Does McShan Lumber Company, Inc. meet FSC's Controlled Wood standard?

July 23, 2026

We are carrying out an audit of McShan Lumber Company, Inc. located in McShan, Alabama, USA, to see if their operations comply with FSC's Controlled Wood standard (FSC-STD-40-005 V3-1). We are writing to you to ask if you know of any reason why their operations would not meet this standard.

Controlled Wood is wood that meets minimum requirements and that can therefore be mixed with FSC wood and used in products with an FSC Mix label. In particular, the wood must not be:

- harvested illegally.
- harvested in violation of traditional and civil rights.
- harvested from forests with a high conservation value that is threatened by management activities.
- harvested from forests being converted to plantations or non-forest use.
- from forests in which genetically modified trees are planted.

We will carry out our audit on September 1st, 2026. Here is how you should comment, if you wish to do so:

- When? You should send comments to us before or during the audit.
- How? You can comment by:
  - Meeting with a Preferred by Nature staff member in person.
  - Phone to Mark Graveel. His phone number is 615-457-9379
  - Writing to Mark Graveel at:
    13 Jolina Court P.O. Box 99
    Richmond, VT 05477
    United States.
  - Email to Mark Graveel at mgraveel@preferredbynature.org
  - In person by arranging to meet with Mark Graveel
- If you want your comments to be confidential please notify us when you submit the comments.

If you provide comments, we will provide feedback to you within 30 days of the audit.

McShan Lumber Company, Inc. has written a summary document that lists:

- the risks they have identified that they may source unacceptable wood
- the measures they implement to mitigate those risks.

We have attached this summary document to this letter.

If you wish to dispute any aspect of this forest certification process or the decision we reach as to whether this company meets the Controlled Wood standard, you can access our Dispute Resolution Policy at https://www.preferredbynature.org/node/9284.

Thank you for any help you are able to provide.

If you have any recommendations for contacting other stakeholders that may have an interest in providing comments on this company and audit, we would also gladly receive these from you.

Yours sincerely,

Mélanie Proulx

FSC Controlled Wood Due Diligence System Public Summary

1. General information

Organisation name:	**McShan Lumber Company, Inc.**
FSC certificate code:	
Organisation's DDS contact person:	**Grover Allgood**
DDS prepared/assisted by:	*Prepared by McShan Lumber Company, Inc.*
Date last reviewed/updated (by the organisation):	**7/29/2025**

2. Suppliers

Participating site	Non-certified material type sourced	Exact number of suppliers	Supplier type(s)	Average no. of tiers in the supply chains	Approximate or exact number of sub-suppliers
McShan Lumber Company, Inc.	**Logs**	**88**	**Producer & Supplier**	**1**	**0**

3. Supply areas

Supply area	Controlled wood category	Reference to risk assessment used	Risk designation
Mississippi Counties: Alcorn, Attala, Benton, Calhoun, Carroll, Chickasaw, Choctaw, Clarke, Clay, Grenada, Itawamba, Kemper, LaFayette, Lauderdale, Leake, Lee, Lowndes, Madison, Marshall, Montgomery, Monroe, Neshoba, Newton, Noxubee, Oktibbeha, Panola, Pontoco, Prentiss, Rankin, Scott, Tate, Tippah, Tishomingo, Union, Webster, Winston, Yalobusha	1	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	2	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	3	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	4	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	5	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
Alabama Counties: Autauga, Bibb, Blount, Calhoun, Chilton, Clay, Colbert, Coosa, Cullman, Dallas, Elmore, Fayette, Franklin, Greene, Hale, Jefferson, Lamar, Lauderdale, Lawrence, Limestone, Lowndes, Marengo, Marion, Monroe, Montgomery, Morgan, Perry, Pickens, St. Clair, Sumter, Talladega, Tallapoosa, Tuscaloosa, Walker, Wilcox, Winston	1	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	2	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	3	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	4	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk
	5	Refer to FSC NRA map for McShan Lumber Company, Inc. (See Annex)	Negligible risk

4. Risk assessment and mitigation

4.a Risk mitigation for the origin of the material

Supply area:		
Indicator	**Control Measures**	**Findings from field verification if undertaken as a control measure**
Controlled wood category 1. Illegally harvested wood *NOT APPLICABLE*		
Controlled wood category 2. Wood harvested in violation of traditional and human rights *NOT APPLICABLE*		
Controlled wood category 3. Wood from forests in which high conservation values are threatened by management activities		
3.1a.	3.1.a.ii) Relevant documents were read and reviewed. Additionally, representatives from International Paper were at the ATL meeting & Appalachian meeting. International Paper staff reviewed documents from both regional meetings.	
Southern Appalachian Critical Biodiversity Area & Central Appalachian Critical Biodiversity Area	*Contracts with suppliers will recommend Best Management Practice are in place for Producers harvesting operations. (See NRA Mitigation Guidance Mitigation Options Document Page 11 option "C"). This central theme will fall under "Direct Influence"* *Also any operations within these areas will require literature distribution form the University of Kentucky titled "The Identification and Timber Management of Mesophytic Cove Sites for FSC Controlled Wood".*	Negligible risk
Late Successional Bottomland Hardwood	*When tracts are purchased in counties that contain the chance of operation within the LSBW specified risk, McShan Lumber Company, Inc. will distribute educational information from the University of Florida and Mississippi State University (See attachment on annex).*	Negligible risk
Native Longleaf Pine Systems	*McShan Lumber Company is a Manufacturing Production Member of the Alabama Forestry Association (AFA). The AFA directly impacts conservation of longleaf pine ecosystems in the NLPS SRA area (See attachment in annex). This central theme will fall under "Implement Management"*	Negligible risk
Controlled wood category 4. Wood from forests being converted to plantations or non-forest use *NOT APPLICABLE*		
Controlled wood category 5. Wood from forests in which genetically modified trees are planted *NOT APPLICABLE*		

4.b Risk assessment and mitigation for mixing in the supply chain

Participating site	**Supply chain type**	**No. of tiers**	**Risk of mixing**	**Control measures**	**Findings from field verification if undertaken as a control measure**
McShan Lumber Company, Inc.	• *Wood delivered and purchased directly from concession holder to Organisation's log yard (mill)* • *All round wood is purchased from counties listed in Alabama and Mississippi. These specific counties are listed above in "3. Supply Area"*	*1 Tier*	*Due to McShan Lumber Company, Inc. purchasing round wood directly from a concession holder, there is Negligible Risk of any possible mixing activity. The basin McShan Lumber Co., Inc. procures from has a non-negligible risk that is listed in "3. Supply Area" above.*	Negligible risk of mixing	

5. Technical experts used in the development of control measures

Name	License/Registration #	Qualification	Scope of service	Source of information
Greg Swede	N/A	Tenured Professional in Forestry Sector of Southeast US (34 Years)	- Mississippi state hardwood management short course -Worked on numerous consultations with Dr. Andy Ezell, hardwood silviculturalist. -Conducted thorough review of Mississippi & Alabama State wildlife action plans. -Served as Cumberland plateau representative of forestland stewards. -Took Native Bat short-course. -Was a former member and sub chair of WSRI. - Member of AFA - Alabama Forest Association; MFA - Mississippi Forest Association; -FRA - Forest Resource Association; -WSRI – Wood Supply Research Institute and; -American bird conservancy Tombigbee partnership committee member.	- *Authors on literature can quickly be searched and credentials are provided* - *Greg swede can be found on LinkedIn for professional profile.*

6. Stakeholder consultation processes

Supply area	Relevant controlled wood category	List of stakeholder groups invited to participate	Summary of comments received from stakeholders	Description of how stakeholder comments were taken into account	Justification for concluding that the material sourced from the area was low risk
		Certifying Body will be conducting a 6 week long mandatory stakeholder consultation			

7. Complaints procedure

We encourage stakeholders who have suggestions for improvements, comments, or complaints related to our controlled wood due diligence system to contact:

Grover Allgood
Allgood77@gmail.com
205-399-2728

We commit to follow up on stakeholder input as soon as we receive it and to provide stakeholders with feedback within 2 weeks.

If any complaints are made to McShan Lumber Company, Inc. then the following process below will be followed:

a) Acknowledging receipt of complaints

b) Informing stakeholders of the complaint procedure, and providing an initial response to complainants in writing within a time period of two (2) weeks;

c) Forwarding complaints related to risk designations in the relevant FSC risk assessment to the responsible body

d) Conducting a preliminary assessment to determine whether evidence provided in a complaint is or is not substantial, by assessing the evidence provided against the risk of using material from unacceptable sources

e) Dialogue with complainants that aims to solve complaints assessed as substantial before further actions are taken

f) Forwarding substantial complaints to the certification body and relevant FSC National Office for the supply area within two (2) weeks of receipt of the complaint. Information on the steps to be taken by the organization in order to resolve the complaint, as well as how a precautionary approach will be used, shall be included with the complaint

g) Employing a precautionary approach towards the continued sourcing of the relevant material while a complaint is pending

h) Implementing a process (e.g. field verification and/or desk verification) to verify a complaint assessed as substantial by the organization, within two (2) months of its receipt

i) Determining the corrective action to be taken by suppliers and the means to enforce its implementation by a supplier if a complaint has been assessed and
verified as substantial. If a corrective action cannot be determined and/or enforced, the relevant material and/or suppliers shall be excluded by the organization;

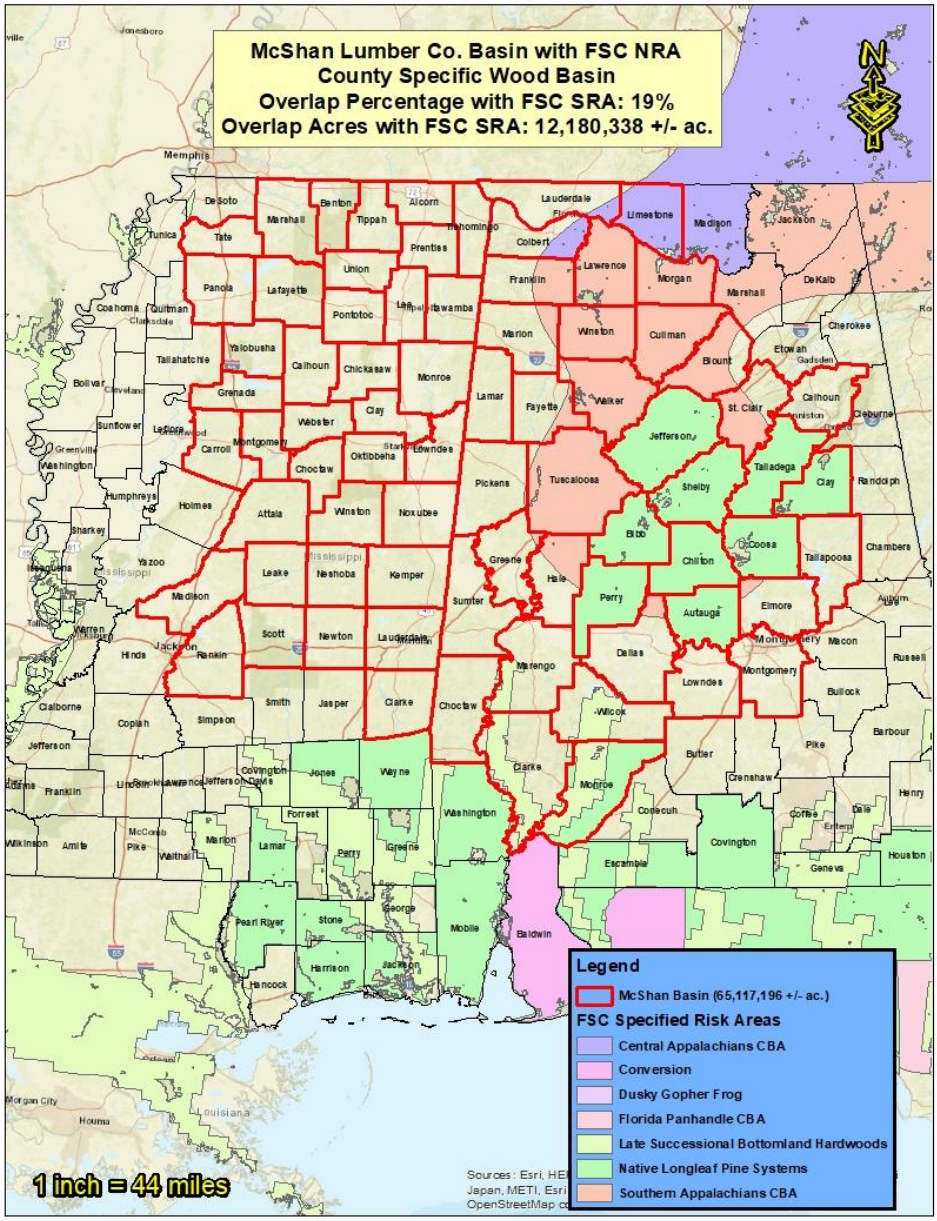
j) Verifying whether corrective action has been taken by suppliers and whether it is effective

k) Excluding the relevant material and suppliers from the organization's supply chain if no corrective action is taken

l) Informing the complainant, the certification body, and the relevant FSC National Office of the results of the complaint and any actions taken towards its resolution, and for maintaining copies of relevant correspondence

m) Recording and filing all complaints received and actions taken

Annex:



Late Successional Bottomland Hardwood

UF IFAS Extension UNIVERSITY of FLORIDA

WEC271

The Importance of Bottomland Hardwood Forests for Wildlife[1]

Holly K. Ober[2]

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.

1. This document is WEC271, one of a series of the Department of Wildlife Ecology and Conservation, UF/IFAS Extension. Original publication date November 2009. Revised February 2019. Visit the EDIS website at https://edis.ifas.ufl.edu for the currently supported version of this publication.

2. Holly K. Ober, associate professor and Extension specialist, Department of Wildlife Ecology and Conservation; UF/IFAS North Florida Research and Education Center, Quincy, FL 32351.

Figure 2. Bottomland forest during wet period.
Credits: H. Ober, UF/IFAS

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

Breithaupt, D (n.d). Forest management in bottomland hardwoods. Louisiana Department of Wildlife and Fisheries, Landowners for Wildlife Private Lands Program. http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/34723-forest-management-bh-low-res/forest_management_in_bh_low-res.pdf

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Florida Forest Service. (2008). Best Management Practices for Silviculture. http://www.floridaforestservice.com/publications/silvicultural_bmp_manual.pdf

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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*

Bottomland Hardwood Management
Species/Site Relationships

Figure 1. This forest shows the impact of not considering species/site relationships. Shumard oak (left) is not adapted to wet, heavy clays, while Nuttall oak (right) is.

Hardwood species selection is one of the most demanding forestry management tasks for private landowners and forest managers. Choosing the correct hardwood species for regeneration is difficult in part due to the large number of species available and their varying needs for survival and growth. In many cases, the needs of different species may only be met by a combination of factors that exist only under different site and soil conditions. To manage hardwoods well, you should understand the nutritional and moisture needs of the main commercial hardwood species and the types of soil that best meet these needs. In general, the most desirable species will survive and grow well only on a narrow range of sites and conditions. Correctly matching species to site will result in a stand capable of growing and thriving over an extended period of time.

Bottomland Hardwood Sites

All forested sites in the South can be divided into different types of physical geography: uplands, terraces, and floodplains. Uplands are the most common type, with soils in these areas formed through natural weathering processes from parent geologic material or wind-blown materials. Terraces are old floodplains of current or ancient streams. The alluvium in these soils made them fertile at first, but they become less productive due to nutrient depletion over time. The nutrient levels in older terrace soils have been depleted in many cases. Many older terrace soils also develop layers called hardpans that limit growth.

The term "bottomland hardwoods" generally refers to hardwoods found on current floodplain sites. Soils on these sites are young because they are made of recent stream deposits. They vary in drainage and nutrient levels, thus resulting in a range of sites with different productivity levels appropriate for different hardwood species.

Floodplain sites in the South are divided into major river bottoms and minor stream bottoms. The obvious difference between them is the size of the stream. Major river bottoms are usually associated with large rivers, such as the Mississippi River. Another important difference is in the kind of soil deposits. The alluvium in major river bottoms can come from hundreds or even thousands of miles away. It may be made up of materials of a variety of textural classes and nutrients. In minor stream bottoms, alluvial deposits are local and usually less variable in texture and nutrients. For these reasons, major river bottoms are often, but not always, more productive than minor stream bottoms.

Bottomland hardwoods mainly occur in the Atlantic and Gulf Coastal Plain divisions of the Coastal Plain Province. That's because the nature of soils in these areas is sedimentary and easily eroded. When the climate was much warmer and wetter, ancient streams eroded away material to form stream valleys. These streams continue

to deposit rich sediments. Today, about 30 million acres of bottomland hardwoods are left in the South. This acreage is about one-half of the estimated coverage at the time of European settlement. The change is the result of factors like urbanization and farming. A prime example of this loss is in the Mississippi Delta where the Mississippi River was leveed to protect cities and valuable rich crop lands from annual flooding.

Site Variation

Site variation within floodplains is mainly associated with elevation differences, where a change of as little as 6 inches of elevation can change the suitability of a site for some species. Elevation differences cause changes in drainage class and soil moisture. Even small elevation differences can result in different soil type, texture, structure, and pH. All of these impact species occurrence and growth. Differences in both topography and parent material alter the way materials are deposited and streamflow within the floodplain.

Figure 2 is a sample cross section of a major stream valley of the coastal plain. It shows topographic features and their usual sequence. Each topographic feature shown may occur several times. Additionally, these features may not occur in the order shown. Ridges and swamps are far more common in the Atlantic Coastal Plain than they are in the Gulf Coastal Plain. This difference is because of the way floodplains formed.

The paragraphs below describe topographic features shown in Figure 2. Each section also gives the hardwood species commonly found on each feature in major river bottoms. The species listed may or may not be desirable in terms of timber value, but species listed in the table at the end of this publication are desirable. In major river bottoms, the types of trees will vary depending on soil age and successional stage.

Bars

Bars are formed when the concave section of a stream bank erodes and sediment is deposited downstream on an opposite convex area of the stream. With time and increasing deposits, the bar may become a mud flat. With more deposits, the flat may become a front. Bars are typically very wet and often flooded.

Here, black willow is the major pioneer species, but if the land is elevated enough or becomes established between high water levels, eastern cottonwood may also grow. Black willow is more tolerant of water. Both species can withstand some sediment deposition, but if a front forms, they may be replaced by front species.

Fronts

Fronts are the best sites for tree growth in the floodplain. These are natural levees that form when streams overflow their banks and quickly deposit sediment. Deposited soil is usually of a sandy texture. Consequently, these areas are usually the highest sites with the best drainage. Fronts usually flood only during extreme conditions. Almost all hardwood species can grow on these sites.

Cottonwood is the primary species found on fronts, usually followed by elm, sycamore, sweet pecan, sugarberry, boxelder, and sweetgum. In many places, fronts appear to be two-tiered stands with cottonwoods in the overstory and other species in the understory. The cottonwood overstory allows enough sunlight to reach the forest floor for other hardwood species to regenerate and develop. This front stand is not final but rather sets the stage for other species that will replace those that originally occupied the site.

If replacement is rapid (caused by humans or natural disaster), a red oak and sweetgum stand may grow. If replacement is slow, the stand may turn into a mixture of boxelder and sugarberry or a mixture of boxelder, hack-

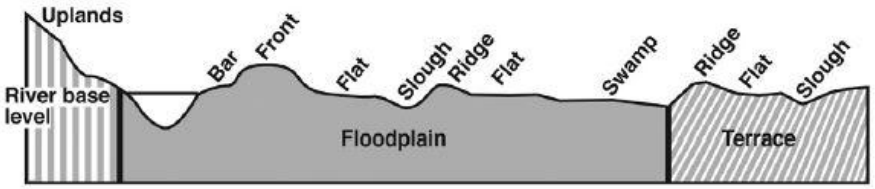

Figure 2. Cross-section of stream valley showing minor topographic positions within the floodplain.

berry, and silver maple. As the site matures, it may again be occupied by sweetgum and red oak. The pH of these soils can greatly affect species combinations, as high pH will greatly inhibit the ability of oaks to occupy these sites. The main exceptions to this rule are Shumard and overcup oaks, which can tolerate higher pH soils.

Flats

A flat is a broad, smooth area between two ridges or between a ridge and a front. The soils are mostly clays. Drainage varies from poor to somewhat poor, but standing water is usually absent during most of the growing season. There may be slight elevation differences. Variations classified as "high flats" and "low flats" are based on drainage patterns. Flats make up the largest area in the floodplain. Flats represent a major change in site quality, as they are not as suitable for growing the most desirable species.

Various tree species grow on flats. On low flats, overcup oak, water hickory, and cypress dominate. Pure stands of overcup oak are common in some places. On high flats, the most common group is elm, ash, and sugarberry. Other species, such as Nuttall oak, willow oak, and red maple are also common on these sites. Occasionaly, Nuttall oak and willow oak will dominate these stands.

Ridges

Ridges are old fronts and are the second best sites for hardwoods. While these areas could vary in elevation from 2 to 15 feet above flats, an elevation gain of 2 or 3 feet is more common. Drainage may not be quite as good as on fronts, and soil fertility may be somewhat lower. Soil textures tend to be coarser than those in flats, and drainage is better.

Past events and treatments will affect species occurrence on ridges. A combination of elm, ash, and sugarberry is the most common, but if the site is opened rapidly and appropriate regeneration is present, it can be replaced by a stand composed of sweetgum, red oak, water oak, willow oak, cherrybark oak, Shumard oak, and a variety of minor species. Without management, these stands typically go back to an elm, ash, and sugarberry mix.

Sloughs

Sloughs are shallow depressions formed from old stream channels that have nearly filled with sediment. They are low areas with poor drainage because of heavy clay soils that result in standing surface water well into the growing season. These areas support lower quality and less desirable timber tree species, such as overcup oak and water hickory.

These areas are usually occupied by baldcypress, water tupelo, and willow. Depending on how close the slough is to a stream or if sedimentation occurs rapidly, higher quality stands of black willow may occupy the site. If sedimentation continues, the black willow will be replaced by elm, ash, and sugarberry. On sites where sediment is deposited slowly some distance from the stream, overcup oak, water hickory, and green ash will most often follow willow.

Swamps

Swamps are also old stream channels, but they are deeper than sloughs. Surface water is usually present year-round. Most species will not grow in these areas. Bald cypress and water tupelo tend to thrive but do require dry conditions to regenerate.

In swamps of major river bottoms, baldcypress and water tupelo are the most common species. Depending on depth and duration of flooding, other tree species that sometimes grow include swamp tupelo, water elm, Carolina ash, water hickory, swamp laurel oak, and overcup oak.

Figure 3. This series of photographs carries you away from the stream bank in a minor stream bottom. A distance of approximately 100 yards and a gain of 2 feet in elevation is encompassed by this series. In the first photograph, the site floods regularly and supports a baldcypress/water elm mixture. As site drainage improves over the next two photographs, site conditions have allowed for successful establishment of a green ash, elm, and sugarberry stand. Continual gain in elevation results in a species shift to water oak and sweetgum by the fourth photo. At a gain of approximately 2 feet in elevation, the ridge in the fifth photograph supports a healthy water oak, cherrybark oak, and sweetgum mixture. While some of the species observed are capable of growing on multiple topographic sites, some are not. Careful consideration of species/site relationships helps avoid management problems that arise when trying to maintain ill-suited species on improper sites.

Species Occurrence

While a large number of hardwood species occur on floodplain sites, only a few are considered desirable for timber production. Table 1 shows desirable timber trees by site type. The table is not a complete listing of all species, but species listed are considered to be the most appropriate for those sites.

There are other wet sites that support hardwood growth but are not associated with stream floodplains. Sites such as coastal and muck swamps often grow hardwoods due to their lack of suitability for pine species. Generally, these sites are not as productive as floodplains, and hardwoods growing there, usually baldcypress and water tupelo, are of low quality.

Minor stream bottoms are just smaller versions of major river bottoms. They have the same physical features, and most of the same species can be found on these sites. Species that occur only on ridge positions in major river bottoms often occur on flats in minor bottoms. River birch is the most common pioneer species on new land such as bars and mud flats. Many different types of trees grow on fronts and may include yellow poplar, American beech, sycamore, spruce pine, sweetgum, cherrybark oak, Shumard oak, water oak, swamp chestnut oak, and several species of hickory.

Although flooding still occurs, other natural forces usually control succession and species on these sites. Typical species growing on well-drained flats and ridges of minor bottoms include sweetgum, cherrybark oak, water oak, swamp chestnut oak, American elm, and hickories. On less well-drained flats, the major species include overcup oak, willow oak, Nuttall oak, swamp laurel oak, persimmon, green ash, sugarberry, and red maple. Tree species growing in sloughs of minor bottoms will vary depending on the duration of flooding. Cypress, swamp tupelo, water tupelo, and water elm are most commonly found where flooding is extended. Overcup oak, water hickory, and persimmon will also occur where flooding is not as severe.

Table 1. Site suitability by topographic position of major river bottoms and minor stream bottoms.

Topographic Position	Desirable/Suitable Species	
	Major River Bottoms	**Minor Stream Bottoms**
bars	cottonwood and black willow	river birch and black willow
fronts	cottonwood, sycamore, sweetgum, sweet pecan, green ash, water oak, cherrybark oak[1], swamp chestnut, oak[1]	cherrybark oak, Shumard oak, sycamore, sweetgum, yellow poplar
ridges	willow oak, water oak, sweetgum, sycamore, green ash, cherrybark oak[1], swamp chestnut oak[1]	cherrybark oak, Shumard oak, swamp, chestnut oak
high flats	Nuttall oak, green ash, sugarberry, willow oak	cherrybark oak, water oak, willow oak, Shumard oak, swamp chestnut oak
low flats	overcup oak, water hickory, green ash, persimmon, sugarberry	willow oak, overcup oak, persimmon, green ash
sloughs	overcup oak, black willow, water hickory	overcup oak and persimmon
swamps	baldcypress and water tupelo	baldcypress, swamp tupelo, water tupelo

[1]Species may not be found on sites in the Mississippi River floodplain.

Implications for Use or Management

The most important part of hardwood regeneration and management is correctly matching species and sites. Factors that influence this selection include topographical features, elevation, soil characteristics, presence of pans, pH, and hydrology. Soil maps and site visits throughout the year will help you decide which hardwood species would grow best in a given area. In most cases, it is better to include a combination of hardwood species and not a single species because of site variability.

If hardwood management objectives include timber, wildlife, or a combination of the two, you must understand species/site relationships and forest succession. Reforestation or afforestation projects are likely to fail if species and sites are not correctly matched. Remember that bottomland ecosystems do change. With or without human influences, forest stands will continue to change species. What is found there today may not be there 100 years from now. Current stand and site conditions can progress a stand toward several different stages of forest succession.

The species/site relationship concepts discussed in this publication can help you make management decisions that could resolve or reduce conflicts over the use of bottomland hardwood resources. These areas are quite diverse and can accommodate a great variety of interests and uses. You can use active management to keep or increase species diversity of forest stands while meeting other objectives. Hardwood management is complicated, and understanding species/site relationships is not easy. If you are uncomfortable with making management decisions in these systems, please contact a consulting forester, a Mississippi Forestry Commission area forester, your local MSU Extension agent, or an Extension forestry specialist for help with these important decisions.

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Native Longleaf Pine Systems

RESULTS


CUMBERLAND PROJECT AREA
COASTAL PLAIN PROJECT AREA
LANDOWNERS
4,609
ENGAGED
10,303
52
SITE VISITS
110
9,374
ACRES
55,111
29
IMPLEMENTING CONSERVATION PRACTICES
107
SHORTLEAF PINE ACRES
772 Planted
5,707 Since Project Start
30 Invasive Species Treated
4,179 Burned
17,036 Since Project Start
324 Thinned
LONGLEAF PINE ACRES
460 Planted
13,717 Since Project Start
5,735 Burned
51,314 Since Project Start
283 Invasive Species Treated
RIPARIAN FORESTS
125 Acres Improved
STREAMS
27 Miles Improved
FOREST CERTIFICATION
10 Landowners Enrolled in Tree Farm / 2,502 Acres
GOPHER TORTOISE SURVEYS
6 Tracts Assessed
4 Surveys Completed / 12 Total
3,605 Acres / 104,605 Total
FOREST CERTIFICATION
7 Landowners Enrolled in Tree Farm / 1,550 Acres

RESULTS

Mesophytic Cove Sites

The Identification and Timber Management of Mesophytic Cove Sites for FSC Controlled Wood

Location and Description

Mesophytic Cove Sites (MCS) are highly diverse hardwood dominated stands that occur in sheltered and highly productive landscape positions such as concave sloped headwaters (coves) with steep slope gradients at low to moderate elevations (1000-3600 ft). Typically, they are found in the Central and Southern Appalachians and northern reaches of the Cumberland Plateau physiographic region. While the word "Site" is used as a term in MCS technically it is a stand that occurs on a particular site, in this case a mesophytic cove. While there are many cove sites in the physiographic region, very few still hold the species diversity required to be classified as an MCS. To be classified as MCS, stands require a preponderance of overstory (dominant and co-dominant) species including: yellow buckeye, basswood, American beech, northern red oak, white oak, white ash, yellow-poplar, sugar maple, black walnut, hickories and potentially eastern hemlock. The majority of these stands were logged in the 1800s and early to mid-1900s resulting in a loss of diversity. This species loss was compounded by farming and other disturbances which further eroded diversity. Many cove sites that originally held an MCS are now skewed to relatively early successional and/or seed-originated species like yellow-poplar or cucumber magnolia, resulting in the loss of the species mix that is required for an MCS.

Protection of High Conservation Value (HCV) Attributes

MCSs that are remaining are a rare ecosystem that is at risk in the region. As indicated above these stands are functionally old growth with little disturbance. Disturbance, specifically harvesting conducted in a manner that increases within-stand light levels and generates significant duff layer and soil disturbance can cause the loss of diversity that is the primary attribute of this HVC that must be protected. If they are also classified as old growth, then attributes associated with this HVC also must be maintained.

The steep topography, restricted entry points, and network of ephemeral and headwater streams present are operationally challenging and make active management of these stands difficult. Management, particularly plans that include harvesting, must maintain the MCS diversity attribute. Given the limited disturbance that can be tolerated, along with the complex topography and hydrologic features present, significant planning and operational sophistication are required to successfully conduct harvesting in MCS's.

Sub-stands Aligned with MCS

Areas that have several of the species characteristics of the MCS can be found in the region, often outside of cove sites. For example, second-growth stands on north-facing concave slopes with northern red oak, yellow-poplar and walnut. These stands do not constitute an MCS because of the lack of holistic attributes associated with the particular HCV. There also may be areas that contain a few of the rarer species such as yellow buckeye; typically, these are small in size and do not constitute a homogenous area that could be classified as a stand.

Identification Key:

1. Harvest area contains a cove (concave sloped, headwater drainage) greater than 2 acres? If Yes go to #2. If No stop, MCS doesn't exist
2. Cove is located low to mid-slope? If yes go to #3. If No stop, upper slope too dry for MCS.
3. Cove is located predominately on a North or East facing slope? If Yes got to #5. If No, go to #4.
4. Cove is on lower slope of predominately South or West facing slope? If Yes go to #5. If No stop, mid to upper south and west facing slopes too dry for MCS to exist.
5. Cove site shows signs of farming or extensive logging such as fencing, rock piles, outbuildings, or numerous stumps? If Yes stop, recent past land use would prohibit the stand diversity needed to be an MCS. If No, go to #6.
6. Dominant or co-dominant overstory trees are made up of at least 4 of the following indicator tree species: American beech, northern red oak, yellow-poplar, sugar maple, American basswood, yellow buckeye, white oak, white ash, black walnut, cucumber magnolia, bitternut hickory or eastern hemlock. If Yes go to #7. If No stop, overstory lacks the diversity to be a MSC.
7. Yellow-poplar makes up less than 33% (1 out of 3) of the dominant or co-dominant overstory trees. If Yes go to #8. If No stop, the stand is too dominated by yellow-poplar and/or maple and therefore lacks the diversity to be MCS.
8. Cove has a high potential to be a MCS. See Recommendations

Recommendations:

1. Advise control wood user of the MCS existence. Control wood user, landowner and conservation agency could explore the possibility of compensating the landowner to protect this area in perpetuity.
2. MCS is selectively harvested, leaving approximately 75% of the dominant overstory trees evenly distributed across the cove. Four out of the 5 trees (80%) harvested should consist of yellow-poplar or cucumber magnolia.
3. Harvest MCS but do not claim controlled wood credits for the site.

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