, private conservation, and private landowners all provide recreational access to land. Mainers have access to more, large, undeveloped landscapes than do most residents in the eastern United States. However, it should be noted that the state's percentage of public land ownership is relatively low. Private lands of varying sizes and purposes play a large role in outdoor recreation in Maine.

NA 14. Investments in forest health, management, research, and wood processing

Table 2.6.4. Capital Investments by Maine's Forest Industry, 1993 - 2008

Sector	1993 (\$1,000)	1998 (\$1,000)	2003 (\$1,000)	2008 (\$1,000)	Change 1993 -2008 (\$)	Change 1993 - 2008 (%)
Wood product mfg	\$24,300	\$74,293	\$41,195	\$84,263	\$59,963	247%
Paper mfg	\$195,500	\$264,475	\$190,788	\$173,080	-\$22,420	-11%
Furniture mfg	\$1,100	\$6,400	\$7,158	\$2,422	\$1,322	120%
Column totals	\$220,900	\$345,168	\$239,141	\$259,765	\$38,865	18%

Source: U.S. Census Bureau, Annual Survey of Manufactures, 1993, 1998, 2003 and 2008. Dollar figures indexed to 1993.

Assessment: Capital investment in Maine's forest products industry increased by 18% in real terms between 1993 and 2008. Investments in wood products manufacturing (e.g. lumber) more than doubled during the period, likely reflecting the retooling and modernization necessary for surviving in a very competitive market. Paper industry investments declined slightly over the period; a more significant decline of 35% occurred between the peak in 1998 and 2008. An increasingly competitive global market for pulp and paper, coupled with the diversion of capital to areas of the world that can produce fiber more quickly and at lower cost likely contributed to this decline. Although the furniture industry has not been a big player percentage wise, it is nonetheless important in the creation of high value markets for wood. The decline in capital investment in this sector reflects the loss of the furniture industry to overseas facilities that are able to import raw logs, manufacture furniture, and export the finished product back into the U.S. at far less cost than required to manufacture the same product here.

Table 2.6.5. Maine Forestry Program Funding Support, 1998, 2002, and 2006

	State (\$1,000)	Federal (\$1,000)	Total (\$1,000)
1998	\$10,000	\$2,000	\$12,000
2002	\$10,710	\$8,164	\$18,874
2006	\$9,701	\$2,040	\$11,741

Note: Large increase for 2002 due to Ice Storm recovery grant.

All figures indexed to 1998

Source: National Association of State Foresters, State Forestry Statistics Reports

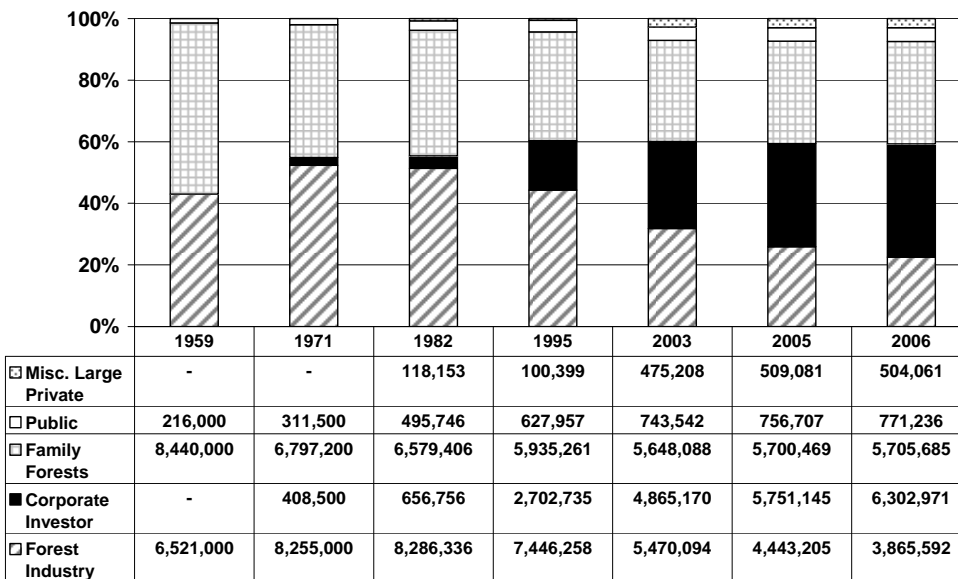
Assessment: In real dollar terms, the Maine Forest Service budget declined slightly between 1998 and 2006.²⁹ That trend has continued to the present day.

²⁹ The figures for 2002 are anomalous in that they reflect a very large federal grant MFS received to assist landowners, loggers and communities recover from the 1998 ice storm.

Recent state budget reductions have set the stage for dramatic changes to the MFS as an institution. The MFS began fiscal year 2008 with a \$12 million general fund budget. Since then, the agency has experienced several budget reductions totaling nearly \$600,000. Coupled with proposed budget reductions in the current biennial budget (still in progress at the time this report was prepared), it is no longer certain that the MFS will be able to fulfill its legislative mandates. MFS relies on USDA Forest Service State & Private Forestry programs to support the organization's core capacity. Recent reductions in federal funding have compounded the impact of state budget reductions on our organization. MFS does not have discretionary resources to support emerging issues such as wood to energy, forest certification, and assisting the forest products industry in weathering the sea of change brought about by global competition. People are working longer, harder, and more creatively than ever before, but the agency's resources are stretched to the breaking point. It is likely that the agency will need to decide in the near future which services it will no longer provide.

NA 15. Forest ownership, land use, and specially designated areas³⁰

Figure 2.6.1. Timberland by Major Owner Group, by Inventory Year.



³⁰ See Criterion 1 for detailed discussion of this indicator.

Figure 2.6.2. Change in Land Use (FIA Basis) by Megaregion and Statewide, 2001-2006.

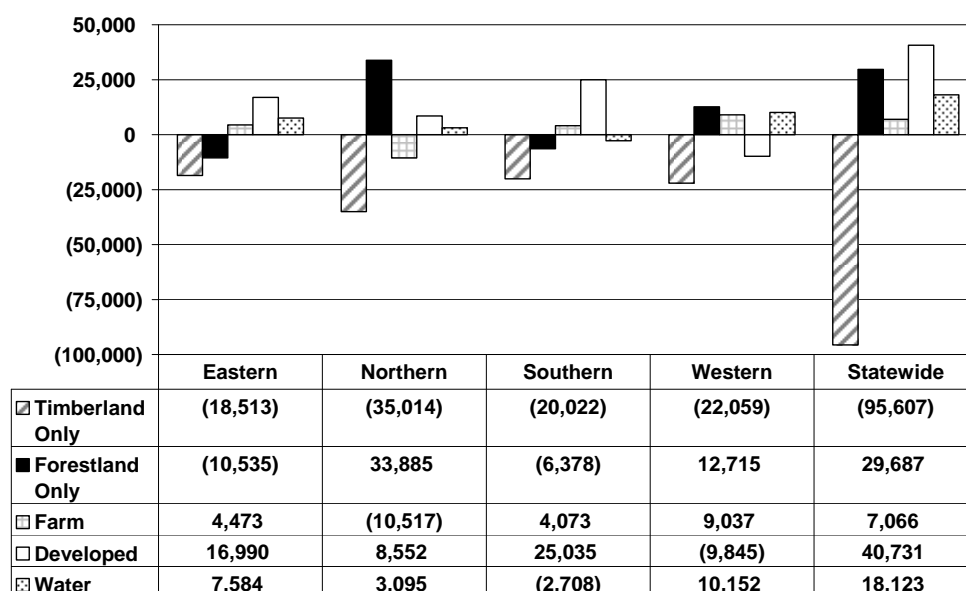


Table 2.6.5. Land Ownership and Other Land Uses.

Metric	Acres	Data Source
Forest Land Ownership		Butler, 2008
Private	16,547,767	Laustsen, 2006
Public	1,117,189	Laustsen, 2006
Total	17,664,957	Laustsen, 2006
Reserved Forest Land	324,076	Laustsen, 2006
Ecological Reserves	Approx. 100,000	Maine Natural Areas Program, 2010 Note: this acreage is a subset of "Reserved Forest Land."
Private Land With Conservation Easements	2,001,158	Maine State Planning Office, as reported in Maine SCORP, 2009-2014
Forest Land in State Current Use Tax Program (aka Tree Growth Tax Law)	Approx. 11,200,000	Maine Revenue Services

Assessment: Maine remains 90% forested; 97% of the forestland is productive timberland. However, the 2006 "Mid-Cycle Report on Inventory and Growth of Maine's Forests" estimated a net loss in timberland of 96,000 acres (30,000 acres changed to forestland, and 66,000 acres became new non-forested land uses). The major combined timberland and forestland losses occurred in the Eastern Megaregion (29,000 acres) and in the Southern Megaregion (26,000 acres).

There have been significant increases in timberland acreage for the Corporate Investor owner class in three of the four megaregions and statewide, with an overall increase of 2.4 million timberland acres. There have also been significant, concurrent decreases in timberland acreage for the Forest Industry owner class in three of the four megaregions and statewide, with an overall decrease of 2.7 million timberland acres.

NA 16. Employment and wages in forest-related sectors

	Jobs	Earnings (\$ millions)	GDP (\$ millions)
Forestry and Logging	5,870	\$210	\$277
Support Services for Forestry	1,110	\$27	Included in above
Wood Product Mfg.	6,883	\$284	\$417
Furniture Mfg.	1,691	\$64	\$63
Paper Mfg.	8,536	\$836	\$998
Total Forest Products Industry	24,090	\$1,421	\$1,755
Total Maine Economy	830,221	\$31,184	\$48,021
Percent	2.9%	4.6%	3.6%

	Jobs	Earnings (millions)	GDP (millions)
Total Forest Products Industry	55,427	\$3,093	\$4,298
Total Maine	830,221	\$31,184	\$48,021
Percent Maine	6.7%	9.9%	8.9%
¹ Includes direct, indirect, and induced effects.			

Assessment: The forest products industry has played a central role in Maine’s economy for generations. Today, Maine’s forest products industry generates \$4.3 billion per year, accounting for over 40% of Maine’s manufacturing sales and employing over 18,000 people (and indirectly supporting over 55,000 jobs). A recent study by the Maine State Planning Office (2010) found that Maine’s forest products industry ranks first in the country in terms of its contribution to the state’s economy and second in the nation in terms of its contribution to state jobs.

Maine Criterion 6a: Aesthetic impacts of timber harvesting

Goal: Manage the visual impacts of timber harvesting to convey a strong stewardship ethic

³¹ Levert, 2009.

³² Ibid.

Maine Indicator 6a.1: Number of forest landowners and the acreage managed by forest landowners certified as managed in compliance with the applicable objectives and criteria pertaining to aesthetics

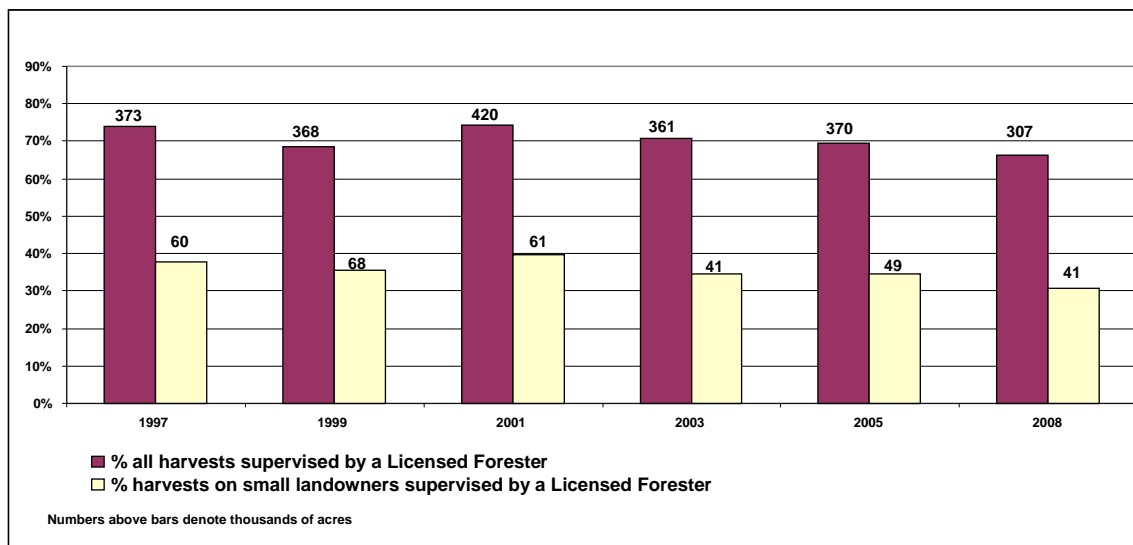
Assessment: The number of forested acres under some form of certification continues to climb. As certification programs evolve on a path of continuous improvement, the correlation of certified acres and management with consideration of aesthetic issues will continue to increase.

Rationale for this indicator: The aesthetics of forested settings are a matter of individual preference. The aesthetic impressions of a timber harvest can vary widely among people with different opinions about forest management. This indicator attempts to bridge that gap by focusing on the efforts of landowners to address aesthetic issues through their policies and performance.

Maine Criterion 6b: Public Accountability of Forest Owners and Managers

Goal: To broaden the practice of sustainable forestry and build public confidence by establishing and maintaining reasonable accountability measures

Maine Indicator 6b.1: Percentage and number of acres harvested where management planning, harvest layout, silvicultural prescription, and harvest operations are conducted under the direct supervision of a Licensed Forester.



Assessment: The percentage of harvests supervised by licensed foresters has changed little over the years. In 2008, 66% of all harvested acres were under the direct supervision of a Licensed Forester, slightly lower than, but essentially unchanged since 1997. On small ownerships, 31% of harvested acres were under the direct supervision of a Licensed Forester, a small but noticeable decrease from 1997.

Encouraging more small woodland owners to involve a forester in planning and overseeing their harvests presents a significant challenge. The Maine Forest Service advocates for forester involvement in harvesting on smaller ownerships to achieve many positive outcomes for the landowner and the future forest. The

diversity of landowners, landowner tenure and turnover, and other factors make this a multifaceted, seemingly intractable problem. Immediate revenue generation seems to drive many landowner decisions. Many seem unwilling to invest a portion of their harvest receipts in the services of a consulting forester. At the same time, many landowners make decisions with very little information. MFS strives constantly to raise awareness, help landowners identify sources of assistance, and perhaps most importantly, provide the landowner with key information at critical decision-making times.

MFS recommends that small landowners implement a controlled harvest by involving Licensed Foresters provide multiple services, including:

- Preparing a long-term forest management plan that describes forest conditions and outlines ways for the landowner to take appropriate actions to achieve his or her objectives over time;
- Preparing a timber harvest on behalf of the landowner to ensure that the landowners' management goals are addressed. The forester may:
 - Identify or develop appropriate access points and landings;
 - Designate or mark trees to be harvested to achieve silvicultural goals;
 - Mark harvest area boundaries;
 - Negotiate appropriate prices for harvested wood;
 - Assure that legal obligations are met and insurance to protect the landowner is in place;
 - Develop a written harvest contract that addresses these and other harvest provisions;
 - Identify and work with a skilled professional logger with appropriate equipment to conduct the harvest;
 - Market and administer payments for wood; and,
 - Supervise and administer the harvest on an ongoing basis to ensure it is completed to the landowner's satisfaction.

Maine Forest Service staff stress the many benefits to landowners of using consulting foresters during any contacts with landowners, as well as in publications, workshops, and other forms of outreach. MFS will work to identify more effective ways of communicating the benefits of consulting foresters to landowners. Some landowners have also expressed skepticism that consulting foresters will represent the landowner's best interests. Maine Forest Service also provides services to foresters with workshops and information to help ensure that landowners receive appropriate professional assistance.

Maine Indicator 6b.2: Number of acres (or number of landowners) under management certified by valid, independent, third party certifiers of sustainable forest management

Assessment: The increase in certified acreage over the past decade has been remarkable. By December 2009, the management of over 7.6 million acres had received certification from one of the three major systems operating in Maine (Sustainable Forestry Initiative, Forest Stewardship Council, and American Tree Farm System). Maine has one of the highest percentages of certified forest land in the nation.

Maine Indicator 6b.3: Number of timber harvesters who have received certification from the Northeast Master Logger Certification program

Assessment: The first Master Loggers were certified in 2001. From its initial cohort of 30 loggers, the number of Master Loggers certified in Maine has increased to well over 100. In addition, the program has expanded from Maine to encompass New England and New York; similar programs have developed in Canada and the upper Midwest.

Indicator 6b.3.b: Number of timber harvesters who have received training and certification from the Certified Logging Professional Program (CLP) or an equivalent training system

Assessment: Although the number of loggers has declined sharply over the years - largely due to technological advances in mechanical harvesting - over 1,800 loggers have maintained their CLP certification. Nearly all of the timber harvests in the state are either conducted or overseen by loggers with CLP credentials.

Maine Indicator 6b.4: Total acres of non industrial forest land with management plans meeting Maine Forest Stewardship Program guidelines

Assessment: The Forest Stewardship Program (known in Maine as WoodsWise) historically provided cost-share assistance to family forest owners to have woodland management plans developed by private consulting foresters. The goal of this element of the program is to foster long-term working relationships between family forest owners and natural resource professionals. From its 2002 peak of 5,133 plans and 571,804 acres, participation in the Forest Stewardship Program as measured by plans and acres declined by about half over the past seven years. The reasons for this decline are unknown at this time, but a number of factors could have contributed to this decline, including a surge in program funding following the 1998 ice storms, a time of heightened awareness. However, the principal reason appears to be program funding. The USDA Forest Service, which provides funding for the program, has progressively reduced funding for the Forest Stewardship Program over the last several years. The 50% decline in total plans and acres corresponds closely with a roughly 50% decline in federal allocations to Maine for this important program. For the most part, other programs have not been created or funded to fill this critical gap. In the one instance where a program has been created in and administered by a different federal agency, family forest owners and consulting foresters find this program overly bureaucratic and less accessible than WoodsWise.

Maine Criterion 6c: Traditional recreation

Goal: Public policies that encourage private landowners to continue to provide traditional forest recreation opportunities

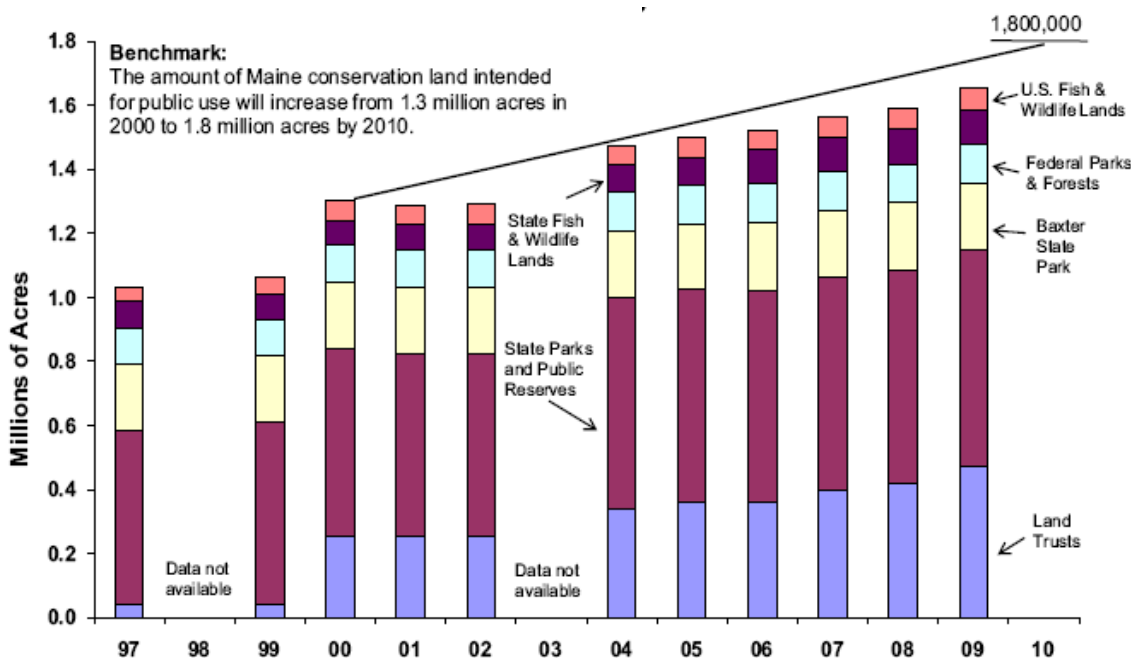
Maine Indicator 6c.1: Acreage of Maine forest land open to responsible public recreation

Existing public lands face increasing demands and pressures similar to those faced by private landowners. State parks, public reserved lands, Baxter State

Park, Acadia National Park, and the White Mountain National Forest all report difficulties in managing recreational use. Many of these entities have instituted, or are considering, measures to manage use, including new user fees, limits on the number of users, and vehicle restrictions. These pressures - and measures to address them - will only continue to grow.

The key public policy issue is one of resource allocation. Less intensive methods of forest management, including winter harvesting, are generally compatible with traditional recreational uses. More intensive silviculture is generally incompatible with these uses, at least in the short run (primarily during final removal and stand regeneration stages). Harvest planning that considers and protects important recreational resources (e.g., remote campsites, trails, and views from water bodies) can often mitigate the negative impacts of such operations. Such planning can include altering road alignments, leaving more of a forest canopy, or softening harvest unit edges. As our uses and perceptions of the forest evolve, society constantly needs to ask itself the following questions: What are the public's expectations of forest landowners regarding the provision of public values? What are forest landowners' responsibilities in this regard? What are the tradeoffs (economic, social, and environmental) associated with favoring one use over another? What is the importance of maintaining traditional uses versus accommodating newer uses? What are the impacts of increasing use on the quality of the experience?

Figure 2.6.3. Acres of Conserved Land, 1997-2009



Source: Maine State Planning Office, in, Maine Development Foundation, 2010

Assessment: Although most private forest land in Maine remains open to responsible recreation, changing landowner attitudes and land management goals, incidents of abusive behavior by some recreationists, and increasing recreational pressures, have led to a perceived increase in posting of private

property. Posting is most prevalent in southern Maine, which continues to experience relatively high levels of development. Landowners, sportsmen, state agencies, and others have undertaken a number of initiatives to try to reduce this trend, and the issue appears to have leveled off in recent years.

The huge increase in conservation lands over the last decade has been a major success story in Maine's conservation history, particularly as many easement agreements include guarantees of public access. The acreage protected from development through public ownership or private conservation easements has skyrocketed. A number of initiatives in the works and continued interest of landowners and conservation partners indicate this upward trend will continue, but at a reduced pace for a variety of reasons, primarily lack of funding.

Rationale for this indicator: MFS has chosen to focus on the umbrella issues of access and conservation lands as benchmarks of sustaining traditional forest-based recreation. Without land to recreate on, or access to that land, there can be no debates about what kinds of uses can or should be accommodated. Although the status of neither indicator can be attributed completely to the support of forest-based recreation, it is fair to say that with 90% of the state's land area in forest, these indicators are likely to predict the status of forest-based recreation with a fairly high level of accuracy.

Literature cited

Butler, B. 2008. Family Forest Owners of the United States, 2006 (corrected). Gen. Tech. Rep. NRS-27. Newtown Square, PA: USDA Forest Service, Northern Research Station.

Green, G, S. Parker, C. Betz, and H. K, Cordell. 2009. Maine and the Maine Market Region: A Report to the Maine Department of Conservation by the Pioneering Research Group, Southern Research Station, USDA Forest Service, Athens, Georgia.

Laustsen, K. 2009. 2006 Mid-Cycle Report on Inventory and Growth of Maine's Forests. http://www.maine.gov/doc/mfs/pubs/midcycle_inventory_rpt.html. Last accessed 15 March 2010.

Lever, M. 2009. The Economic Contributions of Maine's Forest Products Industry. Unpublished draft report of Maine State Planning Office. 2 pp.

Maine Department of Conservation, Bureau of Parks and Lands. 2009. Maine State Comprehensive Outdoor Recreation Plan 2009-2014. <http://www.maine.gov/doc/parks/programs/SCORP/index.html>. Last accessed 15 March 2010.

Maine Development Foundation. 2009. Measures of Growth in Focus. 40 pp. <http://www.mdf.org/publications/Measures-of-Growth-in-Focus-2009/84/>. Last accessed 08 January 2010.

Maine Forest Service. 2009. 2008 Wood Processor Report, Including Import and Export Information.

http://www.maine.gov/doc/mfs/pubs/pdf/wdproc/08_wdproc.pdf. Last accessed 08 January 2010.

Maine International Trade Center. 2009. Maine Exports by Industry, 2008.

http://www.mitc.com/PDFs/me_exports_by_industry2008.pdf. Last accessed 04 January 2010.

Maine State Planning Office. 2010. The Economic Importance of Maine's Forest Products Industries. Unpublished working paper. 4 pp.

Maine State Planning Office. 2009. The Economic Contributions of Maine's Forest Products Industry. Unpublished working paper. 2 pp.

Northern Forest Lands Council. 1994. Finding Common Ground: Conserving the Northern Forest. The Recommendations of the Northern Forest Lands Council. Northern Forest Lands Council: Concord, NH. 180 pp.

Northeast State Foresters Association. 2007. The Economic Importance and Wood Flows from the Forests of Maine, New Hampshire, Vermont, and New York, 2007. 4 pp.

<http://www.nefainfo.org/publications/2007%20Publications/NEFA4StateEconomicWood%20Flow2007FINAL.pdf>. Last accessed 04 January 2010.

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2008. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. 81 pp.

Criterion 7: Legal, institutional, and economic framework for forest conservation and sustainable management

Desired Future Conditions: Public policy: (1) supports the continued long-term ownership and management of forest land; (2) supports the continued operation of and investment in forest products processing facilities; (3) encourages private landowners to continue to provide traditional forest recreation opportunities; and, (4) protects and, where necessary, enhances the public trust resources associated with forests.

This criterion addresses the social framework within which we manage forests for sustainability. In Maine, 95% of the forest land base is privately owned, one of the highest percentages in the country. Policies, laws, regulations, and programs aimed at sustaining Maine's forests and protecting the public's interests beyond obvious public trust resources such as water, wildlife, and air.

Unlike other economic sectors, Maine's natural resource sector (particularly forestry) requires sustainably managed resources to enhance its economic competitiveness in the global marketplace. Given this unique reliance, Maine's regulatory and permitting policies need to be stable, science-based, and appropriately balanced to allow for both necessary resource conservation and competitive resource utilization.

As noted earlier in this report, Maine's forest resources are in very good shape, considering the long history of exploitation. An exemplary set of public policies and private actions have led to these results in Maine's resilient forest ecosystems.

The public policies supporting sustainable forestry include, but are not limited to:

- A prohibition on liquidation harvesting;
- Statewide regulation of clearcutting and harvesting in shoreland areas;
- Protection of water quality;
- Protection of unique or exemplary natural areas as well as rare, threatened and endangered species; and,
- Protection of important wildlife habitats, e.g., deer wintering areas and vernal pools.

Private sector actions supporting sustainable forestry include 7.6 million acres certified to at least one of three forest certification standards. This is one of the highest percentages of certified private land of any state in the nation. Over 50% of Maine's annual timber harvest volume originates either from harvests conducted on certified land or by Master Loggers on other lands.

NA Indicators

NA 17. Forest management standards/guidelines

NA 18. Forest-related planning, assessment, policy, and law

For both indicators above, the matrix on the following pages outlines the various policies and programs operating in Maine and where they intersect with the Montreal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests.

Category	Laws & regulations	Public programs	Private programs	Montreal Process criteria supported
Water and soils	Protection and Improvement of Waters Act Stormwater Management Act Erosion and Sediment Control Act Natural Resource Protection Act (stream crossing, 305(10)) Federal 401 water quality certification	Erosion and sediment control BMPs BMP workshops (multiple partners) DEP workshops for Code Enforcement Officers, other public officials SPO workshops for Code Enforcement Officers, other public officials	Erosion and sediment control BMPs SFI BMP workshops	4. Conservation and maintenance of soil and water resources
Land use	Site Location of Development Law Mandatory Shoreland Zoning Act Natural Resources Protection Act (fish/wildlife habitat, freshwater wetlands, great ponds, rivers, streams and brooks, fragile mountain areas) LURC Protection Districts			1. Conservation of biological diversity 2. Maintenance of productive capacity of forest ecosystems 3. Maintenance of forest ecosystem health 4. Conservation and maintenance of soil and water resources 5. Maintenance of forest contribution to global carbon cycles
Biodiversity	Endangered Species Act (and essential wildlife habitat)	Natural Areas Program technical assistance Wildlife Resources Assessment Section technical assistance DIFW public and landowner education		1. Conservation of biological diversity 3. Maintenance of forest ecosystem health

Category	Laws & regulations	Public programs	Private programs	Montreal Process criteria supported
Cultural resources	National Historic Preservation Act (Section 106)	Maine Historic Preservation Commission technical assistance		6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
Public access	Colonial ordinances	DIFW Landowner Relations Program Landowner Sportsmen Relations Advisory Council Sportsmen/Forest Landowners Alliance	Tradition of public use of private forestlands North Maine Woods public access program One of the nation's most advanced public access easement programs	6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
Ecological reserves		Publicly owned ecological reserve system	Numerous parcels preserved from consumptive uses by land trusts	1. Conservation of biological diversity

Category	Laws & regulations	Public programs	Private programs	Montreal Process criteria supported
Forest practices	<p>Forest Practices Act</p> <ul style="list-style-type: none"> • MFS Rules: Chapter 20 - Forest Regeneration and Clearcutting Standards • MFS Rules: Chapter 21 - Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas • MFS Rules: Chapter 23 - Timber Harvesting Standards to Substantially Eliminate Liquidation Harvesting <p>Tree Growth Tax Law</p> <p>Slash Disposal law</p> <p>Timber trespass laws</p> <p>LURC (Timber Harvesting, 10, 27(B))</p>	<p>MFS WoodsWISE Program (technical assistance, cost-sharing for management plans and implementation practices)</p> <p>Tree Growth Tax Law management plans</p> <p>MFS trip ticket, annual report tracking system</p> <p>MFS enforcement program</p>	<p>Northeast Master Logger Certification</p> <p>Certified Logging Professional Program</p> <p>Qualified Logging Professional Program</p>	<ol style="list-style-type: none"> 1. Conservation of biological diversity 2. Maintenance of productive capacity of forest ecosystems 3. Maintenance of forest ecosystem health 4. Conservation and maintenance of soil and water resources 5. Maintenance of forest contribution to global carbon cycles

Category	Laws & regulations	Public programs	Private programs	Montreal Process criteria supported
Native Americans rights	<p>Maine Indian Claims Settlement Act (Federal)</p> <p>Maine Implementing Act (State)</p> <p>Only state in the nation with two dedicated seats in the state legislature for tribal representatives</p>	Maine Indian Tribal-State Commission		<p>6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies</p> <p>7. Legal, institutional and economic framework for forest conservation and sustainable management</p>
Private property	Well defined real property laws consistent with English and US traditions	Funding of private conservation easements	Advanced system of private conservation easements	7. Legal, institutional and economic framework for forest conservation and sustainable management
Workers' rights and safety	Applicable state labor laws		<p>Northeast Master Logger Certification</p> <p>Certified Logging Professional Program</p> <p>Qualified Logging Professional Program</p>	7. Legal, institutional and economic framework for forest conservation and sustainable management
Monitoring		<p>MFS Forest Inventory</p> <p>MFS BMP monitoring</p> <p>MFS Multi-resource harvest assessment</p> <p>Maine Natural Areas Program</p>		2. Maintenance of productive capacity of forest ecosystems

Category	Laws & regulations	Public programs	Private programs	Montreal Process criteria supported
Reporting		<p>The Forests of Maine (and Annual Inventory Reports on Maine's Forests)</p> <p>Maine Forestry Best Management Practices: Use and Effectiveness</p> <p>Biennial Report on the State of the Forest and Progress Report on Forest Sustainability Standards</p> <p>Silviculture Activities Report</p> <p>Wood Processors Report</p> <p>Stumpage Prices by Maine County Report</p>		2. Maintenance of productive capacity of forest ecosystems
Information		<p>Maine Forest Inventory and Analysis</p> <p>Maine Natural Areas Program</p>		<p>1. Conservation of biological diversity</p> <p>2. Maintenance of productive capacity of forest ecosystems</p>
Policies to support long-term management	<p>Tree Growth Tax Law</p> <p>Forest management planning income tax credit</p> <p>Comprehensive planning law</p>	<p>MFS WoodsWISE program</p> <p>MFS landowner outreach and assistance programs</p> <p>MFS Forest Health Monitoring program</p>	<p>American Tree Farm System</p> <p>Forest Stewardship Council</p> <p>Northeast Master Logger Certification</p> <p>Sustainable Forestry Initiative</p>	7. Legal, institutional and economic framework for forest conservation and sustainable management

Chapter 3. Existing and Emerging Benefits and Services³³

Maine's forests provide numerous benefits and services, not only to Maine, but to the entire northeastern U.S. and neighboring Canadian provinces. The multiple benefits and services support the state's economy and quality of life.

The state's forests have supplied a continuous stream of raw materials for lumber, pulp and paper throughout much of the state's history. Over the last few decades, other uses of wood have developed, for example, the conversion of forest biomass to electricity, and, more recently, biofuels. Maine's forests also once supported a vibrant secondary manufacturing sector, such as turnery products and furniture; however, this sector has largely disappeared as facilities have moved offshore. Despite the challenges facing the state's forest industry, it remains an important component of the state's economy.

Forest-based and forest-dependent recreation opportunities abound in Maine's forests on both private and public lands. The suite of activities that use or rely on the forest include traditional ones such as hunting, fishing, trapping, and hiking, birdwatching, cross-country skiing, and other non-motorized activities to motorized sports such as snowmobiling and ATV riding. Through the generosity of Maine's landowners, most of the state's private forest land remains open to responsible public recreation.

Water quality has become an issue of increasing public awareness and concern, and Maine's working forests help protect and provide an abundant supply of clean, cool water that provides drinking water for a substantial portion of the state's population, offers outstanding water-based recreation opportunities such as canoeing and kayaking, and supports a healthy recreational fishery. Maine's loggers have done an exemplary job of protecting water quality during timber harvesting operations, as evidenced by several years of BMP monitoring reports. When compared to other, more intensive and developed land uses, active forest management is considered a beneficial land use to be encouraged.

While uses of the forest resource have diversified, appreciation of the resource's value independent of its economic and other uses has also grown. Biological diversity, or biodiversity, is a value of increasingly recognized importance associated with the forest resource. There is increasing interest in maintaining a diversity of species and ecosystems across the landscape to preserve genetic diversity and important functions played by natural systems.

Forests constitute both a sink and a source of atmospheric CO₂. Forests absorb carbon through photosynthesis, but emit carbon through decomposition and when trees are burned due to anthropogenic and natural causes. Managing forests in order to retain and increase their stored carbon will help to reduce the rate of increase in atmospheric CO₂ and stabilize atmospheric concentrations (IPCC, n.d.). Forests store more carbon than nearly all other land uses (IPCC, 2007a, 2007b, cited in Jacobson et al, 2009). Maine's forests were recently

³³ Where available data permit, the benefits of Maine's forests are discussed in more detail in Chapter 2.

estimated to store 1,484 million metric tons of carbon, with just over 50% stored below ground in soils (Birdsey and Lewis, 2003, Fernandez, 2008, cited in Jacobsen et al, 2009). Maine's forests currently provide significant benefits to the state in terms of carbon sequestration. However, the potential exists for even greater benefits as forest changes in southern states and other regions diminish those forests' potential for sequestering carbon.

Maine's urban and community forests provide numerous ecological services, including, but not limited to: improved air quality; stormwater control; carbon sequestration; improved water quality; and, reduced energy consumption. Other benefits - more difficult to quantify, but important nonetheless - include increased job satisfaction, faster recovery time for hospital patients, and improved child development. Also, aesthetic values associated with increased urban canopy contribute to higher property values (Kane, 2009).

Literature cited

Birdsey, R. and G. Lewis. 2003. Carbon in US Forests and Wood Products, 1987-1999: State-by-State Estimates. Gen. Tech. Rep. GTR-NE-310. Newtown Square, PA: USDA Forest Service, Northeastern Research Station.

Fernandez, I. 2008. Carbon and Nutrients in Maine Forest Soils. Maine Agricultural Experiment Station Technical Bulletin 200. Orono, ME: University of Maine.

IPCC. 2007a. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, ed. S. Solomon et al. Cambridge, UK: Cambridge University Press.

IPCC. 2007b. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, ed. M Parry et al. Cambridge, UK: Cambridge University Press.

IPCC, n.d. IPCC Technical Paper, Forest Sector. <http://www.gcric.org/ipcc/techrepl/forest.html>. Last accessed 15 April 2010.

Kane, B., J. Kirwan. 2009. Value, Benefits, and Costs of Urban Trees. Virginia Cooperative Extension Publication 420-181. 4 pp. <http://www.pubs.ext.vt.edu/420/420-181/420-181.pdf>. Last accessed 15 April 2010.

Chapter 4. Issues, Threats, and Opportunities

This chapter discusses the major issues regarding Maine's forests, the threats to Maine's forest resources, and opportunities.

Issue/Threat: Keeping Forests as Forests

The top issue for anyone concerned about Maine's forests today is the simply-stated but difficult-to-achieve goal of "keeping forests as forests." Efforts such as Keeping Maine's Forests, the Great Maine Forest Initiative; the New England Governors' Conference Commission on Land Conservation; Wildlands and Woodlands, and a number of other initiatives ongoing in the state and the region - all have at their core the goal of keeping forests as forests given the uncertainty about the future of Maine's forests. It's the number one challenge of our generation with respect to forest issues, and it's particularly challenging considering the fact that we are talking about thousands of landowners who all have their legitimate reasons for owning and managing forest land.

By keeping forests as forests, we mean keeping all the parts that make up the forest community as we know it, including, but not limited to: well-managed forests (certified); the protection and enhancement of the full suite of forest values - biodiversity, soils, and water, among others; a healthy, resilient, diverse forest industry that is highly competitive in the global marketplace; profitable logging and trucking businesses; and a variety of recreational pursuits that improve our quality of life.

Many factors affect our ability to keep forests as forests, including, but not limited to:

- Conversion of forest land to other uses, primarily residential development, in southern Maine;
- Profitability of managing forest land as an investment relative to other investment options;
- Parcelization; and,
- Changing landowner objectives that focus increasingly on returns from other uses of the forest (e.g. sale of waterfront and recreational lots).

The common theme to these factors is money. Practicing good forest management over the long term simply does not pay compared to alternative investment options, if they are available. Whether a landowner's objectives for owning forest land consider forest management at all is immaterial; at some point in time, a landowner must make a critical decision: Do I continue to own (and sometimes manage) this forest land or do I sell it to someone else? A number of pathways can be followed to influence this dynamic and influence landowners to keep their forests as forests, but they all involve money. These pathways include current use taxation of forest land, strengthening of existing wood markets, creation of new markets for ecosystem services, and purchase of conservation easements.

Issue/Threat: Maintaining a Diverse, Robust Forest Products Industry

“Maine’s forest products manufacturing industry is critical to Maine’s economic and environmental health. The industry provides not only manufacturing jobs and economic impact throughout the state, but is critical to the maintenance of undeveloped forestland and the many benefits it provides, helps support a traditional way of life in many Maine communities, and serves as an anchor for the state’s resource-based economy. Maintaining a robust and diverse forest products industry will provide important economic, environmental, and social benefits to Maine (Innovative Natural Resource Solutions LLC, 2005).”

Maine’s forest products industry is both blessed and challenged by the current economic situation: blessed because Maine is effectively the “last man standing” in the region’s forest products economy; challenged because every sector of the industry currently is struggling. Maine is the envy of neighboring states and provinces, all of which have shuttered large amounts of pulp, paper, and sawmill capacity in the last few years, sometimes permanently, whereas Maine has retained a significant amount of production capacity along the spectrum of uses. On the other hand, the struggles to keep pulp and paper mills competitive in the fierce competition that characterizes the global pulp and paper markets; the severe downturn in the construction industry, which has severely curtailed production at Maine’s dimension lumber mills; the movement offshore of furniture making; and, low electricity prices elsewhere; all have combined to create some of the worst market conditions in recent memory.

Despite these challenges, Maine’s forest landowners and the forest products industry also have a number of significant opportunities. These include:

- Conserving large areas of Maine’s forests in perpetuity by capitalizing on the interest of investors to maximize their returns and purchasing conservation easements that ensure retention of undeveloped forest lands, public access, and sustainable management.
- Capitalizing on Maine’s reputation for sustainable management to distinguish Maine’s forest products industry in the global marketplace. In addition to demonstrated evidence that Maine’s forests are sustainably managed, Maine has the one of the highest percentages of certified land and possibly the largest percentage of certified harvests conducted of any state in the nation. These facts can be used to create a special niche for Maine’s forest products among consumers who value sustainability - demand for such products is growing. This will require Maine to remain a leader in certification and addressing forest environmental issues, such as maintaining forest biodiversity.
- Increasing productivity. With improved management, Maine’s forests have the potential to produce considerably more timber per acre while maintaining other forest values. On average, it should be possible to increase the productivity of Maine’s forestland by approximately half over current levels.
- Diversifying Maine’s forest products industry to be a leader in new products such as engineered wood products, biofuels, and those from biorefinery

technology. With increases in fossil fuel prices, the opportunity exists to replace traditional sources of fuels and chemical feedstocks with wood and wood wastes.

Issue/Threat: Maintaining the Forest Land Base, Conversion, and Parcelization

Maine experienced a net loss in timberland of 96,000 acres between 2001 and 2006. The major losses occurred in the eastern forest inventory megaregion (29,000 acres) and in the southern megaregion (26,000 acres). Timberland acreage in the Corporate Investor owner class increased significantly, with an overall increase of 2.4 million timberland acres. Timberland acreage in the Forest Industry owner class declined concurrently, with an overall decrease of 2.7 million timberland acres since 2001.

A number of independent sources using different data sources all point to continuing, accelerating forest land conversion in southern and central Maine. We estimate that between 5,000 and 10,000 acres of forest land are converted each year to developed uses. This estimate correlates closely with the Natural Resource Conservation Service's Natural Resource Inventory estimate of 9,440 acres per year.

It is difficult to measure the shadow effect of conversion; however, landowner motivation to actively manage forest land declines with decreasing parcel size, and logging costs increase (thereby reducing forest management returns), so the effective loss of sustainably managed forest land could be much greater than the numbers indicate.

The following sources corroborate the forest inventory information:

- Landowner reports of timber harvesting indicate that in southern Maine (Androscoggin, Cumberland, Franklin, Hancock, Kennebec, Knox, Lincoln, Oxford, Sagadahoc, Waldo, and York Counties), the annual rate of reported land conversion more than doubled from an average of 1,600 acres between 1991 and 1997 to over 3,400 acres annually between 2004 and 2008. Southern Maine represents one-third of the state's timberland acreage.
- In comparison, the remaining two-thirds of the state averaged 1,200 acres of timberland conversion annually for the first period and just over 3,100 acres annually for the second period. The level of conversion³⁴ is not as serious a concern as the acceleration in the rate of conversion between periods, and what this means for the long-term.
- Nearly two-thirds (63% in 2006) of forest land in southern Maine lies within 1,000 feet of an improved road, a sharp contrast with the statewide average of 46% (2006). Roads improved in southern Maine generally stay improved roads. As the proximity to improved roads increases, forest land becomes more prone to conversion to other uses, particularly development.
- The Maine State Planning Office estimated that between 1970 and 1990, land development occurred at four times the rate of population increase in the state, with an average of 33,600 acres per year of rural land converted (both

³⁴ The total acreage reportedly converted over the last 18 years (1991 - 2008) represents less than 0.5% of the state's 2003 timberland area.

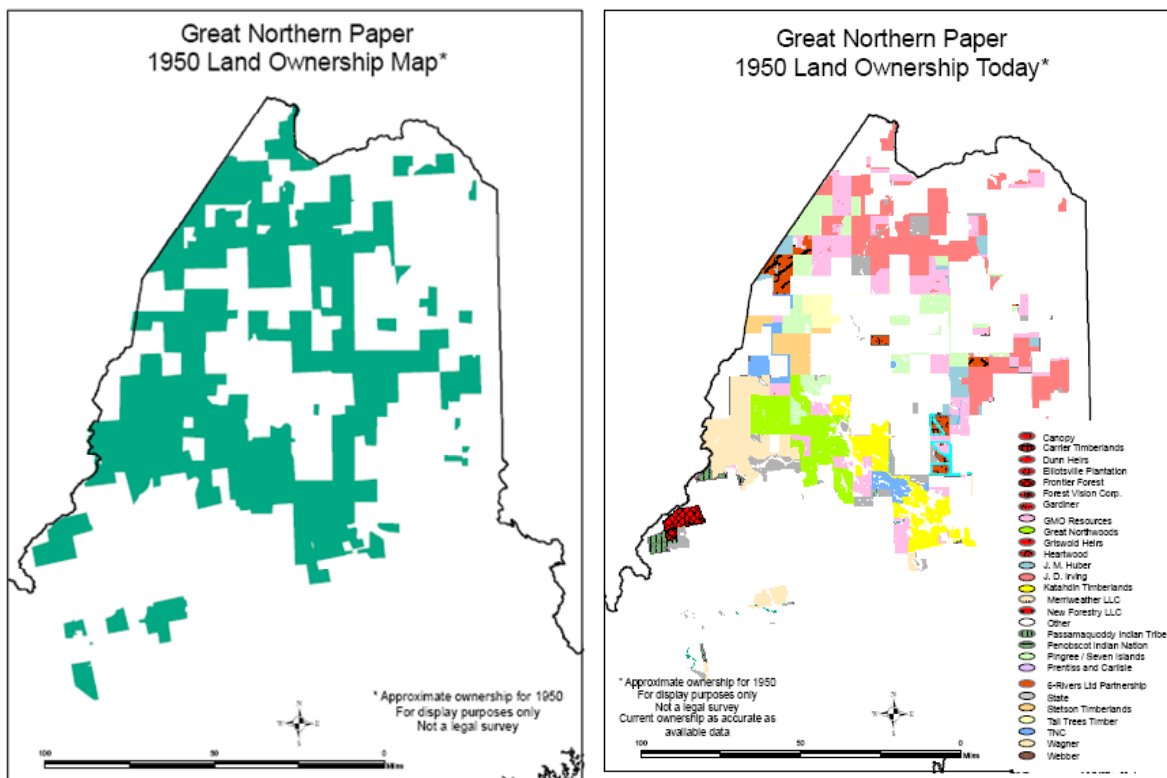
agriculture and forestry). Another State Planning Office source indicates that a very high percentage of the "very high growth" and "high growth" municipalities are located in the southern quadrant of the state.

- The Natural Resources Inventory (conducted by the USDA Natural Resources Conservation Service) shows that land in Maine is being converted from rural to developed uses at an increasing pace. Conversion of rural land has been happening at a faster rate in Maine than nationally, increasing by 29% in Maine between 1992 and 1997 compared to an increase of 18% nationwide.
- The Brookings Institution reported in 2001 that the Portland Metropolitan Area was 8th on a list of the fastest growing metropolitan areas, by percent change in urbanized land between 1982 and 1997. The report found that "...Portland, Maine, had high population growth by Northeastern standards (17 percent), yet increased its urbanized land by 108 percent - more than five times the percentage increase in population."
- Data from the Tree Growth Tax Law program suggests increasing parcelization of forest land. The average size of parcels enrolled in the organized towns has declined steadily since the program was first instituted; from well over 300 acres per parcel in 1978 to about 160 acres per parcel in 2008 (the decline does appear to have leveled off during the past decade). The number of acres enrolled in the program has declined slightly - about 60,000 acres from a peak of 3.73 million acres in 1999. While average parcel sizes have not crossed the threshold where commitment to active forest management becomes less likely, the trends indicated in these figures are troubling.
- A USDA Forest Service report - *Forests on the Edge* (Stein et al, 2005) and several followup reports (White and Mazza, 2008 and White et al, 2009) - identified the lower Kennebec, Piscataqua - Salmon Falls, Presumpscot, and Saco River watersheds as among the top relatively large watersheds in the eastern United States with significantly increased housing density projected over the next 25 years. All of the other major river watersheds in Maine are projected to experience moderate increases in housing density. While much of the current conversion appears to be happening on agricultural land, the forest land base is also being eroded.
- Another USDA Forest Service report - *Forests, Water and People* (Barnes et al, 2009) further explores the potential impacts of development pressure on private forests important for drinking water supply. The Presumpscot, Piscataqua-Salmon Falls, and St. George-Sheepscot River watersheds ranked 1, 2, and 10 in the northeastern U.S. in terms of risk.
- The conversion of forest land to other uses threatens future sustainability in the southern portion of the state. Terminal harvests in southern Maine accounted for 12 percent of that region's annual harvest between 2001 and 2006. This has continuing implications for the future wood supply.

In northern Maine, the situation is more nuanced. As the paper companies sold their Maine lands beginning in the 1980's and continuing into the first decade of

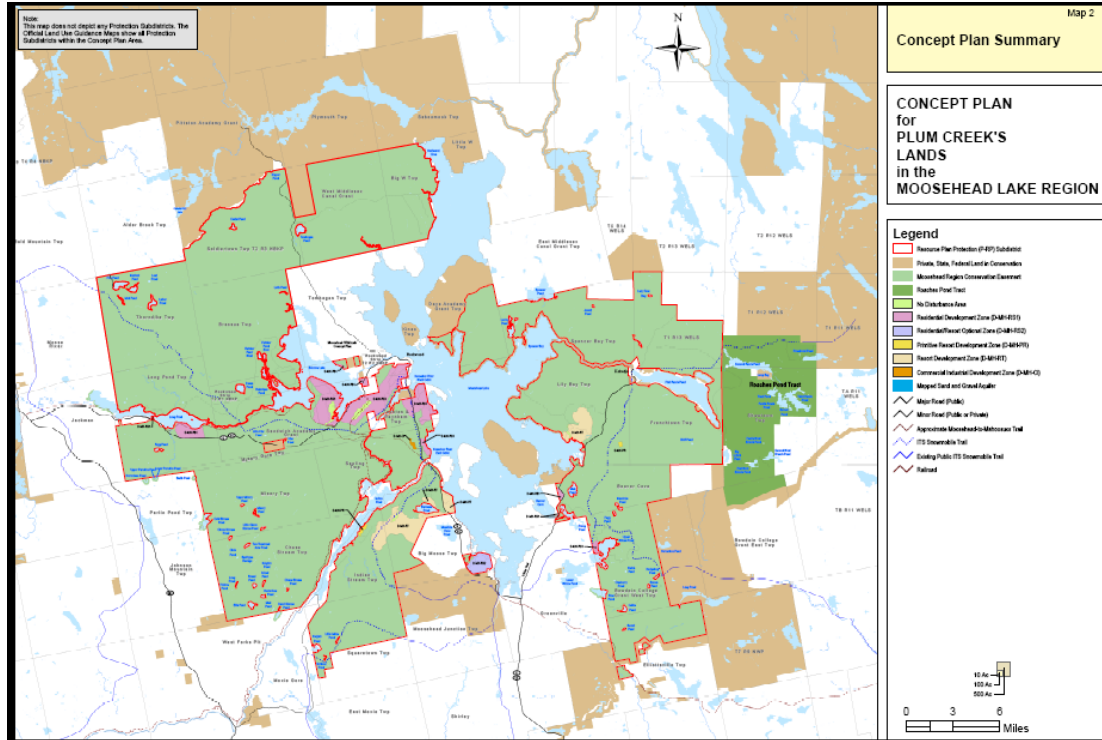
this century, many of the newer owners have - or have tried - to capitalize on the waterfront and recreational values of some of their holdings. So, even in the north woods, some high value lands have been subdivided and converted to other uses, where forest management is either not a landowner objective or is far down the list. Examples include the major subdivision at Grace Pond, the divestiture of non-strategic lands during the International Paper - Champion merger, the breakup of the Diamond Lands (which precipitated the Northern Forest Lands Study and successor efforts to conserve the north woods), the disposition of the former Great Northern Paper lands, and the lake concept plan approved for the Plum Creek lands (see graphics below).

Figure 4.1. Disposition of the former Great Northern Paper lands.



Source: Hagan and Whitman, 2005.

Figure 4.2. Plum Creek lake concept plan.



Source: Maine Land Use Regulation Commission.

Notwithstanding such high profile examples, the forested acreage permanently converted to non-forest uses has been quite small. The total acreage converted is orders of magnitude smaller than what has been lost in southern and central Maine over the last three decades. Further, the transactions of large blocks of forest land have created many conservation opportunities, as discussed elsewhere. Nearly all of the forest land bought and sold over the last three decades remains as working forest.

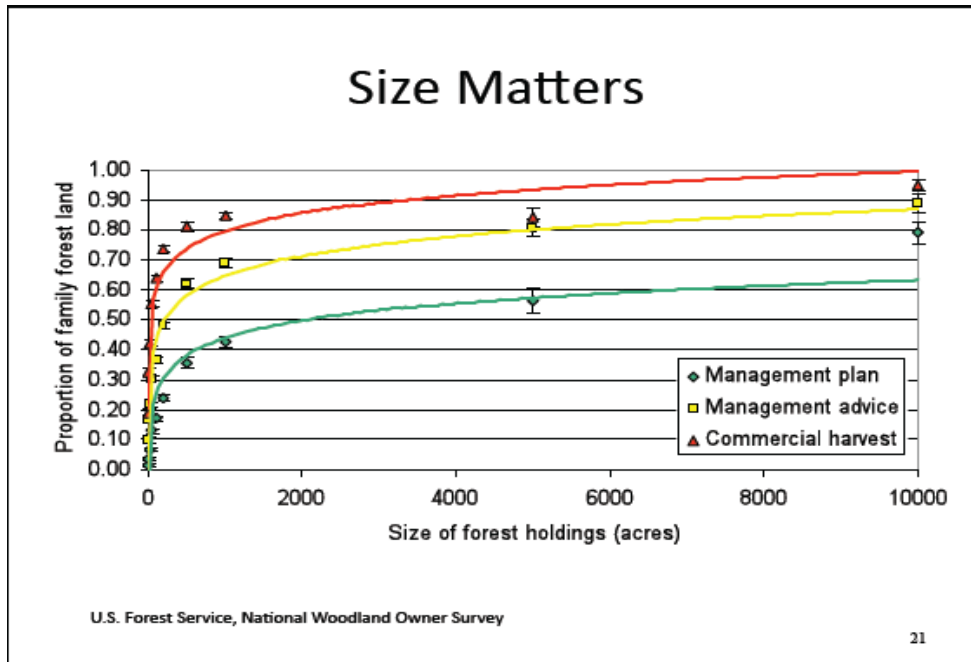
As noted earlier, the conversion of forest land to other uses continues to chip away at the integrity of Maine's forests. While the reversion of agricultural lands to forest once largely offset any losses of forest land to development, that dynamic has halted, and Maine is experiencing a net loss of forest land. The percentage of Maine's forest converted each year is very small (a fraction of a percent), but the cumulative effects of conversion, combined with the impacts of parcelization and changing landowner objectives seem likely to erode the wood basket that supports Maine's forest products industry.

Issue/Threat: Making good forestry pay

An emerging body of literature suggests that investments in good forest management compete poorly against both more exploitive forms of timber harvesting (e.g. high-grading) and alternative uses of forest land (e.g. development) (Amato et al, 2010; Levert et al, 2008; Maine Forest Service, 2006). Sales of large ownerships over the last decade or so validate this hypothesis to some extent. Where large forest ownerships contained so-called

HBU lands such as lake and river frontage, seasonal camps, and mountain settings, the most recent transactions have included the sale or attempted sale of these assets to retail buyers, while the bulk of the forest land has remained in active forest management (Maine Land Use Regulation Commission, 2010; Spelter, 2009; Weinberg and Larson, 2008). Other sources (e.g., Moldenhauer and Bolding, 2009 and 2008; Germain et al, 2007; Thorne, 2000) suggest that as forested parcels become smaller, the economic viability of forest management operations - other than to conduct a final harvest - decreases.

Figure 4.3. Correlation of forest ownership size and active management



Source: Butler, 2009

Even with favorable public policies, such as current use taxation and subsidized forest management plans and implementation practices, long-term forest management is not economically rational. The evidence strongly suggests that landowners - particularly family forest owners - have other motivations besides a revenue stream for continuing to hold and manage forest land.

In addition to the landowner side of the equation, the literature cited earlier also addresses the influence of smaller parcel sizes on logger profitability. Loggers become increasingly reluctant to enter on to forested parcels as they become smaller, due to the higher costs of operations. The presence of large, valuable timber can influence a logger's decision; however, this generally is a one-time opportunity. Cultural roadblocks to traditional timber harvesting usually increase as parcel size decreases. The closer proximity of neighbors makes for added concerns about noise levels, hours of operation and mud tracking onto paved roads, among others.

Issue/Threat: Informing family forest owners of the benefits of sustainable forest management³⁵

Foresters have tried to satisfy landowner objectives since the birth of the profession. Determining just what those objectives are and reconciling them with real forest conditions has been part of the challenge for just as long. Most family forest owners have a deep love of their land and a strong desire to do what is “right,” but they need help in knowing what their options are and what is best for them and their woods. A demographic and generational change in family forest ownership has been going on for some time, and is expected to accelerate in the near future. The previous cohort of family forest owners often put the timber value of their woods at or near the top of their priority list. Programs, tools, and resources now need to be tailored to better meet the needs of newer family forest owners, whose primary ownership objectives are related to aesthetics, privacy, and family legacy. Although family legacy is a major objective, many family forest owners are worried that they will not be able to hold onto the land, or their heirs are not interested in owning it.

Family forest owners have varying reasons for owning their land and differing levels of engagement with it. Understanding the variety of family forest owners is critical to developing a well-focused and effective communications program that speaks to different kinds of people with different motivations. The National Woodlands Owners Survey uses a four-group approach to generate statistically coherent segments. The segments are termed “woodland retreat,” “working the land,” “supplemental income,” and “ready to sell.” These titles were based on unifying characteristics within - and distinguishing characteristics among - the groups.

Another way to group private woodland owners with an eye towards reaching them effectively is to identify them as Model Owners, Prime Prospects, Potential Defectors, and Write-offs. Model Owners include people who are actively engaged in making good land stewardship decisions and show a strong inclination for continuing to do so. They represent 15% of the family forest owners who own 26% of the family forestland. From a social marketing perspective, there is less need to target this group for extension or outreach programs, because they are already the most active and engaged landowners. They can be recruited as conduits for reaching other owners, and should also be allocated enough resources to make sure they keep doing what they are doing. The easiest and most efficient group of people to influence will be the Prime Prospects who comprise 29% of the family forest owners and own 28% of the family forestland. These people are not currently engaged in making land stewardship decisions, but are likely to be interested in doing so because they share attitudes and demographic characteristics with the Model Owners.

The next most efficient group to concentrate on is the Potential Defectors (44% of family forest owners who own 37% of the family forestland). They are currently performing some of the desired behaviors, but they are likely to be

³⁵ Much of this discussion adapted from Butler et al, 2007.

losing interest in doing so or face other obstacles. Their attitudes and demographic characteristics are similar to those of the Write-Offs.

The most difficult people to influence are the Write-Offs (13% of family forest owners who own 9% of the family forestland). These people are not performing the desired behaviors, nor do they show much interest in doing so.

Media habits for white men aged 55 years or older who own three acres or more of land were used to represent the media habits of the average family forest owner. Of the five communications media measured, newspapers and television emerged as the most promising avenues through which to communicate with family forest owners. Magazines, radio, and the internet are not nearly as influential with this segment of the population. Stories and advertisements placed in newspapers are particularly likely to be read, absorbed, and trusted. The target population included many frequent newspaper readers (50% fall in the top two quintiles of newspaper readership compared with 35% of the general population) and solid majorities agree that newspapers “keep [them] up to date” (73%) and “are a good source of learning” (70%). Newspapers tie with television as the “media trusted the most” (31%). The target population also has the nicest things to say, compared with other media, about advertising placed in newspapers: 58% agree that newspaper advertising “provides me with useful information about new products and services.” Few say such ads have “no credibility” (10%) or are “all alike” (16%).

Many in the target population are frequent television viewers. Although television is unlikely to be a key advertising outlet for many forestry initiatives due to its high cost, it could be an important focus for story placement efforts. Nearly one-half of the target population (45%) falls in the top two quintiles of television viewership, compared with just 26% of the general population. Solid majorities agree that television “keeps me up-to-date” (78%), “is a good source of learning” (74%), and “gives me good ideas” (69%). On a cautionary note, it should be highlighted that the target population is relatively likely to say television advertisements have “no credibility” (37%) or are “all alike” (31%).

This population is less likely than other Americans to be frequent magazine readers (28% versus 42%, respectively) or radio listeners (29% versus 48%, respectively). The internet is the advertising medium least likely to provide the target population with “useful information about new products and services” (12% agree with the statement). The target population is likely to be involved with civic groups, particularly religious (11%), veterans (10%), charitable (9%), and fraternal organizations (7%). This suggests a proclivity to “get involved” and might mean the target population would be receptive to messages about land stewardship, particularly if pitched as a community effort and disseminated through one of these types of organizations.

The potential effectiveness of a program can be ascertained by looking at the results from the prime prospects analysis. The fact that approximately one-third of the family forest owners (29% of the family forest owners who own 28% of the family forestland) are Prime Prospects suggests that at least this many owners could be moved toward better stewardship of their lands. The additional 44% of

the owners (who own 37% of the family forestland) who are Potential Defectors indicates that there is a substantial need for this work now. For Model Owners, it is important to keep them going down the right track and use them to influence other owners. Although the prime prospect analysis indicates that the Write-Offs will be very difficult to influence, they may represent a critical part of the target audience, particularly if they own lands that have high conservation value in areas with strong development pressures.

A social marketing campaign can get people to take the first step, but additional resources and methods are needed to guide them the rest of the way. We need to translate the complex reasons for why we need to conserve forests into messages that are simple, salient, and give the owners a reason to reinforce or change their attitudes and behaviors. Sound market segmentation will enable resources to be allocated more efficiently. The diversity of family forest owners must be recognized and embraced, and programs must be developed that are suited to their specific characteristics, needs, and desires.

Issue/Threat: Maintaining the capacity of the Maine Forest Service as an institution to serve the citizens of Maine

In real dollar terms, the Maine Forest Service budget declined slightly between 1998 and 2006,³⁶ while costs have increased significantly. For example, due in large part to the high cost of health insurance, it costs approximately \$2.5 million more to carry the same headcount as it did nearly a decade ago. Recent state budget reductions have set the stage for dramatic changes to the MFS as an institution. The MFS began fiscal year 2008 with a \$12 million general fund budget. Since then, the agency has experienced several budget reductions totaling nearly \$600,000. Coupled with proposed budget reductions in the current biennial budget, it is no longer certain that the MFS will be able to fulfill its legislative mandates appropriately. Indeed, some mandates, such as employing one District Forester in each county, have never been met. MFS relies on USDA Forest Service State & Private Forestry programs to support the organization's core capacity. Recent reductions in federal funding have compounded the impact of state budget reductions on our organization. MFS does not have discretionary resources to support emerging issues such as wood to energy, forest certification, and assisting the forest products industry in weathering the sea of change brought about by global competition. People are working longer, harder, and more creatively than ever before, but the agency's resources are stretched to the breaking point. It is likely that the agency will need to decide in the near future which services it will no longer provide.

For example, maintaining a robust professional response capability, both in terms of equipment and personnel, is essential in preventing large forest fires that damage Maine's natural resources and cause suppression costs to soar. Maine provides initial attack on forest fires with its fleet of aging Huey aircraft. These helicopters are more than forty years old and showing significant signs of

³⁶ The figures for 2002 are anomalous in that they reflect a very large federal grant MFS received to assist landowners, loggers and communities recover from the 1998 ice storm.

wear. MFS purchased a new Bell 407 in 2007 to begin the replacement process for the aging Huey fleet. Maine is faced with a difficult economic climate that has prevented further upgrade of the Hueys. Conservative estimates indicate the Hueys will be gone in less than eight years. If MFS is unable to acquire newer helicopters to provide forest fire suppression, Maine could be left with insufficient aerial resources to provide timely fire suppression, resulting in larger, more damaging and costly fires statewide.

Issue/Threat: Maintaining the health of Maine's forests in the face of threats from native and exotic invasive insects and diseases

The National Association of State Foresters (NASF), in its 1992 forest health committee charter stated, "...forests are defined as healthy if they have sufficient resiliency to respond to and recover from encountered stress while maintaining their capacity to provide necessary ecological process support and generate desired levels of amenities and products..." NASF reaffirmed its policy in 1997 (NASF Resolution # 1997-7). MFS concurs with this definition, and has structured its forest health program toward maintaining Maine's forest as much as possible in that healthy condition.

In that vein, the threat of a resurgent spruce budworm population and the need to detect it and to respond early remains a high priority. Concurrently, MFS recognizes that Maine's forests face increasing threats from the potential introduction, establishment, and expansion of foreign invasive pest species. Under any of the aspects of the NASF definition, previously established nonnative pests have significantly reduced the health of Maine's forests. Nonnative pests established elsewhere on the North American continent pose additional threats.

There is no reason to believe that the impact patterns from any of the native or established pests will abate in the foreseeable future. Spruce budworm, although presently at low levels in Maine, is causing heavy defoliation and decline on hundreds of thousands of acres in neighboring Quebec. It will return to Maine.

Many of the more serious non native pests (e.g. beech bark disease, balsam woolly adelgid, hemlock woolly adelgid, white pine blister rust) continue to intensify and expand through Maine's forests. The recent pattern of warmer winters is exacerbating the build-up of pest population levels; more chaotic weather in the growing season may similarly exacerbate the impacts to the forest.

The combination of a very mobile society and the rapid movement of goods and services around the world virtually assure that the flow of additional pest species inadvertently brought to North America - and to Maine - will continue. The potential for climate change appears to increase the chances of successful establishment.

Issue/Threat: Maintaining the health of Maine’s forests in the face of threats from native and exotic invasive plants

The issue of invasive terrestrial plant species impacts has been gaining momentum within the state and throughout the region for more than ten years. The public has come to realize that many plants promoted for the “conservation plantings” of the not-too-distant past have become problem species and are invading fields and roadsides. This concern has been exacerbated by the issue of exotic aquatic weeds in public waterways, and by the amount of public and private resources that have been expended to manage these situations.

Recognizing the situation, the 123rd Legislature in 2007 passed a resolve directing the Maine Department of Agriculture, Food and Rural Resources to “study invasive terrestrial plant species.” This resolve directed the department to conduct a study to “...develop processes and criteria to assess the danger posed to naturally occurring ecosystems by invasive terrestrial plant species...” That study and resultant report developed:

- A list of criteria or process for evaluating invasive terrestrial plants;
- A preliminary list of invasive terrestrial plants; and,
- A list of suggestions for preventing introduction and further distribution of these plants.

The study committee decided that prevention is the key when dealing with any type of invasive species, because once a species is established it is very difficult to control. They also noted the criteria needed to address potentially invasive plants not currently established in Maine. The committee further agreed it was important to collect information from neighboring states and provinces, because Maine shares similar climate and growing conditions with Canada more than with states to the south.

Subsequent efforts by that group have focused on preventing the introduction and further distribution of invasive plants. This effort has been led by the Maine Department of Agriculture, Food and Rural Resources in collaboration with the Maine Landscape and Nursery Association, Ornamental Horticulture Council, Maine State Florists’ and Growers’ Association and University of Maine Cooperative Extension.

Although several New England states (Connecticut, Massachusetts, New Hampshire, and Vermont) have implemented regulations to address the issue of invasive terrestrial plants, to date Maine has not.

Despite this void, projects to control species generally accepted as pernicious exotic weeds have been, and continue to be, conducted (e.g. biocontrol of purple loosestrife on Mt. Desert Island; barberry control on Monhegan Island; giant hog weed eradication throughout the state).

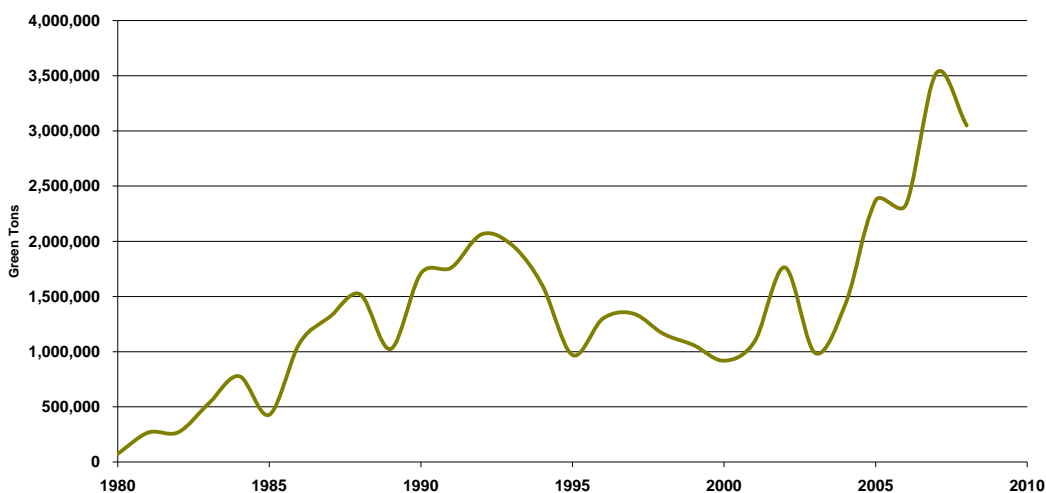
Beyond efforts to limit additional introductions, MFS has been conducting training sessions focused on identification and management of those exotic invasive plants already established in Maine and which threaten forest settings.

The scope of this problem greatly exceeds the agency's internal capacity to manage.

Issue/Threat: Increasing removals of forest biomass³⁷

There is intense competition for raw material within Maine's forest products industry. In addition to traditional roundwood markets, bioenergy facilities that produce electricity by burning wood are common throughout the state. Some are stand-alone facilities, while others are integrated within pulp and paper mills. Biomass chip harvests in Maine have increased more than 3½ times since 2000 (Figure 4.4) - a trend expected to continue given plans for new and expanded capacity in the region. Several wood pellet plants are either in operation or planned for construction. Industry analysts expect global production of wood pellets for residential and commercial heating to increase 25 to 30% annually over the next decade. Research is also in progress at the University of Maine to produce a variety of forest bioproducts including ethanol. Whether this is an opportunity or a threat depends on how these harvests and management are conducted. As stated earlier, Maine can produce more wood but requires improvements in utilization and management.

Figure 4.4. Historic biomass chip harvest levels (Green Tons) in Maine, 1980 - 2008 (Maine Forest Service 2008)



We do not know the impact these new initiatives will have on wood supply, but it is certainly possible that competition for raw material between wood-using facilities will increase. Increased competition may impact harvest levels through shorter rotations, or increased use of small diameter and poor quality stems. This may create opportunities for timber stand improvement by combining such harvests with conventional forest management and silvicultural treatments. Regardless of the outcome, there is concern that these and other related

³⁷ From Benjamin, 2010.

activities will put more pressure on Maine's forests. Wood supply is a concern for both traditional wood processing sectors and the emerging bioindustry, and the general public has raised concerns regarding long-term sustainability of biomass harvesting.

Increased demand for woody biomass will generally increase the potential for conflicts among forest values. For example, a standing dead tree may provide habitat for wildlife, reduce soil compaction and erosion if used in skid trails, or provide economic value to a bioenergy facility. Logging residue can be used to maintain soil productivity, reduce erosion, or produce bioproducts. All values cannot be achieved in each case, so tradeoffs will be necessary. The forest industry in Maine has been dealing with these and other related issues for many years, but until recently, guidelines specific to woody biomass retention were missing from existing best management practices and regulations. It is more important than ever to collect and disseminate credible information to allow landowners, foresters and harvesters to make informed decision in this area.

Issue/Threat: Predicting future forest conditions and wood supplies

Increasing interest in and competition for Maine's forest resources has also increased demand for better tools for predicting future forest conditions and wood supplies. Industrial investors, both current and prospective, are seeking information and assurances regarding available raw materials. Conservation groups, sportsmen, and others concerned about the potential impact of resource extraction patterns on forest conditions are concerned about sustainable harvest rates for new and traditional commodities. No one seems particularly interested in revisiting the acrimonious timber harvesting debates of the 1990's, when the lack of good information resulted in more exchange of heat than light.

MFS's most current timber supply model was constructed in the mid-1990's. On-the-ground behavior in response to that model's predictions have rendered many of the original assumptions moot, skewing future trajectories and limiting the model's further predictive utility. This is exacerbated by developing markets for new products and associated new extraction processes.

Modeling tools exist today that have more robust capacities that would allow MFS to tackle these issues. These new tools, coupled with current data from Maine's annualized forest inventory, provide an opportunity for MFS and its partners to create a new model calibrated to current conditions and anticipated practices. There is a special need for this information as we consider the opportunities presented by developing markets for new products.

Issue/Threat: Climate change impacts on forestlands³⁸

Maine's climate is now changing at an increasing rate. All three of Maine's climate divisions are warmer than 30 years ago, and sea levels have risen several inches over the last century. The seasonality of weather events also is shifting, with earlier snowmelt, peak river flows, and ice-out on lakes.

³⁸ This section sourced in large part from Jacobson, et al, 2009, unless otherwise indicated.

The modeling scenarios examined by the authors of “Maine’s Climate Future” suggest that for the 21st century, there is a strong trend in Maine toward warmer and wetter conditions in all seasons. More winter precipitation is likely to occur as rain. Some models forecast increased storm intensities. Temperature increases could be associated with more extreme precipitation and faster evaporation of water, leading to greater frequency of both very wet and very dry conditions.

Climate change modeling suggests that Maine will continue to have abundant forests, but the composition is likely to change, e.g. a decline in the presence of boreal species such as the spruces and Balsam fir, as well as northern hardwoods, and an increase in the presence of mixed oak-hickory types, white pine, and more aggressive deciduous species such as red maple (Tang and Beckage, 2010).

Forest biodiversity likely will change as well, with some species of plants and animals disappearing while new ones become established, e.g. a recession of northern species at the southern edge of their native ranges, and an advancement of southern species at the northern edge of their native ranges. As mentioned in the forest health section earlier, similar dynamics will exist relative to the range and periodicity of native pests, and the establishment and spread of exotic pest species. This is liable to generate some feedback loops on the host tree species.

Some climate change model scenarios predict wetter than normal spring and summer fire seasons coupled with high intensity, short duration droughts (Hayhoe, et al, 2007). Should such droughts materialize, it would be cause for concern, as Maine’s spring fire season is driven by the drying of fine fuels that ignite larger fuels in forested setting.

The longer duration of un-frozen, wet ground conditions (more commonly known as “mud season”) will likely have an effect on the social acceptability of traditional harvesting methods. Innovative and creative strategies are required to maintain acceptable production levels in increasingly parcelized areas, such as the central and southern parts of the state.

At the same time, the potential exists for Maine’s forests to sequester additional carbon, creating a revenue stream for forest landowners should carbon markets develop under expected revenue scenarios. In addition, possible reductions in forest extent elsewhere on the continent and across the globe could generate increased demands for Maine’s forest products.

Uncertainty abounds as to what will happen where, and to what extent. The key for maintaining or enhancing the multiple values of Maine’s forests in the face of climate change is managing for resiliency - maintaining the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state, controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary (Holling, 1973). The available scientific evidence strongly supports the conclusion that the capacity of forests to resist change, or recover following disturbance, is dependent on maintaining biodiversity at multiple scales, including at the stand level (e.g.

leaving snags and large woody material on site), using natural forests and processes as models. Other important factors in forest resiliency include maintaining connectivity across forest landscapes by reducing fragmentation and recovering lost habitats (forest types), expanding protected area networks, and establishing ecological corridors (this is more of an issue in southern and central Maine) (Thompson, et al, 2009).

Issue/Threat: Threat of forest land or property loss due to forest fire

Maine's forest landscape is changing, and forest fire risk factors have become more complex. Due to increasing development, residential housing is now the greatest value at risk in many forested areas. Where once there were only small camps dotting the forest landscape, now there are year-round homes of significantly greater value. With this increased value at risk comes an increased expectation of protection, as well as a greater likelihood of fire starts due to the increase in population. The single greatest cause of fires in Maine is human caused fires, such as debris burning. Fires start where people are.

Maine has the highest percentage of forested land in the nation. Protecting this natural resource and the values at risk within forested areas is a tremendous responsibility. Indicators point to an increasing threat from human caused fires and weather conditions consistent with high fire danger resulting from climate change.

Issue/Threat: Conservation of forests for clean drinking water supplies

Forests are critically important to the supply of clean drinking water in Maine. Despite the importance of forests to this critical, life-sustaining resource, the public generally is unaware of threats to their water supplies or the connection between clean water and healthy forests in source watersheds. In the recent Forests Water People report, Maine scored highest in the study area in the ability of watersheds to produce clean water. The majority of Maine's watersheds received the highest possible score in this index showing a watershed's ability to produce clean drinking water (Barnes et al, 2009). Maine's ability to produce this clean water is directly related to the high percentage of forest land. The same report identified forests of several Maine watersheds, particularly those in southern Maine, at high risk of conversion to other land uses, particularly residential development. This puts Maine's water supply at risk. The most cost-effective way to continue to provide clean water is keeping forests as forests, rather than build new treatment plants (The Trust for Public Land and American Water Works Association, 2002). Therefore, raising public awareness of the important role forests play in producing clean water, maintaining a healthy forest products industry, and finding creative ways to keep forests as forests in the face of economic realities that favor conversion to other uses are critical to ensuring that Maine continues to produce the clean water that people expect and depend on.

Issue/Threat: Maintaining healthy trees and woodlands in urban and community areas

Maine's forests play a critical role in shaping the state's economy, environment, and directly contribute to the health and livability of Maine communities. However, Maine's forests are changing; expanding populations and land-use changes have reduced the extent of Maine's forests, including Maine's urban and community forests - the forests where people live. Healthy and sustainable community forests support livable, desirable, and ecologically fit places to live for Maine's citizens. They also provide a wide range of services and benefits, including reduced storm water runoff and treatment, improved air quality, noise abatement, and more. Community trees and forests are recognized as an important component of municipal infrastructure needing maintenance and adequate funding.

Municipalities often do not have the tools or expertise to maintain their community forest resources; as a result, the long-term viability and benefits of these resources are rarely realized. Of the 488 incorporated municipalities in Maine, fewer than 30 have comprehensive community forestry management programs that operate on a self sustaining level. Another 111 municipalities are in the process of developing some level of community forestry involvement, but, due to a variety of barriers, have yet to grow their program to a sustained level. This represents a slow improvement over past years. In an effort to break down these barriers, Project Canopy, Maine's urban and community forestry program helps build and support sustainable community forestry programs. Project Canopy has a vision that every community will actively and wisely manage its community forestry resources in a sustainable manner, and that all Maine citizens become well informed as to the proper management of these resources and the benefits derived from them.

Many factors affect our ability to maintain and enhance our urban and community forests, including, but not limited to:

- land use change, fragmentation and urbanization;
- local capacity;
- catastrophic events including storms and invasive species;
- lack of adequate resources for Project Canopy Assistance program; and,
- management of public lands and open space.

Climate change will make the need for active community programs more important. In today's economically challenging times, it is not surprising that 37% of municipalities that participated in the 2009 Project Canopy municipal survey identified lack of funding as the greatest obstacle to managing their community forest resources. The same survey identified assistance with grant development as the most requested service. Declining federal funding for the Urban & Community Forestry program minimizes the number and amount of third party grants Project Canopy is able to offer to municipalities that need support. The Project Canopy Assistance Program is not meeting the state's

needs, funding only 37% of requests in 2009. Program staff are working diligently to diversify the program's funding base and have made some small gains. However, core federal funding is an essential component of our support for local communities in developing basic program function through tree planting, inventory and management, and capacity building. Demand for these services continues to increase, and with it, the need for more funding. The development pressures and parcelization trends identified above and elsewhere will bring more acres into high priority status for urban and community programs and strategies.

Issue/Threat: Increasing the environmental literacy of Maine citizens

Family forest owners who possess basic knowledge about Maine's forests are desirable. Improved and targeted public education programs can improve efficacy, resulting in the retention of forest lands and improved environmental literacy. There is a critical need to educate the public about the body of existing knowledge about forests; their societal benefits and other forest-related topics and pressing issues. Ultimately, effective education and outreach programs lead to more informed decisions by residents of Maine.

Approximately 44.2 million acres of private forests, located primarily in the eastern United States, are likely to experience dramatic increases in development in the next three decades, with consequent impacts on ecological, economic and social services. Without effective educational programs, thousands of family forests could be fragmented and parcelized, ultimately reducing the region's forestland capacity (Stein et al, 2005).

Maine people are keenly interested in the forest. They want to understand how it grows and whether it is well-managed. They are curious about the plants and animals that live there. They want to know whether it can continue to be the economic lifeblood of Maine. Yet too often, they do not have access to accurate, timely and independent information about the forest. The general public needs to understand forestry issues better if they are to make informed decisions.

Maine Forest Service's educational programs complement the USFS national Natural Resources Conservation Education program. MFS provides technical educational assistance to collaborating organizations and agencies to promote informed decisions affecting forests and other natural resources. The program emphasizes core themes of sustainability of natural and cultural resources in forest; and developing awareness and of the interrelationships between people and the land. The program emphasizes forest health, the benefits of forests, the role of humans in forest ecosystems, wildlife conservation, and the role of fire in creating healthy forest ecosystems, all to achieve the goal of healthy, sustainable forests.

The program is designed and delivered to promote informed decisions affecting forests and other natural resources by those in policy positions, citizens, and residents of all ages. MFS's Forest Policy and Management Division has primary responsibility for program delivery. The division's natural science educator coordinates program delivery with input from the division's education and outreach team. The MFS Natural Science Education program is a broad

spectrum educational program that targets landowners, teachers, school-aged children, and resource professionals. Directed by legislative mandate, the program utilizes a wide range of methods to reach diverse audiences. Educational programs are delivered through workshops, publications, exhibits and tours. The program also utilizes one-on-one visits, a forest information center, classroom visits, presentations, public service announcements, direct mailings, site visits, and newsletters. The program's success hinges on effective partnerships with a diverse group of interests, including, but not limited to, other agencies, conservation groups, and the forestry community.

Issue/Threat: Continued reduction of federal and state funding for stewardship cost-sharing practices, community forestry grants, and forestry education and outreach

The State and Private Forestry program of the USDA Forest Service was formally authorized by Congress in the Clarke-McNary Act of 1924. The program was recodified in the Cooperative Forestry Assistance Act of 1978. In this latter act, Congress declared that "it is in the national interest for the Secretary [of Agriculture] to work through and in cooperation with State foresters or equivalent State officials, nongovernmental organizations, and the private sector in implementing Federal programs affecting non-Federal forest lands." The Congress further authorized the establishment of landowner assistance and other forestry programs, including but not limited to Forest Stewardship, Urban and Community Forestry, Forest Health Protection, and Rural Fire Protection. The authorities further stipulate that such programs be delivered through the state foresters (or equivalent state officials).

For many years, these programs, and the partnerships between and among the USDA Forest Service, Maine Forest Service, and the many landowners and other cooperators who participated in these programs worked well. Funding levels, although rarely adequate, sufficed to enable the states to leverage existing resources and truly get good forestry in place on the ground. In recent years, however, program funding levels have declined for a number of programs (though not all), and, as a result the partnerships have begun to degrade.

The severe declines in funding for the Forest Stewardship Program are a particular case in point. The Forest Stewardship Program (known in Maine as WoodsWise) was created "to encourage the long-term stewardship of non-industrial private forest lands by assisting owners of such lands to more actively manage their forest and related resources..."³⁹ Although program funding has been used for a number of activities germane to the statutory authority, the primary focus has been to connect family forest owners with qualified natural resource professionals and help them with financial assistance for the preparation of forest stewardship plans. This assistance helped foster long-term working relationships between family forest owners and natural resource professionals that carried through to other management activities. Unlike most other states, Maine has always delivered its Forest Stewardship Program

³⁹ 16 U.S.C. §2103a, sub-§a.

through a network of private sector consulting foresters. Most other states delivered their programs almost exclusively through state service foresters until recently; this option simply has never been feasible in Maine, which has only ten District Foresters. By delivering the program through the private sector, Maine has been able to leverage the federal funding assistance for forest stewardship plans with significant technical assistance.

While the program has never (with the exception of a few years following the 1998 ice storms) had the funding it needs to deliver major accomplishments, funding was, until recently, adequate, and relatively stable at around \$250,000 per year. However, federal fiscal year 2009 funding declined 40%, and Maine was forced to implement a moratorium on providing cost-share assistance for forest stewardship plans in the hope that fiscal year 2010 would be better. Unfortunately, despite a slight increase in funding for the Forest Stewardship Program in federal fiscal year 2010, Northeastern Area State and Private Forestry further reduced the allocation to Maine and other states in the area. The continued decline in available program funding is forcing a serious discussion about whether the state can continue to offer the types of services to family forest owners that they have come to expect.

Other programs have not been immune from reductions or outright elimination. For example, the Conservation Education program has not been funded for several years, yet the USDA Forest Service continues to require states to report on program accomplishments.

The examples cited above point to a diminution of the partnership with which Cooperative Forestry Assistance programs were intended to be delivered. While states have been faced with severe budget cuts and have been forced to make hard choices about staff and program reductions, similar measures have not been instituted at the federal level. As a result, the percentage of Congressional appropriations intended to deliver programs on the ground in the states has decreased, while the percentage retained by the USDA Forest Service has increased.

Issue/Threat: Maintaining and enhancing forest biodiversity

Fewer species have been extirpated in Maine than in other states with richer biodiversity and higher levels of endemism (examples include Hawaii, Florida, and California). However, Maine is not immune from the loss of native species due to human-caused changes (Gawler, et al, 1996). While the habitat losses that largely drive non-aquatic species extirpations involve the permanent conversion of forest land or other habitats to a developed use, forest management focused strictly on economic objectives and/or involving too-frequent harvest entries can have negative impacts on biodiversity.

Certain examples demonstrate this point. Across the state, the following habitat elements and features are lacking and/or are in decline:

- Late successional and old growth forests (LSOG): LSOG forests could be the most at-risk feature of Maine's forest landscape. Although estimates vary, and depend on the definitions used, the evidence suggests that LSOG

- High volume, large sawtimber stands: These stands, which can be managed for and maintained on working landscapes, also comprise a very small percentage of the forested landscape (see the discussion of forest stand structure in Chapter 2, Criterion 1).
- Large woody material also is not present in the quantities recommended in “Biodiversity in the Forests of Maine: Guidelines for Land Management” (Elliott, ed. 1999).
- Maine’s ecological reserve system lacks adequate representation in southern and central Maine (see the discussion in Chapter 2, Criterion 1). The overwhelming majority of protected acres and protected forest types are in northwestern and Downeast Maine, yet a disproportionate amount of Maine’s rare species and species diversity lies in southern Maine. Only one forest type is sufficiently protected in Maine’s southernmost region. The lack of protected forest types in southern and central Maine becomes more pronounced when replication is considered.

As LSOG forests and associated features continue to decline, Maine faces a situation comparable to that already in play in Scandinavia, where a number of LSOG-dependent species are expected to be extirpated over time due to the efficiency and productivity of forest management systems there, even though forest managers have undertaken measures to reverse the loss of LSOG features (Hagan and Whitman, 2004; Tikkanen, et al, 2006).

Opportunity: Markets - Biomass⁴⁰

An analysis of highly reliable existing information on Maine’s forest resources indicates that, with improvements in forest utilization and silviculture, Maine’s forests are capable of producing substantially more wood than they do currently, while at the same time retaining the number of den trees, snags, large dead logs, and limbs and tops needed to maintain or improve site fertility, wildlife populations, and biodiversity. Increased imports of wood from states nearby are also possible.

MFS developed its estimate of available wood taking into account concerns for soil productivity, water quality protection, and biodiversity based on Maine’s “benchmarks of sustainability.” As a result, the maximum quantities available were discounted significantly.

Based on this analysis, MFS identified four potential sources of “new” wood:

⁴⁰ Maine Forest Service, 2008.

1. Improved harvest/utilization of wood from currently harvested stands - Considerable residual material is left on harvest sites that could provide additional biomass (not just limbs and tops, but previously unmerchantable trees as well). MFS estimates that, if these opportunities are pursued, an additional 3.8 million green tons of wood could be supplied annually, of which 1.8 million green tons are of a quality for making premium grade wood pellets.
2. Harvest in stands not previously considered commercially viable - Thinning overstocked stands could provide several million green tons of wood of varying quality. These operations could provide an additional 1.4 million tons of wood per year.
3. Increasing productivity (and allowable cut) through more intensive management - Investing in intensive silviculture on the most productive sites could double the potential growth on these sites and yield approximately 600,000 tons per year of additional sustainable annual harvest.
4. Increased imports from outside Maine's borders - Wood flows back and forth across the region. Neighboring states have growth rates well in excess of harvest; opportunities abound to import high-quality wood to support the emerging pellet industry. The amounts of surplus plus pulpwood grade material available from just two neighboring states is approximately 3.8 million tons.

All told, if all these opportunities are pursued and prove to be financially feasible, the amount of wood available for energy purposes could be increased by approximately 9.7 million tons per year. This represents a 50-60% increase over current levels of harvest.

Realizing the opportunities from these four potential sources requires operating beyond "business-as-usual" in the Maine woods. Maine's forest industry currently harvests 15-17.5 million green tons annually. Harvest and growth under current practices are in balance at 1:1. We have specifically not determined the economic feasibility of extracting, transporting, and utilizing these potential sources of supply. Our analysis only deals with potential supply. Constraining factors include logging capacity, need for new logging technologies to harvest smaller material, fuel costs (and distance to some markets), and new market entrants competing directly with existing users for the same supply base.

Opportunity: Markets - Biofuels

The development of renewable biofuels from sustainably harvested forest biomass is essential to reducing Maine's dependence on foreign petroleum products. Maine is poised to make a major break-through on second generation biofuels from cellulose, although much research and development remains to be done. The University of Maine is developing a process to make cellulosic ethanol from waste wood from the papermaking process. Creating biofuel from such waste wood diminishes the risk of competition for similar wood grades and does not exert as much pressure on the forest resource as would using wood chips delivered directly from the forest (Maine Office of Energy Independence

and Security, 2009). The increased use of biofuels could also reduce Maine's net greenhouse gas emissions, yielding a significant benefit in the effort to combat climate change.

Opportunity: Markets - Engineered Wood

Maine has a mature, fairly diverse wood composite sector (e.g., oriented strand board, plywood); however, this sector has weakened in recent years due to high operating costs and the housing market decline. On the other hand, Maine is well-positioned to take advantage of future developments in engineered wood composites. Maine is home to the Advanced Engineered Wood Composites (AEWC) Center, a "globally recognized leader in composite research and development...[for] the next generation of cost-effective, high-performance, wood-nonwood composite materials." The AEW Center is a leading research facility with state-of-the-art capabilities to help usher an engineered wood product from the conceptual stage through research, manufacturing of prototypes, testing and evaluation, code approval and commercialization (Innovative Natural Resource Solutions LLC, 2005). Some of the center's innovative products include blast-resistant wood panels and delta strand lumber.

Opportunity: Markets - Ecosystem Services

Natural ecosystems provide a wide range of ecosystem services from which people benefit and upon which all life depends. These include provision of food, fuel, building materials, freshwater, climate regulation, flood control, nutrient and waste management, maintenance of biodiversity, and cultural services, to name a few. While the benefits of environmental services are public goods, the cost of ensuring their provision often falls on private landowners (Bond et al 2009).

While policy tools such as regulation, acquisition of interest in land (both fee and conservation easement), cost share programs, and tax incentives can be effective in conserving some ecosystem services, additional tools are needed for the next big step in conservation. Private investments in conservation can financially compensate landowners for protecting and enhancing ecosystem services, particularly in places where these services are degraded or scarce. In some cases, markets and payments for ecosystem services are a means of capturing the financial value of well-managed forests. Payments for watershed management, carbon sequestration, ecotourism, and a host of other services may supplement traditional forest revenues and promote good stewardship, especially when used together with other conservation tools (USDA Forest Service, 2007).

Maine has benefited to some extent from the Conservation Reserve Program, which provides annual rental and cost share payments to farmers to protect water quality, establish wildlife habitat, and enhance forest and wetland resources. However, only a relatively small percentage of Maine's land area is devoted to agriculture, so the potential of this program is limited. The state's wetlands compensation program is similarly limited in scope, given the relatively small amount of wetlands converted to other uses.

The opportunity exists to expand ecosystem services markets in Maine, particularly if regulated carbon markets develop. However, carbon is not the only opportunity on the horizon. As the public develops an increased understanding of and appreciation for the role that healthy forests play in delivering clean water supplies, the possibilities for water markets also could expand. Wildlife habitat protection and some forms of recreation may also offer opportunities for landowners. For example, the contentious issue of deer wintering area management could be resolved efficiently and effectively by the creation of a market-based program that rewarded landowners who sought to manage potential and actual deer wintering areas in a manner consistent with the maintenance of habitat values.

Opportunity: Large scale land conservation

The "Maine Woods" constitute the largest continuous expanse of undeveloped and unfragmented forest in the eastern United States, a unique productive forest with a vast array of nationally significant public values that private landowners have managed and which the public has used largely unfettered for generations.

Since 2003, the percentage of conserved land throughout the state has increased from about 6 percent to nearly 18 percent. Most of this acreage is managed forest, including state-owned public lands, state wildlife refuges, and working forest conservation easements. A much smaller subset, approximately 670,000 acres, or 3% of the state, is restricted from harvesting. Most of the conservation efforts were accomplished through joint partnerships among federal and state agencies, private corporations and state and local land trusts.

Despite these conservation successes, much remains to be done. The significant changes in forest land ownership in Maine over the previous decade have created a special opportunity for land conservation. Changing ownership objectives portend changes in traditional management of forestland for timber production. Traditional Maine values associated with these lands, including the maintenance of wildlife habitat, recreational uses, and economic productivity of these lands, are at risk. Maine voters have repeatedly expressed strong interest in protecting public values associated with forestland. Through effective partnerships and the use of working forest conservation easements, Maine has used available conservation dollars in a remarkably efficient manner, and has been a national leader in forestland conservation. The opportunity exists to conserve large areas of Maine's forests in perpetuity by capitalizing on the interest of investors to maximize their returns and purchasing conservation easements that ensure retention of undeveloped forest lands, public access, and sustainable management. While much has been accomplished, the future likely holds even greater challenges for the state.

Literature cited

Bond et al. 2009. Incentives to sustain forest ecosystem services: A review and lessons for REDD. Natural Resource Issues No. 16. International Institute for Environment and Development, London, UK, with CIFOR, Bogor, Indonesia, and World Resources Institute, Washington D.C., USA.

- Barnes, M., A. Todd, R. Lilja, P. Barten. 2009. Forests, Water and People: Drinking Water Supply and Forest Lands in the Northeast and Midwest United States. NA-FR-01-08. USDA Forest Service, Northeastern Area State and Private Forestry.
- Benjamin, J. (Editor). 2010. Considerations and Recommendations for Retaining Woody Biomass on Timber Harvest Sites in Maine. University of Maine, Maine Agricultural and Forest Experiment Station. Orono, ME. Miscellaneous Publication 761. 68pp.
- Butler, B. 2009. Who owns America's Forests? Powerpoint presentation on results of National Woodland Owners Survey.
- Butler, B., M. Tyrrell, G. Feinberg, S. VanManen, L. Wiseman, and S. Wallinger. 2007. Understanding and reaching family forest owners: lessons from social marketing research. *Journal of Forestry* 105 (7), October/November 2007: 348-357.
- D'Amato, A., P. Catanzaro, D. Damery, D. Kittredge, K. Ferrare. 2010. Are Family Forest Owners Facing a Future in Which Forest Management is Not Enough? *Journal of Forestry* 108(1), January/February 2010: 32-38.
- Gawler, S., J. Albright, P. Vickery, and F. Smith. 1996. Biological Diversity in Maine: An Assessment of Status and Trends in the Terrestrial and Freshwater Landscape. Report prepared for the Maine Forest Biodiversity Project. Maine Natural Areas Program, Department of Conservation, Augusta. 80 pp. + Appendices.
- Germain, R. et al. 2007. The Effects of Forestland Parcelization and Ownership Transfers on Nonindustrial Private Forestland Forest Stocking in New York. *Journal of Forestry* 105 (8), December 2007: 403-408.
- Hagan, J., L. Irland, and A. Whitman. 2005. Changing timberland ownership in the Northern Forest and implications for biodiversity. Manomet Center for Conservation Sciences, Report # MCCS-FCP-2005-1, Brunswick, Maine. 25 pp.
- Hagan, J. and A. Whitman. 2004. Late-successional Forest: A disappearing age class and implications for biodiversity. Manomet Center for Conservation Sciences, Forest Mosaic Science Notes FMSN-2004-2, May 2004. 4 pp.
- Hayhoe, K., C. Wake, T. Huntington, L. Luo, M. Schwartz, J. Sheffield, E. Wood, B. Anderson, J. Bradbury, A. DeGaetano, T. Troy, and D. Wolfe. 2007. Past and Future Changes in Climate and Hydrological Indicators in the U.S. Northeast. *Climate Dynamics* 28: 381-407.
- Holling, C. 1973. Resilience and stability of ecological systems. *Annu. Rev. Ecol. Syst.* 4:1-23.
- Innovative Natural Resources Solutions LLC. 2005. Maine Future Forest Economy Project: Current Conditions and Factors Influencing the Future of Maine's Forest Products Industry. 474 pp.
<http://www.maine.gov/doc/mfs/fpm/ffe/>. Last accessed 11 January 2010.

Jacobson, G., I. Fernandez, P. Mayewski, and C. Schmitt (editors). 2009. Maine's Climate Future: An Initial Assessment. Orono, ME: University of Maine. <http://www.climatechange.umaine.edu/about/reports/climate-future>. Last accessed 29 December 2009.

Kenefic, L. S., P. E. Sendak, and J. C. Brissette. 2005. Comparison of fixed diameter-limit and selection cutting in northern conifers. *North. J. Appl. For.* 22(2):77-84.

Levert, M., C. Colgan, C. Lawton. 2007. Are the Economics of a Sustainable Maine Forest Sustainable? *Maine Policy Review* 16 (2), Winter 2007: 26-36.

Maine Forest Service. 2008. Maine Forest Service Assessment of Sustainable Biomass Availability: Absolute Supply is not the Issue. Improving Utilization and Silviculture While Keeping Costs Low Are. 17 July 2008. 18 pp. http://www.maine.gov/doc/mfs/pubs/pdf/biomass_memo_071708.pdf. Last accessed 10 April 2010.

Maine Forest Service. 2006. Summary of the Analysis Conducted Regarding the Ability of the Returns from Sustainable Forestry to Pay Back Loans for Forest Land Acquisition in Maine, 11 April 2006. 2 pp.

Maine Land Use Regulation Commission. 2010. Comprehensive Land Use Plan. <http://www.state.me.us/doc/lurc/reference/clup.html>. Last accessed 15 May 2010.

Maine Office of Energy Independence and Security. 2009. 2009 Annual Report. 18 February 2010. <http://www.maine.gov/oeis/docs/OEIS2010Annual%20Report.pdf>. Last accessed 13 April 2010.

Moldenhauer, M. and M. Bolding. 2009. Identifying loggers' reactions and priorities in an increasingly fragmented landscape. In: Proc. 32nd Annual Council on Forest Engineering Meeting; Kings Beach, CA. 7 pgs.

Moldenhauer, M. and M. Bolding. 2008. Parcelization at the Wildland-Urban Interface: Effects on Forest Operations. In: Proc. 31st Annual Council on Forest Engineering Meeting; Charleston, SC. 5 pgs.

Spelter, H. 2009. Lumber Market. Status and Trends. May 1, 2009, vol. 5, no. 5. 2 pp.

Stein, S, R. McRoberts, R. Alig, M. Nelson, D. Theobald, M. Eley, M. Dechter, M. Carr. 2005. Forests on the Edge: Housing Development on America's Private Forests. Gen. Tech. Report PNW-GTR-636. USDA Forest Service, Pacific Northwest Research Station.

Tang, G. and B. Beckage. 2010. Projecting the Distribution of Forests in New England in Response to Climate Change. *Diversity and Distributions* 16: 144-158.

The Trust for Public Land and American Water Works Association (Caryn Ernst, author). 2002. Protecting the Source. Land Conservation and the Future of America's Drinking Water.

http://www.tpl.org/content_documents/protecting_the_source_04.pdf. Last accessed 15 March 2010.

Thompson, I., Mackey, B., McNulty, S., Mosseler, A. 2009. Forest Resilience, Biodiversity, and Climate Change. A synthesis of the biodiversity/resilience/stability relationship in forest ecosystems. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 43, 67 pages.

Thorne, S. 2000. New Hampshire Forest Land Base Survey: Report of Results. Society for the Protection of New Hampshire Forests, for the New Hampshire Division of Forests and Lands, Department of Resources and Economic Development. 23 pp. plus appendices.

Tikkanen, O-P, P. Martikainen, E. Hyvärinen, K. Junninen, and J. Kouki. 2006. Red-listed boreal forest species of Finland: associations with forest structure, tree species, and decaying wood. *Ann. Zool. Fennici* 43: 373-383.

USDA Forest Service. 2007. Valuing Ecosystem Services: Capturing the True Value of Nature's Capital. USDA Forest Service, FS-870a, February 2007. 2 pp.

Weinberg, A. and C. Larson. 2008. Forestland for Sale: Challenges and Opportunities for Conservation over the Next Ten Years. Open Space Institute: New York, NY. 22 pp.

White, E., R. Alig, S. Stein, L. Mahal, D. Theobald. 2009. A Sensitivity Analysis of "Forests on the Edge" Housing Development on America's Private Forests." Gen. Tech. Report PNW-GR-792. USDA Forest Service, Pacific Northwest Research Station.

White, E., R. Mazza. 2008. A Closer Look at Forests on the Edge: Future Development on Private Forests in Three States. Gen. Tech. Rept. PNW-GTR-758. USDA Forest Service, Pacific Northwest Research Station.

Chapter 5. Priority Landscape Areas

Introduction

This chapter describes Maine's priority landscape areas. The 2008 Farm Bill requires that state assessments include "any areas or regions of [a] state that are a priority..." Final joint guidance from the USDA Forest Service and the National Association of State Foresters (Redesign Implementation Committee, 2008) further states that assessments should "[d]elineate priority rural and urban forest landscape areas to be addressed by the state resource strategy. States can also identify linkages between terrestrial and aquatic habitat, as appropriate."

Although the USDA Forest Service expects states to base the identification of priority landscape areas largely on geospatial analysis, a strong case can be made that qualitative, non-spatial data can inform such a process as well as, or even better than the compilation of spatial data layers assigned arbitrary or subjective values. For example, exotic pest occurrences can flare up almost anywhere in the state, depending on the type of pest and the host species affected. In this example, the location of the priority resource values protected does not necessarily correspond with location of any priority management action. The issue of intergenerational transfer transcends arbitrary boundaries; it is happening across the state, even in the largest family ownerships.

The federal guidance to the states considers prioritization essential to maximizing the benefits of federal funds. Unfortunately, this guidance fails to recognize that state forestry and landowner assistance programs are established *in law* to serve all of the people of a state. State forestry agencies cannot choose who benefits from their programs and who does not based on where they live or own forest land.

In Maine's case, it is hard to identify what is not a priority landscape area. Consider the following facts:

1. Maine is a net importer of wood.
2. Maine's forest products industry provides markets not only for Maine forest landowners but for landowners across the region whose states and provinces lack the diversity of markets that Maine still has.
3. The proximity of most land in Maine to some form of water: Rivers, streams, ponds, lakes, and wetlands.
4. Wildlife do not recognize ownership boundaries.
5. The important contributions that the interconnected network of family forests in southern Maine make to the state's quality of life.

A strong case can be made that *every acre* of forest land in Maine is important for some purpose, provides some form of public benefit, and is therefore a priority. The goal of no net loss of forest land, while laudable, is unrealistic. However, considering the economic importance of forests alone, Maine cannot afford to walk away from efforts to conserve forest lands in any part of the state.

Nonetheless, in keeping with the federal guidance, Maine has identified priority landscape areas. These areas are further classified by four types:

1. Urban trees and forests
2. Family forests
3. Rural/large parcels; and,
4. Important natural resources.

In addition, Maine has identified one multi-state area, commonly known as “the Northern Forest.” Conservation of the Northern Forest has been the subject of much discussion and multi-state cooperation over the last 20 years, beginning with the Northern Forest Lands Study and Northern Forest Lands Council, and continuing to the present under the aegis of the Conservation Lands Committee of the New England Governors Conference.

Priority areas and methodology

1. Urban Trees and Forests

The Urban Trees and Forest data theme is intended to identify those urban lands and county subdivisions demonstrating potential for urban and community forestry program development. Priority municipalities and landscape areas are identified through a combination of geospatial and qualitative data. The Community Accomplishment Reporting System (CARS), Development Pressure, Urban Tree Canopy Assessment, and Community Wildfire Protection Plans (CWPP) are the geospatial datasets used to help identify the Priority Urban Forests.

The Community Accomplishment Reporting System (CARS) evaluates existing and potential capacity of county subdivisions to support urban and community forestry programming based on four elements. Managing programs have active urban and community tree and forest management plans developed from professionally-based resource assessments/inventories; employ or retain through written agreement the services of professional forestry staff; adopted local/statewide ordinances or policies that focus on planting, protecting, and maintaining their urban and community trees and forests; and have a local advocacy/advisory organization, such as a tree board, commission, or non-profit organization that is formalized or chartered to advise and/or advocate for the planting, protection, and maintenance of urban and community trees and forests. Developing programs have between one and three of the previously mentioned elements. The master list of communities that participate in Project Canopy, or identified as having the potential to participate was developed based on a number of qualitative elements. Population and population characteristics was the primary indicator for potential participation. Community structure identified through 5 year cyclical municipal surveys was also used to determine potential. Elements such as the identification of a tree warden, community forest or tree board, conservation commission, or garden club were all considered. Physical community characteristics are as important as population characteristics. Qualitative data associated with current and projected development is

incorporated into the CARS master community list. Comparative analysis between the CARS master community list and priority planting indices for county subdivision were conducted to ensure consistency between geospatial and qualitative data.

Additional urban data was provided in a study by Theobald for the USDA Forest Service. The purpose of the study was to describe the development of a nationwide, fine-grained database of historical, current, and forecasted housing density. 2000 US Census Bureau block (SF1) data, Forest Inventory and Analysis UNPROTPRIV100 data, USGS 1992 NLCD data and US Census Bureau TIGER data were the data input to run the SERGOM v2 model. This model was used to forecast housing density growth using county-level population for 2010, 2020, and 2030. The 2030 URBAN, SUBURBAN AND EXURBAN classes were used with the CARS data to create the Urban Forests layer.

The Urban Tree Canopy Assessment dataset, provided by the USDA Forest Service, used the “Maryland Method” to identify communities in Maine that are targeted for setting urban canopy goals. Census and Urban RPA data was used in the analysis with the following criteria:

Step 1: Determine the average population, urbanized area, impervious surface cover, and urban tree canopy in the state.

Step 2: Query to find communities that meet the following criteria:

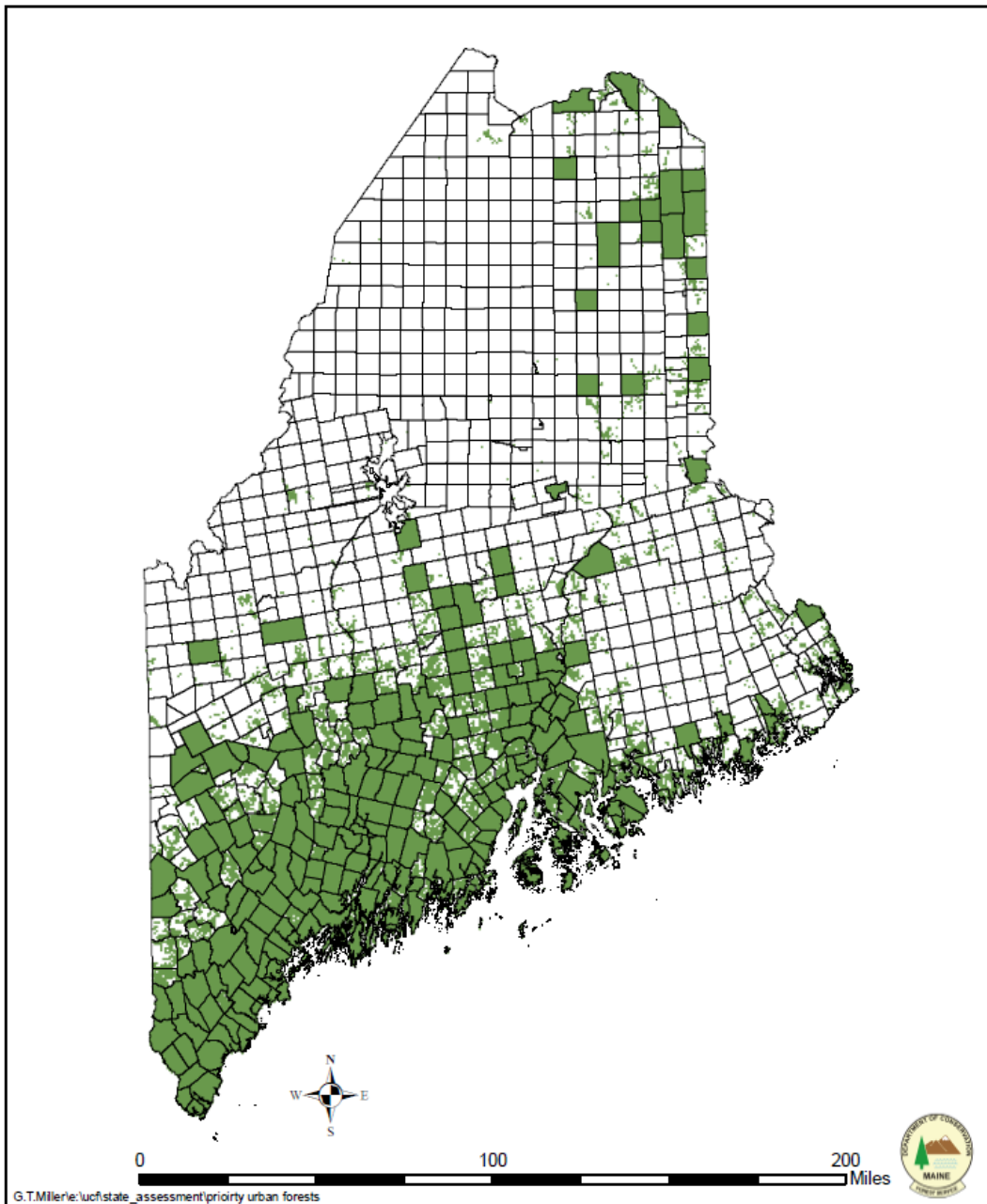
- Greater than average population
- Greater than average urbanized area
- Greater than average impervious surface
- Less than average urban tree canopy

MFS’s Forest Protection Division has been conducting Community Wildfire Protection Plan assessments, assessing a community’s risk in the Wildland Urban Interface (WUI) throughout Maine. An assessment form was used to collect data concerning a structure’s ability to withstand a wildfire in the Wildland Urban Interface. Questions are related to topics such as: road access and signage, build materials, vegetation and defensible space, and water source. Each question has a point value and when compiled, provides a risk assessment for not only the structure but the community. This information provides firefighters with knowledge about preventing fires in the Wildland Urban Interface, identifies the location of water sources and access points in the community, and provides homeowners with knowledge about defensible space. The data was used to create a geospatial dataset showing a community’s risk in the Wildland Urban Interface and is updated as community assessments are completed.

Currently, there is insufficient geospatial data to specifically segregate Urban Forests into a high, medium or low classification. Canopy closure and impervious data sets exist, but a strategy has yet to be devised for implementing this data into the Urban Forest program on a statewide assessment.

The northeastern states successfully acquired an ARRA-funded grant to collect coastal lidar in the region. For Maine, that translates to 2,628 square miles of new lidar data to be collected. This data will supplement existing coastal lidar in southern Maine, extending all the way east to Calais, and connecting tidal areas along the Kennebec and Penobscot rivers. The resulting products will include 2-meter point-spaced lidar files (LAS files both raw and classified), a 2-meter bare-earth DEM, hydro-flattening breaklines, and metadata. Vertical accuracy is +/- 15cm. Lidar acquisition should start this fall with product delivery next year.

Priority Urban and Community Forests



2. Family Forests

The family forest landscape area is neither urban, suburban, nor exurban, nor is it large, industrial, or investor-owned. The threshold for the exurban designation is 1.7 - 40 acres per unit (Theobald, 2005). In Maine, the unorganized territories serve as a proxy for the large, industrial, and investor-owned lands (there are family forest ownerships in the unorganized territories; however, it is very difficult to capture them geospatially, owing to a lack of usable parcel information).

Data concerning development pressure, wildlife habitat focus areas, distances from paved roads, wetlands and riparian areas, drinking water production, and so on all combine to show where strategies such as Forest Stewardship could have the greatest impact over the long term. The selection of priority data layers was based in part on input from the State Stewardship Coordinating Committee. Areas more likely to migrate to the “urban-exurban” landscape will require a different approach, likely a hybrid of existing programs (Stewardship, Urban & Community) plus something innovative. These are discussed in more detail in the Strategies.

This section describes the methodology used for Maine’s Priority Landscapes GIS Analysis. The GIS analysis was based upon previous work performed as the Spatial Analysis Project (SAP). The purpose of the GIS analysis was to classify all 21 million acres of the state into high-, medium-, and low-priority categories based upon the map themes.

The eight datasets used were:

- Forest Land
- Major Public Roads
- Wetlands
- Riparian
- Proximity to Public Lands
- Clean Water
- Development Pressure
- Wildlife and Natural Community Focus Areas

The eight datasets were used in the GIS analysis for classifying Maine’s forests into high, medium, and low categories with respect to Family Forest strategies. It was determined that no one dataset should have more weight than another dataset. Therefore, each dataset was equally weighted, having a maximum value of 10.

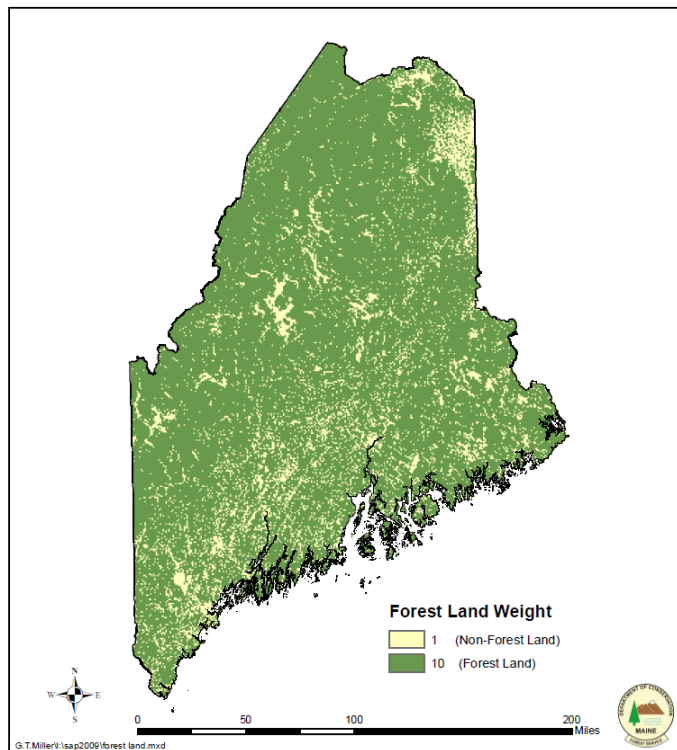
The GIS analysis was performed using ArcGIS 9.3.1 with the Spatial Analysis Extension. Vector data was transformed to 30m grid cells to perform the overlay analysis.

Forest Land

Dataset used was 2004 MELCD. The 2004 MELCD Maine Land Cover Dataset is a land cover map for Maine primarily derived from Landsat Thematic Mapper 5 and 7 imagery from the years 1999-2001. This imagery constitutes the basis for the National Land Cover Dataset (NLCD 2001) and the NOAA Coastal Change Analysis Program (C-CAP). This land cover data was refined to the State of Maine requirements using SPOT 5 panchromatic imagery from 2004. The following land cover classifications were used to create the forest land data set:

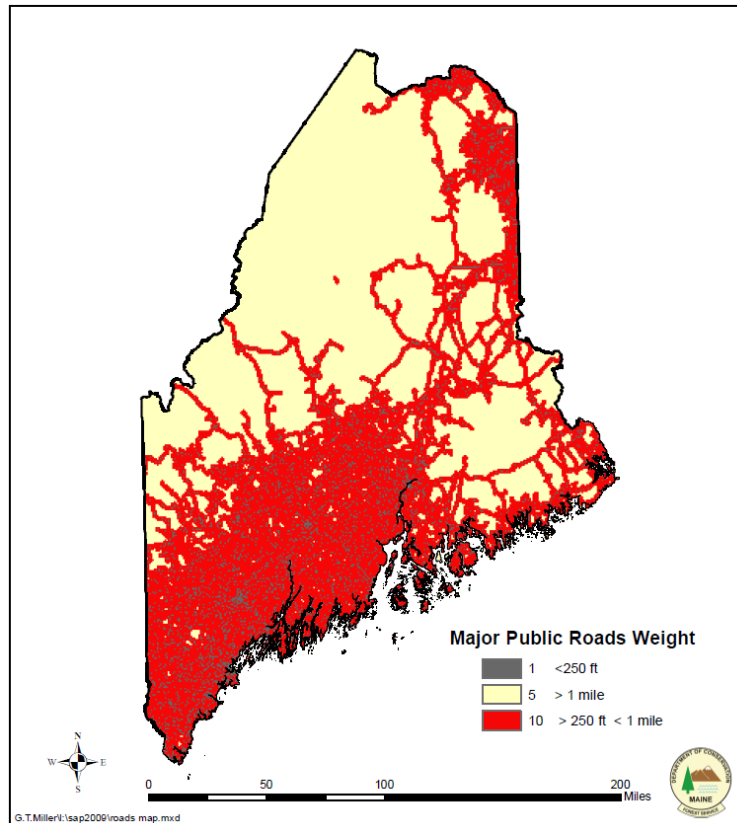
Value Codes	Land Cover Classification
9	Deciduous Forest
10	Evergreen Forest
11	Mixed Forest
13	Wetland Forest
23	Recent Clearcut
24	Light Partial Cut
25	Heavy Partial Cut
26	Regenerating Forest

The data was resampled from 5 m to 30 m cells to reduce the processing time in the computer and to match the vector data. All forested land was given a weight of 10 while all other land was given a 1.



Major Public Roads

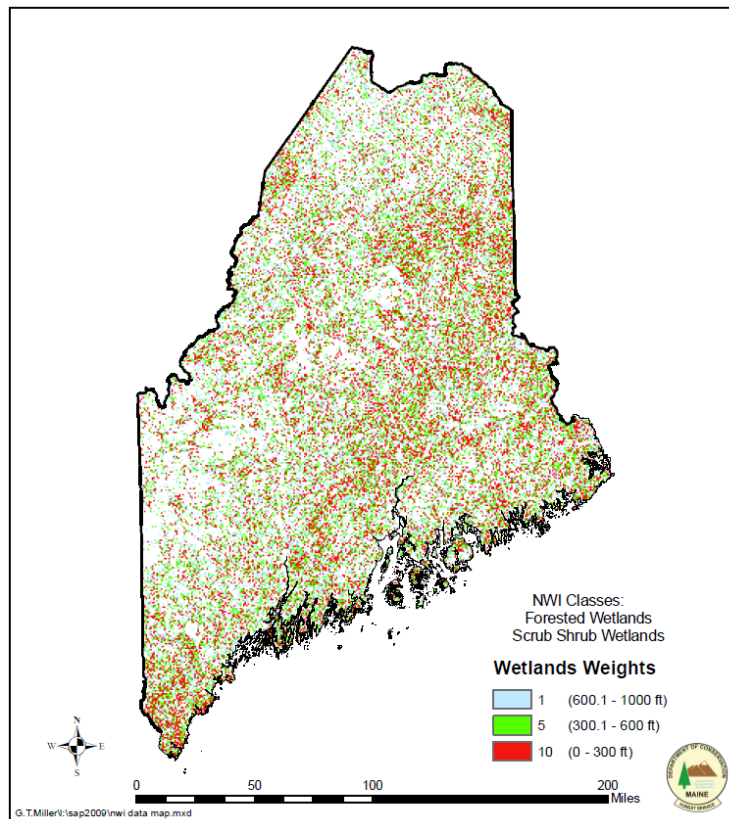
Dataset used was MDOTPUBRDS. The MDOTPUBRDS dataset contains the major public roads in Maine. This dataset does not include private roads or the logging roads found throughout the state, especially in the North Maine Woods and Downeast regions. This is a vector dataset that was converted into a 30 m cell grid dataset. The public roads were buffered by 250 ft and 1 mile buffers in order to weight them appropriately. The 250 ft distance from a public road was given a low ranking and received a weight of 1. The distance from 250 ft to 1 mile from a public road was given a high ranking and received a weight of 10. This is the area where family forest landowners routinely operate, so this is the area where Forest Stewardship and allied programs and strategies have the greatest importance. There is very little land in the populated areas of the state that is greater than 1 mile from a public road. Distance greater than 1 mile from a public road was given a medium ranking and received a weight of 5. Most of the unorganized towns of the state fall in this category.



Wetlands

Dataset used was the National Wetland Inventory (NWI) data. The NWI contains USFW National Wetland Inventory polygon data for Maine at a 1:24,000 scale. The polygons were classified using the Cowardin system. The Forested Wetlands and Scrub Shrub Wetlands classes were used to create the wetland data set. This data was merged into one dataset and then buffered at 300ft, 300ft - 600ft, and 600ft - 1000ft distances. The buffered datasets were then converted into grid datasets, summed together and weighted. The 300 ft buffer was classified as high and given a weight of 10, the 300 ft - 600 ft buffer had a medium classification and was given a weight of 5, and the 600 ft - 1000 ft buffer has a low classification and a weight of 1.

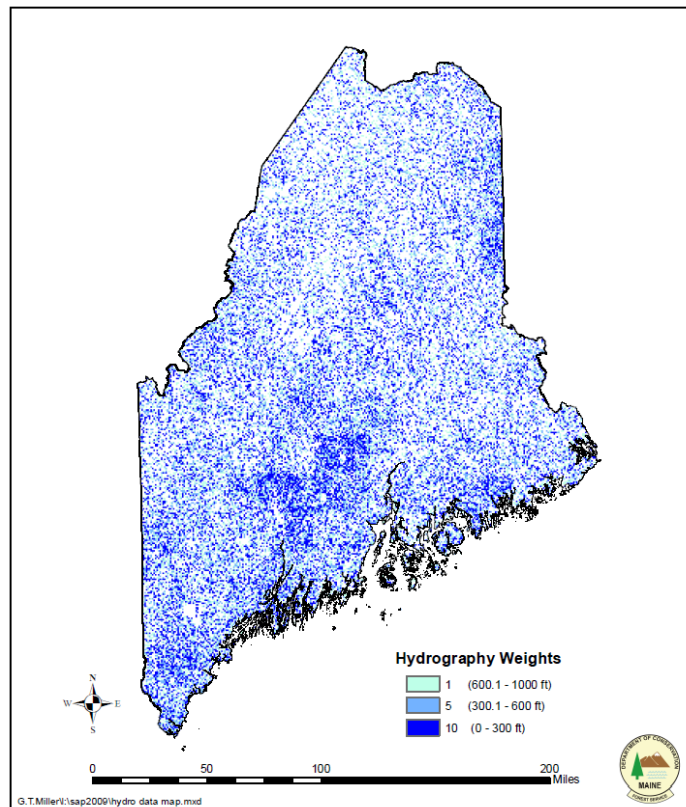
The life form of the dominant vegetation defines the five Classes based on vegetative form: (1) Aquatic Bed, (2) Moss-Lichen Wetland, (3) Emergent Wetland; (4) Scrub-Shrub Wetland; and, (5) Forested Wetland. The Scrub-Shrub Wetland is dominated by shrubs or small trees while the Forested Wetland is dominated by large trees.



Riparian

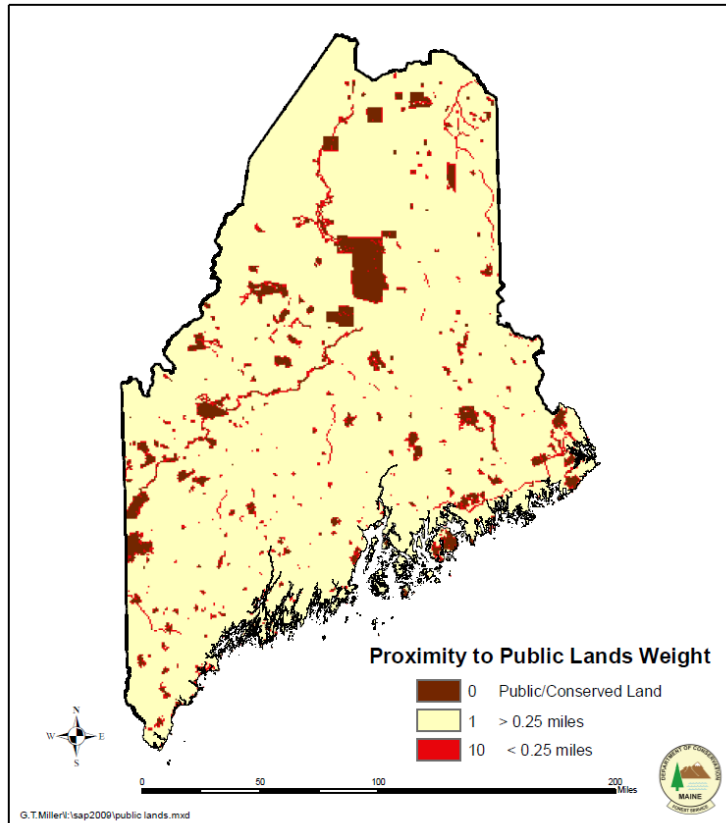
Dataset used was HYDRO24. HYDRO24 depicts Maine's hydrography data, ponds, rivers, streams and hydrography network at a 1:24,000 scale.

The polygon data (ponds, lakes, and rivers) and the line data (streams) were buffered at 300ft, 300ft - 600ft, and 600ft - 1000ft distances. The buffered datasets were then converted into grid datasets, weighted and summed together. The 300 ft buffer was classified as high and given a weight of 10, the 300 ft - 600 ft buffer had a medium classification and was given a weight of 5, and the 600 ft - 1000 ft buffer has a low classification and a weight of 1.



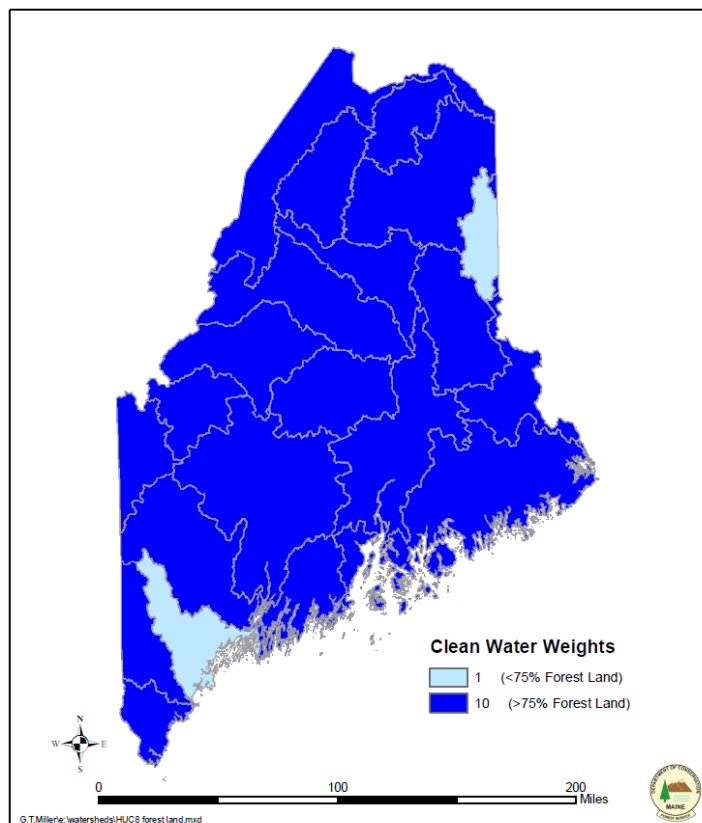
Proximity to Public Lands

Dataset used was CONSERVED LANDS. The Conserved Lands data is a polygon data set that had buffer distances of within 0.25 miles and greater than 0.25 miles. The buffered datasets were then converted into grid datasets, weighted and summed together. The within 0.25 miles buffer was classified as high and given a weight of 10 and the remaining area was given a low classification with a weight of 1.



Clean Water

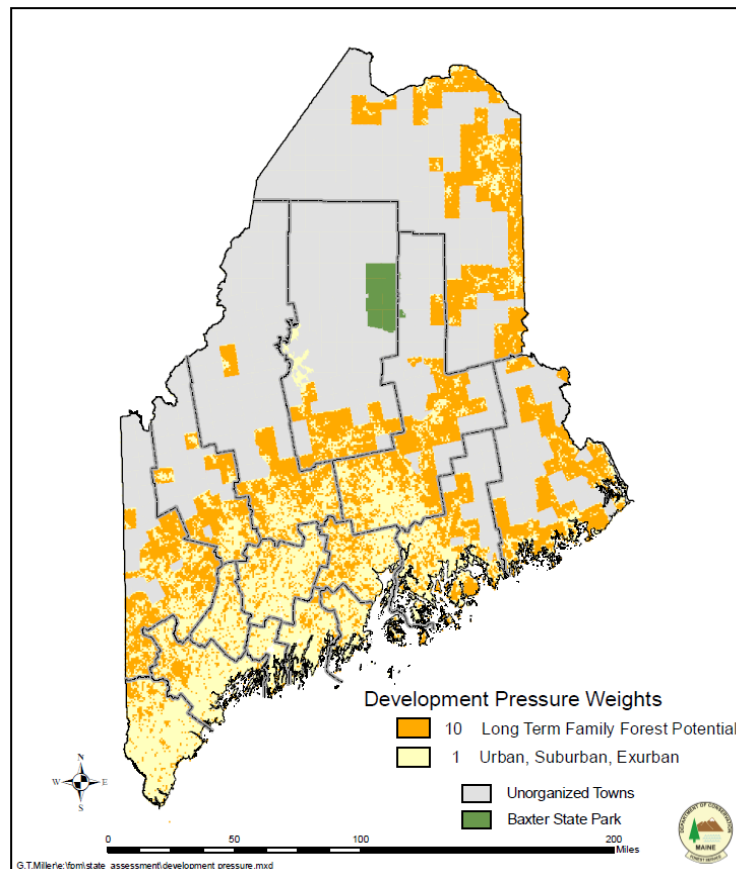
Dataset used was FORESTED WATERSHEDS. Forested Watersheds data was created by using the Maine Land Cover Data (2004 MELCD) and NRCS HUC8 Watersheds data. Forest land was summarized by using the 2004 MELCD grid values of 9 Deciduous Forest, 10 Evergreen Forest, 11 Mixed Forest, 13 Forested Wetlands, 23 Recent Clearcut, 24 Light Partial Harvest, 25 Heavy Partial Harvest, and 26 Regenerating Forest and the HUC8 watersheds. The tabulate areas function was used to calculate the acreage of forest land in each HUC 8 watershed. The table was then joined to the HUC8 watershed. The percent forest land was then calculated by dividing the forest land acreage by the total land acreage for each watershed. Forested Watersheds having an overall average > 75% forest land were given a weight of 10 and the remaining watersheds were given a weight of 1. This data can be further refined as strategies are implemented on the ground. For instance, portions of the Presumpscot Watershed are currently > 75% forested, but the developed areas bring the average down.⁴¹ Conversely, there are sub-watersheds in the central part of the state that are < 75% forested. However, for the purposes of this assessment, the HUC 8 delineations are pertinent.



⁴¹ It is worth noting that the two watersheds with less than average 75% forest cover are still greater than 70% forested.

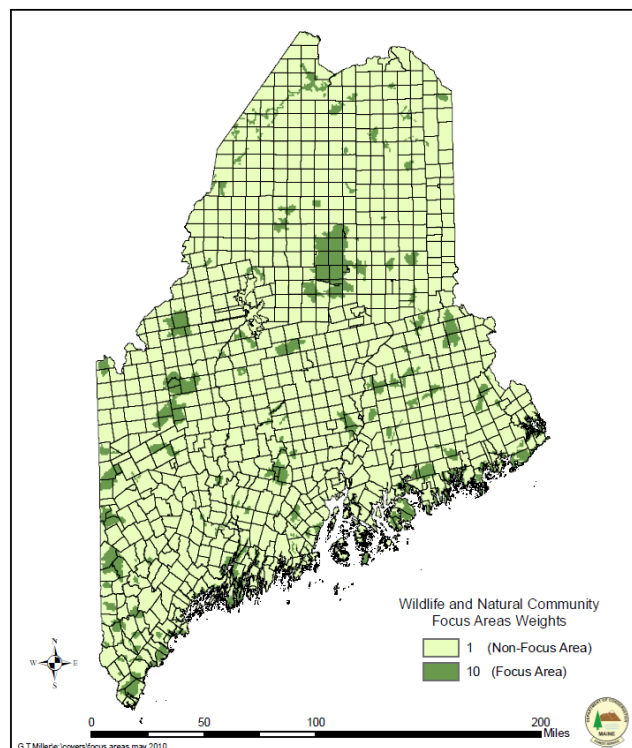
Development Pressure

Dataset used is housing density growth data that was provided by a study performed by Theobald (2005) for the USDA Forest Service. The data provided was 100 m grid cells that were transformed into 30 m cells. The purpose of the study was to describe the development of a nationwide, fine-grained database of historical, current, and forecasted housing density. 2000 US Census Bureau block (SF1) data, Forest Inventory and Analysis UNPROTPRIV100 data, USGS 1992 NLCD data and US Census Bureau TIGER data were the data input to run the SERGOM v2 model. This model was used to forecast housing density growth using county-level population for 2010, 2020, and 2030. The 2030 URBAN, SUBURBAN AND EXURBAN classes were used to create the development pressure data layer. These classes received a weight of 1 on the Family Forest date theme. These areas have a greater priority for U&CF programs and strategies. Conversely, areas that are less likely to convert by 2030, and do not qualify as “large” rural parcels, receive a weight of 10 on the Family Forest Landscape map. Here is where programs such as Forest Stewardship have a greater chance of positively affecting long-term forest management.



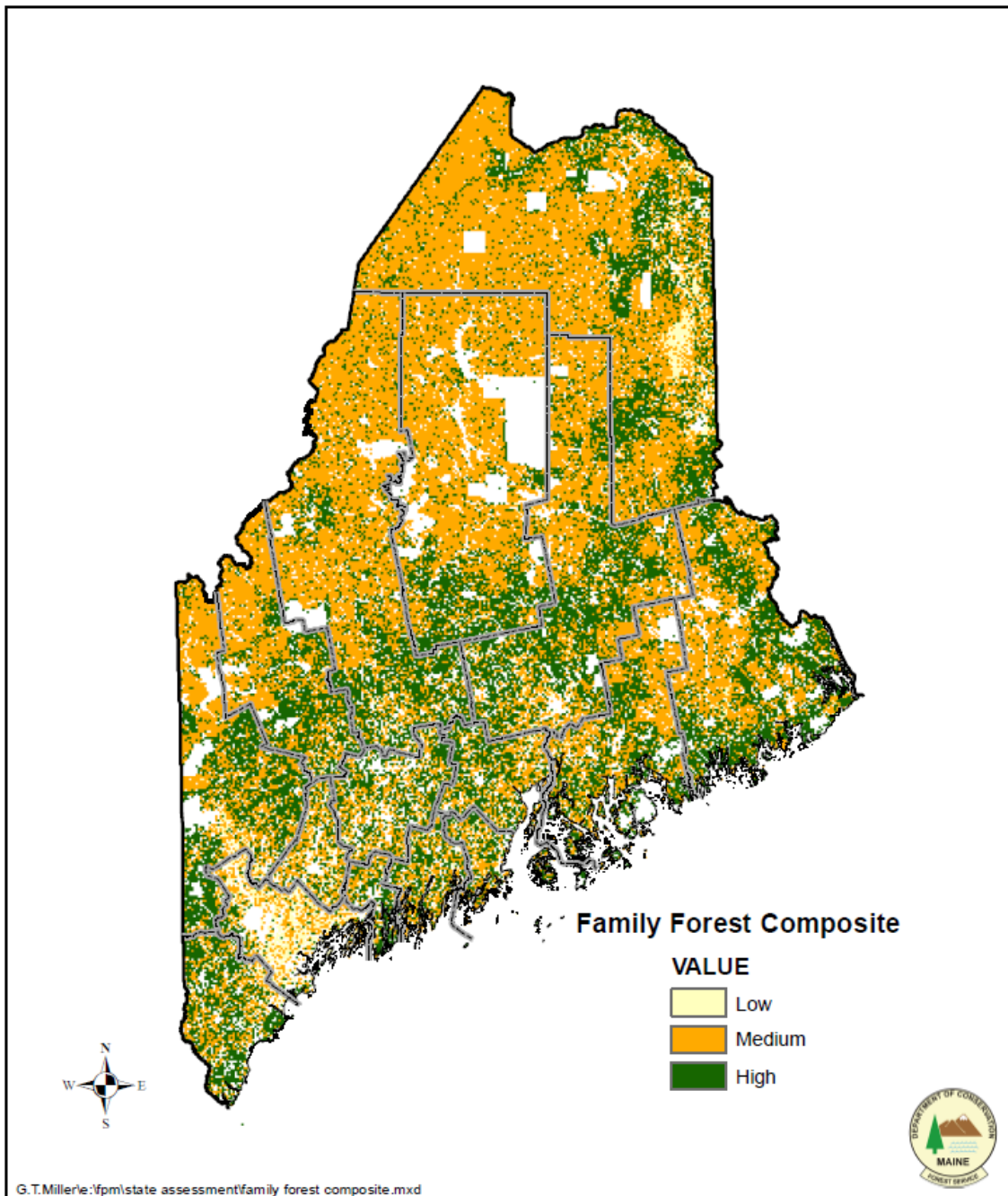
Wildlife and Natural Communities Focus Areas

The dataset used is the Beginning with Habitat (BwH) Focus Areas. The Maine Natural Areas Program (MNAP), Maine Department of Inland Fisheries and Wildlife (MDIFW), and US Fish and Wildlife, began a habitat-based approach to conserving wildlife and plant habitat on a landscape scale in 2000 with the creation of the Beginning with Habitat (BwH) program. Beginning with Habitat is a cooperative, non-regulatory effort between state and federal agencies, conservation groups and regional governments in Maine. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine. Maine's Comprehensive Wildlife Conservation Strategy addresses the full array of wildlife and their habitats in Maine including vertebrates and invertebrates in aquatic (freshwater, estuarine, and marine) and terrestrial habitats. Wildlife is defined as any species of wild, free-ranging fauna including fish. The plan builds on a planning effort ongoing in Maine since 1968; a landscape approach to habitat conservation, initiated in 2000; and a long history of public involvement and collaboration among conservation partners. The Strategy covers the entire state, from the dramatic coastline to the heights of Mt. Katahdin and is meant to be dynamic, responsive, and adaptive. BwH identified landscape scale areas (focus areas) that contain exceptionally rich concentrations of at-risk-species and natural communities and high quality common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat. The polygons were converted to 30 m grid cells. These focus areas are used for the Wildlife and Natural Communities Focus Area data layer and given a weight of 10.

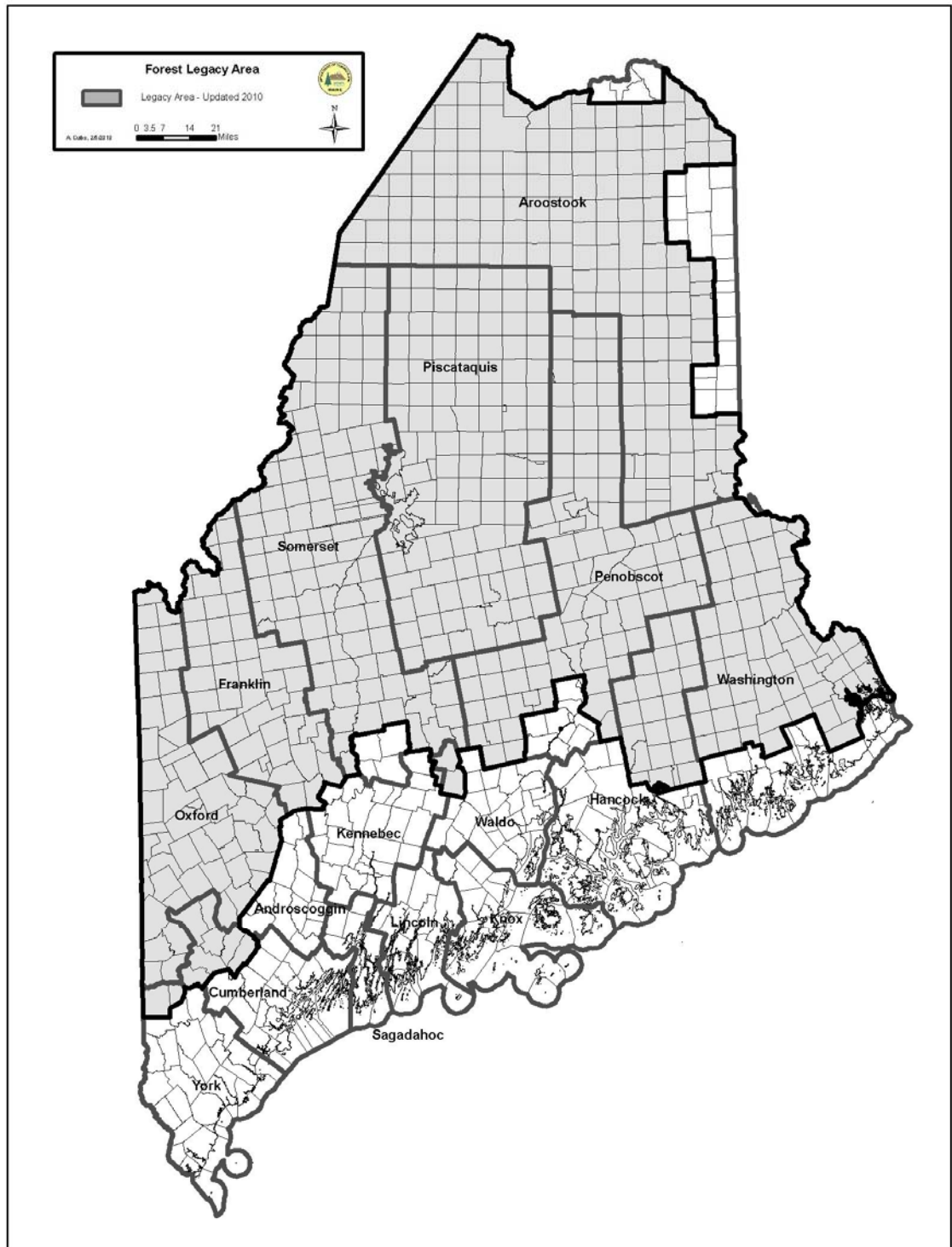


Family Forest Priority Landscapes

The composite map was created by summing the grid layers (equally weighted), by using an overlay process, into a composite grid. The composite grid is displayed in 3 classes (high, medium, and low) using Natural Breaks (Jenks), depicting the areas of priority landscapes. A mask overlay, composed of the features that are not eligible for stewardship (roads, hydrology, public lands, etc.), overlays the family forest priority landscapes areas.



3. Rural/large parcels (Forest Legacy AON)



4. Priority Natural Resources

This section chapter describes the methodology used for Maine's Priority Natural Resource Landscape GIS Analysis. The purpose of the GIS analysis was to classify all 21 million acres of the state into high-, moderate-, and low-priority categories based upon the natural resource map themes.

The five datasets used were:

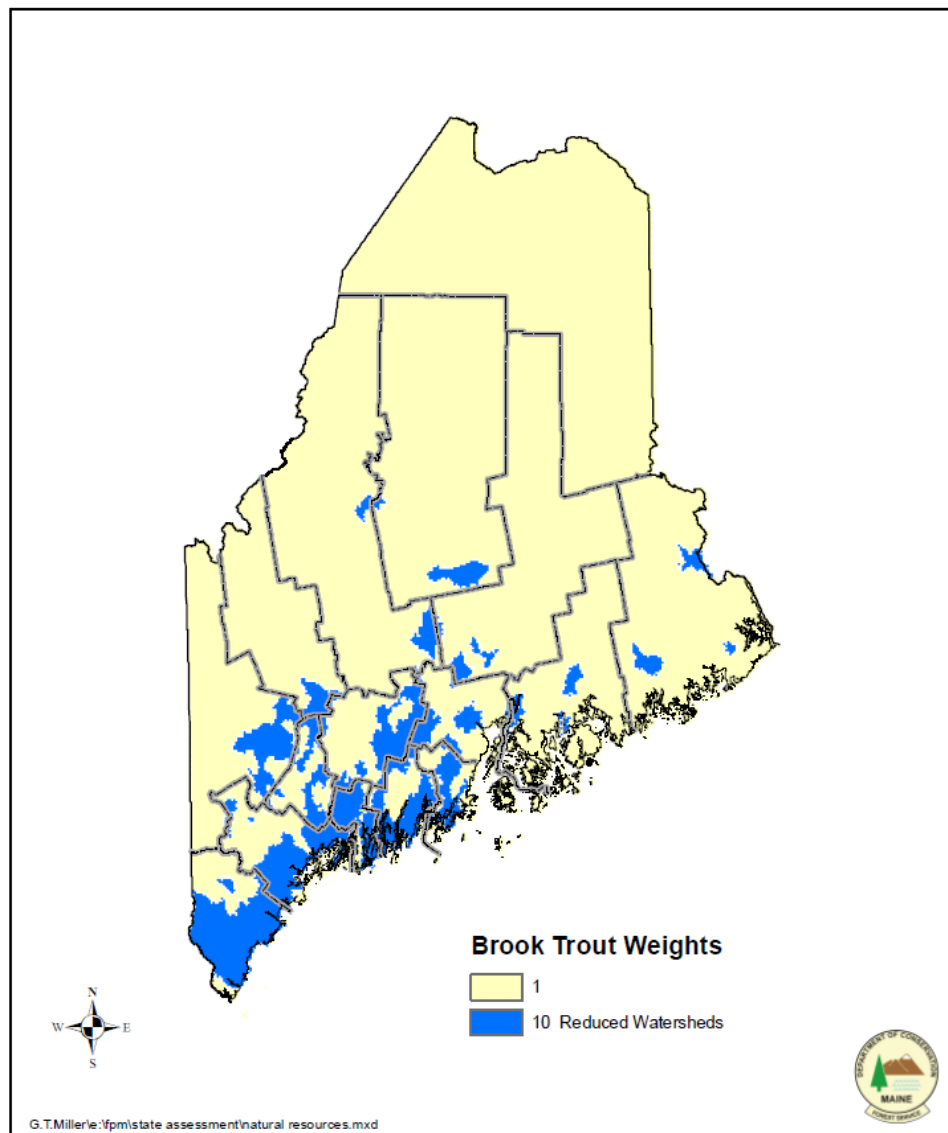
- Eastern Brook Trout
- Wildlife and Natural Areas Focus Areas
- Canada Lynx
- Conservation Priority Areas
- Impaired watersheds

The five dataset were used in the GIS analysis for classifying Maine's lands into high, moderate, and low categories with respect to Natural Resource strategies. It was determined that no dataset should have more weight than another dataset; therefore, each dataset was equally weighted, having a maximum value of 10.

The GIS analysis was performed using ArcGIS 9.3.1 with the Spatial Analysis Extension. A description of the datasets used in the analysis follows. Vector data was transformed to 30 m grid cells to perform the overlay analysis. This section describes the process used to analyze the data along with the weighting scheme and map results.

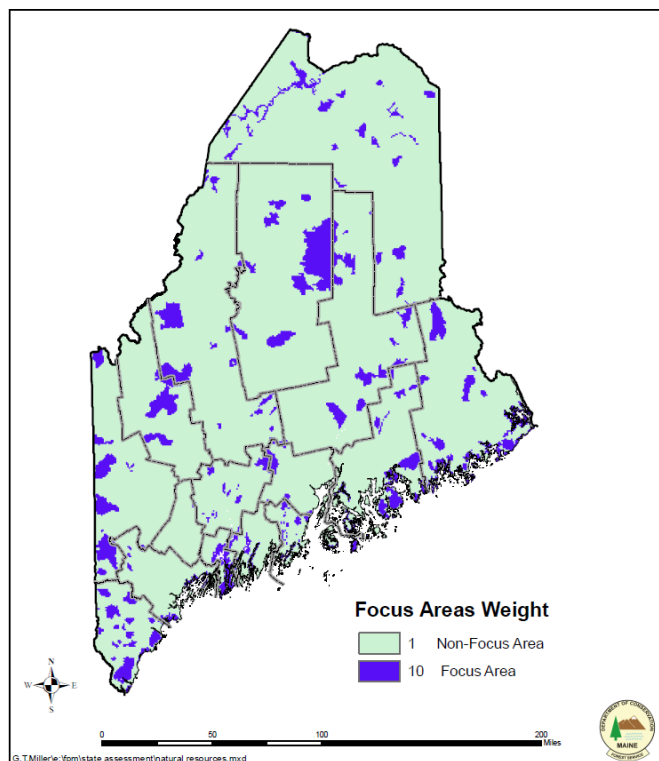
Eastern Brook Trout

The dataset used was from the Eastern Brook Trout Joint Venture (EBTJV) website. The Eastern Brook Trout dataset contained two vector datasets: Brook Trout Distribution by Watershed and Model 3 Distribution with Core Metrics vector data. The Model 3 Distribution with Core Metrics vector data was the dataset used because the model predicts future brook trout watershed occurrence. The data was transformed to 30 m grid cells. The categories Reduced and Predicted: Reduced were given a weight of 10 while the remaining categories received a weight of 1.



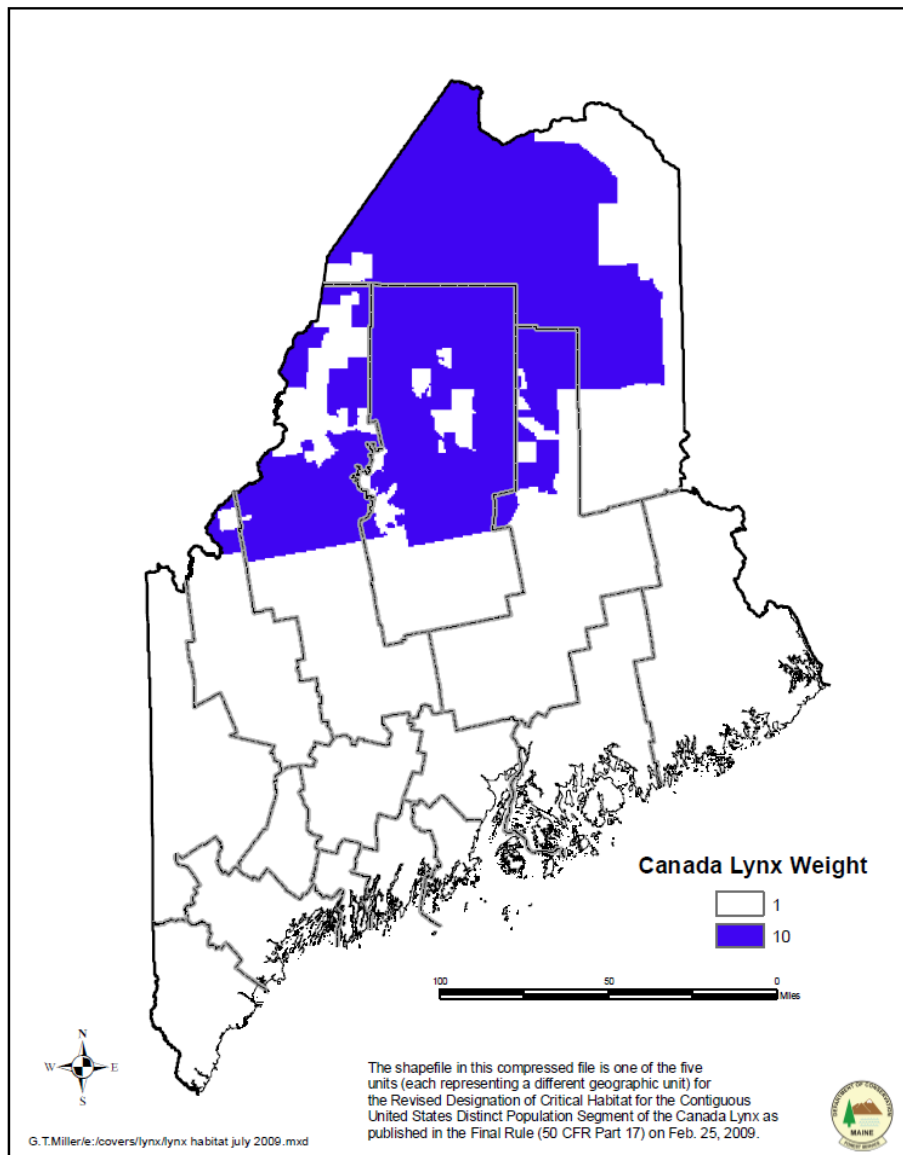
Wildlife and Natural Communities Focus Areas

The dataset used is the Beginning with Habitat (BwH) Focus Areas. The Maine Natural Areas Program (MNAP), Maine Department of Inland Fisheries and Wildlife (MDIFW), and US Fish and Wildlife, began a habitat-based approach to conserving wildlife and plant habitat on a landscape scale in 2000 with the creation of the Beginning with Habitat (BwH) program. The Beginning with Habitat program is a cooperative, non-regulatory effort between state and federal agencies, conservation groups and regional governments in Maine. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine. Maine's Comprehensive Wildlife Conservation Strategy addresses the full array of wildlife and their habitats in Maine including vertebrates and invertebrates in aquatic (freshwater, estuarine, and marine) and terrestrial habitats. Wildlife is defined as any species of wild, free-ranging fauna including fish. The plan builds on a planning effort ongoing in Maine since 1968; a landscape approach to habitat conservation, initiated in 2000; and a long history of public involvement and collaboration among conservation partners. The Strategy covers the entire state, from the dramatic coastline to the heights of Mt. Katahdin and is meant to be dynamic, responsive, and adaptive. BwH identified landscape scale areas (focus areas) that contain exceptionally rich concentrations of at-risk-species and natural communities and high quality common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat. The polygons were converted to 30 m grid cells. These focus areas are used for the Wildlife and Natural Communities Focus Area data layer and given a weight of 10.



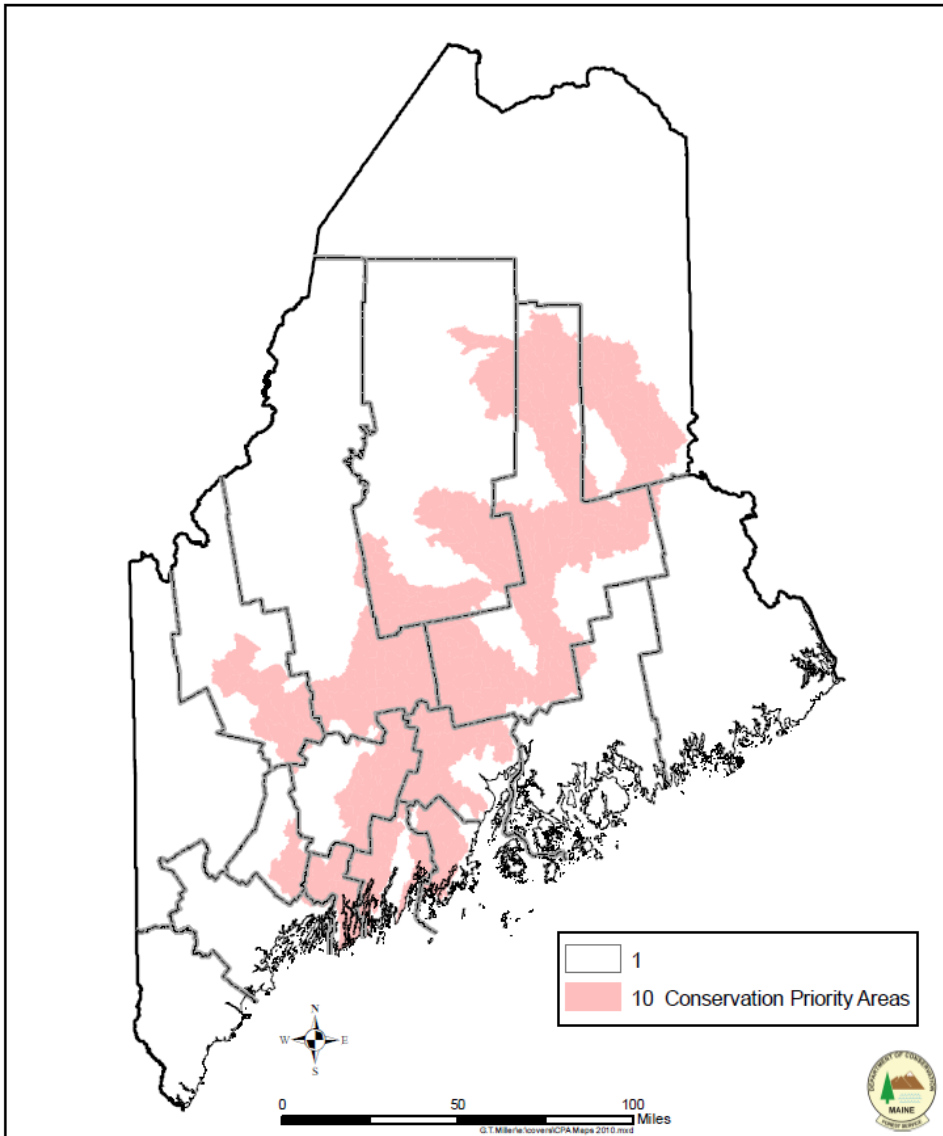
Canada Lynx

Dataset used was provided by the US Fish and Wildlife Service. On March 24, 2000, The US Fish and Wildlife Service designated critical Canada lynx (*Lynx canadensis*) habitat in Maine, as an amendment, to the Endangered Species Act of 1973. The final rule for the revised critical habitat was published in the Federal Register February 25, 2009. The vector data was transformed to 30 m grid cells and critical lynx habitat was given a weight of 10.



Conservation Priority Areas

Dataset used was provided by the USDA Natural Resources Conservation Service (NRCS). The NRCS Conservation Priority Area dataset contains vector data of the Atlantic Salmon Critical Habitat and Occupied Watersheds in Maine. This vector data was transformed to 30 m grid cells and given a weight of 10.

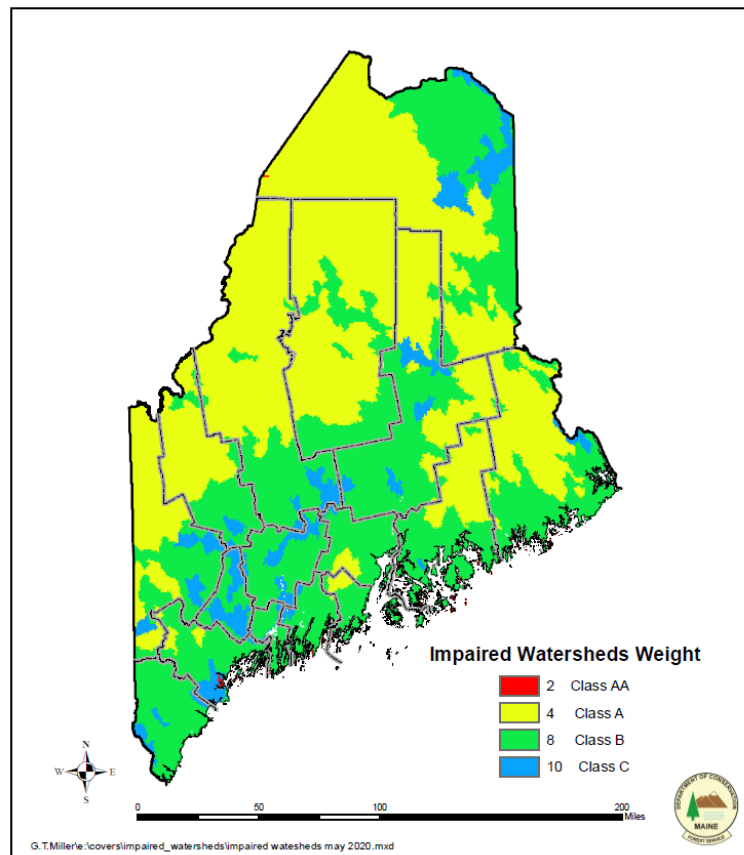


Impaired Watersheds

Dataset used was provided by the Maine Department of Environmental Protection (MDEP). Maine has had a water classification system since the 1950's which establishes water quality goals for the State. There are four water classes for freshwater rivers: AA, A, B, and C. These classes should be viewed as a hierarchy of risk, rather than one of water use or water quality. The stream data (arcs) was intersected to the HUC12 watershed data by class. The resulting water quality class HUC12 watersheds were transformed to 30 m grid cells and weighted as follows:

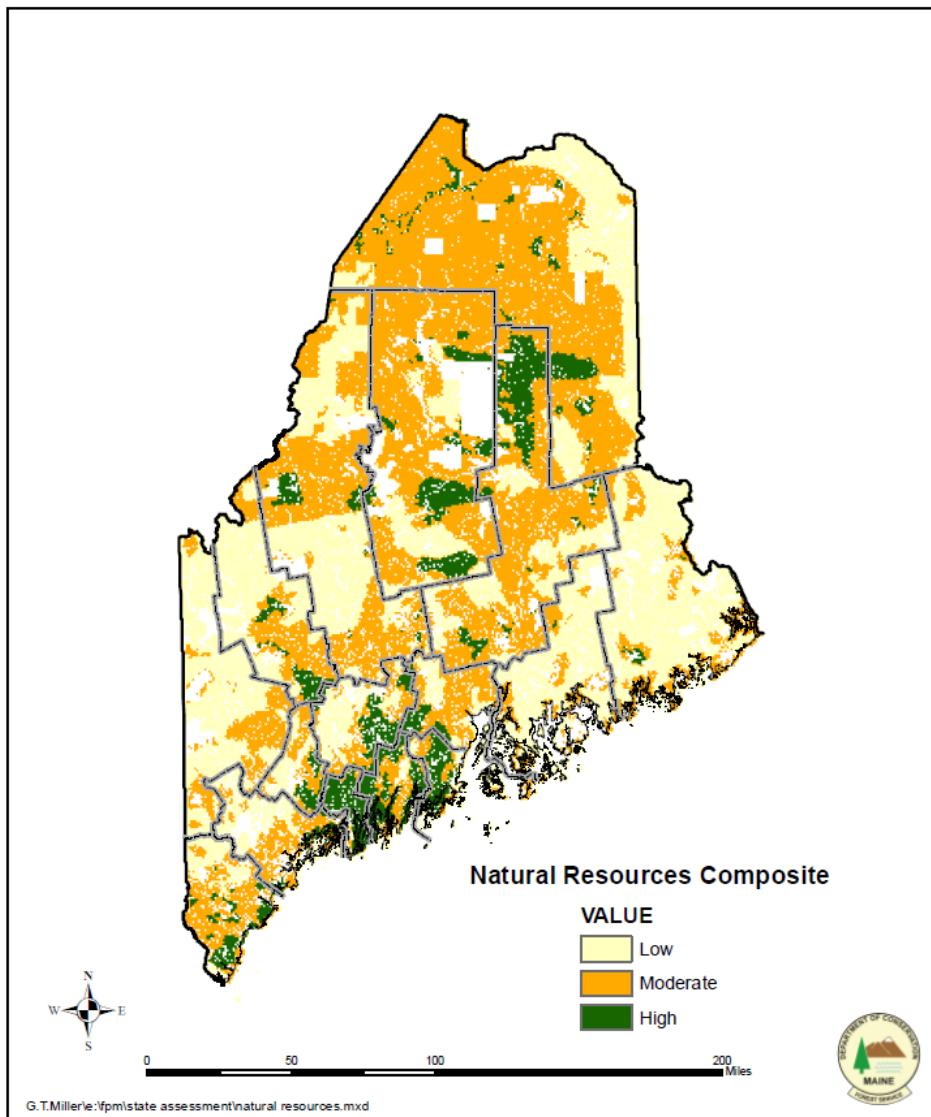
Water Quality Class	Weight
Class A	2
Class AA	4
Class B	8
Class C	10

The weighted water quality class grids were summed to create the Impaired Watershed layer (water quality class by HUC12 watershed).



Natural Resources Composite

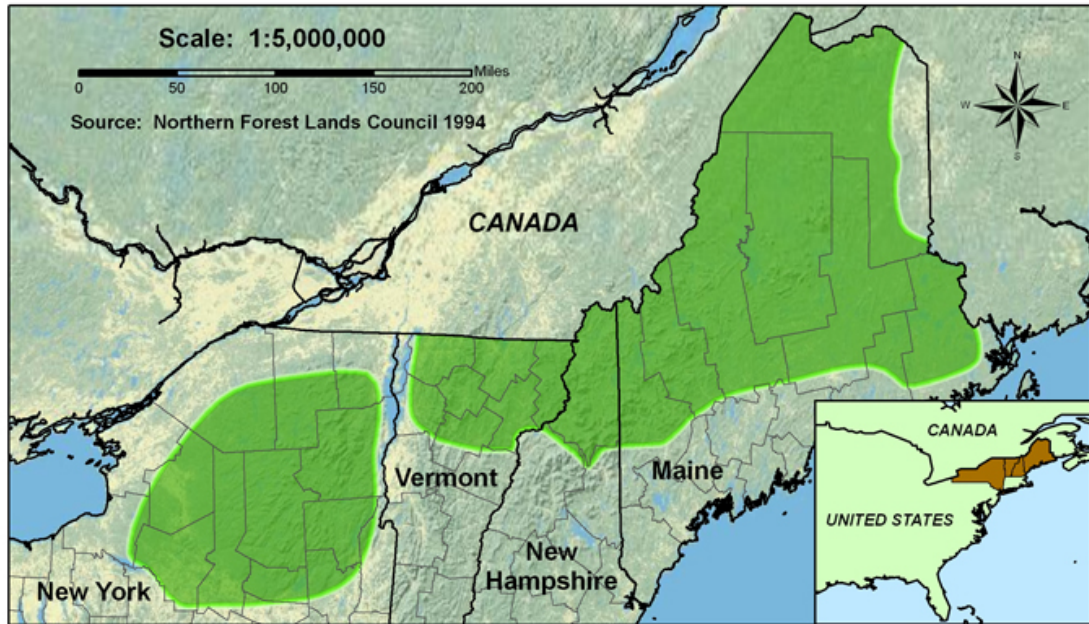
The Natural Resources Composite was created by summing the five grid layers (equally weighted), by using an overlay process, into a composite grid. The composite grid is displayed in 3 classes (high, moderate, and low) using Natural Breaks (Jenks), depicting the areas of natural resources priority landscapes. A mask overlay, composed of the features that are not eligible for protection (i.e. roads, hydrology, public lands), overlays the natural resources priority areas.



5. Multi state area - Northern Forest Lands

The Northern Forest Lands area encompasses 26 million acres, stretching from the Tug Hill Plateau in New York through the Northeast Kingdom of Vermont, Coos County, New Hampshire, and into the Great North Woods of Maine. The area has been the focus of much public concern and discussion for over 20 years, ever since the breakup of the original Diamond lands. Those issues are covered in detail in other reports (e.g. the Northern Forest Lands Council's "Finding Common Ground") and are discussed in the present context earlier in this report.

The Northern Forest of New England and New York

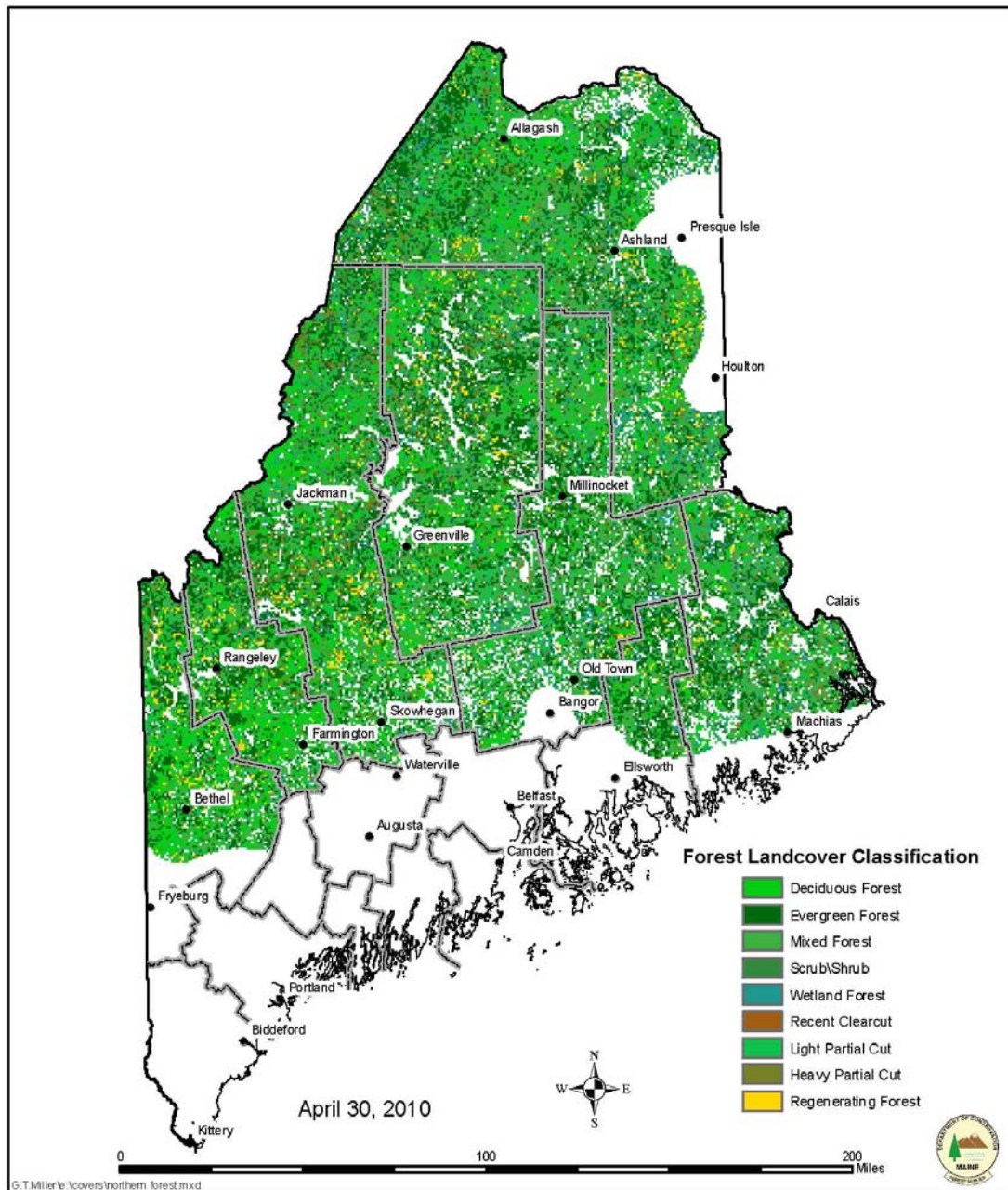


Map published at: <http://www.nsrcforest.org/about.html#map>.

The dataset used was provided by the USDA Forest Service. The dataset contains polygon data depicting The Northern Forest, which extends from Maine to New York. The data was clipped to Maine and then used to clip the 2004 MELCD land cover data. The following land cover classifications were used to create The Northern Forest of Maine Map.

Value Codes	Land Cover Classification
9	Deciduous Forest
10	Evergreen Forest
11	Mixed Forest
13	Wetland Forest
23	Recent Clearcut
24	Light Partial Cut
25	Heavy Partial Cut
26	Regenerating Forest

The Northern Forest of Maine



Literature cited

Nowak, D.; Greenfield, E. 2008. Urban and Community Forests of New England. Resour. Bull NRS-38. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 62p.

Redesign Implementation Committee. 2008. Farm Bill Requirement & Redesign Components: State Assessments and Resource Strategies. Final Guidance. 20 October 2008.

Theobald, D., 2005. Landscape patterns of exurban growth in the USA from 1980 to 2020, Ecology and Society 10 (1):32. 34 pp.

<http://www.ecologyandsociety.org/vol10/iss1/art32/>. Last accessed 10 May 2010.

Chapter 6. Statewide Forest Strategy

Introduction

Maine's statewide forest strategy outlines long-term strategies for addressing priority landscapes identified in the forest resource assessment as well as the national priorities and their associated management objectives. The strategies outlined below are meant to provide a long-term, comprehensive, and coordinated approach to guide actions and investments of resources over the next five years. It is organized by major theme and drawn from the issues, threats, and opportunities identified in Chapter 4.

A combination of threats and opportunities were considered when developing the following list of six key forest goals/themes for Maine:

State Goal/Theme 1: Keeping forests as forests

State Goal/Theme 2: Improving and diversifying markets

State Goal/Theme 3: Protecting forests from harm

State Goal/Theme 4: Maintaining healthy trees and woodlands in urban and community areas

State Goal/Theme 5: Maintaining the capacity of the Maine Forest Service as an institution to serve the citizens of Maine

State Goal/Theme 6: Increasing the environmental literacy of Maine citizens

State Goal/Theme 7: Maintaining and enhancing forest biodiversity

Any new initiatives identified in the strategy will be incorporated as resources permit into existing programs which are mandated by state statute and/or supported by federal programs. One thing is clear: the resources needed to carry out the strategies described below far exceed the resources currently available to MFS, regardless of source.

State Goal/Theme 1: Keeping forests as forests

Strategies

1. Continue efforts to establish working forest conservation easements.
2. Provide information, technical assistance, and financial assistance to family forest owners interested in maintaining and improving their forest land holdings.
3. Re-establish the Forest Stewardship Program (known in Maine as the WoodsWISE Incentives Program) as the forestry assistance program for the state of Maine, with delivery through MFS and its network of private consulting foresters.
4. Expand the planning services menu for landowners to include Woodlot Assessments, Silvicultural Operations Plans, and post-harvest activity assessment and monitoring.
5. Reinstate WoodsWISE Project cost-sharing.
6. Create a hybrid of Forest Stewardship and Urban and Community Forestry, e.g. "WoodsWISE in the Backyard" for suburban and exurban landscapes, which incentivizes and encourages collaboration among adjacent/nearby woodland owners (no minimum acreage) for planning and implementation of projects.
7. Partner with outside groups to provide a "woodscaping" practitioner corps, with emphasis on "foresthetics" and habitat protection and creation.
8. In concert with UMaine Cooperative Extension and the USDA FS National Woodland Owners Survey, establish regular interval statewide and/or "priority area" surveys of Maine woodland owners, for state-specific guidance in program content and delivery.
9. Create a library of video profiles of model woodland stewards, made easily accessible via DVD, web and TV.
10. Create and maintain a peer-to-peer network of "Stewardship Stars" among the model stewards, to further extend outreach of the Stewardship program.
11. Diversify and expand the funding base for MFS programs.
12. Provide information, technical assistance, and financial assistance to municipalities interested in maintaining and improving their urban and community forest resources.
13. Provide forest protection services to minimize the risks and damages from insect, disease, fire, wind, and other destructive agents.
14. Continue to support a stable Tree Growth Tax Law program for current use valuation of managed forest lands.
15. Continue to support and advocate for state and federal tax policies that support long-term ownership of and investment in forest lands.

16. Find ways to change the economic equation to favor long-term ownership and management of forest land.

Priority landscape area(s) the strategies address

1. Urban and community forests
2. Family forests
3. Rural/large parcels (Forest Legacy)

S&PF and other programs that contribute to the strategies

Forest Stewardship

Urban and Community Forestry

Forest Health - Cooperative Lands

State Fire Assistance

Volunteer Fire Assistance

Key stakeholders important for implementing the strategies

Family forest owners	Land trusts
Owners of large forested tracts	Land for Maine's Future Board
Forest industry and related organizations	NRCS USDA Forest Service
Consulting foresters	Real estate brokers
Loggers	Tax assessors
Conservation groups	Academia
Municipal officials	

Overview of resources available/required to implement the strategies

- o Resources potentially available
 - State General Fund
 - Federal
 - USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance
 - NRCS - EQIP, WHIP
 - Private - matching cost-share investments
- o Resources Needed

Currently available resources are insufficient to sustain programs as currently structured. Both state general fund and federal fund support for core programs has declined over the last two decades. Federal support for the Forest Stewardship Program has been particularly weak in recent years.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to (all a priority for this theme)

- Criterion 1: Conservation of Biological Diversity
- Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems
- Criterion 3: Maintenance of Forest Ecosystem Health and Vitality
- Criterion 4: Conservation and Maintenance of Soil and Water Resources
- Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles
- Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies
- Criterion 7: Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management

Measure(s) of success⁴²

- High priority forest ecosystems and landscapes are protected from conversion (acres - annual and cumulative)
- Number of acres in forest areas managed sustainably as defined by current Forest Stewardship Management Plan or NRCS equivalent (cumulative⁴³) - through the state's Forest Stewardship Monitoring program.
- Number of acres certified to an independent third party standard (American Tree Farm System®, Forest Stewardship Council, and/or Sustainable Forestry Initiative)
- Number of acres harvested by loggers certified to the Northeast Master Logger Certification standard.
- Growth and harvest remain in relative balance.
- BMP monitoring, multi-resource harvest assessment.

⁴² Measuring aggregation of forest parcels may also be a measure of success; however, a means of measuring ownership aggregation has not yet been identified.

⁴³ In this instance, "cumulative" refers to the sum total of current, active plans that have been field-verified.

State Goal/Theme 2: Improving and diversifying markets

Strategies

1. Improve the relationship between Maine's forest products industry and state government and other stakeholders, and work toward a common goal of a vibrant, sustainable forest industry in Maine.
2. Provide for a high-level state staff member who has credibility and relationships with all state agencies and is responsible for coordination of efforts to address issues within the forest products manufacturing sector.
3. Provide for a utilization and marketing specialist who can work with family forest owners, loggers, and processing facilities (primarily, but not limited to sawmills) to help each link in the wood processing chain realize the greatest value from their forest products.
4. Conduct a collaborative effort spearheaded by the forest products industry, state government and the University of Maine to help Maine citizens, legislators, opinion leaders and others understand the current state of the forest products industry, the challenges it faces, and the actions that might best improve the long-term prospects of the industry.
5. Create both the perception and reality of public policy consistency and predictability.
6. Increase efforts to move work conducted at Maine's world-class research and development facilities to commercial application in Maine.
7. Promote research, development and commercialization of bio-based products, particularly those that are compatible with Maine's existing forest products manufacturing infrastructure.
8. Expose Maine forest product manufacturers to the latest technologies.
9. Develop a marketing campaign that highlights the environmental and other benefits of Maine forest products, and use this to help distinguish Maine products in a global marketplace.
10. Create a "Maine Manufacturing Competitiveness Fund," a revolving fund that provides manufacturers with capital to make capital investments in energy efficiency.
11. Support the Maine Congressional delegation's effort to obtain a permanent federal weight limit exemption for Maine's currently non-exempt Interstate highways.
12. Continue state efforts to address challenges in Maine's business climate.
13. Work with landowners, suppliers, mills and wood product users to simplify and incentivize chain-of-custody and labeling processes, with an eye towards greater recognition of Maine forests in the global marketplace.

Priority landscape area(s) the strategies address

1. Family forests
2. Rural/large parcels (Forest Legacy)

S&PF and other programs that contribute to the strategies

Economic Action

Key stakeholders important for implementing the strategies

Forest industry and related organizations

Loggers

University of Maine

Maine Congressional delegation

Academia

Overview of resources available/required to implement the strategies

- Resources potentially available

 - State General Fund

 - Federal

 - USDA Forest Service - Economic Action

 - USDA Rural Development

 - Private - matching cost-share investments

- Resources Needed

 - Currently available resources are insufficient to sustain programs as currently structured.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to

- **Primary** - Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies

Measure(s) of success

- Maine's forest products industry maintains or increases its current processing capacity.⁴⁴
- Number of jobs (direct, indirect, and induced) sustained or maintained annually due to investments in the forest products industry.
- Value-added (direct and indirect) to Maine's economy by the forest industry.

⁴⁴ The product mix is likely to change over time.

State Goal/Theme 3: Protecting forests from harm

Strategies

Maintain effective cooperative forestry programs, particularly the Forest Stewardship Program.

Maintain effective and proactive water quality protection programs.

Maintain effective and proactive fire prevention and suppression programs.

Maintain effective and proactive forest health protection programs.

Encourage proactive efforts at the municipal level to maintain healthy urban and community forests.

Work with the Maine Legislature to create statutory authorities (e.g., a firewood import ban) and associated resource support to address new or resurgent issues.

Vigorously solicit collaborative partnerships and outside resources to address forest health and sustainability issues of common interest.

Continue to develop local client/cooperator networks to augment pest detection/reporting capability.

Continue to develop cooperative projects with neighboring jurisdictions to address forest health and sustainability issues of common interest.

Continue current cooperative projects with Maine's Native American Tribes, NGO's, forest land ownership organizations, land trusts, academia, and local citizen groups to educate and influence the broader public.

Strengthen working relationships with Maine Department of Agriculture and USDA APHIS to address nonnative invasive forest pest threats.

Maintain public support for critical pest management tools so that we can limit potential impacts to Maine's forest resource dependent industries and associated local economies.

Encourage proactive efforts at the municipal level to maintain healthy urban and community forests.

Proactively address protection of important habitat features, including, but not limited to, late successional and old growth forests, large woody material (cavity trees, snags, down logs), and ecological reserves, with a focus on cooperative, non-regulatory efforts.

Support efforts to reduce atmospheric greenhouse gas levels and damage to forests.

Promote efforts to allow forests to adapt to climate change - e.g.:

- Maintain large contiguous areas as forests;
- Reduce other stressors;
- Encourage species suited to future climates.

Priority landscape area(s) the strategies address

1. Urban and community forests
2. Family forests
3. Rural/large parcels (Forest Legacy)

S&PF and other programs that contribute to the strategies

State Fire Assistance

Volunteer Fire Assistance

Forest Health - Cooperative Lands

Forest Stewardship

Urban and Community Forestry

Key stakeholders important for implementing the strategies

Maine Legislature

Forest landowners

Forest industry and related organizations

Municipal officials

Conservation groups

Native American Tribes

Academia

Overview of resources available/required to implement the strategies

- o Resources potentially available

- State General Fund

- Federal

- USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance

Private - matching cost-share investments

- o Resources Needed

- Currently available resources are insufficient to sustain programs as currently structured.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to⁴⁵

- **Primary** - Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

Measure(s) of success

- Harvest and growth, both actual and projected, remain in relative balance.
- Federal funding for Cooperative Forest Management programs, particularly Forest Stewardship, is increased to and sustained at levels adequate to deliver effective programs.
- Total number of fires kept to less than 1,000 and acres burned kept to less than 3,500 annually.
- Losses are kept to less than 10% of the homes threatened by fire.⁴⁶
- An average of 500 acres annually are treated either with prescribed fire or mechanical chipping operations.
- Percentage of at risk communities reporting increased local suppression capacity as evidenced by: (1) The increasing number of trained and/or certified fire fighters and crews or (2) Upgraded or new fire suppression equipment obtained or (3) Formation of a new fire department or expansion of an existing department involved in wildland fire fighting.⁴⁷
- Number of firefighters trained annually in forest fire suppression techniques.
- Number and percent of forest acres restored and/or protected from (1) invasive and (2) native insects, diseases and plants (annual).
- Number of client cooperators and/or organizations trained and participating in survey and outreach efforts.
- Currently available options for forest and pest management maintained.
- Outreach products created (reports, media events, newsletters, press coverage, etc.).

⁴⁵ The strategies contribute in some way to all of the NA sustainability criteria. Only the primary objective is listed.

⁴⁶ On average, 350 homes are threatened by wildfire in Maine.

⁴⁷ Currently, 57 communities are at risk. Of these, over 30% have received federal Volunteer Fire Assistance funding that allows for increased suppression capability. The Forest Protection Division has focused hazard mitigation efforts within communities at risk, treating an average of 380 acres per year. The division also supports these communities with Federal Excess Property. The total value of loaned excess federal property to these communities exceeds \$580,000. Had this equipment not been made available to these towns, some would have little forest fire suppression equipment with which to respond to reported wildfires.

State Goal/Theme 4: Maintaining healthy trees and woodlands in urban and community areas⁴⁸

Strategies

Encourage proactive efforts at municipal level to maintain healthy urban and community forests.

Provide information, technical and financial assistance to municipalities.

Reduce the impacts of land use change, fragmentation and urbanization of forest landscapes.

Moderate the impacts of catastrophic events.

Protect and improve air and water quality.

Manage trees and forests to mitigate and adapt to climate change.

Maintain and enhance the economic benefits and social values of trees and forests.

Build and enhance partnerships that increase the effectiveness of state urban forestry programming, and improve Maine's urban and community forests.

Priority landscape area(s) the strategies address

1. Urban and community forests

S&PF and other programs that contribute to the strategies

Urban and Community Forestry

Forest Health

Forest Stewardship

State Fire Assistance

Key stakeholders important for implementing the strategies

Municipal officials and Maine Municipal Association

Viles Arboretum

Consulting foresters

Maine Arborist Association

Maine Department of Agriculture, Food and Rural Resources

Maine Department of Transportation

State Planning Office

Maine Department of Economic and Community Development

Maine Department of Environmental Protection

⁴⁸ This strategy incorporates by reference the extension of the Project Canopy Strategic Plan (Appendix 2).

University of Maine Cooperative Extension

Utilities

Local volunteer organizations, such as trails committees

Overview of resources available/required to implement the strategies

- Resources potentially available

State General Fund

Federal

USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance

Private - matching cost-share investments

- Resources Needed

Currently available resources are insufficient to sustain programs as currently structured.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to⁴⁹

- **Primary** - Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies

Measure(s) of success

- Number of communities and percent of population served by a managing program, as defined in the Community Accomplishment Reporting System (CARS).

⁴⁹ The strategies contribute in some way to all of the NA sustainability criteria. Only the primary objective is listed.

State Goal/Theme 5: Maintaining the capacity of the Maine Forest Service as an institution to serve the citizens of Maine

Strategies

Advocate for maintaining current levels of staffing, programs, and services as a minimum.

Continue to track and highlight success stories and disseminate through various internal and external channels.

Maintain recognition and presence in the public eye through outreach mechanisms such as news releases and articles, booths and displays at public events (fairs, Arbor Day celebration, field days, etc.), web-based content, and appropriate media advertisement and underwriting

Reach out to non-governmental entities for sponsorship and funding for programs and events.

Develop and market a line of products, such as tree identification or "Big Tree" flash cards, calendars, placemats, and so on, building on the success of the "Forest Trees of Maine" Centennial Edition.

Priority landscape area(s) the strategies address

All priority landscape areas.

S&PF and other programs that contribute to the strategies

All Cooperative Forestry Assistance programs.

Key stakeholders important for implementing the strategies

Legislature

Maine citizens

Forest landowners

Loggers

Foresters

Forest industry and related organizations

Conservation groups

Overview of resources available/required to implement the strategies

- Resources potentially available

- State General Fund

- Federal

- USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance

- NRCS - EQIP

- Resources Needed

Currently available resources are insufficient to sustain programs as currently structured.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to⁵⁰

- **Primary** - Criterion 7: Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management

Measure(s) of success

- MFS at least retains its current level of staffing, services, and programs during each biennial budget period.

⁵⁰ The strategies contribute in some way to all of the NA sustainability criteria. Only the primary objective is listed.

State Goal/Theme 6: Increasing the environmental literacy of Maine citizens⁵¹

Strategies

Update strategic plan for Maine's Conservation Education Program, covering 2010 - 2015. This plan will act as the guide for MFS statewide educational programs.

Assist Maine Project Learning TREE Executive Committee to secure stable funding sources, provide presence on executive committee, conduct facilitator training, and act as workshop facilitators.

Expand capacity building efforts to increase effectiveness of collaborating organizations. Focus on the use of adult learning concepts and effective teaching techniques.

Conduct Woody Biomass Retention Guidelines workshops for loggers, foresters, natural resource managers, and family forest landowners. This will be accomplished through extensive collaboration with organizations across the state.

Participate with the development and writing the Maine Environmental Literacy Plan (ELP). MFS is one of four primary organizations responsible for the effort.

Conduct training with Cooperative Extension on Women and the Woods program.

Conduct at least six Forester Institutes for Maine Licensed Foresters.

Participate in public and private school forest field days.

Continue sponsorship of Southern and Northern Maine Water Festivals for approximately 1,800 4th, 5th and 6th graders at each event.

Support and conduct K-12 teacher workshops on forest-related issues conducted across Maine.

Provide a bridge between the formal education system, Maine Environmental Educators and forestry-related professionals.

Continue developing new partnerships for program delivery, technology transfer, and information exchange by reaching beyond our traditional partnership base.

Continue to increase national and regional level partnerships for fresh perspectives and more effective education impact while working to strengthen existing conservation education networks.

Continue to identify and reach new audiences while maintaining our traditional audience base.

Communicate program information more effectively to the general public through upgrading and maintenance of our fair display and related materials.

⁵¹ This section incorporates by reference the Natural Science Education program activity matrix (Appendix 3).

Work with Department's of Labor, Education, and Conservation to enhance the effectiveness of logger education in the state.

Play a more active role in the educational program of the Forest Protection and Forest Health and Monitoring Divisions.

Priority landscape area(s) the strategies address

All priority landscapes.

S&PF and other programs that contribute to the strategies

Forest Stewardship

Urban and Community Forestry

Forest Health

State Fire Assistance

Key stakeholders important for implementing the strategies

Maine Legislature

Maine Congressional delegation

USDA Forest Service

Maine Department of Education

Maine Department of Labor

Maine Department of Agriculture,
Food and Rural Resources

Maine Vocational Forestry Programs

Academia

University of Maine Cooperative
Extension

Small Woodland Owners
Association of Maine

Natural Resources Conservation
Service

Logger certification and training
programs

Maine Environmental Education
Association and other environmental
education NGO's

Conservation groups

Sustainable Forestry Initiative
Program

Overview of resources available/required to implement the strategies

o Resources potentially available

State General Fund

Federal

- USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance
- NRCS - EQIP, WHIP

Private - matching cost-share investments

o Resources Needed

Currently available resources are insufficient to sustain programs as currently structured. Both state general fund and federal fund support for core programs has declined over the last two decades. Federal support for the

Forest Stewardship Program has been particularly weak in recent years; federal support for Natural Resource Conservation Education has been nonexistent.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to⁵²

- **Primary** - Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies

Measure(s) of success

- Number of people (measured in person days) engaged in environmental stewardship activities as part of a MFS program.⁵³
- Number of teachers trained in environmental educational programs (ie. PLT)
- Number of students participating in school forest-related events
- Development of Maine Environmental Literacy Plan that potentially can leverage federal environmental education funds.

⁵² The strategies contribute in some way to all of the NA sustainability criteria. Only the primary objective is listed.

⁵³ This will include information on landowners who have attended education programs, as well as people attending trainings, workshops, or volunteering as captured by other programs, like Urban and Community Forestry, Forest Health, and others.

State Goal/Theme 7: Maintaining and enhancing forest biodiversity

Strategies

The following strategies are complementary to and supportive of the strategies identified in Maine's Comprehensive Wildlife Conservation Strategy.

- Support research that addresses this issue.
- Monitor the conditions in Maine's forests as regards biodiversity.
- Provide advice and training to landowners and land managers on best practices to conserve biodiversity.
- Assist in the development of markets for ecosystem services that can reward landowners for maintaining biodiversity.
- Develop new approaches that could be more effective in protecting biodiversity (e.g., having federal agencies pool resources to reward landowners who manage to provide the full range of habitats needed by wildlife).

Priority landscape area(s) the strategies address

All priority landscapes.

S&PF and other programs that contribute to the strategies

Forest Stewardship

Urban and Community Forestry

Forest Health

State Fire Assistance

Key stakeholders important for implementing the strategies

Landowners

Consulting foresters

Loggers

Department of Inland Fisheries and Wildlife

Maine Natural Areas Program

Manomet Center for Conservation Sciences

Project SHARE

University of Maine

Overview of resources available/required to implement the strategies

- Resources potentially available

State General Fund

Federal

- USDA Forest Service - Forest Stewardship, Urban and Community Forestry, Forest Health, State Fire Assistance, Volunteer Fire Assistance
- NRCS - EQIP, WHIP

Private - matching cost-share investments

○ Resources Needed

Currently available resources are insufficient to sustain programs as currently structured. Both state general fund and federal fund support for core programs has declined over the last two decades. Federal support for the Forest Stewardship Program has been particularly weak in recent years; federal support for Natural Resource Conservation Education has been nonexistent.

National objective(s) the strategies contribute to

The strategies support all of the national objectives.

NA sustainability criteria the strategies contribute to⁵⁴

- **Primary** - Criterion 1: Conservation of Biological Diversity

Measure(s) of success

- Number of forest practitioners trained in best practices for protecting elements of biodiversity (e.g. vernal pool habitat management guidelines and biomass retention guidelines).
- Populations of forest dependent state- or federal-listed threatened and endangered species stabilize and/or recover.
- Important forest habitat features (e.g. large diameter snags, cavity trees, and down logs) increase in abundance and distribution.

⁵⁴ The strategies contribute in some way to all of the NA sustainability criteria. Only the primary objective is listed.

Appendix 1. Review of state wildlife action plan and other natural resource plans

National guidance on state assessments and the 2008 Farm Bill require that state assessments and resource strategy plans pertaining to forestry assess commonalities between a statewide assessment of forest resources and a state wildlife action plan within a state. The Maine Comprehensive Wildlife Conservation Strategy, or wildlife action plan, was produced by the Maine Department of Inland Fisheries and Wildlife. It was created as a complete wildlife management guide for Maine. The wildlife action plan replaced other plans previously published in order to align with required directive elements set forth by the U.S. Fish & Wildlife Service.

Although the wildlife action plan was the most inclusive document reviewed, MFS also reviewed plans from other agencies and organizations with natural resource responsibilities. These agencies were selected based upon similar interests when managing natural resources, similar organizational structure, and having published resource management plans.

In cases where MFS has existing partnerships with other agencies, commonalities were found between MFS forest planning issues and other agency resource plans. Water quality, supply, and use of water were a common issue among many of the agencies. Dealing with climate change also is a common theme across agencies. When forestry is mentioned, it is often as a secondary issue instead of a primary management objective. Other agencies generally address forests in terms of potential for loss of habitat and fragmentation created by increased population growth and development.

Below is a listing of agencies and documents reviewed.

Agency Documents Reviewed

Agency/Organization	Document Title (date)
Land Use Regulation Commission	Post Hearing Draft - Comprehensive Land Use Plan, 22 December 2009
Maine Dept. of Inland Fisheries & Wildlife	Maine's Comprehensive Wildlife Conservation Strategy, September 2005
Maine Forest Service	Project Canopy Five-Year Plan, revised May 2010
Maine Forest Service	Natural Science Education Program Activity Matrix, May 2010
Maine Forest Service	Community Wildfire Protection Plan (list), May 2010
Maine Forest Service	2006 Mid-Cycle Report on Inventory and Growth of Maine's Forests, March 2009

Maine Forest Service	Maine Future Forest Economy Project: Current Conditions and Factors Influencing the future of Maine's Forest Products Industry, March 2005
Maine Forest Service	Identifying Strategies to Assist Maine's Logging and Trucking Professionals, May 2010
Maine Forest Service	The 2005 Biennial Report on the State of the Forest and Progress Report on Forest Sustainability Standards, December 2005
Maine Forest Service	Environmental Assessment Regarding Management of Hemlock Woolly Adelgid Impacts In Maine, November 2007
New England Governors' Conference Commission on Land Conservation	Report of the Blue Ribbon Commission on Land Conservation, November 2009
USDA Forest Service	Draft National Report on Sustainable Forests - 2010, December, 2008
USDA Forest Service, White Mountain National Forest	Land and Resource Management Plan, September 2005

Appendix 2. Consultation with stakeholders

This section details the efforts to coordinate with stakeholder groups and individuals and encourage public participation. MFS has consulted with key stakeholders to ensure that the state assessment (1) integrates, builds upon, and complements other state natural resource assessments and plans and (2) identifies opportunities for program coordination and integration.

MFS staff made presentations to the following groups:

- Forest Stewardship Coordinating Committee, an established group representing a range of forestry interests in the state;
- Forest Legacy Committee, an established group which advises the Bureau of Parks and Lands on the Forest Legacy Program;
- Natural Resources Conservation Service, State Technical Committee, an established group which advises NRCS on implementation of its various programs;

MFS also convened a group of stakeholders to advise it at various points during development of the assessment. This group of invited stakeholders included representatives of Maine's Department of Inland Fisheries and Wildlife, the USDA Forest Service, State and Private Forestry, and the White Mountain National Forest.

The USDA Forest Service, State and Private Forestry, White Mountain National Forest, and Northern Research Station also contributed a joint letter addressing what those parties saw as important issues concerning Maine's forests (see below).

MFS conducted two online surveys to gauge respondent's awareness of and level of concern about a wide range of forestry issues. Over 700 people participated in the survey. The results are presented at the MFS website.



United States
Department of
Agriculture

Forest
Service

Northeastern Area
State and Private
Forestry

271 Mast Road
Durham, NH 03824

File Code: 3000/1920-2/4000

Date: February 23, 2010

Mr. Alec Giffen
Director
Maine Forest Service
22 SHS
Augusta, ME 04333

Dear Alec:

We appreciate the opportunity to provide comment on the Maine State-wide Assessment and Strategy. Our long term relationship with the Maine Department of Conservation, Maine Forest Service spans all three branches of the Forest including: Northeast Area State and Private, Northern Research Station and the White Mountain National Forest. Our comments reflect the US Forest Service position as technical and financial assistance to the Maine Forest Service for Forest Health and Cooperative Forestry programs as well as the manager of public land in Maine and nationally recognized research on sustainable forest management and forest ecology. We are taking an "All Lands" approach to our feedback to you.

Don Mansius provided an excellent overview of the State-wide Assessment and Strategy in December. During that meeting Anne Archie provided comment and this letter is a follow-up for additional information we would like you to consider for the State-wide Assessment.

Conserving Working Forest Landscapes: We cannot over emphasize the importance of conserving private forest landscapes in Maine. The parcels of land protected by state and federal government, non-profit organizations and conservation easements is inadequate, in our view, to maintain the necessary ecosystem benefits we realize from our current forested landscape. Working private forests are essential to maintain clean water, provide connected wildlife habitat, assure economic stability and provide the scenic backdrop to our communities among many other values. To us it is clear that maintaining a viable working forest landscape requires attention to the economic, tax, land use planning and regulatory framework in local communities and at the State level. Small changes to tax laws, for example, may impact the viability of small wood lot operations that then lead to the unintended consequence of liquidation and conversion to non forestry uses. The lack of a nearby mill or decisions regarding road access can encourage or adversely affect the viability of continued management of private forest land. We would encourage the review of State and local efforts in this area to promote "Forest-Friendly" policies and to actively encourage the continued existence of a working forest landscape.

A second aspect of conserving working forest landscapes is the continued investment by government and non-profit groups in acquiring forested land outright or thru the purchase of easements or development rights. We support these efforts where they conserve important ecosystems or key natural areas. The recent interest we have seen in the development of town forests should be encouraged and support given to local governments to continue as good



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stewards of these lands. It is certainly obvious that citizens who are involved in Town Forest efforts or Stewardship Plans on their own property are more active in supporting the overall ecological, social and economic benefits of our forested landscape.

Protecting Forests from Harm: There are many threats to the State's forests that deserve attention and resources. We feel that the myriad threats, some we know of and others that we can only speculate about, are best addressed by maintaining a healthy and diverse forest. Whether the threat is from an insect, such as Asian Long Horn Beetle, or from changes in precipitation patterns as a result of climate change the key condition will be the health of our forests. Toward this end there are several things the Maine State-wide Assessment and Strategy could consider:

- **Continued Monitoring:** We support a stronger effort to monitor the health and resiliency of forested ecosystems across the State. Whether the threat is from development, air pollution or infestation maintaining the capability and system to monitor actively for threats is important to be able to act in time to mitigate the risk or adapt management.
- **Invasive Species:** We view the greatest current threat to be from invasive species and in particular insects such as the Asian Longhorn Beetle, Hemlock Woolley Adelgid and Emerald Ash Borer. The State, in conjunction with key partners, should continue to be active in a strategic effort to combat these pests including the development of contingency and quarantine plans as necessary. Your efforts this last year to play a leadership role in helping us address these kinds of threats across jurisdictional boundaries is critical.
- **Accessible and Useable Information:** It has been our observation that there is a significant body of public resource information now available in various databases being maintained by various government and non government agencies. The State can play a leadership role in making this information available to Town Select boards, Planning Boards, Conservation Commissions and private and public land managers to help make more informed decisions in regards to our forested landscapes.

Enhance Public Benefits from Trees and Forests: We feel that the key way to look at the public benefits of trees and forests is to consider them from the aspect of the environmental services they provide that support a healthy environment and backdrop to our everyday life and to the unique character of Maine. Continuing research from academia and Forest Service research continue to show that healthy and diverse forest landscapes add measurably to the quality of life. Whether this is from clean plentiful water to air quality, wildlife, wood products or other economic uses our forested landscape provides innumerable benefits. Some aspects that should be considered are as follows:

- **Water:** Water quality and quantity were issues directly behind the Weeks Act that created the Eastern National Forests. Maintaining forested watersheds, including those in urban and suburban settings provides significant benefits in storm water control and ground water recharge.

- **Energy:** More consideration should be given to the role trees play in the urban landscape and the benefits that can accrue from their presence. Reducing landscape fragmentation in highly forested parts of the State should also be addressed as utility, transportation and other corridors are expanded or widened.
- **Wildlife and Fish Habitat.** A diverse and healthy forested landscape supports diverse and healthy wildlife and fish populations by maintaining habitat.
- **Economic Benefits:** Ecosystem services for private landowners will play an increasing role in the financial ability of landowners to keep their forests intact. Whether Maine chooses to address ecosystem services on a local basis or a larger regional basis, it is very important that careful and considerable thought be given to developing these markets for private forest land owners.
- **Education and Connection:** It is important to engage the non-Forest owning public in the discussion about how essential forests are to our communities. This education is necessary at many levels and on a diversity of subjects and needs to involve many partners to reach the maximum number of citizens. We feel strongly that a good conservation education program with clear objectives will assist in this area.

Other Issues:

- We feel strongly that multi-State landscape conservation efforts need to maintain a high priority position in the State-wide Assessment and Strategy. Efforts in the Northern states to preserve the northern forest and the local economies associated with it are very important. Remaining actively engaged in these regional issues at the landscape level is important for maintain healthy and diverse forests that can withstand the many threats facing them. The recent effort of Maine's Governor to address large scale forest landscapes in the unorganized territories as well as the New England Governors to address conservation issues should certainly be recognized in the State-wide Assessment and supported by planned funding efforts.
- Integrating urban areas into the State-wide Assessment will continue to be important. The forested lands in the southern portion of the State are all that more important because there is less to go around and what remains may be strained to provide the essential ecosystem services of a growing population. Whether it is the issue of urban tree canopy and heat amelioration, storm water control, ground water recharge or wildlife habitat these forests continue to need active attention.

All three branches of the US Forest Service looks forward to working with you on this important effort and as you move forward in addressing the various issues and opportunities that will be addressed in your plan. We also recognize that current economic conditions only reinforce the importance of all the interested agencies and organizations to help support Maine's

conservation efforts. Please let us know how we could be of any further assistance as your work to complete the Maine State-wide Assessment and Strategy.

Sincerely,

/s/ Anne F. Archie

ANNE F. ARCHIE
Field Representative

/s/ John Brissette

JOHN BRISSETTE
Project Leader

/s/ Thomas G. Wagner

THOMAS G. WAGNER
Forest Supervisor

cc: Don Mansius
Kathryn Maloney

Appendix 3. Project Canopy Strategic Plan



Five-Year Plan

2008 - 2012
(2003-2007 plan extension)

EXCERPTED

Maine's Community Forestry Program

Five-Year Plan 2008 - 2012 (2003-2007 plan extension)

Executive Summary

Maine's forests play a critical role in shaping the state's economy, environment, and directly contribute to the health and livability of Maine communities. However, Maine's forests are changing; expanding populations and land-use changes have had a negative impact on Maine's forests, particularly Maine's community forests - the forests where people live. Often times municipalities do not have the tools or expertise to maintain their community forest resources and, as a result, long-term viability and benefits of these resources are rarely realized. Of the 489 incorporated municipalities in Maine, fewer than 20 have comprehensive community forestry management programs that operate on a self-sustainable level. Of the 489 incorporated municipalities, approximately 200 have some level of community forestry involvement, but, due to a variety of barriers, have yet to grow their program to a sustained level.

In an effort to break down these barriers, Project Canopy, Maine's community forestry program, helps build and support sustainable community forestry programs. Project Canopy has a vision that every community will actively and wisely manage its community forestry resources in a sustainable manner, and that all Maine citizens become well informed as to the proper management of these resources and the benefits derived from them. The success of Project Canopy depends on the commitment and cooperation of municipalities, industry, educational institutions, service groups, non-profit organizations and citizen volunteers. The following Project Canopy goals support the program vision and serve as the foundation for program direction and activity.

- Increase the number of communities with sustainable community forestry programs to thirty-five by the year 2014.
- Ensure that all Maine communities are aware of what the community forest is, its role and benefits.
- Build and enhance partnerships that increase the effectiveness of Project Canopy and improve Maine's community forests.
- Ensure that Project Canopy is financially viable.

This five-year plan complements and significantly builds upon the accomplishments made since the current program began in 1991. It is a highly ambitious plan, reflecting the increased demand for community forestry services in the state. The overall direction of this plan is primarily in response to input from Maine communities, Maine Forest Service (MFS), USDA Forest Service, and the Project Canopy Leadership Team (PCLT).

This plan extends the 2003-2007 strategic plan for an additional five years. MFS intends to do a more complete revision over the next year (June 2010 - May 2011).

Project Canopy Direction

The following goals, objectives and tasks have been created to guide program activities and accomplishments over the next five years. While progress will be reviewed and activities adjusted on an annual basis, the goals, objectives, and tasks contained herein serve as the foundation of program direction and activity.

Goal A: Increase the number of communities with sustainable community forestry program to thirty-five by 2012.

Objective A.1. Promote the establishment and expansion of community forest boards, community foresters, tree wardens, planners, and conservation commissions.

- Identify all communities with community foresters and tree wardens.
- Assess the potential of all communities to develop and support a viable community forestry program.
- Provide technical assistance in establishing and enhancing a community's forestry program.
- Continue to sponsor regional training programs on basic tree care, management, and protection. Work with municipalities to increase municipal staff participation in regional training programs.
- Use available resources to assist cooperating communities and partners in capacity building.

Objective A.2. Promote resource planning and management of the urban/rural fire interface.

- Provide sample ordinances for communities concerning the protection and management of the urban/rural fire interface.
- Partner with organizations currently targeting the urban/rural fire interface to increase program effectiveness within communities.

Objective A.3. Promote ecologically, and socially sound community forest management.

- Continue to furnish technical assistance to volunteer groups, non-profit organizations, municipalities, and government agencies in managing their local resources.
- Actively work with communities and the DOT to increase awareness regarding community trees and advocate decision making that considers the needs of the community and the resource.
- Utilize existing research and resources to help communities achieve better wood utilization and wood waste recycling.
- Assist communities in developing comprehensive resource plans when requested.
- Provide municipalities with tools and resources to develop ordinances that work for them.
- Work with participating communities to provide and support consistent community forestry management practices through the cost-share grants program.
- Create a financial incentive program/mechanism, through our grant program, to encourage greater community participation in the Tree City USA, or parallel, program.
- Increase awareness regarding municipal risk management, and public and private liability pertaining to community forestry.

Objective A.4. Identify and incorporate appropriate community forestry research into program activities.

- Cooperate with the USDA Forest Service Urban and Community Forestry Research units, Private research institutions and educational institutions on new research initiatives.
- Encourage and support the implementation of new technologies and methods in Maine communities.

Goal B: Ensure that all Maine communities are aware of what the community forest is, its role and benefits.

Objective B.1. Outreach through training and education.

- Develop and sponsor educational workshops and seminars on statewide and local levels.
- Provide technical support to the Project Learning Tree program where appropriate.
- Utilize and assist volunteer groups in developing local community forestry programs.
- Educate MFS and partner staff about Project Canopy and community forestry.
- Develop and implement “Advanced or Master Maine Tree Steward” training to compliment existing Beginner “Maine Tree Steward” training program.

Objective B.2. Outreach through information exchange.

- Continue to produce and distribute the Trees on Maine Street quarterly and bi-monthly bulletins. Make these publications available on the Project Canopy website. Explore the possibility of distributing bulletins via email to reduce postage and printing costs.
- Produce articles, news releases, and PSA's on current community forestry practices and programs for distribution to trade magazines, newspapers, and other media sources.
- Identify and promote publications and websites of community forestry related information. Include links to these resources on the Project Canopy website.
- Continue to develop and maintain the Project Canopy website as a resource for community forestry related information.

Objective B.3. Engage underserved and non-traditional communities.

- Use available data and resources to identify underserved and non-traditional communities and populations.

- Identify and partner with existing efforts that engage underserved and non-traditional communities.
- Develop a recruitment strategy to encourage and incorporate underserved population participation on the PCLT.
- Insure that publicity and information materials are relevant to rural, minority and underserved populations.

Objective B.4. Publicly recognize exceptional tree programs, individuals, and industry members actively involved in urban and community forestry.

- Continue to sponsor and support community forestry corporate, organization and individual excellence awards.
- Expand and update award guidelines.
- Promote Arbor Day/Week activities through media events and school programs.
- Promote the National Arbor Day Foundation's Tree City USA & Growth Award, and Building with Trees recognition programs.
- Continue to support and promote Maine's Big Tree program.
- Develop a program to identify, preserve and maintain local historic and landmark trees.

Goal C: Build and enhance partnerships that increase the effectiveness of Project Canopy and Improve Maine's community forests.

Objective C.1. Work to sustain and enhance partnerships with present cooperators, and non-traditional groups on efforts to promote urban and community forestry in Maine, and support local community forestry initiatives.

- DOA, Dept. of Agriculture. Cooperate on efforts to promote the stewardship of Maine's community forestry resources.
- DECD, Dept. of Economic and Community Development. More cooperation needed concerning tree planting in downtown revitalization. Develop a consistent set of standards to insure health of trees in downtown locations.
- DEP, Dept. of Environmental Protection. Work cooperatively in researching and diagnosing ways to restore and manage critical sites such as dumps, gravel pits, and dredge spoils.
- DOT, Dept. of Transportation. Work with communities and DOT to fully consider the value of trees and community forestry resources when planning DOT projects. Provide involved parties with tools and information to make wise community decisions. Develop a consistent set of standards to insure health of trees planted as a part of DOT road projects.
- Grow Smart Maine. Encourage communities to implement smart-growth principles in their planning activities.
- IF&W, Inland Fisheries and Wildlife. Continue to cooperate on the Beginning with Habitat Coalition and similar initiatives.
- MAGC, Maine Assoc. of General Contractors. Increase awareness of the value of trees, and work to improve tree protection during construction projects.
- MAA, Maine Arborists Association. Collaborate on training and education endeavors.
- Maine Association of Conservation Commissions. Work to build and support conservation commissions throughout the state.
- Maine Association of Realtors. Develop brochure discussing the benefits of trees to be provided in new homeowner materials. Work with municipalities and local realtors to provide locally pertinent information.
- Maine Audubon. Partner on community-based natural resource stewardship initiatives.
- MCC, Maine State Chamber of Commerce. Cooperate on efforts to improve the viability and effectiveness of Maine businesses, through sound community forestry management.
- MLNA, Maine Landscape and Nursery Association. Collaborate on training and education endeavors.

- MMA, Maine Municipal Association. Cooperate to assist municipal governments and strengthen communities.
- NAACP, National Assoc. for the Advancement of Colored People. Work with local chapter to encourage participation within program.
- NRCS, Natural Resource Conservation Service. Work cooperatively with Lake Associations and Land Trusts to manage areas with a watershed or ecosystem approach.
- Ornamental Horticulture Council. Cooperate on educational outreach and technical assistance initiatives.
- RC&D, Resource Conservation and Development Areas. Focus on incorporating under-served rural populations.
- SPO, State Planning Office. Work in conjunction with downtown revitalization projects and economic analysis. Advocate for towns to include forestry in their comprehensive plans.
- SWCD, Soil and Water Conservation Districts. Cooperate on educational outreach and technical assistance initiatives.
- SWOAM, Small Woodland Owners Assoc. of Maine. Encourage participation and sponsorship of Big Tree Program.
- Tribal Communities. Encourage and assist communities to establish comprehensive community forestry programs.
- University of Maine Cooperative Extension. Cooperate on educational outreach and technical assistance initiatives.
- USDA, Forest Service, Northeast Area Center for Urban Forestry Research. Cooperate to test and deliver new technologies to communities and partners.
- Maine civic organizations (Rotarians, Kiwanis, etc.). Support local community forestry initiatives.

Objective C.2. Foster support of private businesses and encourage participation in statewide and local programs.

- Seek private-sector sponsorship of community forestry initiatives.
- Seek private-sector sponsorship of community forestry Arbor Week awards.
- Expand and update the Maine Grant makers' directory.

Goal D: Ensure that State and Local community forestry programs are financially viable.

Objective D.1. Increase program funding.

- Establish Project Canopy Fund.
- Continue to develop and enhance private sponsorship of community forestry initiatives.
- Identify and implement fundraising and promotional strategies regarding Big Tree and Historic Tree programs.
- Increase state financial support for Project Canopy.
- Identify and secure private funding for the Maine Tree Stewards program.
- Seek potential collaborative efforts, with partner organizations, on actively funded projects.

Objective D.2. Increase local program funding levels.

- Target and secure funding sources to support local programs.
- Educate municipal leaders about the potential financial benefits of responsible town-owned forestland management.
- Increase public awareness about time critical grants, and funding sources, by posting announcements on the Project Canopy website.

- Encourage municipal collaborations to increase buying power for urban and community forest products and services.
- Encourage municipal collaborations to market urban and community forest products including municipal wood waste and products from town owned forestlands.
- Explore the possibility of green certification for municipal-owned forestlands to further enhance market value for municipal forest products.

Action Timeline

The following section addresses specific activities needed to successfully carry out the goals of this five-year strategic plan. This information follows the order previously set forth within this document. Objectives are identified, prioritized and list the lead and supporting organizations responsible for implementation. Included within these charts is a time line column to be utilized for tracking progress through over next five years.

Goal A: Increase the number of communities with sustainable community forestry programs to thirty by the year 2008.

Objective A.1. Promote the establishment and expansion of community forest boards, community foresters, tree wardens, planners, and conservation commissions.

	Activity	Priority	Organizations	Status
1	Identify all communities with community foresters and tree wardens.	High	VA	2003
2	Assess the potential of all communities to develop and support a viable community forestry program.	High	MFS, MMA, VA	2004
3	Provide technical assistance in establishing and enhancing a community's forestry program.	High	MFS, PVA	Ongoing
4	Continue to sponsor regional training programs on basic tree care, management, and protection. Work with municipalities to increase municipal staff participation in regional training programs.	High	MAA, MFS, VA	Ongoing
5	Use available resources to assist partners in capacity building.	High	MCC, MFS, MMA, USFS	Ongoing

Objective A.2. Promote resource planning and management of the urban/rural fire interface.

	Activity	Priority	Organizations	Status
1	Provide sample ordinances for communities concerning the protection and management of the urban/rural fire interface.	Medium	MFS	2004
2	Partner with organizations currently targeting the urban/rural fire interface to increase program effectiveness within communities.	Medium	MFS, USFS	2005

Objective A.3. Promote ecologically, and socially sound community forest management.

	Activity	Priority	Organizations	Status
1	Continue to furnish technical assistance to volunteer groups, non-profit organizations, municipalities, and government agencies in managing their local resources.	High	MFS, VA, UME, USFS	Ongoing

2	Actively work with communities and the DOT to increase awareness regarding community trees and advocate decision making that considers the needs of the community and the resource.	High	DOT, MFS, Municipalities	2004
3	Utilize existing research and resources to help communities achieve better wood utilization and wood waste recycling.	Medium	MFS, USFS	2004
4	Assist communities in developing comprehensive resource plans when requested.	Medium	MFS, GSM, SPO	Ongoing
5	Provide municipalities with tools and resources to develop ordinances that work for them.	Medium	MFS, SPO	Ongoing
6	Work with participating communities to provide and support consistent community forestry management practices through the cost-share grants program.	High	MFS, DOT, VA, MAA, MELNA	Ongoing
7	Create a financial incentive program/mechanism, through our grant program, to encourage greater community participation in the Tree City USA, or parallel, program.	High	MFS, PCLT	2005
8	Increase awareness regarding municipal risk management, and public and private liability pertaining to community forestry.	High	MFS, MAA, PCLT USFS	2004

Objective A.4. Identify and incorporate appropriate community forestry research into program activities.

	Activity	Priority	Organizations	Status
1	Cooperate with the USDA Forest Service Urban and Community Forestry Research units, Private research institutions and educational institutions on new research initiatives.	Medium	MFS, USFS, Educational and Research Institutions	Ongoing
2	Encourage and support the implementation of new technologies and methods in Maine communities.	Medium	MFS, USFS, Municipalities	Ongoing

Goal B: Ensure that all Maine communities are aware of what the community forest is, its role and benefits.

Objective B.1. Outreach through training, education.

	Activity	Priority	Organizations	Status
1	Develop and sponsor educational workshops and seminars on statewide and local levels.	High	MFS, UME, USFS	Ongoing
2	Provide technical support to the Project Learning Tree program where appropriate.	Medium	MFS, VA	Ongoing
3	Utilize and assist volunteer groups in developing local community forestry programs.	High	MFS, VA, Local community based partners	Ongoing
4	Educate MFS and partner staff about Project Canopy and community forestry.	High	Project Canopy Staff, USFS	Ongoing

5	Develop and implement “Advanced or Master Maine Tree Steward” training to compliment existing Beginner “Maine Tree Steward” training program.	Medium	MFS, USFS	2005
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Objective B.2. Outreach through information exchange.

	Activity	Priority	Organizations	Status
1	Continue to produce and distribute the Trees on Maine Street quarterly and bi-monthly bulletins. Make these publications available on the Project Canopy website. Explore the possibility of distributing bulletins via email to reduce postage and printing costs.	High	MFS, MMA, VA, PCLT	2003
2	Produce articles, news releases, and PSA's on current community forestry practices and programs for distribution to trade magazines, newspapers, and other media sources.	Medium	MFS, PCLT, VA	Ongoing
3	Identify and promote publications and websites of community forestry related information. Include links to these resources on the Project Canopy website.	Medium	MFS, PCLT, VA	2003
4	Continue to develop and maintain the Project Canopy website as a resource for urban and community forestry related information.	Medium	MFS, VA	Ongoing

Objective B.3. Engage underserved and non-traditional communities.

	Activity	Priority	Organizations	Status
1	Use available data and resources to identify underserved and non-traditional communities and populations.	Medium	MFS, VA	2004
2	Identify and partner with existing efforts that engage underserved and non-traditional communities.	Medium	MFS, MCC, MMA, NAACP, PCLT	2004
3	Develop a recruitment strategy to encourage and incorporate under-served population participation on the PCLT.	Medium	MFS, NAACP, PCLT	2005
4	Insure that publicity and information materials are relevant to rural, minority and underserved populations.	Medium	MFS, VA	Ongoing

Objective B.4. Publicly recognize exceptional tree programs, individuals, and industry members actively involved in urban and community forestry.

	Activity	Priority	Organizations	Status
1	Continue to sponsor and support community forestry corporate, organization and individual excellence awards.	High	MFS, PCLT	Ongoing
2	Expand and update award guidelines.	High	MFS, PCLT, VA	2004

3	Promote Arbor Day/Week activities through media events and school programs.	Medium	MFS, PCLT, VA	Ongoing
4	Promote the National Arbor Day Foundation's Tree City USA & Growth Award, and Building with Trees recognition programs.	High	MFS, PCLT, VA	Ongoing
5	Continue to support and promote Maine's Big Tree program.	Medium	MFS, PCLT, VA, SWOAM	Ongoing
6	Develop a program to identify, preserve and maintain local historic and landmark trees.	Medium	MFS, MMA, MSCC, VA	2005

Goal C: Build and enhance partnerships that increase the effectiveness of Project Canopy and improve Maine's community forests.

Objective C.1. Work to sustain and enhance partnerships with present cooperators, and non-traditional groups on efforts to promote urban and community forestry in Maine, and support local community forestry initiatives.

	Activity	Priority	Organizations	Status
1	Cooperate on efforts to promote the stewardship of Maine's community forestry resources.	High	DOA, Dept. of Agriculture.	Ongoing
2	More cooperation needed concerning tree planting in downtown revitalization. Develop a consistent set of standards to insure health of trees in downtown locations.	High	DECD, Dept. of Economic and Community Development.	2004
3	Work cooperatively in researching and diagnosing ways to restore and manage critical sites such as dumps, gravel pits, and dredge spoils.	Medium	DEP, Dept. of Environmental Protection.	2005
4	Work with communities and DOT to fully consider the value of trees and community forestry resources when planning DOT projects. Provide all involved parties with tools and information to make wise community decisions. Develop a consistent set of standards to insure health of trees planted as a part of MDOT road projects.	High	DOT, Dept. of Transportation.	2004
5	Encourage communities to implement smart-growth principles in their planning activities.	High	Grow Smart Maine.	2005
6	Continue to cooperate on the Beginning with Habitat Coalition and similar initiatives.	Medium	IF&W, Inland Fisheries and Wildlife.	Ongoing
7	Work to include tree protection strategies on construction projects. Provide on-sight technical assistance on tree care and protection.	Medium	MAGC, Maine Assoc. of General Contractors.	2004
8	Collaborate on training and education endeavors.	Medium	MAA, Maine Arborists Association.	Ongoing
9	Work to build and support conservation commissions throughout the state.	Medium	Maine Association of Conservation Commissions.	Ongoing

10	Develop a brochure discussing the benefits of trees to be provided in new homeowner materials. Work with municipalities and local realtors to provide locally pertinent information.	Medium	Maine Association of Realtors.	2006
11	Partner on community-based natural resource stewardship initiatives.	High	Maine Audubon.	2006
12	Cooperate on efforts to improve the viability and effectiveness of Maine businesses, through sound community forestry management.	High	MSCC, Maine State Chamber of Commerce	2005
13	Collaborate on training and education endeavors.	Medium	MLNA, Maine Landscape and Nursery Association.	2005
14	Cooperate to assist municipal governments and strengthen communities.	High	MMA, Maine Municipal Association.	Ongoing
15	Work with local chapter to encourage participation within program.	Medium	NAACP, National Assoc. for the Advancement of Colored People.	2005
16	Work cooperatively with Lake Associations and Land Trusts to manage areas with a watershed or ecosystem approach.	Medium	NRCS, Natural Resource Conservation Service.	Ongoing
17	Cooperate on educational outreach and technical assistance initiatives.	Medium	Ornamental Horticulture Council.	2006
18	Focus on incorporating under-served rural populations.	Medium	RC&D, Resource Conservation and Development Areas.	Ongoing
19	Work in conjunction with downtown revitalization projects and economic analysis. Advocate for towns to include forestry in their comprehensive plans.	High	SPO, State Planning Office.	Ongoing
20	Cooperate on educational outreach and technical assistance initiatives.	Medium	SWCD, Soil and Water Conservation Districts.	Ongoing
21	Encourage participation and sponsorship of Big Tree Program.	Medium	SWOAM, Small Woodland Owners Assoc. of Maine.	Ongoing
22	Encourage and assist communities to establish comprehensive community forestry programs.	Medium	Tribal Communities.	2007
23	Cooperate on educational outreach and technical assistance initiatives.	High	University of Maine Cooperative Extension.	Ongoing
24	Cooperate to test and deliver new technologies to communities and partners.	High	USFS, NA Center for Urban Forestry Research.	Ongoing
25	Support local community forestry initiatives.	Medium	Maine civic organizations	Ongoing

Objective C.2. Foster support of private businesses and encourage participation in statewide and local programs.

	Activity	Priority	Organizations	Status
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1	Seek private-sector sponsorship of community forestry initiatives.	Medium	MFS, MSCC, PCLT	2006
2	Seek private sponsorship of community forestry Arbor Week awards.	Medium	MFS, MSCC, PCLT	2006
3	Expand and update the Maine Grant makers' directory.	Medium	MFS, VA	2005

Goal D: Ensure that State and Local community forestry programs are financially viable.

Objective D.1. Increase program funding.

	Activity	Priority	Organizations	Status
1	Establish Project Canopy Fund	High	MFS, PCLT, VA, MCF	2007
2	Continue to develop and enhance private sponsorship of community forestry initiatives.	Medium	MFS, VA, PCLT	Ongoing
3	Identify and implement fundraising and promotional strategies regarding Big Tree and Historic Tree programs.	Medium	MFS, VA, PCLT, Private Industry	2006
4	Increase state financial support for Project Canopy.	Medium	MFS, Legislature	2007
5	Identify and secure private funding for the Maine Tree Stewards program	High	MFS, VA, PCLT	2005
6	Seek potential collaborative efforts, with partner organizations, on actively funded projects.	High	MFS	Ongoing

Objective D.2. Increase local program funding levels.

	Activity	Priority	Organizations	Status
1	Target and secure funding sources to support local programs.	High	MFS	Ongoing
2	Educate municipal leaders about the potential financial benefits of responsible town-owned forestland management.	High	MFS, MMA	Ongoing
3	Increase public awareness about time critical grants, and funding sources, by posting announcements on the Project Canopy website.	High	MFS, VA	2004
4	Encourage municipal collaborations to increase buying power for urban and community forest products and services.	High	MFS, MAA, VA	2005
5	Encourage municipal collaborations to market urban and community forest products including municipal wood waste and products from town owned forestlands.	Medium	MFS, MFPC, SWOAM	2005
6	Explore the possibility of green certification for municipal-owned forestlands to further enhance market value for town forest products.	Medium	MFS	2006

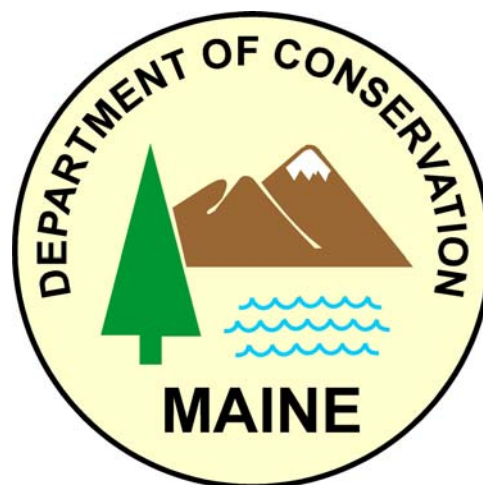
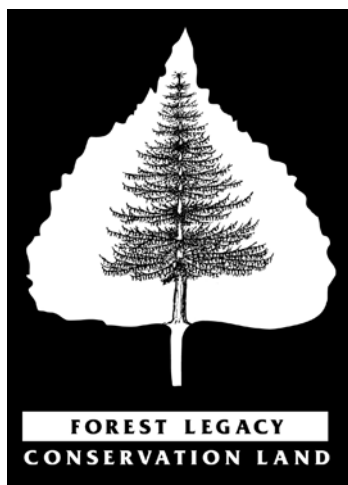
Appendix 4. Natural Science Education program activity matrix

“The director shall employ a natural resource educator to develop and coordinate natural resource education, workshops and training opportunities for school-age children, forest landowners, forest products harvesters and forest managers.” 12 MRSA §8611 (Bureau of Forestry advisory programs)

Mandated Audiences			
School Age Children	Forest Landowners	Product Harvesters	Forest Managers & Towns
Event, Activity or Program	Event, Activity or Program	Event, Activity or Program	Event, Activity or Program
Project Learning Tree (PLT) <ul style="list-style-type: none"> Workshop Facilitators FIG project Executive Committee member 	Forest Working Group (formally Ag-Forest group)	Logger Education Alliance	Be Woods Wise / Forest Stewardship program
	Statewide water quality standards	Statewide water quality standards	Statewide water quality standards
Envirothon <ul style="list-style-type: none"> Test writers Coaches Judges 	MFS website	Quality Logging Professional (QLP)	Water Quality and BMP workshops
	Be Woods Wise/ Stewardship program	Certified Logging Professional (CLP)	
	Individualized training programs	Water Quality and BMP workshops	Website, newsletters, list-serve
Teacher Tours <ul style="list-style-type: none"> Planning Resource person on tours 	Project Canopy	Forester's Institute: Monthly training for foresters, resource professionals, teachers, towns, landowners, and others.	Sustainable Forestry Initiative (SFI) Workshops
	Bangor Flower Show		
	Portland Flower Show		
Teachers <ul style="list-style-type: none"> Individualized instruction Presentations at conferences 	Fryeburg Fair	Individualized, on-site instruction	Training for foresters, resource professionals, teachers, towns, landowners, and others.
	Common Ground Fair		
	SWOAM Field Day		
Presentations in schools	SFI workshops	Forest Resources Educators Network	Forest practices rules
Special Events: <ul style="list-style-type: none"> Southern Maine Water Festival Northern Maine Water Festival China School Forest Day Outdoor classroom development and expert instruction SWCD environmental field days Arbor Day - Project Canopy 	Water quality program & Workshops	SFI Workshops <ul style="list-style-type: none"> BMP Wildlife Habitat/Biodiversity Aesthetics Planning 	New BMP Manual
	Woods In your backyard (WIYB)	University of Maine Forestry Programs (Fort Kent and Orono)	
	Women in the Woods		
	Training for foresters, resource professionals, teachers, towns, landowners, and others.		
Development of Maine's Environmental Literacy Plan	MFS/SWOAM forest management classes	Vocational forestry programs	
	Peer to peer learning opportunities	Individualized company programs	

Maine

Forest Legacy Program



Assessment of Need

June, 2010

⁵⁵ Updated Assessment of Need pending final federal approval.
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I. FORWARD

Maine's Forest Legacy Program was established in 1994 at the culmination of the work of the congressionally mandated Northern Forest Lands Council. The Council identified over thirty-five actions to reinforce the Northern Forest region's traditional patterns of land ownership and use, the first of which was to ensure the consistent and adequate funding by Congress of the Forest Legacy Program. This recommendation came at a time when both public and private efforts were growing to protect forestland in Maine from conversion to non-forest uses.

Many factors have created uncertainty about the long-term stability of Maine's northern forest, and this has led to a significant increase in land protection efforts in the past decade and a half. Land ownership changes began occurring at a rate unseen in Maine's history. Six million acres or one-third of Maine's commercial forestland changed hands between 1998 and 2003. New types of landowners, timber investment management organizations (TIMOs) and real estate investment trusts (REITs), began acquiring significant acreage in Maine. These new landowners carried with them a significantly shorter ownership timeline than prior industrial landowners. At the same time, liquidation harvesting became prevalent, causing widespread public concern over unsustainable forest management practices and ultimately resulting in legislation limiting its use. Finally, development pressure continued throughout Maine's northern forest, including the establishment of "kingdom lots," large tracts purchased by wealthy individuals for personal use. Combined, these factors raised concerns about the long-term availability of Maine's forestland for traditional forest uses.

As forestland ownership and management have evolved in Maine, so too have land protection efforts. In response to greater pressures over conversion of working forestland to non-forest uses, the State of Maine and non-profit land conservation organizations responded by pursuing land protection projects that were increasingly large in size. This resulted in over 2.1 million acres of forestland being permanently protected by fee or easement in the past twelve years. In addition to the substantial private dollars that were necessary to achieve this, many state and federal funding sources beyond the Forest Legacy Program have played a crucial role in protecting Maine's forestland, including the North American Wetlands Conservation Act (NAWCA) grants and Maine's Land for Maine's Future Program (LMF) grants, to name only two.

Since 1994, through the Forest Legacy Program alone, Maine has received over \$58 million and has permanently protected by fee or easement the public values and traditional forest uses of over 700,000 acres of Maine's forest. This has been accomplished through the completion of over twenty projects located from York County to Aroostook County and ranging from 1,272 acres to 328,364 acres in size (see Appendix 1 for a complete list of all Forest Legacy projects completed and underway).

In 2005, Maine received approval from the USDA Forest Service of its updated Modified Assessment of Need (see Appendix 5, letter dated March 25, 2005) which included a description of the goals of Maine's Forest Legacy Program, the eligibility criteria used in determining Maine's Forest Legacy Area, the identification of Maine's Forest Legacy Area, and the application and prioritization process for Maine Forest Legacy projects. Title VIII of the 2008 Farm Bill (P.L. 110-246) amended the Cooperative Forestry Assistance Act of 1978, Sec 8002 (Sec. 2A) which requires states to complete a Statewide Assessment and long-term Statewide Strategy to be eligible to receive funds under the Act. This Maine Forest Legacy Program Assessment of Need has been prepared in response to this requirement, and is an update to Maine's 2005 Modified Assessment of Need. Substantive changes from the 2005 version include: the addition of ecosystem services to Maine's Eligibility Criteria for its

Forest Legacy Area; modifications to Maine's Forest Legacy Area itself; modifications to the application scoring criteria, and discussion of emerging Maine Forest Legacy Program policy issues.

II. GOALS OF MAINE FOREST LEGACY PROGRAM

The goal of Maine's Forest Legacy Program is to prevent the conversion of Maine's forest to non-forest uses, and thereby protect Maine's traditional forest uses and a wide range of public values that Maine's forests provide.

The public values that Maine aims to protect through its Forest Legacy Program include the production of timber, fiber and other forest products; economic benefits from non-timber resources; public recreation opportunities, including tourism activities; high environmental value plant and animal habitat as identified by state, regional, or federal programs; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities; water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems; scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, and areas along state highway systems); historic/cultural/tribal resources of significance; and ecosystem services. Maine's traditional forest uses include, but are not limited to: public access, timber harvesting, hunting, fishing, trapping, hiking, camping, cross-country skiing, snowshoeing, horseback riding, picnicking, boating, swimming, bicycling, outdoor education and nature study including scientific and archeological research, and nature observation.

III. ELIGIBILITY CRITERIA USED IN DETERMINING MAINE'S FOREST LEGACY AREA

A. Maine's State Stewardship Committee established a Maine Forest Legacy Committee (see Appendix 4, letter dated April 24, 2004 for authorization, and Appendix 6 for Committee purpose and membership) to work with the State Lead Agency on matters related to the Forest Legacy Program. The State Lead Agency, originally designated as the Maine Forest Service, was changed to the Maine Department of Conservation, Bureau of Parks and Lands by approval of the U.S. Forest Service (see Appendix 3, letter dated July 2, 2001). Maine's historical Eligibility Criteria used in determining Maine's Forest Legacy Area were most recently approved as part of the State's 2005 Modified Assessment of Need (see Appendix 5, approval letter dated March 25, 2005). The list below is a reflection of these historical criteria, with the addition of ecosystem services as an important emerging public value.

Maine's Forest Legacy Committee, working in association with the Bureau of Parks and Lands, established the following eligibility criteria for use in determining Maine's Forest Legacy Area:

1. Includes forest land threatened by conversion to non-forest uses;
2. Provides opportunities for traditional forest uses and contains the following public values:
 - a. the production of timber, fiber and other forest products;
 - b. economic benefits from non-timber resources;
 - c. public recreation opportunities, including tourism activities;
 - d. high value plant and animal habitat as identified by state, regional, or federal programs; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities;
 - e. water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems;

- f. scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, and areas along state highway systems);
 - g. historic/cultural/tribal resources of significance; and
 - h. ecosystem services; and
3. Contains parcels on which more than 50% of the land meets the definition of commercial forest land (the Maine Forest Legacy Program also assures compliance with the requirement that compatible non-forest uses account for “less than 25% of the total area” as described in the federal Forest Legacy Program Implementation Guidelines).
- B. The following definitions apply to Maine’s Eligibility Criteria:
- 1. Traditional Forest Uses – Activities commonly associated with the use of forestland in Maine. These activities include, but are not limited to: public access, timber harvesting, hunting, fishing, trapping, hiking, camping, cross-country skiing, snowshoeing, horseback riding, picnicking, boating, swimming, bicycling, outdoor education and nature study including scientific and archeological research, and nature observation.
 - 2. Commercial Forest Land – Land used primarily for growth of trees to be harvested for commercial use, but does not include ledge, marsh, open swamp, bog, water and similar areas, which are unsuitable for growing a forest product or for harvesting for commercial use even though these areas may exist within forest lands.
 - 3. Environmentally Important Forests – a parcel that includes multiple public values as described in Section III.A.2.

IV. IDENTIFYING MAINE'S FOREST LEGACY AREA

A. LOCATION AND CONSISTENCY WITH ELIGIBILITY CRITERIA

Appendix 2 includes a map of Maine's Forest Legacy Area as well as a complete list of towns and townships included therein. Maine's Forest Legacy Area originally encompassed the entire portion of the Northern Forest Lands Study Area that lay in Maine as this large block of land met the established eligibility criteria outlined in Maine's 1993 Modified Assessment of Need. In 2001, the U.S. Forest Service, at Maine's request, approved a boundary change to Maine's Forest Legacy Area, adding the following 14 towns: Baldwin, Bridgton, Brownfield, Casco, Cornish, Denmark, Harrison, Hiram, Naples, Otisfield, Parsonsfield, Porter, Raymond and Sebago (see Appendix 3, letter dated July 2, 2001). These towns, though outside the original Northern Forest Lands Study Area, clearly met the State's eligibility criteria as well.

In 2009, the Maine Forest Legacy Committee undertook a thorough review of the existing Forest Legacy Area to determine if there were additional towns, townships or unorganized territories within the State that met its eligibility criteria of containing significant areas of commercial forest land threatened by conversion to non-forest uses, and which provided opportunities for traditional forest uses as well as contained clearly defined public values. At the same time, it considered the elimination of towns, townships and unorganized territories with a land base containing a minimal amount of these same characteristics.

The following towns were identified for addition to and elimination from Maine's Forest Legacy Area. **These changes reduce Maine's Forest Legacy Area by 63,517 acres.**

Original Forest Legacy Area (Acres)	16,015,218
Additions	Added Acres
Bradley	32,395
Clifton	22,959
Burnham, Unity, Unity Twp	59,478
Bold Coast (Northfield, T18 ED BPP, Centerville, Whiting)	113,528
Total Additions	228,360
Reductions	Acres Removed
Mapleton, Washburn, Woodland	66,856
St. Agatha, Frenchville, Madawaska, Fort Kent (east of Rt 11 only)	102,861
Smithfield, Norridgewock, Skowhegan, Fairfield	122,160
Total reductions	291,877
Revised Legacy Area	15,951,701
Net Acreage Change	-63,517
Net Change as % of Total Legacy Area	-0.40%

The towns to be added to the Forest Legacy Area meet all of Maine's Eligibility Criteria:

1. **Include forested land threatened by conversion to non-forest uses** - *the towns, townships and unorganized territories are predominantly forested, and face varying but nonetheless significant threats of conversion. Each of the townships to be added contains large undeveloped blocks – in many cases blocks larger than 25,000 acres. However, divestment of large ownerships and increasing development pressures threaten to change the character and erode the open space potential of these towns. In particular, Bradley and Clifton lie just east of Bangor in the Penobscot River Watershed, and Burnham, Unity, and Unity Township lie east of Waterville within the Kennebec River Watershed. Both the Penobscot and Kennebec watersheds have been identified by the U.S. Forest Service's Forests on the Edge project as among the most highly threatened areas of private forestland in the country. In addition, the Bold Coast townships (Northfield, T18 ED BPP, Centerville and Whiting) have experienced increasing pressure from second home owners and 'kingdom lot' buyers as former corporate ownerships have sold off and subsequent owners have subdivided along the Route 1 corridor.*

2. **Provide opportunities for traditional forest uses** - *the towns, townships and unorganized territories include significant large unfragmented blocks of productive forest land, interspersed with high quality streams and hills and mountains that provide for a range of traditional economic and recreational activities. The proximity of these towns to large existing conservation lands suggests that there is an existing attraction to these areas from hunters, anglers, and other recreational users. The large parcels that exist in each of these towns add to the suitability of these regions for remote recreation.*

3. **Contain the following public values:**
 - **Production of timber, fiber and other forest products** – *because these areas contain large blocks of productive forest land, they play a significant role in Maine's forest based economy. The lands are currently owned by a mix of industrial and family ownerships, with many large parcels ranging from hundreds to thousands of acres in size. Forest management and productivity is a major land use in all towns. In addition, each of the towns currently lies within a local 'wood basket' of one or more large capacity mills, including those in Hinckley, Old Town, and Woodland, Maine.*

 - **Economic benefits from non-timber resources** – *the areas contain significant forest available for outdoor recreation and related tourism which is of substantial benefit to the State economy. Bold Coast lands include regenerating softwood stands sought for Christmas wreaths. The Unity wetlands complex provides exceptional wildlife habitat to a number of waterfowl, wading birds, and aquatic species.*

 - **Public recreation opportunities, including tourism activities** – *the areas provide abundant opportunities for a variety of recreational pursuits, including hunting, fishing, hiking, snowmobiling, cross-country skiing, snowshoeing and sightseeing. The Bold Coast region has drawn increasing use from boaters seeking remote, back-country experiences on numerous lakes, ponds, and the Machias River corridor.*

 - **High value plant and animal habitat; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities** - *habitat for a number of state rare plants is found in the area. Specifically, the Unity Wetlands complex supports several rare plants and freshwater mussels associated with intact and exemplary wetland systems. The Bold Coast region contains outstanding peatlands and emergent wetlands along the East Machias River. Two large peatlands in Bradley support multiple rare plant populations.*

- **Water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems** – *high value riparian habitats and exemplary wetland communities are found throughout the addition areas. The most notable of these is the Unity Wetlands, a Focus Area of statewide significance identified by Maine’s State Wildlife Action Plan. This area contains floodplain forests, extensive peatlands, and intact aquatic systems. In the Bold Coast region, the Machias River corridor supports an intact river ecosystem that has been targeted for restoration of Atlantic salmon, among other efforts.*
 - **Scenic resources** – *the added towns contain outstanding recreational and scenic boating opportunities, including the Machias and East Machias Rivers, the Sebastocook River, and numerous lakes and ponds.*
 - **Historic/cultural/tribal resources** – *the town of Bradley, historically a significant lumber mill town, includes the Leonard’s Mills historic site which is home to the Maine Forest and Logging Museum. The town of Unity is home to a small but growing Amish community and is also the location of the annual Common Ground Fair, an agricultural fair focused exclusively on organic farming.*
 - **Ecosystem services** – *the areas are dominated by unfragmented forest and provide an array of important ecosystem services including carbon sequestration and water quality protection.*
- 4. Contain parcels on which more than 50% of the land meets the definition of commercial forest land** - *the towns, townships and unorganized territories were chosen in large part by identifying those towns adjacent to Maine’s existing Forest Legacy Area that contain significant proportions of the town still in large ownership. The State of Maine has identified these large ownership blocks as highly threatened and important to the long term viability of Maine’s forest economy.*

At its February 4, 2010 meeting, the Maine Forest Legacy Committee voted in support of this updated Forest Legacy Area, which consists of the original Northern Forest Lands Study Area, the 14 towns added in 2001, and the changes reflected in the above table. Also in February, 2010, each municipality potentially affected received written notification with an opportunity for comment. The Department of Conservation Bureau of Parks and Lands replied received no concerns. The Forest Legacy Committee determined through its 2009 review process that this entire area is consistent with Maine’s Forest Legacy Area eligibility criteria, encompasses environmentally important forests, and is consistent with the original purposes for which Congress established the Forest Legacy Program.

B. IMPORTANT ENVIRONMENTAL VALUES AND HOW THEY WILL BE PROTECTED

The Maine Forest Legacy Committee determined that the Maine Forest Legacy Program will focus on acquiring conservation easements or fee interest in lands in order to protect the traditional forest uses and public values of Maine’s forests. These public values are derived from the environmental assets of Maine’s forests and hence, for the purposes of its Forest Legacy Program, Maine’s public and environmental values are one and the same. Maine is committed to protecting the following public values through its Forest Legacy Program:

1. The production of timber, fiber and other forest products;
2. Economic benefits from non-timber resources;

3. Public recreation opportunities, including tourism activities;
4. High value plant and animal habitat as identified by state, regional, or federal programs; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities;
5. Water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems;
6. Scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, and areas along state highway systems);
7. Historic/cultural/tribal resources of significance; and
8. Ecosystem services.

These public values will be protected by the following means:

1. It is the intent of the Maine Forest Legacy Program to use Forest Legacy Program funds for the purchase of both conservation easements and fee interest in lands. It is understood that the use of conservation easements is an effective means to protect interests in lands while maximizing the use of federal funds. However, the acquisition of fee interest in lands is also important, particularly for protecting areas of high ecological value on larger projects that include a sizeable easement component. Lands for which a fee interest is acquired will be managed for public use. As part of the State's assessment of all lands, the owner of the subsurface rights to the land will be identified, and a determination made as to whether the acquisition of mineral rights are necessary to realize the purposes for which the land is entered into the Forest Legacy Program.
2. Where conservation easements are employed as the method of land protection, a forest stewardship plan will serve as the means for describing specifically how easement provisions will be met. The Bureau of Parks and Lands, working in concert with its land protection partners as well as the Department of Inland Fisheries & Wildlife, the Maine Natural Areas Program and the Maine Forest Service, will develop easement provisions that:
 - a. seek to protect significant recreational, wildlife and ecological values for public benefit (for example, important deer yards and significant hiking trails may be identified in the forest stewardship plan and protected through the terms of the easement);
 - b. seek to protect rare and endangered species habitat, rare and exemplary natural communities and other significant wildlife values such as fisheries habitats and deer yards, and natural, scenic, educational, scientific, recreational, historical, cultural and tribal resources (for example, as part of the forest stewardship plan, the State will consult with the Maine Natural Areas Program to identify rare, threatened and endangered species habitats and may include special protection provisions for such habitats in the easement);
 - c. seek to protect water supplies and watersheds, riparian areas, wetlands, shorelines and river systems, and maintain soil fertility and quality (for example, the forest stewardship plan may address how Best Management Practices will be used to protect soils at risk of erosion from timber harvesting; significant wetlands may be identified and an adequate buffer established to ensure their protection; these values may be protected through the terms of the easement);

d. seek to assure the sustained, natural capacity of the property and its soils to support healthy and vigorous forest growth, and that, so long as the property is managed as a working forest, commercial forest management, if undertaken, will provide a continuing, renewable and long-term source of forest products, maintain a healthy and biologically diverse forest that supports a full range of native flora and fauna, and limit adverse aesthetic and ecological impacts, particularly in riparian areas, high elevation areas and public vistas. Conservation easement transactions shall require that a Forest Stewardship Plan or multi-resource management plan be approved before or at closing by the State Forester or designee, as required by 2003 federal Forest Legacy Program Implementation Guidelines section XIV.7.

The post-closing requirements for modification of Forest Stewardship Plans or multi-resource management plans is governed in part by section XIV.7 of the Implementation Guidelines, but also by procedures dictated by the terms of the conservation easement. Maine shall require that the forest planning documents be kept current and updated pursuant to the terms drafted into the easement. Modification of the forest planning documents must be agreed to by the holder, but agreement may be evidenced by a lack of a disagreement following consultation. Sample easement language used in recent easements approved by state and federal parties under current federal guidance is as follows:

Holder Review (where there is NO Third-Party Certification): *The Forest Management Plan shall be provided to Holder prior to conducting any timber harvesting activities. Holder shall review the Forest Management Plan for consistency with the purpose and terms of this Conservation Easement, but is not required to approve the Forest Management Plan. If the Grantor is not certified pursuant to Section 5.C.(i) and the Holder finds that any portion of the Forest Management Plan is inconsistent with the terms of this Conservation Easement or that resulting Forest Management Activities could result in a violation of this Conservation Easement, the Holder shall provide written comments to the Grantor identifying and explaining such inconsistencies or disagreements that may result in a violation of the Easement. Grantor acknowledges that the actual activities and outcomes on the Protected Property will determine compliance with this Conservation Easement whether or not Holder has commented upon the Forest Management Plan. Holder's failure to provide comments does not constitute a waiver of the terms of this Conservation Easement.*

Holder Review (where there IS Third-Party Certification): *Federal Guidance has been interpreted to allow the Third-Party Certification process to suffice for any post-closing consultation or agreement; Third-Party certification suffices as an alternative to the pre-closing requirements for a Forest Stewardship Plan if 1) the State Forester or designee has approved the third-party forest certification the property is part of, 2) the State Forester or designee has had an opportunity to review the plan and 3) there is a contingency plan for the creation of a Forest Stewardship or Multi-resource Management plan if the land was no longer to be certified. The easement holder must also have the ability to review overview certification documents over the years to ensure compliance with the easement purposes.*

e. seek to assure the availability of the property for traditional non-intensive outdoor recreation by the public (for example, access by the public for specifically identified recreational activities may be protected through the terms of the easement). The acquisition of development rights and other rights, and the placing of restrictions on human activities that could impair critical habitat, degrade water quality or harm important vistas, all may be employed to ensure that Maine's environmental values are

protected. By requiring guaranteed public access on Maine Forest Legacy Program parcels, Maine's traditional forest uses will also be protected; and

f. seek to assure the protection of ecosystem services that a property could provide, to the extent that they have been identified as a priority use or attribute of the parcel (for example, specific drinking water protection measures may be identified and required by the terms of the easement).

C. CONSERVATION GOALS OF MAINE'S FOREST LEGACY AREA

The conservation goals of Maine's Forest Legacy Area are to prevent the conversion of Maine's forest to non-forest uses, and thereby protect Maine's traditional forest uses and a wide range of public values that Maine's forests provide.

The public values that Maine aims to protect through its Forest Legacy Program include the production of timber, fiber and other forest products; economic benefits from non-timber resources; public recreation opportunities, including tourism activities; high value plant and animal habitat as identified by state, regional, or federal programs; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities; water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems; scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, and areas along state highway systems); historic/cultural/tribal resources of significance; and ecosystem services.

Maine's traditional forest uses include, but are not limited to: public access, timber harvesting, hunting, fishing, trapping, hiking, camping, cross-country skiing, snowshoeing, horseback riding, picnicking, boating, swimming, bicycling, outdoor education and nature study including scientific and archeological research, and nature observation.

D. PUBLIC BENEFITS DERIVED FROM ESTABLISHING MAINE'S FOREST LEGACY AREA

The public benefits to be derived from Maine's Forest Legacy Program include the:

1. Production of timber, fiber and other forest products;
2. Economic benefits from non-timber resources;
3. Public recreation opportunities, including tourism activities;
4. High value plant and animal habitat as identified by state, regional, or federal programs; habitat for rare, threatened or endangered plant or animal species; and rare or exemplary natural communities;
5. Water supply and watershed protection, and/or important riparian areas, wetlands, shorelines, or river systems;
6. Scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, and areas along state highway systems);
7. Historic/cultural/tribal resources of significance; and
8. Ecosystem services.

V. GOVERNMENTAL ENTITIES THAT MAY HOLD LAND OR INTERESTS IN LAND

Listed below are the agencies that may hold right, title or interests in lands protected with Forest Legacy Program funding. These agencies may then enter into management agreements with non-governmental entities to help manage protected lands.

- a. Maine Department of Conservation, Bureau of Parks and Lands
- b. Maine Department of Inland Fisheries and Wildlife
- c. Maine Department of Marine Resources
- d. Maine Department of Conservation, Bureau of Forestry
- e. Maine Department of Agriculture, Food and Rural Resources
- f. U.S. Department of Agriculture Forest Service
- g. U.S. Department of Interior, National Park Service
- h. U.S. Department of Interior, Fish and Wildlife Service
- i. Local Governments

VI. PUBLIC INVOLVEMENT PROCESS

Maine's Forest Legacy Program has been guided by two prior documents: an original Modified Assessment of Need (AON) adopted March 18, 1994, and an updated Modified AON adopted March 25, 2005. Prior to the adoption of each document, the State undertook a thorough public involvement process to solicit feedback on the proposed Program guidelines. Comments received were summarized in each of the documents.

In creating this document, a public input process was undertaken to ensure that the public had ample opportunity to provide comments on its contents. Forest landowners, land conservation organizations and others interested parties were notified by email of the draft document and public comment opportunity. All towns, townships and unorganized territories proposed for addition to or removal from Maine's Forest Legacy Area were notified in writing and provided an opportunity for comment. The draft Statewide Forest Resource Assessment and Strategy document was posted for public comment on the Department of Conservation Maine Forest Service website. The general public was notified of the opportunity to comment through a media release to all major Maine media outlets and an email message to all subscribers to the agency's various listservs. This served as a means of publication for the Forest Legacy Program Assessment of Need as well. The draft Forest Legacy Program Assessment of Need was posted on the Department of Conservation Bureau of Parks and Lands' website enabling the public to submit comments online. A 30-day written comment period yielded one comment from a southern Maine land trust suggesting that Maine's Forest Legacy Area be enlarged by one town, the town of Lebanon in York County, to encompass a prospective land conservation project area. This area was thoroughly analyzed by the Maine Forest Legacy Committee prior to this most recent request. It was determined that the town of Lebanon did not contain sufficient public values as described in Section III.A.2 nor possess them at a sufficient scale to likely compete successfully against projects from other areas of the State.

VII. APPLICATION AND PRIORITIZATION PROCESS FOR MAINE FOREST LEGACY PROJECTS

Each year, the Maine Department of Conservation submits a prioritized list of potential Maine Forest Legacy Program projects to the U.S. Forest Service in hopes of securing Forest Legacy Program funding. This prioritized list is based on a ranking process undertaken by Maine's Forest Legacy Committee. In order to consider the broadest range of potential Forest Legacy Program projects from throughout Maine's Forest Legacy area, the Forest Legacy Committee issues a Request for Proposals (RFP) once each year.

Projects must be described in a proposal and submitted in five copies to the Department of Conservation Bureau of Parks and Lands (BPL) by June 1. Landowners and land protection partners interested in submitting proposals must include the following in a narrative application:

- A. A Summary Information Form (see attached);
- B. A detailed description of how the proposed project meets the Minimum Required Criteria of Maine's Forest Legacy Program (see attached list);
- C. A detailed description of how the proposed project addresses each of Maine's Forest Legacy Scoring Criteria (see attached list);
- D. A map of the project area;
- E. A signed Memorandum of Understanding between the lead State agency and the lead land protection partner (NGO) which describes the extent of the NGO's commitment to raise funds for a stewardship endowment by the date of closing, or an explanation of planned alternative approaches or commitments to stewardship;
- F. Letters of support; and
- G. A budget of the project, including the source and amount of matching funds, and detailing how the project meets Forest Legacy Program match requirements of at least 25% of the total project costs.

Proposals will first be evaluated and numerically scored by a Scoring Subcommittee of Maine's Forest Legacy Committee. The Scoring Subcommittee is comprised of the Director of the Land for Maine's Future Program and two or three other Maine Forest Legacy Committee members. No Maine Forest Legacy Committee member representing an applicant may serve on the Scoring Subcommittee. Numerical scores and a narrative assessment of each project, including a judgment as to the project's readiness, will be forwarded to the full Forest Legacy Committee. This scoring is advisory to the full Forest Legacy Committee and is intended to provide a systematic context for considering the applications. The full Forest Legacy Committee will then make a final recommendation on the selection and prioritization of that year's potential Maine Forest Legacy projects. No Forest Legacy Committee member representing an applicant, the landowner or other partner with a material interest may vote on funding recommendations. The Forest Legacy Committee member representing the Department of Conservation Bureau of Parks and Lands may vote and participate in these deliberations. Applicants will be notified of the Committee's project selection and prioritization recommendations within four months of the RFP deadline. Also at that time, the Maine Department of Conservation will submit a prioritized list, including requested funding levels, of potential Maine Forest Legacy projects to the U.S. Forest Service for funding in the following fiscal year.

A. Maine Forest Legacy Program Summary Information Form

Maine Forest Legacy Program proposals are due once each year, generally June 1st. Proposals in five copies must be sent to the Department of Conservation, Bureau of Parks and Lands, 22 State House Station, Augusta, Maine 04333-0022. An electronic copy of the proposal must also be submitted by CD or DVD. Please provide the following information as part of your Maine Forest Legacy Program proposal.

Date: _____

Project Title: _____

Project Location (township and county): _____

Name, Address, Telephone Number and Contact Person of Landowner: _____

Name, Address and Telephone Number and Contact Person of Partner Organization (if applicable): _____

Land Protection Method (easement or fee) and Management Entity Proposed: _____

Abstract of Project: _____

Estimated Total Project Cost: _____

Acquisition cost: _____

Preacquisition costs including, but not limited to, legal, survey and appraisal costs: _____

Forest Legacy Funding Request (\$) (must not exceed 75% of the above Total Project Cost): _____

Matching Funds to be provided (\$ and source) (must equal at least 25% of the Total Project Cost): _____

Annual Management Costs and Easement Stewardship Endowment Commitment (see BPL's Easement Monitoring Costs and Stewardship Endowment Levels for Maine Working Forest Easements for requirements: <http://www.maine.gov/doc/parks/forestlegacy.shtml>): _____

B. Maine Forest Legacy Program Minimum Required Criteria

1. *Parcels must be within Maine's Forest Legacy Area.*
2. *More than 50% of land must meet definition of commercial forest land (land used primarily for growth of trees to be harvested for commercial use, but does not include ledge, marsh, open swamp, bog, water and similar areas, which are unsuitable for growing a forest product or for harvesting for commercial use even though these areas may exist within forest lands).*
3. *Parcels must be threatened by conversion to non-forest use (contain characteristics making it attractive to changes so that traditional uses are at risk such as: close proximity to public roads and/or utilities; short travel time from population centers; existence of scenic values and water resources such as streams/rivers/ponds/lakes; or presence of outdoor recreation opportunities). It is recognized that pre-acquisition of land may occur by a land protection partner at the request of the State as part of the land protection strategy for particular parcels. In this case, the parcels must have been threatened by conversion to non-forest use prior to preacquisition to meet the Minimum Required Criteria for Maine's Forest Legacy Program.*
4. *Proposed holder of right, title or interest in parcel must be among those cited in Maine's Statewide Forest Resource Assessment.*
5. *To the extent that it has the legal authority to do so, the landowner must guarantee unencumbered foot access to the parcels.*
6. *Landowner must guarantee access on the parcels for non-motorized recreational uses of the parcels, such as hunting, fishing, hiking, cross-country skiing and wildlife watching by the general public.*
7. *Proposal must meet Forest Legacy Program match requirements (the Forest Legacy Program will pay no more than 75% of the total project costs).*

**C. Maine Forest Legacy Program Scoring Criteria
(for applications that meet Minimum Required Criteria)**

Maximum Total Points: 110

IMPORTANCE CRITERIA (30 points maximum)

1. Identify total size of project: (0 pts if < 10,000 Acres; 5 pts if >10,000 Acres).
2. Describe to what extent the project contains each public value
 - a. Economic benefits from timber and potential forest productivity (including landowner commitment to sustainable forest management in accordance with a management plan and whether land is third party certified; whether forestry activities contribute to the region's resource-based economy; and whether the property contains characteristics to sustain a productive forest)
 - b. Economic benefits from non-timber products (such as non-timber forest products and guided outdoor recreation)
 - c. Public recreation opportunities
 - d. High value plant and animal habitat as identified by state, regional, or federal programs, including but not limited to Significant Wildlife Habitat; Beginning with Habitat Focus Areas; habitat for rare, threatened or endangered plant or animal species (including Essential Habitat and Critical Habitat); and rare or exemplary natural communities.¹
 - e. water supply and watershed protection, and/or containing important riparian areas, wetlands, shorelines, or river systems
 - f. scenic resources (such as mountain viewsheds, undeveloped shorelines, visual access to water, areas along state highway system)
 - g. historic/cultural/tribal resources of significance as formally documented by a government agency or non-governmental organization

(1 pt for each public value significantly represented by the project; 0 additional pts if project is of primarily regional significance; 4 additional pts if project is of state significance; 8 additional pts if project is of national significance)
3. Describe access to the project for recreational purposes: (0 pts if foot access to the parcel is not being guaranteed and/or vehicle access to project will not be available; 5 pts if foot access to the parcel is being guaranteed and vehicle access to the project will be available; scoring will recognize that vehicle access to certain lands such as high elevation parcels may not be appropriate).
4. Describe the future forest management objectives, what entity will be responsible for future forest management and how the property will be sustainably managed to protect the values identified in #2. Scoring is based upon the degree to which future forest management will be consistent with the Land for Maine's Future Program's most current policy for working forest easements: (0 pts if not consistent; 5 pts if highly consistent).

¹“Relevant data to this criterion may be obtained from MDIFW, the Maine Natural Areas Program, or the U.S. Fish and Wildlife Service. Other private or non-profit sources or individuals may have additional information relevant to this criterion.

THREATENED CRITERION (20 points maximum)

5. Describe the extent to which the values identified in #2 are under threat of loss or conversion to non-forest uses (or were under threat prior to pre-acquisition). Describe the type, severity and imminence of the threat. Include a description of any legal protections that currently exist on the property; landowner circumstances; adjacent land use; and physical attributes of the parcel that could facilitate conversion: (5 pts if threat of loss or conversion is low; 10 pts if threat of loss or conversion is moderate; 20 pts if threat of loss or conversion is high).

STRATEGIC CRITERION (30 points maximum)

6. Describe the property's relevance or relationship to conservation efforts on a broader level. Describe the scale of the broader conservation plan, the scale of the project's contribution to that plan, and the placement of the project within the plan area. Describe whether the project is adjacent to or otherwise located so as to significantly enhance the values of existing conservation land. (0 pts if property is not part of a broader conservation plan; 15 pts if the property makes a modest contribution to a conservation effort and is near already protected lands; 30 pts if the property significantly advances a landscape scale or watershed-based conservation strategy through infill and/or key linkages and supports previous conservation investments.)

READINESS FACTORS AND OTHER CONSIDERATIONS (30 points maximum)

7. Describe the degree of match being provided as a percentage of the Total Project Cost (the Total Project Cost is the sum of acquisition and preacquisition costs, but does not include stewardship endowment; do not include funds raised for stewardship endowment as match): (0 pts if percent match is <50%; 5 pts if percent match is 50% or greater).
8. Describe the degree of project readiness including the status of each of the following:
 - a. preliminary appraisal
 - b. agreement on easement or fee acquisition conditions between landowner and state
 - c. cost-share commitment has been obtained from a specified source
 - d. signed option or purchase and sales agreement is held by the state or at the request of the state OR at the request of the state, conservation easement or fee title is held by a third party
 - e. title search is completed
 - f. minerals determination is completed
 - g. stewardship plan or multi-resource management plan is completed(1 pt for each readiness factor completed, up to 5 pts maximum).
9. Describe the nature of ongoing management and stewardship of the fee or easement parcel. If fee, describe the potential for the parcel to generate revenue through timber harvesting, recreational fees, or other revenue streams directly connected to the parcel. Describe the annual management and stewardship costs of the parcel and the size of endowment needed to cover these costs using, in the case of easements, the model recommended in BPL's Monitoring Costs and Stewardship Endowment Levels for Maine Working Forest Easements <http://www.maine.gov/doc/parks/forestlegacy.shtml> or more recent BPL guidance, or, in the case of fee lands, most recent BPL guidance on the issue. Describe landowner or conservation partner's commitment to raise the necessary endowment. (0 pts if easement without commitment to raise full stewardship endowment; 20 pts if easement with commitment to raise full stewardship endowment; 10 pts if fee parcel with no or partial endowment commitment; 20 pts if fee parcel with commitment to raise full stewardship endowment or applicant demonstrates that land management will yield sufficient revenue, beginning at closing, to fully support land stewardship)

VIII. MAINE FOREST LEGACY PROGRAM POLICY ISSUES

A. WINDPOWER, TRANSMISSION and COMMUNICATION TOWERS, and GRAVEL

Maine's Forest Legacy Program, insofar as it frequently employs the use of conservation easements to protect vast landscape-scale working forest, aspires to not disrupt, impede or unintentionally distort other economic functions that might be best served by that vast acreage. Often these other economic functions are unknown at the time of easement drafting, yet the easement is drafted with permanent effect. Examples include communications facilities, transmission lines, gravel extraction for local benefit or for woods road benefit, and renewable energy generation including windpower. At the same time, Maine's Forest Legacy Program seeks to be fully compliant with existing federal guidance on the use of Legacy dollars, which generally discourages or prohibits such uses. "Carve outs" of geographic areas from federally funded acquisitions where non-forest uses might occur have been a successful tool to bridge this gap, but there are various risks and expenses inherent in carve outs. As such, this document establishes a firm respect for federal guidance, yet a goal of accommodation of land uses.

- B. CONSERVATION EASEMENT AMENDMENTS, MONITORING AND ENFORCEMENT. Conservation Easement amendments, as well as circumstances involving potential easement violations, currently have little if any precedent within Maine's Forest Legacy Program. Maine's Forest Legacy Committee is not equipped or structured to review or approve conservation easement amendments which might come years or decades after a project is promoted by the Committee. Amendments and potential violations fall under strict provisions of state and federal law and guidance, with extraordinary checks and balances. As such, Maine's Forest Legacy Committee should not have a formal role in case-by-case conservation easement amendments or easement enforcement issues or violations. Maine's Forest Legacy Committee is, however, a critical sounding board regarding overarching trends and evolving practices and policies associated with these topics. The Bureau of Parks and Lands will continue to consult with and brief Maine's Forest Legacy Committee on these issues, especially if reason for new precedent emerges.
- C. ECOSYSTEM SERVICES. The Bureau of Parks and Lands recognizes that the use of forestland to provide specific ecosystem services such as carbon sequestration or the protection of public drinking water supplies is an emerging policy area. How conservation easements can best address the issue of potential future sales of ecosystem services is just one of many complex policy debates currently underway. The Bureau of Parks and Lands recognizes that the structure of ecosystem services agreements will be guided by evolving policies and laws at the federal and state level. This document does not attempt to provide guidance in this area, though Maine's Forest Legacy Committee will continue to serve as an important sounding board on such issues.

IX. NON-DISCRIMINATION

Maine's Forest Legacy Program complies with all State and Federal statutes relating to nondiscrimination and all applicable requirements of all other State and Federal laws, Executive orders, regulations, and policies. Maine's Forest Legacy Program does not discriminate on the basis of disability, race, color, creed, religion, gender, sexual orientation, age, national origin or ancestry, in admission to, access to, or operations of its programs, services, or activities, or its hiring or employment practices. This notice is provided as required by Title II of the Americans with Disabilities Act of 1990 and in accordance with the Civil Rights Act of 1964 as amended, Section 504 of the Rehabilitation Act of 1973, as amended, the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972 and the Maine Human Rights Act and Executive Order Regarding State of Maine Contracts for Services. Questions, concerns, complaints or requests for additional information regarding the ADA may be forwarded to the ADA Compliance/EEO Coordinators, Natural Resources Service Center, 155 State House Station, Augusta, Maine 04333, 207-287-2214. Individuals who need auxiliary aids for effective communication in program and services are invited to make their needs and preferences known to Bureau of Parks and Lands or Forest Legacy Program staff.

This document was prepared by Jo D. Saffair, in consultation with the Maine Forest Legacy Committee. It was reviewed and approved by: Alan Stearns, Deputy Director, Bureau of Parks and Lands, on behalf of the State Lead Agency.

Forest Legacy AON Appendices

Forest Legacy AON Appendix 1

Maine Forest Legacy Program Projects Completed and Underway as of 2010

Maine Forest Legacy Completed & Pending Projects By Fiscal Year

Completed Forest Legacy Tracts as of December, 2009 (Year Represents Year Completed, Not Fiscal Year Funded)

No.	Name	Acquisition Rights	Location	Acres	Total Cost	FLP payment
1	Cupsuptic Lake (1994)	Easement	Oxford County	1,272	843,000	843,000
2-4	Pierce Pond (1996 & 98)	Easement (s)	Somerset County	9,858	1,950,000	1,950,000
5	Nicatous Lake (2000)	Easement	Hancock County	20,268	4,500,000	3,000,000
6-11	Mt. Blue/Tumbledown Mtn. (2002, 03,04 & 06)	Fee & Easement(s)	Franklin County	25,776	7,690,000	4,240,000
12	Mattawamkeag (2003)	Easement	Aroostook County	3,338	894,700	500,000
13	Leavitt Plantation (2003)	Easement	York County	8,603	2,735,000	596,000
14-15	West Branch (2004)	Fee & Easement	Somerset County	328,364	36,167,000	19,647,000
16	Machias River Phase 1 (2004)	Fee & Easement	Washington County	6,316	2,903,000	1,987,000
17	Machias River Phase 2 (2006)	Fee	Washington and Hancock Counties	7,662	7,565,000	1,478,000
18	Katahdin Forest (2006)	Easement	Piscataquis and Penobscot Counties	194,751	23,800,000	4,437,000
19	Katahdin Iron Works (2007)	Easement	Piscataquis County	37,000	9,870,000	4,434,000
20	Grafton (2007)	Fee	Oxford County	3,688	2,850,000	2,000,000
21 -22	Lower Penobscot – Amherst Tract and Sunkhaze Corridor Tract (2007 & 09)	Fee & Easement	Hancock and Penobscot Counties	Amherst: 4,974 Sunkhaze: 12,710	Pending final accounting	2,200,000
23	Machias River Phase III: Wabassus Lake Tract (2009)	Easement (LMF fee)	Washington County	6,628	Pending final accounting	1,390,000
24	Grafton - Stowe Mountain (2009)	Easement	Oxford County	3,363	Pending final accounting	1,111,000
Total				687,300		\$50,183,000

Maine Forest Legacy Completed & Pending Projects By Fiscal Year (cont'd)

Federally Funded Forest Legacy Tracts FY2008 (Closing expected in calendar 2010 or later)

No.	Name	Acquisition Rights	Location	Acres	Total Cost	FLP award
25	Lower Penobscot – Great Pond	Easement	Penobscot and Hancock Counties	21,910	Pending final accounting	2,896,000

Federally Funded Forest Legacy Tracts FY2009 (Closing expected in calendar 2010 or later)

No.	Name	Acquisition Rights	Location	Acres	Total Cost	FLP award
26	Machias River Phase III Washington Bald Tract	Easement	Washington County	27,164	3,332,000	2,060,000

Federally Funded Forest Legacy Tracts FY2010 (Closing expected in calendar 2010 or later)

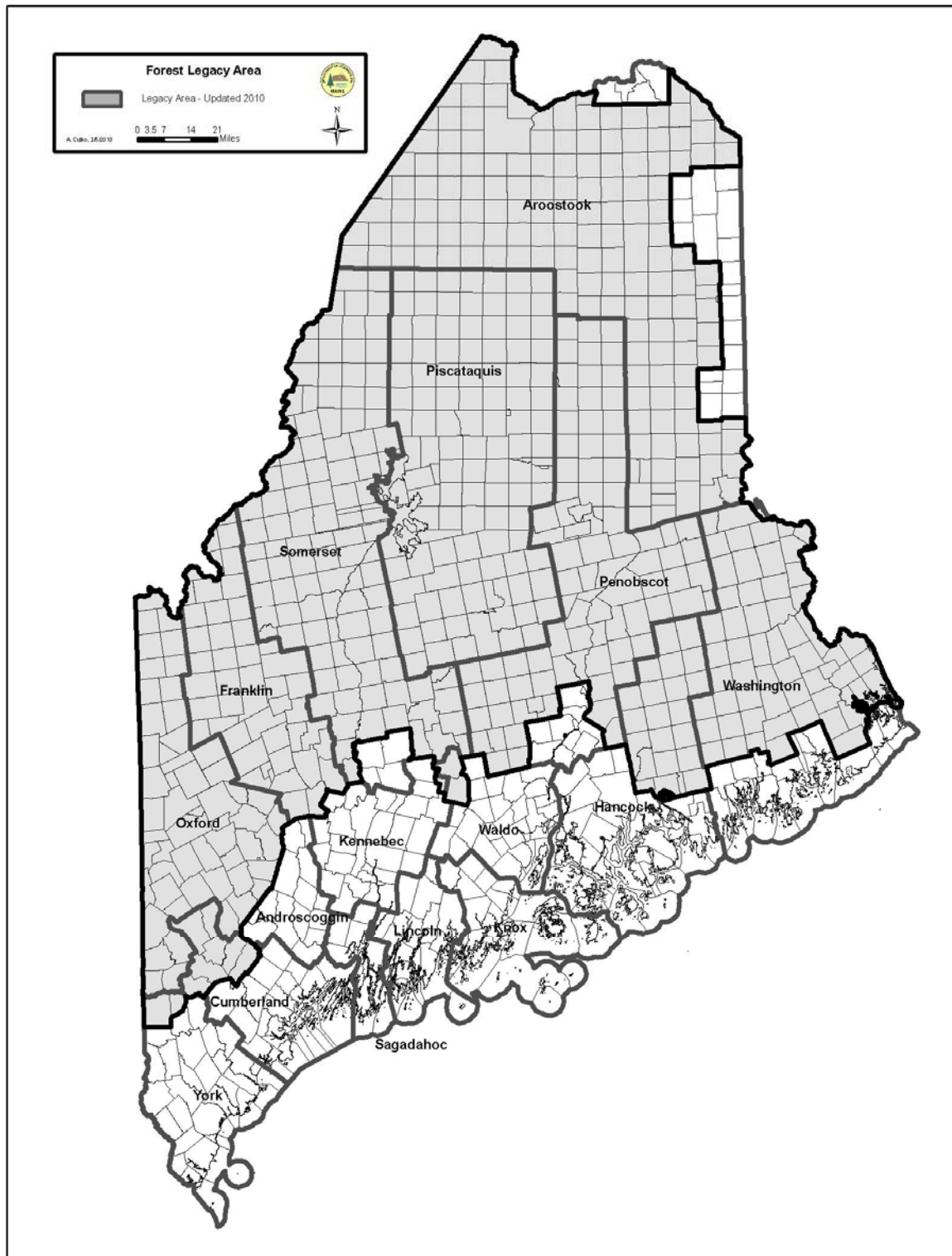
No.	Name	Acquisition Rights	Location	Acres	Total Cost	FLP award
27	Katahdin Forest Expansion (Seboeis Lake & Millinocket/East Branch)	Five tracts: Mix of Fee and Easement	Piscataquis & Penobscot Counties	17,491	9,000,000	\$3,700,000

FY2011 Federal Priority Requests/pending congressional action

No.	Name	Acquisition Rights	Location	Acres	Total Cost	President's budget proposal
28	West Grand Lake	Easement	Washington County	21,700	\$14,897,000	\$6,675,000
29	KFE III (Gulf Hags Mtn)	Mix of fee/easement	Piscataquis County	32,000	\$4,700,000	\$1,500,000

Forest Legacy AON Appendix 2

Maine Forest Legacy Area Map and Town/Township List



TOWN	COUNTY		
Abbot	Piscataquis	Brassua Twp	Somerset
Adamstown Twp	Oxford	Brewer	Penobscot
Albany Twp	Oxford	Bridgton	Cumberland
Alder Brook Twp	Somerset	Brighton Plt	Somerset
Alder Stream Twp	Franklin	Brookton Twp	Washington
Alexander	Washington	Brownfield	Oxford
Allagash	Aroostook	Brownville	Piscataquis
Alton	Penobscot	Buckfield	Oxford
Amherst	Hancock	Burlington	Penobscot
Amity	Aroostook	Burnham	Waldo
Andover	Oxford	Byron	Oxford
Andover North Surplus	Oxford	C Surplus	Oxford
Andover West Surplus Twp	Oxford	Calais	Washington
Anson	Somerset	Cambridge	Somerset
Appleton Twp	Somerset	Canaan	Somerset
Argyle Twp	Penobscot	Canton	Oxford
Ashland	Aroostook	Caratunk	Somerset
Athens	Somerset	Carmel	Penobscot
Atkinson	Piscataquis	Carrabassett Valley	Franklin
Attean Twp	Somerset	Carroll Plt	Penobscot
Aurora	Hancock	Carrying Place Town Twp	Somerset
Avon	Franklin	Carrying Place Twp	Somerset
Baileyville	Washington	Carthage	Franklin
Bald Mountain Twp T2 R3	Somerset	Cary Plt	Aroostook
Bald Mountain Twp T4 R3	Somerset	Casco	Cumberland
Baldwin	Cumberland	Castle Hill	Aroostook
Bancroft	Aroostook	Caswell	Aroostook
Bangor	Penobscot	Centerville Twp	Washington
Baring Plt	Washington	Chain of Ponds Twp	Franklin
Barnard Twp	Piscataquis	Chapman	Aroostook
Batchelders Grant Twp	Oxford	Charleston	Penobscot
Beattie Twp	Franklin	Charlotte	Washington
Beaver Cove	Piscataquis	Chase Stream Twp	Somerset
Beddington	Washington	Chester	Penobscot
Benedicta Twp	Aroostook	Chesterville	Franklin
Bethel	Oxford	Chesuncook Twp	Piscataquis
Big Moose Twp	Piscataquis	Clifton	Penobscot
Big Six Twp	Somerset	Coburn Gore	Franklin
Big Ten Twp	Somerset	Codyville Plt	Washington
Big Twenty Twp	Aroostook	Comstock Twp	Somerset
Big W Twp	Somerset	Concord Twp	Somerset
Bigelow Twp	Somerset	Connor Twp	Aroostook
Bingham	Somerset	Cooper	Washington
Blake Gore	Somerset	Coplin Plt	Franklin
Blanchard Twp	Piscataquis	Corinna	Penobscot
Bowdoin College Grant East Twp	Piscataquis	Corinth	Penobscot
Bowdoin College Grant West Twp	Piscataquis	Cornish	York
Bowerbank	Piscataquis	Cornville	Somerset
Bowmantown Twp	Oxford	Cove Point Twp	Piscataquis
Bowtown Twp	Somerset	Cox Patent	Aroostook
Bradford	Penobscot	Crawford	Washington
Bradley	Penobscot	Cross Lake Twp	Aroostook
		Crystal	Aroostook
		Cutler	Washington
		Cyr Plt	Aroostook
		Dallas Plt	Franklin
		Danforth	Washington
Bradstreet Twp	Somerset	Davis Twp	Franklin

Days Academy Grant Twp	Piscataquis	Greenville	Piscataquis
Dead River Twp	Somerset	Greenwood	Oxford
Deblois	Washington	Grindstone Twp	Penobscot
Denmark	Oxford	Guilford	Piscataquis
Dennistown Plt	Somerset	Hamlin	Aroostook
Dennysville	Washington	Hammond	Aroostook
Dennysville	Washington	Hammond Twp	Somerset
Detroit	Somerset	Hampden	Penobscot
Devereaux Twp	Washington	Hanover	Oxford
Dexter	Penobscot	Harfords Point Twp	Piscataquis
Dixfield	Oxford	Harmony	Somerset
Dixmont	Penobscot	Harrison	Cumberland
Dole Brook Twp	Somerset	Hartford	Oxford
Dover-Foxcroft	Piscataquis	Hartland	Somerset
Drew Plt	Penobscot	Haynesville	Aroostook
Dudley Twp	Aroostook	Hebron	Oxford
Dyer Brook	Aroostook	Hersey	Aroostook
Dyer Twp	Washington	Herseytown Twp	Penobscot
E Twp	Aroostook	Highland Plt	Somerset
Eagle Lake	Aroostook	Hiram	Oxford
Eagle Lake Twp	Piscataquis	Hobbstown Twp	Somerset
East Middlesex Canal Grant Twp	Piscataquis	Holeb Twp	Somerset
East Millinocket	Penobscot	Hopkins Academy Grant Twp	Penobscot
East Moxie Twp	Somerset	Howland	Penobscot
Eastport	Washington	Hudson	Penobscot
Ebeemee Twp	Piscataquis	Indian Stream Twp	Somerset
Edinburg	Penobscot	Indian Twp Res	Washington
Edmunds Twp	Washington	Industry	Franklin
Elliottsville Twp	Piscataquis	Island Falls	Aroostook
Elm Stream Twp	Somerset	Islands of Moosehead Lake	Piscataquis
Embden	Somerset	Jackman	Somerset
Enfield	Penobscot	Jay	Franklin
Etna	Penobscot	Jim Pond Twp	Franklin
Eustis	Franklin	Johnson Mountain Twp	Somerset
Exeter	Penobscot	Katahdin Iron Works Twp	Piscataquis
Farmington	Franklin	Kenduskeag	Penobscot
Flagstaff Twp	Somerset	Kibby Twp	Franklin
Fletchers Landing Twp	Hancock	Kineo Twp	Piscataquis
Forest Twp	Washington	King & Bartlett Twp	Somerset
Forkstown Twp	Aroostook	Kingfield	Franklin
Forsyth Twp	Somerset	Kingman Twp	Penobscot
Fort Kent (west of Rt 11)	Aroostook	Kingsbury Plt	Piscataquis
Fowler Twp	Washington	Kossuth Twp	Washington
Franklin	Hancock	Lagrange	Penobscot
Freeman Twp	Franklin	Lake View Plt	Piscataquis
Frenchtown Twp	Piscataquis	Lakeville	Penobscot
Fryeburg	Oxford	Lambert Lake Twp	Washington
Garfield Plt	Aroostook	Lang Twp	Franklin
Garland	Penobscot	Lee	Penobscot
Gilead	Oxford	Levant	Penobscot
Glenburn	Penobscot	Lexington Twp	Somerset
Glenwood Plt	Aroostook	Lily Bay Twp	Piscataquis
Gorham Gore	Franklin	Lincoln	Penobscot
Grafton Twp	Oxford	Lincoln Plt	Oxford
Grand Falls Twp	Penobscot	Little W Twp	Somerset
Grand Isle	Aroostook	Lobster Twp	Piscataquis
Grand Lake Stream Plt	Washington	Long A Twp	Penobscot
Great Pond	Hancock	Long Pond Twp	Somerset
Greenbush	Penobscot	Lovell	Oxford
Greenfield Twp	Penobscot	Lowell	Penobscot

Lowelltown Twp	Franklin	Oqiton Twp	Hancock
Lower Cupsuptic Twp	Oxford	Orient	Aroostook
Lower Enchanted Twp	Somerset	Orneville Twp	Piscataquis
Lynchtown Twp	Oxford	Osborn	Hancock
Machiasport	Washington	Otisfield	Oxford
Macwahoc Plt	Aroostook	Oxbow Plt	Aroostook
Madison	Somerset	Oxbow Twp	Oxford
Madrid Twp	Franklin	Oxford	Oxford
Magalloway Plt	Oxford	Palmyra	Somerset
Mariaville	Hancock	Paris	Oxford
Marion Twp	Washington	Parkertown Twp	Oxford
Masardis	Aroostook	Parkman	Piscataquis
Mason Twp	Oxford	Parlin Pond Twp	Somerset
Massachusetts Gore	Franklin	Parmachenee Twp	Oxford
Mattamiscontis Twp	Penobscot	Parsonsfield	York
Mattawamkeag	Penobscot	Passadumkeag	Penobscot
Maxfield	Penobscot	Patten	Penobscot
Mayfield Twp	Somerset	Pembroke	Washington
Meddybemps	Washington	Perham	Aroostook
Medford	Piscataquis	Perkins Twp	Franklin
Medway	Penobscot	Perry	Washington
Mercer	Somerset	Peru	Oxford
Merrill	Aroostook	Phillips	Franklin
Merrill Strip Twp	Franklin	Pierce Pond Twp	Somerset
Mexico	Oxford	Pittsfield	Somerset
Milford	Penobscot	Pittston Academy Grant	Somerset
Millinocket	Penobscot	Pleasant Point	Washington
Milo	Piscataquis	Pleasant Ridge Plt	Somerset
Milton Twp	Oxford	Plymouth	Penobscot
Misery Gore Twp	Somerset	Plymouth Twp	Somerset
Misery Twp	Somerset	Portage Lake	Aroostook
Molunkus Twp	Aroostook	Porter	Oxford
Monson	Piscataquis	Prentiss Twp T4 R4 NBKP	Somerset
Moose River	Somerset	Prentiss Twp T7 R3 NBPP	Penobscot
Moosehead Junction Twp	Piscataquis	Princeton	Washington
Moro Plt	Aroostook	Pukakon Twp	Penobscot
Moscow	Somerset	Rainbow Twp	Piscataquis
Mount Abram Twp	Franklin	Rangeley	Franklin
Mount Chase	Penobscot	Rangeley Plt	Franklin
Mount Katahdin Twp	Piscataquis	Raymond	Cumberland
Moxie Gore	Somerset	Redington Twp	Franklin
Naples	Cumberland	Reed Plt	Aroostook
Nashville Plt	Aroostook	Richardsontown Twp	Oxford
Nesourdnahunk Twp	Piscataquis	Riley Twp	Oxford
New Canada	Aroostook	Ripley	Somerset
New Portland	Somerset	Robbinston	Washington
New Sharon	Franklin	Rockwood Strip T1 R1 NBKP	Somerset
New Sweden	Aroostook	Rockwood Strip T2 R1 NBKP	Somerset
New Vineyard	Franklin	Roxbury	Oxford
Newburgh	Penobscot	Rumford	Oxford
Newport	Penobscot	Russell Pond Twp	Somerset
Newry	Oxford	Saint Albans	Somerset
No 14 Twp	Washington	Saint Croix Twp	Aroostook
No 21 Twp	Washington	Saint Francis	Aroostook
North Yarmouth Academy Grant	Aroostook	Saint John Plt	Aroostook
Twp		Saint John Twp	Somerset
Northeast Carry Twp	Piscataquis	Sakom Twp	Washington
Northfield	Washington	Salem Twp	Franklin
Norway	Oxford	Sandbar Tract Twp	Somerset
Oakfield	Aroostook	Sandbar Tract Twp	Somerset

Sandwich Academy Grant Twp	Somerset	T11 R14 WELS	Aroostook
Sandy Bay Twp	Somerset	T11 R15 WELS	Aroostook
Sandy River Plt	Franklin	T11 R16 WELS	Aroostook
Sangerville	Piscataquis	T11 R17 WELS	Aroostook
Sapling Twp	Somerset	T11 R3 NBPP	Washington
Sebago	Cumberland	T11 R4 WELS	Aroostook
Sebec	Piscataquis	T11 R7 WELS	Aroostook
Seboeis Plt	Penobscot	T11 R8 WELS	Aroostook
Seboomook Twp	Somerset	T11 R9 WELS	Aroostook
Seven Ponds Twp	Franklin	T12 R10 WELS	Aroostook
Shawtown Twp	Piscataquis	T12 R11 WELS	Aroostook
Sherman	Aroostook	T12 R12 WELS	Aroostook
Shirley	Piscataquis	T12 R13 WELS	Aroostook
Silver Ridge Twp	Aroostook	T12 R14 WELS	Aroostook
Skinner Twp	Franklin	T12 R15 WELS	Aroostook
Smyrna	Aroostook	T12 R16 WELS	Aroostook
Soldiertown Twp T2 R3 NBKP	Somerset	T12 R17 WELS	Aroostook
Soldiertown Twp T2 R7 WELS	Penobscot	T12 R7 WELS	Aroostook
Solon	Somerset	T12 R8 WELS	Aroostook
Soper Mountain Twp	Piscataquis	T12 R9 WELS	Aroostook
Spencer Bay Twp	Piscataquis	T13 R10 WELS	Aroostook
Springfield	Penobscot	T13 R11 WELS	Aroostook
Squapan Twp	Aroostook	T13 R12 WELS	Aroostook
Squaretown Twp	Somerset	T13 R13 WELS	Aroostook
Stacyville	Penobscot	T13 R14 WELS	Aroostook
Starks	Somerset	T13 R15 WELS	Aroostook
Stetson	Penobscot	T13 R16 WELS	Aroostook
Stetsontown Twp	Franklin	T13 R5 WELS	Aroostook
Stockholm	Aroostook	T13 R7 WELS	Aroostook
Stoneham	Oxford	T13 R8 WELS	Aroostook
Stow	Oxford	T13 R9 WELS	Aroostook
Strong	Franklin	T14 R10 WELS	Aroostook
Summit Twp	Penobscot	T14 R11 WELS	Aroostook
Sumner	Oxford	T14 R12 WELS	Aroostook
Sweden	Oxford	T14 R13 WELS	Aroostook
T1 R10 WELS	Piscataquis	T14 R14 WELS	Aroostook
T1 R11 WELS	Piscataquis	T14 R15 WELS	Aroostook
T1 R12 WELS	Piscataquis	T14 R16 WELS	Aroostook
T1 R13 WELS	Piscataquis	T14 R5 WELS	Aroostook
T1 R5 WELS	Aroostook	T14 R6 WELS	Aroostook
T1 R6 WELS	Penobscot	T14 R7 WELS	Aroostook
T1 R8 WELS	Penobscot	T14 R8 WELS	Aroostook
T1 R9 WELS	Piscataquis	T14 R9 WELS	Aroostook
T10 R10 WELS	Piscataquis	T15 R10 WELS	Aroostook
T10 R11 WELS	Piscataquis	T15 R11 WELS	Aroostook
T10 R12 WELS	Piscataquis	T15 R12 WELS	Aroostook
T10 R13 WELS	Piscataquis	T15 R13 WELS	Aroostook
T10 R14 WELS	Piscataquis	T15 R14 WELS	Aroostook
T10 R15 WELS	Piscataquis	T15 R15 WELS	Aroostook
T10 R16 WELS	Somerset	T15 R5 WELS	Aroostook
T10 R3 WELS	Aroostook	T15 R6 WELS	Aroostook
T10 R6 WELS	Aroostook	T15 R8 WELS	Aroostook
T10 R7 WELS	Aroostook	T15 R9 WELS	Aroostook
T10 R8 WELS	Aroostook	T16 MD	Hancock
T10 R9 WELS	Piscataquis	T16 R12 WELS	Aroostook
T10 SD	Hancock	T16 R13 WELS	Aroostook
T11 R10 WELS	Aroostook	T16 R14 WELS	Aroostook
T11 R11 WELS	Aroostook	T16 R4 WELS	Aroostook
T11 R12 WELS	Aroostook	T16 R5 WELS	Aroostook
T11 R13 WELS	Aroostook	T16 R6 WELS	Aroostook

T16 R8 WELS	Aroostook	T4 R13 WELS	Piscataquis
T16 R9 WELS	Aroostook	T4 R14 WELS	Piscataquis
T17 R12 WELS	Aroostook	T4 R15 WELS	Piscataquis
T17 R13 WELS	Aroostook	T4 R17 WELS	Somerset
T17 R14 WELS	Aroostook	T4 R3 WELS	Aroostook
T17 R3 WELS	Aroostook	T4 R5 NBKP	Somerset
T17 R4 WELS	Aroostook	T4 R7 WELS	Penobscot
T18 ED BPP	Washington	T4 R8 WELS	Penobscot
T18 MD BPP	Washington	T4 R9 NWP	Piscataquis
T18 R10 WELS	Aroostook	T4 R9 WELS	Piscataquis
T18 R11 WELS	Aroostook	T40 MD	Hancock
T18 R12 WELS	Aroostook	T41 MD	Hancock
T18 R13 WELS	Aroostook	T42 MD BPP	Washington
T19 ED BPP	Washington	T43 MD BPP	Washington
T19 MD BPP	Washington	T5 R11 WELS	Piscataquis
T19 R11 WELS	Aroostook	T5 R12 WELS	Piscataquis
T19 R12 WELS	Aroostook	T5 R14 WELS	Piscataquis
T2 R10 WELS	Piscataquis	T5 R15 WELS	Piscataquis
T2 R10 WELS	Piscataquis	T5 R17 WELS	Somerset
T2 R12 WELS	Piscataquis	T5 R18 WELS	Somerset
T2 R13 WELS	Piscataquis	T5 R19 WELS	Somerset
T2 R4 WELS	Aroostook	T5 R20 WELS	Somerset
T2 R8 NWP	Penobscot	T5 R6 BKP WKR	Somerset
T2 R8 WELS	Penobscot	T5 R7 BKP WKR	Somerset
T2 R9 NWP	Penobscot	T5 R7 WELS	Penobscot
T2 R9 WELS	Piscataquis	T5 R8 WELS	Penobscot
T2 R9 WELS	Piscataquis	T5 R9 WELS	Piscataquis
T2 R9 WELS	Piscataquis	T6 ND BPP	Washington
T22 MD	Hancock	T6 R1 NBPP	Washington
T24 MD BPP	Washington	T6 R10 WELS	Piscataquis
T25 MD BPP	Washington	T6 R11 WELS	Piscataquis
T26 ED BPP	Washington	T6 R12 WELS	Piscataquis
T27 ED BPP	Washington	T6 R13 WELS	Piscataquis
T28 MD	Hancock	T6 R14 WELS	Piscataquis
T3 Indian Purchase Twp	Penobscot	T6 R15 WELS	Piscataquis
T3 ND	Hancock	T6 R17 WELS	Somerset
T3 R1 NBPP	Penobscot	T6 R18 WELS	Somerset
T3 R10 WELS	Piscataquis	T6 R6 WELS	Penobscot
T3 R11 WELS	Piscataquis	T6 R7 WELS	Penobscot
T3 R12 WELS	Piscataquis	T6 R8 WELS	Penobscot
T3 R13 WELS	Piscataquis	T7 R10 WELS	Piscataquis
T3 R3 WELS	Aroostook	T7 R11 WELS	Piscataquis
T3 R4 BKP WKR	Somerset	T7 R12 WELS	Piscataquis
T3 R4 WELS	Aroostook	T7 R13 WELS	Piscataquis
T3 R5 BKP WKR	Somerset	T7 R14 WELS	Piscataquis
T3 R7 WELS	Penobscot	T7 R15 WELS	Piscataquis
T3 R8 WELS	Penobscot	T7 R16 WELS	Somerset
T3 R9 NWP	Penobscot	T7 R17 WELS	Somerset
T30 MD BPP	Washington	T7 R18 WELS	Somerset
T31 MD BPP	Washington	T7 R19 WELS	Somerset
T32 MD	Hancock	T7 R5 WELS	Aroostook
T34 MD	Hancock	T7 R6 WELS	Penobscot
T35 MD	Hancock	T7 R7 WELS	Penobscot
T36 MD BPP	Washington	T7 R8 WELS	Penobscot
T37 MD BPP	Washington	T7 R9 NWP	Piscataquis
T39 MD	Hancock	T7 R9 WELS	Piscataquis
T4 Indian Purchase Twp	Penobscot	T8 R10 WELS	Piscataquis
T4 R10 WELS	Piscataquis	T8 R11 WELS	Piscataquis
T4 R11 WELS	Piscataquis	T8 R14 WELS	Piscataquis
T4 R12 WELS	Piscataquis	T8 R15 WELS	Piscataquis

T8 R16 WELS	Somerset	Wade	Aroostook
T8 R17 WELS	Somerset	Waite	Washington
T8 R18 WELS	Somerset	Wallagrass	Aroostook
T8 R19 WELS	Somerset	Waltham	Aroostook
T8 R3 NBPP	Washington	Washington Twp	Franklin
T8 R3 WELS	Aroostook	Waterford	Oxford
T8 R4 NBPP	Washington	Webbertown Twp	Aroostook
T8 R5 WELS	Aroostook	Webster Plt	Penobscot
T8 R6 WELS	Penobscot	Weld	Franklin
T8 R7 WELS	Penobscot	Wellington	Piscataquis
T8 R8 WELS	Penobscot	Wesley	Washington
T8 R9 WELS	Piscataquis	West Forks Plt	Somerset
T9 R10 WELS	Piscataquis	West Middlesex Canal Grant	Somerset
T9 R11 WELS	Piscataquis	West Paris	Oxford
T9 R12 WELS	Piscataquis	Westfield	Aroostook
T9 R13 WELS	Piscataquis	Westmanland	Aroostook
T9 R14 WELS	Piscataquis	Weston	Aroostook
T9 R15 WELS	Piscataquis	Whiting	Washington
T9 R16 WELS	Somerset	Williamsburg Twp	Piscataquis
T9 R17 WELS	Somerset	Willimantic	Piscataquis
T9 R18 WELS	Somerset	Wilton	Franklin
T9 R3 WELS	Aroostook	Winn	Penobscot
T9 R4 WELS	Aroostook	Winterville Plt	Aroostook
T9 R5 WELS	Aroostook	Woodstock	Oxford
T9 R7 WELS	Aroostook	Woodville	Penobscot
T9 R8 WELS	Aroostook	Wyman Twp	Franklin
T9 R9 WELS	Piscataquis		
T9 SD	Hancock		
TA R10 WELS	Piscataquis		
TA R11 WELS	Piscataquis		
TA R2 WELS	Aroostook		
TA R7 WELS	Penobscot		
Talmadge	Washington		
Taunton & Raynham Academy Grant	Somerset		
TB R10 WELS	Piscataquis		
TB R11 WELS	Piscataquis		
TC R2 WELS	Aroostook		
TD R2 WELS	Aroostook		
Temple	Franklin		
The Forks Plt	Somerset		
Thorndike Twp	Somerset		
Tim Pond Twp	Franklin		
Tomhegan Twp	Somerset		
Topsfield	Washington		
Township 6 North of Weld	Franklin		
Township C	Oxford		
Township D	Franklin		
Township E	Franklin		
Trout Brook Twp	Piscataquis		
TX R14 WELS	Piscataquis		
Unity	Waldo		
Unity Twp	Kennebec		
Upper Cupsuptic Twp	Oxford		
Upper Enchanted Twp	Somerset		
Upper Molunkus Twp	Aroostook		
Upton	Oxford		
Van Buren	Aroostook		
Vanceboro	Washington		
Veazie Gore	Penobscot		

Forest Legacy AON Appendix 3

USDA Forest Service Letter Approving Lead Agency Designation & Boundary Change



Forest
Service

Northeastern Area
State and Private
Forestry

Newtown Square Corporate Campus
14 Campus Boulevard, Suite 200
Newtown Square, Pennsylvania 19073

File Code: 3200

Date: July 2, 2001

Ralph Knoll, Director
Planning and Land Acquisition
Bureau of Parks and Lands
22 State House Station
Augusta, ME 04333

Dear Mr. Knoll:

Please note this letter is to serve two purposes. The first purpose is to acknowledge the Maine Bureau of Parks and Lands as the State Lead Agency for the Forest Legacy Program (FLP). This is at the request of Governor King in a letter dated May 11, 2001. I understand that the Maine Forest Service, the former State Lead Agency, will continue to be involved in the Forest Legacy Program (FLP) through the Maine Forest Stewardship Committee. Your activities as the State Lead Agency should be coordinated with Deirdre Raimo, Forest Legacy Program Manager for the Northeastern Area. Deirdre may be reached at (603) 868 - 7695 or draino@fs.fed.us.

The second purpose is to respond to the request of the Maine Forest Legacy Committee, acting on behalf of the Maine Stewardship Committee, for a Forest Legacy Area Boundary change. The boundary change requested is acceptable with reconciliation of certain boundary discrepancies noted below.

The boundary change as requested meets Maine's Eligibility Criteria and will complement Maine's current efforts to achieve FLP goals. The public support as explained in your justification is essential to maintaining a viable FLP. However, a discrepancy in the boundary of the Maine Forest Legacy Area was noted when evaluating your request. The Modified Assessment of Need for Maine, which was approved by the Secretary on March 18, 1994, displayed the Forest Legacy Area by shading in a township map. The boundary was described by listing all the towns within the Forest Legacy Area. There were certain towns or townships that were shaded on the Forest Legacy Area map but not listed in the accompanying list of towns. In addition, the boundary description had listed some towns to be included in the Forest Legacy Area but these towns were not shaded on the map. Some of these towns are included in your current proposal to expand the Forest Legacy Area. The Maine Modified Assessment of Need describes the initial Forest Legacy Area as encompassing the "Northern Forest Lands Study Area". Thus, when determining which towns were intended to be in the Area initially and which were not, the "Northern Forest Lands Study" of April 1990 boundary was checked and towns that could be interpreted to be in the Study Area were included and those that did not fit in the Study area were excluded.

Towns for which there was a discrepancy and are considered to be in the Maine Forest Legacy Area are Hammond and Milford. Towns for which there was a discrepancy and are not considered to be in the Maine Forest Legacy Area include Blue Hill and Verona. As the remaining towns are included in your proposal, they are not listed here.




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Your boundary change request for the Forest Legacy Area to include the additional towns as stated in your letter of June 20, 2001 is hereby approved.

Sincerely,


KATHRYN P. MALONEY
Area Director

cc:
Tom Doak, Maine State Forester
Karen Mollander
Deirdre Raimo
Robin Morgan
Rick Cooksey

Forest Legacy AON Appendix 4
Stewardship Committee Authorizing the Maine Forest Legacy
Committee
to Act on its Behalf



JOHN ELIAS BALDACCI
GOVERNOR

STATE OF MAINE
DEPARTMENT OF CONSERVATION
MAINE FOREST SERVICE
22 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0022

PATRICK K. MCGOWAN
COMMISSIONER

April 28, 2004

Re: Maine Forest Legacy Stewardship Committee

To Whom It May Concern:

The Maine Department of Conservation has served as the lead agency for the federal Forest Legacy program in Maine since its inception. Initially, the Bureau of Forestry (aka Maine Forest Service), as the State forestry agency, had oversight of the program. However, the Bureau of Parks and Lands, as the primary agency in Maine that acquires and manages public land, became heavily involved in the mid-1990s. The USDA Forest Service Northeastern Area officially recognized this role in July, 2001, when it transferred oversight of Maine's Forest Legacy program to the Bureau of Parks and Lands.

The Forest Legacy program in each state officially comes under the purview of the State Stewardship Committee. However, in 1993, Maine's State Stewardship Committee created a Forest Legacy Committee to address the needs of the program more efficiently. The State Stewardship Committee collaborates with and offers advice to Maine Forest Service primarily in regard to management assistance and outreach programs targeting small landowners. The Forest Legacy Committee, in cooperation with the Bureau of Parks and Lands, focuses solely on implementation of the Forest Legacy program, which in Maine has dealt almost exclusively with larger tracts in industrial or land management company ownership.

The Forest Legacy committee operates independently of the State Stewardship Committee, due to the separation in both the agency exercising oversight and in area of responsibility. The State Stewardship Committee no longer exercises authority over Maine's Forest Legacy Program. The Stewardship Committee delegated that responsibility to the Forest Legacy Committee in 1993.

The Department of Conservation seeks formal recognition of this delegation of responsibility from the State Stewardship Committee to Maine's Forest Legacy Committee, as part of its 2004 revision of the Forest Legacy Modified Assessment of Need.

Sincerely,

Morten Moesswilde, Landowner Outreach Forester
Maine Forest Service - Forest Policy and Management Division
Maine Department of Conservation



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R. ALEC GIFFEN, DIRECTOR

PHONE: (207) 287-2791 OR 1-800-367-0223
FAX: (207) 287-8422
TTY: (207) 287-2213
www.maine.gov/doc/mfs

We help you make informed decisions about Maine's forests

Forest Legacy AON Appendix 5
USDA Forest Service Letter Approving Maine's March 2005
Modified Assessment of Need



United States
Department of
Agriculture

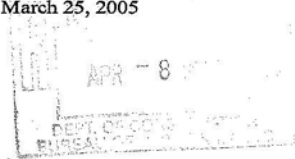
Forest
Service

Northeastern Area
State and Private Forestry

Newtown Square Corporate Campus
11 Campus Boulevard, Suite 200
Newtown Square, PA 19073

File Code: 3000/3200
Date: March 25, 2005

Mr. Ralph Knoll
Deputy Director, Bureau of Parks and Lands
Maine Department of Conservation
22 State House Station
Augusta, Maine 04333-0022



Dear Mr. Knoll:

Your submission of an updated Maine Modified Assessment of Need (MAON) for the Forest Legacy Program (FLP) in a letter dated March 7, 2005 has been reviewed. In accordance with the Forest Legacy Guidelines of June 30, 2003, the Updated Maine MAON includes no elements that cause it to be a Significant Amendment to the Maine MAON currently in use -- March 18, 1994 approval date -- thus, approval takes place at the Northeastern Area USDA Forest Service office. I approve the March 2005 Maine Forest Legacy Program Modified Assessment of Need.

The MAON reflects the changes that have evolved in the Maine FLP, such as project prioritization; and incorporates some clarifications in key definitions as well as the interactions of the Maine Forest Stewardship and Maine Forest Legacy committees. The public involvement and involvement of the Maine Forest Legacy committee in reviewing the document and your incorporation of their concerns helps assure that the program course is acceptable to the public. Approval of the Updated Maine MAON signifies that the 2005 document will guide Maine in implementing the FLP into the foreseeable future.

Maine is to be commended for the initiative and spirit exhibited to undertake an Assessment of Need (AON) Update without significant written guidance on how to proceed. As the first state in the Area to undertake an update, you demonstrated extra effort and coordination with the Northeastern Area. The Northeastern Area appreciates your leadership in this regard.

If you have any questions about FLP implementation, please contact Deirdre Raimo at (603) 868 -- 7695 or by email draimo@fs.fed.us.

Sincerely,


KATHRYN P. MALONEY
Area Director

cc:
Alec Giffen
Deirdre Raimo
Robin Morgan
Terry Hoffman
Rick Cooksey
Neal Bungard
Scott Stewart



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Forest Legacy AON Appendix 6

Maine Forest Legacy Committee Purpose and Membership

Purpose

The Maine Forest Legacy Committee was established in 1993 by Maine's State Stewardship Committee "to work with the Maine Forest Service on matters related to the Forest Legacy Program." Its purpose today remains largely the same: to provide input to the Maine Department of Conservation Bureau of Parks and Lands, the lead agency for Maine's Forest Legacy Program, regarding the management and implementation of the Forest Legacy Program in Maine.

Committee Responsibilities

It is the Maine Forest Legacy Committee's responsibility to:

- Review and make recommendations on appropriate Maine Forest Legacy Program policies, procedures, and other programmatic materials except those explicitly excluded by reference in other parts of this document;
- Administer an annual Request For Proposals process to solicit new Maine Forest Legacy Program projects;
- Review and rank project proposals submitted;
- Maintain a list of currently active and viable Forest Legacy Program projects;
- Make recommendations to the Bureau of Parks and Lands regarding the prioritization of projects for Forest Legacy Program funding;
- Provide input on the range of values to be protected within Maine Forest Legacy Program projects;
- Periodically review the Maine Forest Legacy Program Assessment of Need
- Monitor the Forest Legacy Program's structure to ensure that it continues to meet the forest land protection needs of the State; and
- Ensure that support for the Forest Legacy Program remains strong within Maine and nationally.

Committee Membership

The Committee is intended to represent a broad range of agencies and organizations with interest and expertise in forest and land conservation issues while being of a reasonable size to remain efficient. Each Committee member embraces the principles and concepts of the Forest Legacy Program, is willing to work positively within the Committee structure to achieve the Forest Legacy Program's goals, and has a strong understanding of and commitment to seeing the economic, recreational, and ecological values and traditions of Maine's forestlands maintained.

The Committee consists of 12 members some of whom are permanent members, but most of whom hold staggered three year terms. Committee member terms are limited to one term. Committee members are chosen by the Director of the Bureau of Parks and Lands. Standing Committee members and others may make recommendations to the Bureau Director regarding potential Committee candidates at any time. Public participation is welcome at Committee meetings.

It is the responsibility of each member of the Maine Forest Legacy Committee to:

- Regularly attend and participate in Maine Forest Legacy Committee meetings, which are held from 3-6 times/year;
- Review Committee materials prior to Committee meetings;
- Periodically serve on subcommittees or otherwise perform special assignments;
- Bring unique expertise to the Committee based on the members' affiliation with a particular interest group, organization, or agency;
- Provide input into the development and review of Maine Forest Legacy Program policies, procedures and other programmatic materials except those explicitly excluded by reference in other sections of this document;
- Evaluate project proposals and make recommendations regarding their merits, priority and funding level as Maine Forest Legacy projects; and
- Serve as an advocate for the Forest Legacy Program.

Maine Forest Legacy Committee members represent the following interests, organizations, and state agencies:

- 1/2. Two large landowners/land managers (representing a private industrial landowner, private non-industrial landowner, family ownership, and/or timber investment management organization)
3. Statewide sportsman's organization
4. Statewide environmental advocacy organization
- 5/6. Two statewide non-profit land conservation partners
7. Wood harvester or processor
8. Public Representative who resides within Maine's Forest Legacy area - individual will fill gap in skills/interests otherwise not represented on Committee
9. Dept. of Conservation, Bureau of Parks and Lands, Deputy Director– permanent position
10. Maine Forest Service, State Forester Designee – permanent position
11. Dept. of Inland Fisheries & Wildlife, Director of Resource Management– permanent position

Appendix 6. GIS Analysis Datasets

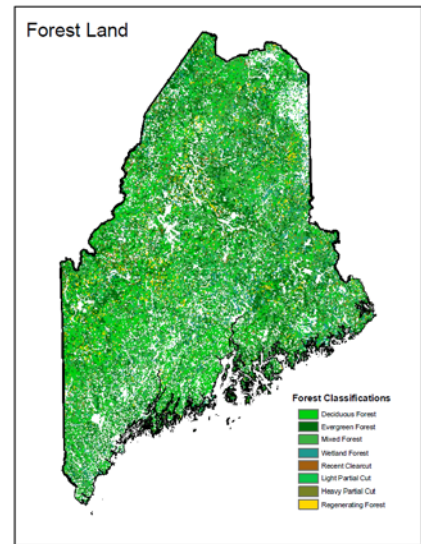
Most of the GIS data is available from the Maine Geographic Information System (MEGIS) website <http://megis.maine.gov/> (unless otherwise noted).

Dataset: Forest Land

Data Type: Grid 30 m (sharpened to 5m)

Data Source: 2004 MELCD Maine Land Cover Dataset

Description: 2004 MELCD is a land cover map for Maine primarily derived from Landsat Thematic Mapper 5 and 7 imagery, from the years 1999-2001. This imagery constitutes the basis for the National Land Cover Dataset (NLCD 2001) and the NOAA Coastal Change Analysis Program (C-CAP). This land cover map was refined to the State of Maine requirements using SPOT 5 panchromatic imagery from 2004. The Landsat imagery used was for three seasons: early spring (leaf-off), summer, and early fall (senescence) and was collected with a spatial resolution of 30 m. The SPOT 5 panchromatic imagery was collected at a spatial resolution of 5 m during the spring and summer months of 2004. The map was developed in two distinct stages, the first stage was the development of a state wide land cover data set consistent with the NOAA-CAP land cover map. The second stage was: a) the update to 2004 conditions, b) a refinement of the classification system to Maine specific classes and, c) a refinement of the spatial boundaries to create a polygon map based on 5 m imagery.



Forest Value Codes:

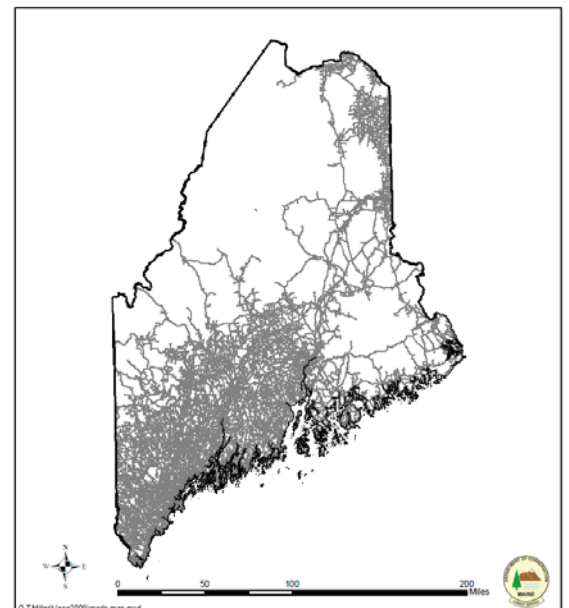
9	Deciduous Forest
10	Evergreen Forest
11	Mixed Forest
13	Wetland Forest
23	Recent Clearcut
24	Light Partial Cut
25	Heavy Partial Cut
26	Regenerating Forest

Dataset: Major Public Roads

Data Type: Vector Data

Data Sources: MDOTPUBRDS

Description: MDOTPUBRDS contains public road centerlines for Maine at a 1:24000 scale, created by Maine Department of Transportation using MEDOT's basemap line work.

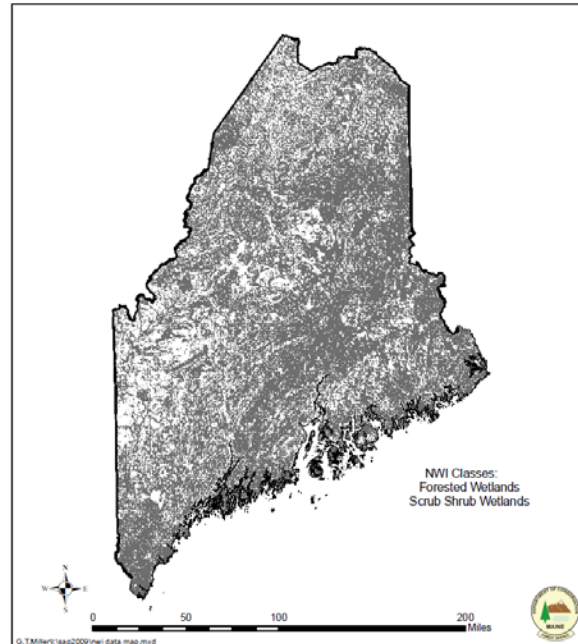


Dataset: Wetlands

Data Type: Vector data

Data Source: US Fish and Wildlife Service
National Wetlands Inventory (NWI)

Description: NWI contains USFWS National Wetland Inventory polygon data for Maine at 1:24,000 scale, classified using the Cowardin system. NWI data are compiled from color infrared aerial photography and are digitized onto 1:24000 scale base maps by the U.S. Fish and Wildlife Service in St. Petersburg, FL. The Forested Wetlands and Scrub Shrub Wetlands classes were used to create the wetland data set.

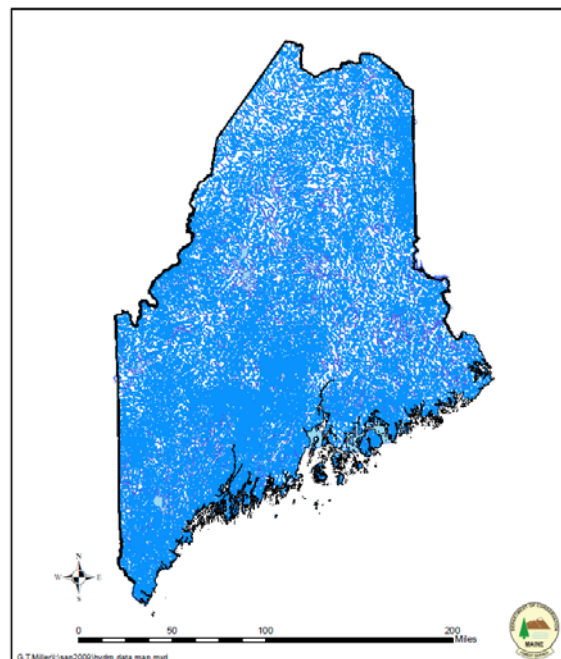


Dataset: Riparian

Data Type: Vector Data

Data Sources: HYDRO24

Description: HYDRO24 depicts Maine's hydrography data, coast, ponds, rivers, streams and hydrography network at 1:24,000 scale. The dataset represents preliminary data from the Maine GIS/USGS National Hydrography Data (NHD) project. Initial stages of the project generated three improved hydrography datasets HYD24L, HYD24P, and HYD24N. HYD24L contains arcs that represent the boundaries of all polygon and double line features. These arcs represent shoreline, coastline, river mouth, associated closure arcs, the state boundary relative to hydrography features, and an offshore limit line. HYD24P consists of polygon and double line features representing ponds, rivers, coast, inland and coastal islands. HYD24N represents a network of hydrography features made up of single line streams both intermittent and perennial, as well as connectors, and artificial paths used to create a network.

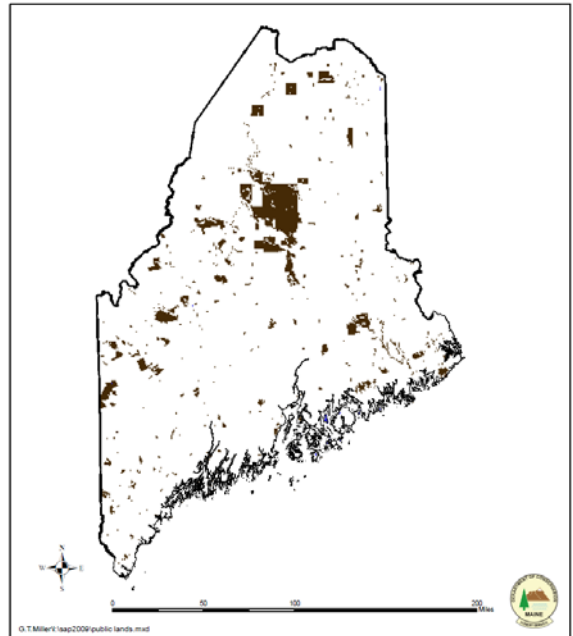


Dataset: Proximity to Public Lands

Data Type: Vector Data

Data Sources: Conserved Lands

Description: Conserved Lands contains conservation lands ownership boundaries at a 1:24,000 scale for Maine land in federal, state, municipal and non-profit ownership with easements. Where state, county, and town boundaries were coincident with property boundaries, the coincident features were taken from METWP24. Where hydrography, roads, railroads and power-lines were coincident with property boundaries, the coincident features were taken from 1:24,000 digital line graph data. The ownership lines do not represent legal boundaries nor are the ownership lines a survey. Conserved Lands is an inventory of approximate property boundaries.



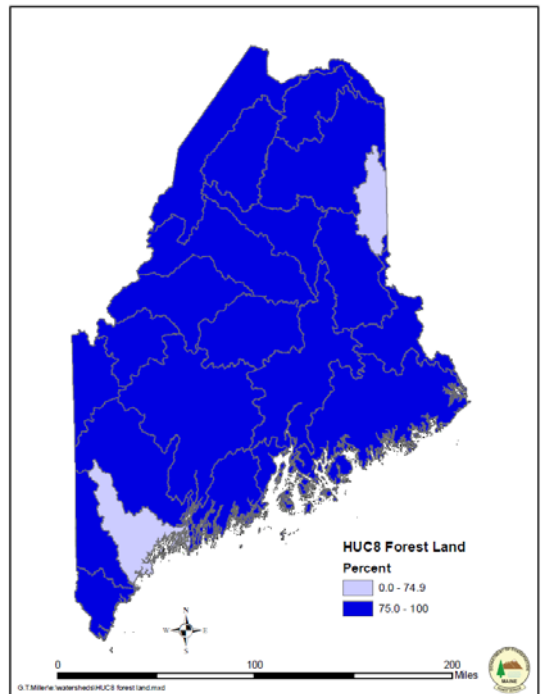
Dataset: Clean Water

Data Type: Vector Data

Data Sources: FORESTED WATERSHEDS

Description: FORESTED WATERSHEDS data was extracted from the Maine Land Cover Data (2004 MELCD) and NRCS HUC8 Watershed data. Forest land was summarized by using the 2004 MELCD grid values of 9 Deciduous Forest, 10 Evergreen Forest, 11 Mixed Forest, 13 Forested Wetlands, 23 Recent Clearcut, 24 Light Partial Harvest, 25 Heavy Partial Harvest, and 26 Regenerating Forest. The tabulate areas function was used to calculate the acreage of forest land in each HUC 8 watershed. The table was then joined to the HUC8 watershed. The percent forest land was then calculated by dividing the forest land acreage by the total land acreage for each watershed.

NRCS HUC8 Hydrologic Unit delineations are closed polygons that encompass all area draining toward the lowest point (called outlet or pour point) in the polygon. Because of varying sizes for the different hydrologic unit levels: some polygons do not include all areas up to the drainage divide, but all areas are included up to one or more other upstream hydrologic units. A unique hydrologic unit code identifies each hydrologic unit. The hydrologic unit codes start with the 2-digit Region number that contains the 4-, 6-, and 8-digit hydrologic units. Each hydrologic unit has a unique hydrologic code.

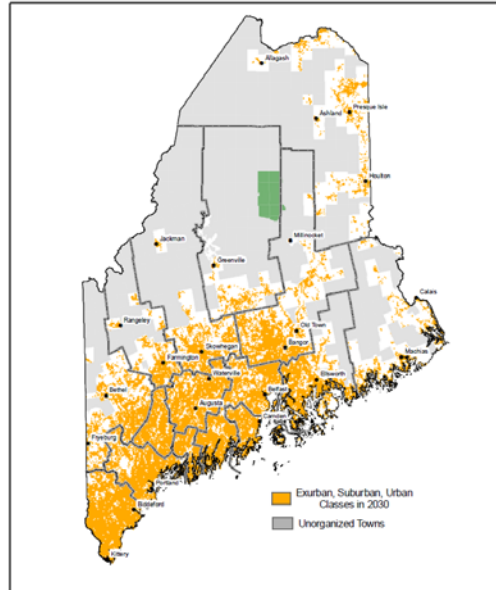


Dataset: Development Pressure

Data Type: Grid Data (100 m)

Data Sources: Dataset used was provided by a study performed by D. M Theobald for the USDA Forest Service.

Description: The purpose of the study was to describe the development of a nationwide, fine-grained database of historical, current, and forecasted housing density. 2000 US Census Bureau block (SF1) data, Forest Inventory and Analysis UNPROTPRIV100 data, USGS 1992 NLCD data and US Census Bureau TIGER data were the data input to run the SERGOM v2 model. This model was used to forecast housing density growth using county-level population for 2010, 2020, and 2030. The 2030 URBAN, SUBURBAN AND EXURBAN classes were used to create the development pressure data layer.

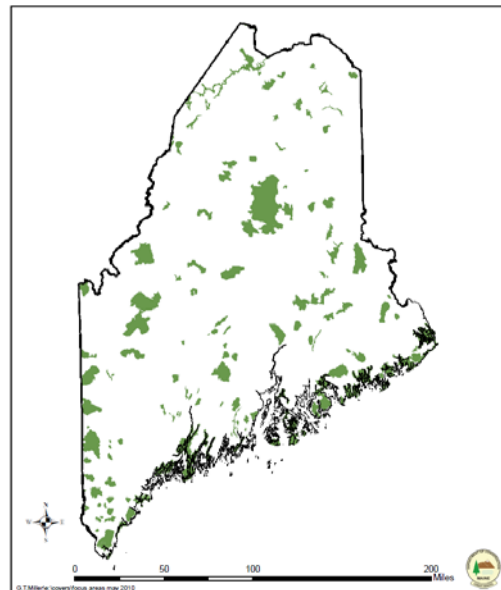


Dataset: Wildlife and Natural Communities Focus Areas

Data Type: Vector Data

Data Source: The dataset used is the Beginning with Habitat (BwH) Focus Areas that was provided by the Maine Natural Areas Program and Maine Department of Inland Fish and Wildlife.

Description: The Maine Natural Areas Program (MNAP), Maine Department of Inland Fisheries and Wildlife (MDIFW), and US Fish and Wildlife, began a habitat-based approach to conserving wildlife and plant habitat on a landscape scale in 2000 with the creation of the Beginning with Habitat (BwH) program. The Beginning with Habitat program is a cooperative, non-regulatory effort between state and federal agencies, conservation groups and regional governments in Maine. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine.



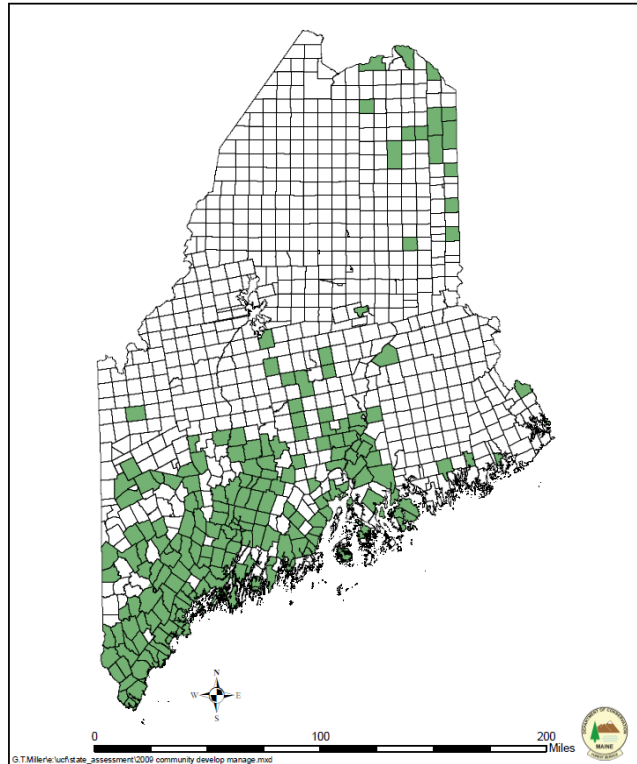
Maine's Comprehensive Wildlife Conservation Strategy addresses the full array of wildlife and their habitats in Maine including vertebrates and invertebrates in aquatic (freshwater, estuarine, and marine) and terrestrial habitats. Wildlife is defined as any species of wild, free-ranging fauna including fish. The plan builds on a planning effort ongoing in Maine since 1968; a landscape approach to habitat conservation, initiated in 2000; and a long history of public involvement and collaboration among conservation partners. The Strategy covers the entire state, from the dramatic coastline to the heights of Mt. Katahdin and is meant to be dynamic, responsive, and adaptive. The BwH program identified landscape scale areas (focus areas) that contain exceptionally rich concentrations of at-risk species and natural communities and high quality common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat. The polygons were converted to 30 m grid cells.

Dataset: Community Accomplishment Reporting System (CARS) Urban Forests

Data Type: Vector Data

Data Source: The Community Accomplishment Reporting System (CARS)

Description: This map displays the communities that participate in or have the potential to participate in Project Canopy. The Community Accomplishment Reporting System (CARS) evaluates the existing and potential capacity of a community's ability to support urban and community forestry programming based upon four key elements: active urban and community tree and forest management plans; employ or retain professional forestry staff; adopt local/statewide ordinances or policies that focus on planting, protecting, and maintaining their urban and community trees and forests; and have a local advocacy/advisory organization. The list of communities that participate in Project Canopy or have been identified as having the potential to participate was developed based on a number of qualitative elements, of which, population and population characteristics was the primary indicator.



Dataset: Urban Tree Canopy Assessment

Data Type: Vector Data

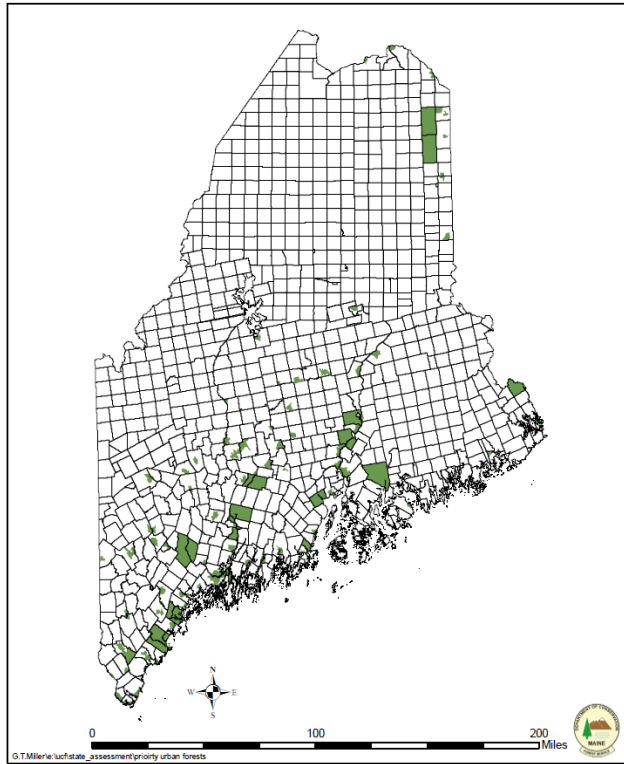
Data Sources: The dataset was provided by the USDA Forest Service

Description: The Urban Tree Canopy Assessment dataset, provided by the USDA Forest Service, used the "Maryland Method" to identify communities that are targeted for setting urban canopy goals. Census and Urban RPA data was used in the analysis with the following criteria:

Step 1: Determine the average population, urbanized area, impervious surface cover, and urban tree canopy in the state.

Step 2: Query to find communities that meet the following criteria:

- Greater than average population;
- Greater than average urbanized area;
- Greater than average impervious surface;
- Less than average urban tree canopy.

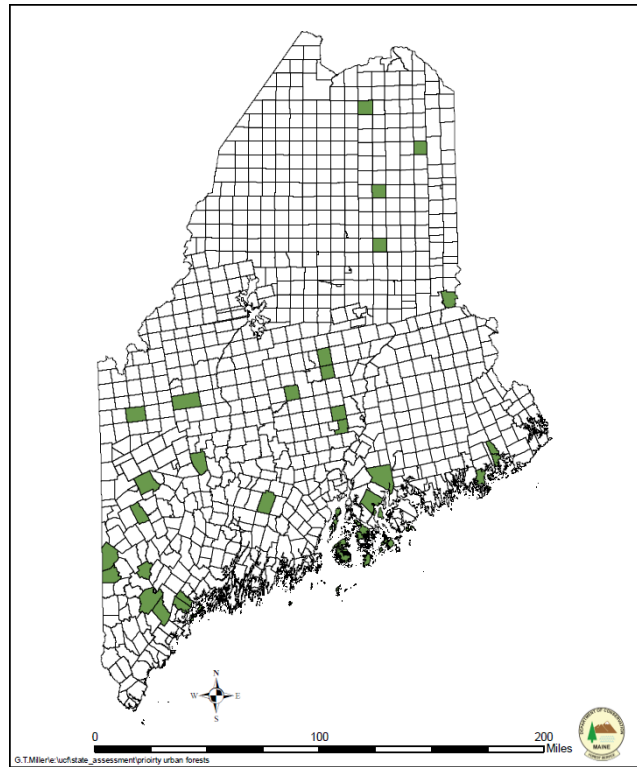


Dataset: Community Wildfire Protection Plans

Data Type: Vector Data

Data Sources: WHAMS Assessment Ratings data

Description: Maine Forest Service's Forest Protection Division has been conducting Community Wildfire Protection Plan assessments, assessing a community's risk in the Wildland Urban Interface (WUI) throughout Maine. An assessment form was used to collect data concerning a structures ability to survive a wildfire in the Wildland Urban Interface. This data was used to create a geospatial dataset showing a communities risk in the Wildland Urban Interface and is updated as community assessments are completed.

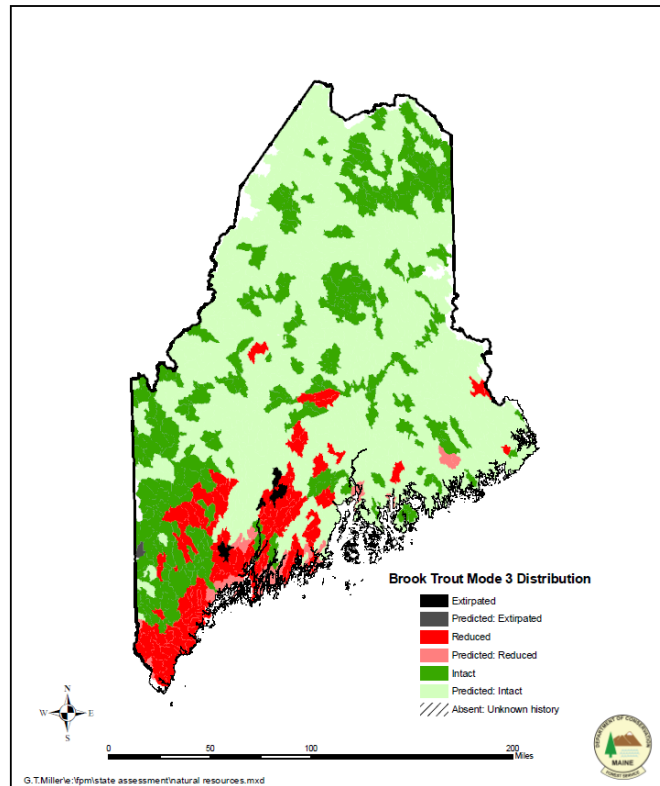


Dataset: Eastern Brook Trout

Data Type: Vector Data

Data Sources: The dataset used was from the Eastern Brook Trout Joint Venture website.

Description: The Eastern Brook Trout dataset contained two vector datasets: Brook Trout Distribution by Watershed and Model 3 Distribution with Core Metrics vector data. The Model 3 Distribution with Core Metrics vector data was the dataset used because the model predicts future brook trout watershed occurrence.

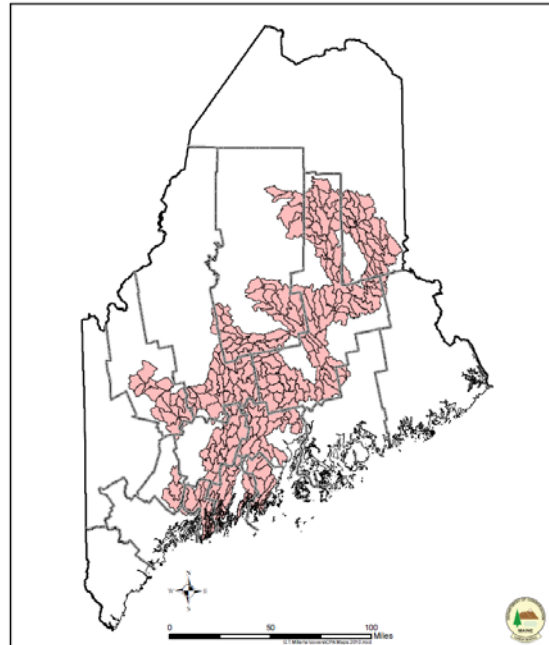


Dataset: Conservation Priority Areas

Data Type: Vector Data

Data Sources: The dataset used was provided by the USDA Natural Resources Conservation Service (NRCS).

Description: The NRCS Conservation Priority Area dataset contains vector data of Atlantic Salmon Critical Habitat and Occupied Watersheds in Maine based upon HUC12 watersheds.

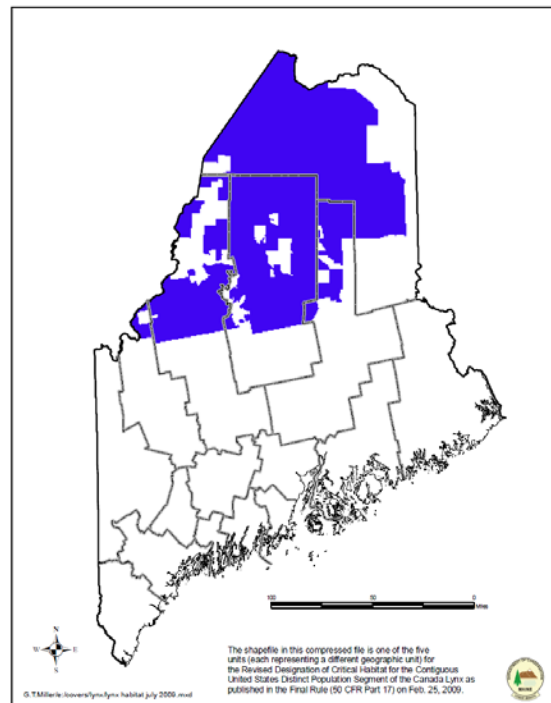


Dataset: Canada Lynx (*Lynx canadensis*)

Data Type: Vector Data

Data Sources: The dataset used was provided by the US Fish and Wildlife Service.

Description: On March 24, 2000, The US Fish and Wildlife Service designated critical Canada lynx (*Lynx canadensis*) habitat in Maine, as an amendment, to the Endangered Species Act of 1973. The final rule for the revised critical habitat was published in the Federal Register February 25, 2009. The shapefile is one of the five units (each representing a different geographic unit) for the Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx as published in the Final Rule (50 CFR Part 17) on Feb. 25, 2009.

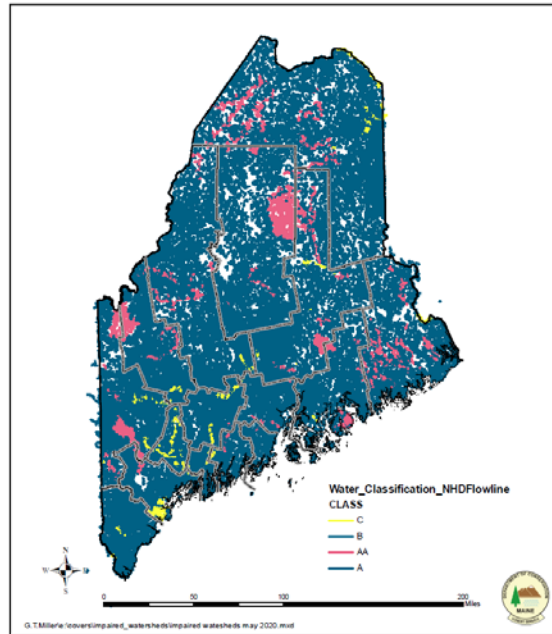


Dataset: Impaired Watersheds

Data Type: Vector Data

Data Sources: The dataset used was provided by the Maine Department of Environmental Protection (MDEP).

Description: Maine has had a water classification system since the 1950's which establishes water quality goals for the State. There are four water classes for freshwater rivers: AA, A, B, and C. These classes should be viewed as a hierarchy of risk, rather than one of water use or water quality. The stream data (arcs) was intersected to the HUC12 watershed data by class. The resulting water quality class HUC12 watersheds were transformed to 30 m grid cells and weighted as follows:

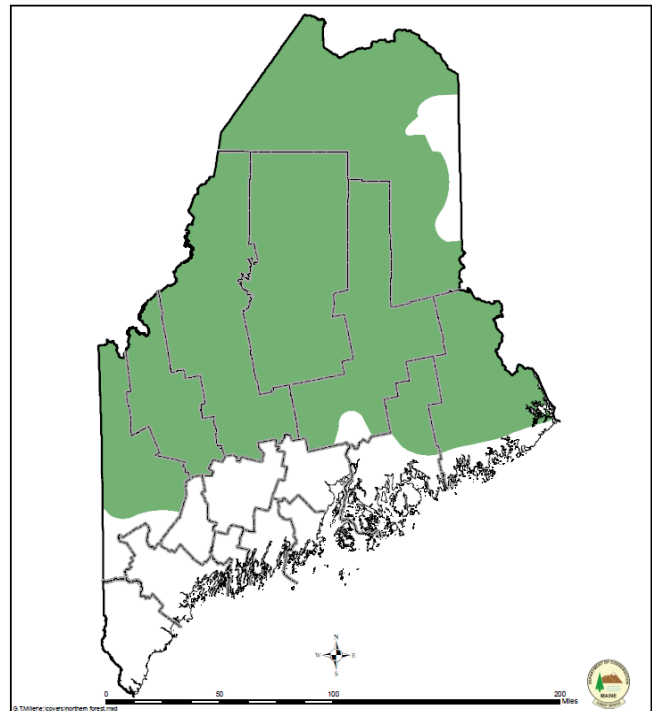


Dataset: The Northern Forest of Maine

Data Type: Vector Data

Data Sources: The dataset used was provided by the USDA Forest Service.

Description: The dataset contains polygon data depicting The Northern Forest, which extends from Maine to New York.



Appendix 7. Data Gaps

The following provides a listing of some of the data gaps identified during the process of developing this document. Some of the data on this list may exist; however, the data were not located in time to include in this document.

1. Projections/Future Outlooks - Maine currently does not have the resources to do either a short-term (10 years) or a long-term (50 years) forward looking, modeling analysis of potential changes in many forest resource attributes, including the prediction of potential impacts of insect and disease outbreaks, climate change, and/or changes in harvesting behavior.
2. Economic data - forest products industry: It is not possible at this time to assess the full economic contributions of the forest products industry to the state's economy. The following industry sectors (SIC codes) can be accounted for:

Forestry and Logging (113)
Support Services for Forestry (1153)
Wood Product Manufacturing (321)
Paper Manufacturing (322)
Furniture and Related Product Manufacturing (337)

This classification accounts for nearly all primary and secondary wood processing activity in the forest products industry; however, it is imperfect. It overstates economic activity in the furniture manufacturing industry because not all of this manufacturing is done with wood. It understates activity in the Forestry and Logging industry because support services for forestry (e.g., trucking) are not included.

3. Economic data - forest based recreation and tourism: Forest based recreation and tourism clearly are important to Maine's economy; however, publicly available data are not available to make reasonable assumptions about these sub-sectors (e.g., forest-based recreation and tourism cannot easily be separated from recreation and tourism overall).
4. Parcel aggregation and ownership expansion: Although much research effort has been expended in developing methods for determining the level of fragmentation and parcelization, little is known about the dynamics of parcel aggregation and ownership expansion. Anecdotal evidence suggests that even as some owners break up larger holdings, other owners, often logging contractors, have increased the size of their holdings. Further anecdotal evidence suggests that even in parts of Maine subject to development pressure, landowners occasionally acquire additional parcels, either adjacent to existing holdings and/or in other locations. However, no reliable, efficient method exists to measure such aggregation and expansion of woodland holdings.
5. Soils data: Data is not collected at sufficient intensity to allow analysis below the state level.