United States Department of Agriculture
Natural Resources Conservation Service

NEW JERSEY AUDUBON SOCIETY

NJ Biology Fact Sheet: Forest Management in Disturbance-Dependent Pinelands Habitats

Introduction
The Pinelands region of southern New Jersey includes 1.1 million acres of pine/oak uplands, Atlantic white-cedar swamps, pine plains, savannas, and streams. It spans all or part of seven counties (Ocean, Atlantic, Burlington, Camden, Gloucester, Cumberland and Cape May) and makes up about 22 percent of the entire state. Pinelands habitats are characterized by sandy and nutrient-poor soils, tea-colored waterways, and fire-adapted plants and animals. In 1978, the Pinelands National Reserve, the first national reserve in the country, was created to protect the integrity of this unique ecosystem.

Rich in natural and cultural history, this area relies heavily on disturbances to the natural forests to maintain ecosystem health. The Pinelands has been largely shaped by natural and man-made disturbance, including fire, flooding, windstorms, agricultural practices, and timber harvesting. Although the Pinelands region is largely undeveloped, the frequency and intensity of these disturbances have changed over time, resulting in different effects on species composition and ecosystem structure. Approximately two thirds of the Pinelands is privately owned, and proper management of forested land is crucial for the protection of the region's vital ecosystems.

Why Is Forest Management Important in the Pinelands?
Disturbance of natural habitats is one of the most crucial aspects of maintaining Pinelands ecosystems. Many plants and animals that inhabit the Pinelands have adapted to withstand wildfires, flooding, and other disturbances, while several even require fire to reproduce and regenerate.

Historically, wildfires were relatively large and frequent, often reoccurring every 5 to 25 years in pitch pine-dominated areas. In more recent years, the frequency, severity, and variability of each wildfire have decreased. This shift in wildfire characteristics can largely be attributed to suppression and pre-suppression efforts as development increases in this region. Prescribed burning and other forestry practices that mimic the results of

This Pinelands forest is being managed under a Forest Stewardship Plan to increase ecosystem health, reduce fuel, and improve habitat for rare plants and animals (Kristen Meistrell, NJA)

natural disturbances can have several ecological, economic, and recreational benefits, including:

- Decreasing the risk of intense, hard-to-control wildfires
- Improving habitat for disturbance-dependent plant species
- Improving habitat for a variety of wildlife
- Increasing forest stand health and timber value by removing competitive vegetation
- Increasing resistance to disease and insect outbreaks by promoting healthy tree growth
- Improving recreational opportunities and aesthetics

Although fire and disturbance are important components to maintaining the ecosystems of the Pinelands, it's essential to maintain safety and prevent property damage for the 700,000 residents of this area. Fortunately, proper forest management techniques can improve both ecosystem health and the safety of nearby residential areas.

Management Options
Depending on the landowner's goals and objectives, as well as the habitat types present, management can be guided by a Forest Stewardship Plan drafted by an approved forester or natural resource professional. The Forest Stewardship Plan will reflect the guidelines in the

New Jersey Pinelands Commission's *Recommended Forestry Management Practices* manual. Forestry work done in the Pinelands may also be regulated under the New Jersey Pinelands Commission's Comprehensive Management Plan, and management in wetlands should follow the New Jersey Division of Parks and Forestry's *New Jersey Forestry and Wetlands Best Management Practices Manual*.

Silvicultural techniques that can enhance biodiversity and ecosystem health include:

- Prescribed burns
- Selective cutting and felling
- Girdling
- Herbicide application
- Tree and shrub establishment

Depending on the existing fuel loads, selective cutting may be a necessary first step before using prescribed burns. Although these managed burns are very effective in the Pinelands, implementation requires special training, specific weather conditions, and a permit from the New Jersey Forest Fire Service.

In addition to these general management options, certain techniques can be used to enhance specific habitat types and to meet the needs of rare and endangered plants and animals. Regulations and restrictions may apply, depending on site conditions or the presence of particular species. It is important to consult an approved forester or natural resource professional for proper guidance.

Forested Uplands

Several types of forested upland occur throughout the Pinelands. These plant communities are often shaped by disturbance with varying frequencies and intensities. Listed in increasing order of fire frequency and intensity,

The pygmy pine plains, shaped by frequent and severe wildfires, rarely reach a height above 6 feet. Worldwide, the largest contiguous acreage of this rare and unique forest community can be found in New Jersey, reaching over 3,000 acres (Rick Radis, NJA)

Open savannas provide valuable resources to rare and endangered plants and animals, including the endangered bog asphodel (Rick Radis, NJA)

these habitat types include oak-dominated uplands, pine-dominated uplands, pine-shrub oak uplands, and pine plains. Each plant community features certain structural elements that support rare plant and animal species; these can include standing snags, exposed bare mineral soil, and mast-producing plants (which provide food such as nuts and berries). In many upland forests throughout the Pinelands, pitch pine (*Pinus rigida*) is present. This species has several physiological characteristics that allow it to regenerate and thrive in the presence of fire.

For each of these habitat types, proper management is crucial to preserve species composition and habitat structure. Prescribed burns integrated with selective removal of competitive vegetation can be an important tool for managing these habitat types. Selective cutting can mimic some of the effects of wildfire; this step may be advisable prior to a prescribed burn to help reduce fuel loads and create safer fire conditions. Prescribed fires require specific conditions, special training, and are not recommended for all situations, so it is important to consult an approved forester or natural resource professional for guidance.

Savanna and Grassland Uplands

These habitat types are characterized by a dominant grassy herbaceous layer with either widely spaced trees forming an open canopy (savanna) or no trees (grassland). Savannas and grasslands are typically the result of natural or man-made disturbance, such as intense fire, frequent fire, or agricultural practices that create early successional habitat characteristics. Areas that encountered an extreme wildfire, were at one time cleared for agricultural purposes, or are burned annually may sometimes succeed to grassland habitat in the Pinelands. Selective cutting, girdling, herbicide application, and prescribed fire can be

(From left to right) The swamp pink (Mike Crewe, NJA), bog asphodel (Rick Radis, NJA), sand myrtle (John Parke, NJA), and Pine Barrens gentian (Rick Radis, NJA) are all unique plants that thrive in the harsh conditions of the Pinelands.

used to remove competitive or encroaching vegetation and maintain grassland and savanna habitats.

Forested Wetlands

Two types of forested wetland that are shaped by disturbance in the Pinelands are Atlantic white-cedar (*Chamaecyparis thyoides*) swamps and pitch pine (*P. rigida*) lowlands. Both of these habitats are very different in ecosystem structure, species composition, and disturbance regimes; however, both support a wide variety of rare and unique plant and animal species.

Atlantic white-cedar swamps are often characterized by even-aged, dense stands that contain few hardwood trees and pitch pines scattered throughout. Atlantic white-cedar is not fire tolerant, but disturbance, such as fire, flooding, or windstorms, does provide seedlings with ample sunlight to regenerate. For existing stands, strips or patches can be cleared, followed by natural regeneration or artificial planting. In some instances, new cedar stands can be established in areas that provide proper site conditions. When preparing an area for regeneration, it is important to remove all existing vegetation and to construct a deer exclosure fence to prevent overbrowse. In certain situations, harvested timber can also be used for various wood products. Guidelines for best management options can be found in the *NJ Atlantic White-cedar Ecology and Best Management Practices Manual.*

Pitch pine (*P. rigida*) lowlands often contain a variety of moisture-loving plants and are located at or near the water table. Disturbance, including wildfire and flooding, does play a major role in restoring and shaping these habitats. In order to enhance ecosystem health and maintain diversity, selective removal of competitive vegetation can be applied. Prescribed burns can then be used to maintain vegetative structure and forest health.

Savanna and Grassland Wetlands

Although small in acreage, wetland savannas and grasslands are rich in plant diversity and support a wide range of rare and endangered plants and animals. Disturbance, such as fire and flooding, plays an important role in maintaining open conditions, which is critical for the survival of many species. Selectively removing encroaching trees by cutting, girdling, or herbicide application along with prescribed burns can help maintain vegetative structure while preserving ecosystem health. Additional caution and restrictions should be exercised when using equipment and herbicides in and around wetlands.

Plant and Animal Species of the Pinelands

In addition to these unique ecosystems, the Pinelands region supports a wide variety of rare and endangered plant and animal species. For some of these species, the Pinelands may contain some of the largest populations found anywhere throughout their range. When implementing a Forest Stewardship Plan, it is important to minimize any negative potential impacts to these species, or to improve conditions for them. Species such as red-headed woodpecker (*Melanerpes erythrocephalus*), corn

(From left to right)The threatened red-headed woodpecker (© Michael Hogan), endangered corn snake (Kristen Meistrell, NJA), threatened Pine Barrens treefrog (© Brian Zarate), and threatened frosted elfin (© David Amadio) are all unique species that reside in a variety of Pinelands habitats.

snake (*Elaphe guttata*), Pine Barrens treefrog (*Hyla andersonii*), frosted elfin (*Callophrys irus*), broom crowberry (*Corema conradii*), curly grass fern (*Schizaea pusilla*), swamp pink (*Helonias bullata*), and bog asphodel (*Narthecium ossifragum*) are all species that thrive in disturbance-dependent ecosystems. A Forest Stewardship Plan developed by an approved forester or natural resource professional will include information about rare species that are present while providing guidance on minimizing adverse effects to sensitive species. Depending on the landowner's goals, the Forest Stewardship Plan may also be tailored to enhance habitat for these species.

Technical and Financial Assistance

A Forest Stewardship Plan that incorporates some of the concepts listed above will promote a healthy ecosystem that is beneficial to disturbance-dependent species throughout the Pinelands. The landowner is typically responsible for the costs of development and implementation of a Forest Stewardship Plan. However, qualifying landowners in New Jersey have several options for obtaining technical and financial assistance for forest management.

The Natural Resources Conservation Service (NRCS) offers technical and financial assistance to forest landowners through the Environmental Quality Incentives Program (EQIP). Eligible landowners with 10 acres of forest land may receive cost-share assistance for the development of a Forest Stewardship Plan, or for costs related to implementation of the plan. Forest Stewardship Plans cost-shared through EQIP must be prepared by an NRCS-approved Technical Service Provider (TSP). A list of TSPs can be found at a local NRCS service center or on the New Jersey NRCS website.

Atlantic white-cedar typically forms dense, even-aged stands that are valued for their timber (John Parke, NJA)

NRCS office locations and more detailed information about NRCS assistance and the EQIP program can be found at: www.nj.nrcs.usda.gov/

For more information:

General Information on NRCS Forestry Programs
www.nj.nrcs.usda.gov/technical/forestry/index.html

Information on NRCS EQIP Program
www.nj.nrcs.usda.gov/programs/eqip/forestry.html

Locating an NRCS TSP
http://techreg.usda.gov/CustLocateTSP.aspx

NRCS & NJ Audubon: Atlantic White-Cedar Fact Sheet
http://www.nj.nrcs.usda.gov/technical/forestry/index.html

NRCS & NJ Audubon: Invasive Plants in the Pinelands
http://www.nj.nrcs.usda.gov/technical/forestry/index.html

List of NJDEP-Approved Consulting Foresters
www.state.nj.us/dep/parksandforests/forest/ACF.pdf

NJ Pinelands Commission
http://www.state.nj.us/pinelands/

NJ Recommended Forestry Practices Manual
http://www.state.nj.us/pinelands/images/pdf%20files/03-07-06%20report.pdf

NJ Atlantic White-cedar: Ecology and Best Management Practices Manual order form
http://www.state.nj.us/dep/parksandforests/forest/AWC_BMP_order.pdf

NJ Forestry and Wetlands Best Management Practices Manual
www.state.nj/us/dep/parksandforests/forest/nj_bmp_manual1995.pdf