



FOREST MANAGEMENT PLAN ADDENDUM

Morehouse Parish School Board Forest Management Unit A Member of the NativState Resource Management Unit

**3,726.60 Gross Acres
Morehouse Parish, LA**

Prepared by: F&W Forestry Services, Inc.

April 2025

Prepared to Conform with the FSC-US Forest Management Standard

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Management Plan Addendum Explanation: This Management Plan Addendum presents information related to FSC Management Plan requirements not covered in the landowner's existing Management Plan (prepared by NativState for the American Tree Farm System). F&W's full FSC Management Plan template contains the items below. In this addendum, items covered in the landowner's existing plan are highlighted in green. The remaining items are included in this addendum.

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SUMMARY INFORMATION

OWNERSHIP

LA-5392

Section 16; Township 21 North; Range 8 East; Morehouse Parish, LA

LA-5392A

Section 16; Township 20 North; Range 7 East; Morehouse Parish, LA.

LA-5392B

Section 16; Township 18 North; Range 6 East; Morehouse Parish, LA.

LA-5392C

Section 16; Township 23 North; Range 4 East; Morehouse Parish, LA.

LA-5392D

Section 16; Township 19 North; Range 8 East; Morehouse Parish, LA.

LA-5392E

Section 16; Township 23 North; Range 9 East; Morehouse Parish, LA.

LA-5392F

Section 16; Township 21 North; Range 7 East; Morehouse Parish, LA.

LAND (Plan Acres)

Commercial Forestland	3,605.8 ACRES
Non-Forest	<u>120.8 ACRES</u>
Total Acres	3,726.6 ACRES

(See Spatial Data Housed in NativState's GIS Directory)

TIMBER AND INVENTORY SUMMARY

LA-5392

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland	457.1	51.2	123.3	Oak-Hickory
Stand 2 - Juvenile Hardwood	181.1	33.3	132.5	Oak-Pine

LA-5392A

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland	574.1	70.1	78.0	Oak-Hickory
Stand 2 - Juvenile Bottomland Hardwood	25.6	0.0	0.0	Oak-Hickory
Stand 3 - Food Plots	2.7	0.0	0.0	Food Plots
Stand 4 - Inoperable	6.6	0.0	0.0	Water Grasses
Stand 5 - Little Bayou Bonnie Idee	5.8	0.0	0.0	N/A
Stand 6 - White Oak Bayou	27.2	0.0	0.0	N/A

LA-5392B

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	453.4	83.5	110.7	Oak-Hickory
Stand 2 - Thinned Bottomland Hardwood	133.0	30.0	35.0	Oak-Boxelder
Stand 3 - Food Plots	3.7	0.0	0.0	Food Plots
Stand 4 - Inoperable	4.5	0.0	0.0	Water Grasses
Stand 5 - Irwin Lake	11.9	0.0	0.0	N/A
Stand 6 - Ag Field	28.2	0.0	0.0	N/A

LA-5392C

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	587.9	88.4	122.2	Oak-Hickory
Stand 2 - Elm Slough	17.9	0.0	0.0	N/A
Stand 3 - Inoperable	34.8	0.0	0.0	Water Grasses

LA-5392D

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	221.3	78.0	91.6	Oak-Pine
Stand 2 - Food Plots	4.6	0.0	0.0	Food Plots
Stand 3 - Juvenile Bottomland Hardwood	15.0	52.8	130.0	Oak-Elm
Stand 4 - Pipeline	3.4	0.0	0.0	N/A

LA-5392E

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	475.9	78.9	82.6	Oak-Hickory
Stand 2 - Inoperable	3.6	0.0	0.0	N/A
Stand 3 - Ponds	5.2	0.0	0.0	N/A

LA-5392F

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	428.9	70.7	84.8	Oak-Hickory
Stand 2 - Bayou Galion	5.9	0.0	0.0	N/A
Stand 3 - Delemar Bayou	6.4	0.0	0.0	N/A

ACTIVITY SUMMARY

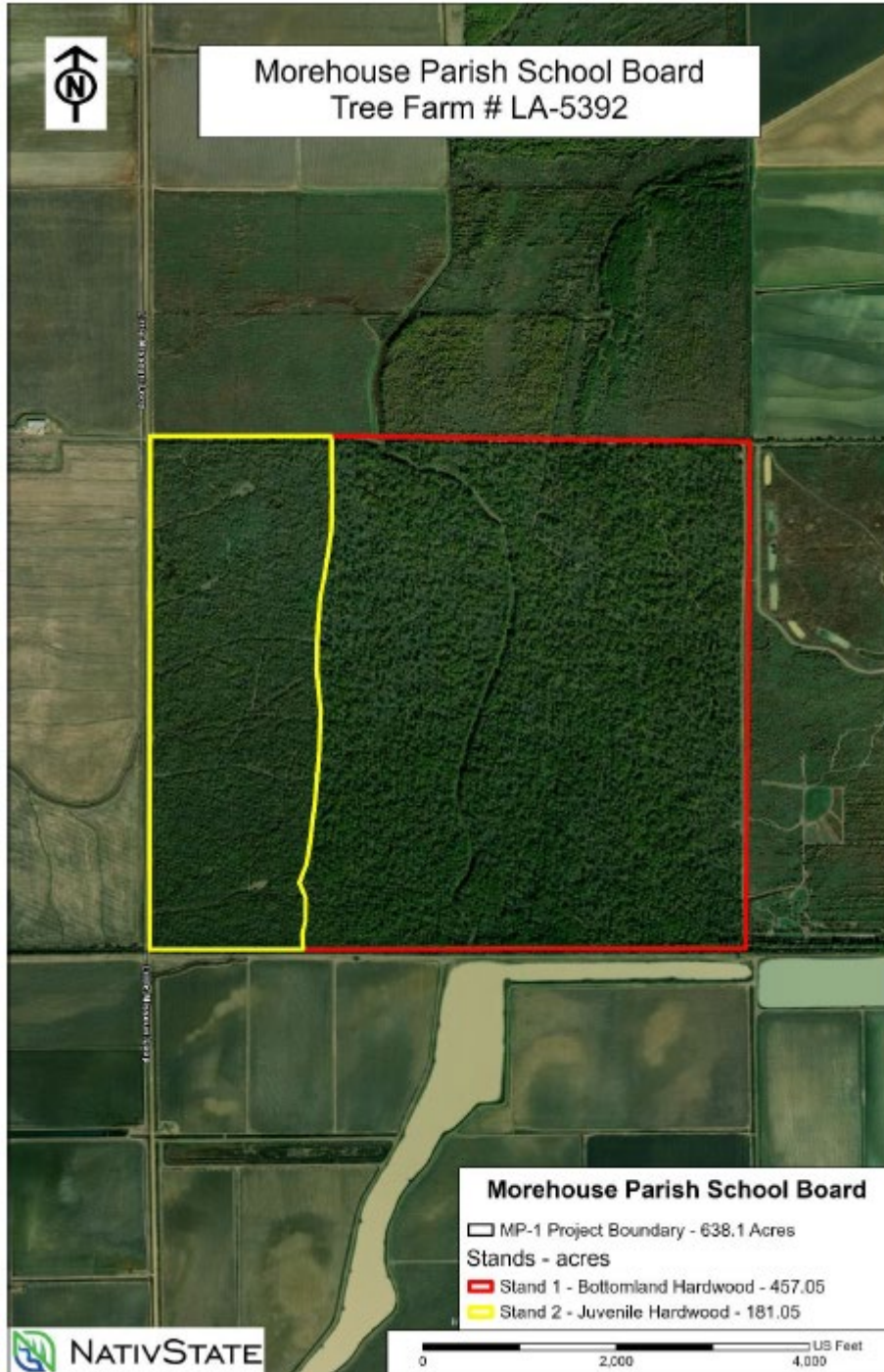
This Management Plan covers the period from February 2024 to February 2034. The management plan will be kept up to date, although updates may occur as Addenda documents and other updates of the suite of documents which guides the management of the forest. A full revision will occur by February 2034.

For activity summary, see the landowner's Tree Farm Management Plan.

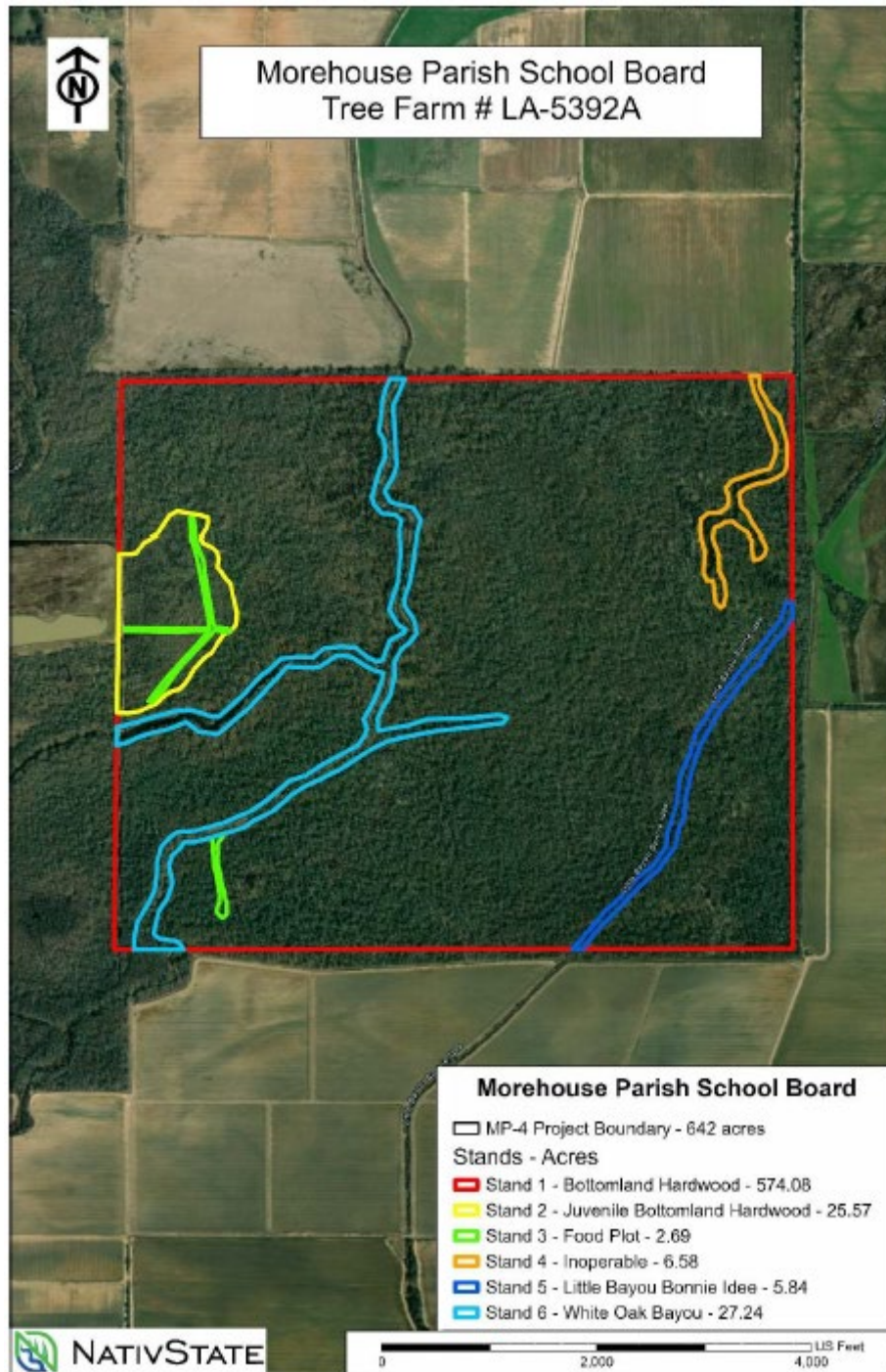
MAPS

Stand Map

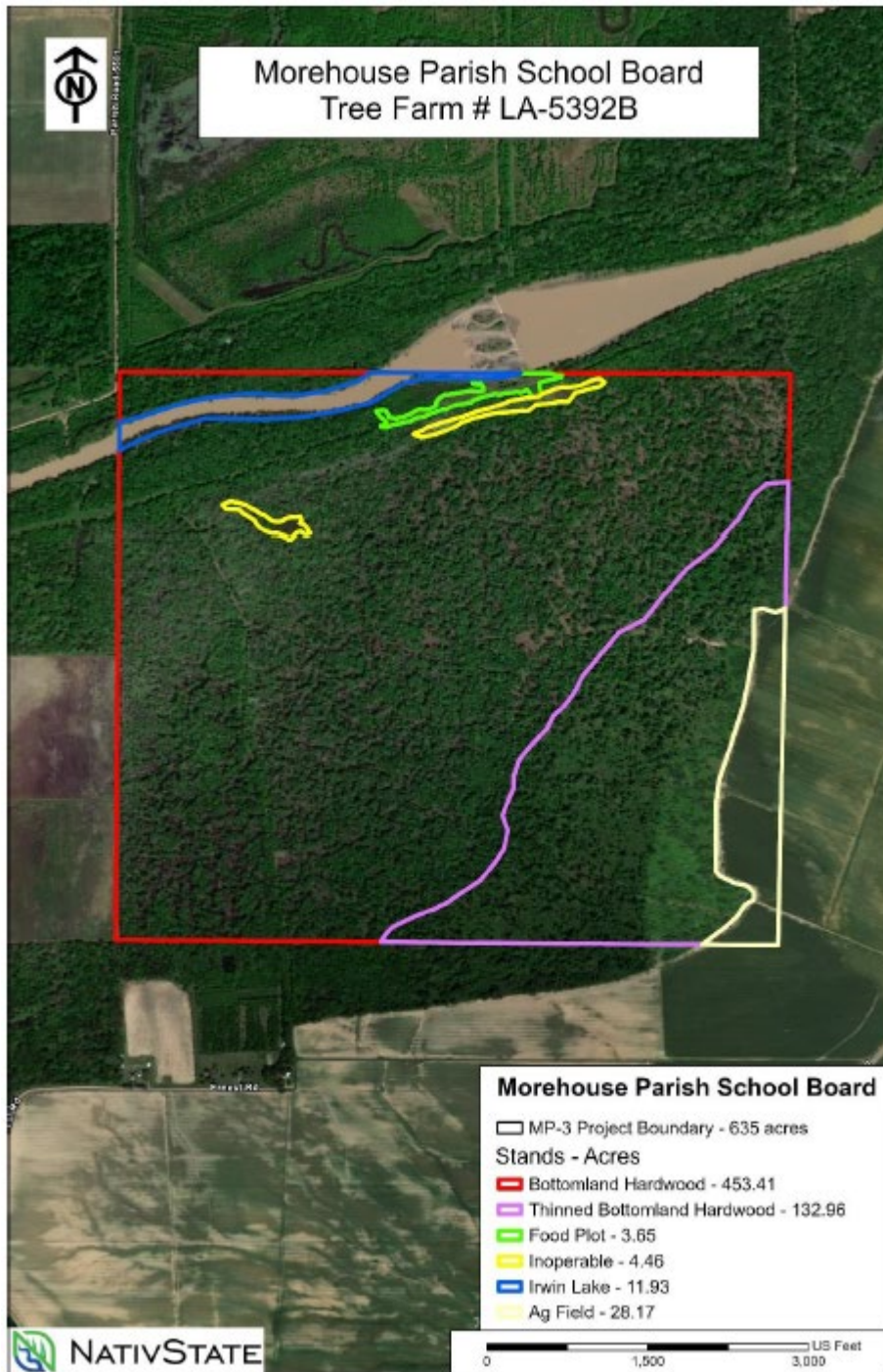
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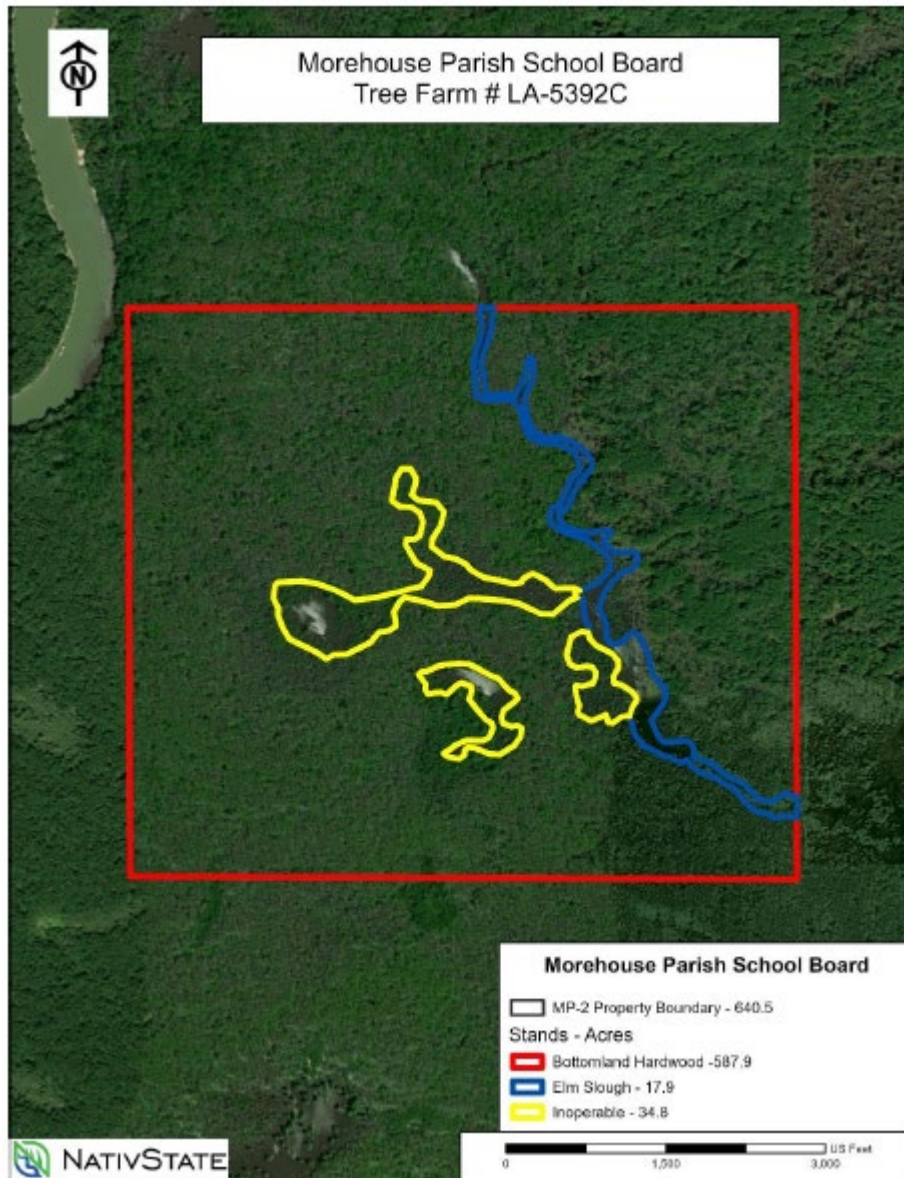
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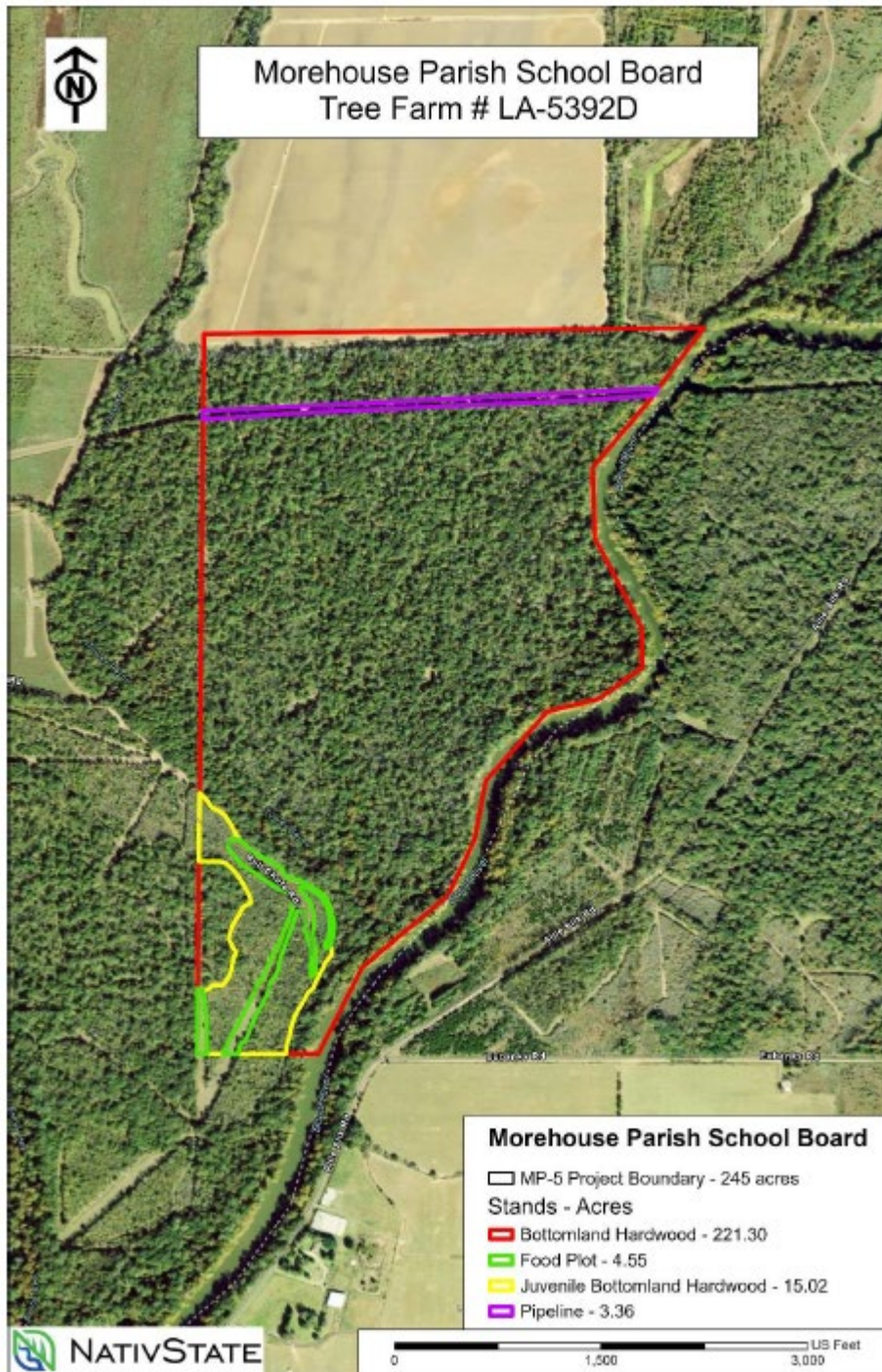
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LA-5392C



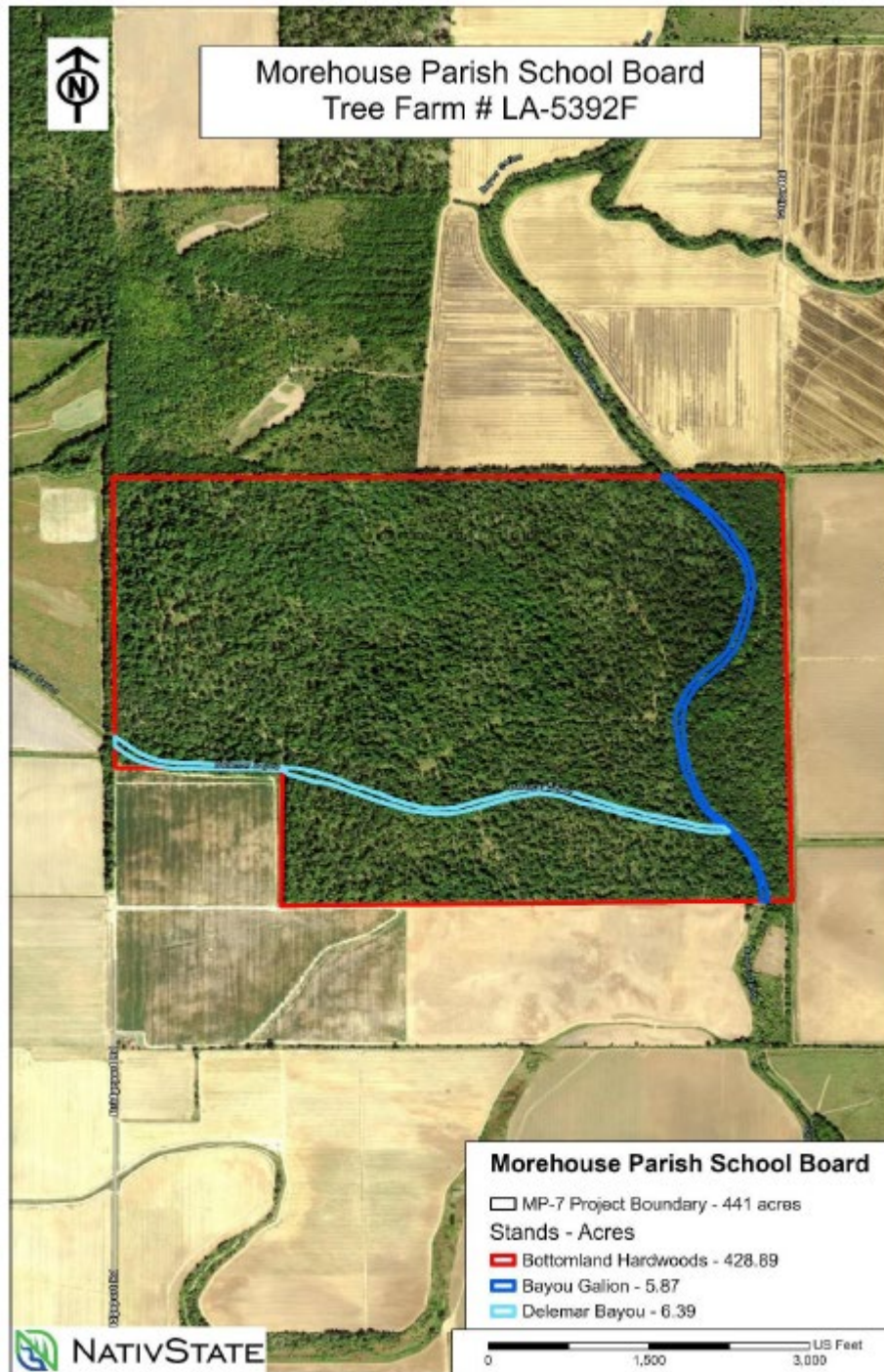
LA-5392D



LA-5392E



LA-5392F



For other maps, see the landowner's Tree Farm Management Plan.

INTRODUCTION

The Forest Management Plan for the Morehouse Parish School Board Forest is composed of a central Management Plan, produced by NativState to meet the requirements of the American Tree Farm System, this document to meet the requirements of Forest Stewardship Council (FSC) certification, and all other documents and resources which guide the management of the forest. These other documents may include growth and yield modeling, spatial data, reference documents describing standard operating practices for the forest types present on the forest, Policies and Procedures, and addenda prepared by the manager and covering various topics related to the forest.

The Management Plan is intended to guide the management of the forest in compliance with all applicable federal, state and local forestry and related social and environmental laws and regulations, and with any adopted forest certification standards.

This Management Plan will be updated periodically to reflect new forest inventory, changes in growth and productivity, environmental factors including climate change, changes in forestland ownership and tenure, or forest health. Updates may occur in the form of partial or complete revisions or addenda, and may happen at times appropriate to reflect changing conditions. The intended initial management period covered by this Forest Management Plan is from February 2024 to February 2034.

OWNERSHIP OBJECTIVES AND MANAGEMENT COMMITMENT

OWNERSHIP OBJECTIVES

For detailed ownership objectives, see the landowner's Tree Farm Management Plan.

In addition to the forestry objectives listed in the Tree Farm Management Plan, the forest is enrolled in a carbon project to generate carbon credits for sale through the voluntary carbon market. The landowner's resource manager, NativState, is the developer of this carbon project. As such, sequestration of carbon through forest growth and reduced harvest is a landowner objective.

In addition to commercial forestry objectives, management goals include maintaining and improving overall forest health and sustainability, protecting cultural and community resources, and providing economic and recreational benefit to the local communities. Planning should consider the impacts of forest management on public resources such as air, water, and climate.

FSC RESOURCE MANAGER AND LANDOWNER COMMITMENT

F&W Forestry is a Forest Stewardship Council (FSC) Group Certificate Holder for a FSC Group Certificate with multiple Resource Managers. The Resource Manager for the Morehouse Parish School Board Forest is NativState. The Certificate Holder, the Resource Manager and the owners of the Morehouse Parish School Board Forest are committed to manage this forest in conformance with the FSC-US Standard.

Reference is also made to the F&W Forestry FSC Certification Policies and Procedures, which are integral to the management of all properties within the F&W Forestry group certification, and are considered a component of this management plan.

PUBLIC FOREST

In addition to the requirements for forest management and stewardship described in the FSC-US Forest Management Standard (and the subsequent Forest Stewardship Standard), FSC places additional requirements on FSC-certified public forests. The Morehouse Parish School Board Forest qualifies as a public forest per the FSC-US definition, in that it is held in government ownership *in trust for the citizens of a city, county, state, or nation*.

The following indicators from the FSC-US Forest Management Standard describe the requirements for FSC-certified public forests:

Indicator 4.4.d For public forests, consultation includes the following components:

- *Clearly defined and accessible methods for public participation are provided in both long and short-term planning processes, including harvest plans and operational plans;*
- *Public notification is sufficient to allow interested stakeholders the chance to learn of upcoming opportunities for public review and/or comment on the proposed management;*
- *An accessible and affordable appeals process to planning decisions is available. Planning decisions incorporate the results of public consultation. All draft and final planning documents, and their supporting data, are made readily available to the public.*

NativState will deliver a full set of management plans, plus HCV and other assessments, to MPSB, and MPSB will make them available to the public in some format, appropriate to their usual processes. They will include these planning documents on a school board meeting agenda, provide an opportunity to discuss, and afterward, vote to adopt.

Indicator 5.2.c On public lands where forest products are harvested and sold, some sales of forest products or contracts are scaled or structured to allow small business to bid competitively.

This indicator is not applicable now, due to the harvest deferral of the carbon project, but when harvest is planned, timber will be sold by competitive bid.

Indicator 6.1.d On public lands, assessments developed in Indicator 6.1.a and management approaches developed in Indicator 6.1.c are made available to the public in draft form for review and comment prior to finalization. Final assessments are also made available.

All these assessments are components of the management plan and associated documents. The approach under 4.4.d above applies to this indicator.

Indicator 6.2.c For medium and large public forests (e.g. state forests), forest management plans and operations are designed to meet species' recovery goals, as well as landscape level biodiversity conservation goals.

MPSB is a medium forest per FSC definition (greater than 1000 hectares), and therefore this forest will be managed by standard silviculture involving natural regeneration, to contribute to landscape level biodiversity conservation goals, and significant habitat features will be protected per F&W's guidance on stand level habitat to align with species recovery goals.

Indicator 7.4.b Managers of public forests make draft management plans, revisions and supporting documentation easily accessible for public review and comment prior to their implementation. Managers address public comments and modify the plans to ensure compliance with this Standard.

Access to the management plan and associated documents is covered under the approach to 4.4.d above. The same process will be followed when operations are planned.

Indicator 9.2.b On public forests, a transparent and accessible public review of proposed HCV attributes and HCVF areas and management is carried out. Information from stakeholder consultations and other public review is integrated into HCVF descriptions, delineations and management.

There are no HCVs identified on the forest. The HCV assessment will be included in the set of documents delivered to MPSB and approved by MPSB.

Indicator 9.4.a The forest owner or manager monitors, or participates in a program to annually monitor, the status of the specific HCV attributes, including the effectiveness of the measures employed for their maintenance or enhancement. The monitoring program is designed and implemented consistent with the requirements of Principle 8.

FF Indicator 9.4.a Low risk of negative social or environmental impact for private family forests. Public lands must follow the requirements in Indicator 9.4.a.

Not Applicable. There are no HCVs identified on the forest.

Indicator 10.5.g All plantations on forest soils on public lands are managed to restore and maintain natural forest vegetation, structure, function, and habitats, and fully meet, at the earliest possible time, all aspects of Principles and Criteria 1-9 that are relevant to natural forests for the area.

Not Applicable. There are no plantations on the forest. Any planted stands will be managed as semi-natural forests.

GENERAL DESCRIPTION

LOCATION

The Morehouse Parish School Board Forests are located in Morehouse Parish in northeast Louisiana.

HISTORY

The region was first settled by Europeans in the early to mid-portion of the 18th century; they cleared the forests to begin the establishment of the old plantations of the south. In the mid-1800's, the upland sites on the Morehouse Parish School Board Forest were likely open farmland tilled for cotton and lowlands were likely forested with bottomland species.

There was a shift from large plantation to smaller tenant farmers after the Civil War in the mid 1800's. Most areas continued as farmland through the early 1900's to about the time of the Great Depression. At this point, many of the farms were abandoned and, through natural progression, were populated by early successional species like pine, poplar and sweetgum, then overtime gave way to oak and hickory dominated forest.

Some areas that may have been maintained as pasture or open land may have been planted in either loblolly or slash pine in the 1950's or 1960's tied to government programs to make idle land productive.

During the recent past, the forest has been dedicated to timber management and production.

The forest was re-inventoried in 2023 to develop the current plan.

Historical Conditions of the Forest Community:

Before European settlement, the Mississippi Alluvial Valley (MAV) was dominated by extensive, contiguous hardwood forests that were different in species composition and structure compared to today.

The forests were shaped by flooding, fire, and other ecological events, and by Native American use of fire to control vegetation to allow hunting and agricultural use.

Large herbivores, such as white-tailed deer, elk, and bison - indicating the presence of forest openings - were present as were large carnivores such as bobcat, cougar, and red wolf. (See southernforests.org)

LAND USES AND TRENDS IN THE LANDSCAPE

In the vicinity of the Morehouse Parish School Board Forest, the general regional trend in ownership and land use patterns, at a landscape level, is toward parcelization, agricultural use, and development of land for residential and other uses, especially where access and access to

power exist. Areas which are poorly drained and/or flood periodically are under less pressure for land use change. While this trend is not proceeding rapidly, large parcels are rare, and subdivision of larger parcels into smaller parcels occurs regularly. As these trends occur, practicing productive forest management meets new challenges, especially from neighbors unacquainted with a working landscape, and from increasing tax burdens.

Despite the non-forest use, most of the surrounding landscape in the immediate vicinity and to the west, toward the Mississippi River, is used as private non-industrial forestland or farmland. To the south and east, there is development along County and State roads.

OWNERSHIP HISTORY/TENURE/USE RIGHTS

A deed review in NativState's Surface Ownership Report found that there are no reservations pertaining to surface limitations.

The forest is enrolled in a carbon project to generate carbon credits for sale through the voluntary carbon market. The landowner's resource manager, NativState, is the developer of this carbon project.

INDIGENOUS RIGHTS

A review of the ownership records indicates no indigenous rights associated with the Morehouse Parish School Board Forest.

Louisiana has an office to address Native American Affairs and a State Archeologist. These offices, the Eastern Office of the US Bureau of Indian Affairs and several tribes (Muskogee (Creek) Nation, Eastern Shawnee Tribe of Oklahoma, Choctaw Nation of Oklahoma, Seminole Nation of Oklahoma, Quapaw Tribe of Oklahoma, and the Quapaw Nation) were contacted to determine if there are any significant resources or sites on the Morehouse Parish School Board Forest, with no response received at the time of this management plan addendum.

ROADS AND INTERNAL ACCESS

Tract LA-5392 is accessed from the west off Little Missouri Loop Road. LA-5392A is accessed from the north off of Grabault Road across adjacent private landowners.

LA-5392B is accessed from Lake Irwin Road (take parish road 5510 north to Ernest Road until it ends, then go north across the adjacent landowner to the tract), and also from the south on Lake Irwin Road to the hunting camp, then turn west across the adjacent landowner's field to the tract. LA-5392C access from the east. Main Line Road runs west into Irvin Lake Road, which continues

west unit it dead ends. Access continues west across private landowners for approximately two miles until it reaches the subject property. Access is very difficult.

LA-5392D access from the west, going east on Bull Chute Road. When it dead ends at the boat ramp, continue east across private landowner to subject property. Access is also from the north across a private landowner coming south off of Trails End Road.

LA-5392E access from the south off Kilbourne Highway.

LA-5392F access from the east off Louis White Road (go north on private road, then turn left going west across private landowner into subject property), also access from the west off Highway 165 (go southeast along Delemar Bayou across private landowner into subject property).

Best Management Practices are applied in the maintenance of the road system.

BOUNDARIES

The Morehouse Parish School Board Forest boundary lines need establishment or routine maintenance, including painting. This maintenance is recommended in the landowner's Tree Farm management plan. FSC certification requires that boundaries of activity areas be well-marked before activity occurs.

RECREATION

Recreational resources are covered in the landowner's Tree Farm Management Plan.

AESTHETICS AND OTHER SOCIAL IMPACTS OF MANAGEMENT

The aesthetic value of Morehouse Parish School Board is recognized as a social value, particularly along public county and state roads. The property is located in a rural setting consisting of bottomlands, hardwood stands, pine plantations, agricultural lands, small towns and residential development. Current views of the property from distant viewpoints are generally limited due to the forest canopy.

Roadside landings are present and fairly common in the region. Timber harvesting is reasonably common, including thinnings and clearcuts.

Forest management activities in the future will consider the impact on the social aesthetic value as part of the planning process. Examples of strategies to manage the aesthetic value include the use of visual buffers, limits on harvest unit size, and retention of trees when these activities are complimentary with the ownership and silvicultural objectives of the activity. These strategies may be used where appropriate and in-line with the owners' objectives on the forest.

In the event that there are aesthetic, cultural, historical, wildlife, riparian, soil, or other resources of such unique nature that they are not adequately protected by current F&W Forestry policies, specific experts will be consulted in order to protect the unique resource.

STAKEHOLDER CONSULTATION PROCESS

In advance of any timber harvest, a signed posting describing the planned activity will be made on the site. Key stakeholders will be notified by mail or email of the activity to include a letter describing the activity and a map showing the planned site. Key stakeholders will include easement holders, active mineral or gas owners, regulatory agencies with direct operational responsibilities, and other relevant parties as identified by the manager. Further, if there are aesthetic, cultural, historical, wildlife, riparian, soil, or other resources of such unique nature that they are not adequately protected by current Resource Manager policies, specific experts will be consulted to protect the unique resource.

CARBON STORAGE AND CLIMATE INDUCED ECOSYSTEM CHANGE

The role of forests in addressing climate changes caused by increased levels of greenhouse gases in the atmosphere is well-established by science. Trees sequester carbon through the process of photosynthesis, and carbon can thus be stored for the duration of the resulting wood and other plant tissue. As climate change accelerates and as the average atmospheric and ocean temperatures increase, addressing climate change becomes an increasingly important issue for all.

Several aspects of a forest can affect the storage of carbon. These include, but are not limited to: the inherent productivity of the site, the management practices applied, compliance with Best Management Practices, the lifespan of the wood products generated, and the success of regeneration.

Foresters and forest landowners should familiarize themselves with the influence of forest management on levels of carbon sequestration.

When making management decisions, foresters and forest landowners should consider the impact of their decision on the capacity of the forests under their stewardship to sequester carbon.

FOREST INVENTORY

DESCRIPTION OF INVENTORY PROCEDURE

The forest is enrolled in a carbon project to generate carbon credits for sale through the voluntary carbon market. The landowner's resource manager, NativState, is the developer of this carbon project. The resource manager, NativState, conducts two periodic inventories on the forest: a carbon inventory to estimate the current storage and sequestration of carbon, and a management inventory to provide data for stand descriptions and prescriptions.

Procedures for both inventories are available from NativState.

PHYSICAL FEATURES OF THE FOREST

GEOLOGY

The regional geology is characterized by a layered structure, with a mix of ancient Paleozoic rocks, Mesozoic and Cenozoic deposits, and younger Mississippi River deposits. The Mississippi flows through a tectonic basin called the Mississippi Embayment, and the younger Mississippi River deposits are restricted to this area. There are some effects from glaciation in the northern part of the region.

SOILS

Soils are described in the landowner's Tree Farm Management Plan.

Site and soil characteristics, such as slope, erodibility, origin, drainage class, depth, permeability, likelihood of sand and gravel deposits, etc., are considered in harvest and other operation planning. Soils maps and data may be used to identify site productivity and features relevant to operations such as erodibility and vulnerability to compaction.

STREAMS, WATERSHEDS, AND MAJOR WATERBODIES

The Morehouse Parish School Board Forest lies within the watershed of the Mississippi River.

LA-5392 is located within the Mississippi Alluvial Plain region of Louisiana.

LA-5392A is located within the Mississippi Alluvial Plain region of Louisiana. Little Bayou Bonnie Idee flows through the eastern portion of the property and then flows through the forest towards the Ouachita River.

LA-5392B is located within the Mississippi Alluvial Plain region of Louisiana. The Irwin Lake Diversion Canal flows through the property's northwestern portion and then through the forest towards the Ouachita River.

LA-5392C is located within the Mississippi Alluvial Plain region of Louisiana. White Brake Slough flows through the property and then flows through the forest towards the Ouachita River.

LA-5392D is located within the Mississippi Alluvial Plain region of Louisiana. Boeuf River makes up the eastern property line and then flows through the forest towards the Ouachita River.

LA-5392E is located within the Mississippi Alluvial Plain region of Louisiana.

LA-5392F is located within the Mississippi Alluvial Plain region of Louisiana. Delemar and Galion Bayou flow through the property and then flow through the forest towards the Ouachita River.

Stream gradients on the forest range from low to moderate.

Maximum stream flows occur in spring with high water on the river. Extreme peak flows can happen at any time of year, typically with storm or hurricane-related intense rainfall. Minimum monthly stream flows occur in August and September.

Forest management on the Morehouse Parish School Board Forest will have no negative effect on water quality within the forest or downstream. Forest management may cause risks to surface waters (most notably sediment and temperature) if precautions are not taken. Key point sources for sedimentation are stream crossings on skid trails, and waterbars, ditching and stream crossings on the access roads.

To address sedimentation at stream crossings on skid trails and truck roads, Louisiana Best Management Practices (BMP's) and F&W Forestry's Water Quality Policies will be followed in the construction and use of skid trails and truck roads on the forest.

The risk of elevated temperatures in surface waters will be addressed by compliance with Louisiana Best Management Practices and F&W Forestry Water Quality Policies as they relate to stream management zones.

F&W Forestry Water Quality Policies are included in the Appendix.

CULTURAL FEATURES OF THE FOREST

ARCHEOLOGICAL/HISTORIC/PREHISTORIC SITES AND OTHER CULTURAL FEATURES

Cultural resources include the artifacts and evidence of human activity on the land. Significant cultural resources are often the remains of abandoned dwellings and former agricultural or other land uses.

Known features and sites should be mapped in NativState's GIS of the property. Significant cultural resources should be avoided and protected during forestry activities. In general, protection of these features and sites may involve the following:

- Minimizing or avoiding crossings of stone walls, or using crossings which have previously breached and degraded the wall;
- Avoiding disturbance of large stone piles;
- Delineation of the immediate vicinity of foundations and other extensive features as machine exclusion areas;
- Operating equipment in the vicinity of significant sites during periods of dry ground, frozen ground and/or deep snow cover.

SPECIAL SITES REQUIRING PROTECTION

Special sites requiring protection are addressed in the landowner's Tree Farm Management Plan.

BIOLOGICAL FEATURES OF THE FOREST

GENERAL DESCRIPTION OF THE FOREST

A general description of the forest is provided in the landowner's Tree Farm Management Plan.

WILDLIFE RESOURCES AND BIOLOGICAL DIVERSITY AT THE LANDSCAPE LEVEL

A description of the wildlife resources on the forest is provided in the landowner's Tree Farm Management Plan.

Diversity of Habitats As Reflected by Forest Types

The primary habitat types on the forest (as reflected by forest types) are:

- Early Successional Habitat: consisting of recently harvested stands and supporting populations of eastern cotton tail rabbit, cotton rat, northern bobwhite quail, indigo bunting, and other early succession habitat species.
- Mature Stands: consisting of maturing and mature stands of pine, hardwood or mixed pine hardwood species and supporting populations of eastern wild turkey, white tailed deer, yellow-billed cuckoo, barred owl, and gray squirrels.
- Wetlands: these consist of beaver ponds and supporting populations of beaver, wood duck and hooded merganser.

Habitat for Species with Large Home Ranges or Affected by Fragmentation

The Morehouse Parish School Board Forest lies within a large area of relatively fragmented forest cover with natural and planted forestland, agricultural land, residential uses and small towns. As such, there is minimal habitat for species with large home ranges. Near the Mississippi River, public lands, conserved lands, and private forestland together function in this regard, although such areas are not ubiquitous in the landscape.

Rare, Threatened or Endangered Species

A description of the rare, threatened and endangered species in the area is provided in the landowner's Tree Farm Management Plan.

If rare, threatened, or endangered species are located on the forest, they will be mapped using GPS and added to the forest GIS project. Management strategies will be developed using sound science and professional advice to protect such species or natural communities. We will look to such programs as NatureServe and The Nature Conservancy for guidance when such strategies are unclear.

Critical Habitats/Significant Natural Communities:

The US Fish and Wildlife Department provides data layers for Critical Habitat and areas with conservation protections (GAP status). These data layers show no overlap with the Morehouse Parish School Board Forest. In addition, NativState foresters have identified no areas which

appear to be critical habitats or areas of significant natural communities. If other information comes to light, this management plan will be updated.

LA-5392 is bordered by a GAP Status 2 Conservation Easement - Wetlands Reserve Program (WRP) to the east and a GAP Status 2 National Wildlife Refuge to the north.

LA-5392A is bordered by a GAP Status 2 Conservation Easement - Wetlands Reserve Program (WRP) to the west.

LA-5392B is bordered by a GAP Status 2 Conservation Easement - Wetlands Reserve Program (WRP) to the north.

LA-5392C is bordered by a GAP Status 2 Conservation Easement - Wetlands Reserve Program (WRP) on all boundaries.

A portion of LA-5392D's northern boundary is bordered by a GAP Status 2 Conservation Easement-Wetlands Reserve Program (WRP)

LA-5392F is bordered by a GAP Status 2 Conservation Easement - Wetlands Reserve Program (WRP) to the west and a GAP Status 2 National Wildlife Refuge to the north.

Old Growth Forests:

The Forest Stewardship Council defines Old Growth as:

Old growth: (1) the oldest seral stage in which a plant community is capable of existing on a site, given the frequency of natural disturbance events, or (2) a very old example of a stand dominated by long-lived early- or mid-seral species. The onset of old growth varies by forest community and region. Depending on the frequency and intensity of disturbances, and site conditions, old-growth forest will have different structures, species compositions, and age distributions, and functional capacities than younger forests. Old-growth stands and forests include:

- *Type 1 Old Growth: three acres or more that have never been logged and that display old-growth characteristics.*
- *Type 2 Old Growth: 20 acres that have been logged, but which retain significant old-growth structure and functions. Forests of Exceptional Conservation Value (FECV) as "Critically imperiled (G1) and imperiled (G2) species and ecological communities." (Critically imperiled generally means five or fewer occurrences globally, and imperiled generally means six to 20 occurrences globally).*

A review of the inventory data for this forest indicates that no Old Growth forests are present on this forest.

Should Old Growth forests be identified on the forest at a later date, they will be protected from human disturbance to protect their unique characteristics.

INSECTS AND DISEASE

Forest insect pests, tree diseases, and other forest health issues are assessed and addressed at the time of management planning, operational planning, and in response to specific outbreaks. Currently the following insect and disease risks are known on the forest: southern pine beetle, Ips

beetle, black turpentine beetle, Nantucket pine tip moth, fusiform rust, annosus root rot, brown spot needle blight, and pitch canker.

INVASIVE SPECIES

Invasive plant species have the potential to invade the forest and alter its character and biodiversity. If left unchecked, invasive species can out-compete and crowd out native species through the formation of dense thickets, and they may interfere with future attempts to establish desirable regeneration.

Various control options are available and consist of manual, mechanical and chemical methods. It is recommended that invasive species control be conducted as soon as they are detected, and before any active forest management begins, unless standard management (harvest, site-prep, and reforestation) will eliminate the threats posed by invasive species.

For the Morehouse Parish School Board Forest, the primary invasive species of concern are: nonnative wisteria, kudzu, and privet.

F&W Forestry has recognized the threat posed by invasive species and has developed a policy to address the issue. That policy is included in the Appendix of this management plan.

DISTURBANCE REGIMES

Forests are naturally replaced when overstory trees die, providing growing space and sunlight to the forest floor which enables new trees to germinate and grow. Overstory trees die in many ways. Individual trees will ultimately die of old age in the absence of other factors.

Natural disturbances occur in events as small as the death of single trees, to as large as stand-replacing events. Fires, both from lightning and human sources, have had a major influence on the forest. Wind events, typically associated with thunderstorms or hurricanes, can knock trees down or damage them enough to make them more susceptible to insects, disease and fire. Other weather events include damage from ice and spring frost. In general, the larger, stand-replacing events happen at less frequent intervals.

Biotic disturbances can also be single-tree or stand-replacing events. In the early twentieth century, the Chestnut Blight eliminated the American chestnut from eastern North America. Gypsy moth and Beech-bark disease are more recent examples of biotic disturbances. Secondary insects can attack individual stems as they become stressed, damaged or otherwise weakened.

Significant disturbance factors on the Morehouse Parish School Board Forest include fire, wind events from thunderstorms or tropical systems, ice damage and root biotic disturbances coined “loblolly decline”.

Such disturbances may require immediate management response and may result in revisions to the management anticipated in this plan.

HIGH CONSERVATION VALUE FORESTS

FSC introduced the concept of High Conservation Value Forests (HCVFs) in 1999 to ensure identification and proper management of forest areas with exceptional conservation value. FSC defines High Conservation Value Forests as those that possess one or more of the following High Conservation Values (HCVs):

1. HCV forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia);
2. HCV forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;
3. HCV forest areas that are in or contain rare, threatened or endangered ecosystems;
4. HCV forest areas that provide basic services of nature in critical situations (e.g., watershed protection, erosion control);
5. HCV forest areas fundamental to meeting basic needs of local communities (e.g., subsistence, health); or,
6. HCV forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

FSC certification prioritizes the protection of these valuable forest ecosystems.

HCV's are assessed for the NativState RMU HCVF Identification and Assessment document. This document also describes the process by which high conservation values are identified and assessed. The assessment and identification is conducted by F&W Forestry Services Inc. in consultation with stakeholders, experts and other qualified parties and resources.

REPRESENTATIVE SAMPLE AREAS

FSC Criterion 6.4 states that "Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources."

FSC uses the concept of Representative Sample Areas (RSA's) to address this Criterion. RSA's are intended to:

1. Establish and/or maintain an ecological reference condition,
2. Create or maintain an under-represented ecological condition,
3. Serve as a set of protected areas or refugia for species, communities and community types not captured in other Criteria of this Standard.

To ensure that "representative samples of existing ecosystems" are protected, all forests in the F&W FSC management shall establish Representative Sample Areas as required by the FSC Standard.

RSA's for the Morehouse Parish School Board Forest are identified in the RSA Identification document. RSA designations shall be reviewed, and updated if necessary, at least at every management plan update, and at least at ten year intervals.

GROWTH/YIELD

REGULATION, LONG TERM YIELD AND GROWTH

Regulation in forestry is control over the structure of the forest to meet the owner's objectives for yield. In the case of the NativState Resource Management Unit, the yield objective is twofold:

- All members of this RMU maintain a long term objective to release capital through the harvest of high quality, financially mature sawlogs (although all have opted for a five-year deferral of any harvest, and some have opted for a 40-year deferral through a carbon contract with NativState).
- All members of this RMU also have a specific objective to sequester carbon (in addition to what would be sequestered under standard management practices) to generate carbon credits for the voluntary carbon market.

The past management history and the current distribution of age and size classes throughout the forest has an impact on both of the objectives listed above. If there is equal representation of the various age and size classes, yields will flow steadily. If the distribution of age and size classes within the forest is skewed, yields will vary through time accordingly. While the health and sustainability of the forest is not dependent upon the resulting pattern of yield, the diversity of the larger landscape is an important element in regional forest health and needs to be considered.

The regulatory goal of the Morehouse Parish School Board Forest is to prioritize carbon sequestration over timber yields for the duration of the carbon contract with NativState.

Sustained Yield Harvest Calculation

The FSC-US Standard requires that: *In FMUs where products are being harvested, the landowner or manager calculates the sustained yield harvest level for each sustained yield planning unit, and provides clear rationale for determining the size and layout of the planning unit. The sustained yield harvest level calculation is documented in the Management Plan.* (Indicator 5.6.a)

In this case, the *Sustained Yield Planning Unit* is the entire NativState RMU, as the entire RMU is considered a consolidated modeling unit by the manager.

The *Sustained Yield Harvest Level* is defined by FSC-US as: *harvest levels and rates that do not exceed growth over successive harvests, that contribute directly to achieving desired future conditions, and that do not diminish the long term ecological integrity and productivity of the site.*

Sustained Yield Harvest Level is described in the NativState SYHL Memo, which is considered a component of this management plan.

Actual harvest volumes are tracked by NativState and aligned with the SYHL calculation.

MANAGEMENT

MONITORING

The management of the Morehouse Parish School Board Forest reflects a research-based management system, data collected on the forest representing current conditions and the results of ongoing monitoring.

Ongoing monitoring addresses the following factors:

Yield of forest products harvested

Inventory is managed by the Resource Manager. The inventory tracks the actual and projected harvests of timber and species, volumes, stocking, regeneration, stand and forest composition and structure, and timber quality. Inventory is adjusted for growth and actual harvest results.

Growth rates, regeneration, and condition of the forest

This is monitored through cruising, tract inspections, and timber sale inspections. Foresters monitor: Seedling Delivery and Inspection, Preharvest, Harvest, BMP Compliance, Tract and Stand Conditions, and Roadwork.

Composition and observed changes in the flora and fauna

This is monitored through tract inspections and timber sale inspections.

Environmental and social impacts of harvesting and other operations

This is monitored through cruising, tract inspections, timber sale inspections, pesticide application inspections, and review of the appropriate Environmental and Social Risk Assessments for pesticides.

High Conservation Value Areas

HCV areas are monitored annually to ensure the maintenance and/or enhancement of High Conservation Values.

Monitoring Trends in Stand and Landscape Habitat Diversity

The diversity of managed timberlands will be monitored by assessing both within-stand and stand-to-stand diversity. Monitoring includes:

- Stand Habitat Diversity Monitoring—Currently, forest inventories collect data that can be used to characterize stand diversity. Data pertaining to tree size, tree species, tree height, canopy closure are currently being collected.
- Landscape Habitat Diversity Monitoring—Landscape habitat diversity is monitored by inclusion of landscape scale data layers in planning (such as RTE species and wetlands).

Landscape scale trends are assessed and reported at each management plan update (see the LAND USES AND TRENDS IN THE LANDSCAPE and DISTURBANCE REGIMES sections).

Monitoring Impacts on Social Values

F&W and NativState monitors the impacts of operations on social values largely through engagement with stakeholders. This includes engagement with neighbors, lease holders, rights holders and others. F&W Forestry identifies Native American groups and local communities that may hold rights applicable to the Management Unit. If any such groups exist, F&W will engage with rights holders regarding management activities that affect their rights. In the event any special sites are located on the forest, they will be mapped using GPS and added to the forest GIS project, afforded appropriate protection, and monitored during operations. F&W and NativState support local economic and social development using local processing, local services, and local value-added manufacturing.

Costs, productivity, and efficiency of forest management

This is monitored through timber harvest inspections when harvests occur.

Monitoring and Evaluation Systems

All aspects of the business are monitored on a continual but unscheduled basis. Managers are responsible for monitoring the work done by their staff and contractors. The most rigorous monitoring is conducted by operations inspection and forest inventory. Logging operations are monitored by frequent visits to the logging sites to check on safety, log quality, and adherence to the contract. Inventory projects serve to monitor the area inventoried.

F&W administers a quality control program that involves both internal operations audits and inventory audits. All three certification programs run by F&W include an internal monitoring component to insure compliance with the relevant certification standards.

SILVICULTURE

The Morehouse Parish School Board Forest will be managed under a system of deferred harvest, and then a standard program of silviculture, as described in the landowner's Tree Farm Management Plan.

SUSTAINING FOREST HEALTH AND PRODUCTIVITY

As a company, F&W Forestry believes that it has a professional and ethical obligation to recommend and implement forest practices that assure that the long-term health and productivity of the forests it manages are sustained. Maintaining the integrity of forest ecosystems, promoting biodiversity and forest productivity, and protecting critical habitat are all aspects of forest management that must be considered to assure forest health is maintained over the long term. Forest practices must also consider the larger landscape in which the forest ownership is located, and manage within the context of the regional ecosystem.

Although in most cases financial objectives, timber production and protecting forest health are entirely compatible and synonymous, situations may arise where they are not. In these situations, F&W Forestry has an obligation to advise owners against activities that are detrimental to forest health and to recommend alternatives. F&W also has an obligation to owners to advise on the financial impact to the investment of protecting forest health and sustainability.

To be sustainable, forest management must assure that future generations are not more limited in resource use options than present conditions allow. The following management principles are endorsed by F&W Forestry to assure this objective is met.

1. *Regeneration* - All harvest systems and final harvest cuts, except those where a change of land use is planned, are designed to provide for or accommodate acceptable regeneration of a healthy new stand. Specifically, forests certified under the SFI Standard are managed to comply with the following requirement: *Documented reforestation plans, including designation of all harvest areas for either natural, planted or direct seeded regeneration and prompt reforestation, unless delayed for site-specific environmental or forest health considerations or legal requirements, through planting within two years or two planting seasons, or by planned natural regeneration methods within five years.*

2. *Genetic Quality* - Tree quality and health are controlled not only by environmental factors but also genetic factors. Management decisions are therefore designed to favor vigorous, superior quality stems over lesser quality stems to assure that genetic quality is maintained. Cutting that removes only the highest quality stems for short-term financial gain, leaving a residual stand with reduced long-term potential, is strongly discouraged.

3. *Biodiversity* - Many natural forests are naturally biodiverse, with a healthy mix of tree species, plants and habitat types occurring in fairly homogeneous stands. While management is generally designed to make specific stands more homogeneous in pursuit of productivity and quality, biodiversity may be maintained within the stand and, on a forest-wide level, enhanced through regulation of the overall forest structure. Plantations are non-diverse by definition. Biodiversity may be achieved by tract-level diversity of stands or age classes. Conversion of existing healthy natural stands to plantations is discouraged. Where biologically and economically appropriate, management may recommend maintaining ecological reserves where portions of the forest are allowed to reach biological maturity rather than financial maturity to further enhance biodiversity.

4. *Wetland, Streams, and Soil Erosion* - All logging and road construction activities are conducted to have no permanent adverse impact on water quality and wetlands. Most states have established "Best Management Practices" (BMPs) as guidelines or regulations for protecting streams and wetlands, and preventing soil erosion. Standards required by F&W Forestry routinely meet or exceed state BMPs. Documented post-harvest inspections note adherence to BMPs and the quality of protection of soil and water resources.

5. *Wildlife* - Planning of forest practices and timber harvesting will include consideration of impact on wildlife populations. Where no specific ownership goal exists concerning wildlife species, and there are no endangered or otherwise regulated wildlife populations, management objectives will be to protect and preserve any critical habitat areas, to

encourage a diversity of habitat conditions that allow a diversity of wildlife species to thrive, and to control populations where appropriate to assure the carrying capacity of the forest is not exceeded and overall forest health is maintained.

6. *Cultural Resources* - Forest practices must be considered in the context of the local community and the social values the forest provides. Aesthetic impact on the surrounding community must be considered in planning forest practices. Historical public use and access to the forest, where not in conflict with management activities and landowner objectives, and when not creating undue liability exposure, should be allowed to continue. Historical sites, such as abandoned settlements, mill sites, graveyards and cellar holes should be identified and protected as appropriate. Local contractors, mills and other businesses should be employed where appropriate.

WATER QUALITY PROTECTION

Typically, if water quality degradation occurs on a harvesting operation, it is likely to occur as a result of sedimentation from roads, skid trails or landings. Another more minor, but still important, detriment to water quality is an increase in temperature.

F&W Forestry has a water quality protection policy and water quality protection guidelines that depend on the type of stream or water body. The overriding goal is to keep sediment out of the water and maintain water temperature.

HARVEST OPERATIONS

Logging is not unduly limited, although the terrain over portions of the forest can be demanding due to the wetter soils that will need to be operated under drier conditions.

Harvesting will be accomplished either by a mechanized operation. A typical mechanized operation currently utilizes a feller buncher and grapple skidders to extract the timber. The trees are usually processed on the landing with the aid of a loader/slasher. Hand crews typically fell the trees using a chainsaw. The trees are removed from the woods using a cable skidder. Landing work is often similar to the mechanized operation, but may include product separation with a person using a chainsaw. Other harvesting techniques and equipment will be used as developed over time and as appropriate to the site.

By its nature, timber harvesting is a disruptive process. Silvicultural operations may be intended to mimic a natural disturbance such as windthrow or fire. Therefore, reduction of canopy density, overstory removal and ground scarification are intended to have significant environmental impacts. Harvest operations are designed to effectively create the desired conditions of density, species composition and ground disturbance, while minimizing detrimental environmental impacts, such as erosion and sedimentation. It is acknowledged that, while these detrimental impacts can be significantly reduced, they cannot be completely eliminated in all situations.

ROAD CONSTRUCTION AND MAINTENANCE

Any necessary road construction and maintenance needs are described in the landowner's Tree Farm Management Plan.

BOUNDARY MAINTENANCE

Any necessary boundary maintenance needs are described in the landowner's Tree Farm Management Plan.

STAND DESCRIPTIONS AND MANAGEMENT

Stand descriptions and management needs are discussed in the landowner's Tree Farm Management Plan.

DESCRIPTION OF LAND CLASSIFICATION SYSTEM

The NativState uses a descriptive land classification system.

The entire tracts are called 'parcels' by NativState. NativState also refers to 'Tree Farms' (by State ATFS Program Tree Farm Number) in their management plans.

Parcels include areas delineated as 'operable' and 'non-operable'

Operable areas include productive forestland suitable for the carbon project and 50' SMZ's delineated by NativState. Operable areas are equivalent to the FSC footprint of the RMU.

Non-operable areas include all non-forest and areas too steep to be operable (40% slope or greater). These areas are excluded from the FSC footprint upon entry.

Within management plans, stands are described with common forest type descriptors such as 'bottomland hardwoods' or 'upland hardwoods'.

STAND OR TYPE DESCRIPTIONS

The following table summarizes forest stands or types for the Morehouse Parish School Board Forest.

LA-5392

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland	457.1	51.2	123.3	Oak-Hickory
Stand 2 - Juvenile Hardwood	181.1	33.3	132.5	Oak-Pine

LA-5392A

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland	574.1	70.1	78.0	Oak-Hickory
Stand 2 - Juvenile Bottomland Hardwood	25.6	0.0	0.0	Oak-Hickory
Stand 3 - Food Plots	2.7	0.0	0.0	Food Plots
Stand 4 - Inoperable	6.6	0.0	0.0	Water Grasses
Stand 5 - Little Bayou Bonnie Idee	5.8	0.0	0.0	N/A
Stand 6 - White Oak Bayou	27.2	0.0	0.0	N/A

LA-5392B

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	453.4	83.5	110.7	Oak-Hickory
Stand 2 - Thinned Bottomland Hardwood	133.0	30.0	35.0	Oak-Boxelder
Stand 3 - Food Plots	3.7	0.0	0.0	Food Plots
Stand 4 - Inoperable	4.5	0.0	0.0	Water Grasses
Stand 5 - Irwin Lake	11.9	0.0	0.0	N/A
Stand 6 - Ag Field	28.2	0.0	0.0	N/A

LA-5392C

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	587.9	88.4	122.2	Oak-Hickory
Stand 2 - Elm Slough	17.9	0.0	0.0	N/A
Stand 3 - Inoperable	34.8	0.0	0.0	Water Grasses

LA-5392D

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	221.3	78.0	91.6	Oak-Pine
Stand 2 - Food Plots	4.6	0.0	0.0	Food Plots
Stand 3 - Juvenile Bottomland Hardwood	15.0	52.8	130.0	Oak-Elm
Stand 4 - Pipeline	3.4	0.0	0.0	N/A

LA-5392E

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	475.9	78.9	82.6	Oak-Hickory
Stand 2 - Inoperable	3.6	0.0	0.0	N/A
Stand 3 - Ponds	5.2	0.0	0.0	N/A

LA-5392F

Stand Number and Description	Acres	Basal Area	TPA	Primary Species
Stand 1 - Bottomland Hardwoods	428.9	70.7	84.8	Oak-Hickory
Stand 2 - Bayou Galion	5.9	0.0	0.0	N/A
Stand 3 - Delemar Bayou	6.4	0.0	0.0	N/A

APPENDIX

MAJOR SOUTHEASTERN TREE SPECIES

Softwoods

LOBLOLLY PINE (*Pinus taeda*)

Perhaps the most important timber tree in the Southeast, both in plantations, and naturally regenerating into old fields. Used for sawtimber, pulpwood and poles.

SLASH PINE (*Pinus elliottii*)

An important timber tree in the Southeast, particularly in the lower coastal plain, Used for sawtimber, pulpwood and poles.

LONGLEAF PINE (*Pinus palustris*)

An important timber tree in the Southeast, often selected for deployment in efforts to restore pre-European settlement timber types. Used for sawtimber, pulpwood and poles.

SHORTLEAF PINE (*Pinus echinata*)

An important timber tree in the Southeast, particularly in the upper piedmont and Appalachia, Used for sawtimber, pulpwood and poles.

Hardwoods

AMERICAN BEECH (*Fagus grandifolia*)

Common throughout the piedmont primarily in bottomland or lowland areas. A timber that works well and finds uses in furniture and tool making, although it is not durable outdoors.

BLACK OAK (*Quercus velutina*)

Found on ridges in the piedmont, but in greater proportions to the north in association with red and white oak. Similar in growth and use to red oak good prices.

HICKORY (*Carya sp.*)

A number of species of nut bearing trees with ash-like leaves. The logs have a white sapwood and red-brown heartwood. It is a very tough, hard, heavy, resilient wood, which is used for tool handles, sporting goods, wheel spokes and ladder rungs, while green hickory chips are used to flavor meat in smoking and barbecuing. One species, pecan (*Carya illinoensis*), is grown commercially for nuts. Price range, however, is usually low to medium.

RED MAPLE (*Acer rubrum*)

Common on wetter lands in the coastal plain. Softer and less strong than sugar maple, it has a low hardwood price.

RED OAK (*Quercus rubra*)

Common in the piedmont. A very attractive grain and easy working characteristics make this timber popular for furniture and other quality hardwood applications where appearance is important. Has a good to excellent hardwood price.

WHITE ASH (*Fraxinus americana*)

Exists as a small proportion of many forests on the East Coast and occupies moist fertile sites. Used in furniture, sporting goods and tool handles. Price range is good to very good.

WHITE OAK (*Quercus alba*)

Common in the piedmont. An attractive, durable wood highly prized for furniture and in the manufacture of water-tight casks. Achieves good hardwood prices.

YELLOW POPLAR (*Liriodendron tulipifera*)

Present throughout the south. The timber is used for less visible furniture parts such as drawer sides and backs, and in the manufacture of plywood. Price range is average to good.

SWEETGUM (*Liquidambar styraciflua*)

Present throughout the south. The timber is used for less visible furniture parts such as drawer sides and backs, and in the manufacture of plywood. Price range is average to good.

GLOSSARY OF FORESTRY TERMS COMMON IN THE SOUTHEASTERN UNITED STATES

AGS	Acceptable Growing Stock. Trees that either are quality sawlogs or have the potential to grow into quality sawlogs (grade 2 or better).
Advance Growth	Young trees that have become established naturally before regeneration cuttings are begun, or a clear-cutting is made.
Basal Area	The area of the cross-section of a tree inclusive of bark at breast height (4.5 ft or 1.37 meters above the ground) most commonly expressed as square feet per acre or square meters per hectare. For a stand, basal area is computed from all living trees.
Biomass	The total quantity, at a given time, of living organisms of one or more species usually expressed in weight per unit area.
Board Foot	A piece of lumber one inch thick, 12 inches wide and 12 inches long or its equivalent. It is used as a volume measure of sawlogs and is commonly expressed by the thousand (MBF).
Cleaning	Elimination or suppression of competing vegetation from stands not past the sapling stage (2-4 inches or 5-10 centimeters) in diameter as measured 4.5 feet or 1.37 meters above the ground. Specifically, removal of (a) weeds, climbers, or sod-forming grasses, as in plantations or (b) trees of similar age and of less desirable species or form than crop trees which they are or may soon be over topping.
Clearcutting	The cutting method that describes the silvicultural system in which the old crop is cleared over a considerable area at one time. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding. An even-aged forest usually results.
Climax Forest	A plant community that represents for its locality and its environment the culminating stage of a natural succession. When the culminating stage is influenced by topography, it is termed a topographic climax and when maintained by regular fires, it is termed a fire climax.
Co-dominant	A tree with its crown in the upper forest canopy but less free than the dominant trees and freer and taller than the intermediates and suppressed trees. A crown class.

Coppice	A regeneration method in which standing trees are cut and subsequent crops originate mainly from adventitious or dormant buds on living stumps; but also as suckers from roots and rhizomes.
Cord	A pile of 4 foot long pieces of wood, 4 feet high and 8 feet long, occupying 128 cubic feet of space. Solid wood volume of a cord is approximately 85 cubic feet but can vary significantly. It is used as a volume measure of pulpwood, firewood and boltwood. The cord is sometimes defined by its weight equivalent. This, however, is not standardized and varies by species and by mill. The green (fresh cut) weight of a cord of hardwood is commonly 5000 pounds.
Crop Tree	A tree that forms, or is selected to form, a component of the final crop, specifically, one selected to be carried through to maturity. Also known as a final crop tree or growing stock tree.
Crown Class	Any class into which trees of a stand may be divided based on their crown development and crown position relative to crowns of adjacent trees. Commonly used crown classes are dominant, co-dominant, intermediate and suppressed.
Crown Thinning	A thinning that favors the most promising (not necessarily the dominant) stems, with due regard to even distribution over the stand by removing those trees that interfere with them. Also called thinning from above.
DBH	Tree diameter at breast height (4.5 feet or 1.37 meters above the ground).
Dominant	A tree with its largely free-growing crown in the upper most layers of the forest canopy. A crown class.
Even-Aged	The condition of a forest or stand composed of trees having no, or relatively small, differences in age, although differences of as much as 30% are admissible in rotations greater than 100 years of age.
Even-Aged Management	The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20% of the age of the stand at maturity. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration, and is

harvested. Cutting methods producing even-aged stands are clear-cut, shelterwood, or seed-tree.

Group Selection

The cutting method which describes the silvicultural system in which trees are removed periodically in small groups resulting in openings that do not exceed an acre or two in size. This leads to the formation of an uneven-aged stand in the form of a mosaic of age-class groups in the same forest.

Improvement Cutting

The elimination or suppression of less valuable trees in favor of more valuable trees, typically in a mixed, uneven-aged forest.

Individual Tree Selection

The cutting method that describes the silvicultural system in which trees are removed individually, here and there, each year over an entire forest or stand. The resultant stand usually regenerates naturally and becomes all-aged.

Intermediate

A tree of the middle canopy dominated by others in the dominant and co-dominant crown classes. A crown class.

Intermediate Cutting

Any removal of trees from a stand between the time of its formation or establishment and the harvest cut. Generally taken to include cleaning, thinning, liberation and improvement cuttings, increment felling and sometimes even salvage and sanitation cuttings.

Intolerance

Trees unable to survive or grow satisfactorily under specific conditions, most commonly used with respect to their sensitivity to shade but also to conditions such as wind, drought, salt and flooding.

Low Thinning

A thinning that favors the dominants or selected dominants more or less evenly distributed over the stand by removing a varying proportion of the other trees. Also called a thinning from below.

Overstory

The trees in a forest of more than one cohort that form the upper or uppermost canopy layer.

Preparatory Cutting

The removal of trees near the end of a rotation, which permanently opens the canopy and enables the crowns of seed bearers to enlarge, to improve conditions of seed production and natural regeneration. Typically done in the shelterwood system.

Regeneration

The removal of tree crop whether by natural or artificial means. Also the young crop itself, which commonly is referred to as reproduction.

Regeneration Cutting	Any removal of trees intended to assist regeneration already present or to make regeneration possible.
Release	Freeing a tree or group of trees from competition by cutting or otherwise eliminating growth that is over topping or closely surrounding them.
Relative Density	A measure of stand density that takes into account variations in growing space requirements of different species and tree sizes within a stand. Usually expressed as a percentage of average maximum density.
Salvage Cutting	The exploitation of trees that are dead, dying or deteriorating (e.g. because they are over mature or have been damaged by fire, wind, insect, fungi, or other injurious agents) before their timber becomes worthless.
Sanitation Cutting	The removal of dead, damaged, or susceptible trees done primarily to prevent the spread of pests or pathogens and so promote forest hygiene.
Scarification	Loosening of the topsoil of open areas, or breaking up the forest floor, in preparation for regenerating by direct seeding or natural seed fall.
Seed Cutting	Removal of trees in a mature stand to effect permanent openings in the canopy (if not done in preparatory cutting) and thereby provide conditions for securing regeneration from the seed of trees retained for this purpose. Also the first of the shelterwood cuttings.
Seed-Tree	The cutting method that describes the silvicultural system in which the dominant feature is the removal of all trees in one cut except for a small number of seed bearers left singly or in small groups, usually 8-10 per acre (20-25 per hectare). The seed trees generally are harvested when regeneration is established. An even-aged stand results.
Shelterwood	The cutting method that describes the silvicultural system in which in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive shelterwood cuttings. The first cutting is ordinarily the seed cutting, and the last is the final cutting. Any intervening cutting is termed removal cutting. An even-aged stand results.

Site	An area considered in terms of its environment as determined by the type and quality of the vegetation it can carry.
Site Index	A measure of site class based upon the height of the dominant trees in a stand at an arbitrarily chosen age, most commonly at 50 years in the East and 100 years in the West.
Stand	A community of naturally or artificially established trees of any age sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities thereby forming a silvicultural or management entity.
Stand Density	A quantitative measure of the degree of crowding of stems within a stand. Usually expressed in number of stems, basal area or crown closure.
Stocking	A relative term to describe the adequacy of a given stand density in meeting management objectives. Three levels of stocking are generally recognized: 1. "A" level stocking - The maximum stocking a stand can carry without overcrowding and the resultant loss of growth. Stands with stocking above this level are overstocked. 2. "B" level stocking - The minimum stocking a stand can carry and fully utilize the site. Stands with stocking below the "B" level are under stocked. 3. "C" level stocking - Stands that will require 10 years or less of growth to reach "B" level stocking. These stands are considered potentially adequately stocked.
Structure	Of a forest, crop, or stand, the distribution and representation of age and/or size (particularly diameter) classes and of crown and other tree classes.
Succession	The gradual supplanting of one community of plants by another.
Suppressed	One of the four main crown classes. Very slowly growing trees with crowns in the lower layer of the canopy and leading shoots not free. Suppressed trees are subordinate to dominant, co-dominant, and intermediates in the crown canopy.
Thinning	A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average

	form of the remaining trees without permanently breaking the canopy. An intermediate cutting.
Type	An aggregate of similar stands grouped together to improve statistical analysis and simplify management.
UGS	Unacceptable Growing Stock. Sound trees that either do not have the potential to make quality sawlogs, or that have some damage, disease or other conditions that make them a poor risk to survive for future management.
Understory	Trees and woody species growing under an overstory.
Uneven-Aged	The condition of a forest, crop, or stand composed of intermingling trees that differ markedly in age. In practice a minimum age difference of 25% of the length of the rotation usually is used.
Uneven-Aged Management	The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Cutting methods that develop and maintain uneven-aged stands are single tree selection and group selection.
Yield	The amount of forest produce that may be harvested periodically from a specified area over a stated period in accordance with the objectives of management.

Definitions contained in this glossary are based on those that appear in the December 1983 edition of *Silvicultural Systems for the Major Forest Types of the United States* published by the United States Forest Service, United States Department of Agriculture. In instances where definitions were not available or were not appropriate in the Forest Service publication, composites were prepared from other sources or new definitions developed.

F&W FORESTRY STATEMENT ON INVASIVE PLANT SPECIES

Original Draft: February 23, 2021

Revised: March 30, 2021

POLICY STATEMENT

F&W Forestry understands that invasive plants can pose a substantial threat to the management, health, sustainability, and economic viability of forests, agricultural lands, and water resources.

F&W Forestry understands that invasive plant species pose challenges at both the individual forest level and at the landscape level and, as such, effective solutions may require action by both the individual landowner and by institutional and/or governmental bodies to successfully address the problem.

F&W Forestry understands that invasive plants do not recognize property boundaries, that effective control measures can be prohibitively expensive, and that control strategies are evolving and have not yet been fully developed. In some cases, the complexities of the invasive plant problem can exceed the capabilities of individual landowners.

THUS, F&W COMMITS TO ...

- Follow all laws and regulations regarding control of invasive plant species.
- Provide our foresters with the tools and training necessary to allow them to recognize invasive species in the regions where they work.
- When invasive plants are recognized on F&W-managed forestland, F&W will evaluate, on a case-by-case basis, the control options available, taking into account the level of threat, the cost of control, and the likely impact of no control.
- Communicate management options and any pertinent stewardship, compliance, or environmental issues to our clients, so that they can make appropriate and informed decisions.
- Implement control measures, upon the approval of our client, and if both operationally and economically feasible.
- If control measures involve the application of herbicides; F&W will assure that herbicides are applied by appropriately trained and licensed personnel, and only according to all label instructions and precautions.
- When required by law, regulation or applicable certification program, F&W will record herbicide applications in an appropriate manner.

As to the use of mulch and seed for erosion control, F&W recognizes that while mulch and seed are commonly used to stabilize soil disturbed by logging and road building activities, such products often contain a variety of ingredients, some of which may contain the seed of invasive species.

THUS, F&W COMMITS TO ...

- Obtain from the vendor a listing of the contents of seed and mulch products.
- If required by regulation or an applicable certification program, utilize products certified by the vendor as containing only native non-invasive plant species. In other situations,

products certified by the vendor as containing only seed of native non-invasive plant species will be strongly preferred.

- If required by regulation or an applicable certification program, only hay, straw, or other matting material certified by the vendor as weed-free shall be used. In other situations, hay, straw, or other matting material certified as weed-free by the vendor will be strongly preferred over hay or other products with respect to which such certification cannot be obtained or which are known to contain invasive or unknown seed.
- Should products with non-native or invasive species seed be used, the application date, location and species will be recorded in the project file. If required, the site will be monitored for the designated period.

CERTIFICATION PROGRAM GUIDANCE

American Tree Farm (See ATF Standard 4.2)

Landowner shall consider a range of forest management activities to control pests, pathogens and unwanted vegetation.

Sustainable Forestry Initiative (See Performance Measures 2.2 and 2.4)

Performance Measure 2.2. Program Participants shall minimize chemical use required to achieve management objectives while protecting employees, neighbors, the public and the environment, including wildlife and aquatic habitats.

Performance Measure 2.4. Program Participants shall manage so as to protect forests from damaging agents, such as environmentally or economically undesirable wildfire, pests, diseases, and invasive exotic plants and animals, to maintain and improve long-term forest health, productivity, and economic viability.

To conserve biological diversity: Participation in programs and demonstrations of activities as appropriate to limit the introduction, spread and impact of invasive exotic plants and animals that directly threaten or are likely to threaten native plant and animal communities.

Forest Stewardship Council (See FSC Standard C6.3, 6.6, 6.9, and 7.1)

Indicator 6.3.h The forest owner or manager assesses the risk of, prioritizes, and, as warranted, develops and implements a strategy to prevent or control invasive species

C6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

Indicator 6.6.d Whenever chemicals are used, a written prescription is prepared that describes the site-specific hazards and environmental risks, and the precautions that workers will employ to avoid or minimize those hazards and risks and includes a map of the treatment area.

Indicator 6.9.a The use of exotic species is contingent on the availability of credible scientific data indicating that any such species is non-invasive, and its application does not pose a risk to native biodiversity. (This indicator is pertinent to erosion control seed mixes)

Indicator 7.1.f If invasive species are present, the management plan describes invasive species conditions, applicable management objectives, and how they will be controlled.

STATEMENT ON WATER QUALITY PROTECTION

Original: June 7, 2021

The health and functions of aquatic systems, the human use and enjoyment of surface water resources, and the quality and quantity of groundwater supplies all depend on clean surface waters. As a company, we believe that the production and protection of clean surface water and the production of timber are compatible systems, when forest management follows appropriate practices.

Forested landscapes provide water of outstanding quality. Forestry operations are not typically major contributors to soil erosion and water pollution, but if water quality degradation occurs during operations, it is most often caused by sedimentation and, to a lesser extent, increased water temperature. Most sedimentation originates from roads, skid trails and landings.

It is an objective of all F&W Forestry operations to protect water quality in streams, rivers, ponds, lakes, and wetlands on the forests we manage. Primary concerns are the proper construction and maintenance of roads, skid trails and landings, stream and wetland crossings, handling of slash and maintaining adequate riparian protection zones (streamside management zones).

STATEMENT ON WET SEASON/ WET SITE PRACTICES

Original Policy (Fountains Forestry): September 29, 2004

Revised Practices: June 10, 2021

F&W Forestry Services, Inc. takes appropriate steps to plan its forest management activities and operations to avoid damaging water quality and soil productivity when soils are saturated.

F&W Forestry foresters will use appropriate procedures to plan for and manage adverse weather conditions, including:

- Follow all applicable state Best Management Practices and any local regulations in the harvesting of timber and construction of road, landings and skid trails.
- Identify when soil and road conditions are not conducive to forest management and logging activities and plan such activities when conditions are more favorable.
- Schedule harvests to coincide with proper weather conditions and landowner requirements.
- Access drier and more accessible sites that can be harvested during periods of inclement weather.
- Harvest upland portions of tracts that are appropriate for wet weather conditions.
- Maintain several optional sites that can be harvested without causing excessive rutting or other environmental damage.
- Evaluate operations that may require the use of alternative logging systems or should be suspended until weather and soil moisture conditions improve.
- Construct roads during the dry season to allow them to settle and be available for later use.
- Use rock, gravel, filter fabric, tops and branches or other practices as appropriate to stabilize roads and skid trails, minimize erosion, and improve accessibility during adverse weather.

WATER QUALITY PROTECTION GUIDELINES

Revised July 2008, June 2011, June 2021

Typically, if water quality degradation occurs on a harvesting operation, it is likely to occur as a result of sedimentation from roads, skid trails or landings. Another more minor, but still important, detriment to water quality is an increase in temperature.

Our protection guidelines depend on the type of stream or water body. The overriding goal is to keep sediment out of the water and maintain water temperature. To accomplish the task, we will establish streamside management zones (SMZs). A SMZ is vegetated land adjacent to perennial, intermittent and ephemeral streams and ponds or lakes requiring special attention during forestry operations. It is an area of undisturbed forest soils between disturbed soils and a stream bank. It provides a protective zone to trap and filter out suspended sediments before these particulates reach the stream. For some bodies of water as described below, the SMZ may need to be lightly cut or uncut to protect the aquatic ecosystem. In general, the larger the body of water and the steeper the slope, the wider the SMZ must be.

Every State has Best Management Practices (BMPs) to protect water quality on logging jobs. In some States the BMPs are law. In most States they are recommended practices with varying degrees of enforcement afforded. In all cases, if the laws of the State are more stringent than the guidelines provided here, State law always supersedes these guidelines. In all cases, if protection in excess of these guidelines is necessary to achieve our overall goal of protecting water quality from sedimentation and excessive temperatures, we will provide that added protection.

Every forester will know and understand the BMPs for every State in which he/she operates. Foresters will attend BMP and water quality training and field sessions as they are available and applicable to their operating conditions. As needed in particular situations, the appropriate water quality enforcement officer should be consulted to determine the right level of water protection.

Often, ongoing operations are suspended for any number of reasons including markets, logging labor availability, season, weather, etc. When logging jobs are suspended, water quality control structures should be installed sufficient to ensure soil stability and to prevent sediment from entering water bodies.

As an example of practices related to harvest season, in the northeast, winter logging jobs come to a halt for spring “mud season”. Sometimes the harvesting is complete while at other times operations are simply suspended until ground conditions allow the operation to continue. Usually, the ground is still frozen solid when winter operations are shut down. On winter logging jobs suspended because of spring conditions or completed by winter’s end when the ground is still frozen, temporary water diversion structures will be installed if possible and as necessary. Once the snow melts, a forester will inspect the site to determine if more substantial, emergency action is necessary. If so, water diversions will be installed immediately or as soon as conditions allow. If the site is stable, permanent close out will occur within the term of the timber sale/service contract but in no case later than mid-July. On winter logging jobs, the need for waterbars or other water diversions can often be anticipated pre-harvest. Foresters should

consider pre-installing water diversions where there exists the risk of significant erosion during and after snowmelt. Resulting decisions will be recorded in the Pre-Harvest Plan.

The guidelines below refer most specifically to skid trail placement, operational buffers, etc. Road and landing location and construction should occur outside the delineated SMZs except that roads should cross streams at right angles. Culvert placement and size should closely follow BMP recommendations by the State. SMZ widths stated are a minimum. They should be increased as slope increases.

These guidelines are provided for application in areas without specific BMP requirements. Practice should follow either State BMP's or these standards, whichever is more protective.

Ephemeral Streams

Definition - Ephemeral streams are streams that flow as a result of wet weather conditions when the ground is saturated (less than 40% of the year). They disappear soon after the rain or snowmelt event has ceased. Ephemeral streams do not provide permanent aquatic habitat. Typically, ephemeral streams are not depicted on USGS topographic maps.

Operational Protection – Ephemeral streams are often difficult to find, especially under snow cover. Overall, protection is aimed at keeping machinery from skidding in them, exposing mineral soil to the next runoff. Skid trail crossings will be kept to a minimum and will be at right angles to the flow.

Intermittent Streams

Definition – Intermittent streams have well defined banks and natural channels but typically have water flow for only a portion (40%-90%) of the year. Intermittent streams do not provide permanent aquatic habitat. They are usually depicted on USGS topographic maps as a broken blue line.

Operational Protection – A 25-foot machine exclusion zone on either side of the centerline of the channel should be painted or flagged. Logging debris should be removed from the stream channel. Skid trail crossings should be kept to a minimum, will be pre-approved by the inspecting forester and at right angles to the flow.

Perennial Streams

Definition – Perennial streams have well defined banks and natural channels and have continuously flowing water most years. Perennial streams do provide habitat for aquatic plants and animals. They are usually depicted on USGS topographic maps as a solid blue line.

Operational Protection – A 50-foot buffer zone on either side of the stream channel should be flagged if the harvest will exceed the removal constraints within the buffer. Within this buffer zone, no more than 50% of the basal area should be removed in any 10-year period with the intent of always maintaining shade for the stream. A machine exclusion should be painted or otherwise delineated 25 feet on either side of the stream channel. Logging debris should be removed from the stream channel. This protection should apply to ponds smaller than 10 acres and open wetlands. All stream crossings will allow for passage by aquatic species by matching the natural stream depth, velocity, and substrate.

Large Streams/Rivers/Ponds/Lakes

Definition - Large Streams/Rivers are defined as double line streams as depicted on a USGS topographic map. Ponds/Lakes as defined here are open water bodies larger than 10 acres.

Operational Protection – A no cut, machine exclusion zone of a minimum of 25 feet is recommended and should be painted. Between this zone and 100 feet only a third of the basal area should be removed every 10 years. This zone should be flagged. Logging debris should be pulled out of the 25 foot no cut zone.

WATER QUALITY PROTECTION GUIDELINES – ROAD CONSTRUCTION

Original (Fountains Forestry): September 2004

Revised: June 2021

Typically, if water quality degradation occurs on a harvesting operation, it is likely to occur as a result of sedimentation from roads, skid trails or landings. Another more minor, but still important, detriment to water quality is an increase in temperature.

Our protection guidelines depend on the type of stream or water body. The overriding goal is to keep sediment out of the water and maintain water temperature. To accomplish the task, we will establish streamside management zones (SMZs). A SMZ is vegetated land adjacent to perennial, intermittent and ephemeral streams and ponds or lakes requiring special attention during forestry operations. It is an area of undisturbed forest soils between disturbed soils and a stream bank. It provides a protective zone to trap and filter out suspended sediments before these particulates reach the stream. For some bodies of water as described below, the SMZ may need to be lightly cut or uncut to protect the aquatic ecosystem. In general, the larger the body of water and the steeper the slope, the wider the SMZ must be.

Every State has Best Management Practices (BMPs) to protect water quality on logging jobs. In some States the BMPs are law. In most States they are recommended practices with varying degrees of enforcement afforded. In all cases, if the laws of the State are more stringent than the guidelines provided here, State law always supersedes these guidelines. In all cases, if protection in excess of these guidelines is necessary to achieve our overall goal of protecting water quality from sedimentation and excessive temperatures, we will provide that added protection.

Every forester will know and understand the BMPs for every State in which he/she operates. Foresters will attend BMP and water quality training and field sessions as they are available and applicable to their operating conditions. As needed in particular situations, the appropriate water quality enforcement officer should be consulted to determine the right level of water protection.

These guidelines refer most specifically to stream crossings. Culvert placement and size, cross drainage structures, ditch placement, etc. should closely follow BMP's. The following guidelines should be followed as closely as practically possible.

- Use stream crossings only when absolutely necessary. Keep stream crossings to a minimum.
- Cross streams by the most direct route and at right angles to the stream channel.
- Whenever possible, find crossing sites that have stable banks, a firm stream bottom, minimal surface runoff and gentle slopes on the approaches.

- Avoid direct ditch termination by using cross drainage culverts. Divert road drainage into undisturbed vegetation, preferably outside the SMZ, so that drainage does not directly enter a stream.
- Fill over a culvert or construct a bridge so it is higher than the road approach on either side to prevent surface road runoff from draining directly into the stream. If making the crossing higher than the approaches is not possible, use a broad-based dip on either side of the crossing to accomplish the same result.
- Stabilize exposed soil around culverts and bridges immediately after installation using seed and mulch (free of any non-native invasive species) and install temporary sediment control structures as necessary to control siltation.
- Generally, install stream crossings that are 2.5 times the cross-sectional area of the stream for roads that will be maintained on a regular basis and 3.5 times for infrequently maintained roads.
- Except in unusual circumstances, cross drainage culverts should be no smaller than 12" in diameter.

Most state BMP publications have a more complete discussion on the above and should be consulted prior to any road construction project.