

White Pine as Wildlife Habitat

Mariko Yamasaki, Research Wildlife Biologist, Northeastern Research Station, PO Box 640, Durham, New Hampshire 03824

White pine (*Pinus strobus*) provides terrestrial habitat elements across the New England landscape in ways that other large conifer species are unable to duplicate. As a food source, white pine provides seeds, needles and buds, bark, and the insects that can be gleaned from white pine substrates. White pine seed provides a food source for bird species such as red-breasted nuthatch (*Sitta canadensis*), pine warbler (*Dendroica pinus*), chipping sparrow (*Spizella passerina*), common grackle (*Quiscalus quiscula*), crossbills (*Loxia* sp.), pine siskin (*Carduelis pinus*), and evening grosbeak (*Coccothraustes vespertinus*) (DeGraaf and Yamasaki 2001; Abbott 1958). Black-capped chickadee (*Poecile atricapillus*) and pine warbler also glean insects from white pine bark, needles and twigs. White pine seed is a food source for eastern chipmunk (*Tamias striatus*), gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), northern and southern flying squirrels (*Glaucomys sabrinus* and *G. volans*), white-footed mouse (*Peromyscus leucopus*), and red-backed vole (*Clethrionomys gapperi*). White pine is an emergency winter food source for herbivores such as white-tailed deer (*Odocoileus virginianus*) and a minor food item for spruce grouse (*Falcipennis canadensis*). Finally, the porcupine (*Erethizon dorsatum*) is well-known for its tree-barking habits on white pine as well as the rectangular-shaped excavations of foraging pileated woodpeckers (*Dryocopus pileatus*) searching for carpenter ants.

White pine stands on shallow-to-bedrock, and sandy outwash sites often encompass several associated habitat features. Many seeps and vernal/autumnal pools can be found in upland areas with an overstory typed as white pine, oak-pine, or white pine/red oak/red maple or adjacent to wetlands or floodplains. Several mole salamanders particularly marbled (*Ambystoma opacum*) and Jefferson salamanders (*A. jeffersonianum*) can be found using temporary pools in these types of upland stands. Hard mast opportunities especially for red oak (*Quercus rubra*), white oak (*Q. alba*) and beech (*Fagus grandifolia*) occur routinely in white pine stands and are of benefit to a variety of hard mast seeking species such as wild turkey (*Meleagris gallopavo*), blue jay (*Cyanocitta cristata*), and white-tailed deer. Eastern hemlock stocking in white pine stands significantly increases the value of the resulting overstory canopy and horizontal cover value for wintering white-tailed deer, especially on more southerly slopes (Reay 2000).

White pine provides a variety of cavity and exfoliated bark sites, canopy cover conditions, and a variety of forest floor habitat elements, as well as a supracanopy habitat element unmatched by other conifer or hardwood species. Large white pine stems usually > 18 inches dbh having a decaying central core are very valuable habitat elements to large-bodied cavity excavators such as pileated woodpecker and other cavity dwellers such as the barred owl (*Strix varia*), red-headed woodpecker (*Melanerpes erythrocephalus*), red-bellied woodpecker (*M. carolinus*), tufted titmouse (*Baeolophus bicolor*), red-breasted nuthatch (*Sitta canadensis*), bats (*Myotis* sp.), red and gray squirrels, and flying squirrels. Exfoliated plates of white pine bark often shelter many bat species as well as the brown creeper (*Certhia americana*).

Canopy cover conditions can vary widely in stands typed predominantly white pine, pine-oak or pine-hardwood. Larger white pine stems, both live and dead, in and adjacent to old beaver ponds, impoundments, and other open wetlands are often sites in which great horned owl (*Bubo*

virginianus) and great blue heron (*Ardea herodias*) successfully nest. Sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperi*), northern goshawk (*A. gentilis*), great horned owl, and common raven (*Corvus corax*) all use larger white pine trees, among others in which to nest up against the tree bole. Goshawks tend to nest at the base of the canopy; sharp-shinned hawks nest in the upper canopy; while Cooper's hawks nest in the middle of the canopy. Great horned owls often use other species' nests. Red squirrels will often construct stick nests in the upper canopy of white pine stands. Hardwood inclusions in pine stands greatly improve avian diversity compared with pure pine stands.

Dense coniferous regeneration on the forest floor creates favorable foraging and cover opportunities for snowshoe hare (*Lepus americanus*), gray fox (*Urocyon cinereoargenteus*), fisher (*Martes pennanti*), and an array of small mammals such as eastern chipmunk, red-backed vole, and white-footed mouse. The presence of substantial piles of coarse woody debris, especially down hollow logs, greatly improves the cover conditions usually found under younger uniform pine stands for such ground dwellers.

Supracanopy white pines serve as nesting sites for many bald eagles (*Haliaeetus leucocephalus*) in New England, especially if the top is broken off or damaged and the nest tree/site is within 0.6 mi (1km) of a productive fishery (e.g., large lakes, rivers, and marine habitats) (Livingston et al. 1990). Osprey (*Pandion haliaetus*) also use broken-topped supracanopy white pine close to water, often out in the open; but many osprey pairs are now nesting successfully on artificial platforms. Continued increases in both bald eagle and osprey populations in New England will depend on both a plentiful and diverse fish prey base during the breeding season and continued existence of potential nesting sites not currently occupied.

Availability of open water in the winter appears to be one of several key elements to perennial winter bald eagle habitat use (McCollough et al. 1994). Open water concentrates local waterfowl activity along coastal and estuarine habitats; and inland, on the downstream reaches from dams on major rivers where bald eagles can hunt ducks, fish, and scavenge carcasses. Supracanopy white pines with branches thick enough to support an eagle's weight, and providing an unobstructed view of open water serve as day and hunting perches for foraging bald eagles in New Hampshire (Sweeney 1999). Bald eagles also use white pine trees with weight-bearing branches and open branch architecture, close to foraging areas as night roost trees. Roost sites tend to be in mixed white pine-hardwood stands with more open canopies on steeper southerly slopes close to water. Many of the current winter foraging and roost sites occur within areas of considerable human use (e.g. commercial and residential land use, recreational activities). Disturbance factors need to be minimized to ensure continued successful use of these special habitats by wintering bald eagles wherever these conditions may be found, now and into the future.

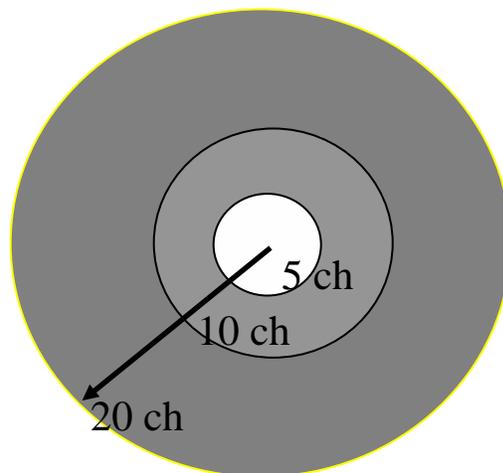
Management Recommendations

- Large supracanopy white pine in close proximity (< 0.6 mi (1 km)) to aquatic habitats (e.g., lakes ≥ 74 ac (30 ha); rivers; and marine habitats) that support substantial and diverse fish populations are potential nesting sites for both bald eagle and osprey. Consider these spatial-habitat values in any land-use and management planning activities, as these populations appear to be increasing.
- Pay attention to territorial raptor activity beginning in late winter/early spring (e.g. audible calls, territorial displays, nest-building and -defending behaviors) in areas with large white pine present.
- Minimize seasonal human disturbance around nest sites during the breeding season (Figure 1) and at winter roost sites.
- Maintain a sufficient number of large cavity trees per acre in a variety of upland and riparian forests and open habitats over time.

Take Home Messages

- White pine is an important habitat element to a variety of wildlife species.
- Wildlife species-stand use is dynamic over time.
- A fraction of the pine stands have some charismatic megafaunal use.
- Paying attention to these characteristics can add diversity elements to future landscapes.

Figure 1.. Generalized nest site protection guidelines for bald eagles per USFWS recovery plan.



- Establish 20 chain buffer around nest trees
- Full protection within 0 - 5 chain zone – limits human activity
- Limited activity/forestry operations outside nesting season (Feb-Aug) in the 5 – 10 chain zone
- Other operations acceptable outside of nesting season in the 10 – 20 chain zone

Selected References

Abbott, H.G. 1958. **Application of avian repellants to eastern white pine seed.** J. Wildl. Manage. 22: 304-306.

DeGraaf, R.M., Yamasaki, M., 2001. **New England wildlife: Habitat, natural history and distribution.** University Press of New England, Hanover, NH.

Livingston, S.A., Todd, C.S., Krohn, W.B., Owen, R.B., Jr. 1990. **Habitat models for nesting bald eagles in Maine.** J. Wildl. Manage. 54: 644-653.

McCullough, M.A., Todd, C.S., Owen, R.B., Jr. 1994. **Supplemental feeding program for wintering bald eagles in Maine.** Wildl. Soc. Bull. 22: 147-154.

Reay, R.S. 2000. **Management of eastern hemlock for deer wintering areas.** Pages 144-147. In: McManus, K.A., Shields, K.S., Souto, D.R. (editors). Proceedings: Symposium on sustainable management of hemlock ecosystems in eastern North America. USDA Forest Service, Northeastern Research Station, GTR-NE-267.

Sweeney, J.P. 1999. **Winter habitat selection by bald eagles in New Hampshire.** M.S. thesis, University of New Hampshire, Durham. 35 p.

**Managing White Pine in a New Millennium
2003 Workshop Proceedings**

**October 9 and 10, 2003
Caroline A. Fox Research Forest
Hillsborough, New Hampshire**



The Caroline A. Fox Research and Demonstration Forest (Fox Forest) focuses on applied practical research, demonstration forests, and education and outreach for a variety of audiences.

It has been nearly two decades since foresters and researchers gathered for the last white pine symposium held in New Hampshire. *Managing White Pine in a New Millennium* held on October 9 and 10, 2003 was designed to disseminate the latest about management, measurement, condition, and regeneration. These proceedings were prepared as a supplement to the workshop. Papers submitted were not peer-reviewed or edited. They were

compiled by Karen P. Bennett, Extension Professor and Specialist in Forest Resources and Ken Desmarais, Forester with the NH Division of Forests and Lands. Readers are encouraged to contact authors directly for clarifications.

October 9, 2003

A Regional Overview of the White Pine Resource-*Richard Widmann*, Forester, Forest Inventory Analysis, USDA Forest Service

Recognizing White Pine on Aerial Photos-*William Frament*, Remote Sensing Specialist, USDA-Forest Service

Emerging Pine Health Issues-*Kyle Lombard*, Forester, Forest Health Section, NH Division of Forests and Lands

The Perfect Pine Log-*Sarah Smith*, Forest Industry Specialist, UNH Cooperative Extension

Choosing White Pine Crop Trees for Maximum Profits-*Ken Desmarais*, Program Forester, NH Division of Forests and Lands

Efficient Sampling of White Pine Dominated Woodlands-*Ken Desmarais*, Program Forester, NH Division of Forests and Lands

Inventory Considerations in Quantitative Silviculture-*Mark Ducey*, Associate Professor of Forest Biometrics and Management, University of New Hampshire

A Structural Stocking Guide for Eastern White Pine-*Jeff Gove*, Research Forester, USDA-Forest Service, Northeastern Research Station, Durham

White Pine and Wildlife-*Mariko Yamasaki*, Research Wildlife Biologist, USDA-Forest Service, Northeastern Research Station, Durham

October 10, 2003

Optimum Stocking of White Pine: It All Depends-*Bill Leak*, Silviculturist, USDA-Forest Service, Northeastern Research Station, Durham

Low Density Management of White Pine Crop Trees-*Bob Seymour*, Professor, University of Maine

Fire: A Prescription for White Pine Management-*Inge Seaboyer*, Forester, NH Division of Forests and Lands and *Dick Weyrick*, Professor, University of New Hampshire

Site Preparation Efforts to Establish White Pine on Variable Sites-*Peter Pohl*, Extension Forestry Educator, UNH Cooperative Extension

Planting White Pine-*Brooks McCandish*, Forester, New England Forestry Consultants

Conifer Release Using Herbicides-*Dan Cyr*, Consulting Forester, Bay State Forestry Service and Vegetation Control Service, Inc.