Lessons learned from using the Criteria and Indicators framework

New Hampshire Forest Resources Plan Revision
Assessment – 2006

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1. Introduction

The New Hampshire Division of Forests and Lands is required by state law to create and update a state Forest Resources Plan every ten years. State law also requires that an "Assessment and Inventory" be completed as part of the planning process. Under the law, the assessment and inventory must include at least the following:

> "I. Forestland ownership and management objectives.
> II. Quantity and quality of timber and forestland in the state.
> III. Efficiency of utilization of forest products.
> IV. Contribution to energy needs being made by wood.
> V. Status of forest protection.
> VI. Status of forest resources and benefits.
> VII. A description and evaluation of current public and private forestry programs.
> VIII. Evaluation of management status on public and private lands.
> IX. Analysis of present and anticipated supply and demand for the various forest resources in the state.
> X. Evaluation of forest-related employment and associated economic benefits, including, but not limited to, timber."

New Hampshire decided to undertake its 2006 decennial revision of the plan with a new structure and organization. With the assistance of a grant from the USDA Forest Service, Northeastern Area State & Private Forestry, the Assessment portion of the plan revision was developed using the Montreal Process Criteria and Indicators as the framework. New Hampshire State Forester Philip Bryce is very interested in keeping the Criteria and Indicators framework for future revisions so as to utilize the first assessment as a baseline.

The NH Forest Advisory Board, an appointed stakeholder board that advises the state forester and his agency, served as a steering committee for the Assessment work. A subcommittee of this group acted as a data group. This group spent time on the details of the data within the framework. The NH Division of Forests & Lands contracted with the North East *State* Foresters Association (NEFA) to staff this work. NEFA Executive Director Charles Levesque led the effort and developed the Assessment Report.

Various lessons were learned in the project. This report outlines the process and lessons learned.

2. Assessment Development Process

After receiving authorization for a $ 30,000 grant from the USDA Forest Service, Northeastern Area State & Private Forestry in 2005, the New Hampshire Division of Forests and Lands (Division) contracted with the North East *State* Foresters Association to design and complete an "assessment", or data-gathering and analysis, in preparation for a revision of the state's Forest Resources Plan. NEFA contract Executive Director Charles A. Levesque led the effort. In the interest of building on work completed in other states and the region as well as seeking a way to better use data in a comparative manner from one Plan revision to another, the Division decided to use the Montreal Process Criteria and Indicators as a framework for the Plan Revision Assessment.

The Criteria and Indicators are a series of 7 Criteria and 18 Indicators developed for temperate and boreal forests around the world in an effort designed to develop a consistent set of metrics that determine the sustainability of forests in the world. In this way, subsequent use of the framework will yield comparable results within districts (geographic areas like the State of New Hampshire) or among districts. The Assessment report, then, was structured directly around these 7 Criteria and 18 Indicators.

The Criteria & Indicators framework structure used for the effort was:

Criterion 1: Conservation of Biological Diversity

1. Area of total land, forest land, and reserved forest land
2. Forest type, size class, age class, and successional stage
3. Extent of forest land conversion, fragmentation, and parcelization
4. Status of forest/woodland communities and associated species of concern

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

5. Area of timberland
6. Annual removal of merchantable wood volume compared to net growth

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

7. Area of forest land affected by potentially damaging agents

Criterion 4: Conservation and Maintenance of Soil and Water Resources

8. Soil quality on forest land
9. Area of forest land adjacent to surface water, and forest land by watershed
10. Water Quality in Forested Areas

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles

11. Forest ecosystem biomass and forest carbon pools

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

12. Wood and wood products production, consumption, and trade
13. Outdoor recreational facilities and activities
14. Investments in forest health, management, research, and wood processing

15. Forest ownership, land use, and specially designated areas
16. Employment and wages in forest-related sectors

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

17. Forest management standards/guidelines
18. Forest-related planning, assessment, policy, and law

In addition to these 7 Criteria and 18 Indicators, a set of draft metrics organized under each indicator (see Appendix) was used to source the data initially. This metric organization was developed by the Northeastern Area/Northeastern Area Association of State Foresters as the "Base Indicators and Metrics of Forest Sustainability".

The process used to develop the assessment included the following:

a. **Pre-data gathering consultation** – Prior to beginning data gathering, the project leader convened meetings both with Division staff and Forest Service State & Private Forestry staff to review the objectives of the project and possible data sources available around the Criteria & Indicators framework. Susan Francher was the lead staff person for the Division. Sources identified included a new web-based system for data in this framework for the Northeastern US area developed by the USDA Forest Service, State & Private Forestry office called "Forest Sustainability Indicators Information System"[1]. Other sources included the University of New Hampshire GRANIT GIS data sets, data maintained and developed by The Nature Conservancy, the Division, the Society for the Protection of New Hampshire Forests and many others.

b. **Data gathering** – The vast majority of the staff time utilized on this project was in the identification and analysis of data sets corresponding to the framework. The project lead used the web-based data source mentioned earlier, other web sources from various organizations (see References) and personal contact with individuals at the federal, university, state and private (mostly non-profit) levels. Over 300 hours were required to identify and develop data for this project.

   As data was identified, it was developed into useable graphics and tables for display. Ultimately, a lengthy draft graphics document was developed (see Appendix) for use in a review process with the Division and expert advisors (see next section).

c. **Data and Criteria & Indicator relevance checking with experts** – One of the most important parts of the Assessment development process was the data review process with experts. Ultimately, the New Hampshire Forest Advisory Board (FAB), an appointed statutory board charged with advising the State Forester and the Division of Forests and Lands, acted as that review body. The detailed task of reviewing the draft data was assigned to a subcommittee of the FAB that included:

[1] This site can be found at http://www.nsgi-hq.com/fsiis/

Matthew Tanzey, Biometrician, NH Division of Forests & Lands
Carol Foss, Senior Biologist, Audubon Society of New Hampshire
Mark Zankel, Vice-President, NH Chapter, The Nature Conservancy
Jasen Stock, Executive Director, NH Timberland Owners Association
David Publicover, Senior Scientist, Appalachian Mountain Club
James Oehler, Biologist, NH Fish and Game Department
Mark Ducey, Associate Professor of Forestry, University of New Hampshire
Observer: Constance Carpenter, USDA Forest Service, State and Private Forestry

Data review was accomplished at a detailed level with the subcommittee. A more cursory review was done with the full Forest Advisory Board in a short portion of a meeting and through e-mail, though only a few members not on the subcommittee took advantage of the latter. With the subcommittee, the initial contact was made by the project lead through phone calls or personal meetings. These initial communications included a review of the purpose of the project, the framework and the process as well as data sets available or sought. A series of recommendations for data resulted from those initial calls.

The major method used to receive review from the subcommittee was an all-day meeting in February of 2006. At this meeting, a methodical review of the draft data graphics displays developed by the project lead (found in the Appendix) was accomplished. The subcommittee reviewed the data sets with the following objectives and criteria:

- identification of the most appropriate/accurate data set for the indicators given its intended use as the factual basis for the revision of the state's forest resources plan;
- attempt to identify the acceptable range/threshholds of these metric values.

The first objective/criteria was met at the meeting, but the latter was not. It was determined that the latter task, though desirable, was a more complicated and value-laden exercise than members had anticipated. They agreed to attempt this work as part of the Plan revision but not the Assessment development process. A result of the meeting was an updated set of metrics (see Appendix).

Subsequent to the meeting, subcommittee members provided additional comments and leads on data sets via e-mail and phone.

A resulting revised set of metrics, data sets and graphics resulted from this effort.

d. Data revision – Following the review process by the NH Forest Advisory Board data subcommittee, the project lead revised the data sets and graphics. This process required some 50 hours of staff time. The resulting data sources and graphics were much improved over the draft set originally developed.

e. Report writing – the final step in the Assessment development process was the development of a manuscript for the report. This process was also time-consuming, requiring nearly another 100 hours to complete. The report includes many, but not all, of the data sets and graphics developed as part of the data subcommittee process.

Guidance for the important areas to include in the report was provided by agency staff, the project leader and the Forest Advisory Board members. The manuscript was submitted in July of 2006 to the State of New Hampshire's graphic services agency to develop a 4-color report from.

3. Findings

Choice of C&I and NA/NAASF metrics – The NH Division of Forest and Lands made the decision to use the C&I framework as the basis for the NH Forest Plan Revisions Assessment. Their initial view that the framework was thorough and comprehensive was, in fact, born out by the process and the data gathered. The Division also made a choice to use the Northeastern Area/Northeastern Area Association of State Foresters developed base indicators/metrics (in Appendix) as the starting point for the development of the assessment. Some changes in the metrics were made based on the input of the data subcommittee (further defined below).

NH Forest Advisory Board reaction to C&I framework – Not a single member of the NH Forest Advisory Board or its data subcommittee questioned the appropriateness or use of the C&I framework (or the NA/NAASF chosen base indicators and metrics) for this project. The data subcommittee members, who spent much more time reviewing and working with the framework in their effort to improve the data, also never questioned its use. Several members made explicit comments to the effect that the framework was very thorough and a good organization of data and information needed for this kind of project. Members were made aware that this framework was intended as a draft and that changes were possible based on their findings.

Changes were made in the metrics list that accompanied the 18 indicators for the project, but in the scheme of the project, these changes were minor in nature. The details of those changes follow.

Changes made to metrics and why – The changes made in the metrics can be found in the Appendix[2]. A Criterion by Criterion review of those changes is as follows:

Criterion 1 Conservation of Biological Diversity

- Indicator 1 Area of total land, forest land, and reserved forest land

Metric 1.5 Urban Forest was changed to Landownership types simply because the urban forest was not the focus of the Forest Resources Plan and New Hampshire has few true urban areas. Metric 1.6 on Landowner age was added because understanding the demographics of the private landowner base is important relative to potential changes in the forest-base.

- Indicator 2 Forest type, size class, age class, and successional stage

Metric 2.2 on size class by forest type group was changed to county because the data subcommittee felt that activities affecting size class distribution are much more geographic-based rather than forest-type based. Metric 2.3 on Age class by forest type group was changed to species composition because the group believed species composition is more important to habitat changes across the landscape.

- Indicator 3 Extent of forest land conversion, fragmentation, and parcelization

[2] The Appendix section with changes to the metrics also includes some of the data sources used for the metrics. Although the Forest Service web-based data sets were queried and some of this data used, most of the data ultimately was derived from other sources.

Metric 3.3 was changed from Net change in forest land to Undeveloped land and conversion because conversion to developed use is likely the largest issue facing the changing forest-base in New Hampshire.

- Indicator 4 Status of forest/woodland communities and associated species of concern

All the indicators were changed in this section to the following three because they felt these best represent the status of biodiversity in the state:

Metric 4.1 Status of natural communities and habitats
Metric 4.2 Status of Wildlife Species
Metric 4.3 Status of Plants

Criterion 2 Maintenance of Productive Capacity of Forest Ecosystems

- Indicator 5 Area of timberland

Metric 5.2 Total forest area was eliminated because it was redundant with other metrics in this and other indicators.

- Indicator 6 Annual removal of merchantable wood volume compared to net growth

Metric 6.2 Type of removal harvest, land clearing was changed to terminal harvests because the data for the former was not available and the terminal harvest issue (final harvest of timber before land use change) was more important to what is going on in New Hampshire.

Criterion 3 Maintenance of Forest Ecosystem Health and Vitality

- Indicator 7 Area of forest land affected by potentially damaging agents

Metric 7.3 Weather phenomena was changed to Large weather events because this was a better descriptor of weather events affecting forests.

Criterion 4 Conservation and Maintenance of Soil and Water Resources

- Indicator 8 Soil quality on forest land

Metric 8.3 Estimated bare soil was eliminated because the data was deemed not useful to the process. Metric 8.5 Calcium/aluminum ratio was changed to Soils sensitive to sulfur and nitrogen deposition because the original data for calcium/aluminum was not useful at the state scale and the data relative to sulfur and nitrogen deposition was very specific (geographically displayed) resulting in useful data for analysis.

- Indicator 9 Area of forest land adjacent to surface water, and forest land by watershed

Metric 9.2 Forest land per watershed was eliminated because another metric covered this general topic better.

Criterion 5 Maintenance of Forest Contribution to Global Carbon Cycles

- Indicator 11 Forest ecosystem biomass and forest carbon pools

Metric 11.2 Forest carbon pools was eliminated because this data was covered in other metrics. Metric 11.4 on Change in forest carbon pools was eliminated for the same reason.

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

- Indicator 12- Wood and wood products production, consumption and trade

Metric 12.1a added Value of Maple Syrup and Christmas tree production because this data was missing in the other metrics and an important part of the forest products economy. Metric 12.2 Value added in wood products, 12.3 Volume of roundwood production and 12.4 Consumption were consolidated into two metrics: Number of employees and payroll in wood products and Volume of timber production and consumption to better organize this data and reduce duplication.

- Indicator 13 – Outdoor recreation facilities and activities

Metric 13.2 Federal Land Open to Recreation was changed to Public and Private Land Open to Recreation to make it more comprehensive and to recognize the tradition of open private land in New England.

- Indicator 15 Forest ownership, land use, and specially designated areas

Metrics 15.2 State land, 15.3 Protected lands, 15.4 Private land with public conservation easements, and 15.5 Forest land in State current use/tax reduction programs were all eliminated because they were redundant and covered under other indicators and metrics.

- Indicator 16 Employment and wages in forest-related sectors

Metric 16.4 WMNF Forest Service permanent employees was eliminated because the WMNF activities are out of the scope of the NH State Forest Resources Plan.

Criterion 7 Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management

- Indicator 17 Forest management standards/guidelines

Metric 17.2 Program type and 17.3 Monitoring (by type of monitoring) were eliminated because the content was better organized and covered under 17.1 Types of forest management standards/guidelines

- Indicator 18 Forest-related planning, assessment, policy, and law

Metric 18.2 was added Other NH State Natural Resource Related Plans was added to recognize all of the natural resource related state planning that is going on. Metrics 18.3 Forest planning on national forest land, 18.4 Status of comprehensive State forest resource assessments, and 18.5 Existence of State forest related laws and policies were all eliminated because the subcommittee felt that these were irrelevant to the Assessment and Plan development.

<u>Using C&I framework to encourage a broader look</u> – The project leader used the C&I framework to provide data that was more regional in nature in order to give the New Hampshire situation more context. This was done when draft data/metrics/graphics were developed and presented to both the full Forest Advisory Board and its data subcommittee. Interestingly, there was very little interest in viewing data that involved other states – whether used for comparison purposes or viewed in the context of regional data sets. Of all the findings from this project, the project leader was most perplexed and intrigued by this somewhat parochial view of the forests of New Hampshire by this group of very informed and bright people!

4. Recommendations and Conclusions

Overall, using the Montreal Process Criteria & Indicators as the framework for the development of the Assessment portion of the NH Forest Resources Plan worked very well. There was no apprehension for its use by the key group of stakeholders who provided oversight to the process of data development and the state forester and his staff seemed to embrace the approach. Despite this, a few minor recommendations are in order.

First, a better explanation and stakeholder buy-in process by the agency was warranted in the early stages of the process. While little opposition emerged from the NH Forest Advisory Board members, the use of the C&I framework was provided as a given to them – the decision already having been made. It would have been helpful to have a briefing on the origin of the C&I and have a stakeholder discussion about its use as the framework for the Assessment and, ultimately, the Forest Resources Plan revision process.

Second, even with the winnowing of indicator metrics through the data subcommittee process, a lot of the data gathered will likely not be used by the NH Forest Advisory Board in its process of revising the Forest Plan. The Assessment report has taken this into account somewhat by the fact that it does not use approximately 30%+ of the data in the Assessment data collection. A better process should have been done with the full Forest Advisory Board at the outset of this process to better reduce the amount of data collected. The reduction in data used in the Assessment report resulted from a short brainstorming session with the full Advisory Board relative to priority data.

Finally, there were inadequate resources provided to do this project. A generous $30,000 grant was provided to the agency and subsequently NEFA for this work, but the organization contract staff spent over twice this amount in staff time and expenses. A budget of between $75,000 and $100,000 is necessary to complete this kind of project.

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Farnsworth, Elizabeth, Ogurcak, Danielle, *Patterns in Biogeographic Dynamics and Decline of 71 Rare Plant Species in New England: Evidence from Historical Collections and Contemporary Monitoring, 2005.*

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US Department of the Interior Fish & Wildlife Service and U.S. Department of Commerce, Bureau of the Census. *1996 National Survey of Fishing Hunting, & Wildlife-Associated Recreation (FHW/96 NAT)*

U.S. DOI, F&WS and US DOC, US Census Bureau. *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.* (Oct. 2002).

Woodall's Publications Corp Campground Statistics

Appendix

Criteria, Indicators & Metrics

NA/NAASF Base Indicators and Metrics of Forest Sustainability

Criterion 1: Conservation of Biological Diversity

1. **Area of total land, forest land, and reserved forest land**
   - Metric 1.1 Forest density
   - Metric 1.2 Total forest area
   - Metric 1.3 Total land area
   - Metric 1.4 Reserved forest land
   - Metric 1.5 Population
2. **Forest type, size class, age class, and successional stage**
   - Metric 2.1 Area by forest type group
   - Metric 2.2 Size class by forest type group
   - Metric 2.3 Age class by forest type group
3. **Extent of forest land conversion, fragmentation, and parcelization**
   - Metric 3.1 Forest land conversion
   - Metric 3.2 Forest land change
   - Metric 3.3 Fragmentation
   - Metric 3.4 Parcelization: distribution/average size of private land holdings
4. **Status of forest/woodland communities and associated species of concern**
   - Metric 4.1 Status of forest-associated species of concern relative to the total
   - Metric 4.2 Status of forest and woodland communities of concern relative to the total
   - Metric 4.3 Bird species population trends

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

5. **Area of timberland**
   - Metric 5.1 Timberland area
   - Metric 5.2 Total forest area
6. **Annual removal of merchantable wood volume compared to net growth**
   - Metric 6.1 Net growth of growing stock on timberland
   - Metric 6.2 Removals of growing stock on timberland
   - Metric 6.3 Net growth to removals ratio
   - Metric 6.4 Type of removals: harvest, land clearing

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

7. **Area of forest land affected by potentially damaging agents**
   - Metric 7.1 Tree mortality

Metric 7.2 Biotic stressors: insects, diseases, plants, and animals
Metric 7.3 Wildfire
Metric 7.4 Weather phenomena: drought, storm, flood
Metric 7.5 Forest land clearance

Criterion 4: Conservation and Maintenance of Soil and Water Resources

8. Soil quality on forest land
Metric 8.1 Soil pH
Metric 8.2 Soil carbon
Metric 8.3 Estimated bare soil
Metric 8.4 Bulk density
Metric 8.5 Calcium/aluminum ratio

9. Area of forest land adjacent to surface water, and forest land by watershed
Metric 9.1 Forest land adjacent to surface water
Metric 9.2 Forest land per watershed

10. Water quality in forested areas
Metric 10.1 Impaired stream miles by percent of watershed forested

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles

11. Forest ecosystem biomass and forest carbon pools
Metric 11.1 Forest ecosystem biomass
Metric 11.2 Forest carbon pools
Metric 11.3 Change in forest carbon pools
Metric 11.4 Forest ecosystem carbon pools by forest type

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

12. Wood and wood products production, consumption, and trade
Metric 12.1 Total value of wood products shipments
Metric 12.2 Value added in wood products
Metric 12.3 Volume of roundwood production
Metric 12.4 Consumption of roundwood
Metric 12.5 Recovered paper
Metric 12.6 Trade or wood flow

13. Outdoor recreational facilities and activities
Metric 13.1 Recreational areas
Metric 13.2 Trails
Metric 13.3 Campgrounds
Metric 13.4 Participation in outdoor recreation

14. Investments in forest health, management, research, and wood processing
Metric 14.1 USDA Forest Service funding in state and private forest health and management
Metric 14.2 State forestry program funding

Metric 14.3 Funding for forestry research at universities
Metric 14.4 USDA Forest Service Research funding
Metric 14.5 Capital expenditures by wood product manufacturers

15. Forest ownership, land use, and specially designated areas

Metric 15.1 Forest land ownership
Metric 15.2 Protected public forest land
Metric 15.3 State forests, parks, natural areas, and fish and wildlife areas
Metric 15.4 Private land with public conservation easements
Metric 15.5 Forest land in State current use/tax reduction programs
Metric 15.6 Urban forest
Metric 15.7 Amount of land under forest certification programs
Metric 15.8 Reserved forest land

16. Employment and wages in forest-related sectors

Metric 16.1 Wood product manufacturing employees
Metric 16.2 State forestry employees
Metric 16.3 USDA Forest Service permanent employees
Metric 16.4 Wood product manufacturing annual payroll
Metric 16.5 Wood product manufacturing production workers wages per hour
Metric 16.6 State forestry employee salaries

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

17. Forest management standards/guidelines

Metric 17.1 Types of forest management standards/guidelines
Metric 17.2 Program type (e.g., voluntary, regulatory)
Metric 17.3 Monitoring (by type of monitoring)

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

Metric 18.1 Status of comprehensive State forest resource planning
Metric 18.2 Type of planning State forestry agencies are involved in
Metric 18.3 Forest planning on non-industrial private forest land
Metric 18.4 Forest planning on national forest land
Metric 18.5 Status of comprehensive State forest resource assessments
Metric 18.6 Existence of State forest-related laws and policies
Metric 18.7 Existence of active State forestry advisory committees

New Hampshire Forest Resource Plan Revision
Criteria & Indicators Assessment

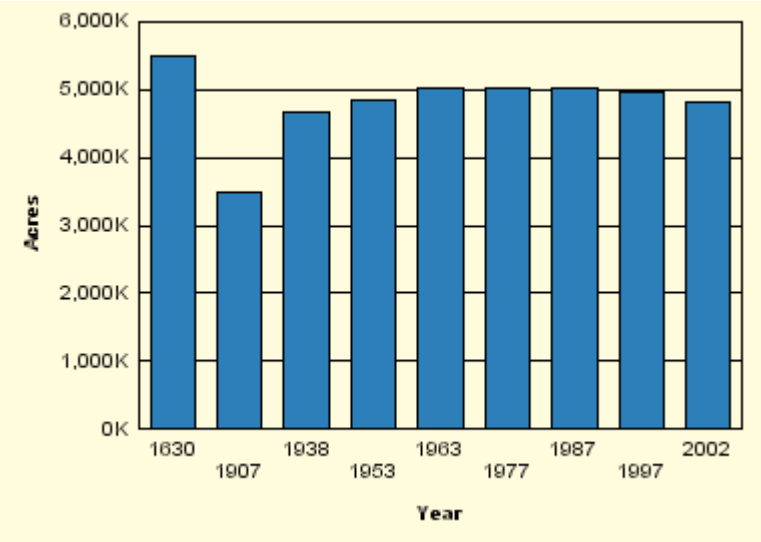
Draft Data Displays

Criterion 1: Conservation of Biological Diversity

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

Metric 1.1 Forest land and total land

Total Forest Land - NH



Data Source: USDA Forest Service, Forest Inventory and Analysis

5,712,968.1 acres of total land area

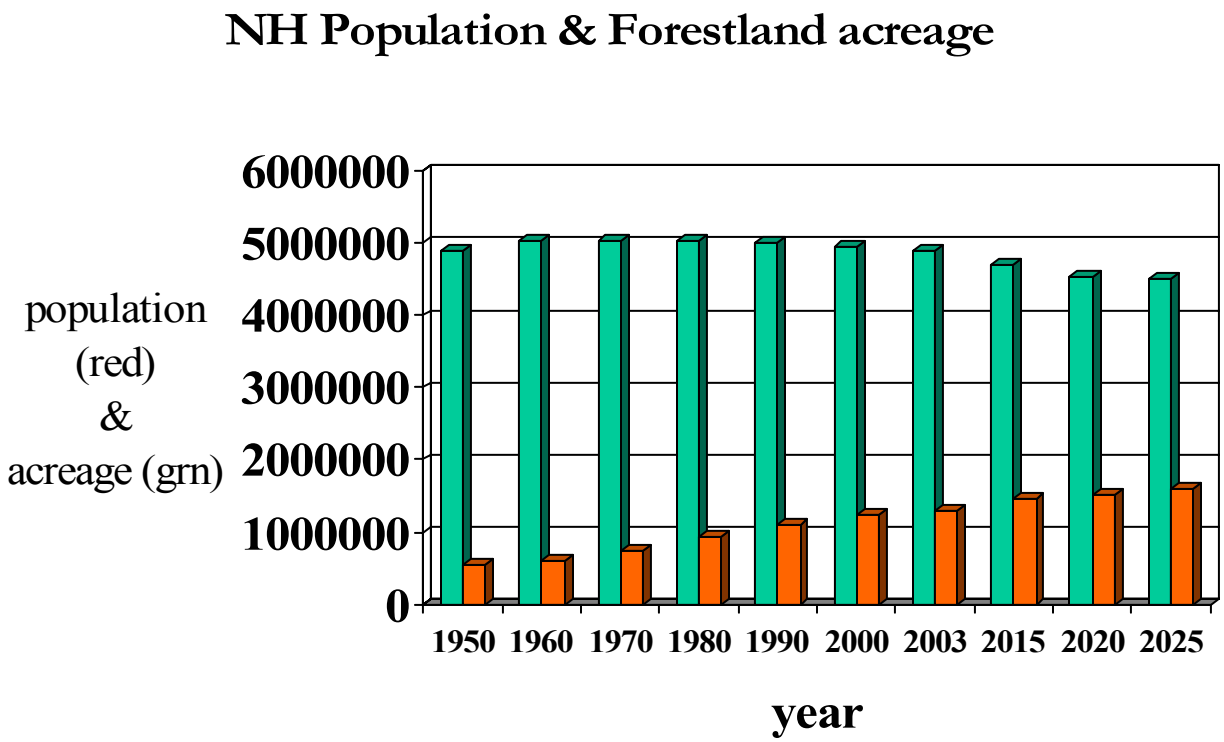
Source: SPNHF, NH's Changing Landscape

Metric 1.2 Forest Density

Forestland as a percentage of all land in NH

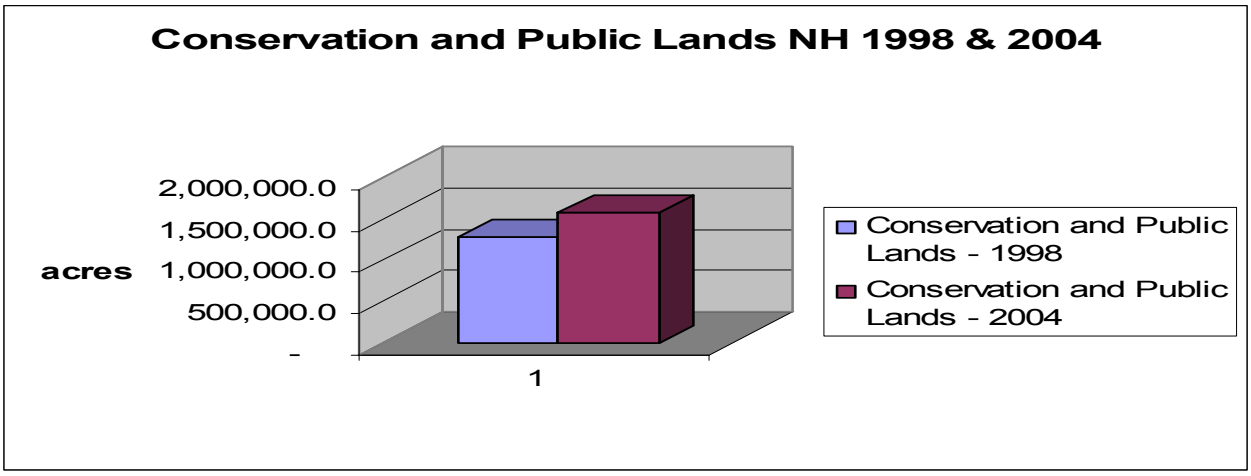
Source: 2004. Forest resources of the United States, 2002 (A Technical document supporting the USDA Forest Service 2005 update of the RPA Assessment).

Metric 1.3 Forest Land & Population



Data Source: USDA Forest Service, Forest Inventory and Analysis, SPNHF, NH's Changing Landscape, US Census

Metric 1.4 Reserved forest land



Source: SPNHF – NH's Changing Landscape 2004

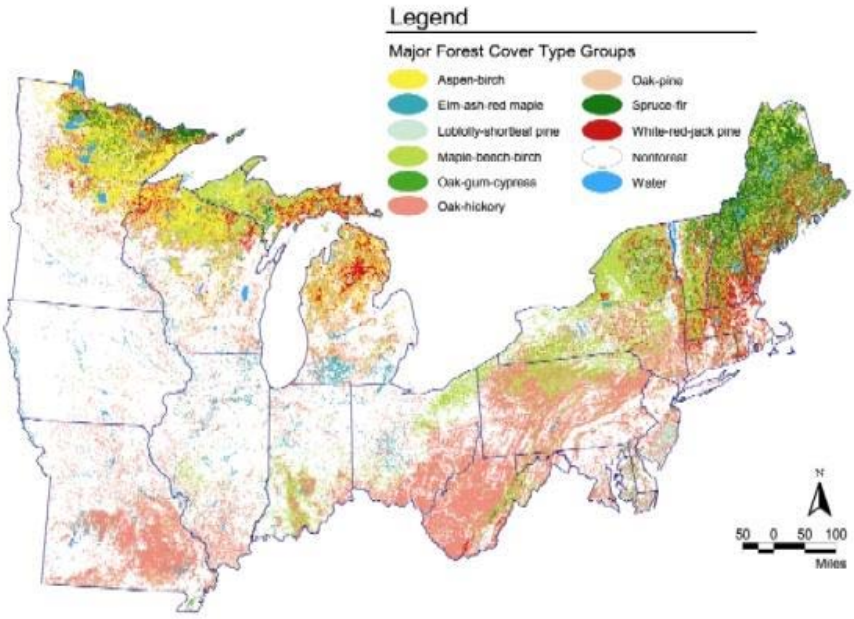
Metric 1.5 Urban Forest

No data

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

Metric 2.1 Area by forest type group

Forest cover type groups, 2004

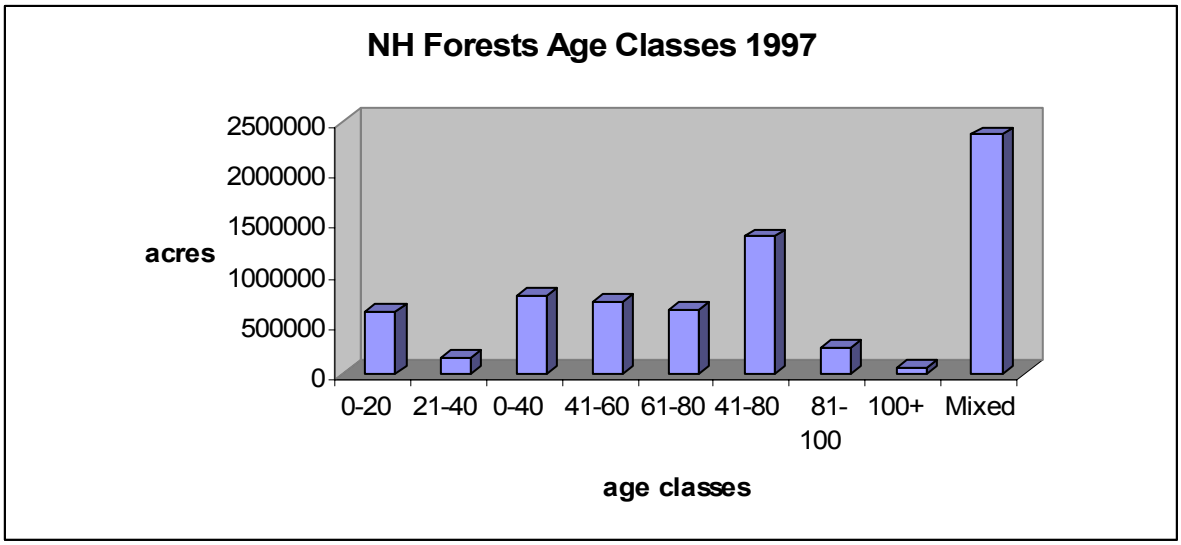


Source : USDA Forest Service, Forest Inventory and Analysis **GRANIT much better**

Metric 2.2 Size class by forest type group

NOTHING IN electronic USDA data set from FIA for NH – 2003 data only two cycles so not useful yet (at 40%)

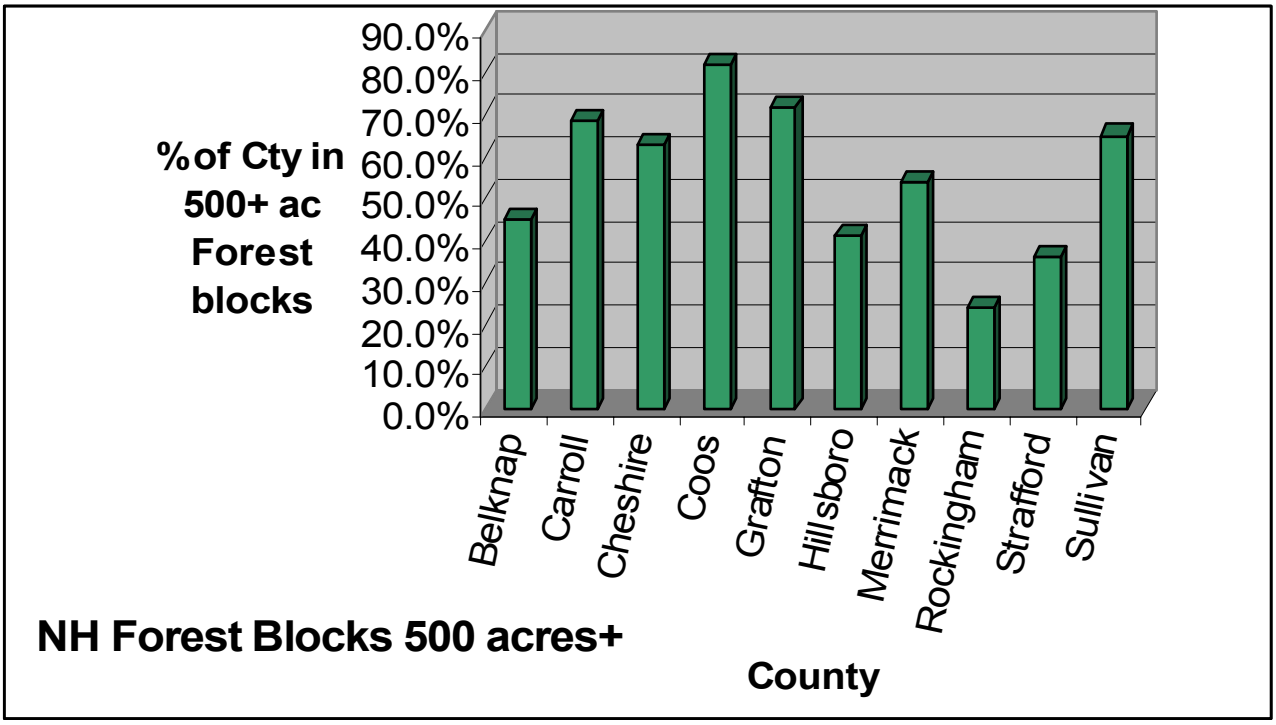
Metric 2.3 Age class by forest type group



Source : USDA Forest Service, Forest Inventory and Analysis

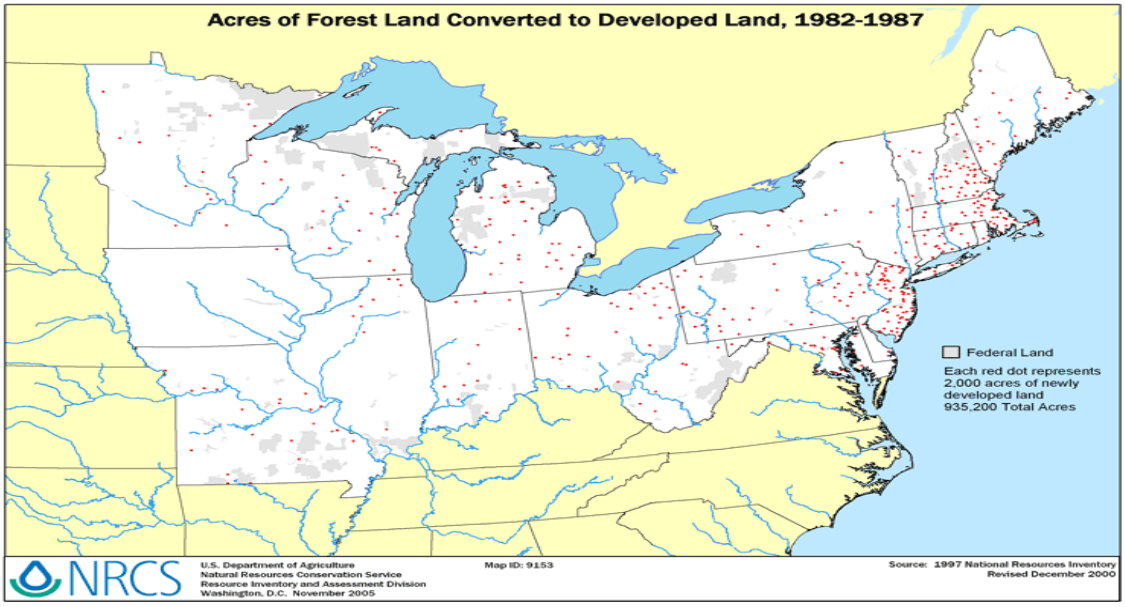
11. Extent of forest land conversion, fragmentation, and parcelization

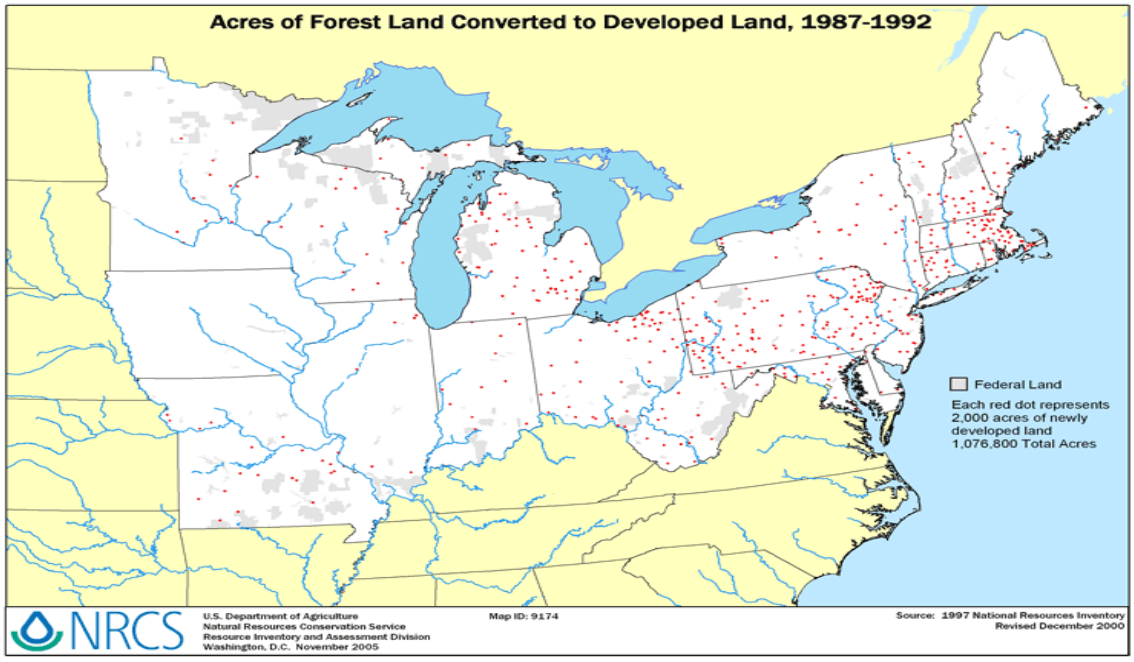
Metric 3.1 Fragmentation

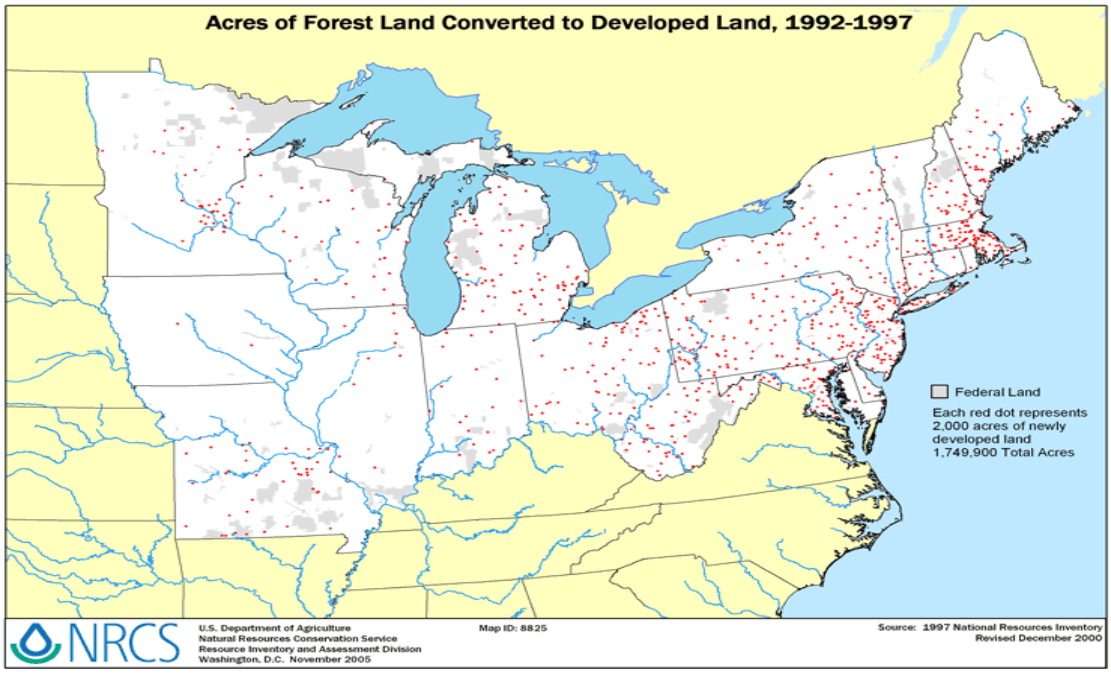


Source: SPNHF, NH's Changing Landscape

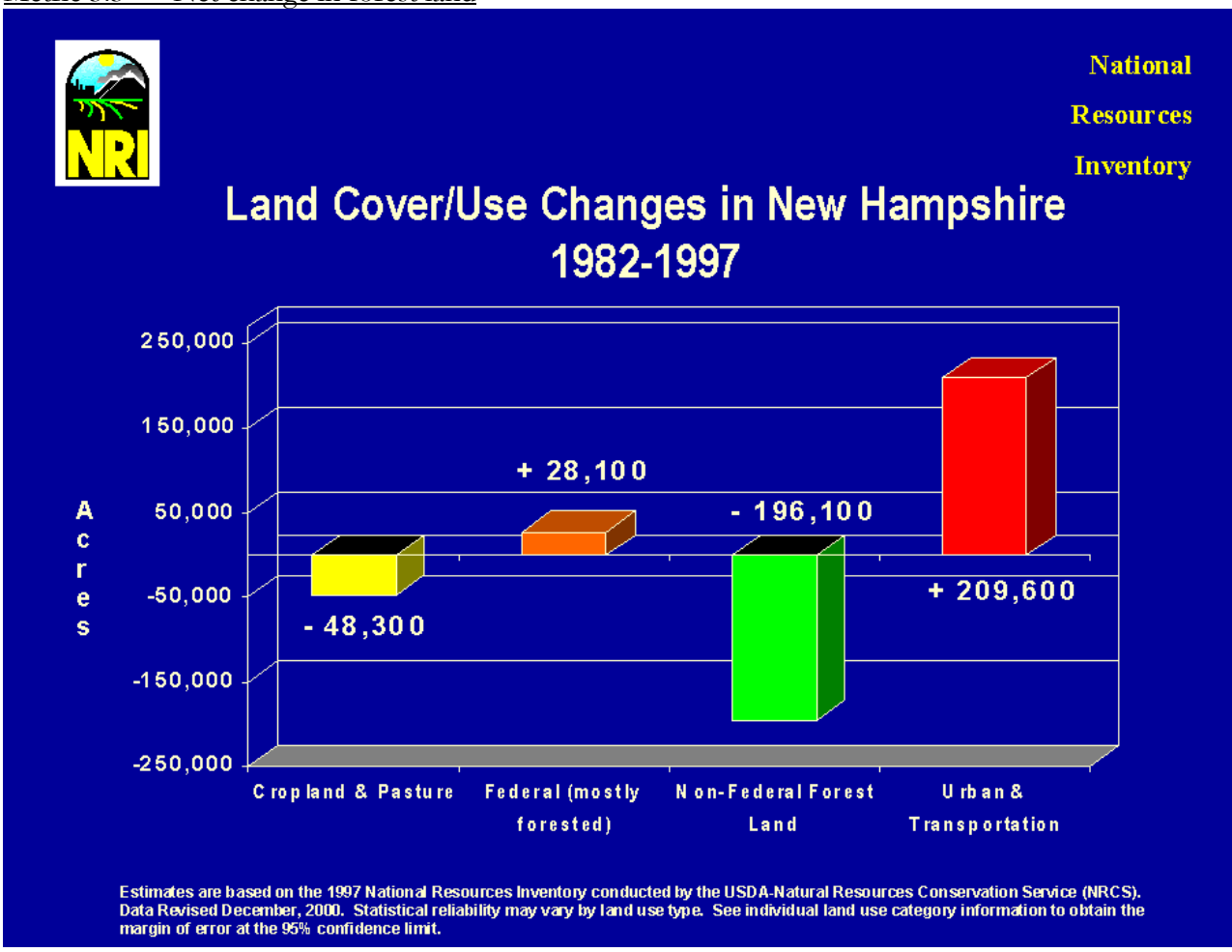
Metric 3.2 Forestland conversion


Acres of Forest Land Converted to Developed Land, 1982-1987
Federal Land
Each red dot represents
2,000 acres of newly
developed land
935,200 Total Acres
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Inventory and Assessment Division
Washington, D.C. November 2005
Map ID: 9153
Source: 1997 National Resources Inventory
Revised December 2000

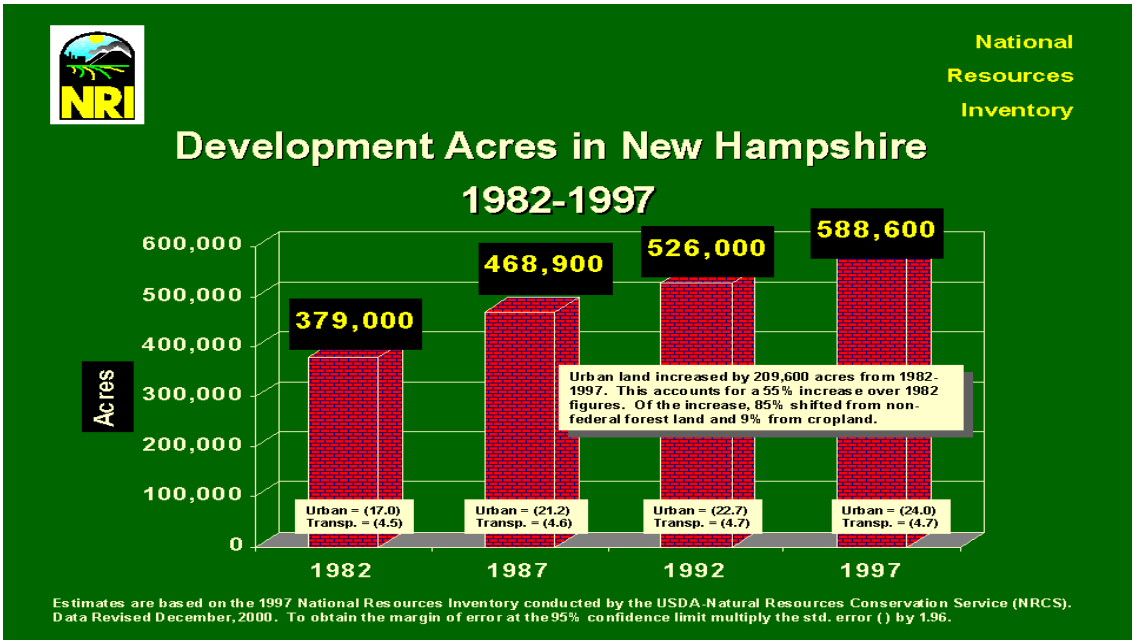

Acres of Forest Land Converted to Developed Land, 1987-1992
Federal Land
Each red dot represents
2,000 acres of newly
developed land
1,076,800 Total Acres
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Inventory and Assessment Division
Washington, D.C. November 2005
Map ID: 9174
Source: 1997 National Resources Inventory
Revised December 2000


Acres of Forest Land Converted to Developed Land, 1992-1997
Federal Land
Each red dot represents
2,000 acres of newly
developed land
1,749,900 Total Acres
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Inventory and Assessment Division
Washington, D.C. November 2005
Map ID: 8825
Source: 1997 National Resources Inventory
Revised December 2000

Metric 3.3 Net change in forest land



Metric 3.4 Additions to and conversions from forest land



Metric 3.5 Forest Parcel Size

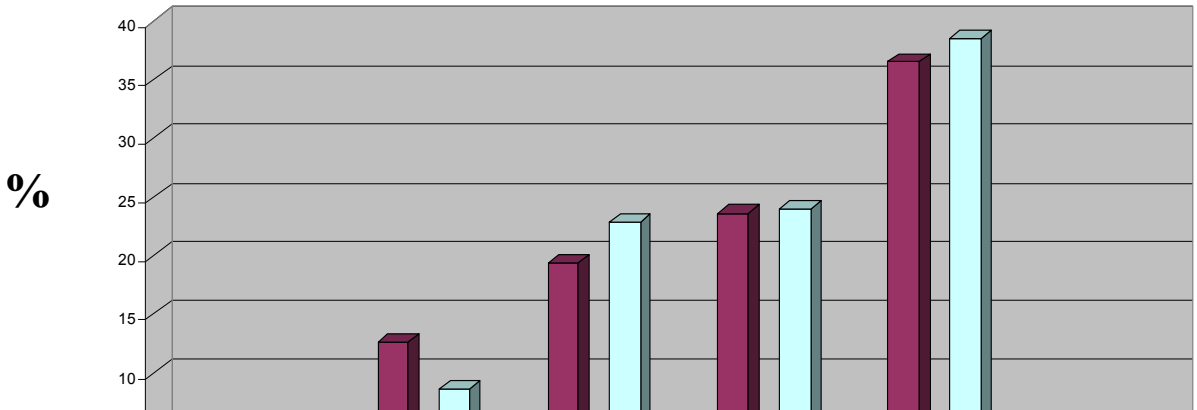
Land Ownership Trends – Northern US

Number of ownerships by parcel size:

Acres	1993(%)	2003(%)
1-9	53.6	61.5
10-49	31.9	28.7
50-99	8.5	5.9
100-499	5.6	3.8
500-999	0.2	0.1
1000-4999	0.1	<.1
5000+	<.1	<.1

Source: National Woodland Owners Survey, USDA Forest Service

Avg Age of Forest Landowners, 1993 & 2003
Northern US by land area %



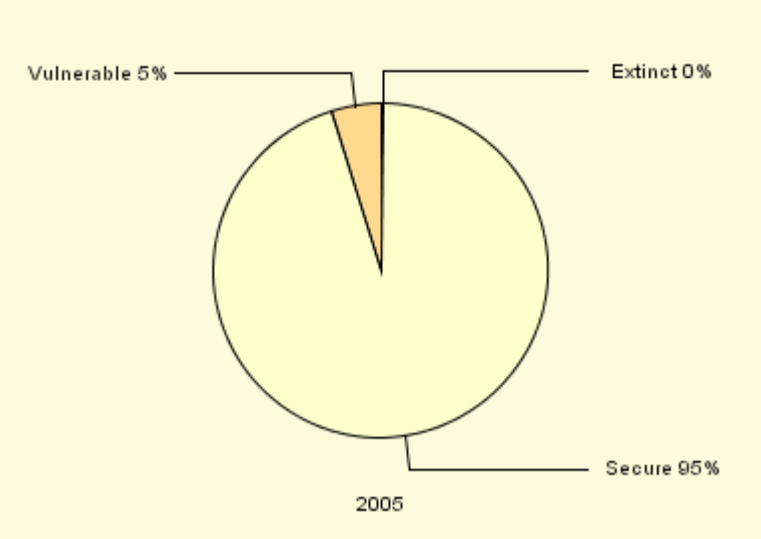
Age

Source: National Woodland Owners Survey, USDA Forest Service (1993 maroon, 2003 light green)

12. Status of forest/woodland communities and associated species of concern

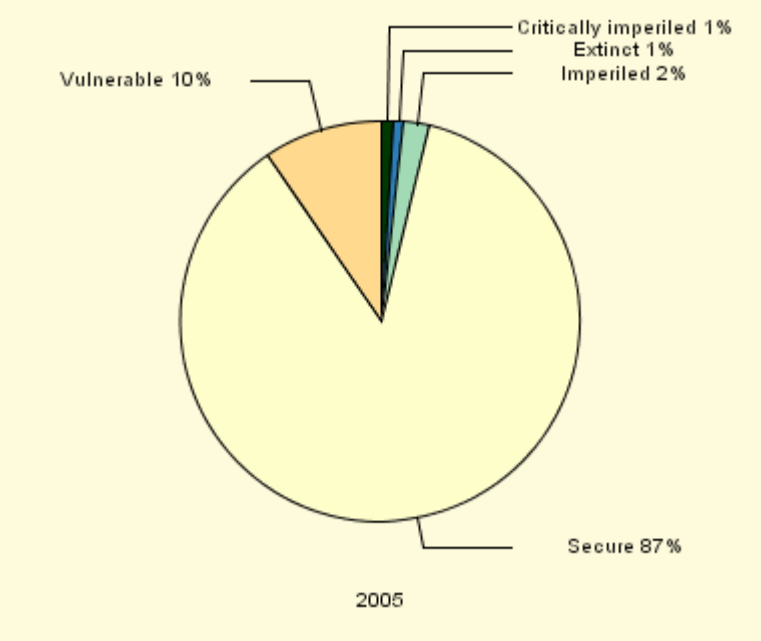
Metric 4.1 Forest and woodland communities – species of concern

NH Forest Animals Species of Concern



Source: NatureServe

Northern US Forest Animals Species of Concern

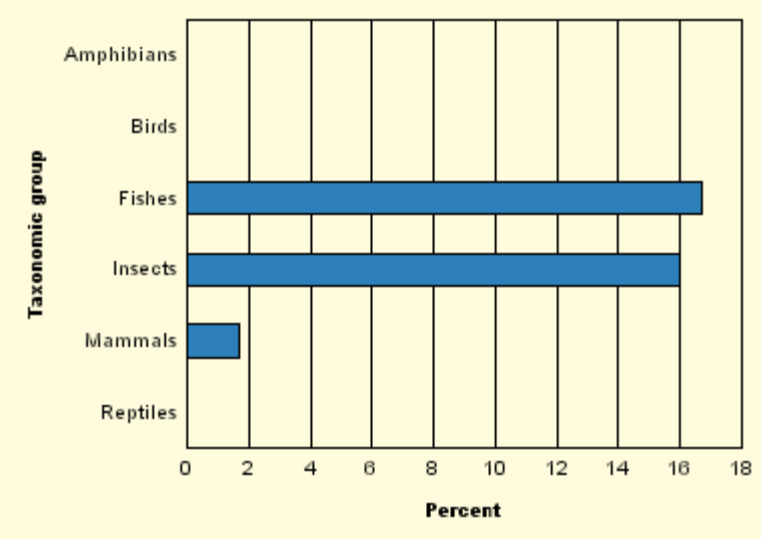


Source: NatureServe

Metric 4.2 Forest-associated species of concern relative to the total

No useful data here

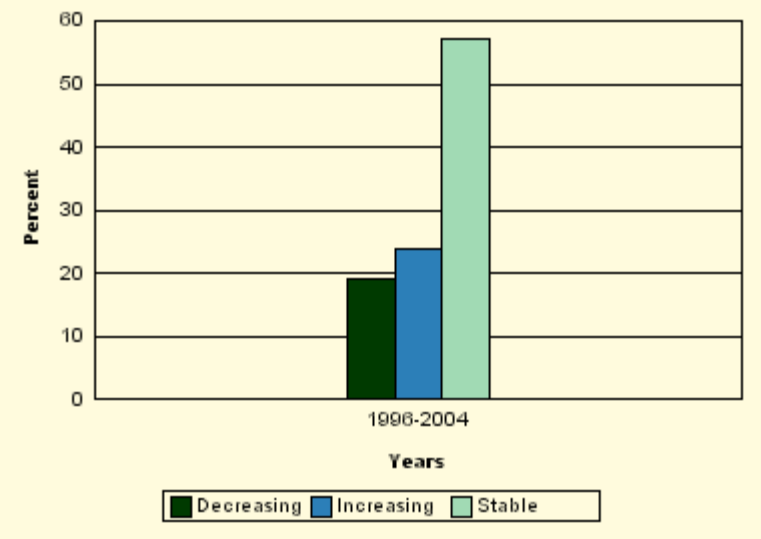
Metric 4.3 Forest associated species by taxonomic group



Source: NatureServe

Metric 4.4 Bird species population trends

NH Woodland Breeding Bird Trends



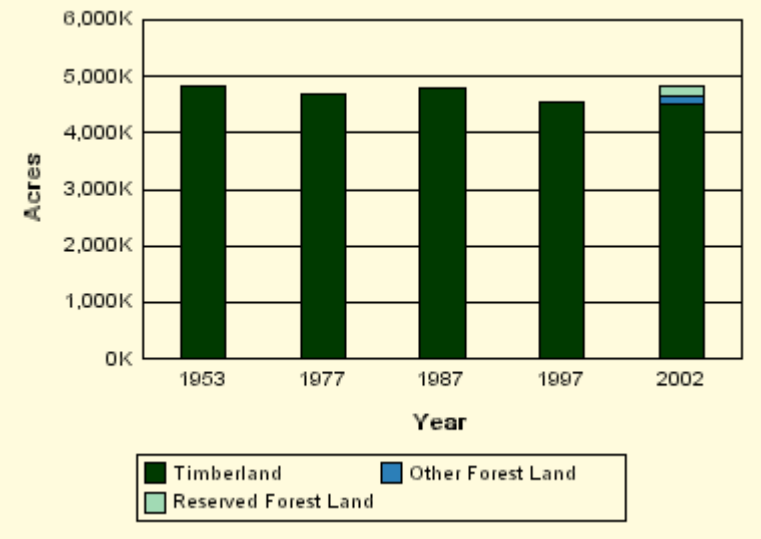
Source: North American Breeding Bird Survey

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

13. Area of timberland

Metric 5.1 Timberland area

NH Timberland Acreage



Metric 5.2 Total forest area

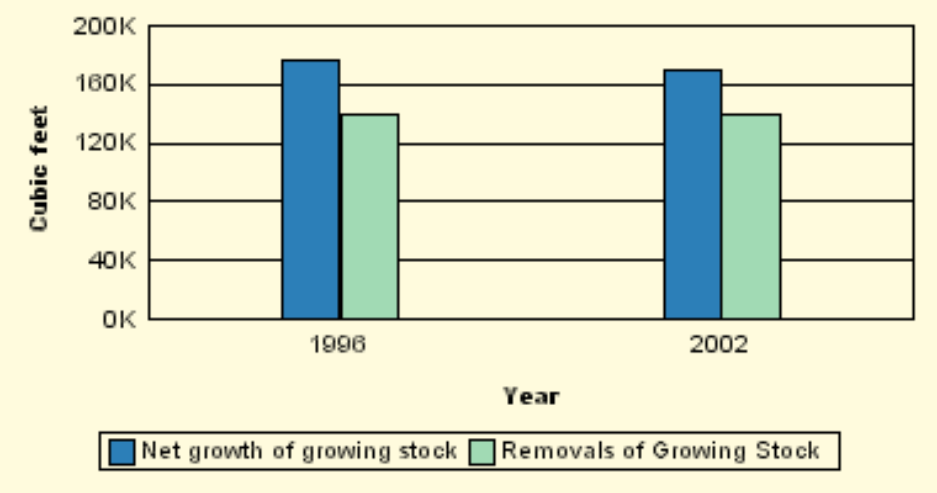
NH Total Forest Acres – 4,638,856 acres

Source: SPNHF, NH's Changing Landscape, GRANIT

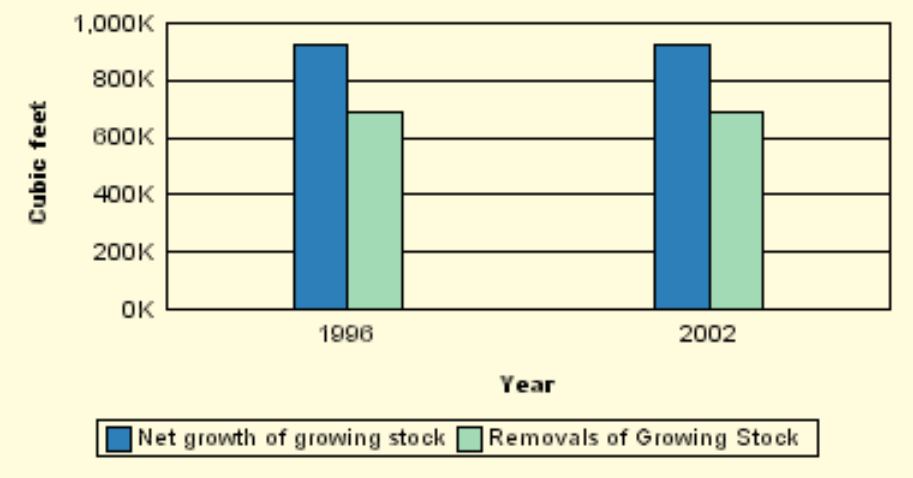
14. Annual removal of merchantable wood volume compared to net growth

Metric 6.1 Net growth to removals ratio

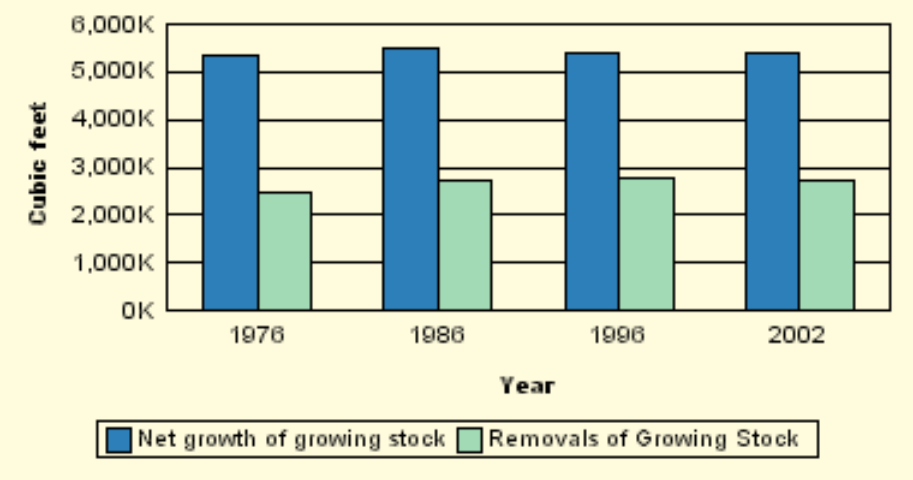
NH Net Forest Growth to Removals



NE Net Forest Growth to Removals

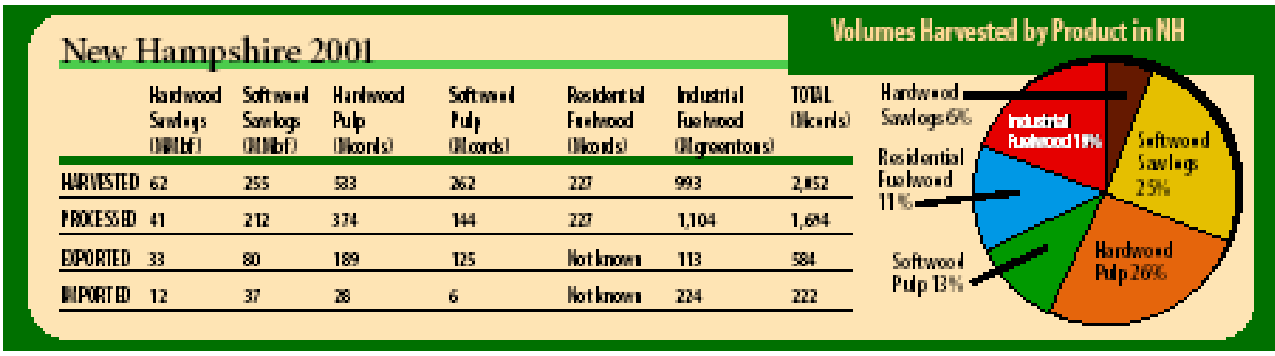


Northeast Net Forest Growth to Removals



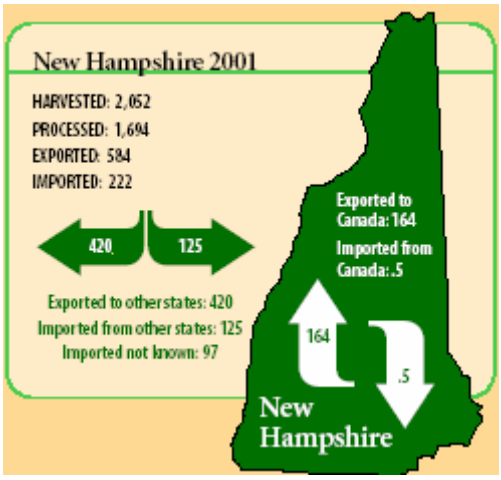
Source: all USDA FIA

Metric 6.2 Type of removals: harvest, land clearing



	Hardwood Sawlogs (MMBbf)	Softwood Sawlogs (MMBbf)	Hardwood Pulp (Mcords)	Softwood Pulp (Mcords)	Residential Fuelwood (Mcords)	Industrial Fuelwood (Mgreentons)	TOTAL (Mcords)
HARVESTED	62	255	533	262	227	993	2,852
PROCESSED	41	212	374	144	227	1,104	1,694
EXPORTED	33	80	189	125	Not known	113	584
IMPORTED	12	37	28	6	Not known	224	222

Source: North East State *Foresters Association, 2002*



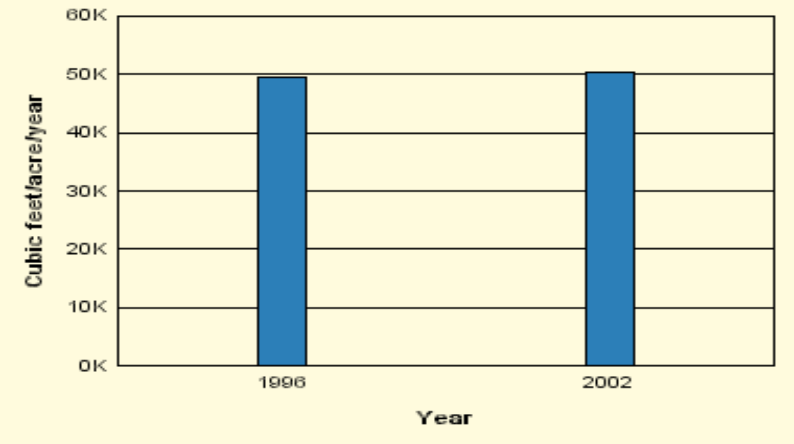
Source: North East State *Foresters Association, 2002*

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

15. Area of forest land affected by potentially damaging agents

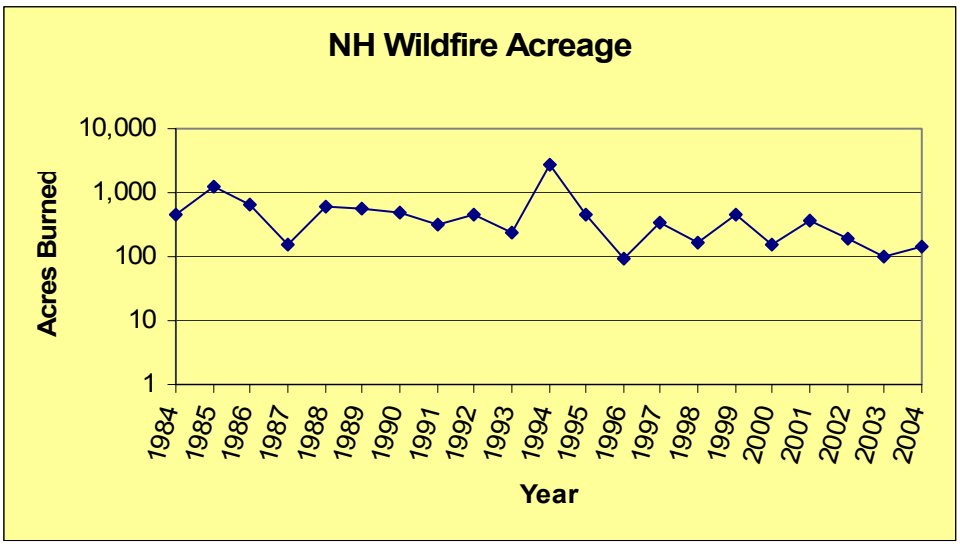
Metric 7.1 Tree mortality

NH Tree Mortality



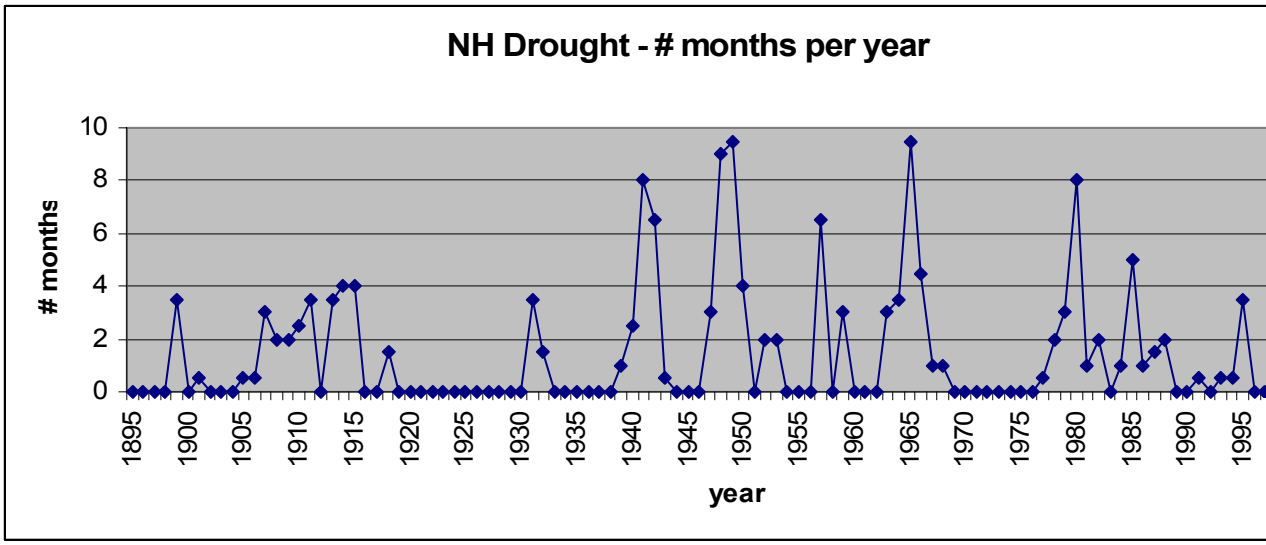
Source: USDA FIA

Metric 7.2 Wildfire



Source: USDA Forest Service from state reports

Metric 7.3 Weather phenomena: drought, storm, flood



Source: NOAA, National Climatic Data Center

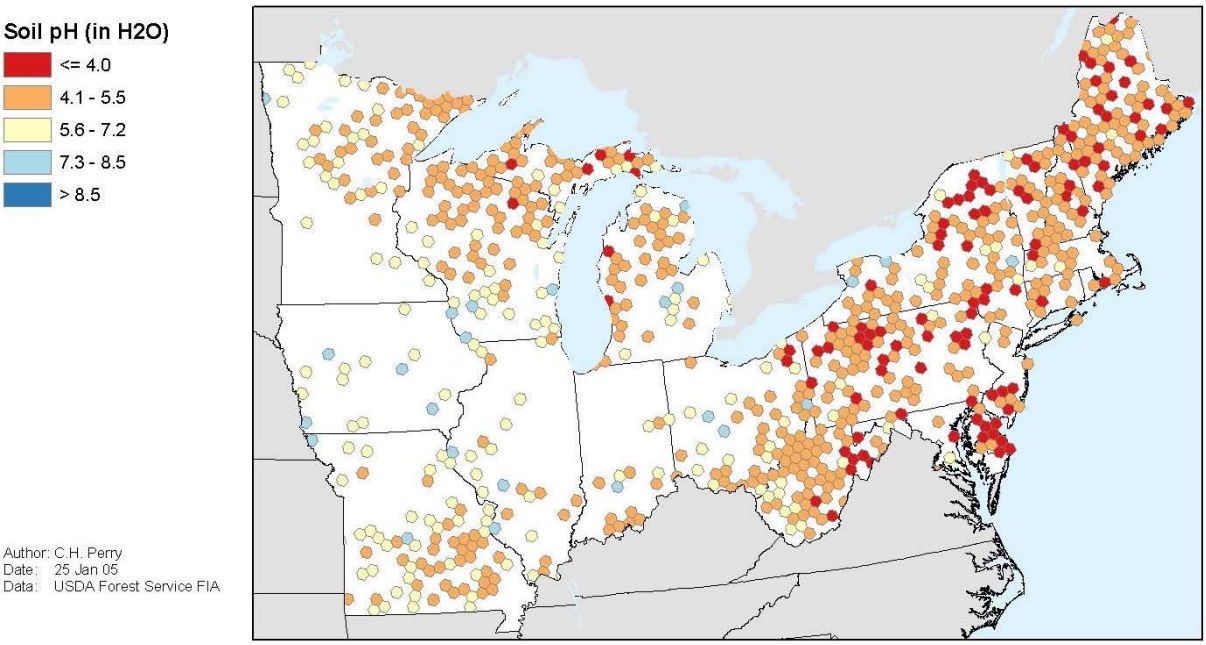
Metric 7.4 Biotic stressors: insects, diseases, plants, and animals

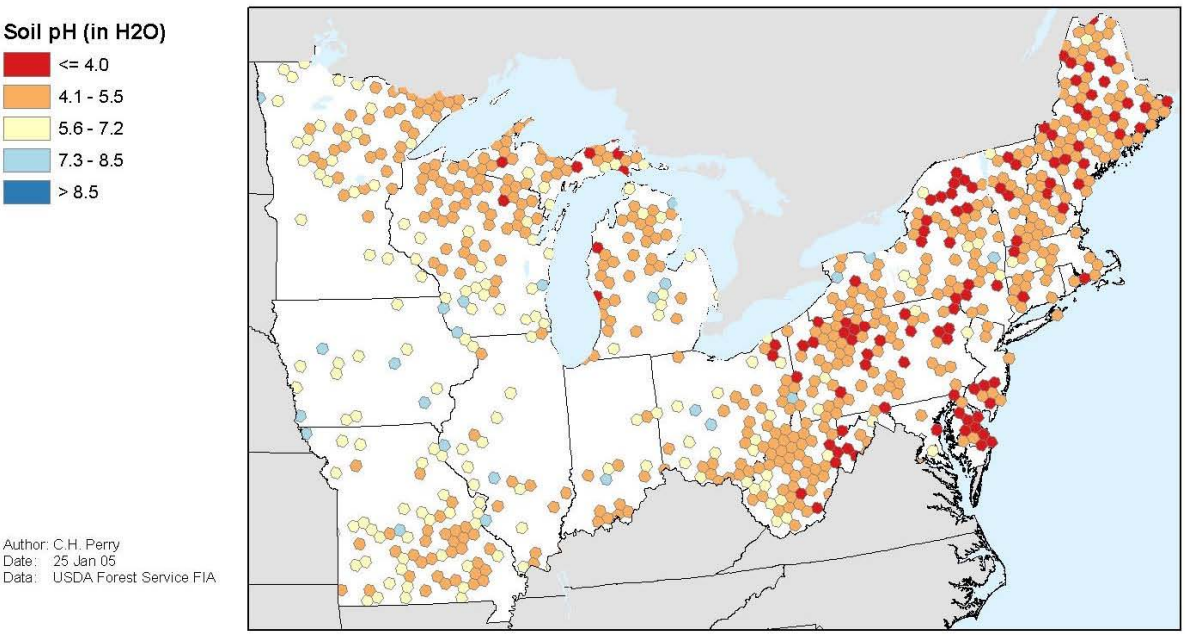
Data doesn't lend itself to display

Criterion 4: Conservation and Maintenance of Soil and Water Resources

16. Soil quality on forest land

Metric 8.1 Soil pH





Metric 8.2 Soil carbon

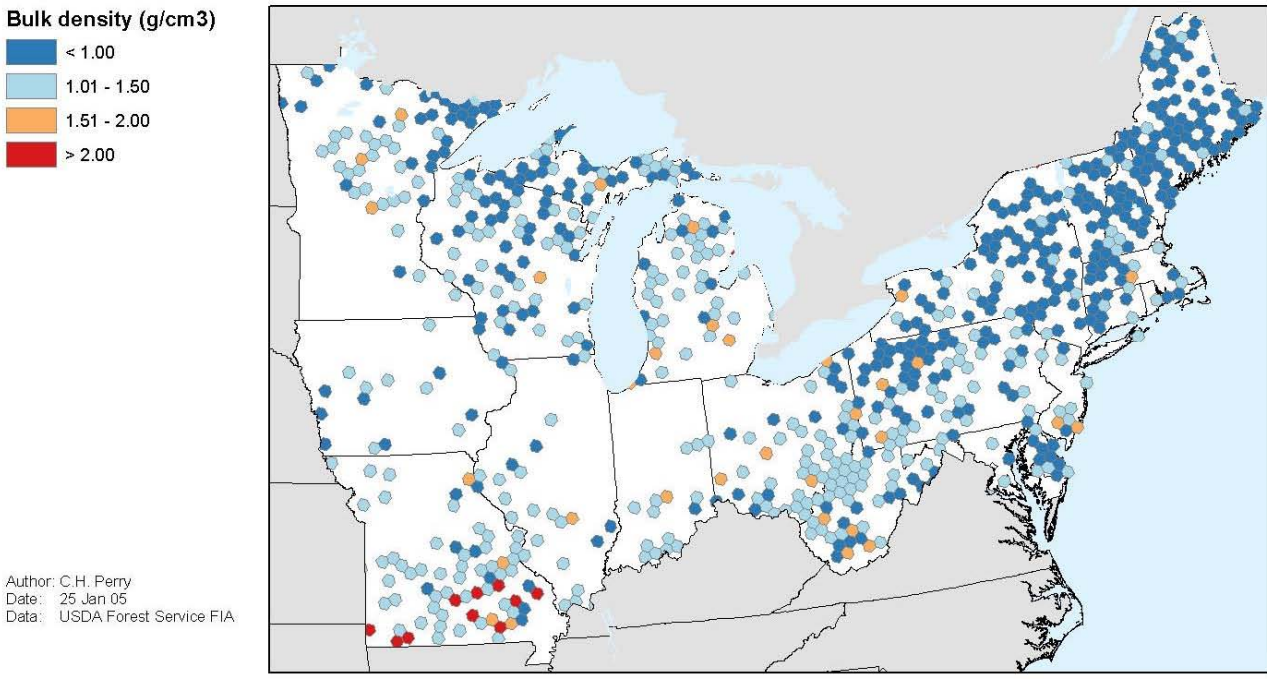
Data not clear…

Data Source : USDA Forest Service, Forest Inventory and Analysis

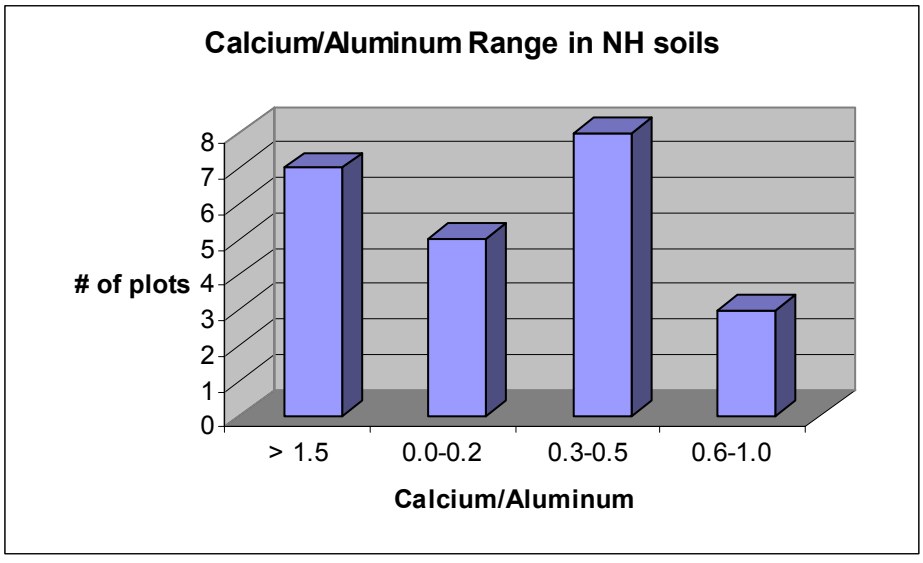
Metric 8.3 Estimated bare soil

No data from USDA. Possible GRANIT?

Metric 8.4 Bulk density



Metric 8.5 Calcium/aluminum ratio



Source: USDA Forest Service

9. Area of forest land adjacent to surface water, and forest land by watershed

Metric 9.1 Forest land adjacent to surface water

Data not available DES?

Metric 9.2 Forest land per watershed

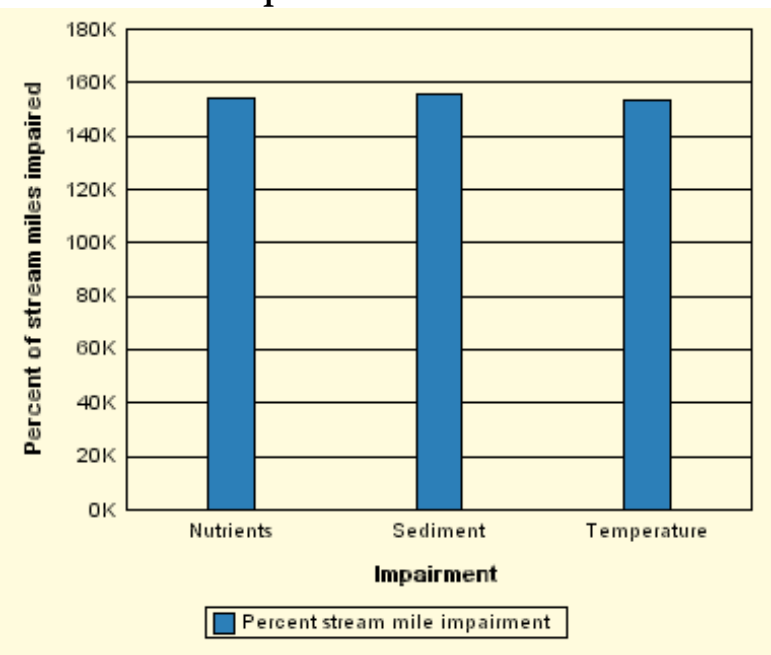
Data not available DES?

10. Water quality in forested areas

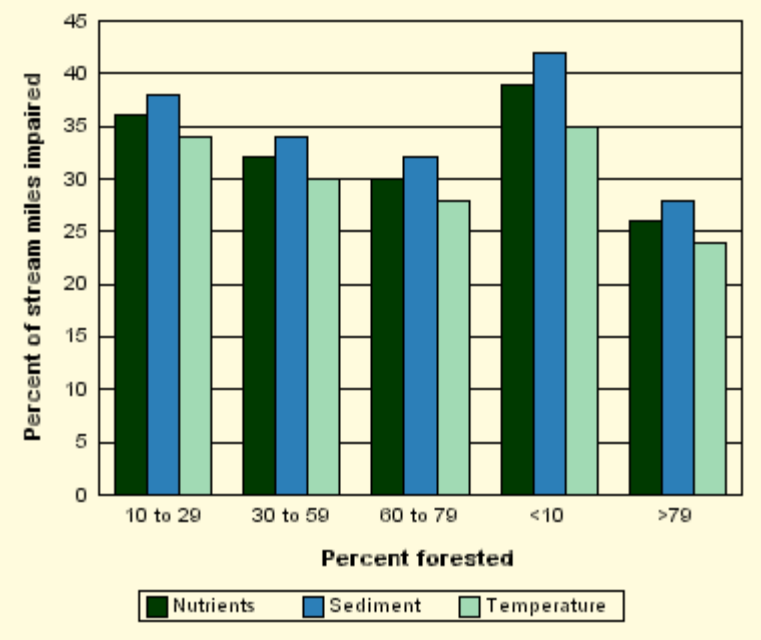
Metric 10.1 Water quality in forested areas

Data not available DES?

10.2 - Stream miles impaired by percentage of watershed



Data Source : USDA Forest Service, Northeastern Area State and Private Forestry, Information Management and Analysis



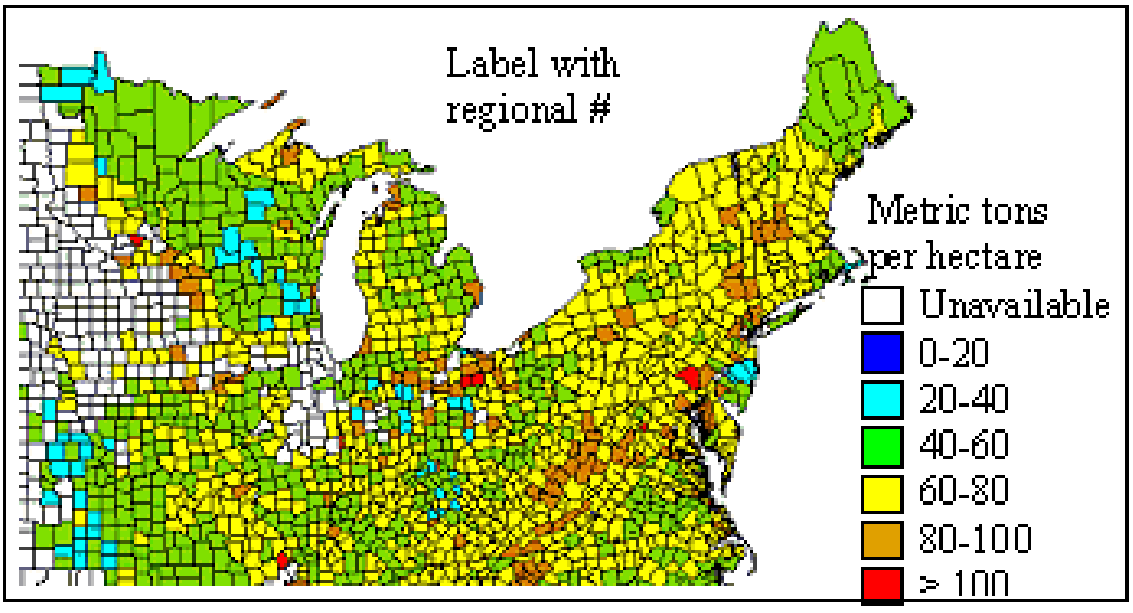
Data Source : USDA Forest Service, Northeastern Area State and Private Forestry, Information Management and Analysis

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles

11. Forest ecosystem biomass and forest carbon pools

Metric 11.1 Forest ecosystem biomass

Forest Biomass - 2003



Data Source : USDA Forest Service, Northern Global Change Research Program

Metric 11.2 Forest carbon pools

Carbon in biomass for Northeast Region – Millions of Metric Tons

RPA_year	Live Tree	Standing Dead	Understory	Down Dead	Litter	Big Live tree	Big Standing Dead
1953	1707.375	192.7362	52.2887	143.8955	1155.829	333.974	162.1025
1963	2147.872	243.5959	65.4759	179.1939	1217.847	420.464	202.9725
1977	2835.696	321.5337	80.8408	237.8413	1299.554	555.3289	268.1345
1987	3444.574	395.022	95.4294	285.9585	1304.179	672.0788	323.8846
1997	3939.527	456.7549	108.5374	325.4665	1347.661	765.7329	368.6057
2002	4001.621	463.9542	110.2481	330.5965	1368.902	777.8023	374.4156

Source: USDA Forest Service FIA

Carbon in biomass for New Hampshire – Millions of Short Tons

	Live Tree	Standing Dead	Understory	Down Dead	Litter	Big Live tree	Big Standing Dead	Acres
1997	162.03211	2.24210057	3.76869108	13.4160067	47.9774249	32.34842	0.443019	4,823,70
2002	165.87929	14.5694649	3.79646932	13.7226696	47.8257469	33.15322	2.839443	4,812,57

Source: USDA Forest Service FIA

Metric 11.3 Forest ecosystem carbon pools by forest type

Carbon by forest type in New Hampshire 2002 – Millions of Metric Tons

Broad-leaved	***148.0549***	***22.9538***	***87.2824***
Coniferous	58.1222	9.5619	46.1544
Mixture	17.668	2.6136	9.5158
Nonstocked	0.0307	0	0.4456

Source: USDA Forest Service FIA

Metric 11.4 Change in forest carbon pools

Average annual change in forest carbon for New Hampshire = + 3.7269 million tons

Source: USDA Forest Service FIA

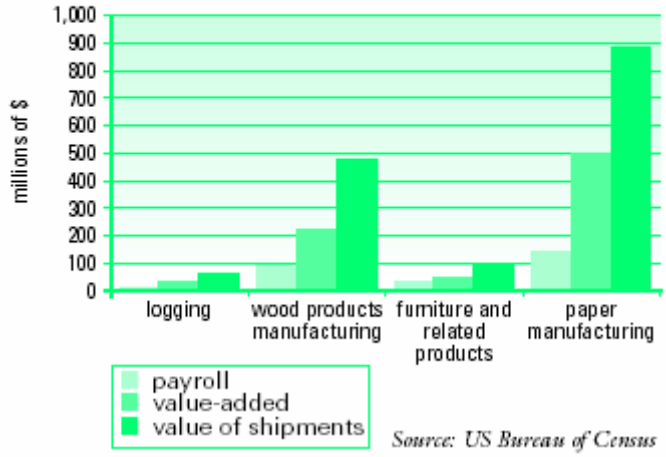
Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies

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

Metric 12.1 Total value of wood products shipments

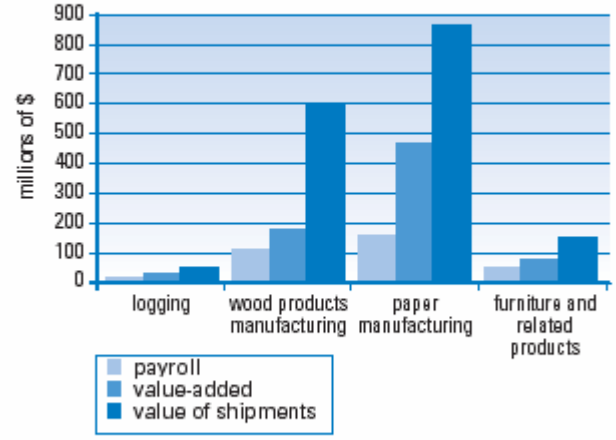
Metric 12.2 Value added in wood products

Figure 5. PAYROLL, VALUE-ADDED, AND VALUE OF SHIPMENTS FOR FOREST-BASED MANUFACTURING INDUSTRIES, NEW HAMPSHIRE, 1997



Source: US Bureau of Census

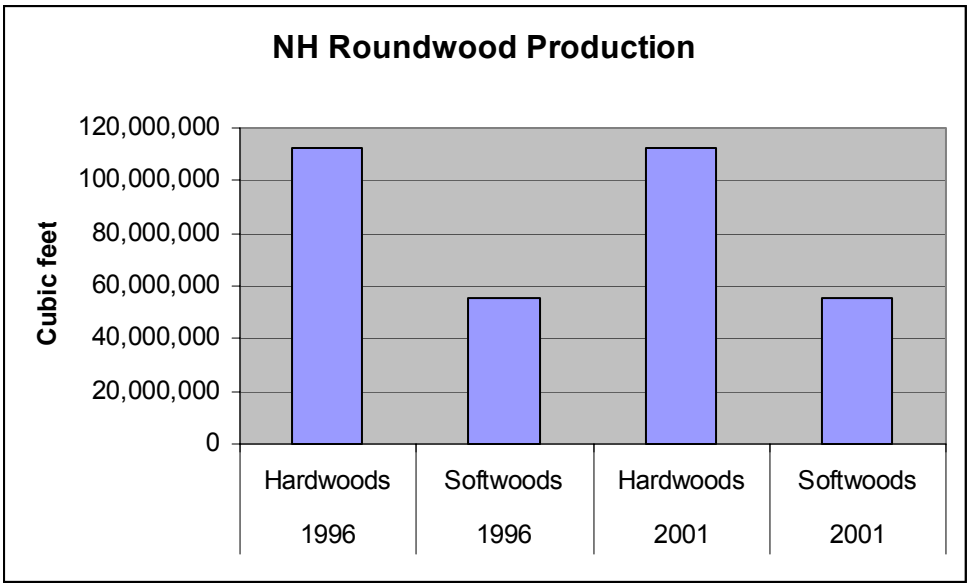
Figure 5. Figure 5. PAYROLL, VALUE-ADDED, AND VALUE OF SHIPMENTS FOR FOREST-BASED MANUFACTURING INDUSTRIES, NEW HAMPSHIRE



Sources of data for Figures 4 and 5:
US Bureau of the Census, 1997 Economic Census (logging);
US Bureau of the Census, Annual Survey of Manufacturers, 2001 (other)

NEFA publication 2004

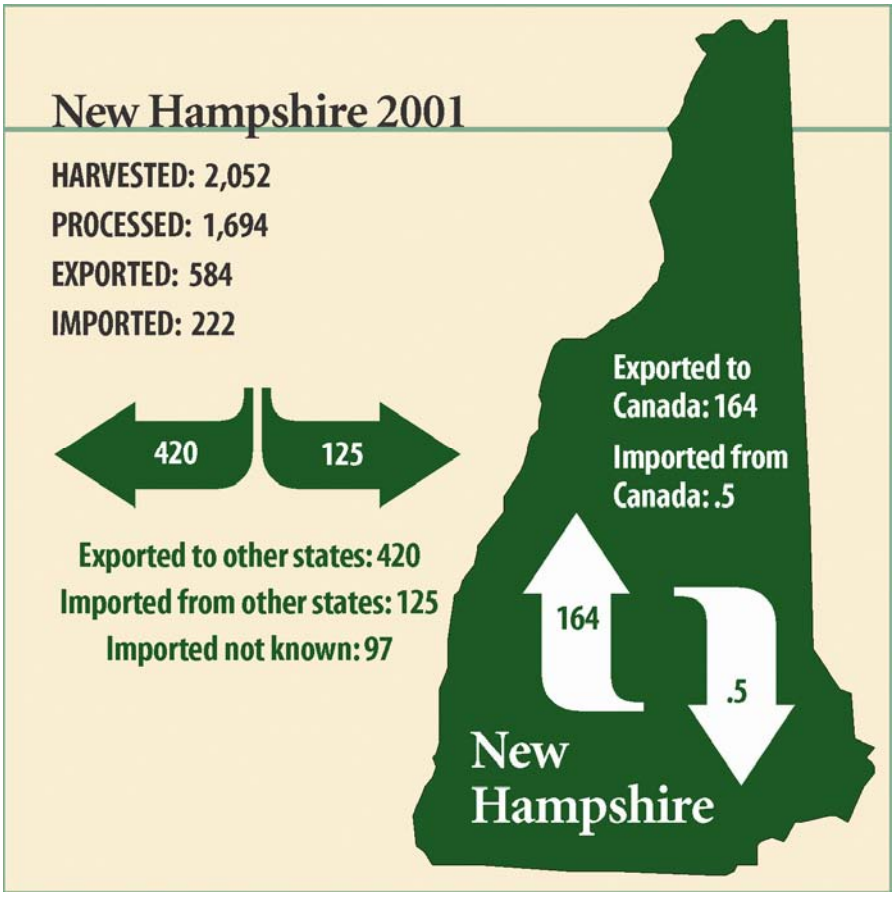
Metric 12.3 Volume of roundwood production



Source: USDA Forest Service Timber Product Output surveys

Metric 12.4 Consumption of roundwood

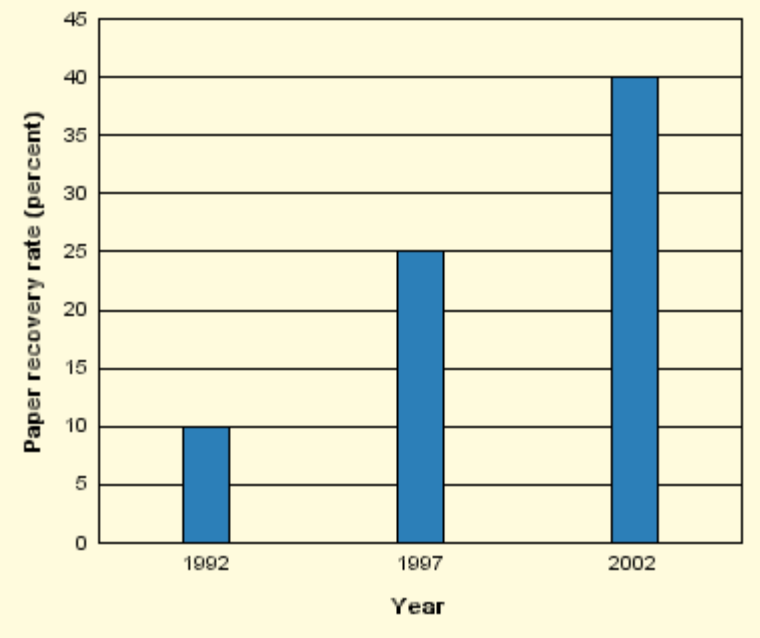
NH Wood consumption and production 2001 – thousands of cords



Source: NEFA Wood Flows

Metric 12.5 Recovered paper

Recovered paper as percentage of production in Northeast Region of US



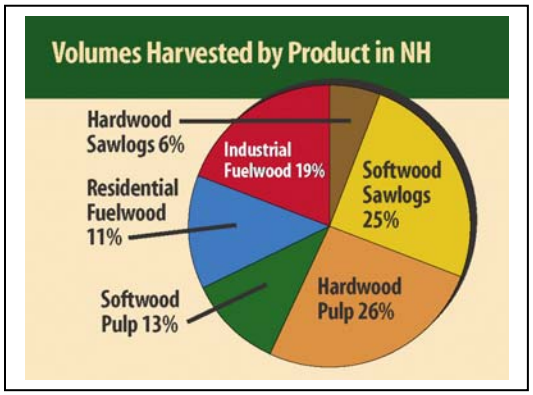
Source: USDA Forest Service

Metric 12.6 Bioenergy

NH Timber Harvest and Processed Data 2001

New Hampshire 2001

	Hardwood Sawlogs (MMbf)	Softwood Sawlogs (MMbf)	Hardwood Pulp (Mcords)	Softwood Pulp (Mcords)	Residential Fuelwood (Mcords)	Industrial Fuelwood (Mgreen tons)	TOTAL (Mcords)
HARVESTED	62	255	533	262	227	993	2,052
PROCESSED	41	212	374	144	227	1,104	1,694
EXPORTED	33	80	189	125	Not known	113	584
IMPORTED	12	37	28	6	Not known	224	222



Source: NEFA Wood Flows 2001

13. Outdoor recreational facilities and activities

Metric 13.1 Participation in outdoor recreation

National Data – Outdoor recreation participation

Activity	Sample size	Percent participating	95% confidence interval lower bound (%)	95% confidence interval upper bound (%)	Number of participants (1,000s)	95% confidence interval lower bound (1,000s)	9 confider inter up bou (1,00
View/photograph wildlife, scenery, etc.	2,935	77.7	76.2	79.2	3,230	3,168	3,2
Picnicking	2,901	56.6	54.8	58.4	2,353	2,278	2,4
Swimming in lakes, streams, etc.	2,815	45.8	44	47.6	1,904	1,829	1,9
Freshwater fishing	2,782	40.7	38.9	42.5	1,692	1,617	1,7
Gather mushrooms, berries, etc.	2,825	39.5	37.7	41.3	1,642	1,567	1,7
Camping and/or backpacking	2,935	38.7	36.9	40.5	1,609	1,534	1,6
Visit a wilderness or primitive area	1,496	38.3	35.8	40.8	1,592	1,488	1,6
Day hiking	2,902	35	33.3	36.7	1,455	1,384	1,5
Developed camping	2,902	32.3	30.6	34	1,343	1,272	1,4
Mountain biking	2,839	31.3	29.6	33	1,301	1,230	1,3
Drive off-road	2,747	25.8	24.2	27.4	1,073	1,006	1,1
Canoeing and/or Kayaking	2,935	20.8	19.3	22.3	865	802	9
Hunting (small or big game)	2,935	18.3	16.9	19.7	761	703	8
Snowmobiling	2,748	18.3	16.9	19.7	761	703	8
Primitive camping	2,780	16	14.6	17.4	665	607	7
Cross country skiing and/or snowshoeing	2,935	13	11.8	14.2	540	491	5
Downhill skiing and/or snowboarding	2,935	11.6	10.4	12.8	482	432	5
Horseback riding on trails	1,419	8.1	6.7	9.5	337	279	3
Backpacking	2,902	6.9	6	7.8	287	249	3

Source: NSRE 2000-2004. Versions 1-18, N=2,935. Interview dates: 7/99 to 11/04.

Based on 4.157 million people age 16 and older (2000 Census)

US Fish & Wildlife Service, National Survey of Fishing, Hunting, & Wildlife-Associated Recreation
Days of activity in fishing, hunting, and wildlife watching.

Population 16 years and older, numbers in thousands

	Hunting			Fresh-water Fishing			Wildlife watching		
State	**1991**	**1996**	**2001**	**1991**	**1996**	**2001**	**1991**	**1996**	**2001**
Connecticut	840	854	766	3,460	3,880	3,516	4,098	1,887	7,241
Delaware	410	716	226	569	980	609	835	958	722
Illinois	6,863	6,488	4,522	15,626	17,089	14,246	8,464	9,416	7,656
Indiana	7,155	6,204	5,000	11,793	13,465	12,756	7,135	5,912	11,999
Iowa	4,005	5,182	3,989	6,062	7,062	7,485	4,415	4,816	6,393
Maine	2,347	3,144	2,469	3,960	4,107	3,422	4,502	2,942	4,981
Maryland	2,276	1,741	1,799	4,354	4,290	4,269	6,580	5,717	6,809
Massachusetts	1,426	1,261	1,158	6,011	6,746	4,560	8,222	9,193	10,198

Michigan	15,088	18,408	8,994	14,816	19,456	12,817	14,159	16,162	13,999
Minnesota	5,235	6,984	8,437	17,959	25,897	28,159	10,378	6,807	13,234
Missouri	7,196	8,508	6,606	15,136	14,682	13,279	7,019	8,598	12,448
New Hampshire	1,118	1,204	1,459	2,720	3,139	2,871	3,337	4,191	3,178
New Jersey	2,363	2,242	3,120	5,911	6,021	5,553	5,472	7,363	9,873
New York	13,110	11,552	13,187	15,497	17,412	13,022	12,729	9,457	21,583
Ohio	9,013	7,933	10,233	14,450	12,878	15,212	12,769	11,418	19,814
Pennsylvania	15,639	13,173	13,955	23,792	18,635	17,201	20,062	13,123	18,990
Rhode Island	350	502	104	1,049	1,347	649	1,204	1,202	1,414
Vermont	1,777	1,642	1,510	2,258	1,951	2,321	2,364	2,340	3,717
West Virginia	6,104	6,262	5,166	4,107	5,040	4,152	3,584	2,452	2,619
Wisconsin	11,324	10,042	9,653	19,003	14,398	19,139	12,914	12,154	16,499
Regional totals	**113,639**	**114,042**	**102,353**	**188,533**	**198,475**	**185,238**	**150,242**	**136,108**	**193,367**

1991 Data: US Department of the Interior Fish & Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 1991 National Survey o
Hunting, & Wildlife-Associated Recreation.

1996 Data: US Department of the Interior Fish & Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 1996 National Survey o
Hunting, & Wildlife-Associated Recreation (FHW/96 NAT)

2001 Data: U.S. DOI, F&WS and US DOC, US Census Bureau. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. (Oct.

Metric 13.2 Federal Land Open to Recreation

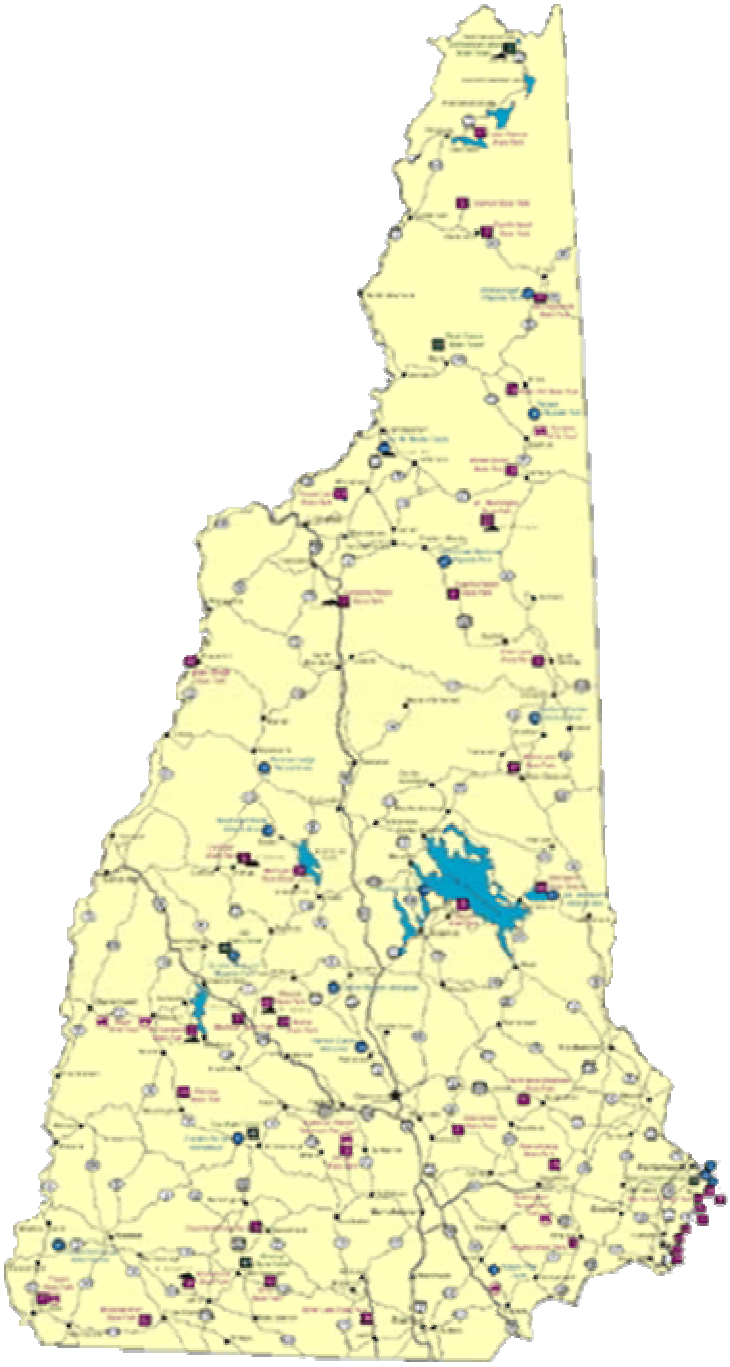
Federal Land other than WMNF in NH Open to Recreation 2003

USDA Forest Service	731,942
National Park Service	15,400
Fish & Wildlife Service	19,689
Bureau of Land Management	0
U.S. Army Corps of Engineers	21,344

Source: federal agencies

Metric 13.3 Recreational Facilities on State Land

NH Division of Parks & Recreation facilities



Metric 13.4 Trails

The NH Division of Parks and Recreation's Bureau of Trails administers multiple-use trails on st
federal, and private lands. The Bureau of Trails assists organizations, municipalities, and trail clu
with the development of trails on both public and private lands. Included in the Bureau's manage
are 250 miles of wheeled off-highway recreational vehicle trails, over 300 miles of state-owned r
trails, and 6,830 miles of snowmobile trails.

Metric 13.5 Campgrounds

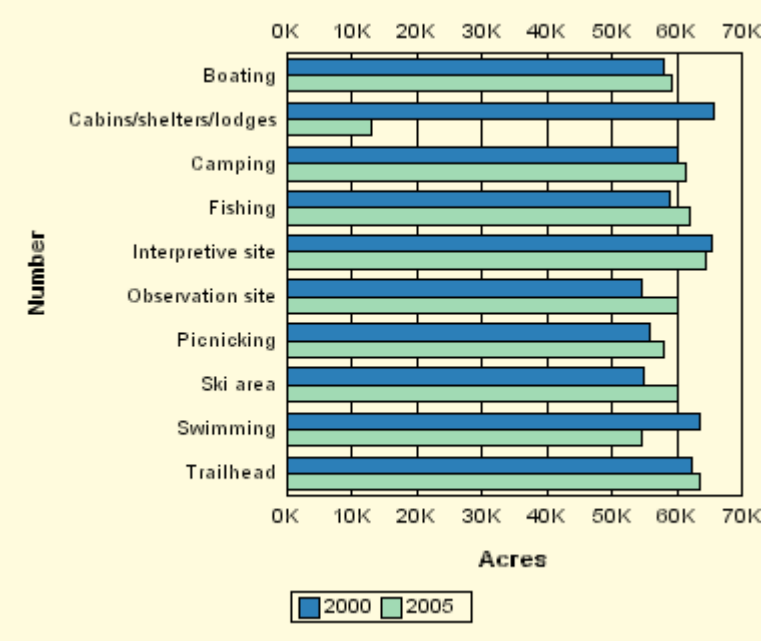
NH's Campgrounds - 2005

No Public Campgrounds	No_Private Campgrounds	No_Public Campsites	No_Private Campsites
33	109	2360	13379

Data source: Woodall's Publications Corp.

Metric 13.4 Recreational areas

Developed Recreation Sites on National Forest lands in the US

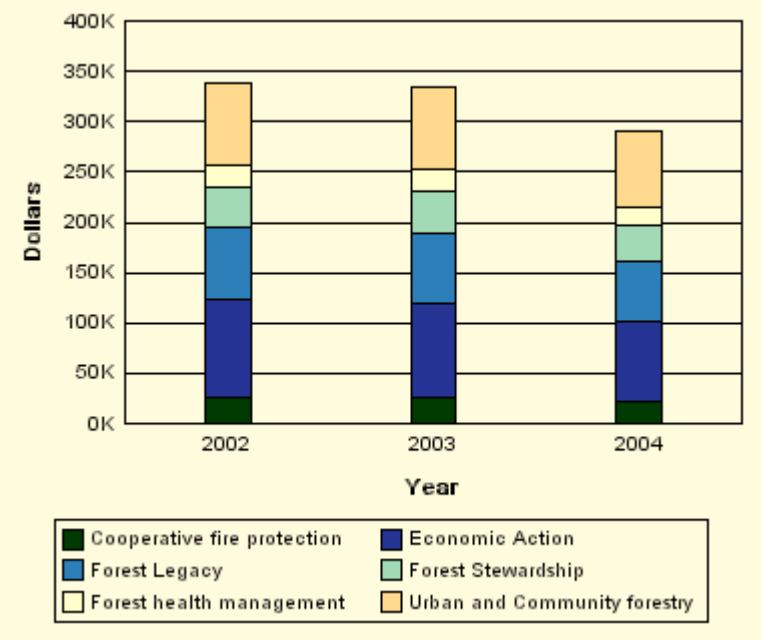


Source: USDA Forest Service

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

Metric 14.1 USDA NA S&PF funding

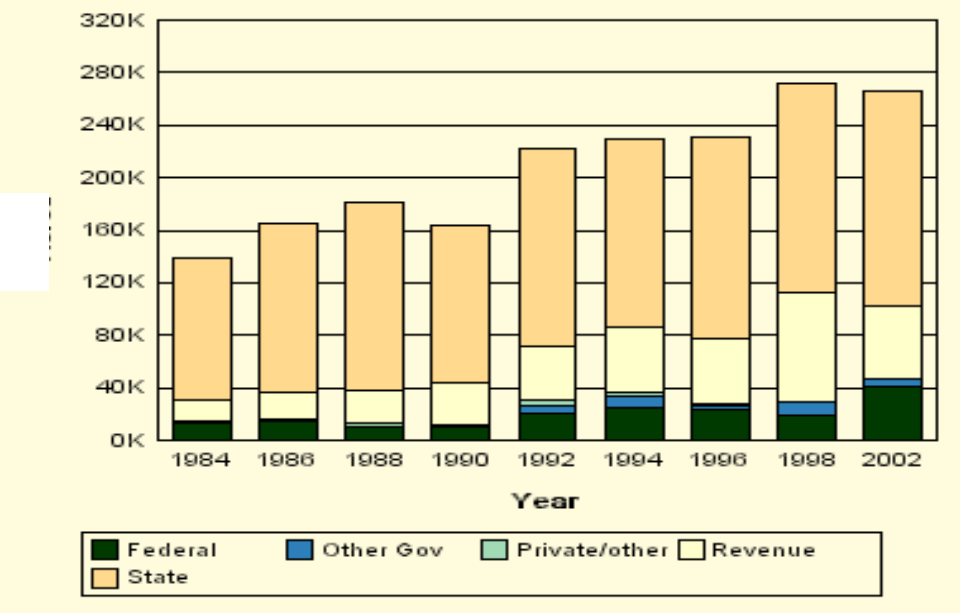
USDA Forest Service State & Private Funding



Source: USDA Forest Service

Metric 14.2 State forestry program funding

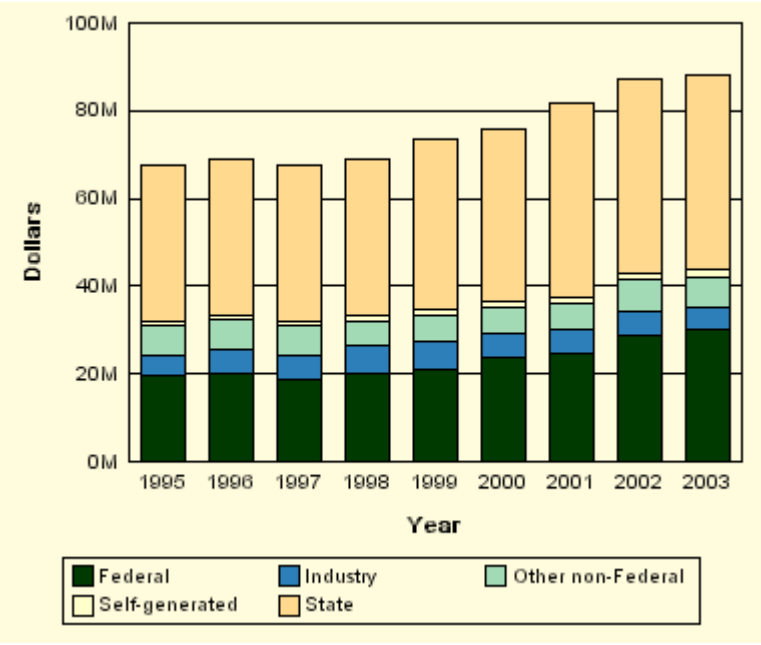
NH Division of Forests & Lands funding



Source: agency

Metric 14.3 Funding for forestry research at universities

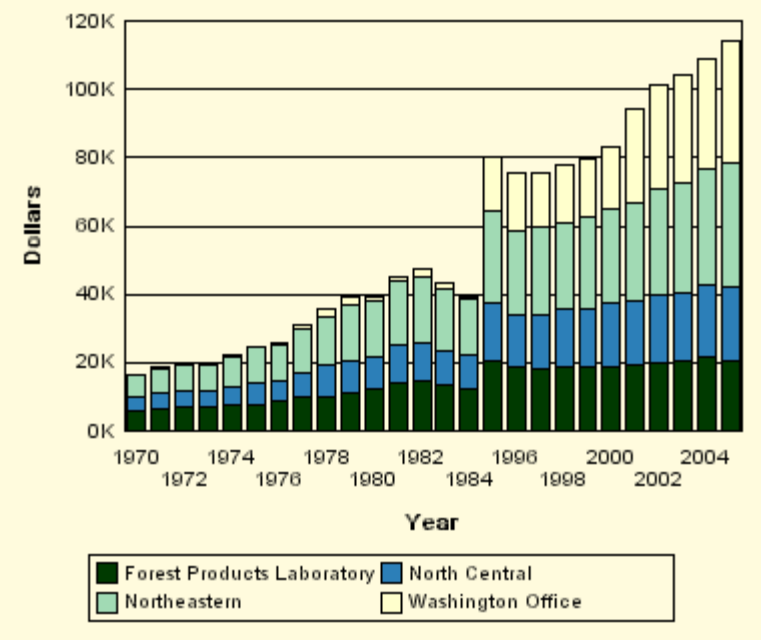
Forestry Research Funding at Universities in Northeast US region



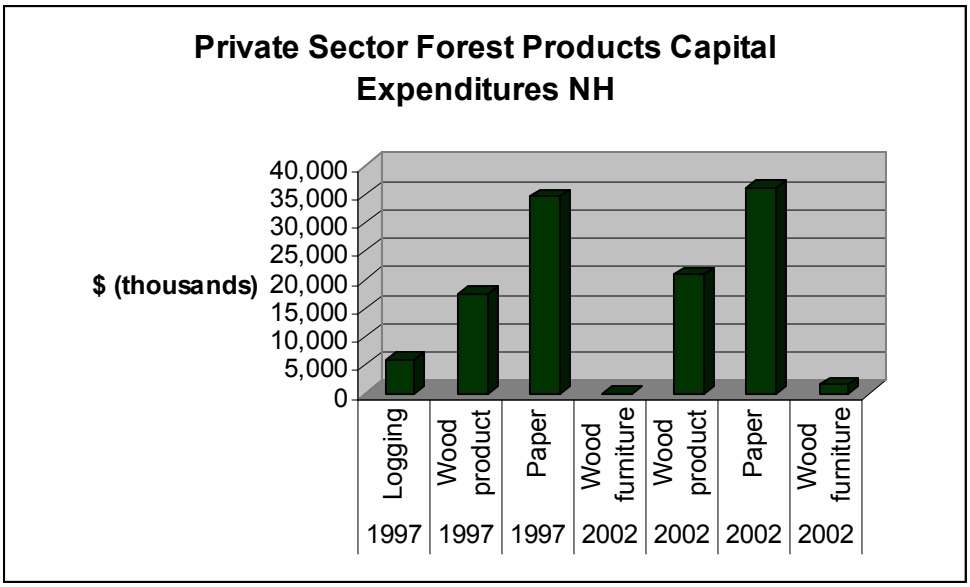
Source: National Association of Professional Forestry Schools

Metric 14.4 USDA Forest Service Research funding

USDA Forestry Research Funding – Northeast Region


120K
100K
80K
60K
40K
20K
0K
Dollars
1970
1972
1974
1976
1978
1980
1982
1984
1996
1998
2000
2002
2004
Year
Forest Products Laboratory
North Central
Northeastern
Washington Office

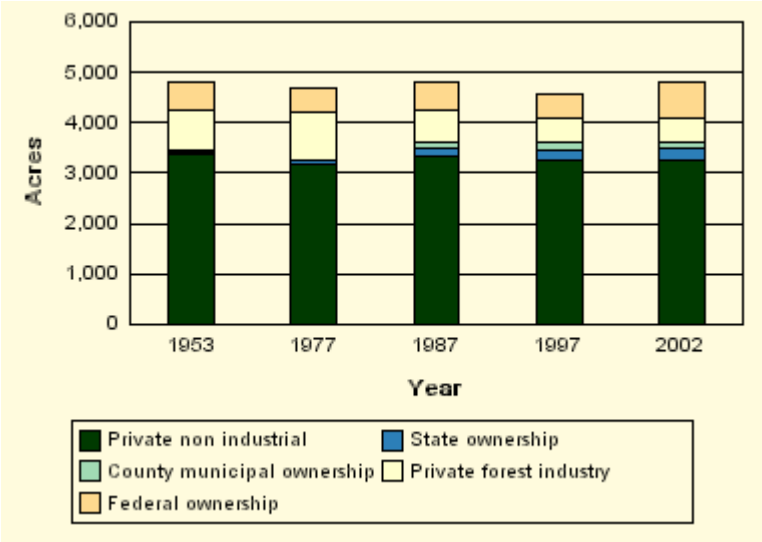
Metric 14.5 Capital expenditures by wood product manufacturers



Source: USDA TPO survey

15. Forest ownership, land use, and specially designated areas

Metric 15.1 Forest land ownership



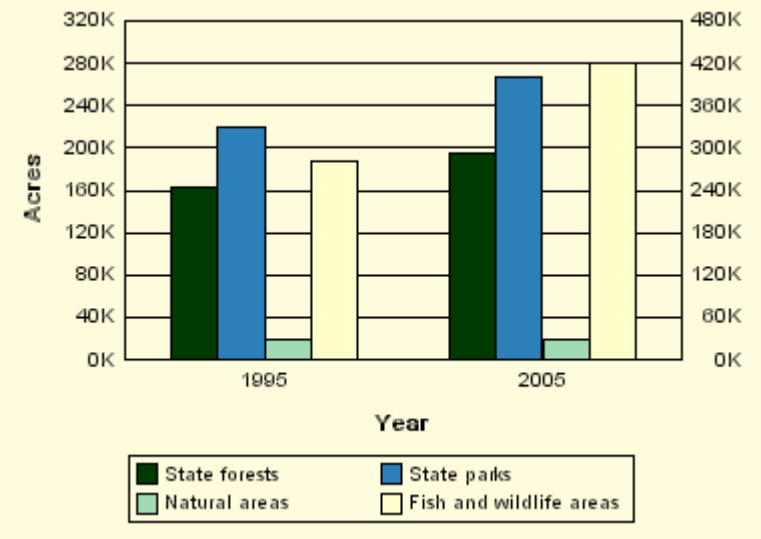
Source: USDA FIA and National Woodland Owner Survey

Metric 15.2 State land

State Fee Owned Lands in NH

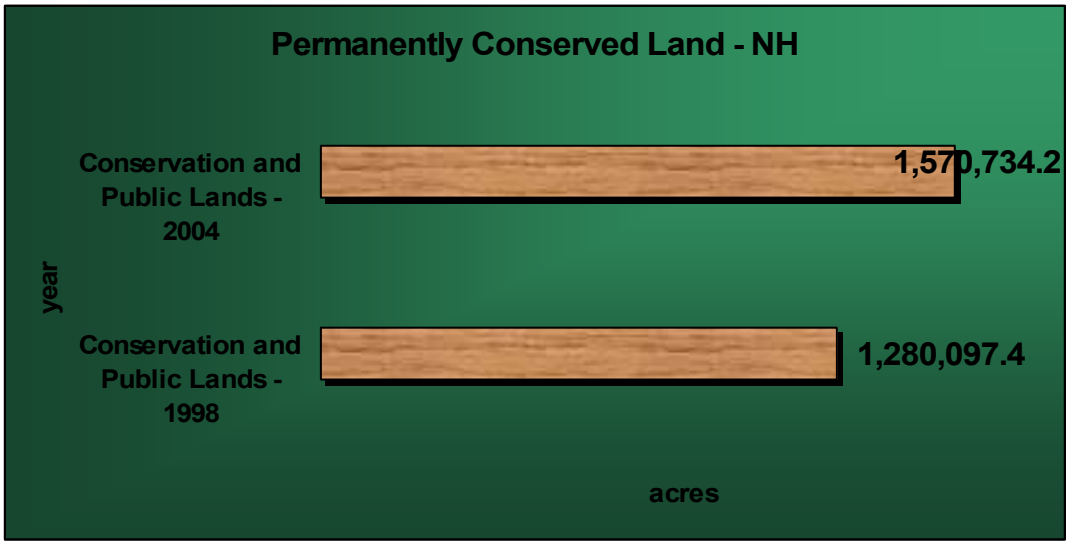
DRED 149,435 acres
Fish & Game 19,114
Source: GRANIT 2005

State Lands in New England



Source: USDA from state sources

Metric 15.3 Protected lands



Source: GRANIT and SPNHF – NH's Changing Landscape

Metric 15.4 Private land with public conservation easements

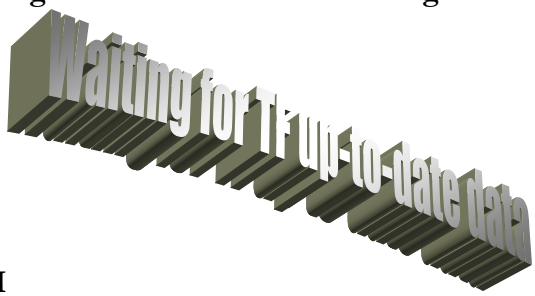
207,403 Acres
Source: GRANIT

Metric 15.5 Forest land in State current use/tax reduction programs

2,522,713 acres of forestland in current use in NH in 2004
Source: Dept. of Revenue Administration

Metric 15.6 Amount of land under forest certification programs

Acreage in Forest Certification Programs in



NH

Program	*1994*	*2004*
SFI	**0**	**141,000**
FSC	**0**	**283,432**
Tree Farm		
TOTAL		

Source: SFI, FSC & Tree Farm

Acreage in Forest Certification Programs in ME, NH, VT, NY (millions of acres)

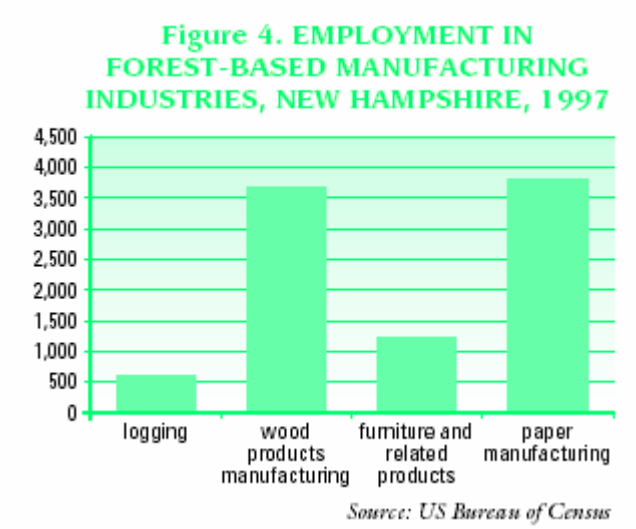
Program	*1994*	*2004*
SFI	**0**	**6.6**
FSC	**1.1**	**3.5**
Tree Farm	**1.3**	**1.4**
TOTAL	**2.4**	**11.5**

Source: SFI, FSC & Tree Farm

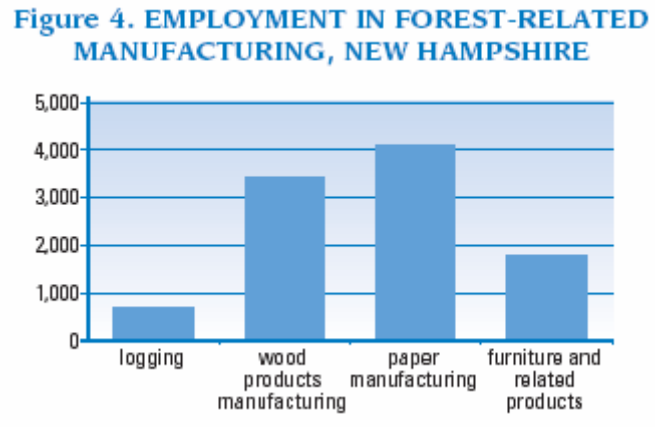
16. Employment and wages in forest-related sectors

Metric 16.1 Wood product manufacturing employees

NH Wood Products Employment 1997



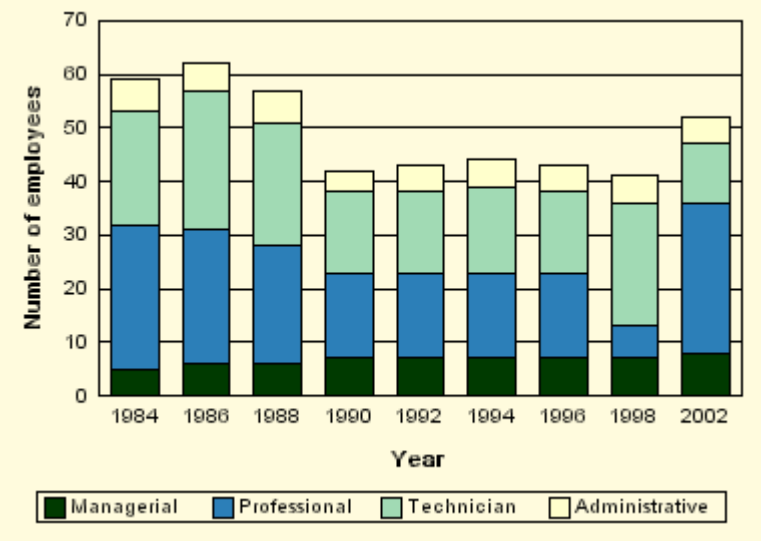
NH Wood Products Employment 2002



Source: NEFA and U.S. Census

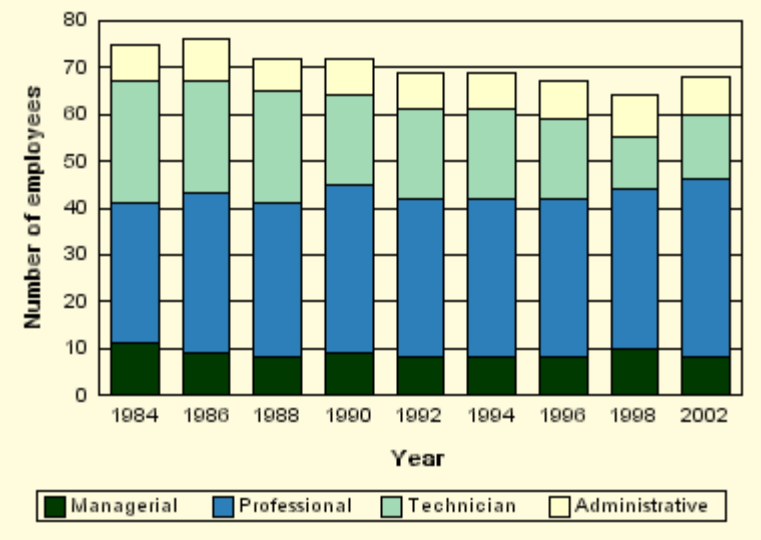
Metric 16.2 State forestry employees

NH Division of Forests & Lands employees



Source: NAASF & DRED

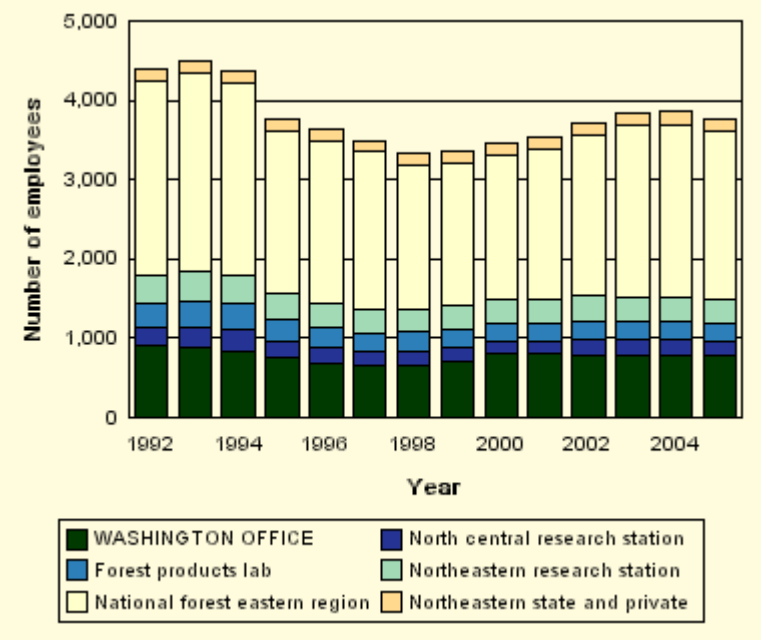
VT forestry agency employees



Source: NAASF & DRED

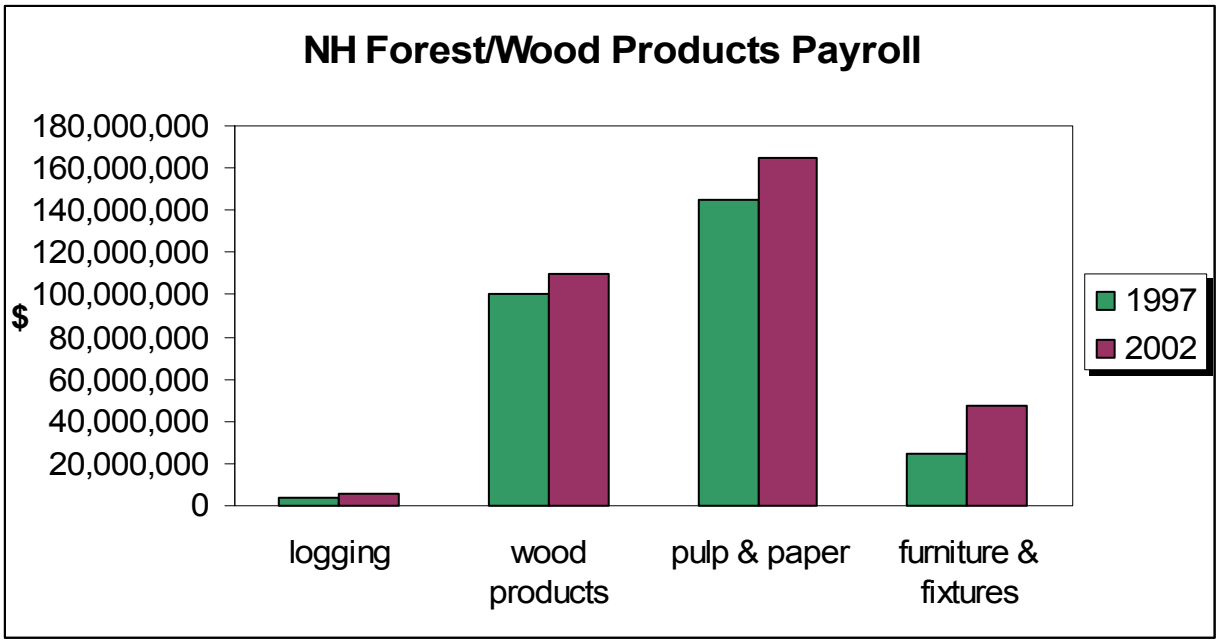
Metric 16.3 USDA Forest Service permanent employees

USDA Forest Service employees in Northeast US region



Metric 16.4 Wood product manufacturing annual payroll

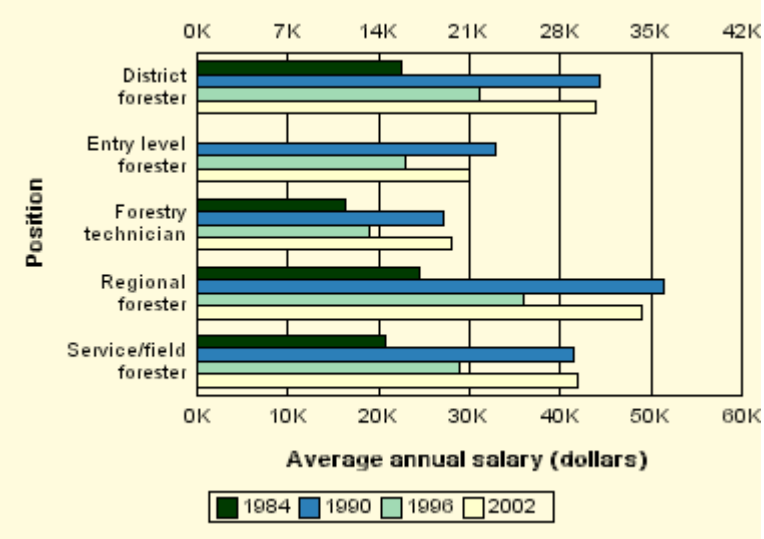
Wood Products Manufacturing Annual Payroll – NH



Source: NEFA and U.S. Census

Metric 16.5 State forestry employee salaries

Northeast Region State Forestry Agency Salaries



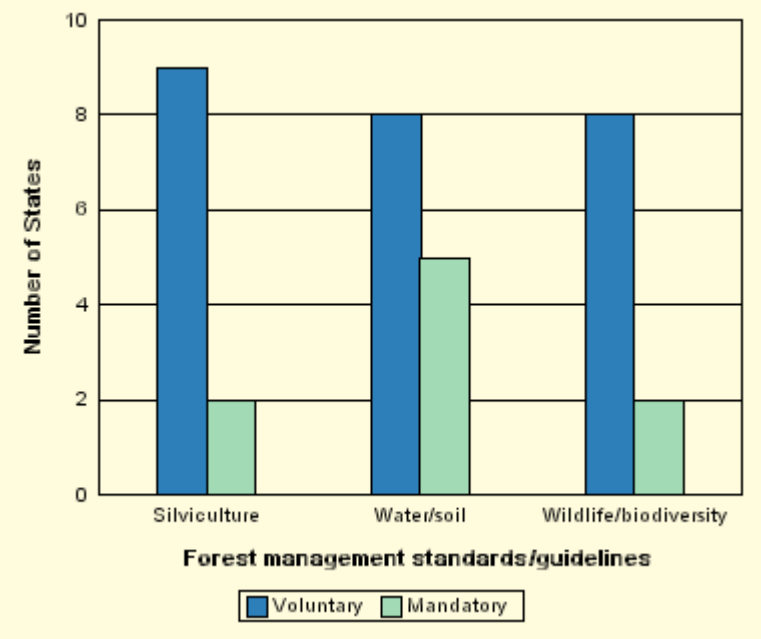
Source: NAASF & states

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

17. Forest management standards/guidelines

Metric 17.1 Types of forest management standards/guidelines

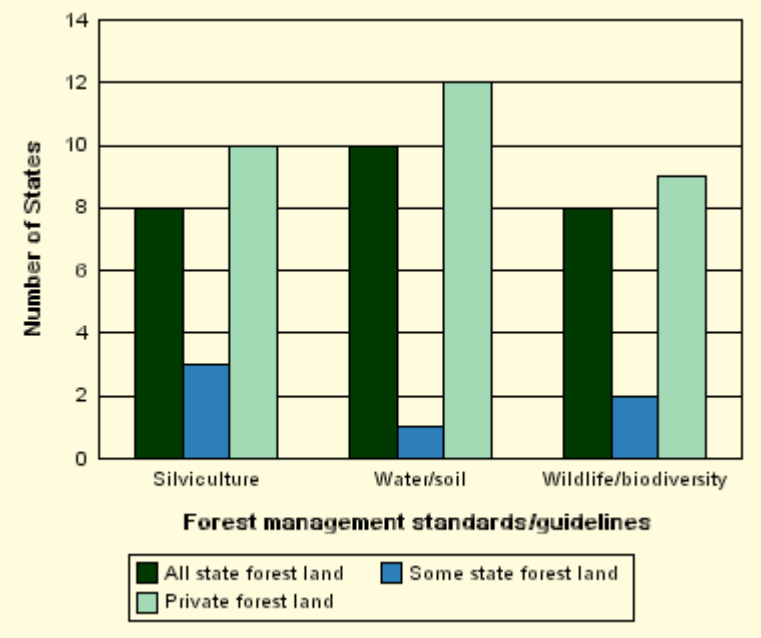
Number of States with forest management standards on private lands in Northeast region



Source: States

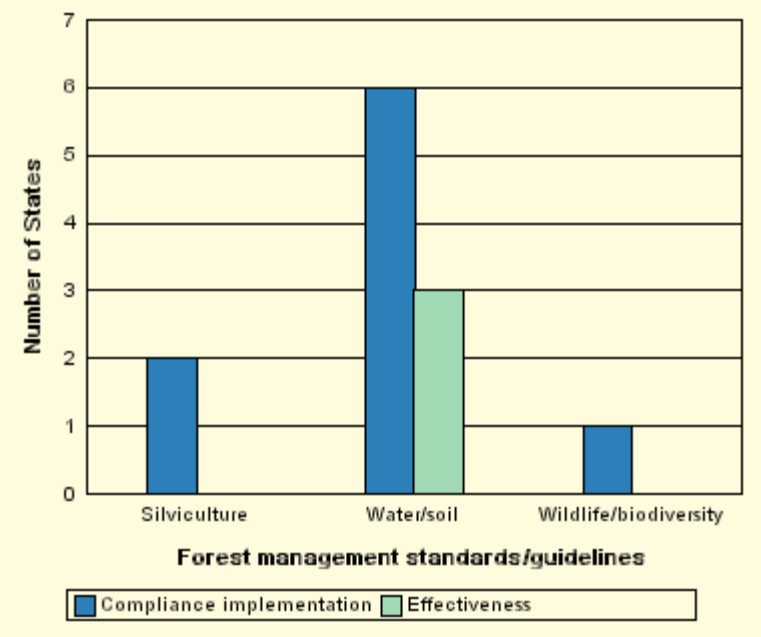
Metric 17.2 Program type

Types of Forest Management standards on private lands in Northeast region



Source: States

Metric 17.3 Monitoring (by type of monitoring)

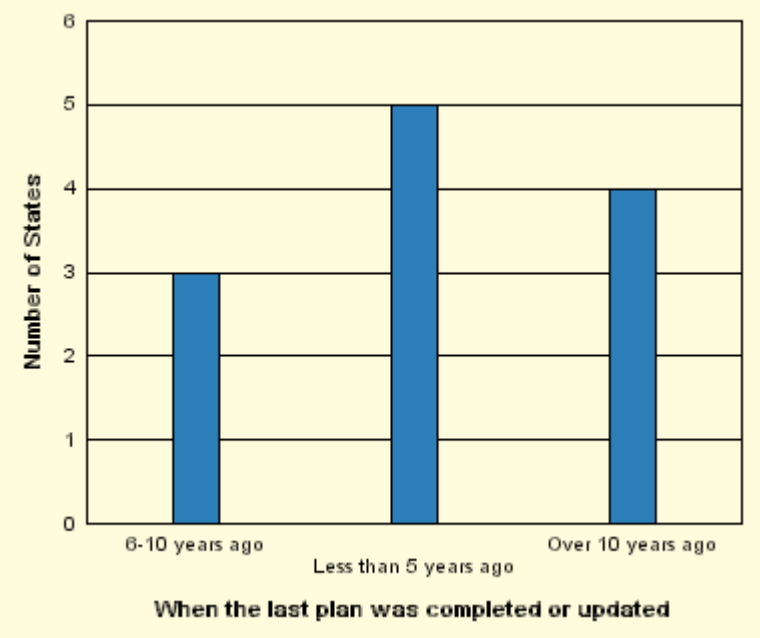


Source: States

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

Metric 18.1 Status of comprehensive State forest resource planning

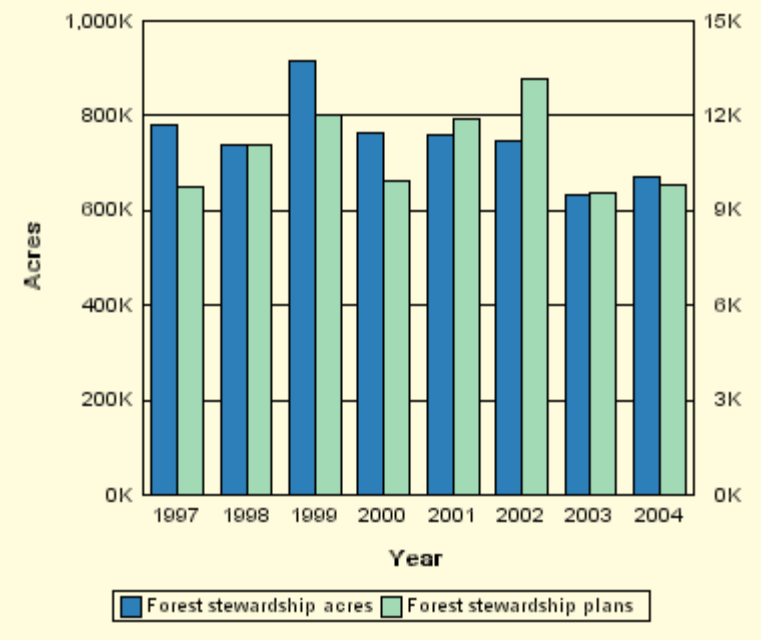
Northeast States status of State Forest Plans



Source: States

Metric 18.2 Forest planning on non-industrial private forest land

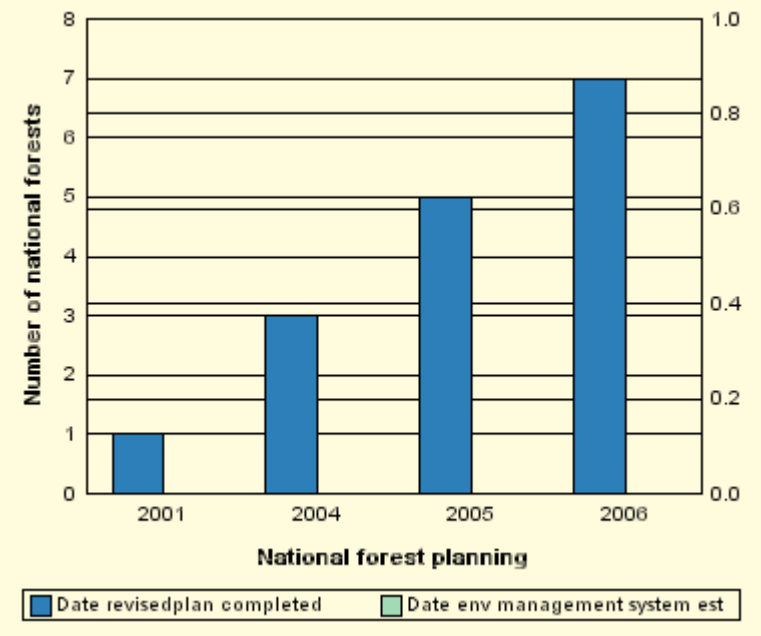
Northeast States status of forest stewardship plans on private forests



Source: States

Metric 18.3 Forest planning on national forest land

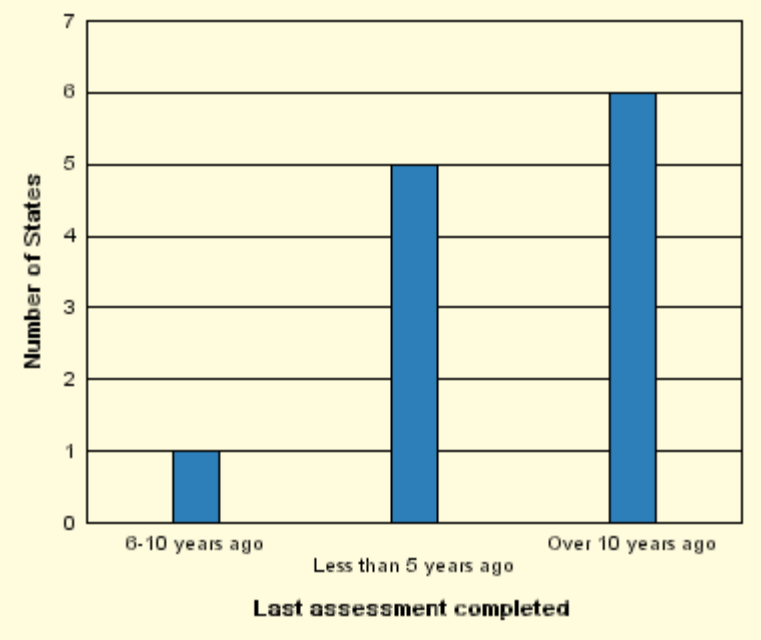
National Forest Planning in Northeast Region



Source: USDA National Forests

Metric 18.5 Status of comprehensive State forest resource assessments

Status of State Forest Resource Assessments in Northeast



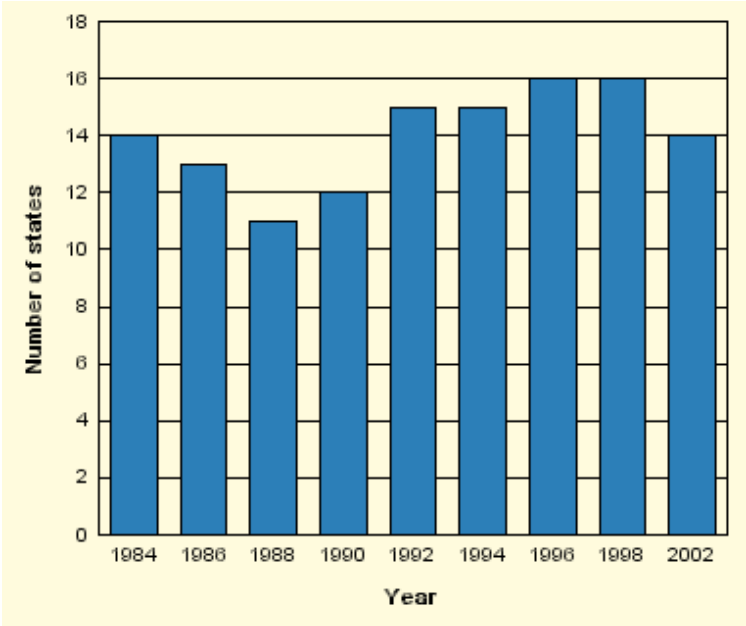
Source: states

Metric 18.5 Existence of State forest-related laws and policies

No useful data here

Metric 18.6 Existence of active State forestry advisory committees

Number of States with Forests Advisory Committees in the Northeast



Source: states

Revised Set of C&I Metrics as a result of NH Forest Advisory Board data subcommittee review and analysis

Criterion 1: Conservation of Biological Diversity

1. **Area of total land, forest land, and reserved forest land**

Metric 1.1 Forest land and total land source is FIA and GRANIT and SPNHF

Metric 1.2 Forest Density source is SPNHF "NH's Changing Landscape"

Metric 1.3 Forestland per Person changed from Forest Land & Population

Metric 1.4 Protected Land changed from Reserved forest land

~~Metric 1.5 Urban Forest~~ eliminated changed to Metric 1.5 Landownership types

Metric 1.6 Landowner age new metric

2. **Forest type, size class, age class, and successional stage**

Metric 2.1 Area by forest type group used GRANIT data for map

Metric 2.2 Size class by ~~forest type group~~ county changed to county

Metric 2.3 ~~Age class by forest type group~~ change to Species composition

3. **Extent of forest land conversion, fragmentation, and parcelization**

Metric 3.1 Fragmentation

Metric 3.2 Forestland conversion used SPNHF data instead of NRI

Metric 3.3 ~~Net change in forest land~~ change to Undeveloped and conversion

Metric 3.4 Additions to and conversions from forest land

Metric 3.5 Forest Parcel Size

4. **Status of forest/woodland communities and associated species of concern**

   Metric 4.1 Status of natural communities and habitats

   Metric 4.2 Status of Wildlife Species

   Metric 4.3 Status of Plants

   ~~Metric 4.1 Forest and woodland communities – species of concern~~

   ~~Metric 4.2 Forest-associated species of concern relative to the total~~

   ~~Metric 4.3 Forest associated species by taxonomic group~~

   ~~Metric 4.4 Bird species population trends~~

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

5. **Area of timberland**

   Metric 5.1 Timberland area

   ~~Metric 5.2 Total forest area~~

6. **Annual removal of merchantable wood volume compared to net growth**

   Metric 6.1 Net growth to removals ratio

   Metric 6.2 ~~Type of removals: harvest, land clearing~~ terminal harvests

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

7. **Area of forest land affected by potentially damaging agents**

   Metric 7.1 Tree mortality

   Metric 7.2 Wildfire

   Metric 7.3 ~~Weather phenomena: drought, storm, flood~~ Large weather events

   Metric 7.4 Biotic stressors: insects, diseases, plants, and animals

Criterion 4: Conservation and Maintenance of Soil and Water Resources

8. Soil quality on forest land

Metric 8.1 Soil pH

Metric 8.2 Soil carbon

~~Metric 8.3 Estimated bare soil~~ not useful

Metric 8.~~4~~3 Bulk density

Metric 8.5 ~~Calcium/aluminum ratio~~ Soils sensitive to sulfur and nitrogen deposition

9. Area of forest land adjacent to surface water, and forest land by watershed

Metric 9.1 Forest land adjacent to surface water

~~Metric 9.2 Forest land per watershed~~

10. Water Quality in Forested Areas

Metric 10.1 Water quality in forested areas

Metric 10.2 - Stream miles impaired by percentage of watershed

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles

10. Forest ecosystem biomass and forest carbon pools

Metric 11.1 Forest ecosystem biomass

~~Metric 11.2 Forest carbon pools~~

Metric 11.2~~3~~ Forest ecosystem carbon pools by forest type

~~Metric 11.4 Change in forest carbon pools~~

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

11. Wood and wood products production, consumption, and trade

Metric 12.1 Total value of wood products shipments

Metric 12.1a Value of Maple Syrup and Christmas tree production

Metric 12.2 ~~Value added in wood products~~ Number of employees and payroll in wood products

Metric 12.3 ~~Volume of roundwood production~~ Volume of timber production and consumption

~~Metric 12.4 Consumption of roundwood~~

Metric 12.5 Recovered paper

Metric 12.6 Bioenergy

12. **Outdoor recreational facilities and activities**

Metric 13.1 Participation in outdoor recreation

Metric 13.2 ~~Federal~~ Public and Private Land Open to Recreation

Metric 13.3 Recreational Facilities on State Land

Metric 13.4 Trails

Metric 13.5 Campgrounds

Metric 13.4 Recreational areas

13. **Investments in forest health, management, research, and wood processing**

Metric 14.1 USDA NA S&PF funding

Metric 14.2 State forestry program funding

Metric 14.3 Funding for forestry research at universities

Metric 14.4 USDA Forest Service Research funding

Metric 14.5 Capital expenditures by wood product manufacturers

14. **Forest ownership, land use, and specially designated areas**

Metric 15.1 Forest land ownership

~~Metric 15.2 State land~~

~~Metric 15.3 Protected lands~~

~~Metric 15.4 Private land with public conservation easements~~

~~Metric 15.5 Forest land in State current use/tax reduction programs~~

Metric 15.~~6~~3 Amount of land under forest certification programs

15. **Employment and wages in forest-related sectors**

Metric 16.1 Wood product manufacturing employees

Metric 16.2 Wood product manufacturing annual payroll

Metric 16.~~2~~3 State forestry employees

~~Metric 16.34 WMNF Forest Service permanent employees~~

Metric 16.~~5~~4 State forestry employee salaries

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

16. **Forest management standards/guidelines**

Metric 17.1 Types of forest management standards/guidelines

~~Metric 17.2 Program type~~

~~Metric 17.3 Monitoring (by type of monitoring)~~

17. **Forest-related planning, assessment, policy, and law**

~~Metric 18.1 Status of comprehensive State forest resource planning~~

Metric 18.~~2~~1 Forest planning on non-industrial private forest land

Metric 18.2 Other NH State Natural Resource Related Plans

~~Metric 18.3 Forest planning on national forest land~~

~~Metric 18.4 Status of comprehensive State forest resource assessments~~

~~Metric 18.5 Existence of State forest-related laws and policies~~

~~Metric 18.6 Existence of active State forestry advisory committees~~