



Forest Service

Northeastern  
Research Station

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Rhode Island  
Department of  
Environmental Management  
Division of Forest Environment

# TRENDS IN RHODE ISLAND FORESTS: A HALF-CENTURY OF CHANGE

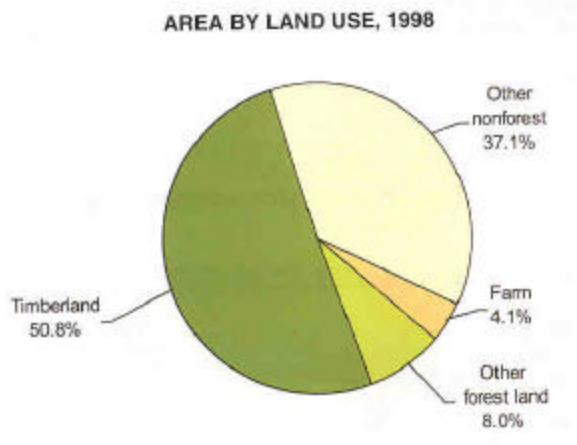


# RHODE ISLAND FORESTS

Forests provide watershed protection, settings for recreation, wildlife habitat, biodiversity, wood and other products, and much more. Forests contribute to the quality of life of each Rhode Island resident making the State a better place in which to live. Some of the significant trends that have occurred in Rhode Island's forests over the last half century are highlighted in this report. The data are summarized from reports published by the USDA Forest Service, which periodically inventories the forest resources of the 50 states. In 1998, the USDA Forest Service, in cooperation with the Rhode Island Department of Environmental Management, Division of Forest Environment completed the fourth statewide inventory of Rhode Island's forests.

## FORESTS COVER 3 OUT OF 5 ACRES OF LAND

In view of its long history and advanced state of economic development, the current amount of forests in Rhode Island is remarkable. Forests cover 59 percent of Rhode Island, or 393,000 acres. But the state wasn't always this heavily forested. Rhode Island's early settlers cleared about two-thirds of the original forest for agriculture. Farming peaked in the early 1800s; subsequently, farmers began abandoning their farms and moving west to better farmland. Much of the abandoned land was reclaimed by forests through natural regeneration. Old stone walls and cellar holes from farmsteads can be found throughout today's forest, evidence of Rhode Island's agricultural history. Forest land increased until the 1950s but then began declining. These declines likely will continue because development pressures continue to increase on forest as well as farmland. To slow the loss of forest land, state, federal, and nongovernmental organizations are working to maintain forest land.



Forest land is categorized by the USDA Forest Service into timberland or noncommercial forest land. Even though we know all forests produce important benefits, these categories help in understanding resource availability and planning forest management. Though Rhode Island is not thought of as a timber producing state, 86 percent of its forest land (380,100 acres) is classified as timberland that is potentially available for harvesting. Noncommercial forest land includes reserved forest lands, unproductive forests, and urban forests. Harvesting for timber products on these lands is administratively restricted or economically impractical. Examples include parks, wildlife preserves, wetlands with poor growing conditions, and forests in urban areas. Most noncommercial forest land is owned by public agencies. Noncommercial forest land has increased steadily from 3,500 acres in 1953 to 53,300 acres in 1998. Nearly all of this increase is due to the reclassification of timberland into the noncommercial category.

### TRENDS IN FOREST-LAND AREA

(Thousands of acres at each inventory)

	Inventory date			
	1953	1972	1985	1998
Timberland	430.5	395.3	380.1	339.7
Noncommercial forest land	3.5	8.9	31.7	53.3
Total forest land	434.0	404.2	411.8	393.0
Percent forested	64.0%	60.2%	61.6%	58.8%
Estimated total land area*	677.0	671.4	668.8	668.8

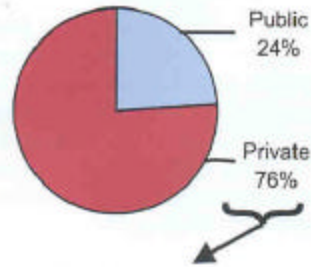
\*Estimates of the total land area have changed because of new measurement techniques and refinements in the classification of small bodies of water.

### PEOPLE AND FORESTS

The population size and how people live on the land are significant forces in shaping what our forests look like. Since 1953, Rhode Island's population grew 28 percent to 1 million, making it the third most densely populated state. Yet it ranks ninth in the nation in percentage of forest cover. Few places on earth have as many people living among so much forest.

Most Rhode Island timberland is owned by an estimated 26,700 private individuals and enterprises, which hold 76 percent of the state's timberland. State, federal, and other public owners hold the remaining 24 percent. The number of Rhode Island landowners who own less than 50 acres of timberland has more than doubled since 1973. These small holdings are primarily home sites and now account for nearly one-half of the state's private timberland. This trend toward breaking up large tracts of forest into smaller pieces by roads, homebuilding, and other development, is called forest "fragmentation." Wildlife biologists have found that forest fragmentation has had a detrimental effect on many bird species and other wildlife. Additionally, a forest landowner's motives and management activities are strongly influenced by the amount of forest land owned. Owners with small amounts of forest land are less likely to manage their forests for timber products, or to allow others on their land for activities such as hunting and fishing.

## TIMBERLAND OWNERSHIP IN RHODE ISLAND



By Size Class of Ownership, 1993

Acres owned (size class)	Number of owners	Total acres in class
1-9	20,900	36,000
10-49	4,600	84,200
50-99	400	17,600
100-499	800	96,600
500+	<50	24,500
All size classes	26,700	258,900

### FORESTS ARE MATURING WITH FEWER STANDS OF YOUNG TREES

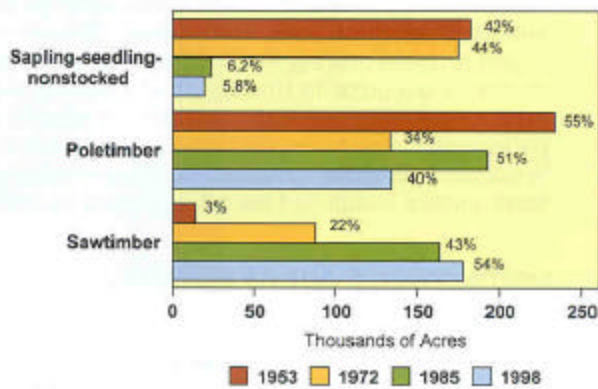
Timberland is classified by the size of trees available for both timber resource and wildlife habitat purposes. Sawtimber stands, which have the majority of their stocking in large trees suitable for sawlogs, have increased in acreage. These stands have more attributes that are beneficial to wildlife: an understory with herbaceous plants and shrubs for food and cover habitat; bole cavities for nesting; bark flaps for feeding sites; and large dead trees, standing and lying on the forest floor. Stands dominated by large trees are also aesthetically pleasing—people enjoy hiking and camping in such stands because they are easier to move through and are perceived to be more attractive. Dead trees also diversify habitats and are used in a variety of ways by wildlife species.

There has been a decline in seedling/sapling and poletimber-size stands, resulting in a change in wildlife habitat and an increase in the value of trees for lumber. Poletimber-size trees are not yet mature enough to produce large amounts of nuts and seeds and their dense, closed overstory can inhibit the growth of understory vegetation.

Sapling/seedling and nonstocked stand areas have decreased from 42 percent in 1953 to 6 percent in 1998. These stands typically support pioneer tree species along with many shrub and herbaceous plants that provide unique nesting and feeding habitats for wildlife.

The shift toward the more mature sawtimber-size class affects the mix of wildlife species that inhabit the forest. Recently wildlife biologists have become concerned about declines in wildlife species that need early successional stands, such as bluebirds and chestnut-sided warblers. Forests made up of all stand size classes provide diverse habitats for wildlife, an even flow of forest products, and might be more resistant to insect and disease outbreaks.

**TIMBERLAND AREA BY STAND-SIZE CLASS  
AND PERCENT OF TOTAL BY INVENTORY YEAR**

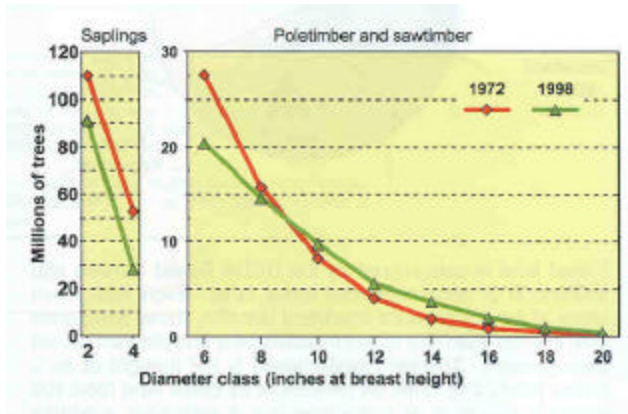


### MORE TREES OF LARGER DIAMETER

How well forests are populated with trees is determined by measures of tree size and number. Foresters measure tree diameters at 4 -1/2 feet above the ground and refer to this as diameter at breast height (d.b.h.). Since 1972, the average d.b.h. of trees at least 5 inches in diameter has increased from 8.2 inches to 9.1 inches. During this period, the average number of trees per acre at least 5 inches d.b.h. has increased from 151 to 171.

Changes in the numbers of trees were not distributed evenly across diameter classes. Since 1972, most of the increase in the number of trees occurred in diameter classes above 8 inches. Numbers of trees in the 2-, 4-, 6-, and 8-inch classes have decreased.

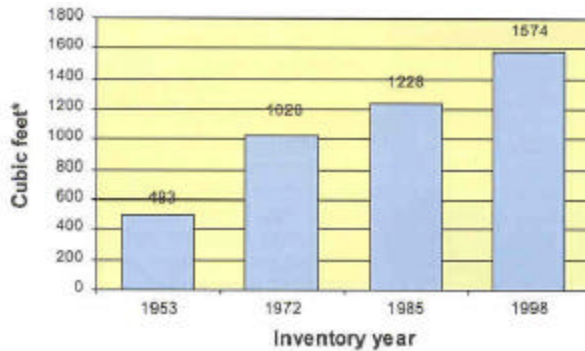
### NUMBER OF TREES BY DIAMETER CLASS



### THE VOLUME OF TREES HAS INCREASED

Increases in size and number of trees have resulted in an increase in the average volume of trees per acre of timberland. Average volume per acre increased from 493 cubic feet in 1953, to 1,574 cubic feet in 1998. During the most recent forest inventory, total volume increased 11 percent, with the portion suitable for sawlogs increasing 29 percent to 1.3 billion board feet.

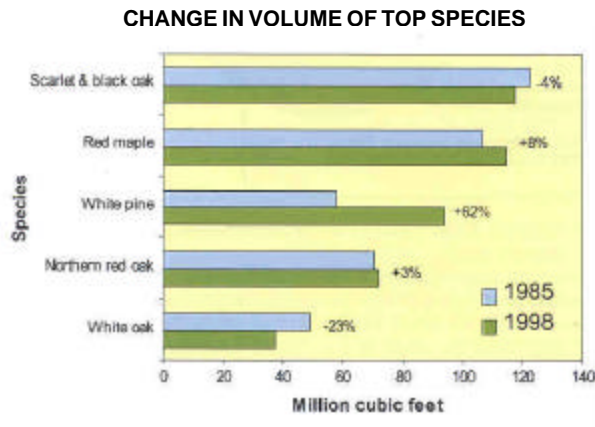
### AVERAGE VOLUME PER ACRE



\* 80 cubic feet of solid wood is equal to approximately 1 cord

## OAKS LEAD IN VOLUME

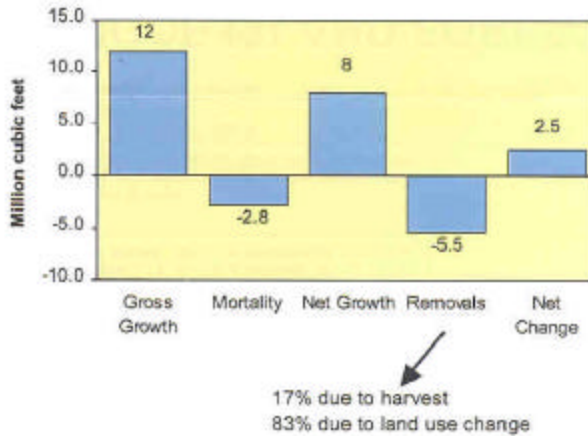
Rhode Island's forests contain a rich mix of species. The 1998 inventory identified 51 tree species, many of which are uncommon. The 5 most common species and species groups (listed in the chart below) account for 82 percent of total volume. Combined oak species represent 43 percent of total volume—a decline from the 50 percent oaks represented in 1953. Since 1953, white pine has increased its portion of total volume from 7 to 18 percent.



## CHANGES IN LAND USE ACCOUNT FOR MOST OF VOLUME REMOVED FROM TIMBERLAND

During the last 50 years, the growth of trees on timberland has outpaced removals by a wide margin. The inventory recognizes two types of removals: those due to changes in land use, and those due to timber harvesting. Forest growth recovers quickly after harvesting if the land remains in timberland. But if the land is converted to other land uses, the growth from that land is permanently lost. The 1998 forest inventory revealed that on an annual basis, since 1985, the net growth of trees averaged 97 million cubic feet and removals averaged 54 million cubic feet. The net growth of wood, which includes losses due to natural mortality, was about 1.8 times as much as was being cut or otherwise removed. Seventeen percent of removals are attributed to harvesting and 83 percent to reclassification of timberland to nonforest or other forest land categories. Oak species accounted for nearly two-thirds of the volume harvested. The surplus growth over removals yields an annual net increase of 43 million cubic feet—an annual increase of 0.8 percent in the total volume on timberland.

**AVERAGE ANNUAL CHANGE IN LIVE VOLUME  
ON TIMBERLAND, 1985-98**



**CONCERNS AND OBSERVATIONS**

Since 1953 there has been a remarkable wide-scale recovery of Rhode Island's forests and an impressive amount of land that has remained in forest despite increased economic development. These forests are maturing, as shown by increases in tree size and the number and volume of trees per acre. Evaluations of forest conditions show the health of the forest is good overall, though introduced forest insect pests such as the hemlock wooly adelgid and the gypsy moth are a concern. The challenge for the future will be to protect these forests from pressures of a growing population and increasing numbers of introduced pests, diseases, and invasive exotic plants, while sustaining the delivery of the variety of goods and services that people expect from the state's valuable forest resource.

For more information contact: Forest Inventory & Analysis (610) 557-4051, or write: USDA Forest Service, FIA Unit, 11 Campus Boulevard, Suite 200, Newtown Square, PA 19073. Website <http://www.fs.fed.us/ne/fia>

Or contact: Department of Environmental Management, Bureau of Natural Resources, Division of Forest Environment, 1037 Hartford Pike, N. Scituate, RI 02857; (401) 647-1439. Website: <http://www.state.ri.us/dem/programs/bnatres/forest/index.htm>

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