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an equal opportunity
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January 18, 2019

The City of Savannah
P.O. Box 1027
Savannah, Ga 31419

Dear City of Savannah:

Attached is the Forest Stewardship Program management plan covering approximately 863.26 acres located in Chatham County. This plan is intended to cover management recommendations for the next 10 years.

This land management plan has been prepared for you in effort to aid you in the profitable management of your timberland resources, while improving wildlife habitat. Additionally, soil and water conservation, recreation and aesthetics are addressed.

We applaud your efforts and interest in practicing multiple resource management on this property through the Forest Stewardship Program. Our goal in the Forest Stewardship Program is to eventually certify you as a designated Forest Steward after significant progress is made in following the plan. We would like to follow up with you in the near future for possible Forest Steward designation.

It is a pleasure to work with you and we commend you for keeping this property in a good combination of multiple resource management.

Please feel free to call anytime.

Michael Hinson

Michael Hinson
Forester
912-486-0666

Kevin Lee

Kevin Lee
District Stewardship Coordinator
478-960-5219

R Zander @
gfc.state.ga.us

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LANDOWNER OBJECTIVES

The City of Savannah wishes to use applicable management techniques to improve the overall quality of the natural resources. The City of Savannah's primary objectives for the property are timber and wildlife, recreation, and aesthetics enhancing soil and water conservation with equal emphasis. The forest resources will be managed for the protection of soil and water quality, improvement of aesthetics and recreational opportunities. Timber management and wildlife management will be improved to make wise use of this resource. These resources together with those mentioned below are addressed in this plan for multiple uses.

- 1. Timber:** Pine timber recommendations will be based on 30 to 40 year rotations for quality chip-n-saw, sawtimber and poles. Thinning will be necessary to maintain timber health and quality, as well as provide periodic income. Where available, quality hardwoods will be protected for aesthetics, wildlife and water-quality.
- 2. Wildlife:** Focal wildlife species include White-tailed Deer and Wild Turkey. These game species will benefit from intermediate harvests and prescribed burning within pine stands, protection of ephemeral drainage ways (Travel Corridors), creation and maintenance of early successional areas, openings, and year round food plots. A combination of prescribed burning, mowing, fertilization, herbicide treatments, and light winter disking also will improve the quality and availability of natural forage.
- 3. Recreation:** Hunting will be the main forms of recreation. Developing landscape features for these activities will be done without water pollution or soil erosion. Timber management recommendations and wildlife habitat improvements will enhance hog and coyote hunting. The maintenance of quality forest road systems will provide additional recreational benefits.
- 4. Aesthetics:** Maintaining forest roads, picking up trash/debris, prescribed burning and creation of wildlife openings will maintain and enhance the overall visual quality of the property. Bottomlands/ephemeral drainage ways will be protected to maintain a unique habitat and travel corridor for wildlife. Native tree, shrub, and/or vine species may be planted to improve aesthetics. The installation and maintenance of firebreaks will help protect the property from damaging effects of wildfire.
- 5. Soil and Water:** Georgia's Best Management Practices for Forestry (BMP's) will be used during all future management practices such as timber harvesting, site preparation, reforestation, firebreak plowing, prescribed burning, road construction, herbicide application, and fertilization. Soil erosion and sedimentation will be reduced and/or prevented by following BMP guidelines. If erosion or sedimentation becomes a problem the landowner will consult with local, state, and federal agencies to resolve those issues.

LOCATION AND ACCESS

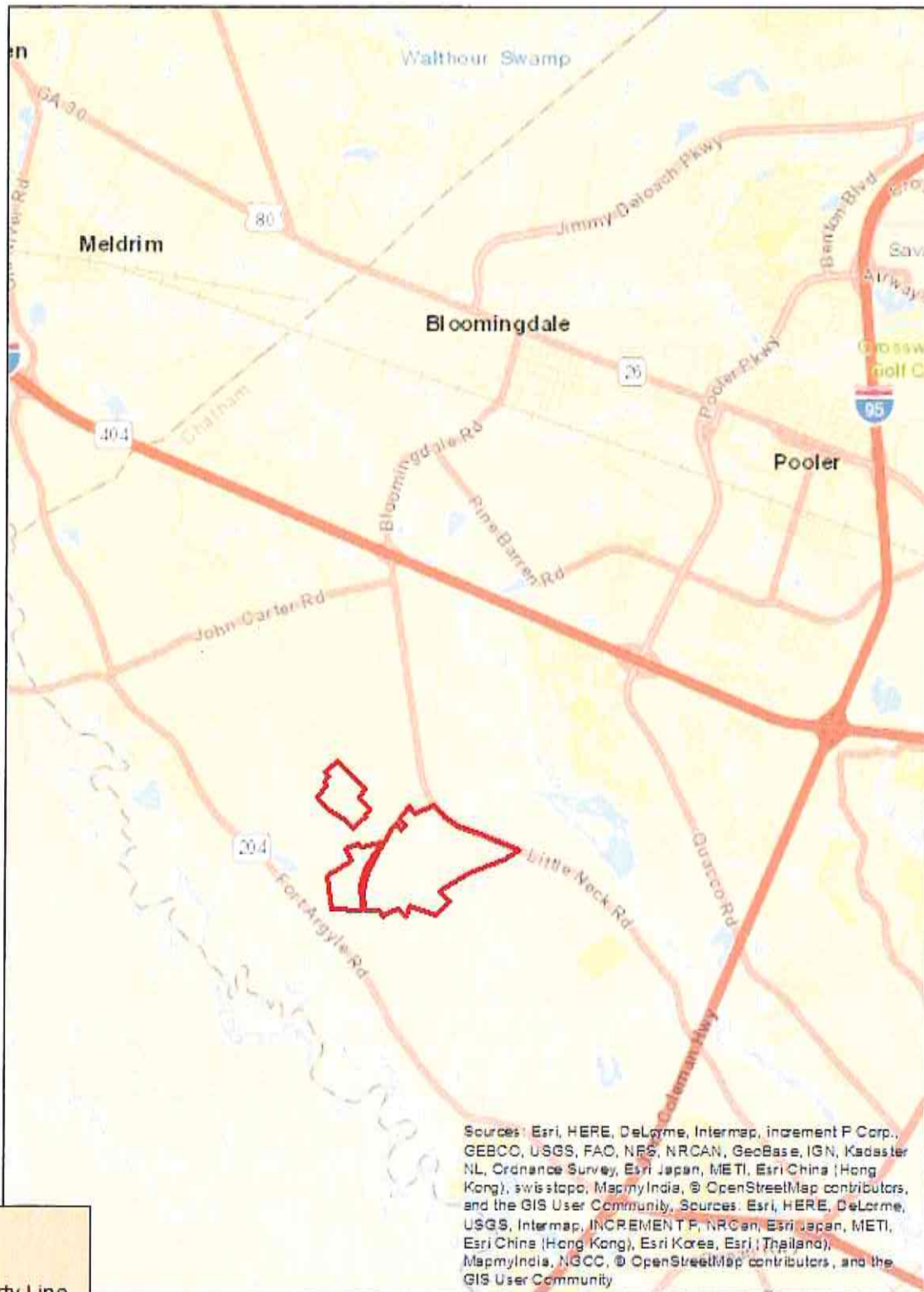
The New Hampstead Conservation area is located in North Western Chatham County, Georgia at 81° 9' 12.42" West and 32° 3' 44.75" North. If traveling West on US Highway 80 from Pooler turn left onto Cherry Street. Continue for 5.4 miles on Cherry Street and turn right onto New Hampstead Parkway Continue for 0.3 miles and one of the entrances is on the left. Over the course of ownership, it is imperative that property boundaries be clearly marked using tree marking paint and/or tree slashing. Metal or cement posts can be placed at all property corners and protected during all operations. Property boundaries should be maintained as needed. Install posted or no trespassing signs along the property perimeter and replace as needed. Place signs on posts or on land-line trees. When placing signs on trees use aluminum nails.

Public road, New Hampstead Parkway, provides access up to several gates into the property. The existing interior woods road consists of several main gate entrances and several other smaller roads throughout the property. As with any secondary woods road, increased traffic may lead to rutting and erosion. Soil erosion and rutting may be mitigated by avoiding heavy use during wet periods and installing water diversion structures where needed. Continue to resurface and stabilize road surfaces as needed. Guidance for road improvements and construction are found in Georgia's Best Management Practices for Forestry Manual. Please visit <http://gatrees.org/forest-management/water-quality/bmmps/manual/> to view the manual. On site advice is available from Matthew Mrizek, Coastal Region Water Quality Specialist Georgia Forestry Commission (GFC) at (706)-556-2149 or the Local USDA Natural Resource Conservation Service at 912-459-2350 Ext 3.



New Hampstead Conservation Area

N



Legend

Property Line

863.26 Acres
Chatham County
Georgia

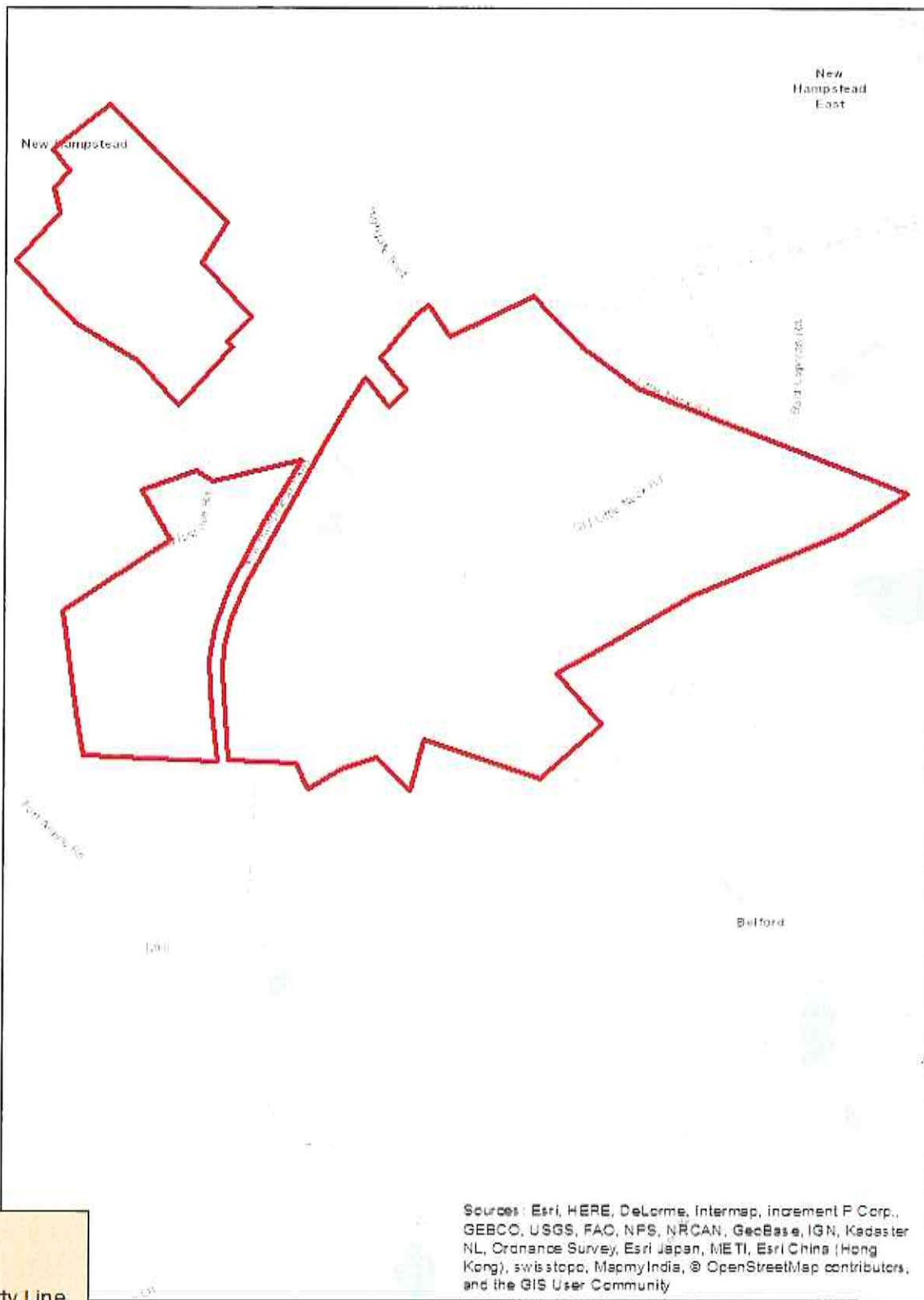
Created by Michael Hinson
January 18, 2019
NAD 1983 UTM 17N

TOPOGRAPHY


The topography of this tract is typical of the lower coastal plain with slopes ranging from 0 to 4 percent. Previous agriculture land use, old skid trails, and firebreaks have impacted tract topography. Topography on this tract should not significantly limit most management activities. A topography map illustrating the tract features is shown below.



New Hampstead Conservation Area



Legend

 Property Line

0 700 1,400 Yards

863.26 Acres
Chatham County
Georgia

Created by Michael Hinson
January 18, 2019
NAD 1983 UTM 17N

SOILS

Soil is the foundation of forest plant and animal life. Soil conservation practices are crucial in maintaining productive wildlife habitat and forestland. Forestry activities such as timber harvesting, reforestation, road development, and stream crossings have the potential to adversely affect soil productivity and degrade water quality through erosion and sedimentation. The State of Georgia has developed a set of recommended guidelines known as Best Management Practices for Forestry (BMP's) to aide landowners in all phases of land management. BMP's provide landowners with information on how to conduct various activities, while minimizing the negative impacts on soil and water. Most of the BMP guidelines are federally mandated by Section 404 of the Clean Water Act or other legislation. As a good steward of the land, BMP's should be followed during all operations. The Georgia BMP manual for forestry can be found at <http://www.gatrees.org/ForestManagement/BMPManual.cfm>.

Areas identified as hydric soils are not necessarily classified as wetlands. Other factors such as vegetation and hydrology are used in wetland determination. Federal regulations may limit certain types of disturbances in designated wetlands. Normal and ongoing silvicultural operations are exempt from permitting. However, prior to initiating a disturbance in a wetland or highly erodible soil the participant should notify the local Natural Resource Conservation Service (NRCS) and sign an AD-1026 form and have a wetland or HEL determination made. The U.S. Army Corps of Engineers should also be contacted at 1-800-448-2402. If the planned activity is establishing perennials in a wetland, a determination should be made ruling it to be converted from nonagricultural use. If food plots are planned for planting on highly erodible or hydric soils, a plan should be completed in conjunction with the NRCS before planting (to comply with the 1985, 1990, and 1995 Farm Bills). The establishment of annuals on wetland areas is prohibited. Avoid food plot establishment in wetland areas. Hydric soils found on the property are identified on the following page under the Brief Soil Description heading (highlighted in blue).


The soil map on the following page identifies the major soil types found on the property. Additional soil information which addresses the specific management concerns (erosion hazards, hydric soils, equipment limitations, road construction and maintenance, action suitability, seedling mortality, etc) may be obtained from the local USDA NRCS office 912-459-2350 Ext 3 or by visiting <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.












New Hampstead Conservation Area



Legend

 Property Line

Soil Type

 As
 Cc
 El
 Mn
 Oj
 Ok
 Ol
 Pl
 Waf

Sources: Earl, HERE, DeLorme, Lidar data, Intersect F Cores, GEBCO, USGS, FAD, NPS, NRCAN, Google, IGN, Kadaster, NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapboxIndia, © OpenStreetMap contributors, and the GIS User Community. Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 700 1,400 Yards

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Brief Descriptions of Soil Type:

As: Albany Fine Sand, 0 to 2 percent slopes- somewhat poorly drained. No frequency of flooding or ponding. Depth to water table is about 12 to 30 inches. Depth to restrictive feature is more than 80 inches. Typically found on flats. Parent material consists of marine deposits. Not prime farmland.

Cc: Cape Fear Soils, 0 to 2 percent slopes- very poorly drained. Rare frequency of flooding and no frequency of ponding. Depth to water table is about 0 to 12 inches. Depth to restrictive feature is more than 80 inches. Typically found in drainageways and depressions. Parent material consists of marine deposits. Not prime farmland.

El: Ellabelle Loamy Sand, 0 to 2 percent sloped- deep, very poorly drained soils of Coastal Plain depressions and drains. These soils have black loamy sand A horizons over thick gray sandy clay loam Bt horizons. Slopes are 0 to 2 percent. Found in depressions and drainageways in the Coastal Plain. Runoff is ponded or very slow; permeability is moderate. Water table is at or near the surface for more than 5 months each year. The forest vegetation is chiefly blackgum, cypress, red maple, water oak, willow, with a few pond and slash pines and an undergrowth of fetter bush, southern wax myrtle, and gallberry.

Mn: Mascotte sand, 0 to 2 percent slopes- poorly drained with no frequency of flooding. Typically found in flats of marine terraces, dips, and on a convex. Parent material consists of sandy and loamy marine deposits. More than 80 inches to the restrictive feature. Depth to water table is about 6 to 18 inches. Farmland of statewide importance.

Oj: Ocilla complex, 0 to 2 percent slopes- somewhat poorly drained. No frequency of flooding or ponding. Depth to water table is about 12 to 30 inches. Typically found in depressions and drainageways. Parent material consists of marine deposits. Farmland of statewide importance.

Ok: Ogeechee loamy fine sand, 0 to 2 percent slopes- poorly drained, depth to water table is about 0 to 12 inches. Depth to restrictive feature is more than 80 inches. Frequent flooding but not frequent ponding. Typically found in flats, depressions, or drainageways. Parent material consists of marine deposits. Not prime farmland.

Ol: Olustee fine sand, 0 to 2 percent slopes- somewhat poorly drained with no frequency of flooding or ponding. Typically found in flats. Parent material consists of marine deposits. More than 80 inches to the restrictive feature. Depth to water table is about 18 to 30 inches. Farmland of statewide importance.

Pl: Pelham loamy sand, 0 to 2 percent slopes- poorly drained with frequent flooding. Typically found in depressions, drainageway, and flatwoods. Parent material consists of sandy

and loamy marine deposits. More than 80 inches to restrictive feature. Depth to water table is about 0 to 12 inches. Not prime farmland.


Waf: Wahee sandy loam, 0 to 2 percent slopes- somewhat poorly drained. No frequency of flooding or ponding. Depth to water table is about 6 to 18 inches. Typically found in depressions and flats. Parent material consists of marine deposits. Not prime farmland.



New Hampstead Conservation Area



Legend

 Property Line

0 700 1,400 Yards

863.26 Acres
Chatham County
Georgia

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MULTI-USE LAND MANAGEMENT & CONCEPTS FOR GOOD STEWARDS

- All management practices should seek to mitigate the impact on the soil and water resource as well as conserve and enhance native biodiversity.
- Establish, mark, and maintain the property boundaries. For liability purposes, posted signs should be used. Try to avoid placing signs on trees, especially those with timber value. If trees must be used, aluminum nails should be used to secure the signs.
- Firebreaks should be installed around tract perimeter and within stands. Establish a prescribed burn regime. A prescribed burn should be used on a 1-3 year rotation to reduce fuel buildup, control unwanted hardwoods, and promote early successional habitat. Break stand into 15-30 acre compartments to better facilitate management. Most burns should be conducted in late winter or early spring; however, summer burns may be used as a hardwood control method. The burn should be done under very specific weather conditions. The Georgia Forestry Commission or a consulting forester can assist you with this operation.
- Conduct periodic thinnings to maintain at least 30% of ground in direct sunlight. A residual basal area of 65-75 ft²/ac is a good compromise between timber production and wildlife management. Evenly scattered slash from thinning throughout stand, and remember to retain 4-6 hardwood snags per acre where possible. Thinning more heavily within (30-120 ft) of a stand edge, along roads, firebreaks, and openings provide better access, improves fire protection, and promotes transitional habitat for wildlife.
- Retain mast-producing hardwoods during thinning in groups or stands. Oaks should comprise 1/2 of remaining trees with rest being a variety of soft-mast producers. Discourage conversion of existing hardwoods (e.g. oak, hickory, cypress) unless recommended by professional.
- Removal of cull or inferior trees for firewood is encouraged. Release of good, mast bearing trees (acorn, nut, and fruit producers) can be attained by removing any lesser valued trees that are crowding them. When harvesting trees for firewood, protect all snags 12" diameter at breast height (4.5ft above the ground) or greater for use by cavity-dependent wildlife species.
- Establish and maintain Streamside Management Zones (SMZ) following "Recommended Best Management Practices for Forestry in Georgia"; however, most wildlife benefits from wider (100-300ft) SMZ's along creeks, lake sites, and other drainages. Vehicle and heavy equipment use should be limited within the SMZ.
- When creating any new woods roads, the guidelines set forth in "Recommended Best Management Practices for Forestry in Georgia" should be followed. Water control structures, such as water bars, water turnouts, and broad-based dips, should be installed on all woods roads where needed to prevent erosion. Any new permanent woods roads, openings, or log decks should be seeded with recommended vegetation to limit erosion and create suitable wildlife habitat. All erosion control methods used should conform to USDA Natural Resource Conservation Service standards.
- On properties where game management is emphasized, strive for 5-20% of the property to be in wildlife openings or food plots. Loading decks, power line right-of-ways, adjacent roadways, firebreaks, agricultural fields, and fallow areas can be used as wildlife openings. Manage for native forages by prescribed burning, winter disking, or planting 30-50% of opening on a 1-3 year rotation. A soil sample is beneficial to determine lime and fertilizer needs. More information for game management practices can be found online at <http://www.georgiawildlife.org/>.

Scheduling Summary of Recommended Management Practices

Summary Table of Recommendations	
Year	Management/practice
2019	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Place wood duck boxes throughout the stands • Stand 5: Apply for the WINGS program through GA DNR
2020	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stand 3: Start contacting loggers or consultants to have this stand cut • Stand 6: Establish trails or picnic area (if decided to make this area recreational)
2021	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Maintain wood duck boxes as needed • Stand 3: Finish harvesting this stand
2022	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stand 3: Begin reforestation (contact GFC forester for recommendations once the stand has been cut)
2023	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Maintain wood duck boxes as needed • Stand 3: Finish reforestation in this stand
2024	<p>Contact local resource professional for Certified Steward Evaluation.</p> <ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stand 1, 4: Thin to a basal area of 70-80 ft²/acre
2025	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Maintain wood duck boxes as needed • Stands 1, 3, 4: Prescribe burn these stands
2026	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed
2027	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Maintain wood duck boxes as needed • Stands 1, 4: Prescribe burn these stands
2028	<ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed
2029	<p>Contact your resource professional for a renewal on your Forest Stewardship Plan.</p> <ul style="list-style-type: none"> • Stands 1, 3, 4: Install firebreaks and maintain the roads as needed • Stands 2, 6: Maintain wood duck boxes as needed • Stands 1, 4: Prescribe burn these stands

SPECIFIC STAND DESCRIPTIONS & RECOMMENDATIONS

Stand 1



This thinned loblolly pine stand is approximately 254.28 acres in size and has been growing for over 25 years, according to aerial imagery. This area was heavily thinned several years ago and has naturally regenerated in the understory. Tree size varies from pulpwood size to sawtimber size with very little chip-n-saw size trees. Small access roads are located throughout parts of this stand. The overstory is composed of loblolly pine and the understory is composed of loblolly pine, wax myrtle, vines, water oaks, live oaks, palmetto, and grasses. The understory is rather thick due to a lack of management after the thinning occurred.

Recommendations:

- ☒ Harvest ☐ Reforestation ☒ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☒ Road maintenance ☐ Wildlife enhancement ☒ Other

Date: Jan-2019 to Dec-2029 **Activity:** Road maintenance

- **Recommendations:** Continue to maintain the roads that are present in this stand as access points. Be sure to follow all Best Management Practices (BPMs) when doing any road maintenance.

Date: Jan-2019 to Dec-2029 **Activity:** Firebreaks

- **Recommendations:** Have firebreaks installed around this stand. This will give better access to some portions and help control a wildfire if one happens in the area. The Georgia Forestry Commission can assist with firebreak installation; their contact number is

912-858-4411. This is a great management activity to complete every year to continue to have extra access and controlling future wildfires and prescribe burns in the stand. Be sure to follow all Best Management Practices (BPMs) when doing any firebreak installation or maintenance.

Date: Jan-2024 to Dec-2024 **Activity:** Harvest

- **Recommendations:** Harvest this area using a combination of a selection method and a row thinning method. By using a selection method you can remove the larger trees that have been providing seeds for regeneration for the past several years. Also using the row thinning method to create rows throughout the stand. This will give the stand a plantation style look and achieve the objective at the same time. I recommend thinning down to a basal area of 70-80ft²/acre. This will give the residual trees more resources and less competition while leaving an adequate amount of trees to continue making the property look great and produce income in the future. Be sure to follow all Best Management Practices (BPMs) during the harvest. I recommend using a consulting forester to help with the timber sale and monitoring the harvest to be sure, all BMPs are followed.

Date: Dec-2025 to Mar-2029 **Activity:** Prescribe Burn

- **Recommendations:** Perform a low intensity burn to keep the competition under control. To achieve this burn try to do it when the temperatures are below 60 degrees, a backing fire to be sure not to scorch the pines, and only a few days after rain so the fire doesn't get too hot. Perform the burn every 2-3 years to help with competition control. Be sure to have fire breaks installed, if you do not currently have any, to contain the fire along with getting the appropriate burn permits. GFC can assist you with both firebreaks and burning at (912)-858-4411.

Stand 2



This hardwood drain area, is approximately 194.01 acres in size, borders several other stands on the property and is spread out into smaller areas. Most of the stand is considered wetlands according to the U.S. Fish and Wildlife maps. The overstory consists of bald cypress, red maple, slash pine, river birch, sweetgum and black gum. The understory contains red bay magnolia, vines, palmetto, red maple and river birch. There is little timber value in this stand but it is considered valuable for aesthetics, wildlife, and recreation.

Recommendations:

- ☐ Harvest ☐ Reforestation ☐ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☐ Road maintenance ☒ Wildlife enhancement ☐ Other

Date: Jan-2019 to Dec-2028 **Activity:** Wildlife Enhancement

- **Recommendations:** Place wood duck boxes throughout this stand to assist with the management of these ducks in the area. These boxes give the ducks somewhere to nest and lay eggs during the nesting seasons. Contact your GFC forester for possible assistance on receiving wood duck boxes for the property.

Stand 3



The loblolly seed tree cut stand is approximately 311.18 acres in size and is spread out in several areas on the tract. This stand has been going for over 25 years according to aerial imagery and has been heavily thinned. Unlike stand 1 the understory regeneration in this stand has not grown well and is still smaller in size and not close to being merchantable. The overstory consists of loblolly pine and the understory consists of loblolly pine regeneration, live oak, palmetto, wax myrtle, American holly, grasses and vines.

Recommendations:

- ☒ Harvest ☒ Reforestation ☒ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☒ Road maintenance ☐ Wildlife enhancement ☒ Other

Date: Jan-2019 to Dec-2021 **Activity:** Harvest

- **Recommendations:** Harvest this stand with a clearcut due to the size and age of the trees. This will give the best return and results for future income in this stand. If the area can be chipped while it is being logged that would be the best route to take as less standing competition will be left. Be sure to follow all Best Management Practices (BPMs) during the harvest. I recommend using a consulting forester to help with the timber sale and monitoring the harvest to be sure, all BMPs are followed.

Date: Jan-2019 to Dec-2029 **Activity:** Road maintenance

- **Recommendations:** Continue to maintain the roads that are present in this stand as access points. Be sure to follow all Best Management Practices (BPMs) when doing any road maintenance.

Date: Feb-2019 to Feb-2029 **Activity:** Firebreaks

- **Recommendations:** Have firebreaks installed around this stand. This will give better access to some portions and help control a wildfire if one happens in the area. The Georgia Forestry Commission can assist with firebreak installation; their contact number is 912-858-4411. This is a great management activity to complete every year to continue to have extra access and controlling future wildfires and prescribe burns in the stand. Be sure to follow all Best Management Practices (BPMs) when doing any firebreak installation or maintenance.

Date: Jun-2022 to Feb-2023 **Activity:** Reforestation

- **Recommendations:** Contact your local GFC forester to update site preparation recommendations if needed, as recommendations may change based on logging debris left over. Prepare the site for reforestation by applying an herbicide in the summer, between June and September, to kill hardwood, loblolly pine and other competition. Chemicals such as Imazapyr or Hexazinone and triclopyr are effective against the possible regeneration for this area. Many other chemical combinations and names are available for use in forestry. Contact a herbicide representative for exact rates of each chemical for the desired outcome. This area should then be burned between November and December to remove logging slash that was left behind and to help eliminate competition. In the winter, plant Longleaf pine on a spacing of 6 feet by 10 feet for a density of 726 trees per acre. Be sure to order the seedlings well in advance to reserve your share. There are several nurseries in the area that sells seedlings, I recommend using containerized seedlings as they produce a better survival rate than bare root seedlings. Contact the local NRCS office about cost share for replanting the harvested area. Their contact number is 912-871-2612 and ask to speak to Jason Gatch or Jessica Spaid with the NRCS. The program you will need to inquire about is the Environmental Quality Incentives Program (EQIP).

Date: Dec-2025 to Mar-2026 **Activity:** Prescribe Burn

- **Recommendations:** Perform a low intensity burn to get the competition under control and to propagate for good understory grasses and forbes. This will also help the longleaf pine grow from the grass stage into the rocket stage. To achieve this burn try to do it when the temperatures are below 60 degrees, a backing fire to be sure not to scorch the pines, and only a few days after rain so the fire doesn't get too hot. After the initial burn, plan to do a prescribed burn every 2-3 years, once the trees reach a height of 8 to 10 feet tall, until final harvest. Have fire breaks installed, if they are not already, to contain the fire along with getting the appropriate burn permits. GFC can assist you with both firebreaks and burning at (912)-858-4411.

Stand 4



The planted loblolly pine stand is approximately 20.24 acres in size and is located in two small areas. The stand appears to be over 25 years old according to aerial imagery. It appears these areas were not thinned with the rest of the property due to access. Both areas have wet spots around them or wetland areas separating them from other stands. The overstory consists of loblolly pine and the understory consists of some grasses, sweetgum, palmetto and vines.

Recommendations:

- ☒ Harvest ☐ Reforestation ☒ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☒ Road maintenance ☐ Wildlife enhancement ☒ Other

Date: Jan-2019 to Dec-2029 **Activity:** Road maintenance

- **Recommendations:** Continue to maintain the roads that are present in this stand as access points. Be sure to follow all Best Management Practices (BPMs) when doing any road maintenance.

Date: Jan-2019 to Dec-2029 **Activity:** Firebreaks

- **Recommendations:** Have firebreaks installed around this stand. This will give better access to some portions and help control a wildfire if one happens in the area. The Georgia Forestry Commission can assist with firebreak installation; their contact number is 912-858-4411. This is a great management activity to complete every year to continue to have extra access and controlling future wildfires and prescribe burns in the stand. Be sure to

follow all Best Management Practices (BPMs) when doing any firebreak installation or maintenance.

Date: Jan-2024 to Dec-2024 **Activity:** Harvest

- **Recommendations:** Harvest this area using a combination of a selection method and a row thinning method. By using a selection method you can remove the larger trees that have been providing seeds for regeneration for the past several years. Also using the row thinning method to create rows throughout the stand. This will give the stand a plantation style look and achieve the objective at the same time. I recommend thinning down to a basal area of 70-80ft²/acre. This will give the residual trees more resources and less competition while leaving an adequate amount of trees to continue making the property look great and produce income in the future. Be sure to follow all Best Management Practices (BPMs) during the harvest. I recommend using a consulting forester to help with the timber sale and monitoring the harvest to be sure, all BMPs are followed.

Date: Dec-2025 to Mar-2029 **Activity:** Prescribe Burn

- **Recommendations:** Perform a low intensity burn to keep the competition under control. To achieve this burn try to do it when the temperatures are below 60 degrees, a backing fire to be sure not to scorch the pines, and only a few days after rain so the fire doesn't get too hot. Perform the burn every 2-3 years to help with competition control. Be sure to have fire breaks installed, if you do not currently have any, to contain the fire along with getting the appropriate burn permits. GFC can assist you with both firebreaks and burning at (912)-858-4411.

Stand 5



The powerline right-away area is approximately 77.34 acres and goes through the center of the property. There is also a small gas line on one side of the powerline right-away. There is currently broomsedge grass and other grasses growing on this area. The power company has maintained it over the years, preventing it from growing up. This area cannot be managed for any type of timber management.

Recommendations:

- ☐ Harvest ☐ Reforestation ☐ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☐ Road maintenance ☒ Wildlife enhancement ☐ Other

Date: Jan-2019 to Dec-2029 **Activity:** Wildlife Enhancement

- **Recommendations:** Manage for wildlife openings by mowing and possibly planting crops directed towards deer and turkey. Reference the wildlife guidelines at the end of this plan for additional information. Contact the NRCS or GA DNR about the WINGS program. It is designed to create new wildlife lands along gas and electricity transmission lines, the project provides cash grants up to \$1,500 along with professional wildlife management advice, to eligible groups and individuals interested in managing brush control and habitat improvement on the rights-of-way on their property for a three-year period.

Stand 6



The pond area is approximately 6.21 acres in size. This area appears to have been used as a borrow pit for dirt to be used in another area. This would make a great recreation area for the public's use in the future. The area is easily accessible and can easily be maintained for recreational uses such as fishing, walking trails and picnic areas. This area is also surrounded by wetland areas therefore most of the public wouldn't wonder off onto the rest of the property.

Recommendations:

- ☐ Harvest ☐ Reforestation ☐ Rx burn ☐ Competition control ☐ Firewise
☐ Leave undisturbed ☐ Road maintenance ☒ Wildlife enhancement ☐ Other

Date: Jan-2019 to Dec-2029 **Activity:** Wildlife Enhancement

- **Recommendations:** Place wood duck boxes throughout this stand to assist with the management of these ducks in the area. These boxes give the ducks somewhere to nest and lay eggs during the nesting seasons. Contact your GFC forester for possible assistance on receiving wood duck boxes for the property. Also maintain the pond banks and keep them mowed or cleaned up for access.

MARKETS

Local timber markets in the area are in demand for pine and hardwood products. A list of products and average stumpage prices for Southeast Georgia are featured below:

Southeast/Coastal Georgia Weighted Average Stumpage Prices (\$/ton) 2nd Quarter 2018

Pine Pulpwood	\$13.88
Pine Chip-n-Saw	\$20.23
Pine Sawtimber	\$28.28
Pine Poles	\$50.59
Hardwood Pulpwood	\$8.60
Hardwood Sawtimber	\$29.39

The above prices are given for informational purposes only. Updated average prices may be obtained by contacting your local forester. The Georgia Forestry Commission (GFC) and other cooperating agencies by no means guarantee prices. Prices are subject to rapid change because of the main economic variables involved. **These prices should not be used to evaluate sales of timber.** Timber prices may vary seasonally, by tract, and timber characteristics. Tract characteristics that drive value pricing include the tract's operability, distance to mill, topography and access. Typically the idea behind a successful timber sale is to sell while markets are in an upswing. In general, smaller tracts of land often bring a lower price because of initial equipment setup costs.

Prior to selling timber consider the area to be sold, volumes, timing, and the tax implications of the sale (State ad valorem, State/Federal income taxes). It is in the best interest of landowners to utilize the services offered by an independent consulting forester (timber cruise and/or marking). For listing of consultant foresters, please visit <http://gatrees.org/resources/directories/consulting-foresters/index.cfm>. Timber cruises provide valuable information that will help determine the current products and volumes present. For a list of area timber buyers please contact your local forester or visit <http://gatrees.org/resources/directories/master-timber-harvester-buyers/>. Consult the "Selling your Timber" brochure on factors to consider prior to conducting your timber sale. Establish a timber sale contract, which includes information such as payments, method/type of harvest, contract period, BMP compliance, minimizing stump height, minimizing trash/debris, harvest restrictions, damage penalties, and any other information that you may consider vital to good stewardship on the property.

Local markets are currently in demand for pine straw. Longleaf and Slash Pine are the desired species for this market. The GFC maintains a directory of pine straw producers or feel free to visit <http://gatrees.org/resources/directories/pine-straw-producers/>. The GFC or cooperating agencies does not certify or guarantee the services of the listed contractors.

Interest in marketing pine straw often spreads rapidly by word of mouth or local advertisements, which will bring producers to your property to place bids.

Hunting leases may also be in demand for your area. Lease rates vary greatly depending on site factors such as habitat quality (evidenced by population densities), amenities, and location. Hunting leases should include a written agreement/contract with each participant, list of guidelines/restrictions, and a detailed map of the property. An example hunting lease contract is provided in the appendix.

SILVICULTURAL EXEMPTIONS DISCLAIMER

The Federal Clean Water Act, Section 404 (33 CFR Part 323.4 & 40 CFR Part 232.3), exempts normal established, ongoing silvicultural activities from the permitting process for discharges of dredged or fill material in wetlands, streams and/or other jurisdictional waters of the US. However, fifteen baseline provisions for forest road construction and maintenance in and across waters of the US (33 CFR Part 328.3 & 40 CFR Part 230.3) are mandated to qualify for the forest road exemption. The burden of maintaining silvicultural exemptions through historical activity, current activities and future plans falls on the landowner. The ultimate determination of whether activities are exempt can only be made by the USACE and USEPA.

RARE, THREATENED, and ENDANGERED SPECIES

Some species of plants and animals are protected by federal and/or state laws that are considered to be rare, threatened, or endangered. These laws exist to regulate human activities that may lead to the extinction of a species. The relative strength/health of the environment is often based on biodiversity. A greater number of species present in an ecosystem will lead to an increase in biodiversity, thus increasing the stability of the environment. Below are the listed species of concern with known occurrences in Charlton County.

If you suspect that a rare, threatened, or endangered species exists on your property, please contact the Georgia Department of Natural Resources, Non-game Conservation Section office at (770) 761-3035, 2067 Hwy. 278 SE, Social Circle, GA 30025. Updated listings and information on the status of rare plants and animals for the state of Georgia can be obtained by calling the Non-game Conservation Section office or visit <https://georgiabiodiversity.org/>

ARCHAEOLOGICAL, CULTURAL, and HISTORICAL RESOURCES

The history of human interaction with the environment is exhibited within the environment itself. Traces of history that illustrate human interaction with the environment may be of interest to future generations. Consideration of this idea proves important for preserving our archaeological, cultural, and historical resources.

No significant sites were noted during my inspection. However, future management operations such as timber harvesting, site preparation, or road construction could reveal such sites. If archaeological, cultural, or historic sites are discovered on the property please notify the State Archaeologist, Historic Preservation Division, Georgia Department of Natural Resources, 2610 Georgia Highway 155, SW, Stockbridge, GA 30281, or call (770) 389-7844.

<http://georgiashpo.org/archaeology>

CONSERVATION EASEMENTS

This tract is currently part of a conservation easement program. Conservation easements are valuable tool for landowners interested in pursuing long-term protection and stewardship of their property. Working forest conservation easements are permanent but do not affect the landowner's right to conduct harvests or other management activities. For more information on conservation easements contact the Georgia Land Conservation Program at 404-463-5715 or visit their website at <http://glcp.georgia.gov>.

ASSISTANCE AVAILABLE to LANDOWNERS

Wildlife Management



Technical assistance concerning all aspects of game and non-game management is available from the Wildlife Resources Division, Game Management Section, Georgia Department of Natural Resources, 1 Conservation Way, Brunswick, GA. 31520, (912) 262-3173. Visit their website at <http://www.gadnr.org>.

Forest Management and Protection



Assistance with all phases of forestry including forest management and forest protection are available from the Georgia Forestry Commission (GFC). The GFC along with the United States Forest Service administers the Southern Pine Beetle Prevention, Restoration, and Suppression Program (**SPBPRS**). The SPBPRS program provides cost share assistance for landowners to implement practices such as non-commercial thinning, release, prescribed burning, tree planting, and permanent buffer strips to prevent or minimize the impacts of future pine bark beetle infestations or to restore areas already impacted. **The Partners for Fish and Wildlife Program (PFW)** is jointly administered by the U.S. Fish and Wildlife Service and

the GFC. This program provides cost share assistance for Longleaf Pine planting and timber stand improvement practices. For more information on cost share assistance or forest management contact the Georgia Forestry Commission at 18899 US Highway 301 North, Statesboro GA. 30458, (912) 486-0666 or 912-681-0490. The GFC also offers services in forest protection, burning permits, firebreak plowing, prescribed burning, and seedling orders. For more information on these services contact the Chatham County GFC unit at (912) 858-441. Visit their website at www.gatrees.org or call 1-800-GATREES.

Soil Conservation and Water Quality



Technical assistance and advice on soil and water issues are available from the USDA Natural Resources Conservation Service (NRCS). The NRCS also offers technical and/or financial assistance to landowners through the Environmental Quality Incentives Program (EQIP), and Wetlands Reserve Easement (WRE). These programs target conservation and improvement practices for both forestry and wildlife. Cost share practices include: afforestation, reforestation, timber stand improvement, invasive species control, rehabilitating forest roads, preventing soil erosion, preventing stream sedimentation, and habitat improvement for game and nongame species. For more information on these programs, please contact the NRCS Service Center at 185 Richard R Davis Drive, Richmond Hill, GA 31324 or call 912-459-2350 EXT 3. Visit their website at <http://www.nrcs.usda.gov>.

Farm Services



The United States Department of Agriculture Farm Service Agency (FSA) offers up to 90 percent cost share for establishment of Longleaf Pine, a \$100.00 per acre sign-up incentive, and an annual lease payment for 10 years under the Conservation Reserve Program (CRP) Longleaf Pine Initiative. This CRP only applies to agricultural land that has been cultivated in recent years. This may be an excellent reforestation avenue for acreages previously used in row crop agriculture. If interested, please contact the USDA FSA office at 151 Langston Chapel Road Statesboro, GA 30458-3751, or call (912) 871-2600 EXT 2. Visit their website at <http://www.fsa.usda.gov>.

Forest Stewardship and State or Federal Cost Share Programs



Landowners participating in cost share programs offered by state and federal agencies incur certain obligations by receiving financial assistance. They must enter a signed agreement, stating not to begin practices until their application has been approved in writing. Practices must be implemented as outlined by the appropriate resource professional and each practice must be maintained by the landowner at his/her expense for the duration of the contract. All interested landowners should carefully research these programs and the obligations they impose prior to making a decision to participate.

Additional Information and Assistance



THE UNIVERSITY OF GEORGIA
COLLEGE OF AGRICULTURAL & ENVIRONMENTAL SCIENCES

Publications and assistance on a wide variety of natural resource management topics and soil analysis to determine fertilizer and lime requirements are available from the University of Georgia Cooperative Extension Service at 124 Bull St, Suite 120, Savannah, GA 31401 or call (912) 652-7981. Visit their website at <http://www.extension.uga.edu>.

Service Vendors

Management services such as site preparation, tree planting, timber stand improvement, harvesting, herbicide applications, food plot installation, vegetation management, and road construction/maintenance are often contracted with private vendors. A list of vendors and their services are included in the appendix. This list is not all inclusive; please feel free to seek out other vendors in your area. For an updated list visit the following website <http://gatrees.org/resources/directories/forestry-services-contractors/>. The Georgia Forestry Commission (GFC) and other cooperating agencies by no means guarantee the services provided by the listed vendors.

Registered Consulting Foresters

At times landowners may require services offered by an independent/private consulting forester. Consultants typically assist landowners with timber cruises, timber marking, timber sales, contracts, timber trespass appraisals, and general forest management. A list of registered/certified consulting foresters is located at <http://gatrees.org/resources/directories/consulting-foresters/index.cfm>. Please note that the list is not all inclusive, feel free to contact other consultants in your area. The Georgia Forestry Commission (GFC) and other cooperating agencies by no means guarantee or certify the services of the consultants listed.

GENERAL WILDLIFE & TIMBER MANAGEMENT RECOMMENDATIONS

Thinning

To manage forestland for deer and turkey habitat, pine stands should be thinned to a basal area of 60 to 70 ft²/acre. For Bobwhite Quail management, a basal area of <50 ft²/acre is preferred. These basal area recommendations will allow approximately 35% sunlight to reach the forest floor at noon for deer/turkey, and at least 50% for Bobwhite Quail.

A good compromise between deer/turkey and Bobwhite quail management is to thin more heavily along the edges of stands and leave the interior at a higher basal area (60-70 ft²/acre). Thinning heavily (< 50 ft²/acre basal area) around the stand edges (particularly those adjacent to wildlife openings and/or agricultural fields), allows greater development of herbaceous understory vegetation. Bobwhite Quail rely on an herbaceous rather than woody understory for their habitat requirements.

In areas with low Annosum Root Rot potential, thinning operations should occur during the winter months. Winter thins will help minimize the potential for pine bark beetle infestations and will avoid disturbance during the primary nesting season. Soil disturbances resulting from winter thins will promote Beggarweed, Ragweed, Partridge Pea, and other natural/beneficial understory vegetation.

An understory vegetation management program should be implemented one to two years after thinning. The waiting period allows time for added bark growth and logging slash time to dry/decompose. The added bark growth will provide greater protection for the trees if prescribed burning is used. A combination of prescribed burning, rotational disking, mowing, and/or herbicide applications can be used to manage understory vegetation. Without an understory management program, pine stands provide poor to moderate habitat for wildlife. For large tracts, program areas may be divided up into smaller management units (15-30 acres).

Prescribed Burning



The use of prescribed fire serves as a cost-effective method of managing understory vegetation in forest stands. Prescribed burning sets back woody species, increases browse production, legume abundance, and insects used for wildlife food. Prescribed burning is a common technique used to control Brownspot Needle Blight (disease of Longleaf Pine) or to stimulate Longleaf Pine to progress out of the grass stage. Prescribed burning can be used to improve access within a stand. Prescribed burning can be used after thinning to reduce logging slash and promote forage production. Back fires conducted during the winter months (November-February) help promote browse and fruit production. Growing season or summer burns can be used to control hardwood competition or to promote wiregrass seeding. However, spring/summer burns have the potential to reduce nesting success for quail and other ground nesting species. As a general rule, divide stands

into management compartments of about 15-30 acres in size and burn on a 2 to 3 year rotation. Landowners are encouraged to work closely with the Georgia Forestry Commission or a consulting forester to develop a prescribe burn plan, which integrates both fire and smoke management.

Disking or Harrowing

Early successional habitat may be maintained by rotational disking every 2 to 3 years. Disking in winter (November-February) will encourage the establishment of plants beneficial to wildlife, such as Partridge Pea, Beggar weed, and Ragweed. Avoid soil disturbances in late spring or summer because this will promote unwanted species such as Coffee Weed/Sicklepod, Showy Crotalaria, and Johnson grass. Disking can be used in forested areas, field borders/edges, crop fields, and wildlife openings. Single-pass disking between pine rows with a small harrow (< 8 ft. width) after the third growing season will help promote early successional species within planted pine stands. Disk approximately 1/3 of the total area each year to create a tiered habitat. Be sure to disk no more than 2 inches deep and stay in the center with a single pass, to avoid tree and/or root damage.

Mowing

Mowing can be used as a single practice or in conjunction with prescribed burning to control competing vegetation, increase forage production, modify travel corridors, food plot preparation, and access improvement. Mowing helps promote insect abundance and diversity which many species of wildlife use for food. Mowing areas that have established grasses (Bahia) often creates a dense root mat that may suppress other beneficial vegetation (in this case use in conjunction with an approved herbicide such as Poast or Fusilade).

Escape Cover

Escape cover is often overlooked in the management of planted pines and food plots. Escape cover serves as a crucial habitat component for all types of wildlife. This type of cover consists of grasses, weeds, shrubs, vines, trees, etc. Small patches of escape cover (20-30' in diameter) should be spaced approximately 300 feet apart within wildlife openings or newly planted pine stands. The key to establishing and maintaining escape cover is to let Mother Nature do the work. Utilize areas that already have blackberries, wild plum, etc. Be sure to identify/reserve these areas and incorporate them into your management plan.

Roadways



Roads are an essential component in active ecosystem management. Roads provide access to the property and are often used by wildlife. Consider managing a 15 to 30 foot strip on one or both sides of the road for early successional vegetation (transition zones). This will benefit many different species of wildlife by promoting connectivity. This early successional habitat will provide excellent insect production and cover areas for young turkey and quail. These strips will also help the road dry

faster, improve access, and serve as a natural firebreak. In most cases, strips may be installed using small farm implements. If thick/heavy vegetation is present wait until there is timber-harvesting activity and have the equipment operators remove the timber along the edge of the road.

Managing Field and Forest Borders

The management of field and forest borders as a "transition zone" is a useful tool in promoting many different species of wildlife. A zone of approximately 20-30 feet between an opening and the forest can be easily managed for intermediate/transition vegetation types. The easiest way to manage borders is to mow or disk every 2 years and prevent vegetation from becoming too large. Forest edges may also be thinned inward 20-30 feet to promote the development of certain shrub species. Transition zones may also be planted with soft mast producing species such as: Chickasaw Plum (*Prunus angustifolia*), Hog Plum (*Prunus umbellata*), Hawthorn (*Crataegus* spp.) Huckleberry (*Gaylussacia* spp.) Yaupon Holly (*Illex vomitoria*), and American Holly (*Illex opaca*). These species provide food and an excellent source of cover for a large variety of wildlife.

Wildlife Openings and Food Plots

Structural diversity (horizontal and vertical) within a landscape benefits many species of game and non-game wildlife. Certain species of wildlife such as deer, turkey, quail, and rabbit, can be classified as "edge dependent" species. Some species are found exclusively in edge habitat. Edges provide food, nesting cover, and escape cover that may be unavailable in forest/field interiors. The creation and maintenance of wildlife openings is an excellent way promote edge dependent species. Wildlife often use openings for feeding, dusting, breeding, and loafing. In addition, openings may serve as wildlife viewing areas. Landowners are encouraged to establish and maintain at least 3 percent of their land for wildlife openings/food plots.

Size, Shape, and Distribution

Wildlife openings and food plots should be large enough to receive direct sunlight for at least 5 hours a day. Direct sunlight is essential for germination and growth of native and cultivated vegetation. Be sure to consider the potential growth of surrounding vegetation when you are choosing the size, shape, and location of wildlife openings. For example an opening may receive adequate sunlight in a 3 year old stand, but may become completely shaded out when the stand reaches 10+ years of age. A wildlife opening should be large enough to support the target species within the area (to prevent over browsing). The area should be large enough to support/benefit wildlife for the duration of the planned period. Depending on the target species, wildlife openings should be between 1 and 5 acres in size. Openings that are considerably larger may not be utilized by wildlife over the entire area and remember that costs increase with size. Openings should be created in a manner that maximizes the amount of available "edge". Irregular shaped, narrow, and rectangular openings provide more "edge" than round or square openings. Sections of firebreaks may be widened to 40-60 feet to create excellent wildlife openings. Openings

should be distributed throughout the property and be accessible by wildlife from any portion of the tract. Particularly good locations are where two or more different habitat types meet (such as where a pine stand joins a hardwood stand). Other possible locations include beetle kill areas, loading decks, and right-of-ways. Avoid areas that have a high erosion potential or may become flooded for extended periods. To discourage poachers, wildlife openings should not be visible from a public road or readily accessed by public road or right-of-way.

Management Techniques

Areas selected as permanent wildlife openings should be cleared, disked, soil tested, and fertilized/limed according to soil test results. Disking is especially important on compacted sites such as logging decks, skid trails, haul roads, or areas with thick/established root mats. Management techniques beyond this point depend on the objectives of the landowner. Openings may be left fallow to produce native vegetation or wildlife food plot plantings may be cultivated. Remember that permanent wildlife openings will require periodic maintenance such as burning, mowing, disking, reseeding, fertilizing, or a combination of techniques.

Prescribe burning serves a cost effective method used to maintain wildlife openings and also promotes many different species of native vegetation. Mowing can be utilized to encourage seed and insect production, and maintain structural diversity. Alternate mowing on a three year rotation serves to maximize the available edge and habitat diversity.

Disking is a simple and quick method used to establish native vegetation, food plot crops, or areas of early successional habitat for wildlife. The timing of soil disturbance will determine what types of native vegetation that will emerge. Rotational disking during the winter months (October- February) helps promote the most desirable native vegetation used by wildlife. Disking may also be conducted at other times of the year. However summer disking typically promotes undesired species such as Sicklepod (*Senna obtusifolia*) and Showy Crotalaria (*Crotalaria spectabilis*). When disking to promote early successional vegetation, only disturb the top 2-3 inches of soil. Light disking will encourage vegetation growth and allow bird species to access exposed seeds and insects. A 2-3 year rotation is commonly used to manage wildlife openings and field borders (disk 1/3 of the area each year). Avoid disking on areas with high erosion potential. **Also, avoid using rotational/light disking on areas with Bermuda or Bahia grass.** The removal of these grasses will be necessary to achieve optimal results (repeated treatments of approved herbicides will help control these pests). Prescribed fire or spot treatments with an approved herbicide can be used to reduce unwanted hardwoods within the area. Periodic fertilization can be used to promote growth and increase palatability of the vegetation.

Winter disking (October-February) will encourage the following: Lespedezas (*Lespedeza* spp.), Beggarweeds (*Desmodium* spp.), Milk peas (*Galactia* spp.), Butterfly Pea (*Centrosema virginianum*), Partridge pea (*Cassia fasciculata*), Ragweed (*Ambrosia artemisiifolia*), Panic grasses (*Panicum* spp.) and Foxtail grass (*Setaria* spp.)

Spring disking (April-September) will encourage the following: Florida Pusley (*Richardia scabra*), Pokeberry (*Phytolacca americana*), Doveweed (*Croton glandulosus*), Woolly Croton (*Croton capitatus*), and Morning Glory (*Ipomoea* spp.).

Wildlife openings planted to benefit white-tailed deer and turkey can provide either warm-season or cool season nutritional benefits. Warm-season typically refers to the period of late spring, summer, and early fall. Cool-season typically refers to the period of late winter and early spring. Warm-season food plots are important to deer and turkey (especially fawns and poults) as they are putting on fat reserves for the upcoming fall and winter. Cool-season food plots are even more important because they provide a supplemental food source while the supply of natural browse is at its lowest point. Mating quickly depletes energy reserves in deer, thereby increasing the need for a dependable supply of food during late winter. Turkeys also need dependable food supplies in preparation for the upcoming spring mating period. However, in any case wildlife plantings are by no means a substitute for sound management of existing native vegetation (trees, shrubs, vines, forbs and grasses).

Common Cool Season Food Plots

Crimson Clover Plot

Crimson Clover is a leafy, reseeding, winter annual legume that grows 10-15 inches tall and is foraged by deer, turkey, rabbits, and quail. Native to the Mediterranean region, it is distinguished by crimson flowers with round yellow seed. It is generally available for a shorter period of time than other clovers, but is more acid-tolerant than most legumes, and has an excellent soil building capacity. Improved varieties are Tibbee, Chief, and Dixie. Production periods are from late November to early April.

Remember to obtain soil test results before planting! Soil pH should be between 5.8 and 6.5. Phosphorus and potassium levels should be maintained per soil test recommendations. An application of one pound of boron with a phosphorus and potassium fertilizer will increase seed production. Apply 60-80 lbs of phosphorus and potassium per acre after plants are established. Planting does well with 300-400 lbs of 0-10-20 or 0-20-20 per acre. Planting dates are from September 15 through October 15. Be selective about planting dates. Try to target planting times when soil moisture is adequate for seed germination. Be sure to inoculate clover with the appropriate inoculant or buy pre-inoculated seed stock. Broadcast 20-30 lbs of inoculated seed per acre. Be sure to use reseeding varieties. Cover seeds to 1/4 inch with a cultipacker or drag. Clover may be used alone or in a mixture with wheat and/or ryegrass. If seeding with wheat or ryegrass mixtures use 20 lbs/acre and plant mid-September to mid-October.

Ryegrass

Plant this grass September through early November. It is of course best on fertile soils, but will tolerate just about anything, including poorly drained areas. Broadcast about 20-40 lbs/acre of seed. In mixtures, use 10-15 lbs/acre. Cover seed lightly with 1/4 inch of soil. Apply fertilizer and lime according to soil test or broadcast 400-500 lbs/acre of 10-10-10 at planting. A second application at 40 lbs/acre of nitrogen may be necessary in February. Maintain a soil pH of 6.0 by applying 1-2 tons of lime per acre.

Ryegrass and Crimson clover make a good fall to spring combination planting on well-drained soils, and can be readily maintained by disking or mowing and fertilizing each September. Other annual clovers, winter peas, and small grains also do well with ryegrass.

Rye

Rye is a small-grain annual which is utilized by quail, turkey, deer, and rabbit. Rye can be established on a wide variety of soils especially well drained upland types. Planting dates range from September through December and will provide browse and cover into the following spring.

Prepare seedbed by disking and drill or broadcast plant 40 lbs/acre. Cover seed with 1 inch of soil and roll/cultipack. Apply 500 lbs/acre of 10-10-10 before or soon after planting to increase production and nutrient levels. Annual cool-season clovers, winter peas, and other small-grains may be planted in conjunction with Rye. Mowing and food plot herbicide applications may be used to combat weed pests.

Alfalfa

Alfalfa is a perennial legume which provides a highly nutritional and palatable browse used by deer and rabbits. Alfalfa also provides ideal nesting habitat, insect production, seeds, and foliage for turkey. This plant is considered drought tolerant and can be established on well drained fertile soils. Planting dates range from September to October.

Start preparing soil in early to mid summer and allow area to remain fallow until time of planting. Plant 20 lbs/acre using a cultipacker-seeder. Fertilize and lime according to soil test results, as Alfalfa requires a strict line of management to reach peak production potential. Alfalfa will not tolerate acidic soils, so be sure to maintain pH levels above 6.5. Alfalfa performs best as a stand alone planting.

Australian Winter Pea

Australian Winter Pea is an annual legume originating from the Mediterranean region. Deer will readily browse the young/tender shoots and foliage. Dove, quail, and turkey will eat the seeds. This plant may be easily established in loam or sandy loam soils.

Prepare a sound seedbed by harrowing. Broadcast and disk in 40 lbs/acre and cover with approximately 1 inch of soil. Follow soil test results to obtain desired results. Maintain pH levels between 5.8 and 6.2. Australian Winter Peas may be planted in conjunction with any small-grain species.

Common Warm Season Food Plot Crops

Alyce Clover

Alyce Clover is a warm-season tropical annual, erect legume 12-24 inches tall with pink flowers that are highly preferred by deer in late summer and early fall. This is also excellent forage for turkeys and rabbits. Seasonal production is best from July through September. The high nutritional quality is maintained well into late summer. Establishment is slow and weed competition may be a problem.

Best planting dates are May through June. Alyce Clover does well on most sites but is best suited for moderately well drained sandy loam soils. Summer rainfall produces the best stand. This plant will tolerate acidic soils. Broadcasting by hand is not recommended. Use an inoculant to increase nitrogen fixation, yields, and crude protein. Plant 15-20 lbs/acre and cover with 1/4 inch of soil by rolling/ or cultipack.

Follow soil test and apply a fertilizer with low or no nitrogen since the plant is a nitrogen-fixing legume. Without a soil test apply 300 lbs of 0-20-20 or an equivalent fertilizer per acre, and 1 ton of lime per acre to obtain a soil pH near 6.2. Alyce Clover requires lime and fertilizer at least every other year. It will not tolerate competition from grasses and weeds during germination and early growth. Nematodes may also be a problem. To overcome grass and weed pests, the plot may need to be mowed off until clover gets established. Stands can be expected to persist for several years if the crop is allowed to produce seed each year. In early spring, disk to control weed growth and to provide good soil conditions for germination of seeds that were produced in the fall.

American Joint Vetch

This plant is a tropical reseeding annual that tends to be "picky" about where it is planted. Also known as Aeschynomene, Joint Vetch is not a true vetch but a warm season legume. Ideally, sites with loamy sands are preferred (neither too wet nor too dry). Joint Vetch is used heavily by deer in late summer and early fall. It is slow to establish the first year. Browsing by deer usually begins in June, peaks in August to September, and ends in November. This plant is rapidly gaining popularity, but has a disadvantage of being more expensive than other seeds. Weed competition may also present problems.

Be sure to obtain soil test results before planting. Prior to the final disking to prepare the seedbed and if soil tests are not available, broadcast 400 lbs of 0-10-20 per acre plus the necessary trace elements. Apply low nitrogen fertilizer at a rate of 15-30 lbs per acre again after plants are 15 inches high. Plant 10-20 lbs/acre if hulled seed or 20-25 lbs/acre if unhulled at any time between April 15 and July 4 (cover with 1/2 inch of soil). Broadcasting by hand is not recommended since this tends to bunch the seed and promotes weed competition. Proper inoculant, like those used for Peanuts, Cowpeas, or Alyce Clover should be applied to the seed immediately before planting. Joint Vetch may also be mixed with Cowpeas and Alyce Clover. Plant peas first at 40 lbs/acre and then drag in Joint Vetch at 5 lbs/acre and Alyce Clover at 10 lbs/acre.

Browntop Millet

Browntop Millet is an annual panic grass native to Asia. It produces a yellow-brown, open-panicle seedhead. This plant will provide mature seeds in 60-70 days. Browntop Millet is valued by quail, dove, ducks, turkey, and non-game birds. Browtop Millet can thrive on a variety of soil types (July through September).

For best results prepare a good seedbed by harrowing. Be sure to obtain soil tests or use ~ 500 lbs/acre of 10-10-10. Lime areas to maintain a target pH of 5.5-6.5. Drill or broadcast 20-25 lbs/acre to benefit a wide variety game species. Planting dates for waterfowl fields range from July-August. For dove field target May 15-July 15. Consider multiple plantings at two to four

weeks apart. Cover seeds with 1/4 to 1/2 inches of soil. For waterfowl, flood fields to a depth of 2-10 inches and leave flooded until spring. Plot sizes: 5 acres for waterfowl, 1/4 acre for quail, 3-5 acres for dove, 3-5 acres for turkey. Other Millets, Sunflowers, Cowpeas, and Corn may be used in combination with this species.

Grain Sorghum

Sorghum species are annual small-grain crops native to Africa. There are many different varieties of sorghum. Sorghum is considered very drought tolerant and provides a high nutritional benefit for dove, quail, turkey, and ducks. Sorghum species may be cultivated on well drained soils to include clay loams and sandy loams.

Use disking methods to prepare seedbed and drill or broadcast plant 7-10 lbs/acre from mid April through July. Cover seeds with approximately 1 inch of soil. Follow soil test results or apply ~ 90 lbs/acre of nitrogen before or just after planting. Lime may be required to maintain a pH >5.8, as Sorghum does not tolerate acidic soils. Corn, Soybeans, reseeding Soybeans, Cowpeas, and Singletary Peas may be planted with Sorghum.

Soybeans

Soybean is an annual legume originating from China. Soybeans are utilized by dove, ducks, quail, turkey, deer, and rabbit. Primary production period ranges from July through August. Soybeans may be established on a wide variety of soils. Areas with high soil fertility are preferred.

Well prepared seedbeds will provide the best results. Follow soil test recommendations. 30 lbs/acre of phosphate and 60 lbs/acre of potash or 300 lbs/acre of 0-10-20 are commonly used to establish Soybeans. Broadcast 1 bushel of inoculated seed per acre and cover with 1 inch of soil pH levels should be maintained just above 6.0. Consider planting different varieties to support extended use by wildlife. Soybeans are commonly planted with Corn or Sorghum.

Corn

Corn is a grain crop originating from Mexico. Corn produces a food source known as "ears". Corn is utilized by bear, deer, squirrel, raccoon, quail, dove, turkey, ducks, and non-game species. Corn provides a mature food source in 160-180 days, depending on variety. Corn also provides ideal cover during times of wildlife use. Corn typically does well on upland soils. Ideal planting dates range from March through April.

Create a seedbed by disking or no-till plant within legume or small grain food plots. Plant 15 lbs/acre in rows about 38 inches apart and cover with 1 inch of soil. For successful corn production, be sure to follow soil test results. Corn is commonly incorporated with Browntop Millet, pea, Soybean, and legume plantings.

Sunflower

Sunflower is an annual small grain crop. The seeds produced by this plant are rich in oil and are utilized by dove, quail, turkey, songbirds, and squirrel. Sunflower also provides an excellent

source of cover for wildlife and browse for deer. Planting dates span from April to May. Seeds mature in 110-120 days depending on variety.

Thoroughly harrow the area to prepare seedbed. Plant 10 lbs/acre and cover with 1 inch of soil. Follow soil test recommendations for best results. 300 lbs/acre of 13-13-13 may be used in lieu of soil test. Maintain pH levels just above 6.0. The use of boron at a 1 lb/acre rate will help improve seed production. Sunflower seeds may be planted in conjunction with Browntop Millet and Corn.

Chufa

Chufa is a sedge with grass-like leaves. Chufa produces seeds that are utilized by many different species of songbirds. The underground tubers are readily eaten by turkey, ducks, deer, raccoon, squirrels, and feral hogs. Chufa may be planted from April through July in a wide variety of well-drained soils.

Prepare the seedbed by harrowing. Row or broadcast plant 30 lbs/acre and use lime to maintain a pH level near 6.0. 500 lbs/acre of 10-10-10 is commonly used to manage Chufa plots. Chufa performs best as a stand alone food plot crop and on new soils (practice rotating plot areas). Disking Chufa plots in early to mid spring will promote reseeding for subsequent years.

Buckwheat (North Georgia Counties only)

Buckwheat is an annual small-grain crop which produces seeds utilized by quail, dove, turkey, ducks, and deer. Seeds mature in approximately 50 days. Buckwheat also serves as an excellent deer browse. Buckwheat may be established on almost all soil types.

Use harrowing methods to prepare seedbed. Planting dates range from April through March. Drill or broadcast 50 lbs/acre and cover with 1 inch of soil. Maintain pH levels between 6.0 and 6.5. Use 10-10-10 at a rate of 500 lbs/acre to satisfy nutrient requirements. Buckwheat may be used in combination with Sunflower, Millets, and Sorghum.

Cowpea

Cowpea is an annual vine-like legume originating from Ethiopia. Cowpeas mature and produce seeds in 80-110 days depending on variety. The seeds are used by quail, dove, and turkey. Deer and rabbit use browse on the tender foliage and shoots until first frost. Cowpeas can be established on a wide variety of sites (especially well drained and fertile soils).

Prepare seedbed by harrowing. Drill or broadcast 20 lbs/acre and cover with 1 inch of soil. Conduct soil tests on site and follow soil test recommendations. Maintain pH levels between 6.0 and 6.5. Cowpeas are commonly planted with Browntop Millet, American Jointvetch, and Alyce Clover.

Eastern Gamagrass (*Tripsacum dactyloides* Highlander variety) (Native Warm Season Grass)

Eastern Gamagrass is a warm season perennial grass that can grow on a wide variety of sites (moist sites preferred) with heights ranging 5-9 feet tall.

Create a seedbed by disking or no-till plant within legume plantings. Plant 5 lbs/acre in drill row or broadcast and cover with $\frac{3}{4}$ inch of soil. For successful production, be sure to follow soil test results. Avoid mixing with Gamagrass with other grass plantings. This planting will provide benefits for Northern Bobwhite Quail, Eastern Wild Turkey, Sparrows, Cottontail rabbits, and many other small mammals and ground nesting birds.

Big Bluestem (*Andropogon Gerardii* Earl, Kaw, and Roundtree varieties) (Native Warm Season Grass)

Big Bluestem is a native perennial warm season bunchgrass that grows best on moist, well-drained soils. Big Bluestem reaches heights of 3-6 feet.

Plantings of 3.5 lbs/acre should be made on a firm seedbed and covered with no more than $\frac{1}{4}$ inch of soil. If seeding is made with a spreader, de-bearded seed may be mixed with a carrier to prevent seed from bridging the spreader. Big Bluestem may be established in combination with Indiangrass or Little Bluestem. This planting will provide benefits for Northern Bobwhite Quail, Eastern Wild Turkey, Sparrows, Cottontail rabbits, and many other small mammals and ground nesting birds.

Indiangrass (*Sorghastrum nutans* Lometa and Americus varieties) (Native Warm Season Grass)

Indiangrass is a native, warm season perennial bunchgrass which can reach heights of 3 to 5 feet. Indiangrass does well on dry medium-heavy to light textured sandy soils.

Plant 3.5 lbs/acre on a firm seedbed using a drill with a special seed box, mixed with a carrier, or use de-bearded seed. This planting will provide benefits for Northern Bobwhite Quail, Eastern Wild Turkey, Sparrows, Cottontail rabbits, and many other small mammals and ground nesting birds.

Little Bluestem (*Schizachyrium scoparium* Aldous, Cimarron, or Pastura varieties) (Native Warm Season Grass)

Little Bluestem is a native warm season bunchgrass which can reach heights of 3 feet. Little Bluestem grows well on deep, shallow, sandy, fine textured, and rocky soils.

Plant 3.5 lbs/acre on a firm seedbed using a drill with a special seed box, mixed with a carrier, or use de-bearded seed. This planting will provide benefits for Northern Bobwhite Quail, Eastern Wild Turkey, Sparrows, Cottontail rabbits, and many other small mammals and ground nesting birds.

Switchgrass (*Panicum virgatum* Alamo and Cave-in-Rock varieties) (Native Warm Season Grass)

Switchgrass is a native warm season perennial bunchgrass that ranges in height from 3-6 feet. Switchgrass grows well on deep soils with good water-holding capacity, including well-drained to poorly-drained soils.

Plant 2 lbs/acre on a firm seedbed as outlined for other native warm season grasses above. This planting will provide benefits for Northern Bobwhite Quail, Eastern Wild Turkey, Sparrows, Cottontail rabbits, and many other small mammals and ground nesting birds.

Combination Plots

The most effective food plots provide supplemental vegetation and cover for wildlife during the warm and cool seasons. For example, combination plots may provide winter grazing for deer, turkey, and rabbit and then provide brood-rearing habitat for turkeys or quail in the summer. Crops or native vegetation may be managed in adjacent strips within a single wildlife opening. For example, plant a strip of corn 20 feet wide, followed by a 20-foot fallow strip, followed by a strip of cowpeas 20 feet wide, followed by a fallow strip, followed by a strip of partridge peas, etc. (warm season plot). Repeat this sequence over the width of the wildlife opening to create horizontal structural diversity. Any combination of plantings may be used, just remember to plant and fertilize according to soil test results. The local Cooperative Extension Service or Natural Resource Conservation Service can help obtain and process soil tests. Be sure to follow recommendations concerning planting dates and techniques specific to the crop planted.

Consider strip mowing combination plots of ryegrass, rye, oats, wheat, and clovers (Red, Arrowleaf, and Crimson) when seedheads mature. This will enhance brood-rearing habitat for turkey and quail as well as promote reseeding the following year. Strip mowing will also leave some seeds intact for wildlife use. When conducting mowing practices, start in the center and spiral outwards to lower the incidence of harming nesting birds. Small-grains such as wheat and rye mixed with clovers will provide excellent grazing opportunities as well as highly palatable seed. Rye and wheat have to be replanted each year. Ryegrass will re-seed after spring mowing but at a lower density. Mow again in late summer to put ryegrass seed on the ground for fall sprouting and to reduce weed competition for the clover. Note: the above clovers are considered perennial or reseeding annuals but typically will have to be re-established every 2 to 4 years.

Additional Wildlife Opening and Food Plot Recommendations (crop, planting date, rate, planting method, and availability)

WILD TURKEY

<u>Crop</u>	<u>Date</u>	<u>Rate</u>	<u>Method</u>	<u>Availability</u>
Chufa	April-July	40-60lbs/ac.	broadcast	fall-winter
Arrowleaf Clover	Sept.-Nov.	10-15lbs/ac.	broadcast	late spring-early summer

Subterranean Clover	Mid Aug.-mid Nov.	15-20lbs/ac.	broadcast	late winter-early spring
white Clover	Sept.-Nov.	2-4lbs/ac	broadcast	late winter-spring
Corn	March-April	12-15lbs/ac.	drill in 36" rows	fall-winter
Pearl Millet	April-June	25-30lbs/ac.	broadcast	late summer
Partridge Pea	Feb.-March	5-10lbs/ac	plant in 36" rows	fall-winter
Peanuts	mid April-mid May	30-40lbs/ac.	drill in 30-38" rows	late summer-fall
Perennial Peanut	Dec.-March	60-80bus/ac.	drill	fall
Ryegrass	Sept.-Dec.	20-40lbs/ac.	broadcast	winter-early spring
Oats	Sept.-Nov.	4lbs/ac.	broadcast or drill	winter-spring
Winter Wheat	Oct.-Nov.	3lbs/ac.	broadcast or drill	winter-spring
Soybeans	May-July	1bus/ac.	broadcast or drill	fall-winter
Grain Sorghum	July	6-8lbs/ac.	drill in 36" rows	fall-winter

WHITE-TAILED DEER

<u>Crop</u>	<u>Date</u>	<u>Rate</u>	<u>Method</u>	<u>Availability</u>
Alyce Clover	May-June	15-20lbs/ac.	broadcast	late summer-early fall
American Jointvetch	April-July	15-25lbs/ac.	broadcast	late summer-early fall
Buckwheat	April-August	40-50lbs/ac.	broadcast	late summer-early fall
Chufa	April-May	40-60lbs/ac.	broadcast	fall-winter
Arrowleaf Clover	Sept.-Nov.	10-15lbs/ac.	broadcast	late spring-early summer
Berseem Clover	Sept.-Oct.	20lbs/ac.	broadcast	winter-early spring
Subterranean Clover	Mid August-mid Nov.	15-20lbs/ac.	broadcast	late winter-early spring
Cowpea	May-June	20-25lbs/ac.	broadcast	late summer-early fall
Peanut	mid April-mid May	30-40lbs/ac.	drill in 30-38" rows	late summer-early fall
Perennial Peanut	Dec.-March	60-80bus/ac.	drill	fall
Sorghum	mid April-mid July	4-7lbs/ac.	broadcast	fall-winter
Soybean	May-July	1bus/ac.	broadcast	late summer-fall
Velvet bean	After last frost	10lbs/ac.	plant 15" apart	summer
Vetch	Sept.-Nov.	25-40lbs/ac.	broadcast	fall-winter

BOBWHITE QUAIL

Quail populations have been on decline in Georgia. This decline is linked to the loss of suitable habitat. Habitat is being lost to urbanization, land use change (conversion of agricultural land to forestland), heavy grazing by livestock, extensive cultivation, and elimination of fence rows. To improve quail habitat increase food availability and maintain the proper amount of cover

horizontal diversity. Ideal quail habitat is a mosaic of small blocks of brush cover mixed with small fields and small patches of woods so that escape cover is a short flight away.

<u>Crop</u>	<u>Date</u>	<u>Rate</u>	<u>Method</u>	<u>Availability</u>
Florida Beggarweed	April-May	10-15lbs/ac.	broadcast	late summer-fall
Buckwheat	April-August	40-50lbs/ac.	broadcast	summer-fall
Crimson Clover	mid Sept.-mid Oct.	20-30lbs/ac.	broadcast	winter
Subterranean Clover	mid Aug.-mid Nov.	15-20lbs/ac.	broadcast	late winter-early spring
White Clover	Sept.-Nov.	8-10lbs/ac.	broadcast	winter
Corn	March-April	12-15lbs/ac.	drill in 36" rows	fall-winter
Cowpea	May-June	20-25lbs/ac.	broadcast	summer
Annual Lespedeza	Feb.-March	40lbs/ac.	broadcast	late summer-early fall
Shrub Lespedeza	Early spring	15lbs/ac.	broadcast	late summer-early fall
Browntop Millet	July-August	20-30lbs/ac.	broadcast	fall
Pearl Millet	April-June	25-30lbs/ac.	broadcast	summer
Partridge Pea	Feb.-March	5-10lbs/ac.	plant in 36" rows	fall-winter
Sesame	May-June	5-6lbs/ac.	plant in 36" rows	fall-early winter
Sorghum	mid April-mid July	4-7lbs/ac.	broadcast	fall
Sunflower	March-August	6-8lbs/ac.	plant in 36" rows	late summer-fall
Vetch	Sept.-Nov.	25-40lbs/ac.	broadcast	fall-winter
Wild reseeding soybean	mid April-June	20-25lbs/ac.	broadcast	late summer-fall

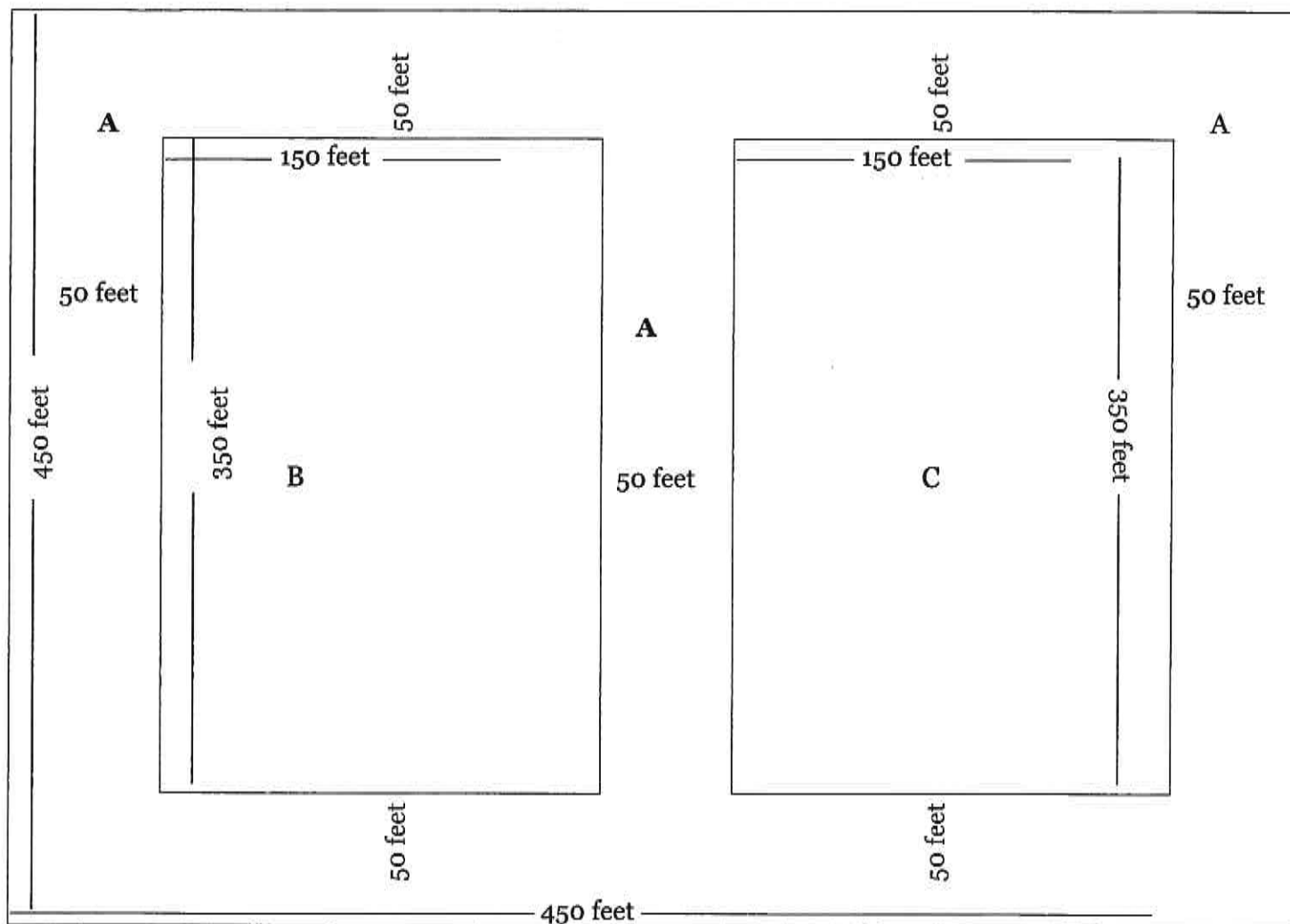


Figure 1. Options for managing a 5-acre opening for wildlife.

Option 1: Quail Intensive

- A: During winter of first year, lightly disk the entire border and center strip. In subsequent years, winter disk only 30% of entire border and center strip each year to maintain different stages of early successional habitat (e.g., mixture of clumped grasses, briars, legumes, and shrub thickets). Consider planting a hedgerow through center composed of wild plum or blueberries. Keep invading trees out!
- B: Plant a mix of annual grains (e.g., wheat, sorghum, corn, millet) in spring of year one and allow to go fallow until fall of year two.
- C: Plant wheat in fall of year one and allow to go fallow until spring of year three.

Option 2: Deer Intensive

- A: During winter of first year lightly disk the entire border and center strip. In subsequent years, winter disk 30% of entire border and plant 30% of border with cool season grasses and grains. Develop the center strip into shrubby border consisting of wild plums, crabapple, and apple trees. Maintain with only low-growing, soft-masting species.
- B: Plant with a mix of cool season grasses (e.g., wheat, oats) and legumes (e.g., alfalfa, white clover, red clover) the first fall. Mow at the end of summer/early fall. Plot will need to be replanted in approximately 3 years.
- C: Plant a mix of annual crops (peanut, corn, soybean, peas) in spring/summer. **Allow to remain standing throughout winter. Replant each year.**

Forest Management Practices

The following section lists forest management activities and concerns that forestland owners often encounter. This section of the plan will provide you with detailed descriptions of activities and terms commonly used by the foresters. This information should provide you with a basic understanding of forestry practices as you read through the management recommendation section of the plan.

Timber Management

A. Timber Harvest

Harvesting methods and the operator's ability to carry out your plans is critical to the overall success of timber management. Future productivity of the site will depend on how well or how poorly the harvesting operations are conducted.

Harvesting includes all operations necessary to remove timber from the forest. These operations include felling, skidding, delimbing, bucking, and loading. Alternate methods for accomplishing each of these operations are available. The correct combination of methods to use on a given site depends on tract size, timber type, volume per acre, individual tree volume, tree size, type of cut, (seed tree removal, harvest cut, selection cut, etc.), topography, weather, soils, access system, equipment availability, and landowner objectives.

Before cutting operations begin, landowners should develop a harvesting plan for the tract or stand. This plan should include:

1. The landowner's management objectives
2. Map of the area
3. Legal property boundaries (clearly marked)
4. Description of trees to be removed
5. Method of marking trees to be removed
6. Method of harvesting
7. The placement of haul roads, skid trails and log landings
8. Road and trail drainage structures
9. Soil conservation measures, including specified Best Management Practices for water quality assurance
10. Maximum stump heights
11. Slash disposal methods
12. Damage Penalties
13. Aesthetic buffers identified
14. Any other landowner specified or legal requirements

A written forest product sales agreement/contract should also be developed that incorporates the essential elements of the logging plan and market price for each

product, payments, and contract duration. It must be comprehensive, feasible, and enforceable by both the landowner and operator.

The following descriptions of harvesting operations serve to help you understand the harvesting process.



1. **Felling**

Felling is the act of severing standing trees from their stumps. Felling is normally accomplished with a chainsaw or a hydraulic-powered felling head mounted on a self-propelled machine. The both techniques are used to fell various sizes of timber. There are several types of felling heads available that are mounted on a crawler tractor, rubber-tired carrier, excavator, or other specialized machine. A shear head typically has either one or two blades and pinches the tree from the stump. Shear heads may cause damage to the butt end of the log, thus limiting their use to pulpwood. Mounted saw heads are most commonly used in harvesting operations today because they minimize damage to butt end of logs by "sawing" the tree from its stump.



2. **Skidding**

Skidding is the act of moving the wood/dragging from the stump or fell group to the loading deck. Skidding can be accomplished with wheeled or tracked machines known as skidders. Skidders are equipped with wire wrap/chokers or grapples to secure stems for transport.



3. **Delimbing and Bucking**

This operation involves removing limbs from the stem up to a minimum top diameter and cutting it into logs or bolts of predetermined lengths. Delimbing and bucking may take place where the tree is felled, or the entire tree may be skidded to a cleared area called a log landing for delimbing and bucking. In some cases, a Delimbing gate is placed against standing trees and a skidder is used to back felled trees through the gate to remove limbs. Some operations use equipment located on or near the loader to shear limbs and cut stems to predetermined length. In pulpwood operations, the entire tree (minus limbs) may be transported to the mill. While some pulpwood or salvage operations may utilize the entire tree (limbs and all) and may be reduced to chips at the log deck. Chips will then be diverted into trailers for transport to the mill.



4. Loading

Loading is the link between logging and hauling operations. Loading is performed from the log deck/landing. Several landings may be used on large tracts so that skidding distances are minimized. However, the number and size of log landings also should be minimized. Loading may be accomplished with a variety of machinery (for example the hydraulic knuckle boom).

B. Prescribed Burning



Native Americans and early settlers used fire to control brush, improve hunting success, and to clear areas for agriculture. Even today, forest managers use fire to accomplish certain management objectives. Prescribed burning is the controlled application of fire to a defined land area under specific weather parameters to accomplish pre-determined and well-defined management objectives. Prescribed fire is a valuable tool and in most cases is the most economical technique for:

- Reducing hazardous fuel accumulation
- Improving wildlife habitat and browse
- Controlling undesirable vegetation/hardwoods
- Controlling certain diseases (Brown Spot Needle Blight on Longleaf Pine)
- Enhancing appearance and value of a stand
- Improving access
- Preparing sites for seeding or planting
- Range management
- Enhancing biological diversity

Prescribed burning is an essential practice in the management and maintenance of Longleaf Pine. Longleaf Pine are tolerant of prescribed fire during the seedling stage. Longleaf Pine should be burned within the first three growing seasons while seedlings are in the grass stage and when temperatures are 55°F or below. Prescribed burning Longleaf Pine helps stimulate upward height growth and combat the fungal disease Brown Spot needle Blight. Once 25 percent or greater of the seedlings have entered into the sapling stage avoid prescribed burning until the 6-9th growing season when trees are approximately 25 feet tall. Prescribed burning should be repeated within Longleaf Pine stands at a 2-5 year intervals, depending upon specific objectives and fuel/brush accumulation.

Slash and Loblolly pines are not resistant to fire while in the seedling stage or sapling stage. Slash and Loblolly Pine can be safely and successfully prescribed burned when trees are more than 25 feet tall (8-10 years old), have a diameter at breast height (DBH) of ≥ 4.5 inches, light to moderate fuel loads within understory, ladder fuels are not present, and

weather conditions allow. In general, I recommend postponing the first prescribed burn within Slash and Loblolly stands until after the first mechanical thinning. Burning before the first thinning can be safely conducted but is often difficult and hazardous (requiring cooler temperatures and steady wind to help dissipate heat and avoid scorching the crowns). Prescribed burning should be repeated at 2-5 year intervals, depending upon specific objectives and fuel/brush accumulation.

It can be difficult to determine the correct burning conditions for a particular stand (wind, relative humidity, temperature, fuel accumulation, and atmospheric stability). Before conducting a prescribed burn contact your consultant or the Georgia Forestry Commission for assistance with burn permits, firebreak installation, prescribed burn assistance, and the development of a prescribed burn plan.

The most cost-effective approach of managing pine stands for wildlife is generally through an active prescribed burning program. The costs associated with prescribed burning can be 10 times less than those associated with chemical and mechanical forms of stand management. Prescribed burning stimulates growth of native legumes, grasses, and wildflowers. It also helps improve stand access, reduce the risk of catastrophic wildfire. Prescribed burning also increases the availability, palatability, and nutritional quality of wildlife browse. However, prescribed burning should be viewed only as one of the many tools available to land managers. Results can often be improved by using a combination of mechanical and chemical practices.

Resource managers are still learning how to manipulate fire frequency, intensity and timing to create environmental conditions that favor a particular species or group of species that are of interest to them. This is especially true of endangered species, like the red-cockaded woodpecker. It is important to remember that the effect of prescribed burning (whether positive or negative) depends upon the interconnections between the pre-burn habitat conditions, needs of a species, a species relationship with other species, and weather. Fire frequency or rotation allows resource managers to manipulate the understory and midstory composition. Short intervals between burns (1-2 years) favor the production of grasses and forbs in the understory while largely excluding hardwoods. Longer intervals between burns (3-5 years) result in more woody growth, such as blackberries, blueberries, and hardwoods. Even longer fire rotations allow a shrub midstory (Sweetgum, Wax Myrtle, Maple) to develop. Overall, prescribed burning sets back succession to early seral stages and helps to recycle important nutrients such as nitrogen and carbon. The types and quantities of early successional vegetation that develops following a burn is strongly tied to canopy cover and soil type. As more sunlight reaches the forest floor this increases the vegetative growth response.

Early successional habitat consists of patches of bare ground, grasses, forbs, woody vines and shrubs. Bare ground is an essential component of brood-rearing habitat for turkeys and quail. Poults and chicks must have access to bare ground be able to forage effectively for insects. Prescribed burning removes the duff layer exposing this bare ground, creating good foraging and dusting areas. The presence of bare ground is also important in the natural regeneration of longleaf pine. Prescribed burning also encourages floristic species diversity. Fire-maintained old growth Longleaf Pine stands may have up to 40 different

plant species within a square meter. This includes many of the native legumes such as butterfly pea and partridge pea. Prescribed burning also encourages increased production of native warm season grasses such as Wiregrass, Indiangrass, and Switchgrass which provide an excellent source of seed, browse, insect production, and cover for wildlife. Many forb and grass species require fire (or some type of disturbance) to stimulate seed production or germination. By managing native forages with fire, resource managers can dramatically reduce the amount of effort placed into planting food plots. Prescribed burning often creates a cascade effect. As conditions improve for one species other species also benefit (directly and/or indirectly) from increased populations of the first species. The Gopher tortoise is an example of this- as prescribed fire increases browse for the tortoise the burrows created by the tortoises can also provide habitat for a variety of other species, including indigo snakes, rattlesnakes, and gopher frogs.

The firing technique, fuel loads, timing, and environmental conditions can all affect fire intensity. A head-fire will burn more intensely than a back-fire. Areas with heavy fuel loads will burn much more intense than areas with light fuel loads. In general, early morning or late evening fires burn less intense than a mid-day burn. Seasonal timing is lumped into two categories, dormant season also called winter burns and growing season or summer burns. Winter burns are thought to be best for wildlife since there is a potential risk of disrupting nesting birds during the summer. Winter burns every 2-3 years stimulates sprouting and provides wildlife with more nutritious forage. Young shoots and re-sprouts have more protein, phosphorous, calcium, digestible energy, and less tannins/toxins than older growth. Recently, the benefit of summer burns to wildlife has received more attention. For example, burning wiregrass during the spring and summer stimulates seed production, which provides food during the fall for a wide range of birds and small mammals. Also, summer burning encourages wildflowers that provide nectar for migrating monarch butterflies in the fall. Burning under dry and windy conditions often causes intense and erratic fire behavior. Resource managers interested in creating a "patchy" burn might choose to use a back-fire under moist conditions to leave some residual cover intact for nesting, foraging, or escape cover purposes.

C. Fertilization



Southern commercial pine species can benefit from fertilization practices. Response is improved when used in conjunction with other intensive management practices (understory vegetation management & density control) and on nutrient deficient sites. Knowledge of soil type and soil condition in addition to soil tests helps identify sites which require or will best respond to supplemental nutrient applications. Foliar analysis is also used to determine a basis for fertilizer applications.

Phosphorus (P) and Nitrogen (N) are the most commonly applied supplemental nutrients.

A stands response to supplemental nutrient applications will be no more than the limiting nutrient allows. Phosphorus and Nitrogen generates a response on sites where its deficiency is limiting growth. Soil tests before plantings are advisable on lower coastal plain sites. Phosphorus deficiency is commonly treated before planting by incorporating concentrated (triple) super phosphate (CSP or TSP) or diammonium phosphate (DAP) into the beds. Typical rates could call for 40-50 pounds per acre of elemental Phosphorus. Fertilization with Phosphorus in combination with herbaceous weed control has been used to boost Longleaf seedlings out of the grass stage.

Established stands generally respond to Nitrogen fertilization. Aerial application is usually in spring or fall. A significant amount of Nitrogen can be consumed by understory species and weeds. Prescribed burning or herbicide treatments before fertilizer application will help suppress/control understory vegetation. If the stand is clean, vigorous stems respond to Nitrogen applications (usually 100-150 pounds per acre of elemental N) for about five years. Intermediate and suppressed trees seldom respond to fertilizers, dropping out of the stand quicker than if no fertilizer is applied.

D. Pre-Commercial Thinning



Pine stands established by natural regeneration, direct seeding, or planted stands with an existing or adjacent seed source often have too many trees per acre. Overcrowding causes reduced growth or stagnation of the developing stand. Stagnation is more likely to occur on poor, dry sites, where trees are slow to express dominance and where natural thinning occurs later. Pre-commercial thinning can result in healthier stands with improved growth and greater economic value.

Pre-commercial thinning may be done manually with hand tools (machete, bush hook, chainsaw) or by machine (pull-behind drum choppers, rotary cutters, mulch heads). If natural stands are overstocked following seed tree removal, consider at pre-commercial thin. This Pre-commercial thinning should occur after the risk of competitive re-growth by hardwoods is past (normally 5 to 10 years). Following the pre-commercial thin approximately 400-600 of the best trees should remain on site. Mechanical pre-commercial thinning natural stands generally involves chopping 7-8 foot wide parallel swaths through the stand, leaving 3 to 5 foot strips of trees between swaths. Trees in the strips may be left undisturbed or manually thinned. Chopping swaths in two directions, leaving small groups of trees at 7 to 8 foot spacing, can create a checkerboard pattern. The currently preferred method of pre-commercial thinning is a combination of mechanical thinning followed by manually thinning down to the target 400-600 trees per acre. Pre-commercial thinning planted (plantation) pine may be conducted using an industrial mower to remove volunteer trees from centers followed by manually removing volunteers or inferior (diseased, suppressed, or malformed stems) from within the tree rows.

E. Commercial Thinning



Stand density or stocking level (represented by the number of trees per acre or basal area) is very important in growing quality commercial timber. Proper stocking is second only to site quality in affecting yield. Over stocking often leads to reduced growth, increased insect and disease risk, and reduced wood quality. Stand density is generally controlled by intermediate harvests known as thinning. During thinning operations a portion of the merchantable trees are harvested for sale. Commercial thinning provides a source of income and helps improve/maintain the growth rate and quality of the remaining stand. After thinning, it is important that each acre support an adequate number of well-spaced, high quality, vigorous crop trees. The benefits of intermediate cutting are threefold: 1. concentrate growth on fewer faster growing trees (each additional inch of diameter growth adds 3 to 4 percent to the board-foot yield at final harvest= better economics) 2. utilize trees that would die before final harvest 3. growing out only the highest quality trees to final harvest (eliminating volume growth on low value stems).

The tree species, soil type, fertility, site index, and initial stocking all affect the timing and intensity prescription of a thinning operation. Trees compete for water, nutrients, and sunlight. Southern Pine species need full or near full sunlight. When overtopped and shaded, the branches thin out and die, leaving a smaller live crown. A tree needs at least one third of its crown (live top) to maintain active growth. Generally, you may expect to thin a planted pine plantation on a former cutover site at age 15 to 18 and for old field sites you should expect to thin at age 14 to 16. Stands managed for commercial timber production, should maintain at least 70ft²/acre after the first thin (275-300 trees per acre) and a basal area of at least 60 ft²/acre after the second thin (175-200 trees per acre).

The most successful competitors (fastest growing trees) typically remain dominant in a stand and receive sunlight from above and from the sides. The next level is comprised of the co-dominant trees which receive sunlight from above and some on the sides. The trees in the intermediate level receive some sunlight from above and none from the sides. Trees below this level are suppressed and have much slower growth rates. If you do not thin, trees in the suppressed and intermediate levels of the canopy may exhibit little to no growth and/or may begin to die. A young natural stand having thousands of stems per acre, or a plantation with 600-1000 seedlings per acre, will each have fewer than 400 trees remaining by age 35, even without thinning. This reduction in number of trees represents a natural thinning process. However, natural thinning only occurs when stands are so dense that even the growth rate for crop trees has been reduced.

In marking a stand for thinning, each acre should be managed to produce as much wood as possible by leaving the highest value crop trees. During thinning operations attempt to select and remove the diseased, damaged, malformed, forked, suppressed, and other low quality stems. Thinning operations in pine plantations typically involves removing an entire row of trees (for example: every 3rd, 4th, or 5th row) and additional low-quality stems from within the remaining rows. The goal for thinning natural stands is to remove the low-quality stems and perhaps some of the good stems to reach the desired stocking

level. Keep in mind that large trees do not usually benefit from removal of smaller neighbors. Also, smaller trees can only benefit if they have a sufficient amount of crown left. On a good site, you can produce nearly the same total volume with a fewer number of high quality stems than you could with many smaller low-quality stems.

Since the number of trees per acre decreases as average size increases, foresters generally use "basal area" to evaluate stocking or stand density. The basal area or cross sectional area of a stem increases with diameter. Diameter may be estimated by placing a measuring tape around the trunk 4.5 feet above the ground, and dividing the resulting number (the circumference) by 3.14. Tree diameter can also be determined using a diameter tape (calibrated in \square inches), tree caliper, or tree scaling stick. A basal area range of 80-110 square feet per acre is ideal for intensively managed pine stands or 50-70 square feet per acre for timber and wildlife. The intensity of a thinning refers to the number of trees to remove or to leave on site. Tree diameter is used to determine the number of trees to be removed and the distance needed between each tree. Recommendations typically call for more basal area to be left on good sites and less on low quality sites.

F. Tree Planting (Artificial Regeneration)

The most common artificial regeneration method is a clear-cut harvest cut followed by machine or hand planting. When using this method, a clear-cut harvest must be clearly defined and communicated with logging operators. The goal is to conduct a total and complete harvest of the area leaving zero square feet of basal area. This means that all stems should be harvested and used from poles all the way down to fuelwood. Subsequent site preparation costs are increased, when large tops and low-grade hardwood material (which could have been salvaged for fuelwood or other uses) are left on site. The clear-cut harvest and planting method requires capital inputs for site preparation and regeneration. Income is not realized for another 14 to 18 years after planting when a pulpwood thinning takes place. However from a commercial timber standpoint, advantages of this method outweigh the natural regeneration option. Advantages of the clear-cut harvest and planting method include faster establishment time, shorter rotation lengths, stocking/density control, options for genetically improved & disease resistant stock, and more efficient to operate than natural stands (all of which helps maximize return on our investment).

When preparing a site for planting, work to suppress and/or control vegetation that will compete against seedlings for sunlight, moisture, and nutrients. Keep in mind that soil disturbances should be minimized in an effort to reduce erosion and protect valuable topsoil. The three basic types of site preparation are: mechanical, chemical and prescribed fire. When large amounts of debris remain after a clear-cut harvest, mechanical site preparation is the predominant site preparation method and is also the most costly. Several types of mechanical treatments may be used individually or in combination.



Drum Chopping is one of the most effective means of reducing woody competition with minimum soil disturbance. The chopper is a rolling drum with cutting blades attached, pulled by a tractor rubber-tired or crawler tractor. Drum Choppers may be used in tandem, offset, and filled with water to increase effectiveness. Drum chopping is normally followed by prescribed burning to help remove debris, facilitate machine planting, and reduce the amount of hardwood re-sprouting.



KG Shear Blade is commonly used on areas with heavy downed residual debris, large stumps, or large diameter standing stems. A KG Shear blade is an angled, C-shaped, sharpened blade mounted on the front of crawler tractor. Many KG Shear blades have a "stinger" or stump splitter on either end of the blade which helps to break up large stems. Tree trunks are sheared at or near ground level and then pushed into windrows or spot piles. Avoid pushing valuable topsoil into windrows or spot piles. Windrows or spot piles

may be burned. However, it is important to plan for both smoke and fire management because these piles often burn/smolder for extended periods time. These piles are often left in place to provide cover for many species of small mammals and birds. If windrows are left in place consider leaving a 20-foot opening every 150 feet to facilitate future equipment operations or fire suppression activities. Windrows should be constructed on the contour.



Root raking, windrowing or spot piling involves the use of a large, toothed blade mounted on a rubber-tired machine or crawler tractor. The toothed blade rips debris, roots, and stumps from the ground. Debris may be pushed into windrows or spot piles as outlined in the KG Shear section above. Avoid pushing valuable topsoil into piles. Do not create debris piles near property lines nor immediately adjacent to other forested stands (Wildfire risk).



Disking is a method especially useful in improving soil aeration, often needed on compacted soils. The disk must break the soil to a minimum of six to eight inches in depth and should be accomplished at least three months prior to planting to allow time for the soil to settle. Disking should not be attempted on steep slopes or erosive soils.



Bedding is a method used to create a sound planting medium for tree establishment. Bedding improves soil aeration, concentrates nutrients for seedling uptake, sets back competition, and lifts seedlings up from inundated or wet soils. Beds are created by using a set of special harrows/plows that pulls in tilled soil to the center and is pressed by a trailing roller packer. Beds should be constructed at least 45 days prior to seedling establishment or receive 2-3 inches of rainfall to aide in soil settling.



Sub-soiling is used in forestry site preparation where soils have high bulk densities, hardpans present, or are compacted from repeated equipment traffic. Compacted soils and soils with a shallow hardpan can negatively impact seedling survival and growth. In-row sub-soiling should be used on forest soils that have a hardpan within 12 inches of the surface. Sub-soiling is accomplished by pulling a single or multiple sub-surface tines behind a tractor. Sub-surface tines should extend down to at least 18 inches below ground

surface to rip soil. Tree planter foots do not qualify as sub-soilers. Complete sub-soiling practices in a manner that will allow at least 60 days and/or receive at least 2 inches of rainfall before planting. When planting on sites that have been sub-soiled, be sure to offset plant the seedlings approximately 6 inches from the sub-soiler path to prevent root desiccation.



Chemical Applications are used to suppress and/or control undesirable vegetative competition. Herbicides may be applied using ground or aerial equipment. Herbicides help provide lasting control of vegetation which in turn improves seedling growth and increases economic return. Herbicides can be used on sites where mechanical site preparation methods are limited (less compaction and increase biomass left in tact). Chemical site preparation treatments are

commonly applied between the months of June and October. Specific herbicide prescriptions can be made based on species type, extent, site condition, location, and timing. Some of the herbicides commonly used for site preparation practices in the coastal plain include Chopper (Imazapyr), Arsenal AC (Imazapyr), Garlon (Triclopyr), and Accord SP (Glyphosate). Always read the herbicide product label and associated materials in their entirety before applying herbicides. Remember to follow Georgia's Best Management Practices for Forestry while applying herbicides.



Prescribed Burning is a cost effective site preparation technique used to breakdown logging slash and debris while returning nutrients to the soil. Prescribed burning is often used in conjunction with roller drum chopping and chemical site preparation practices. When burning debris piles or windrows, always develop a fire & smoke management plan (Prescribed Burn Plan) and obtain a burn permit before beginning operations. Remember that piles will continue to burn, smolder, and smoke for extended periods. Proper pile

construction (minimal amounts of soil in piles) and stirring will help promote a faster and cleaner burn. Burning cleared areas with exposed soil and inconsistent vegetation may require ignition techniques such as stripping, head firing, or ringing. Never conduct burns without adequate firebreaks in place (natural or plowed). The GFC offers assistance in developing prescribed burn plans and firebreak plowing. Burning should only be used under safe fire weather conditions and by those trained in its use.



Seedlings and Planting

A knowledgeable decision concerning selection of the proper pine species must be made before site preparation practices take place. Location of the planting site, soil type, and timber products to be produced are all factors that influence species selection. Seed source (the geographic location of the parent tree) also is an important consideration. Seed collected from within a 100-mile radius of the planting site should prove satisfactory.

Improper seed origin can result in poor survival and slow growth. Using seeds originating from a specific area can often enhance disease resistance.

The planting season for the coastal plain is from late November through February (under normal conditions). Never plant when the ground is frozen or extremely dry. Proper care of seedlings from the time they are lifted and bundled at the nursery until the time they are planted is extremely important. Do not allow the root system of seedlings to dry out or freeze. If a delay in planting is anticipated, place seedlings in a temperature and humidity controlled cold storage. If cold storage is not possible, seedlings can be placed on racks under shelter from the wind and weather. Their root systems should be watered at least twice a week. Seedlings should be kept no longer than two weeks out of cold storage. Care must also be taken to avoid damage to seedlings during planting. Never tear bundles of seedlings apart because of the likelihood of root damage. Cull all poor-quality seedlings and avoid root pruning. Seedlings should be kept in a cool shaded area and protected with water or stored in moss, gel, or wet soil at the planting site.

Seedlings may be planted by machine or by hand. Hand planting with a planting bar, dibble, or containerized plug tool best suited for small acreages and sensitive sites. When using a dibble to plant seedlings, place all roots in the hole and ensure that none are turned upward in the bottom of the hole (avoid J-rooting). J-rooting seedlings will negatively impact

growth, cause malformations, and may even lead to tree mortality. When planting bare-root seedlings, plant slightly deeper (about 1 inch of the root collar should be below the surface) than they grew in the nursery bed. For containerized seedlings leave approximately 1.5 inches of the plug exposed. The bud on containerized seedlings should be about 2 inches above the soil surface. Do not place containerized seedling buds below the surface or allow buds to become covered by subsequent soil movement as this will negatively impact growth and may lead to seedling mortality. The common spacing in the south for commercial timber production is 6' X 12' (seedlings 6 foot apart in the drill and rows 12 foot apart). This spacing will result in an average of 605 seedlings planted per acre. For an adequate stocking a stand should have at least 300 well spaced seedlings per acre after the first growing season (otherwise the site will not be fully utilized throughout the rotation).

Hand planting is slower than machine planting. The number of trees planted per crew per day depends on the hardness of the soil, experience of the planting crew, quality of site preparation and size of the planting crew. An experienced man can plant approximately 1,000 seedlings per day. Machine planting is much faster than hand planting. A planting machine is pulled behind a tractor and makes a narrow slit or furrow with a modified bar-point. A man riding on the planter places one seedling at a time in the slit, which is then closed tightly around the seedling by two rollers or packing wheels to lock the seedling in place. In good weather, a two-man crew (planter and tractor operator) can plant 5,000 to 10,000 trees per day.

G. Insects and Disease

It is important to become familiar with management practices that reduce losses from insects and disease. Reducing such losses often requires the use of an integrated pest management approach (using a combination of methods). For example, thinning a site to reduce stress and promote growth and conducting the practice during times of low risk potential. Matching tree species to site, selecting genetically improved/diseased resistant seedlings, chemically treating freshly cut stumps, using prescribed fire, fertilizing, and salvaging infested trees are common techniques used in integrated pest management. To reduce insect and disease losses forest managers must understand the pest and how site, stand, and climatic factors affect populations. Several insects and diseases commonly found within the southeast are discussed below.

1. Southern Pine Beetle

Southern pine beetle can attack all species of southern pines, but Loblolly and shortleaf are the most susceptible. The first signs of a SPB attack are popcorn-size masses of yellowish-white resinous pitch tubes appearing in the bark crevices from the base of the tree to the lower limbs. Pitch tubes may not form during dry weather, but a reddish boring dust will be found in the bark crevices.

Fading needle color from green to yellow, red and brown is a sign that attacked trees will die. The adult SPB is blackish in color and about the size of a grain of rice, makes winding, S-shaped galleries on the inside of the bark. The SPB introduces a blue stain fungus into the tree. The fungus eventually blocks the water-conducting tissue of the tree and then the tree dies. Hazard rating systems

by region are available to evaluate the relative susceptibility of pine stands to SPB attack. Trees under stress are most susceptible to SPB attack. Causes of tree stress and possible SPB outbreaks include poorly drained sites, diseased or storm damaged stands, drought, and physical damage caused by lightning or mechanical operations. To reduce SPB problems, maintain vigorously growing trees by following the recommended practices below:

1. Harvest mature trees or stands and regenerate the site.
2. Properly match the site with ideal tree species to be planted.
3. Thin overstocked stands.
4. Promptly salvage trees damaged by storms, lightning, or logging activities.
5. Harvest diseased stands.
6. Minimize site and stand disturbance (equipment operations)
7. Promptly salvage SPB-infested trees.

2. Ips Engraver Beetles

Engraver beetles usually attack single, scattered trees that are weakened by drought, ice, wildfire, lightning and logging damage. During periods of extended droughts, the beetles may kill groups of trees (<1/2 acre). All the southern pines are susceptible to attack. There are three different species of Ips Engraver Beetles in Georgia. Engraver beetles form reddish pitch tubes about the size of dime on the bark surface. The pitch tubes may be found at different heights on the trunk, depending on the beetle species. On stressed trees, pitch tubes may be absent, but reddish boring dust will be in the bark crevice. Needles of infested trees fade from green to yellow, and then red and brown. Adult beetles are 1/8 to 1/4 inches long and construct Y- or H-shaped galleries under the bark. These beetles, like the southern pine beetle, introduce the blue stain fungus into the tree. The fungus subsequently causes tree mortality by blocking the water conducting tissue.

Engraver beetles are most likely to be a problem in poorly managed, overstocked, and slow growing stands. As with the southern pine beetle, maintaining healthy, vigorously growing stands is the best way to avoid problems. Since engraver beetles infest trees that have been damaged by storms, lightning, or fire, salvaging such trees will minimize engraver beetle outbreaks. It also is important to avoid placing logging slash against live trees because Engraver beetles live in logging slash. Follow recommended practices for southern pine beetles to minimize the risk of attack.

3. Black Turpentine Beetle

Black turpentine beetles attack all species of southern pines and can become a serious pest. Attacks are often associated with stand disturbances such as lightning, wildfire, logging, storm damage and infestations of other insects. The adult black turpentine beetle is larger than the other pine bark beetles (1/4- to 1/3-inch long). It makes broad irregular galleries under the bark. The first evidence of attack is reddish to brownish-white masses of resin or pitch tubes about the size of

quarters or fifty-cent pieces occurring on the lower 12 feet of the stem. Turpentine beetles do not introduce the blue stain fungus into the trees. Attacks by the black turpentine beetle do not normally lead to tree mortality. More commonly, the attacks weaken the tree, making it more susceptible to other destructive insects. Problems with black turpentine beetle can be prevented by minimizing site disturbances and damage to residual trees during harvesting operations. Follow recommended practices as outlined for other pine bark beetles above.

4. Pine Web Worm

Pine webworm can cause extensive defoliation in young pine stands. Heavy defoliation tends to coincide with droughts. This insect primarily attacks one and two year old seedlings. When larger trees are attacked injury is usually not severe. Most Georgia pines are attacked. Adult moths have a wingspread of 7/8 to one inch: hind wings and body are smoky gray; front wings have tufts of raised scales. Caterpillars are approximately 3/4 inch in length at maturity; tan to gray with two darker longitudinal stripes along each side. The pupae are 1/2 inch in length, robust and reddish.

Winter and spring are passed as pupae in the soil. In late June the adults emerge, mate and the females deposit the eggs on the needles. Weather is an important factor and greatly influences egg incubation. Cool temperatures may prolong the incubation period. The larvae hatch in August and feed on the needles. After feeding the larvae drop to the ground and pupate in an oval shaped cell. In Georgia there may be two generations per year. The larvae feed on the needles constructing masses of frass bound together with silk on the seedlings. These masses of excrement are usually 3 to 5 inches long surrounding the twigs and enclosing the basal portions of the needles. No control is necessary.

5. Pine Sawflies

Pine sawflies are defoliating insects. Eleven different species are commonly found throughout the south wherever the preferred hosts grow. The larvae consume the needles and feeding preferences are peculiar to each species. Most all sawfly species feed on old and current year foliage at some point in their development. Some species have one generation per year with defoliation occurring in the spring and others produce three or more generations with defoliation occurring on into the fall and winter. Fall and winter defoliations have greater impacts on trees and it is for this reason that sawflies having multiple generations are considered more devastating. Sawfly adults resemble large house flies but are actually broad-waisted wasps. The females are equipped with an ovipositor that is serrated which enables them to saw little slits in the needles where eggs are laid; thus the name sawflies. It's important for foresters to recognize sawflies and the damage they do. Defoliation by sawflies is sporadic, occurring in localized or region wide outbreaks lasting one to several years. Growth losses the year following a severe defoliation (>75%) can average over 50 percent and mortality increases due to secondary invasions by bark beetles and pine sawyers. Management practices have been developed to reduce the severity

of sawflies and they should be considered before planting. The management suggestions that may reduce the severity of sawflies are:

1. Consider herbicides to reduce hardwood competition.
2. Avoid planting on wet or droughty soils.
3. Avoid sites below an index of 65.
4. Monitor plantations frequently for sawfly damage. Most infestations begin on the edges of stands or are localized in a portion of the stand. Control with insecticides is most effective at this stage.

6. Pine Tip Moth

Tip moths attack all species of southern pines, except Longleaf; however, slash pine is somewhat resistant. Only small trees, usually less than 20 feet tall, are infested. Moderate to heavy tip moth infestations can cause a 3-5 cords/acre growth loss over a 25-30 year rotation. Attacks also cause tree deformity that may necessitate harvesting the tree as a less valuable product (for instance, pulpwood instead of sawtimber).

Tip moth larvae bore into the growing twigs of young pines. The first symptom of attack is resin-coated webs found at the shoot tips. The hollow, infested tips eventually turn brown and die. Small larvae or pupae can sometimes be seen when the tips are broken open. Chemical control of tip moth is possible but is considered impractical in forestland situations. The best management practice in minimizing damage from this insect is to plant Slash Pine or Longleaf Pine within their natural range rather than Loblolly.

7. Reproduction Weevils

Two species of reproduction weevils, the pales weevil and the pitch-eating weevil, are of primary concern in Georgia. These weevils attack all species of southern pine seedlings planted in cutover, storm-damaged, burned, or otherwise disturbed areas. Seedling mortality can be as high as 60 percent. Adult weevils are attracted to the odor of fresh pine resin. Eggs are laid in the large roots of fresh pine stumps where the larvae develop. Adult weevils emerge and feed on the tender bark of young seedlings. Most damage occurs from February through June, with some damage continuing on during the remainder of the summer and early fall. The following recommendations will help reduce damage:

1. Harvest timber and prepare sites 6 to 9 months before planting. Weevil larvae in large roots or stumps will have matured and left prior to planting (time operations to take advantage of the weevil's life cycle).
2. Prepare the site with prescribed fire. Mechanical methods may prolong the attractiveness of the area to weevils.
3. Plant chemically treated seedlings in March on heavily infested sites.

8. Annosus Root Rot

Annosus Root Rot is a fungal disease that can cause significant growth loss and mortality in recently thinned stands. Loblolly and Slash pine are most susceptible, but all southern pines can be infected. Spores of the fungus infect freshly cut stumps, and the fungus colonizes within the root system. Roots of adjacent trees are infected by contact with other trees' infected roots. Infected trees develop thin crowns, and trees begin to die two to three years after the thinning operation. Irregular infection centers develop as patches of trees die. Fruiting bodies of the fungus can sometimes be found at the bases of infected trees, often partially buried in the litter. They are irregularly shaped, brown on top, and white to light tan below. Infected trees are also susceptible to attack by pine bark beetles. Stands should be evaluated to determine the relative susceptibility to Annosus, and the possible need for special management practices. Generally, stands growing in deep, sandy, well-drained soils have a greater chance of severe infection. Low-hazard sites have poor internal soil drainage and high seasonal water tables, or the depth to clay is less than 12 inches.

Stands on high-hazard sites can be managed to reduce potential losses. Thinning should be made only once, late in the rotation. Trees can be spaced at least 8 x 8 feet apart or thin down to basal area of less than 70 square feet per acre. Prescribe burn at least twice before thinning, once within 6 months of the cut. Stumps should be treated with borax or *Phlebia gigantea*, a competing fungus, to prevent growth of Annosus spores. Thinning during the hottest months (May-August) on high-hazard sites may also reduce the chance of infection.

9. Fusiform Rust

Fusiform rust is one of the most destructive pine diseases in the South. The rust fungus kills many young pines (less than 5 years) and deforms trunks and branches, reduces growth, and increases the risk of wind damage in older trees. Losses in the form of mortality, degraded products, and growth reduction, are difficult to assess, but are in the millions of dollars each year. Fusiform Rust is a larger problem on well-drained, fertile, sandy soils than on poorly drained, infertile soils. Loblolly and slash are the most susceptible. To complete its life cycle, the fungus requires pines and oaks. The symptoms of the disease include spindle-shaped swellings on stems and branches, yellowish-orange, and the presence of powder-like spores on the swells in the spring. Infected trees often have crooked or multiple trunks.

Matching sites and species is important to avoid Fusiform Rust problems. Where possible, plant Longleaf Pine or at least genetically improved rust-resistant seedlings (Slash or Loblolly). On high-hazard sites, planting should be at close spacing to promote early, natural branch pruning. This practice will minimize the fungus spreading from branch galls to the main stem. In general, stands 9 to 15 years old, with less than 30 percent of the trees with main stem cankers, can be grown for pulpwood without early thinning. If more than 30 percent of the trees are infected, the stand may need to be selectively thinned to remove trees with severe trunk infections (galls around 50 percent or more of the trunk). Except for

very heavily infected stands, maintaining adequate stocking until normal rotation age is more cost-effective than harvesting early and regenerating.

10. Pitch Canker

Pitch Canker is a fungal disease that can infect most of the southern pines but more damage is done to slash, shortleaf and Virginia pines. It gains entrance into trees through wounds and insect feeding sites made by pine tip moths, the deodar weevil and beetles in the genus *Pityophthorus*. After the fungus gains entrance into the tree, the tips of terminal and lateral branches are often girdled and killed. Upon close examination of the dead shoots, the wood will be pitch soaked beneath the bark. The fungus also causes trunk cankers. Plantations adjacent to chicken houses or established on soils rich in ammonia often infected with Pitch Canker. The fungus apparently likes high concentrations of ammonia that's absorbed by pine needles and roots. The following management options are available for minimizing the impacts of this disease in pine plantations:

1. Target and remove most of the infected trees during thinning operations
2. Regulate stocking densities to avoid over crowding and individual tree stress.

H. Wildfire Prevention

Although extensive fire prevention and control programs have successfully reduced wildfire damage to southern forests, it is still a serious problem. Wildfires are more prevalent, burn more intensely, and cause more damage. Stands where there is a heavy buildup of fuels such as grass, weeds, pine needles, hardwood leaves, vines (ladder fuels), and downed branches are at increased risk of wildfire damage. An active prescribed burn program will help mitigate heavy fuel loading and benefit stand productivity. An active vegetation management program through the use of herbicides can help reduce the volatility of forest fuels. Quality road systems serve as excellent natural firebreaks and serve to provide access during possible fire suppression activities. Firebreak installation and annual maintenance plays a vital role in protecting your property and timber investment. Firebreaks should be used around the property perimeter as well as with stands. Stands divided up by firebreaks into 20-30 acre blocks are helpful in isolating prescribed burns and wildfires (such as lighting) to specific sections of the tract. Stand establishment and layout practices such as planting parallel to property lines and/or maintaining a 30 foot clean, fuel-free, or early successional vegetation buffer zone can also be used to mitigate wildfire encroachment from adjacent properties.

I. Pine Straw Production

Pine straw markets in South Georgia are in demand for Slash and Longleaf Pine straw. It is a growing market and unlike timber prices, prices for pine straw continue to remain stable and/or increasing. The current and future market forecast for pine straw remains

good. In consideration of these facts, landowners who have soils conducive to the production of Slash or Longleaf Pine may wish to consider potential income from pine straw production. Pine straw removal is variable, depending on stand conditions and operator efficiency. From 1200 to 4100 lbs/acre of straw are removed in a typical operation with the average removal of about 2240 lbs/acre. The dry weight of bales is relatively constant at about 15 to 18 lbs/bale, thus, an average of about 135 bales/acre are removed in commercial pine straw harvesting operations. Fertile soils and old field sites have the potential to produce up to 300 bales per acre. Pine straw harvesting represents an attractive income opportunity in pine stands before commercial harvest. Annual income from pine straw harvests shortens the period over which initial investments in regeneration must be held, and provides a source of income for intermediate silvicultural treatments such as competition control and fertilization, which can increase the value of final timber harvest.

Despite the potential benefits afforded by pine straw harvest, it can have detrimental impacts on forest stand growth. Each year a major portion of the nutrients absorbed by a stand of trees is returned to the soil in pine straw. When pine straw is raked, these nutrients are removed and tree growth can be reduced. Fertilization practices will help offset this nutrient loss. Before making fertilize applications obtain foliar and soil samples and target treatments based on those results. If samples are not taken, you may apply 150-200 lbs of Nitrogen per acre, 40-50 lbs of Phosphorus per acre, and 40-50 lbs of Potassium per acre (every 3-5 years during pine straw removal operations). Competition control will also play a vital role to the success of pine straw operations. It is easier and more cost-effective to control understory vegetation from the start rather than waiting until you plan to begin pine straw collection operations. Controlling understory vegetation early on enhances tree growth and at the same time helps facilitate future pine straw operations.

GLOSSARY OF FORESTRY AND WILDLIFE TERMS

Acid soils: Soils with a pH value of 6.9 or less, which favor pine tree establishment rather than hardwoods.

Acre: An area of land that measures 43,560 square feet or 10 square chains. A square acre would be 208.71 feet by 208.71 feet, and a circular acre would have a 117.75 foot radius.

Ad-Valorem Tax: An annual tax assessed on the basis of the land value.

Aesthetics: Appealing benefits, mental and physical, such as natural beauty that humans see within an environment.

Annual: A plant that grows, reproduces, and dies within one year.

Artificial Regeneration: Establishing a forest by planting or direct seeding.

Aspect: The cardinal direction toward which a slope faces.

Banks: The sides of a water carrying channel.

Bareroot Seedlings: Seedlings grown in a nursery bed, lifted and shipped without soil around roots.

Basal Area: The cross sectional area of a tree, in square feet, measured at breast height. Used as a method of measuring density within of a stand of timber. $.005454154 \cdot \text{DBH}^2$

Basic soils: Soils with a pH value between 7.1 and 14.0.

Bed: Bottom of water channel.

Bedding: A mechanical site preparation technique where top soil is mounded into rows. Trees planted on top of the mounded rows will be well drained, and will benefit from the concentration of organic matter and nutrients.

Best Management Practices (BMP's): A set of recommended guidelines that limit negative impacts on the land in relation to silvicultural practices. Management recommendations that minimize soil erosion and protect water quality during timber harvest, herbicide application, prescribed burning, road construction, reforestation, and firebreak plowing.

Board foot: Unit of wood that measures 1 foot by 1 foot by 1 inch (144 cubic inches) used to describe the volume of lumber that sawed logs will produce.

Bole: The main section of a tree (trunk).

Browse: Vegetative material that is consumed by wildlife.

Buffer: A strip or zone of standing or felled trees, vegetation, or land feature that serves a designated purpose such as a wildlife shelter, windbreak, visual screen, insect and disease control, access, fire protection, etc.

Canopy: The upper-leaved portion of trees and shrubs that intercept light. Pertains to the overstory or crown of a tree or shrub.

Chain: Unit of measure commonly used in forestry equal to 66 feet (10 square chains = 1 acre).

Chopping: Site preparation technique in which a large drum surrounded with sharp blades is pulled behind a machine to crush and cut slash, debris, and vegetation.

Clear-cutting: Method of total and complete timber harvest that removes all trees from a designated stand regardless of size, species, or quality.

Climax Community: Final stage in the ecological succession process. Vegetative community that has the ability to perpetuate itself indefinitely. Commonly used to describe a vegetative community and the wildlife species associated with the final stage of succession. For example a closed canopy composed of hardwood species.

Codominant trees: Trees that receive full sunlight from above and little on the sides. Located just below the dominant trees within the canopy.

Commercial: Action that results in a profit. For example a commercial thinning operation would produce income for the landowner.

Compartment: Areas that have similar site composition/features. Commonly used to divide large or diverse tracts into smaller units that facilitate certain management practices.

Competition: The push for survival that occurs when two or more species of organisms, trees, vegetation, or wildlife draw from similar resources.

Cord: A measure of wood volume to include the wood, bark, and air space if stacked 4 feet high by 4 feet wide by 8 feet long (128 cubic feet).

Corridor: A forested, brushy, or grass travel way where wildlife can easily/readily move from one patch of land to another.

Cost share: Financial assistance provided to landowners by a state or federal agency for specific management practices. Typically expressed as a percentage of the average implementation costs.

Critical Habitat: An area that provides food, water, air, shelter, and all other needs for survival to species that are protected under the Endangered Species Act.

Crown: The upper portion of a tree to include the trunk branches and leaves.

DBH: Diameter at Breast Height. The diameter of a standing tree measured at 4.5 feet above ground on the uphill side of the tree (roughly breast height).

Deck: The site used to sort and load logs onto a transport vehicle. Also called a ramp, loading deck, landing, or brow.

Designated Wetlands: Wetland areas that are protected by the federal government. Also called Jurisdictional wetlands.

Diameter: The length of a straight line passing through the center of a circle to the outer edge. Tree diameter is typically measured at 4.5 feet above ground "diameter at breast height".

Disking: Disturbance of soil, plant, and organic matter by harrowing to improve/prepare area for planting; used to promote early successional habitat and control undesirable competition.

Dominant tree: A tree whose crown extends above the general canopy and receives full sunlight from above.

Duff (litter layer): Accumulation of leaves, branches, stems, trees, and other forest vegetation which forms a layer of decayed and decaying material.

Easement: Granted permission for limited land use by a landowner to another party as an interest, right, or ability.

Ecosystem: A community of interdependent and interacting organisms along with the physical environment.

Edge: An area where two different habitat types meet.

Endangered species: An organism that will become extinct if not protected.

Exclosure: A small, fenced in area within a wildlife food plot that prevents animal access; serves as an indicator as to the extent that wildlife utilizes a food plot.

Fell: To cut and/or remove standing trees or vegetation.

Firebreaks: Natural or constructed barriers that will prohibit the spread of fire.

Food plot: Areas established and planted to provide supplemental food for wildlife.

Game species: Wildlife that is managed and hunted for recreation.

Ground cover: Low-growing vegetation to include grasses, forbs, vines, and shrubs.

Habitat: An area in which organisms live and grow.

Hardpan: An area within the soil layer where soil is severely compacted; soil layer that prohibits plant/root growth.

Hardwoods: Broadleaf tree species such as oak, elm, ash, and maple (does not imply that wood produced is “hard”).

High-grading: Harvesting practice which removes trees of higher commercial value and leaves a stand of poor quality trees of lesser value (depletes timber productivity).

Impoundment: Blocking of the natural drainage of an area to create a accumulation of water to support waterfowl management.

Intermittent stream: Well-defined channels that contain water only during certain times of the year.

KG blade: Blade mounted on the front of a crawler tractor that is used to clear brush and debris in the preparation for planting trees.

Label: Clear and specific instructions from the manufacturer (often mandated by federal government) as to when, where, and how a product is to be used.

Lease: Written agreement between the landowner (lessor) and a land user (lessee). Grants permission to use the land for a specified purpose or activity.

Live Crown Ratio: The length of live crown expressed as a percentage in relation to total tree height.

Matrix: A landscape which contains many different habitat types.

Merchantable timber: Trees managed for a particular product that may be sold for a profit.

Midstory: The intermediate layer of a forest between the understory and the tree canopy.

Multiple use: Land management philosophy for more than one purpose. Typically a management scheme for timber, wildlife, recreation, air, and aesthetics.

Natural regeneration: Seedlings which originate from seeds or sprouts of existing “parent” trees on or near the site.

Non-game species: Wildlife species that are not hunted.

Non-point pollution: Pollutants which cannot be traced back to one identifiable source but comes from a broad area.

Nutrients: Substances found in the soil such as nitrogen, potassium, and phosphorus which supports plant growth. Substances which support life processes of organisms.

Overstocked: A tree density which exceeds the point of optimal timber growth and/or reduces wildlife habitat suitability.

Overstory: (See canopy).

Perennial: A plant which lives for more than one growing season (resprouts from seeds or undergoes vegetative reproduction).

Perennial stream: A well-defined channel which contains water year round under normal climatic conditions.

Pioneer species: Tree or plant species which readily colonizes an area immediately following a soil disturbance (typically light-seeders).

Point-source pollution: Pollutants that can be linked to a specific source.

Pollutants: Elements which enter water and/or air and sacrificing their physical integrity.

Prescribe burning: The knowledgeable application of fire in a controlled manner to accomplish pre-determined and well-defined management objectives.

Reforestation: Restocking, regrowth, or revitalization of a forest through artificially planted seeds/seedlings or through natural regeneration. Actions which result in newly established trees.

Release: The removal or deadening of trees, brush, or herbaceous vegetation to promote growth of remaining target species.

Residual: Standing trees or basal area remaining in a stand after a harvesting operation.

Riparian zone: Area adjacent to a body of water which is often influenced by flooding.

Rutting: Impressions in the ground after soil has been compacted with a large piece of machinery.

Salvage Cut: Removal of dead or damaged timber immediately following a natural disturbance before wood becomes un-merchantable.

Sanitation cut: Removal of trees that are highly susceptible to damage by insects or disease.

Scats: Wildlife fecal droppings.

Sediment: Soil particles that are suspended or deposited in a body of water (may also be considered as a source of pollution).

Seed tree method: Harvesting all trees from a forest at once except for a few scattered trees which will re-seed the site. Certain guidelines should be followed when using this type of regeneration method.

Selection method: Periodic harvesting of individual or small groups of trees as a method of un-even aged management.

Shade tolerance: The ability or inability to survive under shaded conditions.

Shearing and raking: Site preparation technique using a large cutting blade mounted on a tractor to shear trees and vegetation then a second tractor with a rake implement pushes debris into piles.

Silviculture: The establishment, maintenance, and harvesting of trees in a forest stand.

Single-tree selection: Harvesting individual trees as a method of un-even aged management that is commonly used on sensitive sites.

Site Index: A measure of timber production potential of a particular area expressed as the average height of dominant and co-dominant trees at a certain base age such as 25 or 50 years.

Site preparation: The use of mechanical and/or chemical treatments to prepare an area for planting.

Skid (skidding): The act of dragging felled logs to the loading area.

Skid trails: Lanes created by dragging logs to loading areas.

Slash: Debris such as tree stems, tops, branches, or leaves left behind after a harvesting operation.

Snag: A standing dead tree which is often left, created, or protected to serve as a habitat component for wildlife.

Softwoods: Evergreen, cone bearing, trees with needles or scale-like leaves (examples: pines, spruces, firs, and cedars).

Stand: An area of with similar characteristics such as age and species composition that is treated as a single management unit.

Stocking density: Typically illustrated as the number of trees per acre and/or basal area per acre and is used to make specific management recommendations.

Streamside Management Zone (SMZ): A strip along each side of a stream which is composed of tree and brush species that are left intact during harvesting operations.

These areas serve to prevent/minimize erosion and sedimentation, maintain water quality, and improve wildlife habitat.

Succession: The natural change and progression of vegetative communities over time.

Supplemental planting: Direct seeding or planting of seedlings as a desired wildlife food.

Threatened species: A species which is likely to become endangered in the foreseeable future.

Thinning: The removal of trees to reduce stocking level and to focus site productivity on fewer and higher quality trees.

Tree shelters: A mechanism typically made of polyethylene, polypropylene, wire, etc. which serves to protect newly established trees from browsing by wildlife.

Water bar: A hump or small wall of soil approximately 2 feet in height installed at 30 degree angles across a road, skid trail, or firebreak down slope to slow down and divert surface water out of the road, trail or firebreak.

Water Turnout: The extension or spur off of a road, skid trail, or firebreak into an undisturbed vegetated area down slope to provide for the dispersion and filtration of surface water runoff. Turnouts are used in conjunction with water bars. Construct turnouts in a J-shaped fashion off of the road, trail, or firebreak.

Wildfire: Fires which burn out of control and lack specific management objectives.

Windrow: Linear structures created by raking/pushing debris into long strips following a harvest operation.

Appendix Items

- Georgia Forestry Commission Seedling Price List & Order Form
- Scale Maps 1 inch= 660 feet (located on the outside sleeve of the back cover)

PLAN CRITERIA CHECK LIST

For (landowner or farm name): The City of Savannah

1. Landowner Objective: Landowner objectives have been clearly stated?

Yes ☒ No ☐

2. Plan was prepared with or verified as meeting the minimum standards of a Forest Stewardship Management Plan by a professional resource manager and authorship is documented?

Yes ☒ No ☐

3. Plan describes current forest condition or condition class of the property? Plan describes desired forest condition or condition class, and includes practices and activities aimed at reaching the desired forest condition or condition class?

Yes ☒ No ☐

4. Plan documents a feasible management strategy and timeline for implementing conservation practices over a 10 year period. Recommendations are site specific and will protect or enhance all resource elements that are present?

Yes ☒ No ☐

5. Plan describes any suggested monitoring activities to be done by the forester, other natural resource professional, or landowner?

Yes ☒ No ☐

6. The plan preparer has considered, described and evaluated resource elements present and their importance to the ownership. Resource elements to be considered may include: Soil and water, biological diversity, aesthetic quality, recreation, timber, fish and wildlife, threatened and endangered species, forest health, archeological, cultural and historic sites, wetlands, and fire.

Yes ☒ No ☐

7. The landowner's understanding may be improved by including additional information appendices. Appendices might include: Descriptions of assistance available and incentive programs, educational materials, a glossary of terms, an explanation of applicable federal, state and/or county regulatory programs, especially as they apply to: archeological, cultural and historical sites, wetlands and threatened and endangered species. Appropriate appendices included?

Yes ☒ No ☐

8. Aerial Photograph and Shape file: These are required in all plans and obtainable through the Georgia Forestry Commission local office, but may be obtained from other sources. Photo and shape file included?

Yes ☒ No ☐

Plan writer: *Michael Hinson*

Date January 23, 2019

(Note: this check sheet should be completed for each FSP and a copy should be uploaded into the stewardship database as a part of the plan.)