The Importance of Bottomland Hardwood Forests for Wildlife[1]

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Bottomland hardwood forests are seasonally flooded forests located along waterways. These unique forests contain many plant species, structurally complex vegetation, a great deal of cover, and a deep litter layer. Together, these factors make bottomland forests habitat for more species of wildlife than most other forest types in the state of Florida. The alternating wet and dry periods make a single forest stand suitable for different wildlife species during each season of the year. For example, waterfowl, fish, and crayfish may be common in bottomland forests during the wet period. Wading birds may appear for only a short time during the transition between wetter and drier periods. Game species make use of these forests during drier periods.

Many of the plants found in bottomland forests produce fruits, nuts, and flowers that serve as food for wildlife. The soil of bottomland forests is richer in nutrients than soils of most other forest types because bottomland forests produce large amounts of leaf litter. For this reason, individual trees and shrubs in bottomland forests produce more fruits and nuts than trees and shrubs in areas with lower quality soils. The wide variety of oaks found in bottomland forests produces an especially important food resource for many birds and mammals: acorns. See http://edis.ifas.ufl.edu/UW292 for more information on the value of oaks and acorns to wildlife.

Figure 1. Bottomland forest during dry period.
Credits: H. Ober, UF/IFAS

Bottomland forests also support a unique assortment of invertebrates. Organisms that thrive in moist areas such as worms, leeches, mollusks, crustaceans, and aquatic insects draw many wildlife to these forests in search of food that can not be found in drier uplands.

Finally, bottomland forests provide critical travel corridors for wildlife. The bottomland forests that are located along rivers are linear in shape. These linear corridors serve as pathways wildlife can use to move from one habitat patch to another. The dense vegetation of these forests provides cover to hide from predators and an escape from the sun during hot temperatures.

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Figure 2. Bottomland forest during wet period.
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The largest remaining bottomland forests in Florida occur along the Escambia, Choctowatchee, and Apalachicola Rivers in the Panhandle. Other remnants of bottomland hardwood forests can be seen at Clear Creek Nature Trail in Santa Rosa County, Box-R Wildlife Management Area in Franklin County, Joe Budd Wildlife Management Area in Gadsden County, Holton Creek in Hamilton County, Peacock Springs in Suwanee County, Lower Suwannee National Wildlife Refuge in Dixie County, Paynes Prairie in Alachua County, Haw Creek Preserve in Flagler County, Withlacoochee State Forest in Sumter County, Brooker Creek Preserve in Pinellas County, and Caloosahatchee Regional Park in Lee County.

Plants of Bottomland Hardwood Forests

Bottomland hardwood forests are unique, differing from other forests in Florida in many ways. In comparison to upland pine forests, bottomland forests typically have more complex vegetative structure (greater variety in terms of the branching architecture of the plants). See table 1 for a list of plant species typical of Florida's bottomland hardwood forests. These forests also have higher species richness (greater variety in the number of tree and shrub species). They have more leaf litter on the ground because most trees in these forests are deciduous, so they drop all their leaves each fall. Finally, these forests have more nutrient-rich soils because of the large quantities of leaf litter and moisture.

The specific combinations of plant species that occur at a bottomland site are influenced mainly by two factors: how often the site floods and how productive the soil is. Wet sites with long periods of flooding are lower in productivity and plant species diversity than drier sites.

Other plants commonly found in bottomland forests include epiphytes (plants that grow on other plants and collect nutrients and moisture from the air and rain), ferns, bromeliads, and orchids.

Wildlife of Bottomland Hardwood Forests

Many birds use bottomland hardwood forests. These forests provide year-round homes for resident birds and also support Neotropical migrants (birds that breed in Central or South America and spend the non-breeding season in North America) and Nearctic migrants (birds that breed in North America and spend the non-breeding season in Central or South America). Florida is the first landmass birds encounter as they fly north across the Gulf of Mexico and the last they encounter as they fly south across this large body of water. This makes Florida an essential stopover area for migrants. Because large rivers are used as navigational aids by migrating birds, the bottomland hardwood forests located next to these rivers are critical habitat for these long distance travelers. In fact, many of the bird species that breed in these forests breed nowhere else in the world.

Examples of birds that commonly use bottomland hardwood forests include wild turkey, yellow- and black-crowned night herons, wood ducks, hairy woodpeckers, red-headed woodpeckers, screech owls, great horned owls, bald eagles, broad-winged hawks, swallow-tailed kites, Mississippi kites, chuck-will's widow, woodcock, wood thrush, Bachman's warblers, Swainson's warblers, hooded warblers, Kentucky warblers, blue jays, cardinals, and grackles. Waterfowl thrive during periods when forests are flooded with water.

Bottomland hardwoods provide excellent habitat for many species of mammals as well. Mammals known to occur in bottomland hardwoods include the Florida panther, white-tailed deer, black bear, bobcat, wild hog, raccoon, skunk, fox, beaver, otter, mink, opossum, gray squirrel, fox squirrel, flying squirrel, southeastern shrew, cotton rat, Rafinesque's big-eared bat, southeastern bat, gray bat, northern yellow bat, and hoary bat. Large trees with cavities provide important denning and roosting sites for mammals.

Amphibians that use bottomland hardwoods include the southern dusky salamander, four-toed salamander, and one-toed amphiuma, as well as many frogs. Reptiles include the American alligator, coral snake, copperhead,

cottonmouth, eastern diamondback rattlesnake, rainbow snake, Mississippi green water snake, eastern kingsnake, glossy and striped crayfish snakes, box turtle, alligator snapping turtle, mud turtle, and many skinks.

Managing Bottomland Hardwood Forests

Both natural events and human activities can influence the suitability of bottomland forests for wildlife. Four factors within the control of humans that can affect these forests are water, fire, invasive species, and vegetation management activities.

Water

Because these forests are found at low elevations close to bodies of water, the main factor controlling forest characteristics is the water cycle (hydrology). Flooding in these forests occurs irregularly and lasts for varying periods of time, ranging from several days to several months. The timing, frequency, coverage, and depth of floods play a large role in determining which plant species can survive at a particular location.

Changes in the natural flooding of forests can drastically impact which plants live there because plant species vary in their ability to endure standing water. When humans modify rivers to reduce the frequency and intensity of floods, the plant species that can survive in bottomland forests shift as well. It is the great variety in the water table of natural bottomland forests that causes the diversity of plant species, which in turn supports a diversity of wildlife. Any actions that reduce the variability in natural flooding of bottomland forests should be avoided, as these activities are likely to alter the vegetation in ways that are ultimately detrimental to wildlife.

Fire

Changes in fire frequency from what would naturally occur can also be harmful to bottomland forests and the wildlife they support. Infrequent fires are essential to forests for several reasons. First, fires remove leaf litter, reducing the chances that large wildfires could occur during droughts in areas with a large build-up of dead leaves. Second, fires release nutrients from the vegetation back into the soil. Finally, fire maintains the forest as a diverse hardwood forest. If natural fires were suppressed for extremely long periods of time, a single intense wildfire could potentially kill the dominant hardwoods and promote faster-growing pine and herbaceous species. This would ultimately convert a bottomland forest to an entirely different type of forest.

However, fires are not expected to occur in bottomland forests frequently: they typically occur only once per century! Therefore, prescribed burning in bottomland hardwoods is likely to be harmful to both plants and animals and is advised against. Most upland forests in Florida benefit from prescribed burning on fairly short time intervals (1 to 10 years), but bottomland hardwood forests do not.

Invasive Species

Invasive plants can influence the suitability of bottomland forests for wildlife. An exotic plant that threatens many bottomland hardwood forests in north Florida is Japanese climbing fern (*Lygodium japonicum*). This plant, originally from eastern Asia, can form dense mats that choke out other native vegetation. Another exotic species that threatens native vegetation in bottomland forests is Chinese tallow (*Sapium sebiferum*). Originally from China, this plant thrives in bottomland forests because it can survive flooding and because water increases the spread of the species by dispersing seeds. Finally, Melaleuca (*Melaleuca quinquenervia*) poses yet another threat to bottomland forests in south and central Florida, displacing native species, changing patterns of hydrology and fire, and decreasing the value of habitat for wildlife.

Invasive animal species can also alter the suitability of bottomland habitat for wildlife. Unfortunately, the feral hog (*Sus scrofa*), an exotic species originally introduced to the US by Spanish explorers, is common to many bottomland forests. Feral hogs can severely alter natural forests by uprooting large areas of vegetation. Their rooting and wallowing often cause extensive destruction of native plants, rapid spread of weeds, and increased soil erosion. Their aggressive nature and omnivorous feeding habits puts them in direct competition for food that would otherwise be available for many other native species of wildlife. See http://edis.ifas.ufl.edu/uw322 and https://edis.ifas.ufl.edu/uw440 for information on controlling wild hogs..

Vegetation Management

Unlike upland pine forests, bottomland forests do not require intensive management to provide quality habitat for a wide variety of wildlife species. Large tracts of mature bottomland forests will naturally provide quality food and cover without human efforts. One of the most important resources bottomland forests provide for wildlife is mast (fruits and nuts). Production of hard mast (from trees such as oaks and hickories) and soft mast (from plants such as black gum and wild grapes) can be increased by clearing small areas around individual trees and shrubs. This will reduce competition and increase vigor, resulting in greater

mast production. Natural events such as tree falls and wind storms will create small disturbed areas (forest openings) where many plants that provide food for wildlife can thrive.

If timber is harvested within bottomland forest, Best Management Practices (BMPs) should be followed. This includes limiting harvesting activities to the dryer times of the year when soil is least likely to be damaged by logging equipment. It also includes planning road construction to minimize impacts on hydrology. Careful consideration should be given to the use of culverts and ditches that could alter wildlife habitat or movement patterns. See http://www.floridaforestservice.com/publications/silvicultural_bmp_manual.pdf [March 2016] for details on harvesting, skidding, and road building BMPs.

Many bottomland hardwood forests were highgraded during the past century (the larger trees of the most valuable species were removed). This process creates forests that lack many of the habitat features that benefit wildlife, such as large trees that could one day contain cavities, and the vigorous trees that could provide large quantities of mast. Highgrading also reduces the chance that the desirable tree species that were selectively logged will regenerate, because seed sources have been removed. For many reasons, highgrading is strongly warned against.

Some bottomland forest tree species regenerate by seed and others by stump sprouting. Landowners interested in harvesting in bottomland forests should learn about the biology of the tree species they intend to grow after harvest. The conditions under which each tree species thrives are different. Landowners should learn which conditions the desired species require and plan harvesting activities so that they create optimal growing conditions for the species they want to regenerate afterwards. Some species do best when harvested using a coppice method, which typically involves resprouting from cut stumps. Other species do better when clearcut, seedtree, shelterwood, or individual-tree selection systems are used. See http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/34723-forest-management-bh-low-res/forest_management_in_bh_low-res.pdf for a description of these techniques and more information on the conditions under which each is most suitable.

Additional Information

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Table 1. Plant species found in bottomland hardwood forests in Florida.

Common name	Latin name
sweetgum	*Liquidambar styraciflua*
spruce pine	*Pinus glabra*
loblolly pine	*P. taeda*
sweetbay	*Magnolia virginiana*
swamp laurel oak	*Quercus laurifolia*
water oak	*Q. nigra*
live oak	*Q. virginiana*
swamp chestnut oak	*Q. michauxii*
white oak	*Q. alba*
laurel oak	*Q. hemisphaerica*
southern hackberry/sugarberry	*Celtis laevigata*
Florida elm	*Ulmus americana* var. *floridana*
red maple	*Acer rubrum*
black gum	*Nyssa sylvatica*
water tupelo	*N. aquatica*
bald cypress	*Taxodium distichum*
loblolly bay	*Gordonia lasianthus*
blue beech/American hornbeam	*Carpinus caroliniana*
swamp dogwood	*Cornus foemina*
possumhaw	*Ilex decidua*
dahoon holly	*I. cassine*
American holly	*I. opaca*
dwarf palmetto	*Sabal minor*
swamp bay	*Persea palustris*
Redbay	*P. borbonia*
wax myrtle	*Myrica cerifera*
highbush blueberry	*Vaccinium corybosum*
sparkleberry	*V. arboreum*
Gulf Sebastian bush	*Sebastiania fruticosa*
Atlantic white cedar	*Chamaecyparis thyoides*
tuliptree	*Liriodendron tulipifera*