Land Management Plan

Kettle Creek Conservation Easement

Purpose: The purpose of this Land Management Plan ("LMP") is to set forth the long-term property management objectives of Kettle Creek Holdings, LLC, with regards to the Property as described below. The LMP may be modified over time, through written, mutual agreement of Owner, Administrative Member, and Land Trust. The prime objective of the LMP is to identify land management practices that preserve the Conservation Values of the Property and to satisfy the spirit and intent of the Conservation Easement attached hereto as "Exhibit A".

Property: The Kettle Creek Tract is located in Wilkes County, Georgia. The total acreage for the property is approximately 964 acres. Maps are shown in "Exhibit B". The property is situated at the intersection of Sandy Cross Road and Quaker Springs Road at the Little River and Kettle Creek. The location, quality and variety of habitats, presence of mature trees, and prescribed fire regime have created great diversity in plant and animal life within the property.

Owner:

Kettle Creek Holdings, LLC
Charles LeGette, Jr.
27 East Public Square
Washington, GA 30673

Administrative Member:

Kettle Land Manager, LLC
Mr. Pete Davis, Manager
34 Old Ivy Road
Suite 200
Atlanta, GA 30342
Phone: 404-495-4553

Land Trust:

Southeast Regional Land Conservancy, Inc.
Mr. Jim Wright, Executive Director
6111 Peachtree-Dunwoody Road
Building E, Suite 102
Atlanta, GA 30328
Phone: 770-351-0411 x 307

Article I – Access to Kettle Creek Tract

In general, Owner shall obstruct general access to the Kettle Creek Tract through the use of fencing, barricades, gates or other barriers to entry as the Owner may deem appropriate and practical. Signs shall also be posted to notify the public that the land is a Conservation Area and that "No Hunting" and "No Trespassing" are allowed.

A. **Owner Access:** Owner maintains access to the Kettle Creek Tract for the purpose of maintenance and preservation of the Conservation Area, subject to the restrictions and notification requirements as set forth in the Conservation Easement. In addition, Owner retains the right to engage in or permit or invite others to engage in all uses of the Conservation Area that are not expressly prohibited or restricted by the Conservation Easement, subject to the notification requirements as set forth in the Conservation Easement (Article II, Section O).

B. **Land Trust Access:** Land Trust shall maintain access to the Kettle Creek Tract for the purpose of the perpetual monitoring (to be not less than once per year) and reporting as required by the State of Georgia. Land Trust shall notify Owner and Administrative Member prior to accessing the Kettle Creek Tract, and shall coordinate such monitoring visits with Owner.

C. **Administrative Member Access:** Administrative Member shall have access to the Kettle Creek Tract for the purpose of monitoring the activities of Owner to ensure that all activities meet the conservation and business purposes as provided for in the Operating Agreement. Administrative Member shall notify Owner prior to accessing the Kettle Creek Tract, and shall coordinate all visits with Owner.

D. **Third Party Access:** From time to time, Owner and Administrative Member (individually and collectively referred to as the Monitoring Agent(s)) may contract with third parties to engage in maintenance, monitoring, preservation, timbering, or other allowable activities included in the Reserved Rights of the Conservation Easement (Article II, Sections A–N). In order to ensure that all third party contractors are aware of the rights and restrictions provided for in the Conservation Easement, the Monitoring Agents agree to require all third parties to review and sign the Kettle Creek Tract Rights and Restrictions Form ("Exhibit D"). Once third party signature has been acquired, the Monitoring Agent responsible for the third party shall notify the other Monitoring Agents that the Rights and Restrictions have been read, accepted, and agreed to by the third party.

Article II – Monitoring of Kettle Creek Tract

Under the Conservation Easement, Land Trust agrees to ensure the Owner protects the Conservation Values and to enforce the terms of the restrictive covenants. As such, Land Trust agrees to perform the monitoring (to be not less than once per year) and necessary paperwork as may be required.

A. **Land Trust:** Land Trust will perform a physical inspection of Property ("monitoring") at least annually. Monitoring will involve comparing the physical condition of Property to the Baseline Documentation Report and restrictions contained in the Easement Agreement. The Land Trust will note any changes and/or activities with respect to the Property which are not in compliance with the Agreement. Conditions which are violations, or which, in the Land Trust's opinion, could result in violations, will be discussed with Owner as to corrective actions required. Such conditions and corrective actions will be documented the monitoring report and signed by the Owner. Follow-up monitoring action may be required by the Land Trust to ensure appropriate corrective action was completed. While not required, monitoring report may include suggestions for improving conservation of the property, action upon which is at the Owner's discretion. Completed reports will be forwarded by Land Trust to Owner, Administrative Member, and any applicable governmental bodies in the state of Georgia.

B. **Owner:** Owner shall also monitor the Kettle Creek Tract to make sure that the Conservation Values are being protected. In addition, Owner, either by itself, in conjunction with, or through its agent (Administrative Member) shall be responsible for ensuring that Land Trust is executing its duties as described in Section A of this Article.

C. **Administrative Member:** Administrative Member shall monitor Owner to ensure that Owner is managing the Kettle Creek Tract in accordance with its Operating Agreement. Specifically, Administrative Member is looking for actions or inactions that would cause a violation of the Conservation Easement. Administrative Member shall also be responsible for ensuring that Land Trust is executing its duties as described in Section A of this Article.

Article III – Forestry Management Provisions

The Conservation Easement allows for and this LMP adopts the forestry management provisions as set forth in the Forest Management Plan (FMP) prepared by KAP Forestry, LLC and included as "Exhibit C". The FMP provides the basis for timber harvesting, improvement cuts, cutting cycle, rotation age, stand composition, and prescribed burning routines for the different stands of trees located on The Kettle Creek Tract.

A. **Notice:** Owner shall notify Administrative Member and Land Trust in writing at least sixty (60) days before Owner begins, or allows, any thinning, harvesting, or planting of trees pursuant to Article II, Section C(2) of the Conservation Easement. Any notices shall be sent by registered or certified mail, return receipt requested, to the parties at their addresses shown herein above, or to other address(es) that the parties may establish in writing upon notification to the other parties.

B. **Roads:** Owner will endeavor to use existing roads or other right of ways to the maximum extent possible for any timbering activities. If temporary logging roads are necessary, Owner shall notify Administrative Member and Land Trust in writing at least sixty (60) days before Owner begins or allows construction of temporary logging roads. The location of all new roads must have Land Trust's prior written approval as provided in Article II, Section O of the Conservation Easement. Upon conclusion of any timbering activities, temporary logging roads shall be allowed to return to their natural vegetative state.

C. **Third Party Access:** Should Owner wish to engage third parties for the purpose of timbering activities, Owner shall follow the Third Party Access policy as described in Article I.

D. **Conflicts:** Should any provision, whether intentional or unintentional, in this FMP be in conflict with the terms of the Conservation Easement, then the terms of the Conservation Easement shall control.

E. **Hold Period:** Owner currently anticipates that commercial timbering activities will not commence before January of 2018 in order to provide marketable timber adequate time to mature.

Article IV – Future Land Improvement Options

The Kettle Creek Tract Conservation Easement Baseline Documentation Report contains a list of highly recommended management practices that would prove beneficial for the natural resource values of the property. It is Owner's intent to use their best efforts to adopt the following improvement options over time:

A. **Prescribed burning:** The FMP contains a plan for burning certain appropriate stands of timber on a routine basis. Owner will coordinate with Land Trust to ensure that the burning plan in the FMP meets the approval of the Conservation Biologist. Occasional firebreaks may need to be added.

B. **No-logging Zones:** Owner shall not perform commercial logging within the Significant Habitat & Wetlands areas as designated in Appendix I of the Baseline Report. All areas within 100 feet of any rivers, creeks, streams or natural wetlands located within the

Conservation Area are designated as Stream Buffer Zones. Stream Buffer Zones represent a permanent, protective vegetative buffer and shall not be disturbed in any way.

C. **Non-native Plant and Animal Control:** Owner shall remove or control non-native plant or animal species that become invasive.

D. **Erosion and Sedimentation:** Owner shall take extra care in the planning, construction, and management of all activities in the Conservation Area as well as the Third Party Properties to avoid sedimentation and erosion that may cause adverse impacts to the easement area. This includes but is not limited to changes in surface water runoff, erosion, sedimentation, and other effects.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties have read, accepted, and agreed to the terms of this Land Management Plan and warrant that they have the complete authority to enter into this Agreement dated Effective as of the 30th day of December, 2013.

Owner:

Kettle Creek Holdings, LLC,
a Delaware Limited Liability Company

By:_____

Name: Charles Legette, Manager

Land Trust:

Southeast Regional Land Conservancy, Inc.
a North Carolina Non-profit Corporation

By:_____

Name: Jim Wright

Title: Executive Director

Administrative Member:

Kettle Land Manager, LLC,
a Georgia Limited Liability Company

By:_____

Name: J. Steve Bush

Title: Principal

EXHIBIT A: CONSERVATION EASEMENT FOR THE KETTLE CREEK TRACT

{To be attached}

EXHIBIT B: MAPS OF THE KETTLE CREEK TRACT

{To be attached}

EXHIBIT C – FOREST MANAGEMENT PLAN

{To be attached}

EXHIBIT D – KETTLE CREEK TRACT RIGHTS AND RESTRICTIONS FORM

KETTLE CREEK TRACT RIGHTS AND RESTRICTIONS FORM

Third Party Name(s):_____

Company (if Applicable):_____

Address:_____

_____

_____

Phone:_____

NOTICE: THE KETTLE CREEK TRACT IS PROTECTED BY A CONSERVATION EASEMENT HELD BY THE SOUTHEAST REGIONAL LAND CONSERVANCY, INC. PROPER NOTICE MUST BE PROVIDED TO THE LAND CONSERVANCY PRIOR TO ENTERING THE KETTLE CREEK TRACT.

1. **All Dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or other materials on the Conservation Area is strictly prohibited.**
2. **No plant or animal species shall be introduced to the Conservation Area except those native to the area in which the Conservation Area is located.**
3. **Displays of billboards, signs, or advertisements of any kind are prohibited on or over the Conservation Area.**
4. **No filling, excavating, dredging, mining, or drilling is allowed inside the Conservation Area except for such activities listed as Reserved Rights in the Conservation Easement.**
5. **No removal of topsoil, sand, gravel, rock, minerals or other material, nor any changing of the topography of the land in the Conservation Area is allowed, except**

as reasonable necessary to construct and maintain the improvements allowed under the Conservation Easement.

6. **Use of vehicles for allowed activities inside the Conservation Area that are larger than all-terrain vehicles shall be restricted to roads and other right of ways.**
7. **All-terrain vehicles shall be used in such a manner as to avoid soil disruption and destruction of plant life.**

I hereby swear that I have read the Rights and Restrictions form and agree to abide by the restrictions herein.

_____

Third Party Signature

_____

Third Party Name

_____

Date

_____

Monitoring Agent Signature

_____

Date

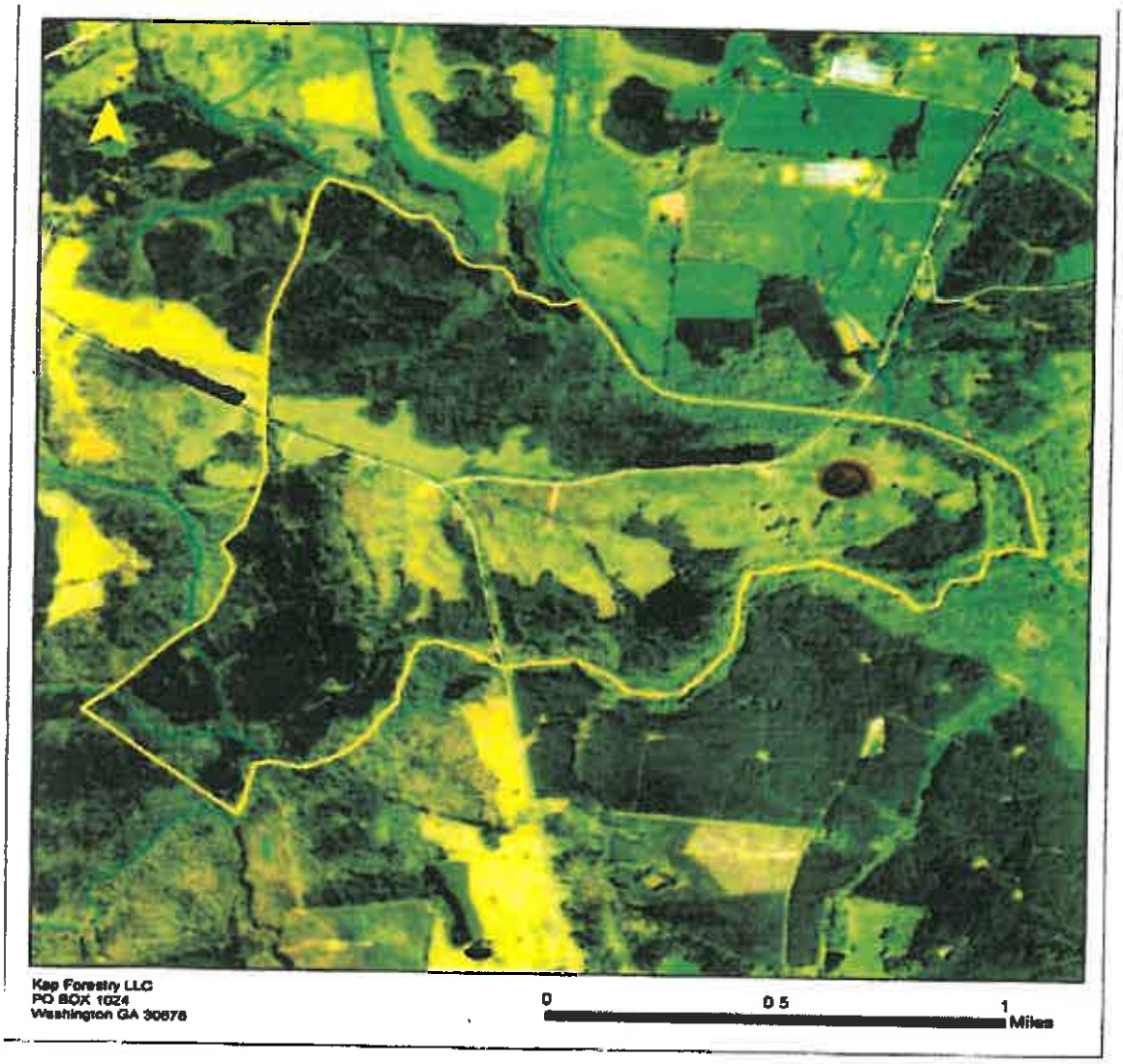
Kettle Creek Holdings, LLC.

Forest Management Plan

December 15, 2013

972.30 Acres

Wilkes County, Georgia



Prepared by: KAP Forestry LLC
P.O. Box 1024, Washington, Georgia 30678
(706) 318-7903 , kap_land @MSN.COM

(with edits by K. Heiman, Southeast Regional Land Conservancy)

Land Management Objectives

The landowners goals are to implement a plan that would conserve and enhance the immediate and long term needs of wildlife habitats, the production and quality of the forest resources, and natural characteristics of the property.

Recommended Management Practices to Improve Wildlife Habitat and Forest Resources

Throughout the timber rotation the land manager will have numerous opportunities to improve wildlife habitats and forest resources. With proper planning and execution, the timber stands can be manipulated to provide needed food and cover for wildlife at little or no expense to timber production.

An important management tool that should begin right away is to establish and initiate a prescribed fire regime. Some of the other improvement practices that can be applied to create a diversified pattern of habitat conditions within a timber stand are described in the following recommended management practices sections below.

Timber:

To maintain the Conservation Values of the easement tract, no commercial timber harvest operations are to be carried out for twenty years, with the exception of possible thinning in older stands only if necessary. Significant Habitat Areas (see map below) are permanently removed from the timber base. No harvest activities, road building, or other earth-moving activities are to be conducted in these areas. All timber harvesting operations will be conducted with enhancing wildlife habitat and increasing the structural quality of the forest as a primary objective. For any additional riparian areas, there is a 100-foot wide SMZ buffer on each side of any spring, creek, wetland, or other water

feature. Hardwood areas where timber harvesting is limited will follow Georgia Best Management Practices (BMP). May 2009 Edition, Section 2.0 "Planning for Water Quality" should be used as a guideline for delineating Stream Management Zones (SMZ). Protected areas where timber harvesting is restricted will be clearly marked and delineated on management plan maps. Site preparation for any future tree planting will be limited to mechanical drum chopping if needed and prescribed burning. No bedding is to occur for planting. This will be addressed and prescribed as needed. No chemical preparation is to take place on this property. The Conservation Easement prohibits widespread use of herbicides. Spot treatments under controlled circumstances are permitted, but any use of herbicides within ten (10) feet of any water source are prohibited. A prior notification to the land trust is needed if any herbicide treatment is to be done. A narrow forest corridor should be retained along all paved public roads during timber operation.

Wildlife:

Wildlife management recommendations will address the immediate and future concerns of improving wildlife habitat through thinning of dense young pines, prescribed burning and food plots.

Setting up a prescribed burning regime in the cutover stands and pine stands is highly recommended.
Burning in this pine forest type is beneficial for timber growth, scenery and aesthetics, Reducing undesirable insects and pests, maintaining native flora, ecological integrity, to help maintain good conservation purpose within the pine stands, and other factors. These forests and associated species are naturally fire-adapted. Notification to the SERLC is not needed for prescribed burns. Prescribed burning should be done every three (3) to five (5) years . No prescribed burning is recommended for hardwood stands. Firebreaks will utilize existing roads and trails. SERLC will be notified should any additional firebreaks need to be constructed. Food plots that will be established will utilize existing open land, log loading docks and trails. Soil analysis of food plot sites will give information necessary to prepare the seedbed for wildlife plantings. Wildlife plantings will be carefully selected to provide forage for deer, turkey and quail during winter and summer months. Food plots will require annual maintenance such as mowing, fertilizing and planting for perennials and annuals.

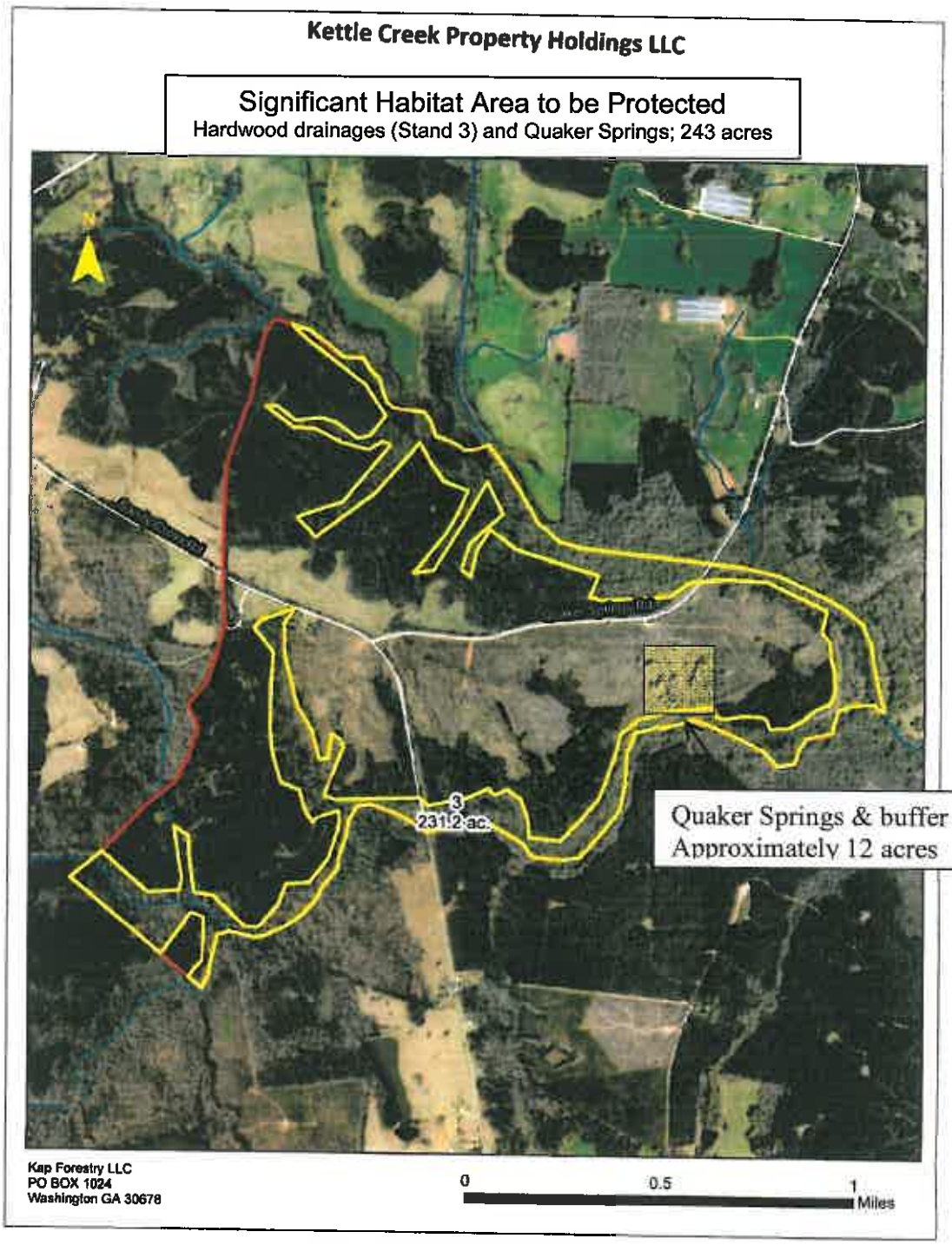
Soils:

All mechanical activities on property, such as improving existing roads, planting food plots and the thinning operation will follow the most current Georgia Best Management

Practices (BMP) guidelines; protecting any creek or spring corridors from logging, skidding and forest roads. A 100 foot buffer has been added to all creeks and springs to provide sedimentation control. Great care will be taken not to create erosion or sedimentation issues when disturbing the soil. Notification and approval by SERLC must take place before any earthmoving activities occur. All roads on this tract will be maintained to limit erosion.

Significant Habitat Areas:

These Significant Habitat areas under the legal requirements of the Easement Agreement and the Baseline Documents preclude general timber harvest operations. They should be given special protection and the map should be consulted whenever activities are proposed .Commercial timber harvest and road building are excluded. The old growth hardwood forest within the drainages are significant and are not to be impacted by timber harvest, road construction or other disturbance. The mature oaks provide substantial mast for wildlife and the mature pines provide forest diversity and habitat for birds & numerous other wildlife. The Significant Habitat Area (shown on map on next page) includes Stand No. 3 (231 acres) and the Quaker Springs Site (12 acres), for a total of approximately 243 acres.


Kettle Creek Property Holdings LLC
Significant Habitat Area to be Protected
Hardwood drainages (Stand 3) and Quaker Springs; 243 acres
N
3
231.2 ac.
Quaker Springs & buffer area
Approximately 12 acres
Kap Forestry LLC
PO BOX 1024
Washington GA 30678
0
0.5
1
Miles

Kettle Creek Property Holdings LLC

Timber Management Plan

Stand No. 1

Kap Forestry LLC
PO BOX 1024
Washington GA 30673

0 0.5 1 Miles

Stand No. 1 **173 acres**

Stand type: Natural Loblolly Pine approximately 16- 18 years old. The site index for this stand is 60 feet at 25 years and 80 feet at 50 years. Reference (University of Georgia Forest Resource Extension Bulletin 950.1 /1987 and NRCS Bulletin 141, soil series Cecil

C1).

Recommended Management Practice:

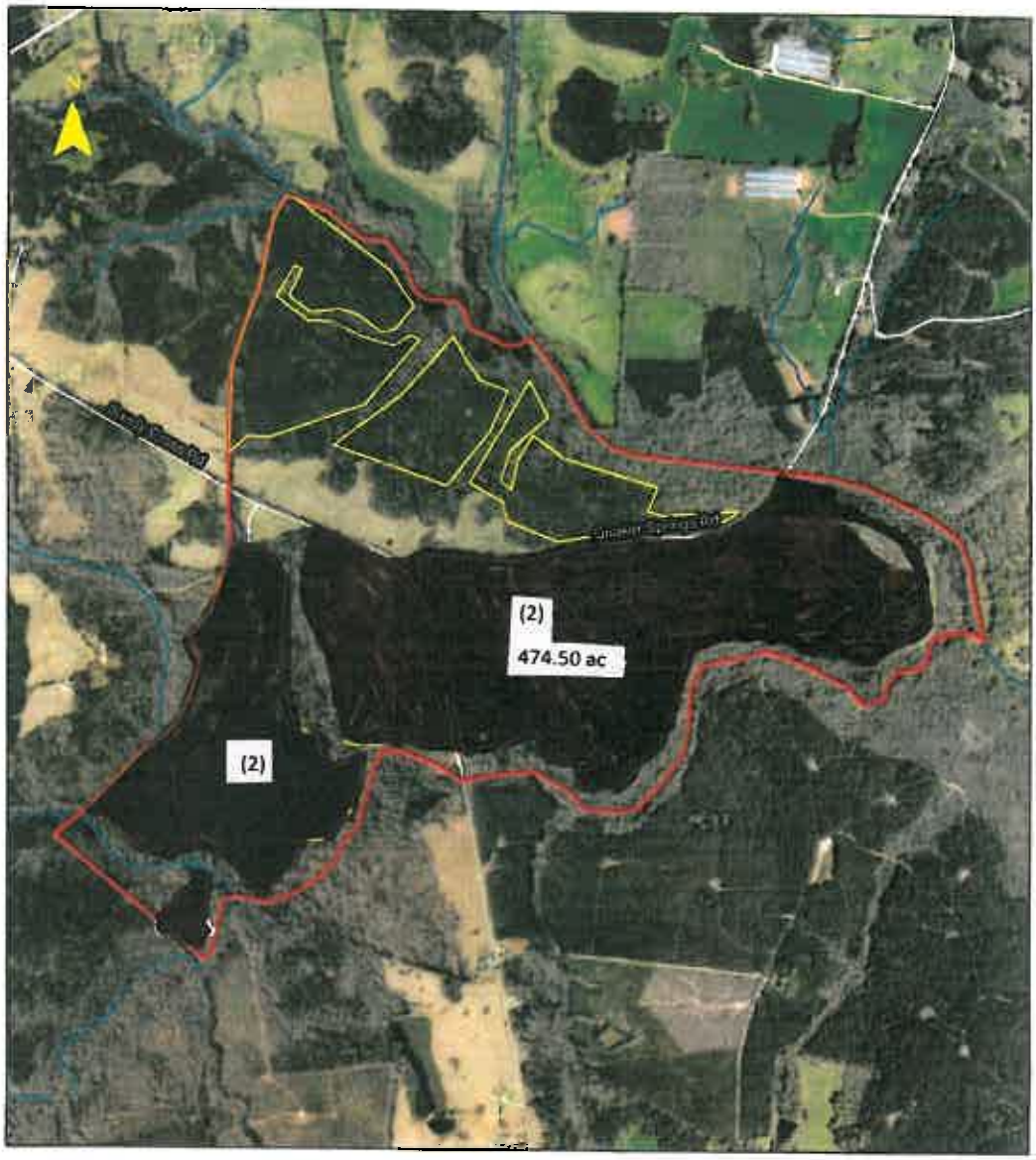
Manage pine on a saw timber rotation. Future thinning will stimulate the growth of forages and increase the amount of food available for wildlife. The remaining trees would experience increased growth and will require consideration for future thinning. The management plan can promote the wise management and utilization of this renewable resource while maintaining the conservation values of the property.
Future thinning of the pine stand will generate income to fund the future wildlife improvements and continual maintenance of the property.
All thinning of pine will be addressed, prescribed and carried out as needed. When a thinning or harvesting is deemed necessary it will be done with the benefits of the wildlife and improvement of the forest resources as a primary objective.
Wildlife openings and plantings should be established and the planting schedule should take into consideration what to plant and the recommended planting dates referenced in NRCS, Ga. December 2012 publication "Supplement to Conservation Practice Standard 512".This can be done on open ground, or between planted rows, log loading decks and logging roads.

A prescribed burning schedule should be put in place after the first thinning. A burning schedule of every 3 to 5 years should be used to improve the wildlife habitat. Fire should be excluded from hardwood stands.

Kettle Creek Property Holdings LLC

Timber Management Plan

Stand No. 2



Kap Forestry LLC
PO BOX 1024
Washington GA 30673

0 0.5 1 Miles

Stand No. 2 **474.50+/- acres**
Stand Type: Recent cutover

The owners wish to allow forests to regenerate by natural regeneration. Therefore, the recommended management practice would be to start prescribed-burning the stands this year. A burning schedule of every 3 to 5 years should be used to improve the stands. If further fire breaks are needed, they can be installed. It is beneficial to work with the state forestry department for burning. Also plant mast producing trees around perimeter should be maintained for wildlife. Further food plots can be established along roads or log landings, if desired. Areas adjacent to SMZ's should be avoided since soil is annually exposed on the plots and could cause sedimentation to the water resources. Have periodic food plot maintenance such as, mowing, fertilizing and planting of annuals and perennials, as desired. Forage crops and time of plantings will adhere to the recommended schedule of the NRCS, GA December 2012 " Supplement to Conservation Practice Standard 512 ".

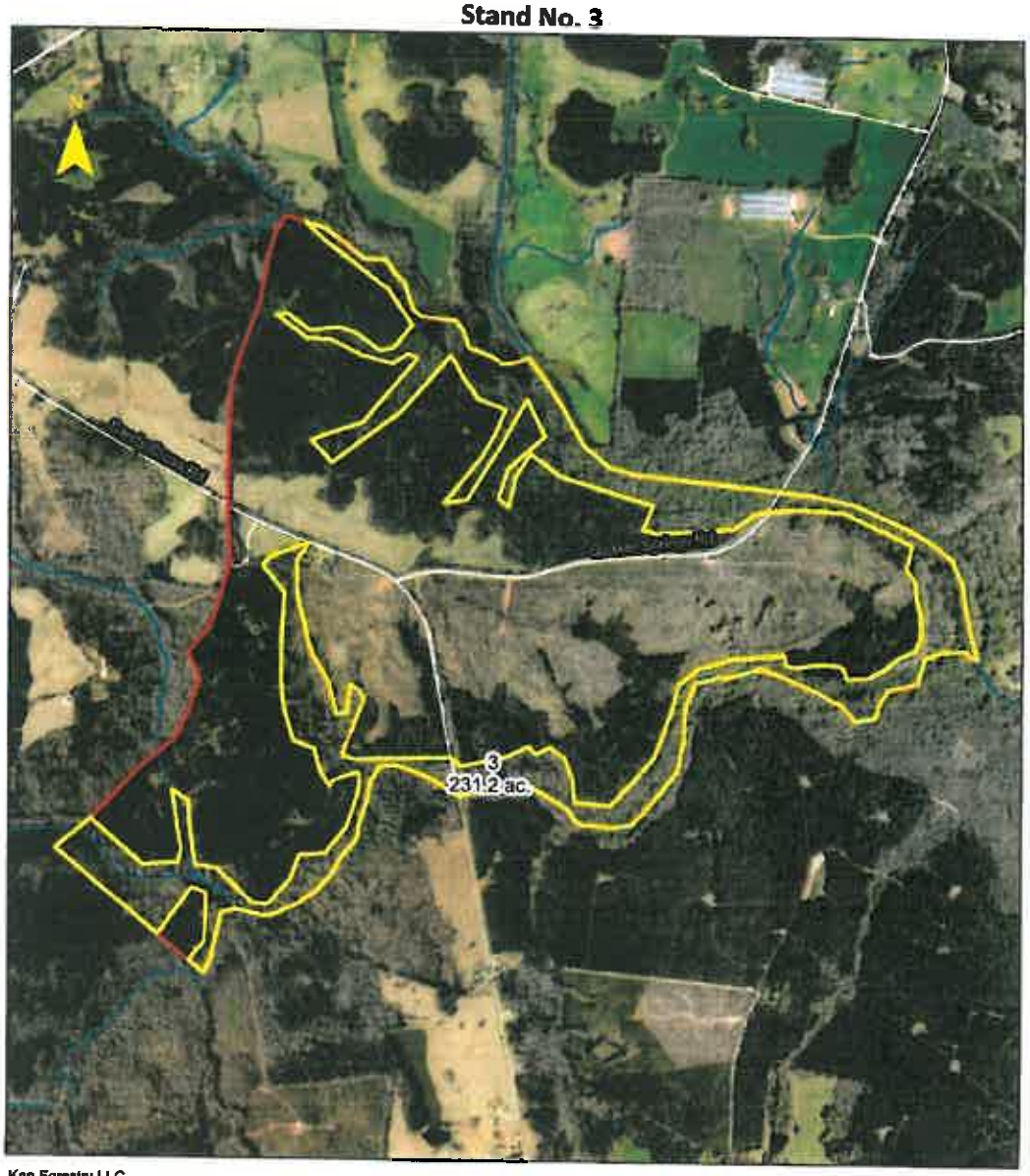
The stands should be managed for a long rotation saw timber, or as natural areas, depending upon desire of owners. Future thinning will stimulate the growth of forages and increase the amount of food available for wildlife. The remaining trees would experience increased growth and will require consideration for future thinning. Prescribed burning is recommended to prepare site for planting . Future thinning of pine stands will generate income to fund future wildlife improvements and continual maintenance of the property. All thinning of pine will be addressed, prescribed and carried out as needed.

When a thinning or harvesting is necessary it will be done to benefit wildlife and the improvement of the forest resources as a primary objective. Wildlife openings and plantings should be established. This can be done by planting between rows, log loading decks and logging roads.

Kettle Creek Property Holdings LLC

Timber Management Plan

Stand No. 3



Kap Forestry LLC
PO BOX 1024
Washington GA 30673

0 0.5 1 Miles

Stand No. 3 231.2 acres Included in the Significant Habitat Area

Stand Type: Mixed pine and hardwood species of Loblolly Pine, Red Oak, White Oak, Poplar, Gum, Ash, Red Maple, and Hickory)

Recommended Management Practice:
No general timber harvesting and maintain SMZ (Stream Management Zone) on Kettle Creek, Little River and Quaker Springs corridor from logging and skidding the forest roads a 100 foot buffer should be established . Important hardwood forest designated in the "Significant Habitat Map" shown above should be given special protection and the map should be consulted whenever activities are proposed .Commercial timber harvest is excluded. The old growth hardwood forest within the drainages are significant and are not to be impacted by timber harvest, road construction or other disturbance.
The mature oaks provide substantial mast for wildlife and the mature pines provide forest diversity and habitat for birds & numerous other wildlife.

Kettle Creek Property Holdings LLC

Timber Management Plan

Stand No. 4

Kap Forestry LLC
PO BOX 1024
Washington GA 30678

0 0.5 1 Miles

Stand No. 4 **38.1 acres**

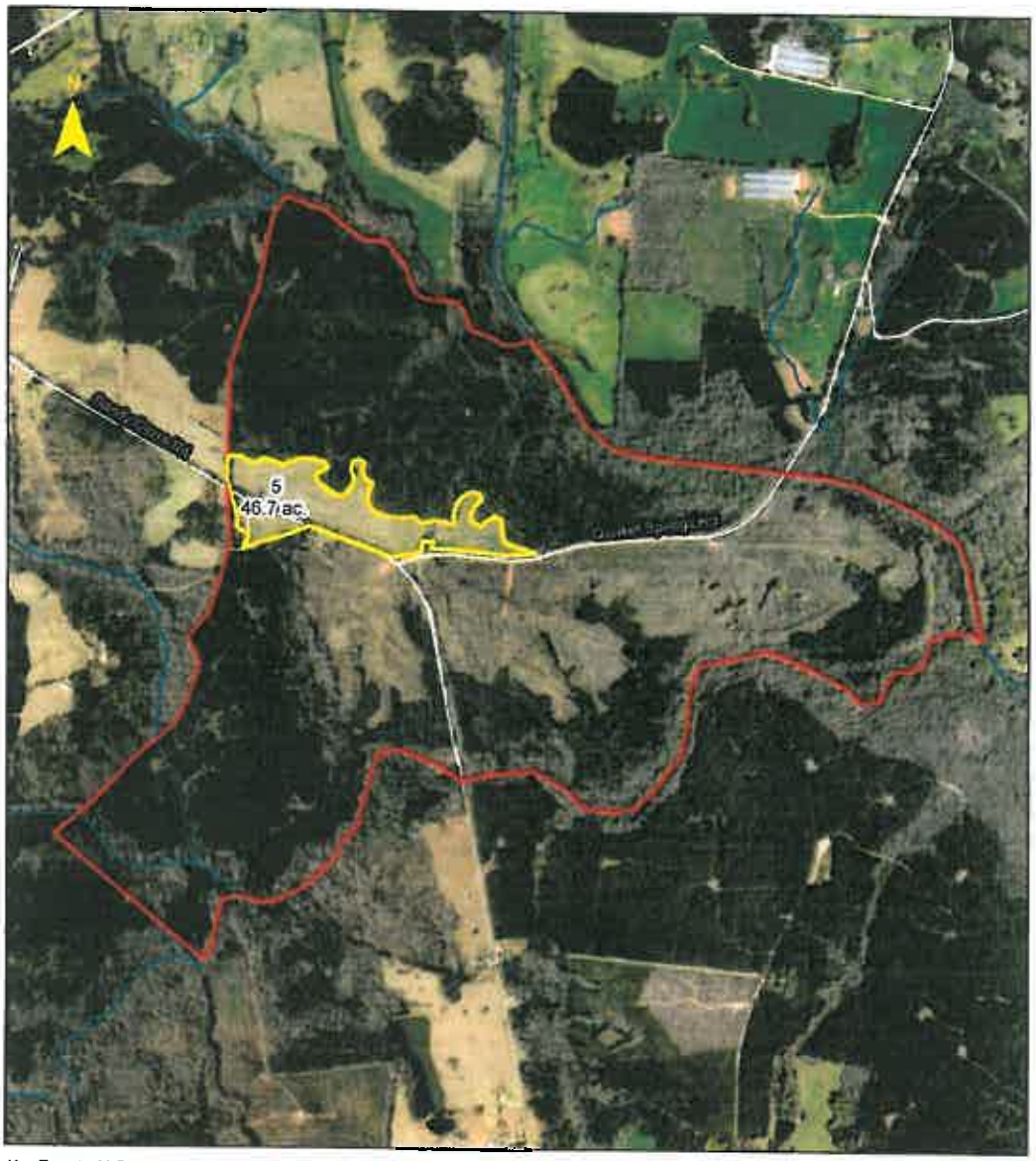
Stand type: Loblolly Pine approximate age is 20+/- years old and mixed hardwood species of, White & Red Oak, Poplar, Sweet gum, Red Maple and Hickory.

Recommended Management Practice:
No timber harvest is to occur for twenty years (as per Conservation Easement Agreement document). Maintain a basal area approximately 60 to 70 square feet per acre excluding edges and plum thickets from mechanical disturbance.

Kettle Creek Property Holdings LLC

Timber Management Plan

Stand No. 5



Kap Forestry LLC
PO BOX 1024
Washington GA 30678

0 0.5 1 Miles

Stand No. 5 46.7 acres
Open pasture / Fescue grass.

Recommended Management Practice:
Maintain hay production cut two times per year and apply fertilizer when needed.

General Land Management Practices

Other land management practices recommended in the Baseline Documentation Report and not already incorporated above should be considered for implementation as necessary, these include;

- Protecting any creek or spring corridors from logging, skidding, and forest roads using Best Management Practices (BMP) for sedimentation control. The Conservation Easement requires a 100 foot vegetative buffer around all creeks and springs.
- Consult Significant Habitat Map prior to planning any activities.
- The prescribed burning regime for Stand 2 should begin this year.
- Care will be exercised with any road or utility maintenance to cause as little sedimentation, erosion and disturbance as possible.
- Road culverts typically create some erosion conditions and should receive moderate stabilization measures as necessary.
- No commercial harvest operations should be done for 20 years, with the exception of possible thinning on older pine stands.

SUMMARY

This Land/Forest Management Plan addresses the concerns of improving wildlife habitat and balancing the needs of management resources.
Implementing this plan will provide the land owner and future generations continual recreational use while protecting the conservation values of the property.

Approximate Acreage Summary

Natural Pine	173.50
Mature Hardwood	231.20
Cutover	474.50
Open pasture	46.70
Mixed Pine & Hardwood	38.1
Springs & Cemetery	8.3
Total Approximate Acres	972.3

Prepared By:
KAP Forestry, LLC
19 East Square P.O. Box 1024
Washington, GA 30673

(706) 318-7903
kap_land@msn.com

(with edits by K. Heiman, Southeast Regional Land Conservancy)

Kenneth A. Pettay
GA RF 1361

ADDENDA

Note: For Quaker Springs approximately 12 acres has been included in the Significant Habitat area to include a buffer

Warnell School of Forest Resources
The University of Georgia

The wood or timber yield obtained from a particular tract of land depends on numerous factors. Species, tree size and number, rotation length, site quality and management activities all influence the ultimate yield.

Wood yield can be regulated by changing some of these factors. Planting genetically improved seedling stock can give greater volume production. Regulating stand density by periodic thinning improves tree growth rate.

Perhaps the most basic factor influencing wood yield is the inherent productive capacity of the site. Seldom can site quality be improved economically, although fertilization can improve growth and yield on certain sites. Because of the importance of land or site to forest productivity, it is necessary to evaluate and classify a particular site as to its productive capability for a given tree species.

Site Index of Forest Land

Site index is used by foresters to describe the productive capacity of a particular soil and site. Since each tree species grows best under a certain set of conditions, forest sites may be classified by species. A loblolly pine site may support other tree species but these may not grow as well as loblolly pine on that specific site.

The most common method of determining site index is on the basis of average total height of dominant trees at a selected age. Total height is relatively easy to measure and is affected very little by stand density and openings caused by injury or thinning.

In the South, site index is based on 50 years for natural plantations and 25 years for plantations. A site 100 capable of growing loblolly pine to a dominant average height of 80 feet in 50 years would be classified as "site index 80" for loblolly pine.

In young trees height growth is rapid. As they grow older, annual height increment decreases. The height growth pattern for loblolly pine on site index 80 land is illustrated in Figure 1.

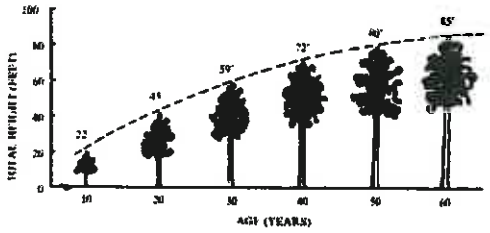


Figure 1. Height growth pattern, loblolly pine, site index 80.

Site index values have been determined for various soil types throughout the state in the county soil surveys published by the Soil Conservation Service. When these surveys are not available it is possible to have a forester estimate site index from trees growing on or near the site. The height and age of dominant trees is determined and compared to site index curves like the ones in Figures 2 and Figure 3.

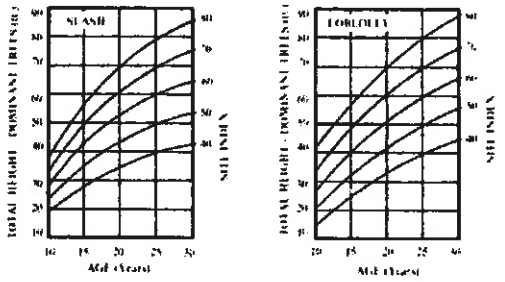


Figure 2. Site index curves (age 25) for slash and loblolly pine plantations.

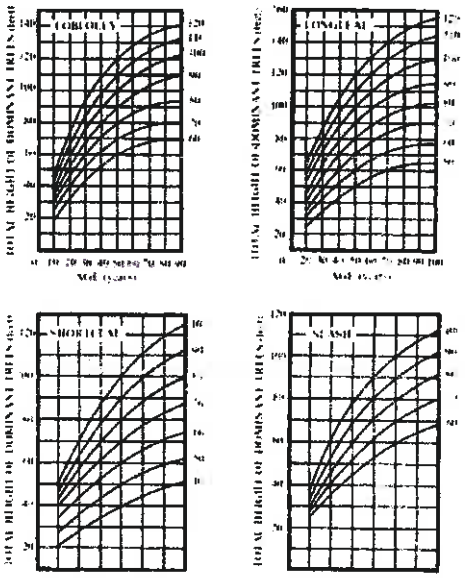


Figure 3. Site index curves (age 50) for southern pine.

The information in Tables 1 and 2 is derived from 25 year site index curves and may be used to estimate site quality in plantations. The age and height of the dominant trees in the stand must be determined. These values are then compared to the table for the appropriate species. For example, in a 12-year- old loblolly pine plantation, average height of the dominant trees was 37 feet. In Table 1, under the "Age" column, locate 12. On the line to the right of 12, find the number nearest 37. In this example, the nearest number is 36 and it is in the column under 65. This plantation has an approximate site index of 65. For slash pine plantations, use Table 2.

Table 1. Total height of dominant trees, by age and site index, for loblolly pine plantations.

	Site Index (Age 25)								
Age	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**
	Total Height in Feet								
10	15	18	21	24	27	30	34	38	42
11	17	20	23	27	30	33	37	41	45
12	19	22	26	29	33	36	40	44	48
13	21	24	28	32	36	39	43	47	51
14	23	26	30	34	38	42	46	50	54
15	25	29	33	37	41	45	49	53	57
16	27	31	35	39	43	47	51	55	60
17	29	33	37	41	45	49	54	58	63
18	30	34	39	43	47	51	56	60	65
19	32	36	41	45	49	54	59	63	68
20	33	37	42	46	51	56	61	65	70

Forage Crops Commonly Grown in Georgia

Forage Crop	Seeding Rate (lb/acre) B: Broadcast D: Drill	Seeding Depth (in.)	Planting Date			Remarks
			Mountains	Piedmont	Central	
[illegible]						
Browntop millet	B: 25 – 30 D: 15 – 20	½ - 1	Apr – Aug	Apr – Aug	Apr – Aug	Less productive than pearl millet or sorghum-sudan hybrids. Nitrate accumulation can cause toxicity
Crabgrass	B/D: 4 – 6	¼ - ½	Mar – May	Mar – May	Mar – May	High quality summer annual, not drought tolerant
Pearl millet	B: 25 – 30 D: 10 – 15	0 – ½	Apr – Jun	Apr – Jun	Apr – Jun	Best adapted on sandy soils, tolerant of drought and soil acidity; nitrate accumulation can cause toxicity
Forage Sorghum	B:15 – 20 D: 4 – 6	1 – 2	May – Jun	May – Jun	Apr – Jun	Very drought tolerant; not tolerant of highly acid soils
Sorghum x Sudan hybrids	B: 30 – 40 D: 20 – 25	1 - 2	May – Jun	May – Jun	Apr – Jun	Very drought tolerant; not tolerant of highly acid soils
Sudangrass	B: 30 – 40 D: 20 – 25	½ - 1	May – Jun	May – Jun	Apr – Jun	Very drought tolerant; not tolerant of highly acid soils
[illegible]						
Orchardgrass	B: 15 – 20 D: 12 – 15	½ - 1 ½	Sep	Sep Upper Piedmont Only	--	Less tolerant of drought, poor drainage, and close grazing than tall fescue
Tall fescue	B: 20 – 25 D: 15 – 20	¼ - ½	Sep – Oct or Mar – Apr	Sep – Oct	--	Adapted to clay and loam soils; Endophyte-infected varieties can cause Fescue Toxicosis; novel endophyte varieties recommended; manage summer grazing carefully.
[illegible]						
Ryegrass ▪ Planted alone	B: 25 – 30 D: 20 – 25	0 – ½	Sep – Oct	Sep – Oct	Sep – Nov	Tolerates wet, poorly drained soil; can be managed to re-seed
▪ Mixtures	B: 15 – 20 D: 10 – 15					
Small grains (rye, oats, wheat, barley, triticale) ▪ Planted Alone	B/D: 90–120	1 – 2	Sep – Oct	Sep – Oct	Sep – Nov	Rye is more tolerant of soil acidity than wheat or oats. Oats is cold sensitive and subject to winterkill, responsive to N and require adequate P & K
▪ Mixtures	B: 90 D: 60					

Forage Crops Commonly Grown in Georgia

Forage Crop	Seeding Rate (lb/acre) B: Broadcast D: Drill	Seeding Depth (in.)	Planting Date			Remarks
			Mountains	Piedmont	Coastal	
Perennial peanut	80 – 120 bu/ac rhizomes	2 – 4	--	--	Dec - Mar	Adapted to well-drained, sandy soils in lower half of Coastal Plain (Tift County and south); very slow to establish; do not graze during first establishment year, low fertility requirement.
Sericea lespedeza	B: 20 – 30 D: 15 – 20	¼ - ½	Mar – May	Mar – May	Mar – Apr	Drought tolerant; best on clay or loam soils; tolerant of soil acidity and low fertility; low-tannin varieties are available; slow to establish
Annual lespedeza						Tolerant of soil acidity and low soil fertility; can be managed to re-seed
▪ Striate	B: 25 – 30 D: 15 – 20	¼ - ½	Feb – Apr	Feb – Apr	Feb – Mar	
▪ Korean	B: 25 – 30 D: 15 – 20	¼ - ½	Feb – Apr	Feb – Apr	--	
Forage Soybean	B/D: 60 – 160	1 – 3	May	May	May	No regrowth after initial defoliation
Alfalfa	B: 22 – 25 PLS D: 18 – 25 PLS	¼ - ½	Sep - Oct (preferable) or Mar – Apr	Sep – Oct	Oct – Nov	Requires well-drained soil with pH 6.5+, drought tolerant; sensitive to potassium, boron and molybdenum deficiencies Can be sod seeded into bermudagrass with appropriate management
Red clover ▪ Solid stand, mixtures	B: 12 – 15 PLS D: 8 – 12 PLS	¼ - ½	Sep – Oct or Feb – Mar	Sep – Oct	Oct – Nov	Short-lived; long growing season; fairly tolerant of drought. acts as an annual in the Coastal Plain
White or Ladino clover ▪ Solid stand, mixtures	B/D: 2 – 3 PLS	0 – ¼	Sep – Oct or Feb – Mar	Sep – Oct	Oct – Dec	Tolerant of moderate soil acidity and wet soils; survives under drought conditions; in mixtures with cool-season perennial grasses

Forage Crops Commonly Grown in Georgia

Forage Crop	Seeding Rate (lb/acre) B: Broadcast D: Drill	Seeding Depth (in.)	Planting Date Remarks			Remarks
			Mountains	Piedmont	Coastal	
Arrowleaf clover ▪ Solid stand, mixtures	B: 8 – 10 PLS D: 5 – 7 PLS	0 – ½	--	Sep – Nov	Oct - Nov	Requires well-drained soil, plant only scarified seed; reseeds well; not tolerant of soil acidity or low fertility
Ball clover ▪ Solid stand, mixtures	B/D: 2 – 3 PLS	0 – ¼	--	Sep – Oct Lower Piedmont Only	Oct - Nov	Good natural reseeder, adapted to loam & clay soils; tolerant of poor drainage, bloat can be a problem; tolerates heavy grazing
Crimson clover ▪ Solid stand	B: 20 – 30 PLS D: 15 – 20 PLS	¼ - ½	--	Aug – Oct	Oct - Nov	Not tolerant of poorly drained soils; moderately tolerant of soil acidity, more productive under low temperatures than most clovers
▪ Mixtures	B: 12 – 20 PLS D: 10 – 15 PLS					
Rose clover	B: 20 – 25 PLS D: 15 – 20 PLS	¼ - ½	--	Sep – Oct	Oct - Nov	Good natural reseeder if livestock removed by mid-April, tolerant of drought & low soil fertility; adapted to soil pH 6 – 7
Subterranean clover	B: 10 – 20 PLS D: 8 – 10 PLS	¼ - ½	--	Sep – Oct	Oct - Nov	Adapted to well-drained soils; lower yielding than crimson or arrowleaf clover; tolerant of soil acidity, close continuous stocking, & shade
Hairy Vetch	B: 20 – 25 PLS D: 15 – 20 PLS	1 – 2				Requires well-drained soil, tolerant of soil acidity; need adequate phosphorous do not graze until plants are at least 6" tall, plant small grain at 60 lb/acre as companion crop
Winter Pea	B: 30 – 35 PLS D: 20 – 25 PLS	1 – 2	Sep – Oct	Sep – Oct	Sep – Oct	Adapted to well-drained loam or sandy loam soils; seed at 20 – 30 lb/A if planted with a small grain; does not tolerate highly acid soils, suited for use as silage or green manure
Turnips and Radishes	B/D: 1 – 6	0 – ½	Aug - Oct	Aug - Oct	Aug - Oct	Fall forage available in 45-60 days Several varieties available. Should only be limit grazed as supplement to other lower quality roughage

Determining Pure Live Seed (PLS) –
The percentage of pure live seed is an indicator of seed quality. It is often used in connection with seeding rate recommendations for species which typically have relatively low germination rates, or frequently contain a substantial amount of inert material. If not specified on the label, PLS can be calculated if purity and germination are known.

Example – Assume a bag of seed has a purity of 97.5% and the germination is 70%. PLS is determined by multiplying the purity by the germination and dividing the product by 100. In this example PLS is calculated as: (97.5 x 70) ÷ 100 = 68.25%

In order to calculate the amount of seed needed per acre, the PLS recommended seeding rate should be divided by the calculated PLS percentage and multiplied by 100. If the PLS recommended seeding rate is 10 lbs. of PLS/A, and the calculated PLS percentage is 68.25, the amount of seed that should be planted per acre is: (10 ÷ 68.25) x 100 = 14.65 lb. 14.65 lb. of the material taken from the bag needs to be planted in order to achieve the 10 lb PLS/A recommended seeding rate.

Forage Crops Commonly Grown in Georgia

Forage Crop	Seeding Rate (lb/acre) B: Broadcast D: Drill	Seeding Depth (in.)	Planting Date			Remarks
			Mountains	Piedmont	Coastal	
Bahiagrass		¼ - ½	--	Mar – Apr	Mar – Apr	Adapted to sandy soils; tolerates drought and poor drainage; best planting results are achieved using a no-till sod drill on prepared ground
▪ Pensacola	B: 18 – 20 D: 12 – 15					
▪ Tifton 9, TifQuick	B: 12 – 15 D: 8 – 10					Higher yields and improved seedling vigor
Bermudagrass – common (hulled)	B/D: 5 – 10	0 - ½	--	Apr – Jun	Mar – Jun	All soil textures, tolerates drought; responds to nitrogen, potassium is important for survival and production
Bermudagrass - hybrid			Mar – May	Feb – Apr	Jan – Apr	All soil textures; tolerates drought, responds to nitrogen; potassium is important for survival and production; sprig through July if under irrigation
▪ Sprigged in rows	10 bu/ac	upper 2" exposed				
▪ Sprigs broadcast	25 – 40 bu/ac	Covered				
▪ Sprigs no-tilled	20 – 25 bu/ac	upper 2" exposed				
Big bluestem	B: 10 – 12 PLS D: 5 – 10 PLS	¼ - ½	Apr – May	Apr – May	Apr – May	Drought tolerant, requires rotational stocking, slow to establish
Dallisgrass	B: 15 PLS D: 10 PLS	¼ - ½	--	Mar – Apr	Mar – Apr	Adapted to clay and loam soils with good summer moisture. Ergot infection of seedheads can lead to the condition "dallisgrass staggers"
Eastern gamagrass	D: 10 – 12 PLS	½ - ¾	May – Jun	May – Jun	Apr – May	Requires rotational stocking; slow to establish
Indiangrass	B: 10 – 12 PLS D: 6 – 10 PLS	¼- ½	Apr – May	Apr – May	Apr – May	Requires rotational stocking, slow to establish Later maturing
Switchgrass	B: 10 – 12 PLS D: 5 – 6 PLS	¼ - ½	Apr – May	Apr – May	Apr – May	Drought tolerant; tolerates poorly drained soils; requires rotational stocking