

Moree, Harsh, & Walker
Natural Resource Consultants

2199 Self Creek Road
Starkville, MS 39759
(601) 441-4529
jlm171@msstate.edu

Management Plan
Coontail Farms
Owner Bobby Watkins

April 21, 2005

Submitted to:

Dr. Ian A. Munn
Associate Professor
Department of Forestry
Mississippi State University
Box 9681
Mississippi State, MS 39762-9681

Submitted by:

Crew 2

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Mr. Bobby Watkins
2220 Amelia Lane
Starkville, MS 39759

Dear Mr. Watkins,

Attached is the Management Plan for Coontail Farms; Aberdeen, Mississippi. Data was collected during a preliminary cruise on January 27th, and February the 3rd and 7th, 2005, and a final cruise done on February 22nd, 24th, 28th, and March 1st, 2005. This management plan has been prepared to assist you in managing Coontail Farms according to your management objectives, and is in partial fulfillment of course requirements for FO 4423 Professional Practices. If you have any questions or concerns feel free to contact us at (601)441-4529.

Sincerely,

Josh Moree

Eddie Harsh

Tyler Walker

Enclosure

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Executive Summary:

This management plan was made for Mr. Bobby Watkins, owner of Coontail Farms, Monroe County, Mississippi by Moree, Harsh, & Walker Natural Resource Consultants. It will allow Mr. Watkins to effectively manage his property for a balance of forestry and wildlife giving him a detailed plan of action to follow.

The property consists of two sections separated by Coontail Road in Monroe County, Mississippi. There are approximately 173 acres of forested land on the east of Coontail Road that make up Coontail Farms. Stands of mature upland hardwoods, bottomland hardwood, and pine plantations make up these acres. On the west side of Coontail Road, West Property, there are approximately 230 acres of forested land. Here stands consist of low quality undesirable species and a recently planted loblolly pine plantation. These properties provide a wide variety of habitat types that support local wildlife species that include: white-tailed deer, eastern wild turkey, waterfowl, squirrel, other small mammals, and numerous song birds. The property is aesthetically pleasing and provides unlimited recreational opportunities such as hunting, fishing, trail riding, wildlife watching, camping, and hiking. Mr. Watkins' also uses the property as an outdoor classroom to educate others in managing their own properties.

Objectives in this management plan is to enhance habitat for wildlife, promote a variety of forest types, enhance biological diversity at the local level, protect and enhance wetlands and riparian zones, and discourage/eliminate exotic plants. Management in the hardwood stands will be minimal to get rid of undesirable species and promote desired mast producing species. The current pine stands will be managed by doing a proposed selective second thin at around age 20 and a harvest at age 30. Food plots will be used to

supplement native vegetation and increase the quantity and quality of the food availability throughout the year for wildlife.

This type management may be intensive and costly, it meets the landowner's objectives to not solely maximize his revenue for the property, but also provide a balance between forestry and wildlife. By accomplishing these objectives, Coontail Farms and West Property will provide enjoyment for future generations.

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Many hours of research, data collection, analysis, interpretation, and writing have gone into preparing this plan. We would like to thank Mr. Bobby Watkins for allowing us on his property and the manner in which he communicated his goals for Coontail Farms for us to conduct this class project. Also, we would like to express our thanks to the following individuals for their contributions to this management plan:

A. Ezell, I. Munn, B. Bingham, S. Edwards, A. Castle, and D. Stringer.

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Introduction:

This management plan was developed by Moree, Harsh, & Walker Natural Resource Consultants for Coontail Farms, and is in part of course requirements for FO 4423 Professional Practices. It was developed by using class guidelines, data from the Inventory Proposal and Inventory Report (Moree, Harsh, and Walker, 2005), and field observations.

To meet landowner objectives, the forested portion of the property was inventoried to determine volume, basal area, and trees per acre. A systematic 2.9% cruise was performed on merchantable timber using 10th acre plots yielding volumes per acre by product class, and a systematic 0.5% cruise in the pre-merchantable stand using 100th acre plots to determine mean stocking per acre (See Tables 1 and 2).

The remainder of this management plan consists of 1) landowner objectives; 2) property description, including history, stand descriptions, soils, wildlife, recreational potential, and a property level summary of the timber inventory; 3) description of the management objectives; 4) description of the management regimes; 5) stand prescriptions and harvest schedule; 6) property descriptions at the end of the planning period; 7) economic summary; 8) plan for monitoring and evaluation; 9) conclusion; 10) literature cited; and 11) appendix.

Landowner Objectives:

Mr. Watkins' objectives for Coontail Farms are to:

- Enhance habitat for wildlife species, specifically wild turkey, whitetail deer, native songbirds, and game birds.
- Promote a variety of forest types.
- Enhance biological diversity at a local level.
- Restore native ecosystem elements.
- Protect and enhance wetlands and riparian zones.
- Discourage or eliminate exotic plants.
- Provide an outdoor classroom for educational purposes by developing a self-sustaining property that will allow demonstration on the benefits of proper forest management and the benefits forest management has for wildlife habitat improvement.

There are no constraints that may limit the implementation of this management plan or the achievement of these objectives.

Property Description:

Mr. Watkins' property consists of 525 acres that are located in Monroe County, Mississippi approximately two miles north of Aberdeen on Coontail Road. Coontail Road separates his 525 acres into two parcels: 225 acres to the east of the road, Coontail Farms; and 300 acres to the west, West Property (See Figure 1). On Coontail Farms, 190 acres have been owned by the Watkins family for several decades. The forest type on this portion of the property consisted of approximately 104 acres of loblolly pine plantation, 24 acres of mixed hardwood/pine, and 51 acres of hardwood. Of this part of the property, approximately 66 acres was previously farmed for soybeans. In 1989, it was planted with loblolly pine (*Pinus taeda*) and placed into the Conservation Reserve Program (CRP). Another 27 acres of the property was previously pasture land with mixed pine/hardwood stand. This acreage was harvested and planted with loblolly pine in 1986. Approximately 11 acres of the property was previously a bermuda grass (*Cynodon* spp.) hay field. Here the acreage was prepared and planted with loblolly pine in 1990. A 35 acre block has just recently been purchased on the east side of Coontail Road adjoining the 190 acres previously owned. This land has previously and currently being used as agriculture field for crops. The remaining acres of Coontail Farms consist of ponds, food plots, and home sites.

The West Property has had several owners in the last generation and was purchased a year ago. The majority of this property occurs in a 16th Section, but it is privately owned due to being part of an Indian Treaty in the past. The acreage consists of approximately 148 acres of natural hardwood stands, 82 acres of planted pine, and 55

acres of open fields. The majority of this property was used as pasture land during the past 10 years. Prior to being pasture land, it was previously farmed for soybeans.

Stand Descriptions:

Coontail Farms is broken down into 8 stands: a 1989 pine stand (CP1), a 1986 pine stand (CP2), a 1990 pine stand (CP3), a hardwood stand (CH4), a mixed pine/hardwood stand (CM5), another mixed pine/hardwood stand (CM6), an agriculture field (CNF), and a wetland stand (CW). West Property is broken down into 5 stands: a beaver wetland stand (WBW), a cypress/cutover stand (WCC), a planted pine stand (WPP1), a scrub oak/sweetgum/maple stand (WSM), and a sugarberry/osage-orange Stand (WSO) (See Figure 1).

Stand CP1 (See Figure 1) is approximately 66 acres of loblolly pine planted in 1989 under the CRP. Before being planted in pine, this land was planted in soybeans. Trees were marked and thinned by removing every 5th row during the summer of 2001 with a prescribed burn done in 2002. This stand is being intensively managed using several different herbicide/burn treatments by the owner. CP1 is predominantly chip-n-saw sized loblolly pine (SI = 95), with little pulpwood and sawtimber mixed throughout. There were considerable fusiform rust (*Cronartium fusiforme*) and forked trees. The overall vigor and health of the stand is fair. There were only remnants of sweetgum (*Liquidambar styraciflua*), boxelder (*Acer negundo*), American beautyberry (*Callicarpa americana*), blackberry (*Rubus* spp.), sumac (*Rhus* spp.), and greenbriar (*Smilax* spp.) located in the midstory and understory of the stand due to herbicide application and prescribed burns done on a 2-3 year cycle by Mr. Watkins. Boundary lines are clearly delineated by Coontail Road on the west, property line to the north, disked interior roads

on the east and south. There are 4.8 tons of pine sawtimber, 47.1 tons of pine chip-n-saw, and 9.9 tons of pine pulpwood per acre in stand CP1 (See Table 3). There were 220 TPA and a basal area (BA) per acre of 108 for this stand (See Table 4).

Stand CP2 (See Figure 1) is approximately 26.7 acres of loblolly pine planted in 1986. Before being planted, it was previously a mixed hardwood/pine stand in a pasture. Trees were marked and thinned by removing every 5th row in the summer of 2001 with a prescribed burn done in 2002. CP2 is predominantly chip-n-saw sized loblolly pine (SI = 95), with little pulpwood and sawtimber mixed throughout. There were considerable fusiform rust and forked trees evident. Overall stand vigor and health are fair. Remnants of American beautyberry, sumac, and blackberry were located in the midstory and understory of the stand due to Mr. Watkins applying herbicides and prescribed burning in the stand on a 2-3 year cycle. Boundary lines are clearly delineated by interior roads on all sides. There are 13.4 tons of pine sawtimber, 35.8 tons of pine chip-n-saw, and 7.0 tons of pine pulpwood per acre in stand CP2 (See Table 3). There were 182 TPA and a 95 BA per acre for this stand (See Table 4).

Stand CP3 (See Figure 1) is approximately 11 acres of loblolly pine planted in 1990. CP3 is predominantly chip-n-saw sized loblolly pine (SI = 95), with little pulpwood and sawtimber mixed throughout. Previously this land was planted in bermuda grass for hay. Trees were marked and thinned by removing every 5th row in the summer of 2001. Overall stand vigor and health are good. No understory or midstory vegetation was found in this stand due to herbicide application and prescribed burning by Mr. Watkins. Boundary lines for the stand are clearly delineated by interior roads on the north, northeast, and east, and by green fields and ponds to the south and southwest.

There are 2.7 tons of pine sawtimber, 43.7 tons of pine chip-n-saw, and 11.8 tons of pine pulpwood per acre in stand CP3 (See Table 3). There were 220 TPA and a 101 BA per acre for this stand (See Table 4).

Stand CH4 (See Figure 1) is an upland hardwood stand consisting of approximately 45.3 acres of primarily white oak (*Quercus alba*), cherrybark oak (*Quercus pagoda*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), sweetgum, yellow poplar (*Liriodendron tulipifera*), and hickory (*Carya* spp.). SI for mixed upland oaks in this stand is 65. This stand is estimated to be 70⁺ years old by Mr. Watkins. CH4 is predominantly sawtimber, with a little chip-n-saw and pulpwood mixed throughout. Overall stand vigor and health are fair. The predominate understory species are sweetgum, red maple (*Acer rubrum*), black cherry (*Prunus serotina*), hickory, and flowering dogwood (*Cornus florida*). On 4.3 acres these undesirable species have been injected with Arsenal AC. Boundary lines are clearly delineated on the north, south, and east by the property line, and the west by interior roads. There are 41.1 tons of oak sawtimber, 19.2 tons of miscellaneous hardwood sawtimber, 0.5 tons of pine chip-n-saw, 10.1 tons of hardwood pulpwood, and 0.2 tons of pine pulpwood per acre in stand CH4 (See Table 3). There were 117 TPA for this stand (See Table 4).

Stand CM5 (See Figure 1) is approximately 11 acres of primarily loblolly pine and various hardwood species. SI for loblolly pine is 85 and 65 for the mixed upland oaks in this stand. This stand is estimated to be 70+ years old by Mr. Watkins. CM5 is predominantly sawtimber and pine chip-n-saw, with little pulpwood mixed throughout. Overall stand vigor and health are fair. The predominate understory species are sweetgum, red maple, hickory, and sugarberry (*Celtis laevigata*). Boundary lines are

clearly delineated on all sides by either interior roads or the property line. There are 10.3 tons of oak sawtimber, 9.6 tons of miscellaneous hardwood sawtimber, 19.2 tons of pine sawtimber, 9.6 tons of pine chip-n-saw, 5.4 tons of hardwood pulpwood, and 6.1 tons of pine pulpwood per acre in stand CM5 (See Table 3). There were 158 TPA for this stand (See Table 4).

Stand CM6 (See Figure 1) is approximately 13 acres of loblolly pine, oak species, yellow poplar, and miscellaneous hardwoods. CM6 was broken out from CM5 because it was recently purchased and Mr. Watkins wants to keep it separate from stand CM5. CM6 is predominantly sawtimber and pine chip-n-saw, with little pulpwood mixed throughout. SI for loblolly pine is 95 and 65 for mixed upland oaks in this stand. Overall stand vigor and health are fair. The predominant understory species are sweetgum, red maple, sugarberry, yellow poplar, and privet (*Ligustrum* spp.). Boundary lines are clearly delineated on the north by open field or property line, east by a disked property line, south by the property line, and west by Coontail Road and open field. There are 1.6 tons of oak sawtimber, 13.6 tons of miscellaneous hardwood sawtimber, 24.4 tons of pine sawtimber, 10.8 tons of pine chip-n-saw, 15.8 tons of hardwood pulpwood, and 5.8 tons of pine pulpwood per acre in stand CM6 (See Table 3). There were 221 TPA for this stand (See Table 4).

Stand CNF (See Figure 1) is approximately 22 acres of old agriculture field. This stand has currently been disked and partially subsoiled to plant loblolly pine, oak species, and bunch grasses in the future. Boundary lines for the stand are clearly delineated by stand CP1 on the north, CM6 to the east and south, and Coontail Road to the west.

Stand CW (See Figure 1) is approximately 6 acres of wetlands consisting of bottomland hardwoods such as bald cypress (*Taxodium distichum*), oak species, and hickories. This stand is estimated to be 80⁺ years old by Mr. Watkins. CW is predominately sawtimber, with little pulpwood mixed throughout. Overall stand vigor and health are fair. Boundary lines are clearly delineated on the west, south, and east by stand CH4, and to the north by the property line.

Stand CGF (See Figure 1) is approximately 7.8 acres of green fields that are planted annually for white-tailed deer and eastern wild turkey. This stand is accessed by interior roads and hunting stands overlooking the green fields. Enclosures are also located in the green field to determine the wildlife use of the green fields.

Stand CHS (See Figure 1) is approximately 5 acres of home sites consisting of 3 homes and surrounding yards.

Stand WBW (See Figure 1) is approximately 18 acres of scrub oaks, red maple, sweetgum, black willow (*Salix nigra*), and sugarberry. WBW is a non-merchantable product class. No SI was given in the Soil Survey for soils occurring in this stand for hardwood, but should match that of surrounding stands. Due to standing water year round, the stand is presumably inaccessible to any kind of timber management or timber operations. There are beaver dams and damage throughout the stand. Boundary lines are clearly delineated on the south by Matubby Creek, west by an interior road and a green field, north by stand WPP1, and east by an interior road and old field.

Stand WCC (See Figure 1) is approximately 14.3 acres of bald cypress and cutover land surrounding an oxbow lake. No SI was given in the Soil Survey for soils occurring in this stand for hardwood, but should match that of surrounding stands. This

stand primarily consists of a buffer strip of bald cypress around an oxbow lake. Prior to being purchased this stand was clear cut. Boundary lines are clearly delineated on the south and east by property line, north by stand WPP1, and west by an interior road and an old field.

Stand WPP1 (See Figure 1) is approximately 82.3 acres of old pasture land. There is an old barn, roads, and a couple of fish ponds located in this stand. This land was sectioned off and sprayed with different herbicide treatments and burned before being planted. It was subsoiled on 10 foot centers running north and south. Loblolly pine seedlings were machine planted in late February on approximately 80 acres of the old pasture land. There is an average of 568 TPA (See Table 2). SI for loblolly pine in this stand is 95. Boundary lines are clearly delineated on the east by the property line, north by stand WSM and green fields, west by stand WSO, and the south by green fields, old field, beaver wetlands, and stand WCC.

Stand WSM (See Figure 1) is approximately 63.5 acres of scrub oaks, sweetgum, and maple with no merchantable value. SI for bottomland hardwoods on this stand is 105. This stand was also covered with water backed up from the beaver wetlands. Prior to being purchased this stand was high graded. Boundary lines for this stand are clearly delineated to the north and east by property lines, west by Matubby Creek, and the south by green fields, old fields, beaver wetland, and stand WPP1.

Stand WSO (See Figure 1) is approximately 52.6 acres of sugarberry and osage-orange (*Maclura pomifera*). WSO fell in a non-merchantable product class. SI for bottomland hardwoods on this stand is 105. Species found in the understory were privet and switchcane (*Arundinaria gigantea*). Privet was found along the edges of the green

fields, and switchcane along Matubby Creek. Boundary lines are clearly delineated to the west and south by Matubby Creek, north by stand WPP1, and the east by green fields, old fields, beaver wetlands, and stand WPP1.

Stand WGF (See Figure 1) is approximately 40⁺ acres of green fields planted annually for white-tailed deer. This stand has interior roads to access each of the 4 green fields with box stands overlooking them.

Stand WOF (See Figure 1) is approximately 11⁺ acres of old pasture land that was not planted with loblolly pine or as a green field. In the future, this stand may be either converted to green fields, planted pines or hardwoods. SI for this stand will match those of surrounding stands.

Soil Description:

Five soil associations occur on Coontail Farms & West Property (See Figure 4). They are: Houlka-Leeper-West Point, Ora-Savannah, Myatt-Stough-Tilden, Bibb-Mantachie-Alluvial, and Ruston-Cuthbert-Luverne. Soils that occur within these associations are as follows: Bibb and Mantachie (Bm), Prentiss fine sandy loam (PrA), Alluvial land (Al), Catalpa silty clay (Cs), Ora Loam (OrC₃), Stough fine sandy loam (St), Myatt fine sandy loam (My), Sandy alluvial soil (Sa), Ruston and Luverne (RtD₂), Ora fine sandy loam (OaB), and Ora fine sandy loam (OaC₂).

Houlka-Leeper-West Point association (See Figure 4) is characterized by being moderately well drained and somewhat poorly drained soils on bottom land along streams flowing from the prairie section. Catalpa soils are found in this association. Their surface layer is dark grayish-brown silty clay, and subsoil is light olive-brown silty clay. Suitable trees for this association are: loblolly pine, cherrybark oak, sweetgum, southern

red oak (*Quercus falcata*), and red maple. Seedling mortality and erosion hazard are slight on these soils, and equipment limitation is moderate or severe.

Ora-Savannah association (See Figure 4) consists of moderately well drained soils of the upland that have fine sandy loam or silt loam surface soil and silt loam or clay loam subsoil with a fragipan. Ora soils are found within this association. They have a brown or dark grayish-brown surface layer and a brown and yellowish-brown loam and clay loam subsoil. A fragipan occurs at a depth of about 20 inches. Suitable trees for this association are: loblolly pine, shortleaf pine (*Pinus echinata*), sweetgum, and red oak. Seedling mortality is slight, equipment limitation is slight, and erosion hazard is slight or moderate on these soils.

Myatt-Stough-Tilden association (See Figure 4) is poorly drained to moderately well drained soils on nearly level and gently sloping stream terraces. Myatt, Stough, and Prentiss soils occur within this association. Myatt soils are poorly drained and have a gray or very dark gray fine sandy loam surface layer and a light brownish-gray sandy loam to sandy clay loam subsoil. Stough soils are somewhat poorly drained. Their surface layer is of dark-brown or dark grayish-brown fine sandy loam and a subsoil of yellowish-brown loam. Prentiss soils are moderately well drained. Their surface layer is grayish-brown or brown fine sandy loam, and their subsoil is yellowish-red, strong-brown, or brown silt loam or loam. Suitable trees for Myatt soils are: loblolly pine, shortleaf pine, red oak, sweetgum, and black tupelo (*Nyssa sylvatica*). Trees suitable for Stough soils are: loblolly pine, shortleaf pine, cherrybark oak, and sweetgum. Suitable trees for Prentiss soils are: loblolly pine, shortleaf pine, sweetgum, and red oak. All three soils have a slight seedling mortality. Erosion hazard is slight for the Myatt and

Stough with the Prentiss having a slight or moderate erosion hazard. Equipment limitation is moderate for the Myatt and Stough with the Prentiss having a slight equipment limitation.

Bibb-Mantachie-Alluvial association (See Figure 4) are sandy soils on the bottom land of the Coastal Plain. Bibb, Mantachie, and Alluvial soils occur in this association. Bibb soils are poorly drained, and the Mantachie soils are somewhat poorly drained. They both have a dark-brown or dark grayish-brown surface layer that varies in texture. Their subsoil is mottled gray, brown, and yellow loam and sandy loam. Alluvial land varies in texture and drainage. Suitable trees for these soils are: cherrybark oak, loblolly pine, shortleaf pine, and sweetgum. The seedling mortality and erosion hazard is slight for these soils, and the equipment limitation is severe on these soils.

Ruston-Cuthbert-Luverne association (See Figure 4) are soils on narrow ridges and steep side slopes. Ruston and Luverne soils occur in this association. The Ruston and Luverne soils are well drained, and have a brownish silt loam or sandy loam surface layer. Their subsoil ranges from yellowish red to dark red in color and from sandy loam to sandy clay in texture. Suitable trees for this association are: loblolly pine, shortleaf pine, sweetgum, and red oak. Seedling mortality is slight, erosion hazard and equipment limitation is slight or moderate on these soils (Murphree et al., 1961).

Wildlife:

Through ancillary observations, the following mammal species were determined to be present on Coontail Farms & West Property: white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), beaver (*Castor canadensis*), armadillo (*Dasypus novemcinctus*), and raccoon

(*Procyon lotor*). Avian species included eastern wild turkey (*Meleagris gallopavo*), American crow (*Corvus brachyrhynchos*), black vulture (*Coragyps atratus*), red-shouldered hawk (*Buteo lineatus*), hooded merganser (*Lophodytes cucullatus*), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), gadwall (*Anas streppa*), and various passerines.

Recreational Potential:

The recreational potential for this property seems unlimited. There are huntable populations of white-tailed deer, eastern wild turkey, and waterfowl on the property. Fishing opportunities also exist in any of the ponds and along Matubby Creek located on the property. Other recreational opportunities such as bird watching, trail riding, and hiking also exist. Some of the landowners' objectives for his property are to enhance habitat for wildlife species, and use the property as an outdoor classroom to educate others in managing their own properties.

Property Level Summary of Timber Inventory:

The total percent sampling error for the merchantable stands (CPP1, CPP2, CPP3, CH4, CM5, and CM6) was 7.2% at the 95% confidence level (See Table 1). This falls within our desired accuracy of +/- 10% sampling error for the merchantable stands.

The total percent sampling error for the pre-merchantable stands (WPP1) was 4.5% at the 95% confidence level (See Table 2). This falls within our desired accuracy of +/- 20% of the mean trees per acre for these stands.

The pulpwood volume for the tract is 1,118 tons of pine and 722 tons of hardwood. Pine chip-n-saw had 4,815 tons. There are 1,233 tons of pine sawtimber, 1,995 tons of oak sawtimber, and 1,151 tons of miscellaneous hardwood sawtimber on

Coontail Farms (See Table 5). The sub-merchantable stand (WPP1) averages 568 TPA (See Table 2).

Management Objective:

The management objective for the property is to establish and maintain a forest that is self sustaining and enhances wildlife habitat. This objective was determined by Mr. Watkins prior to developing this management plan, and some activities have already been undertaken meeting this objective. The target forest will have 10 stands and 4 management units (See Figure 3). Management units are hardwood, pine, riparian zones/wetlands, and fields (See Figure 4).

The objective is to improve pine stands as they grow toward maturity, protect and maintain riparian zones and wetlands, improve hardwood stands by establishing better regeneration of desirable species, and continue to supplement native habitat through the use of wildlife food plots.

The hardwood management unit will be managed to promote better regeneration of desirable hardwood species. This will provide better wildlife habitat and increase the value of the stand if the landowner decides to harvest it in the future.

Within the pine management unit, loblolly pine plantations will be managed at an optimal rotation. Various activities such as thinning, fertilization, herbicide application, and prescribed burning will be conducted to enhance growth and promote better wildlife habitat.

Timber management will be kept to a minimum in the riparian zones/wetlands management unit. This will help to meet the objective of protecting and enhancing wetlands and riparian zones. These areas will provide habitat for waterfowl species along

with other species of wildlife. Protecting these areas will also promote more diversity at the landscape level.

The field management unit will be managed to maintain open areas for wildlife habitat. These open areas will consist of food plots along with native vegetation. This will improve wildlife habitat by providing food and cover for many species.

Management Regimes:

Management regimes are the prescriptions and activities necessary to achieve the target forest and landscape structure. The property was divided into four management units. Each management unit will be treated under a common management regime.

Growth and yield for the pine plantations was simulated using P-YIELD plantation simulator. Several different iterations varying key assumptions were computed to determine the best way to reach the target forest. Rotation age, thinning strategy, and timing of thins varied among iterations.

The pine management unit consists of stands CP1, CP2, CP3, CM6 and WPP1 (See Figure 2). For stands CP1 and CP3, we recommend a second thin (back to 65 BA) at age 20 and a final harvest at age 30. For stand CP2, we recommend a second thin (back to 65 BA) at age 19 and a final harvest at age 30. These strategies yield the highest net present value (NPV) per acre (See Table 6).

Once these plantations are re-established, we recommend a 30 year rotation with two thinning operations. The stands should be machine planted at 545 trees per acre (8 x 10 spacing). The first thin will be a 5th row thin at age 14 and the second will be a selective thin back to 65 BA at age 22. Although a one thinning strategy yields a higher

land expectation value (LEV), we chose a two thinning strategy because we feel it will be best for timber and wildlife management goals (See Table 7).

Before being planted, stands should receive a chemical site preparation by applying a mixture of Chopper and Accord. A prescribed burn could be conducted to remove dead vegetation and debris before planting.

After a stand is thinned, it is exposed to an increased risk for ice and wind damage until crown closure. Therefore, we recommend fertilization after each thin to increase growth and reduce the time of this increased risk. After the first thinning, 125 lbs. of diammonium phosphate (DAP) and 385 lbs. of urea should be applied per acre. Only 385 lbs. of urea per acre should be applied after the second thin. Prescribed burning should be applied every two to three years to reduce the fuel load and to promote herbaceous growth on the forest floor.

The hardwood management unit consists of stands CH4, CM5, and WSM. The understory in some areas of these stands is dominated by undesirable species such as sweetgum, red maple, and hickories. We recommend a series of group selection harvests along with some individual stem treatments. This will remove many of the undesirable species and allow more oak regeneration to occur. We recommend leaving stand WSM alone. Beavers have water backed up throughout most of this stand and it is currently inaccessible by heavy equipment. We do recommend some type of beaver control to reduce the amount of water in the stand.

There are approximately 85 acres, or 16% of the total land base, currently in openings on the property. Openings are critical for a variety of species. They provide low growth that attracts insects and provide green forage near ground level for deer,

quail, turkeys and other species. Some portions of these openings contain food plots. The remaining acreage of the openings provides herbaceous cover for many wildlife species. We recommend dividing the food plots into warm and cool season plantings. This is an excellent way to maximize benefits of food plot plantings. About 3% of the property should be maintained in food plots.

Determining soil quality and correcting problems in fertility and pH are the first steps in food plot preparation. However, if a soil test is not attainable, a good complete fertilizer with equal amounts of nitrogen, phosphorus, and potassium such as 13-13-13 is good for most cereal grains. A fertilizer with low amounts of nitrogen such as 8-24-24 is good for legumes. Fertilizer should be applied at the rate of 200-400 lbs. per acre. If soils are slightly acidic, 2-4 tons of agricultural lime per acre is generally required to adjust pH to the proper level (West 2004).

As a cool season mixture we recommend applying 25-30 lbs. of oats, 25-30 lbs. of wheat, 10-12 lbs. of crimson clover, and 4-5 lbs. of arrowleaf clover per acre. As a warm season mixture we recommend 75 lbs. of iron clay cowpeas and 20 lbs. of joint vetch per acre (See Table 8). These mixtures will provide supplemental forage for wildlife year around (West 2004).

We recommend planting and maintaining some of the other openings with bahiagrass. Bahiagrass is a warm season perennial that provides an excellent source of seed and insects for wild turkey. Bahiagrass can be planted in the spring or fall at a rate of 18 lbs. per acre. If a soil test is not obtained, 400 lbs. of 13-13-13 should be applied per acre. Once established, it should be mowed once in early spring and again in late

summer. Apply 150 lbs. of 34-0-0 per acre after the first mowing each year (West 2004) (See Table 8).

It is important to remember that when pine plantations are thinned, they provide temporary openings for food plots. Also, native vegetation can be managed for wildlife through the use of herbicides and prescribed burning.

Stand Prescriptions and Harvest Schedule:

All costs and revenues are present, per acre values (See Tables 10-15).

Year 0 (2005)

The following activities will occur in Year 0 (2005): planting and fertilizing food plots, and thinning stand CP2. Stand CP2 will be selectively thinned back to a basal area of 65 per acre. Poorly formed and fusiform infected trees will be removed first along with some dominant and codominant trees to meet the target residual basal area. The estimated revenue for this thin is \$190.46 per acre.

Warm season food plots should be planted from May 1 – June 15. Cool season food plots should be planted from September 1 – November 1. Bahiagrass should be planted from March 1 – June 1 or from September 1 – November 1. The total costs associated with planting warm season mixes, cool season mixes, and fertilization is \$195.86 per acre. The total cost associated with planting and fertilizing bahiagrass is \$76.16 per acre (See Table 9). The annual bushhogging of the bahiagrass can be performed by the landowner; therefore, no extra costs are incurred with bushhogging.

Year 1 (2006)

The following activities will occur in Year 1 (2006): planting and fertilizing food plots, and prescribed burning in stand CP2. Guidelines for planting and fertilizing the warm and cool season food plots will be the same as in Year 0. The bahiagrass fields should be bushogged once in early spring and again in late summer. After the first mowing, apply 150 lbs. of 34-0-0 per acre. The cost of applying 34-0-0 is \$25.20 per acre.

The prescribed burn in stand CP2 should be conducted between January and March to remove thinning debris and promote herbaceous growth. Burning should be supervised by a Certified Prescribed Burn Manager in accordance with all smoke and fire guidelines set forth by the Mississippi Forestry Commission. The cost of prescribed burning per acre is \$13.25.

Year 2 (2007)

The following activities will occur in Year 2 (2007): planting and fertilizing food plots, and bushogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as in Year 0 and Year 1. Stand CP2 will be fertilized with 385 lbs. of urea per acre. The cost of fertilizing will be \$86.42 per acre.

Year 3 (2008)

The following activities will occur in Year 3 (2008): planting and fertilizing food plots, and bushogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. A prescribed burn will be conducted in stand CP1 following the same guidelines as in Year 1.

Year 4 (2009)

The following activities will occur in Year 4 (2009): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. A prescribed burn will be conducted in stands CP2 and CP3 following the same guidelines as previous years.

Year 5 (2010)

The following activities will occur in Year 5 (2010): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years.

Stands CP1 and CP3 will be selectively thinned back to a basal area of 65 per acre. Poorly formed and fusiform infected trees will be removed first along with some dominant and codominant trees to meet the target residual basal area. Stand CM5 will also be thinned by removing 20 BA of pine sawtimber. The expected revenue from thinning stand CP1 is \$472.80 per acre, \$496.42 per acre from stand CP3, and \$927.60 per acre from stand CM5. Additionally, stand CM6 will be harvested with an expected revenue of \$2099.12 per acre. Site preparation will also occur in stand CM6. We recommend applying 40 ounces of Chopper and 4 quarts of Accord per acre. A prescribed burn should take place 6 to 8 weeks after applying herbicide to remove debris before planting. The cost of site preparation and prescribed burning will be \$106.43 per acre.

Year 6 (2011)

The following activities will occur in Year 6 (2011): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted

under the same guidelines as the previous years. A prescribed burn will be conducted in stand CP1 following the same guidelines as previous years. Stand CM6 will be replanted with loblolly pine at a spacing of 8 x 10 (545 trees per acre). The total cost of seedlings and planting will be approximately \$170.55 per acre.

Year 7 (2012)

The following activities will occur in Year 7 (2012): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. A prescribed burn will be conducted in stands CP2 and CP3 following the same guidelines as previous years. Additionally, stand CP1 will be fertilized with 385 lbs. of urea per acre. The cost of fertilizing will be \$86.42 per acre.

A herbaceous release will be performed in stand CM6. We recommend applying 2-3 ounces of Oust and 32 ounces of Velpar per acre. This should be applied between August and September to get control through the next growing season. The cost of the herbaceous release will be \$72.82 per acre.

Year 8 (2013)

The following activities will occur in Year 8 (2013): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Stand CP3 will be fertilized with 385 lbs. of urea per acre. The cost of fertilizing will be \$86.42 per acre.

Year 9 (2014)

The following activities will occur in Year 9 (2014): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted

under the same guidelines as the previous years. A prescribed burn will be conducted in stand CP1 following the same guidelines as previous years.

Year 10 (2015)

The following activities will occur in Year 10 (2015): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. A prescribed burn will be conducted in stands CP2 and CP3 following the same guidelines as previous years.

Timber stand improvement will be conducted in stand CH4. Selected undesirable species should be injected using the Hack and Squirt Method. A 20% solution of Arsenal should be used. One hack per 3 inches of DBH is required. The cost is \$.01 per inch of DBH. It is difficult to get a per acre cost for using the Hack and Squirt Method since there are no certain amount of trees that will be injected per acre.

Year 11 (2016)

The following activities will occur in Year 11 (2016): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years.

Stand CM5 will be selectively thinned removing the remaining pine basal area out of the stand. The estimated revenue from this thinning will be \$309.70 per acre. Additionally, stand CP2 will be harvested with an expected revenue of \$4,191.13 per acre. Site preparation will also occur in stand CP2. We recommend applying 40 ounces of Chopper and 4 quarts of Accord per acre. A prescribed burn should take place 6 to 8 weeks after applying herbicide to remove debris before planting. The cost of site preparation and prescribed burning will be \$106.43 per acre.

Year 12 (2017)

The following activities will occur in Year 12 (2017): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. Stand CP1 will be prescribed burned to reduce fuel load and promote herbaceous growth in the understory. These activities will be conducted under the same guidelines as the previous years.

Stand CP2 will be replanted with loblolly pine at a spacing of 8 x 10 (545 trees per acre). The total cost of seedlings and planting will be approximately \$170.55 per acre.

Year 14 (2019)

The following activities will occur in Year 14 (2019): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Also, stand WPP1 will have every 5th row thinned. Expected revenue from this thin will be \$64.29 per acre.

Year 15 (2020)

The following activities will occur in Year 15 (2020): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. Stand WPP1 will be prescribed burned to remove thinning debris and promote herbaceous growth in the understory. These activities will be conducted under the same guidelines as the previous years.

Stand CM5 will be selectively thinned removing undesirable hardwood basal area. The estimated revenue from this thinning will be \$324.09 per acre. Additionally, stands CP1 and CP3 will be harvested. Stand CP1 will have estimated revenue of \$3,632.83 per acre and stand CP3 will have estimated revenue of \$3,618.21 per acre. Site preparation will also occur in stands CP1 and CP3. We recommend applying 40 ounces

of Chopper and 4 quarts of Accord per acre. A prescribed burn should take place 6 to 8 weeks after applying herbicide to remove debris before planting. The cost of site preparation and prescribed burning will be \$106.43 per acre.

Year 16 (2021)

The following activities will occur in Year 16 (2021): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Additionally, stands CP1 and CP3 will be replanted with loblolly pine at a spacing of 8 x 10 (545 trees per acre). The total cost of seedlings and planting will be approximately \$170.55 per acre. Stand WPP1 will be fertilized with 125 lbs. of DAP and 385 lbs. of urea per acre. The cost of fertilizing will be \$86.42 per acre.

Year 20 (2025)

The following activities will occur in Year 20 (2025): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Additionally, stand CM6 will have every 5th row thinned. The estimated revenue from this thinning will be \$64.29 per acre. Various undesirable species in stands CH4 and CM5 will be injected using the Hack and Squirt Method following the same guidelines as in Year 10.

Year 22 (2027)

The following activities will occur in Year 22 (2027): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Additionally, stand WPP1 will be selectively thinned back to a basal area of 65. Poorly formed trees will be removed first

along with some dominant and codominant trees to meet the target residual basal area.

The estimated revenue from this thin will be \$449.58 per acre. Additionally, stand CM6 will be fertilized with 125 lbs. of DAP and 385 lbs. of urea. The cost of fertilizer will be \$86.42 per acre.

Year 26 (2031)

The following activities will occur in Year 26 (2031): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Stand CP2 will have every 5th row thinned. The estimated revenue from this thinning will be \$64.29 per acre.

Year 28 (2033)

The following activities will occur in Year 28 (2033): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Stand CM6 will be selectively thinned back to a basal area of 65 per acre. Poorly formed trees will be removed first along with some dominant and codominant trees to meet the target residual basal area. The estimated revenue for this thin is \$449.58 per acre. Additionally, stand CP2 will be fertilized with 125 lbs. of DAP and 385 lbs. of urea per acre. The cost of fertilization will be \$86.42 per acre.

Year 30 (2035)

The following activities will occur in Year 30 (2035): planting and fertilizing food plots, and bushhogging and fertilizing bahiagrass fields. These activities will be conducted under the same guidelines as the previous years. Stand CM6 will be fertilized with 385 lbs of urea per acre. The cost of fertilization will be \$86.42 per acre. Various undesirable

species in stands CH4 and CM5 will be injected using the Hack and Squirt Method following the same guidelines as in Years 10 and 20.

Stands CP1 and CP3 will have every 5th row thinned. The estimated revenue from this thinning will be \$64.29 per acre. Stand WPP1 will be harvested with an estimated revenue of \$2,471.90 per acre.

Property Description at the End of the Planning Period:

The end of the planning period will be in Year 2035. By now the target forest should be in place. The hardwood management unit will be an uneven-aged forest, pine management unit will be managed an even-aged forest, riparian zone/wetlands are uneven-aged, and fields will be planted annually.

Stands in the hardwood management unit will be: CH4, CM5, and WSM. Projections were not made on these stands due to them being hardwood stands and no accurate way of projecting them. Stands should resemble the current CH4 stand with better quality oak species making up their composition. Hack and squirt treatments will be occurring in these stands every 5 years.

Pine management unit stands are: CP1, CP2, CP3, CM6, and WPP1. Stand CP1 and CP3 are 14 years old. They are to be thinned this year by removing every 5th row. Basal area of the stands are 95 before thinning and 76 after the thin, and 6.5 tons per acre will be removed. Stand CP2 is 18 years old. It was thinned 4 years prior, and awaiting a prescribed burn this year. Basal area is 110, and 56 tons per acre. CM6 has been converted into a pine stand and currently 24 years old. This stand has been thinned twice and will be burned this year. Basal area is 74, and has 50 tons per acre. Stand WPP1 is being harvested this year. Total volume to be harvested is 78 tons per acre and a basal

area of 98. Chemical site preparation will take place either this year or the next depending on when during the year it was harvested followed by a prescribed burn the year after.

Stands in the riparian zone/wetland are: WSO, WBW, WCC, and CW. They were all left alone to grow providing wildlife habitat and promote a variety of forest types. No projections were made on these stands to determine the growth of the current stands.

Economic Summary:

We estimate the current market value of Coontail Farms to be \$320,756.09, and the West Property to be \$67,308.10. The total LEV for Coontail Farms is \$58,667.00 and the total timber value is \$191,337.85. The total LEV for West Property is \$67,308.10 and the total timber value is \$0.00 (See Tables 16 and 18).

We estimate the future market value of Coontail Farms to be \$219,358.65, and the West Property to be \$270,003.98. The total LEV for Coontail Farms and the West Property will be the same as the current value. The total timber value for Coontail Farms at the end of the planning horizon will be \$160,691.65, and the total timber value for the West Property will be \$202,695.88 (See Tables 17 and 19).

The LEV calculations came from that of the optimal target forest determined by PYIELD. The future timber values are based on the age and volume of the timber stands and the end of the planning horizon of 30 years. The cumulative net revenue for Coontail Farms is \$410,349.33 and the cumulative net revenue for West Property is \$206,587.78 (See Tables 20-23).

Plan for Monitoring and Evaluation:

Any good plan needs a plan for evaluation and monitoring to be sure the management objectives are being met. Here are ways in which to monitor and evaluate the effectiveness of operations and treatment performed on the property.

To monitor the amount of wildlife using food plots, exclosures should continue to be used. They should be placed in food plots immediately after they are planted, and removed prior to planting. Success can be measured visually by observing the difference in biomass inside and outside of the exclosures.

Pines planted in stand WPP1 should be visually checked one year after they are planted to determine the percent mortality within each stand. Spots may be replanted as necessary.

To monitor the effects on the chemical site preparation using a Chopper/accord mix, view the stand approximately six weeks after spraying and observe the extent of the herbaceous control. A follow up herbicide application is not necessary, even if there is not complete vegetative control, because a prescribed burn will follow this treatment.

To monitor the effects of the chemical herbaceous release using Oust and Velpar, also view the stand approximately six weeks after spraying and observe the extent of herbaceous control. Here if the treatment does not effectively control the competing vegetation, repeat the treatment the following year if desired.

Monitoring and evaluation of pine plantations should be done before and after each thin. This should be done to ensure that the thinning contract was met. Visual damage to remaining trees should be minimum following a thin, and rutting should be

left to a minimum throughout the stand. This will ensure that tree vigor and health is not stunted.

In ten years, the property should be reassessed due to natural and financial changes.

Conclusion:

Coontail Farms and the West Property have been intensively managed for wildlife and forestry. Mr. Watkins' has an outstanding vision for his property, and already carrying out most of his management objectives. This management plan should aid in improving on the past, provide good management practices for maintaining and improving existing stands, improving overall aesthetic value of the land, maintaining or improving the long-term value of the property, and enhancing the habitat quality on the property. We hope this plan provides valuable assistance to Mr. Watkins in the future management ensuring the legacy of the property is maintained and enjoyed by future generations.

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Description of Materials

Appendix A: Stand and Stock Tables

Summary tables for Stands CP1, CP2, CP3, CH4, CM5, and CM6 by product class showing tree diameter, average tree height, trees per acre, tons per acre, trees per tract, and tons per tract.

Appendix B: Economic Evaluation Procedures

Shows justification for economic evaluation procedure chosen, why it was the criterion of choice, list of where the prices for management activities were derived, and interest rate used.

Appendix C: Development of Management Objective

Explanation of how Coontail Farms' management objective was developed.

Appendix D: Development of Management Regimes

Tells how the management regimes were developed for each stand and how site index was determined. Discussion of the justification used in making recommendations for seedling spacing, thinning regimes in stands CP1, CP2, CP3, CM6, and WPP1, and determining the forages to plant in food plots.

Appendix E: Calculations

Sample calculations for economic calculations and food plot costs.

Economic Evaluation Procedures

Food plot forages, fertilizer, and lime prices were obtained from Oktibbeha County Cooperative. Chemical prices were obtained from Dr. Andrew Ezell. Timber prices were obtained from the Forest 2 Market Timber Owner Market Guide, Mid-South Region. Mechanical site preparation, burn, and planting cost were acquired from Forest Landowner (Costs and Cost Trends for Forestry Practices in the South) and the landowner. The interest rate used for the economic analysis was 6 percent.

Development of Management Objective

The property was broken down into 4 management units based on current stand conditions: hardwood management unit, pine plantation management unit, field management unit, and a riparian management unit. All of the hardwood stands were grouped into one management unit, because all of the stands contain hardwood sawtimber and will follow similar management regimes. WSM will be grouped into this management unit, it has no merchantable timber. This stand will follow the same management regime as the other hardwood stands. The pine plantation stands were grouped together as a separate management unit due to different species composition, intensive management, and prescribed burning. All fields and food plots were grouped into another management unit due to the lack of timber on the stand and landowner objectives. A riparian management unit consisted of stands located along Matubby Creek and an oxbow lake.

The hardwood management unit includes the non-merchantable stand WSM on the West Property. The goal of this unit was chosen to meet the landowner's objective of wildlife management. Also, the landowner wants to improve the quality of the current hardwood stands by removal of less desirable species.

The pine plantation management unit was chosen as the target forest, due to current land use. This objective was determined by the landowner's objective to developing a self sustaining forest. Achieving a self sustaining forest could best be done through intensive management. The landowner will also gain financial revenue from the pine plantation management unit.

The field management unit was separated for the landowner to supplement native vegetation. This also enhances wildlife habitat and enhances the biological diversity at the local level. The management regime recommended for the fields was to maintain openings and foodplots. This unit makes up 16% of the land base for the property. According to Wildlife Food Planting Guide for the Southeast, turkey can thrive in forested habitats that have 15-60% openings on them. (West, 2004)

The riparian management unit was kept separate due to different species composition. This management unit also meets the landowner objectives of protecting and enhancing wetland and riparian zones, as well as, promoting a variety of forest types.

Development of Management Regimes

Site Index (SI) is the average height in feet of the dominant overstory trees at a base age of 50 years. Site indices for pine and hardwoods were obtained from the Monroe County Soil Survey (Murphree et al. 1961). For each species, a SI range was given. The upper end of the SI was used because the landowner intensively manages his property.

The thinning regimes for the pine plantations (CP1, CP2, CP3, CM6, and WPP1) was to do a 5th row thin at age 14 and a selection thin to a residual basal area of 65 at age 22 with a rotation length of 30 years. These regimes are recommended because they yield the highest land expectation value. The use of chemical site preparation and prescribed burning was implemented to discourage hardwood competition and enhance wildlife habitat within the stands. Trees will be planted on 8 X 10 foot spacing, allowing for a balance between forestry and wildlife.

Hardwood and mixed stand regimes were determined by the landowner's objective for the stands. He wants to improve the quality of the hardwoods in his hardwood stands by selectively removing undesirable species through a hack and squirt treatment. A 20% solution of Arsenal should be used while performing this treatment. One hack per 3" of diameter along with one squirt of the solution is recommended. Stand CM5 will be converted to a hardwood stand over a 15 year period by removing the pine through a series of 2 thins and removing miscellaneous hardwoods in a 3rd thin. Stand CM6 will be converted into a pine plantation upon harvest, and follow the management regimes recommended for pine plantations.

Stands CW, WBW, WCC, WSM, and WSO will be left alone for wildlife cover and these areas are covered with water either throughout the year or a majority of the year. CW, WBW, and WSO will be left alone in order to protect and enhance wetlands and riparian zones. WCC and WSM will provide a variety of forest types and enhance biological diversity at the local level. WSM was left alone due to the fact it has standing water throughout the stand and the high cost associated with converting it to a merchantable stand.

Forages for food plots were determined based on familiarity with the species, availability of supply, and forage quality. We recommend using 13-13-13 as fertilizer due to its high usage versatility. Additional varieties and species may be utilized as the discretion of the landowner. Warm and cool season food plots will be located throughout the property. This will supplement native vegetation and ensure year round nutrition for wildlife.