

THE OVERALL MASTERPIECE THAT IS A FOREST INCLUDES THE MULTITUDE OF OTHER PLANTS, ANIMALS, FUNGI, INSECTS, AND MICROBES THAT LIVE AND WORK WITHIN THE FOREST ECOSYSTEM.

breaks of insects and disease. Or, it can change gradually, with much subtlety, through a process called **succession**.

Succession is the constant process by which one plant community replaces another plant community. Generally, a temporary plant community is replaced by a relatively more stable community until a dynamic equilibrium between plants and the environment is attained. However, it is possible for a relatively stable community to be replaced by a temporary community.

What about human impacts?

There is also an inclination to identify man-made disturbances to the forest as artificial; however the activities of man directly relate to the condition of the forest we see in Rhode Island today.

As much as 80% of Rhode Island's land area was cleared for agriculture in the late 1800's. With the abandonment of farm fields, the forest gradually reclaimed the landscape so that today almost 60% of Rhode Island is covered by forest. Many of the most valued timber species become established shortly after land is removed from field crop production, or following fire or some other disturbance. White pine, in Rhode Island, occurs early in the succession process. Extensive areas of white pine have resulted from the abandonment of land previously cleared for agriculture.

The **overall body** of the forest can contain gaps, edges, streams, bogs, ponds, springs, vernal pools, cliffs, ledges, rock outcroppings, stones & boulders, natural kettle holes, and other geologic features that occur with the groupings of trees.

The **overall masterpiece** that is a forest includes the multitude of other plants, animals, fungi, insects, and microbes that live and work within the forest ecosystem.

Where do I turn for more information and help?

RI DEM Division of Forest Environment

- (401) 647-3367 • www.dem.ri.gov
- Talk with a state service forester.
- Obtain a list of consulting foresters and licensed wood operators; *Best Management Practices for Rhode Island: Water Quality Protection and Forest Management Guidelines*.
- Information on Rhode Island's Forest Legacy Program; forest conservation, management & stewardship.

Rhode Island Forest Conservators Organization (RIFCO)

- (401) 568-3421 • www.rifco.org
- Educational programs and events, newsletter, Rhode Island Tree Farm Program, links to numerous publications and local, state, and federal forestry agencies and organizations.

Rhode Island Tree Council

- (401) 647-9922
- *Tree Stewards Training Program*—education series on tree planting and care; urban and community forestry

USDA Forest Service, Northeastern Area, State and Private Forestry

- www.na.fs.fed.us
- Links to Durham, NH Field Office (603) 868-7600
- www.fs.fed.us/na/durham
- Information, factsheets and publications on: forest health and monitoring, stewardship, fire management, conservation education and sustainability, urban and community forestry, watershed program, on-line library.

A Forest Landowner's Guide to Internet Resources: States of the Northeast

- www.na.fs.fed.us/pubs/misc/ir/index.htm
- Publications and factsheets for: Recreation; Wildlife/Hunting; Income Tax and Estate Planning; Economics of Forest Investments; Tree Identification/Species Info; Forest Health and Protection; Tree Planting/Regeneration; Forest Management Planning; Sustainability and Certification; Silviculture; Forest Sampling and Inventory; Forest Harvesting Operations; Timber Sales; and Special Forest Products.

Programs and activities are available to all persons without regard to race, color, sex, disability, religion, age, sexual orientation, or national origin.

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Why Do Foresters Talk the Way They Do?

DBH, Basal Area, Board Foot, Crown, Coppice, Improvement Thinning, Sawtimber, Intolerance, Snag.....? Whoa, hold on there! Are we speaking English? Why can't foresters talk like the rest of us?

The terminology of the professional forester is often unfamiliar and confusing to landowners. Many times, however, technical terms must be used when discussing woodlot management concepts and practices. Therefore, it is very important that forest owners become familiar with some of the basic forestry terms so they can communicate with professional foresters and begin to understand more about the basic principles that correlate with their forest resource. Some of the more commonly used terms are defined in the Glossary. Many of these terms will also be described and explained as they are used within each factsheet.

Rhode Island's forests lie at the northeast edge of the Central Hardwood region, in a transitional zone between the pure *coniferous* (evergreen, needle-leaved, cone-bearing trees) forests of the north and the mixed *deciduous* (hardwood trees with broad, flat leaves that shed each autumn) forests of the Mid-Atlantic States. A long growing season, ample rainfall and reasonably fertile soils have given us a forest that contains a rich mixture of tree species.

There are 51 different tree species found in Rhode Island with the most common being varieties of **oak** species, followed by **red maple**, and **white pine**. 61% of Rhode Island's forest is classified as the oak/hickory forest type. Other forest types occur to varying degrees.

White pine, hemlock, red oak, red maple and hickory occur throughout the state while birch and sugar maple are concentrated in the more fertile soils of northwest Rhode Island. Red pine (a non-native tree species) is commonly found on state and municipally owned lands as the result of extensive reforestation efforts undertaken in the 1930's and 40's. Pitch pine grows with oaks and white pine on the dry, sandy soils of Rhode Island's coast. Upland sites tend

to be dominated by white pine, either in pure stands or mixing with oaks. Wetlands tend to be dominated by red maple, which is probably the most common tree throughout the Rhode Island and New England forest.

When foresters speak of forests they often speak of "forest types." While this can include a very general description of a forest region, determined primarily by climate, foresters most commonly speak of a specific association of trees and other species that frequently grow together on similar sites within a region. Local "forest types" are determined primarily by:

- Soil type
- Availability of water

The main "forest types" that you will find in Rhode Island are:

- Oak/hickory (RI's most common type)
- Elm/Ash/red maple
- White pine/red pine
- Northern hardwoods

The characteristics of the surrounding landscape and the immediate site conditions also contribute to the type of trees and other vegetation growing in your area. In addition to **soil type** and **water availability**, the following natural factors contribute to the type of trees in a given woodland area:

- Available sunlight
- Slope, topography & aspect
- Weather & climate
- Insects & disease (Gypsy Moths, Hemlock Woolly Adelgid, Dutch Elm Disease, etc.)
- Other physical factors (proximity to saltwater)
- Historical impacts from fire & other natural disasters (hurricanes, floods, ice storms, etc.)

FOUR TYPICAL WOODLANDS, FROM HIGH AND DRY TO LOW AND DAMP, THAT ARE WIDE-SPREAD AND COMMON ENOUGH TO SERVE AS MODELS FOR MANY PROPERTIES IN RHODE ISLAND.

- 1 *Dry Site - Mixed Upland Hardwoods (high elevation, dry interior, thin, acidic soil)*
- 2 *Average Moist Site - Oak/Pine site*
- 3 *Moist Site - Mixed Hardwoods*
- 4 *Wet Sites - Hardwood Swamps*

The resulting associations are called cover types. The common cover types found in Rhode Island include: White pine; White Pine/Pitch Pine; Pine/Oak; Oak/Pine; mixed hardwoods; mixed upland hardwoods; hardwood swamps; Hemlock/mixed hardwood.

At first glance, the forest may seem to be a random collection of trees and smaller plants. However, trees grow where they can, and each tree thrives in a particular set of conditions. With a bit of careful attention you will come to recognize the individual trees and plants that repeatedly grow in each other's company. Gradually, you will see that, under similar conditions, these trees repeatedly arrange themselves in the same general patterns.

Tell me more about these cover types

The following describes four typical woodlands, from high and dry to low and damp, that are widespread and common enough to serve as models for many properties in Rhode Island. To care for or improve your property, match one of the communities described in the next few paragraphs to the character of your own property.

1. Dry Site - Mixed Upland Hardwoods (high elevation, dry interior, thin, acidic soil)

These woods are light and dry. Located mostly on higher terrain, their soils are thin, rocky and acidic. An oak stand is growing on this site. Trees commonly originated from sprouts (coppice) from the base of trees burned in wildfires about 50 years ago. Sprout stands of oak resulting from clear-cutting or wildfires are commonplace in Rhode Island. These activities also resulted in the elimination of much of the white pine in these areas. These areas tend to be excessively well drained. Trees lack the water essential for good growth. An indicator of poor growing habitat is the presence of a dense shrub layer, in this case huckleberry. Another indication of growth potential of a site is the number of species found there, or **species diversity**. Note that only a few species of trees grow on poorer growth sites due to the lack of moisture and nutrient availability. On this site, only a few species of trees

are present and commonly include scarlet oak, white and black oak and white pine. Large trees are infrequent and the canopy (upper layer of a forest made up of tree branches and foliage) is sparse. Because of the low diversity of plant species, the value of the site for wildlife is also quite low. Under-plantings of white pine, which grow well on dry sites, would eventually provide cover for many wildlife species. It could also provide a long-term management objective of creating a more diverse forest while at the same time producing pine sawlogs in combination with oak fuelwood.

Typical Plant List:
Upper Forest Layer (Canopy): scarlet oak, white oak and black oak; white pine and pitch pine; red maple
Groundcover: huckleberry, low bush blueberry, bull and green brier

2. Average Moist Site - Oak/Pine site

Due to better soils conditions compared to site 1, both pines and oaks on this site exhibit good growth. The shallow growing roots of the pines tend not to compete with the deeper growing hardwood roots. As a result, competition is reduced and forest soil nutrients are utilized more completely. This site has a moderate diversity of plant species, which provides better wildlife habitat and aesthetic beauty. Large trees are frequent and the canopy is closed.

Typical Plant List:
Upper Forest Layer (Canopy): red oak, scarlet oak, white oak, black oak, white pine, hemlock, sugar maple, red maple

3. Moist Site - Mixed Hardwoods

This site tends to support even-aged stands (stands where all the trees are essentially the same age and grow at the same rate) of hardwoods exhibiting greater growth potential. This is largely due to their location near the bottom of a slope where there are deeper, richer soils and more moisture availability. In general, the vegetation growing on this site is denser, and has a richer and lush appearance. The number of species is greater and the trees are much larger, form a closed canopy, and have good form. You will also see a variety of tree saplings of the same species as those found in the canopy. Absent from this site is the dense shrub layer found on the drier sites.

FOREST SUCCESSION

Forest succession is directed by a number of factors and the interactions between them. However, a generalized pattern of forest succession in New England can be described as follows:

Disturbance - Some type of major disturbance, such as windthrow (uprooting of trees by wind), fire, or land clearing creates an opening in the forest canopy. Small plants, grasses and brush may initially claim this site.

Stand Initiation - The open space in the forest becomes filled with individual trees that arrive by seed (birches, poplar, cherry), stump sprouts (oak after fire) and root sprouts (aspen after clearcutting) or those that were present as advanced regeneration. This stage ends when the canopy becomes continuous and trees are competing with each other for sunlight and canopy space. Generally the tree stand consists of only one age class (even-aged stand), which can continue for up to 75 years.

Stem Exclusion - During this stage the canopy is dense enough to prevent new saplings from growing into the canopy because there is no space available for new canopy trees. Competition among trees is intense and some trees die as a result. When a tree dies, the other trees are able to fill the space in the canopy by expanding their crowns (branches and foliage).

Understory Reinitiation - At this time, the forest stand begins a transition from one age class of trees to more than one age class. As the original age class reaches old age there may be some mortality due to

old age. The tree crowns are now large enough that when one tree dies, the surrounding trees cannot fill the resulting gap created in the canopy. As a result, a new age class of trees has space to enter the canopy.

If the original stand was composed of pioneer species (shade intolerant tree species that are the first to colonize newly disturbed areas or abandoned fields) such as gray birch, aspen, and cherry, shade tolerant trees such as sugar maple, or beech may now begin entering the canopy. If there are more gaps in the canopy and more light is reaching the forest floor, then some other trees such as white ash, red maple, yellow birch, and white pine, also may enter the canopy.

Mortality at this stage is largely the result of old age, windthrow or disease. The stand begins to take on "old growth" characteristics, with large rotten logs on the forest floor, and many tree sizes and an uneven canopy appearance.

Old, Multi-aged Community - At this stage the forest has many age classes and tree sizes in the canopy (uneven-aged forest). Mortality is relatively continuous at low levels and is the result of the death of individual or small groups of trees. Due to the tremendous variety of species in these forests, they tend to:

- Resist disease and insect infestation
- Attract more kinds of wildlife
- Are naturally aesthetic - variety of colors and patterns
- Have many different song birds

The better growing conditions on this site allow for the production of valuable sawlogs. The naturally high diversity of plant species yields high value for wildlife and aesthetic beauty. Larger, older trees produce hard mast crops (acorns and hickory nuts used for food by some wildlife species) and den cavities necessary for many wildlife species. Understory (the smaller, usually younger trees in a forest) species such as dogwood produce flowers and berries, which are heavily used by wildlife.

Typical Plant List:
Upper Forest Layer (Canopy): red oak, white oak, hickories, birches, beech, hemlock, red maple
Understory: sassafras, musclewood, ironwood, dogwood, witch hazel

4. Wet Sites - Hardwood Swamps

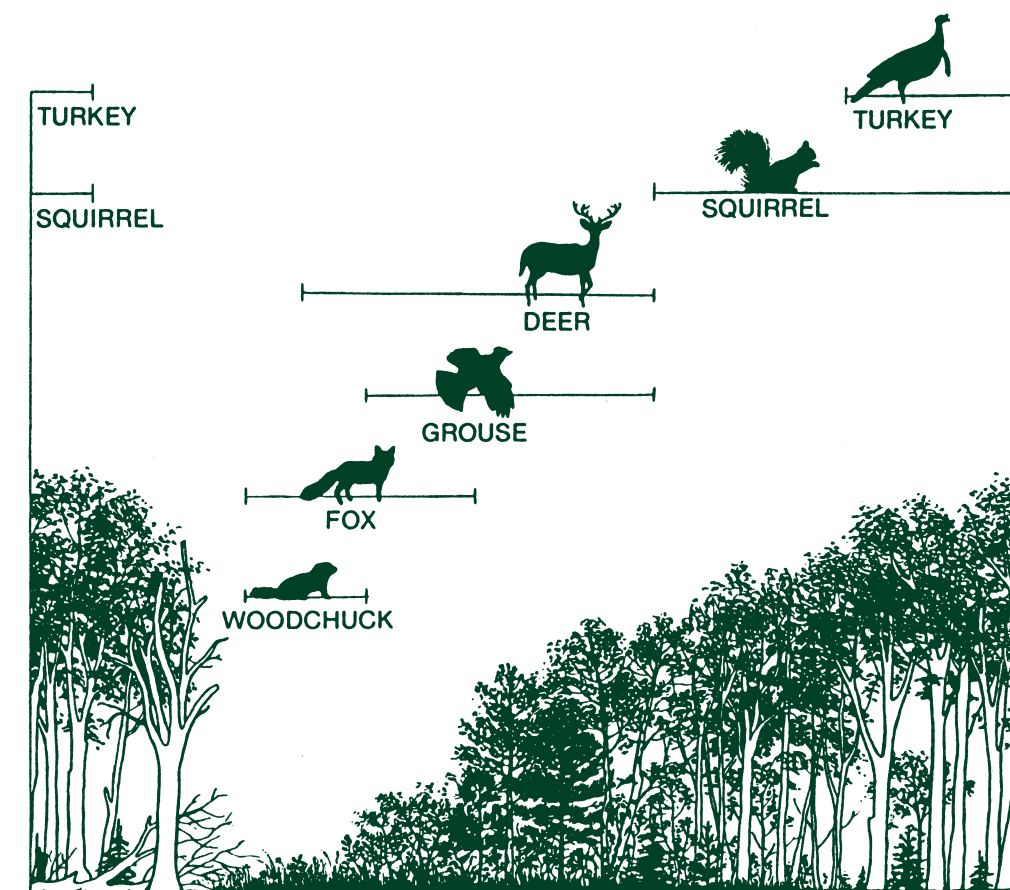
This site tends to offer poor growing conditions for most trees. This is due to their location at the bottom of a slope where there is excessive moisture avail-

ability. Red maple is common on these sites. The excessive moisture conditions on this site does not allow for the production of valuable sawlogs. Red maple can be a valuable source of fuelwood. The naturally high diversity of plant species yields high value for wildlife and aesthetic beauty.

Typical Plant List:
Upper Forest Layer (Canopy): red maple, white ash, tupelo, elm
Understory: Sweet Pepperbush

What other factors can shape a forest?

Trees grow slowly in relation to our lifespan, and we have a tendency to see them as permanent and unchanging fixtures on the landscape. But our forests are dynamic and constantly changing. Leaving the forest untouched does not ensure that it will stay as it is. The forest can change visibly and dramatically as the result of hurricanes, forest fires, ice storms, or out-



A generalized pattern of forest succession in New England including animals typical of each successional stage. Source: Working with Your Woodland, Mollie Beattie, Charles Thompson, and Lynn Levine, 1993, Illustrations by Nancy Howe.