

Property description

State: Kentucky

County: Caldwell County

Township: Dawson Springs

Location of property/Directions:

GPS Coordinates to Address at property: 37.061589° -87.711317°

2760 Wallace Fork Road Princeton, KY 42445

Directions to property:

- From the intersection of Hwy 91 and Hwy 672
- Go north on Hwy 672 for 1.5 miles
- Turn right onto Poole School Road
- Turn left onto Wallace Fork Road and go 1 mile
- driveway to landowner's residence will be on the right

Acreage: Estimated 145 Acres Forested Acres

Topography:

- Topography consists of rolling uplands with natural drains and narrow bottoms
- The overall forest site index for the entire property is well suited for timber production

Residence on the property: Yes

Adjacent stand or ownership concerns and the surrounding environment:

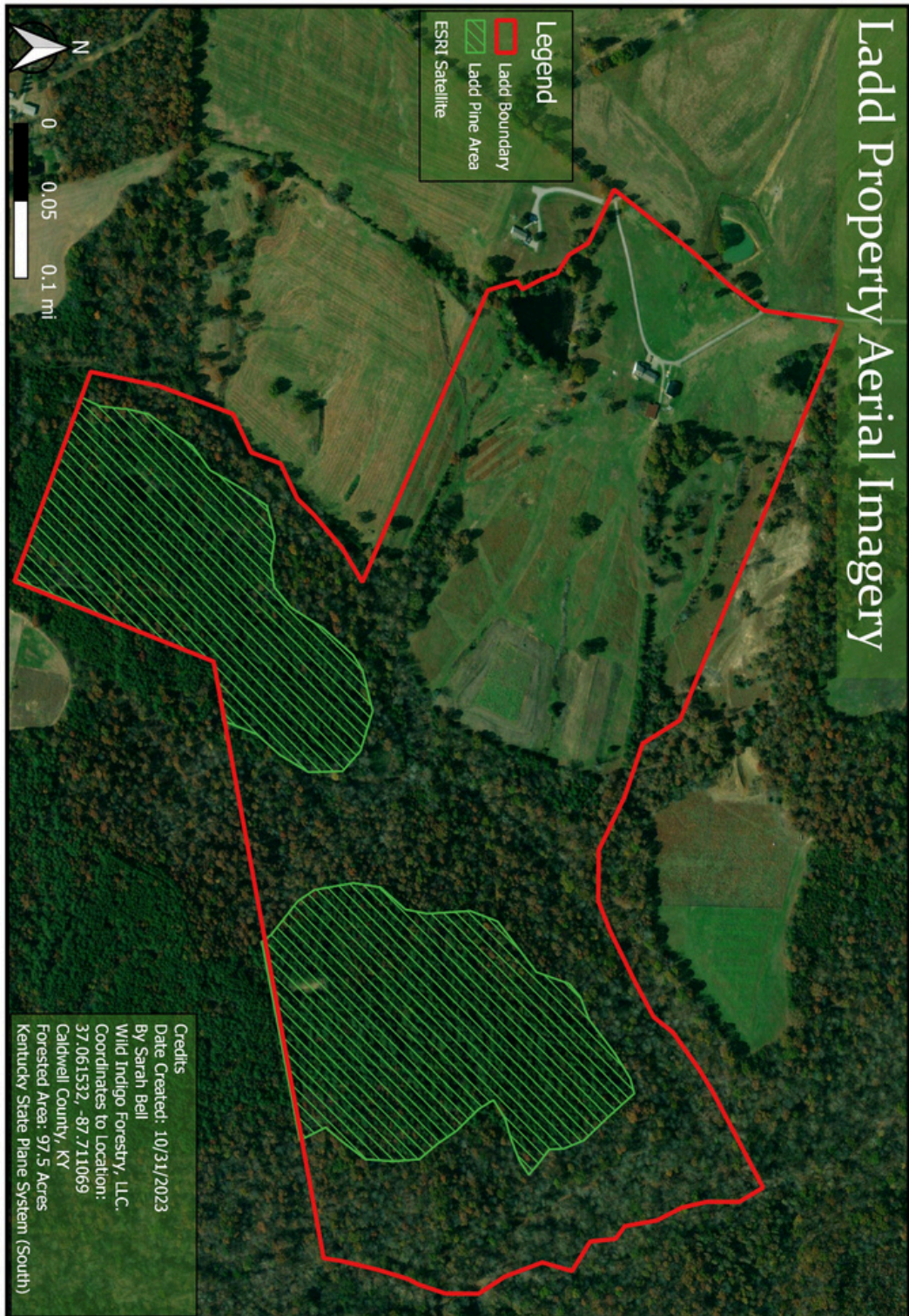
None

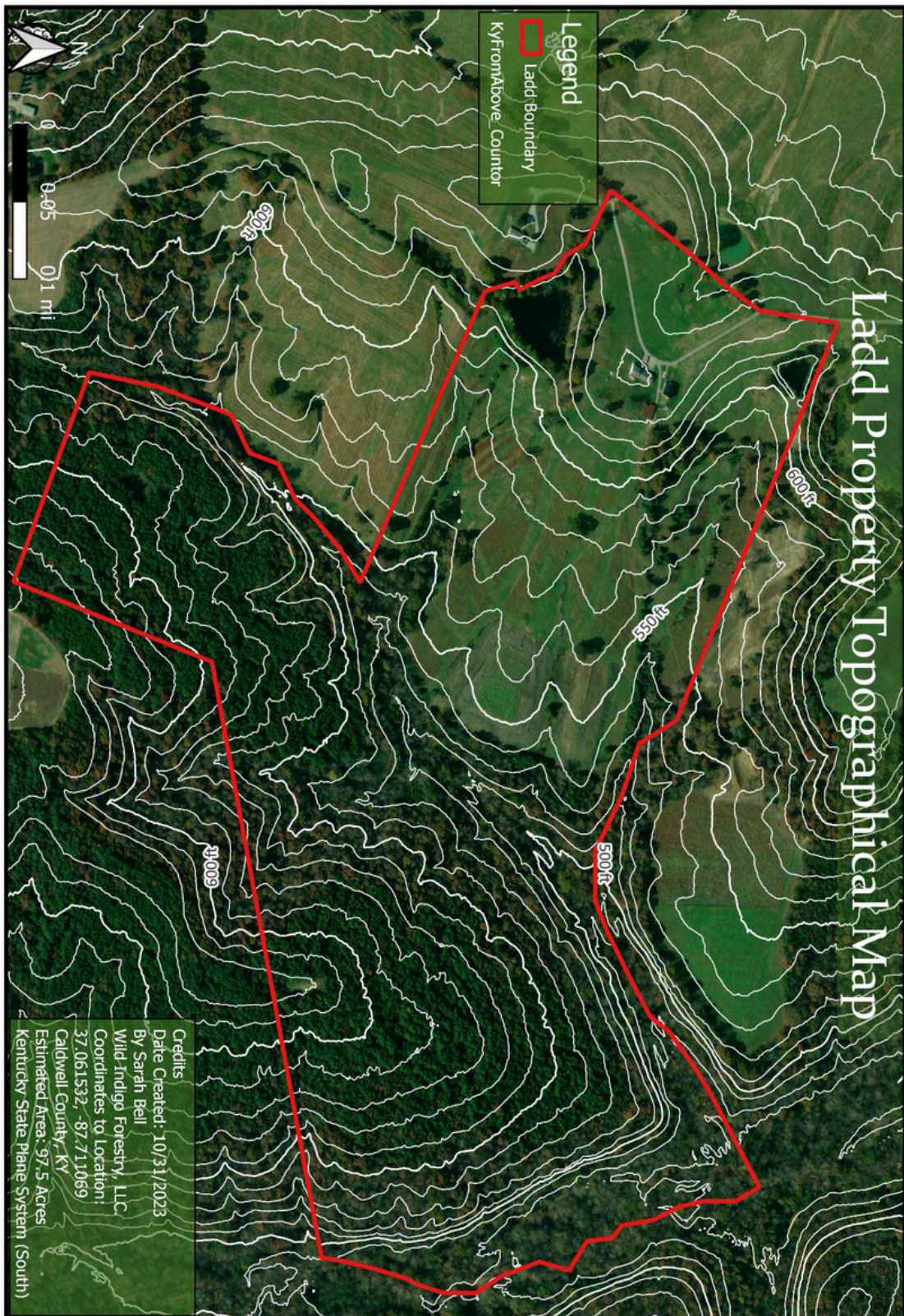
- Recommendation: continue working with the adjacent landowner's on property boundary locations for the purpose of future timber harvest and other management activities
- More Information regarding boundary marking is located in the Natural Resources Section

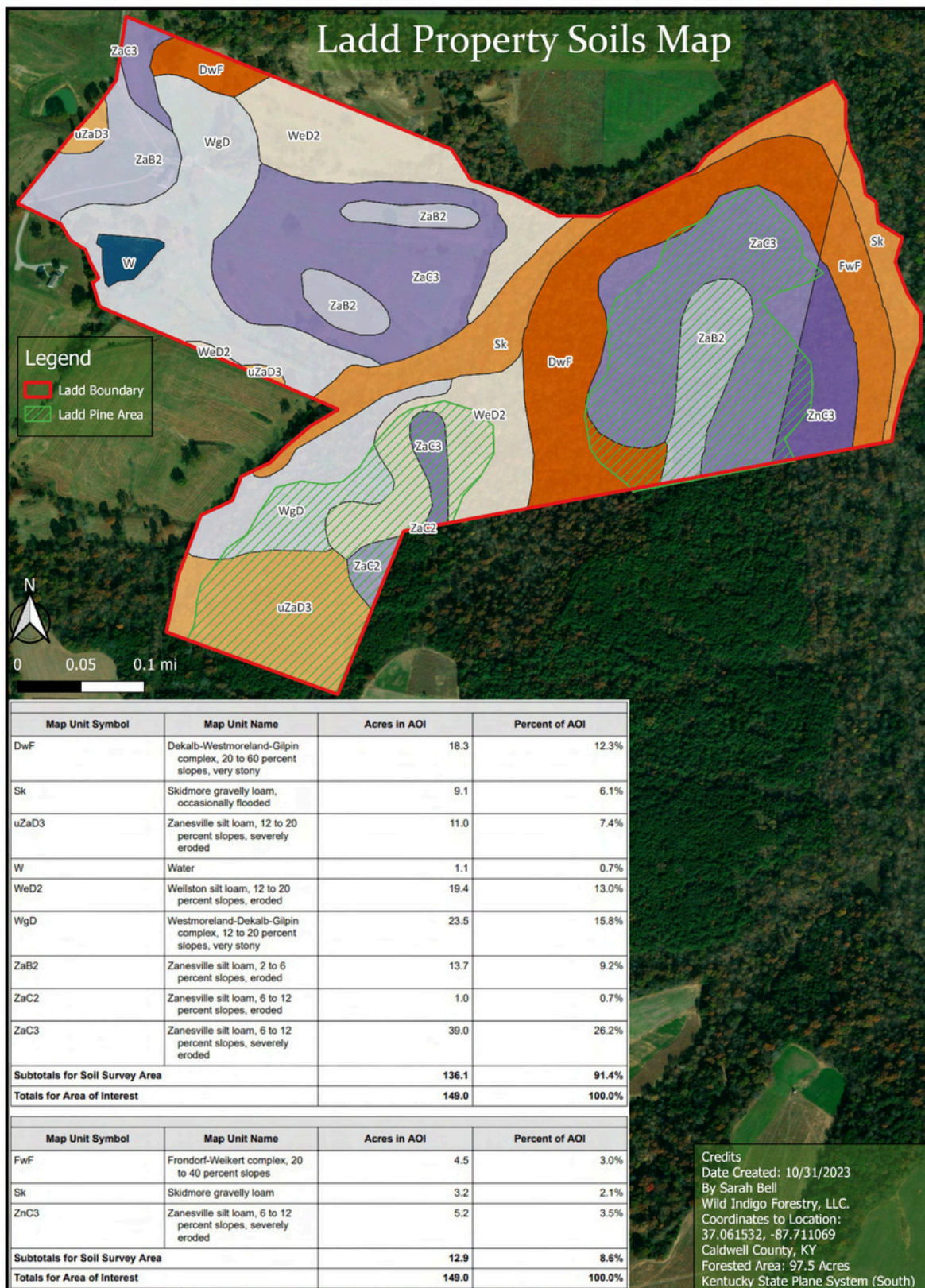
Accessibility to Property / Road conditions:

- There is road access to the property
- Maintained trail system runs throughout the property
- Dozer trail created along the boundary
- Survey has been completed on property

Property Maps







Soil Descriptions

DwF—Dekalb-Westmoreland-Gilpin complex, 20 to 60 percent slopes, very stony

The Dekalb, very stony component makes up 40 percent of the map unit. Slopes are 20 to 60 percent. This component is on hills on uplands. The parent material consists of coarse-loamy residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is excessively drained. The Westmoreland, very stony component makes up 30 percent of the map unit. Slopes are 20 to 60 percent. This component is on hills on uplands. The parent material consists of fine-loamy colluvium derived from sandstone and siltstone over fine-loamy residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained. The Gilpin, very stony component makes up 25 percent of the map unit. Slopes are 20 to 60 percent. This component is on hills on uplands. The parent material consists of fine-loamy residuum weathered from shale and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained.

Sk—Skidmore gravelly loam, occasionally flooded

The Skidmore, occasionally flooded component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on valleys. The parent material consists of gravelly coarse-loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.

uZaD3—Zanesville silt loam, 12 to 20 percent slopes, severely eroded

The Zanesville, severely eroded component makes up 85 percent of the map unit. Slopes are 12 to 20 percent. This component is on hills on uplands. The parent material consists of thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, fragipan, is 21 to 30 inches. The natural drainage class is moderately well drained.

W—Water

Water: 100 percent. Water is a miscellaneous area.

WeD2—Wellston silt loam, 12 to 20 percent slopes, eroded

The Wellston component makes up 94 percent of the map unit. Slopes are 12 to 20 percent. This component is on hills on uplands. The parent material consists of finesilty noncalcareous loess over loamy residuum weathered from sandstone and/or siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained.

WgD—Westmoreland-Dekalb-Gilpin complex, 12 to 20 percent slopes, very stony

The Westmoreland, very stony component makes up 45 percent of the map unit. Slopes are 12 to 20 percent. This component is on hills on uplands. The parent material consists of fine-loamy colluvium derived from sandstone and siltstone over fine-loamy residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained. The Dekalb, very stony component makes up 25 percent of the map unit. Slopes are 12 to 20 percent. This component is on hills on uplands. The parent material consists of loamy colluvium derived from sandstone and siltstone over loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is excessively drained. The Gilpin, very stony component makes up 22 percent of the map unit. Slopes are 12 to 20 percent. This component is on hills on uplands. The parent material consists of fine-loamy residuum weathered from shale and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained.

ZaB2—Zanesville silt loam, 2 to 6 percent slopes, eroded

The Zanesville, eroded component makes up 85 percent of the map unit. Slopes are 2 to 6 percent. This component is on ridges on uplands. The parent material consists of fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale. Depth to a root restrictive layer, fragipan, is 20 to 30 inches. The natural drainage class is moderately well drained.

ZaC2—Zanesville silt loam, 6 to 12 percent slopes, eroded

The Zanesville, eroded component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on ridges on uplands. The parent material consists of thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, fragipan, is 22 to 30 inches. The natural drainage class is moderately well drained.

ZaC3—Zanesville silt loam, 6 to 12 percent slopes, severely eroded

The Zanesville, severely eroded component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on ridges on uplands. The parent material consists of thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, fragipan, is 20 to 28 inches. The natural drainage class is moderately well drained.

FwF—Frondorf-Weikert complex, 20 to 40 percent slopes

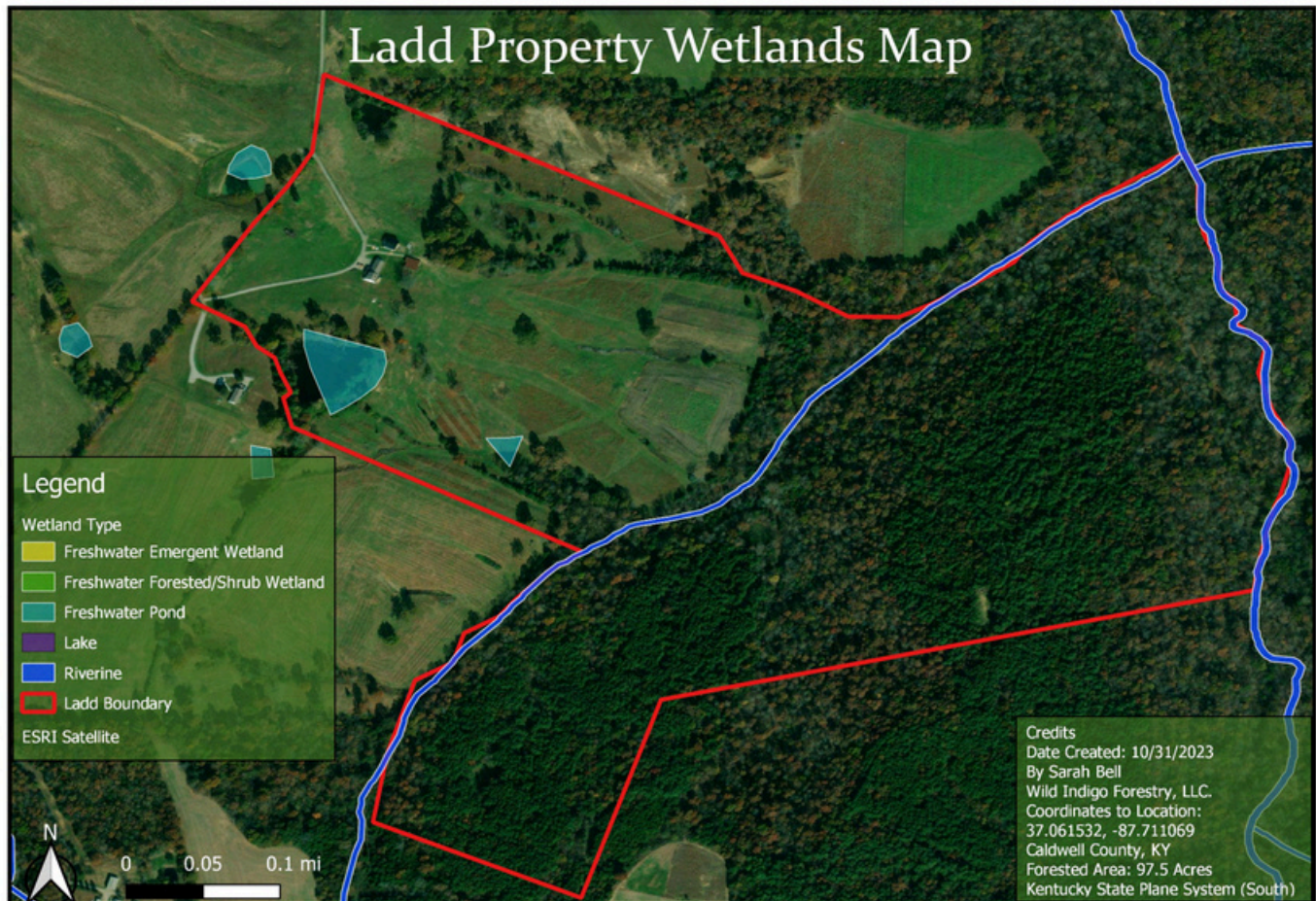
The Frondorf component makes up 50 percent of the map unit. Slopes are 20 to 40 percent. This component is on hills on uplands. The parent material consists of thin fine-loamy noncalcareous loess over loamy residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. The Weikert component makes up 27 percent of the map unit. Slopes are 20 to 40 percent. This component is on hills on uplands. The parent material consists of loamy residuum weathered from shale and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained.

Sk—Skidmore gravelly loam

The Skidmore, occasionally flooded component makes up 85 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains on valleys. The parent material consists of mixed coarse-loamy alluvium. Depth to a root restrictive layer, bedrock, paralithic, is 40 to 100 inches. The natural drainage class is well drained.

ZnC3—Zanesville silt loam, 6 to 12 percent slopes, severely eroded

The Zanesville, severely eroded component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on ridges on uplands. The parent material consists of thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, fragipan, is 20 to 28 inches. The natural drainage class is moderately well drained.



Streams, wetlands, ponds, lakeshore:

- Watershed unit: Piney Creek-Lake Beshear
- HUC Number: 12-051402050104

Effects of natural disasters:

- Property was affected by the ice storm in February 2009
- Emerald Ash Borer (EAB) is affecting the ash trees on the property

Property-level Descriptions

Property acquired: 2020

Landowner's Management Goals and Objectives for Property Include:

Wildlife Habitat Improvement

Forest Management: improve timber resources and control undesirable and invasive species

Recreation: hiking, bird watching, off-road vehicle use, hunting

Stand History - Previous and Current Management Activities:

- Clearcut in the early 1990's
- Westvaco planted Loblolly Pine after clearcut
- Hardwood stand only: blue tree harvest marking paint seen on some trees that were not cut in a previous harvest (loggers may not have found them or wanted them - foresters generally mark timber this way)

Clearcut

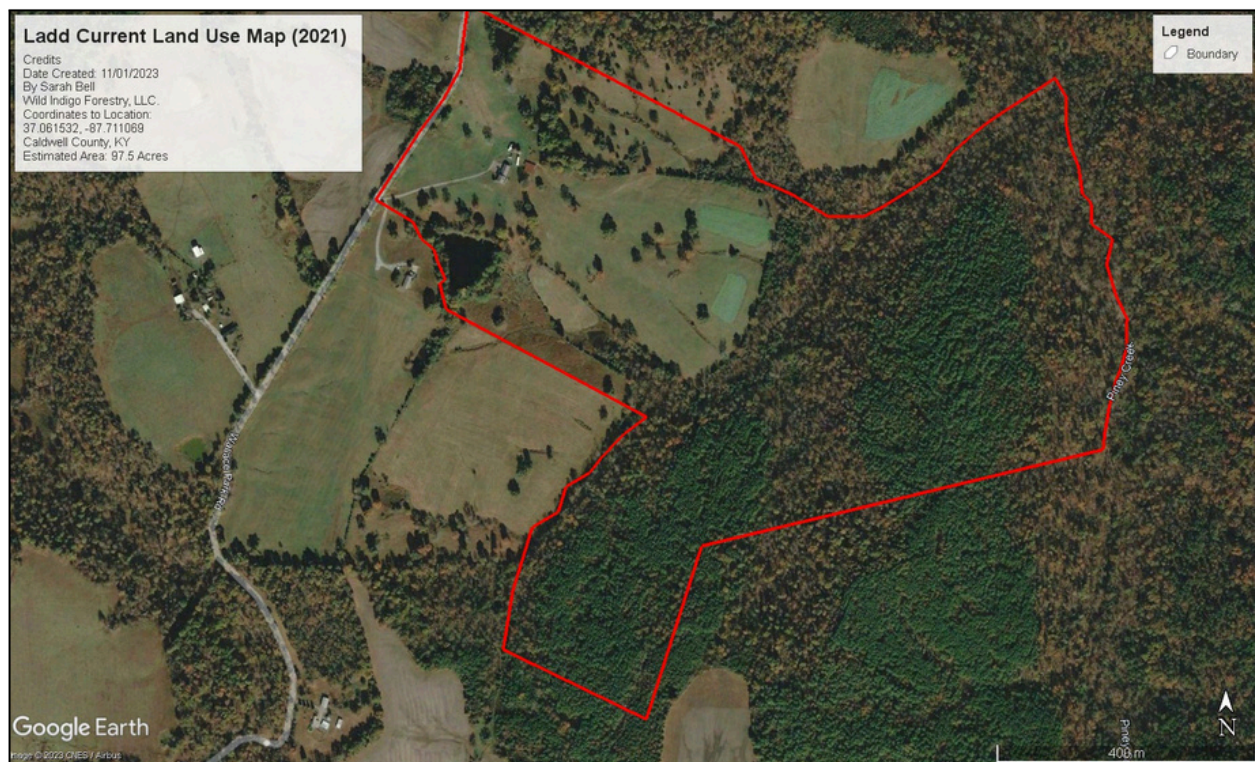
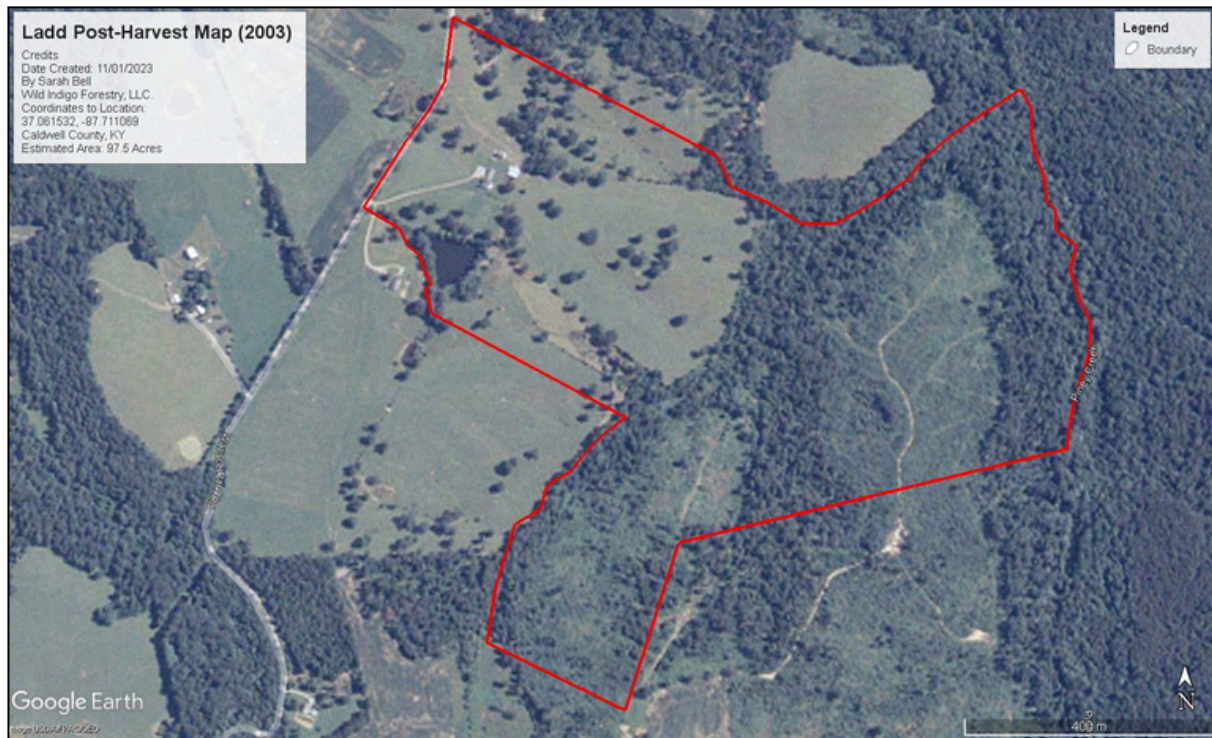
Special Sites - includes social considerations, archeological, cultural, and historic sites:

None

Adjacent Stand or Ownership Information that present opportunities or limitations:

The property is adjacent to the Pennyrile State Forest





Air, Water, and Soil Protection: What is the Importance of Protection?

- Monitor the roads for erosion issues which can create water and soil issues
- follow the BMP rules
- Diversion ditches aka water bars can be utilized on the roads (diagram with more information in this report)

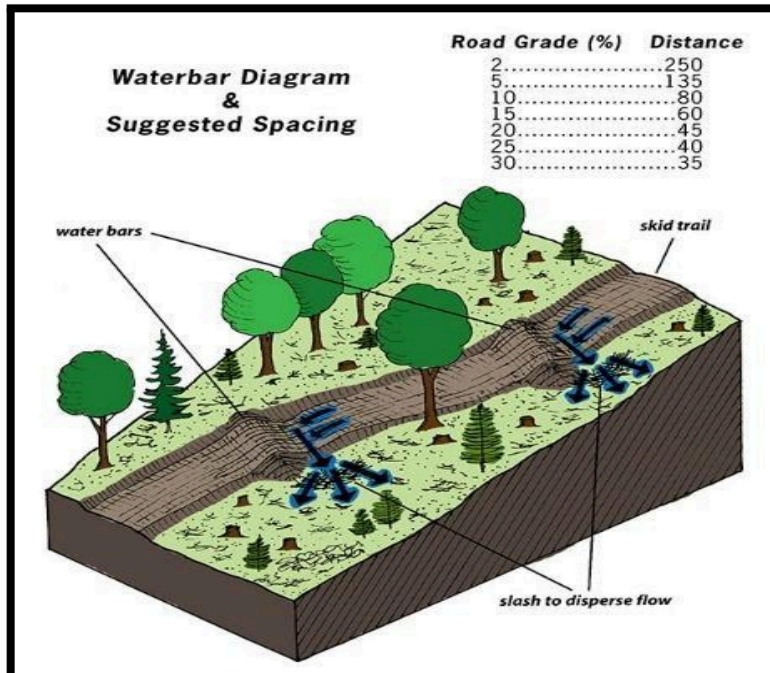
Non-point source pollution is defined as water pollution from a non-specific point such as muddy water runoff from a field or logging road as opposed to point source pollution from a factory outlet pipe. ~~Best Management Practices (BMPs)~~ Best Management Practices (BMPs) are designed to protect water quality from non-point source pollution by preventing or reducing the movement of sediment, nutrients (fertilizer), pesticides, and other pollutants associated with silvicultural activities into surface or groundwater.

Healthy Forest Ecosystems are Ecological Life-support Systems:

Healthy forest ecosystems are ecological life-support systems. Forests provide a full suite of goods and services that are vital to human health and livelihood while providing natural assets we call ecosystem services. When our forests are undervalued, they are increasingly susceptible to development pressures and conversion. Recognizing forest ecosystems as natural assets with economic and social value can help promote conservation, compliance with forestry laws, and more responsible decision-making and commitment from forest landowners.

Woods roads are an outstanding part of your property.

Maintenance will be much easier and the life of your roads extended when thinking about erosion. Shallow-based dips aka water bars can be used to divert water off the roads on slopes. Built properly, these will greatly reduce gillies and still allow vehicles to use the roads. In addition, the water quality in the surrounding tributaries will be healthier because of these efforts.



Fish, Wildlife, and Biodiversity:

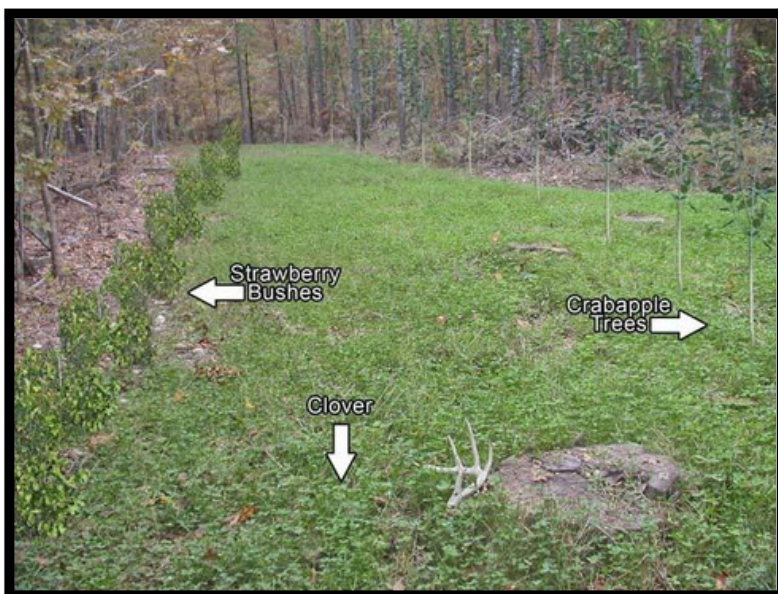
- Wildlife conditions are good
- Plentitude of young hard and soft mast species - primarily in the hardwood area and some scattered in the pine area
- There is sufficient water availability with the creeks and drains on the property
- Den and cavity trees are available on property to wildlife



Den and cavity trees provide nesting, roosting, and escape sites for many forms of wildlife



Hinge cutting trees is a great practice in late summer and late winter or early spring. It makes open areas thicker and creates feeding, bedding and cover for deer.



Wildlife Management: Wildlife openings, food plots, den trees and mast tree species are all important aspects of maintaining long-term wildlife habitat. Planting wildlife food plots is a common practice, as is providing supplementing foods for the deer herd. Manipulating and maintaining the native habitat can also be very beneficial to the local wildlife through sustainable forestry practices.

Working with a Private Lands Wildlife Biologist from KY Fish and Wildlife Resources (KDFWR) is also a great option.

Protected Animal and Plant Species: N/A

Forest Products other than timber (Ex: mushrooms, ginseng, etc.)

None

Aesthetic Quality:

The property is aesthetically pleasing in most areas.

The pine area has very little underbrush and visibility goes far

Grazing and Agroforestry practices:

No

Livestock Exclusion

(Silvopasture is managed separately)

Proper fencing to exclude livestock is an important part of maintaining or improving a quality woodland for both wildlife and timber. Cattle, horses and other livestock graze forest understory plants, damage trees, and compact the soil. The effects of these shorten the lifespan of trees, decrease food and cover available for wildlife, cause erosion, and reduce the timber value of most trees. Compared to good pasture, livestock gain little from grazing forests. Losses of wildlife habitat and timber values far exceed any benefits from grazing. Simply fencing cattle out of the forest areas can greatly improve habitat for wildlife. Shade can be provided by allowing livestock to use a small area of the forest, instead of the entire area.



Forest Health (Disease, Insects, and other pests - includes Invasive Species):

Brush Management will be recommended at the end of the Practice Recommendations Section

Invasives seen on the property include:

Multiflora Rose

- The rose is located on the forest edge along the fields

Japanese Stiltgrass

- Located in pine area, primarily along and in the roads (old skid trails, came in on logging equipment)

There was no evidence of any significant insect or disease problems observed during the field visit and the forest appears healthy and to be growing well.

- It is recommended to monitor the invasives and be sure they do not become a problem with forest regeneration and productivity.

Also, continue to monitor for any new invasives.

The overall health of the property is good.

Emerald Ash Borer (EAB):

The Emerald Ash Borer (EAB) will eventually come into the area if it has not already. This is difficult to determine because there are very few saw size ash trees on the property. EAB kills the larger dominant ash trees and creates holes in the canopy allowing the sun to reach the forest floor more easily. All standing Ash trees are susceptible to this insect and are expected to die shortly after the infestation of the EAB. This will lead to higher levels of woody debris, which can increase the danger of wildland fire. Also, standing dead trees pose a hazard to people using the area for recreation. Ash trees standing within falling distance of buildings should be removed.

Carbon sequestration Opportunities:

No

Forests of Recognized Importance (FORI): This property is not part of a FORI

FORI represent globally, regionally and nationally significant large landscape areas of exceptional ecological, social, cultural or biological values

Wildfire Risk and Reduction and Prescribed Fire:

A high wildfire risk for this property due to the hardwood stand being in an upland and a pine stand where naturally the needles will burn easier.

- Trails throughout the property will provide great firebreaks
- Prescribed fire can help decrease the fuel load and help with management practices

Forest fires are a possible threat.

Maintaining forest trails for use as fire breaks can be beneficial.

Prescribed Fire/Burns and Wildland Fire Information

For assistance in case of forest or field fires, contact 911, the State Police, or the Regional Forestry Office in Madisonville Branch at 270-824-757

FIRE LAWS

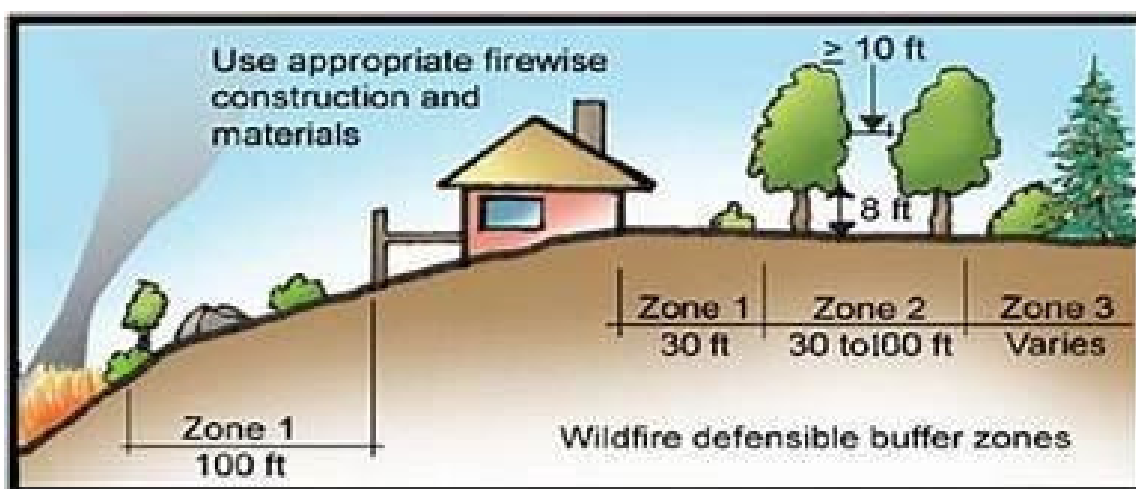
No Burning Between 6am - 6pm
Unless there is snow on the ground

Dates:

February 15th - April 30th
October 1st - December 15th

Practicing Firewise Safety provides your home and residential areas protection if a wildfire was to be in the surrounding forest around your home. To create a Firewise landscape, remember that the primary goal is fuel reduction. The fuel is vegetation. To this end, initiate the zone concept. Zone 1 is closest to the structure; Zones 2-4 move progressively further away.

www.firewise.org



Property lines

Knowing where your property lines are located is very useful. This is helpful for many reasons, particularly during logging operations for yourself and your adjacent landowners, and to help manage trespassing issues. If it has not already been done a licensed surveyor should be consulted. Maintaining your property boundary lines can be done with paint or T posts and will need to be checked and maintained annually by yourself or a reputable company.



*Example of marking
property lines using yellow paint.
Red paint is another great option!
Tip: To help distinguish property corners
put double dashes on trees*

American Tree Farm System

ATFS recognizes and validates family forest owners for their work and commitment to sustainable stewardship of their land.

Consider becoming part of the **American Tree Farm program.**

This program designates that Forest Management is important to you and your family. It is a free program that involves submitting this Forest Management Plan and agreeing that you are committing to practicing sustainable forest management.

Once approved your family will get a free American Tree Farm sign for you to place on your property if you choose.

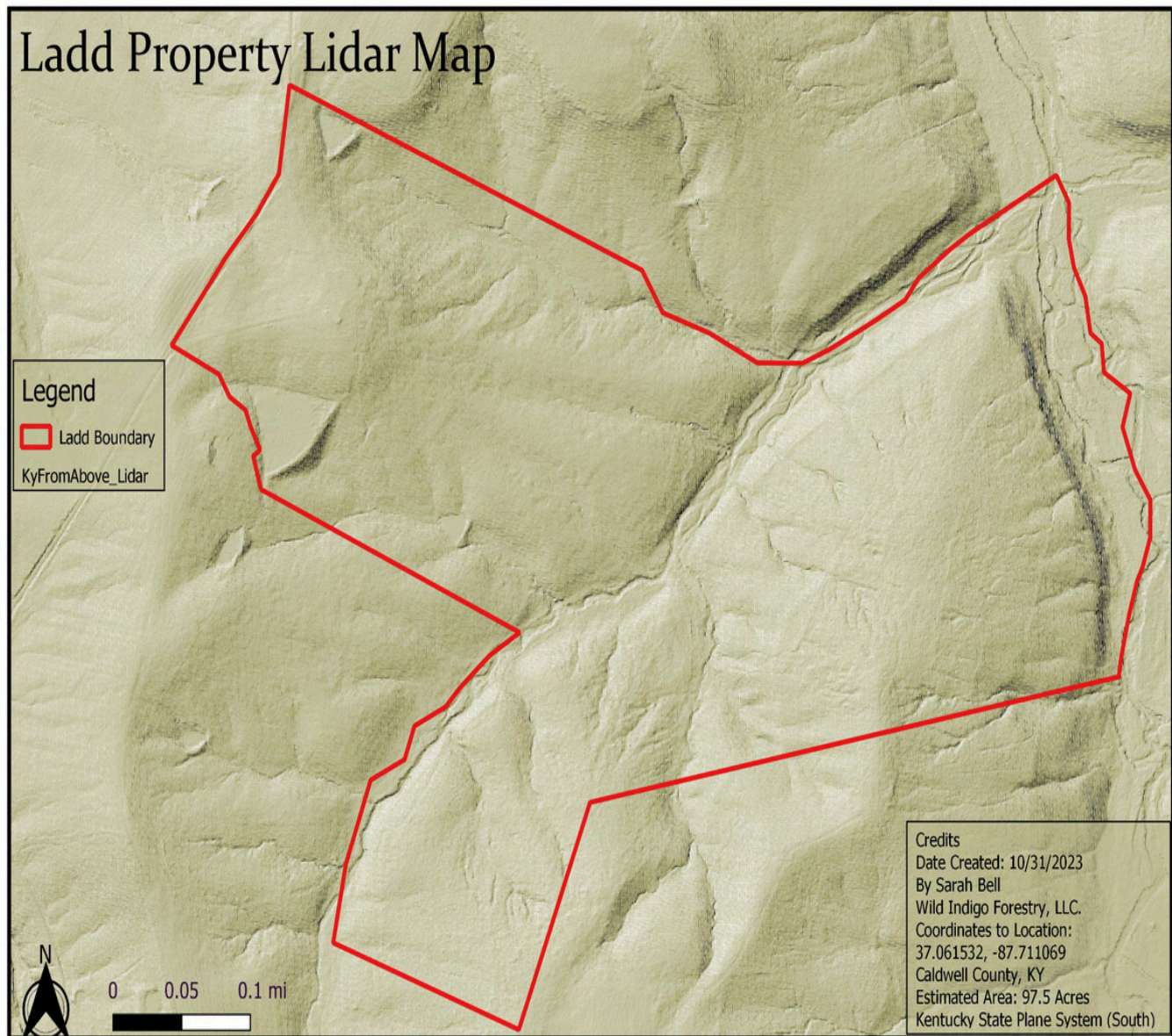
The ATFS Certification system is internationally recognized, and the certified ATFS sign tells your community, and the world, that you stand among the best woodland stewards in America.

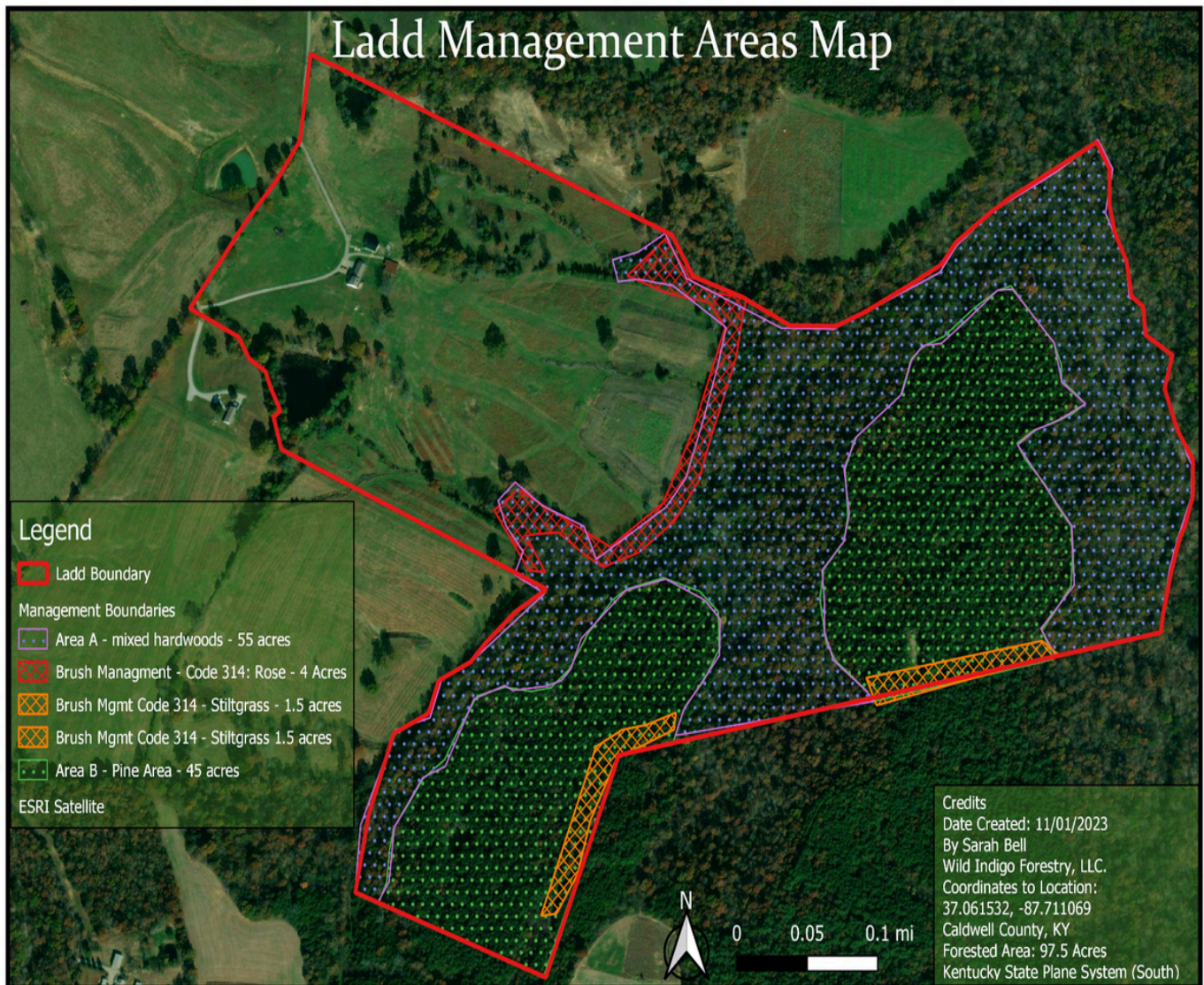


**Please contact your forester for more information
if you are interested in this program.**

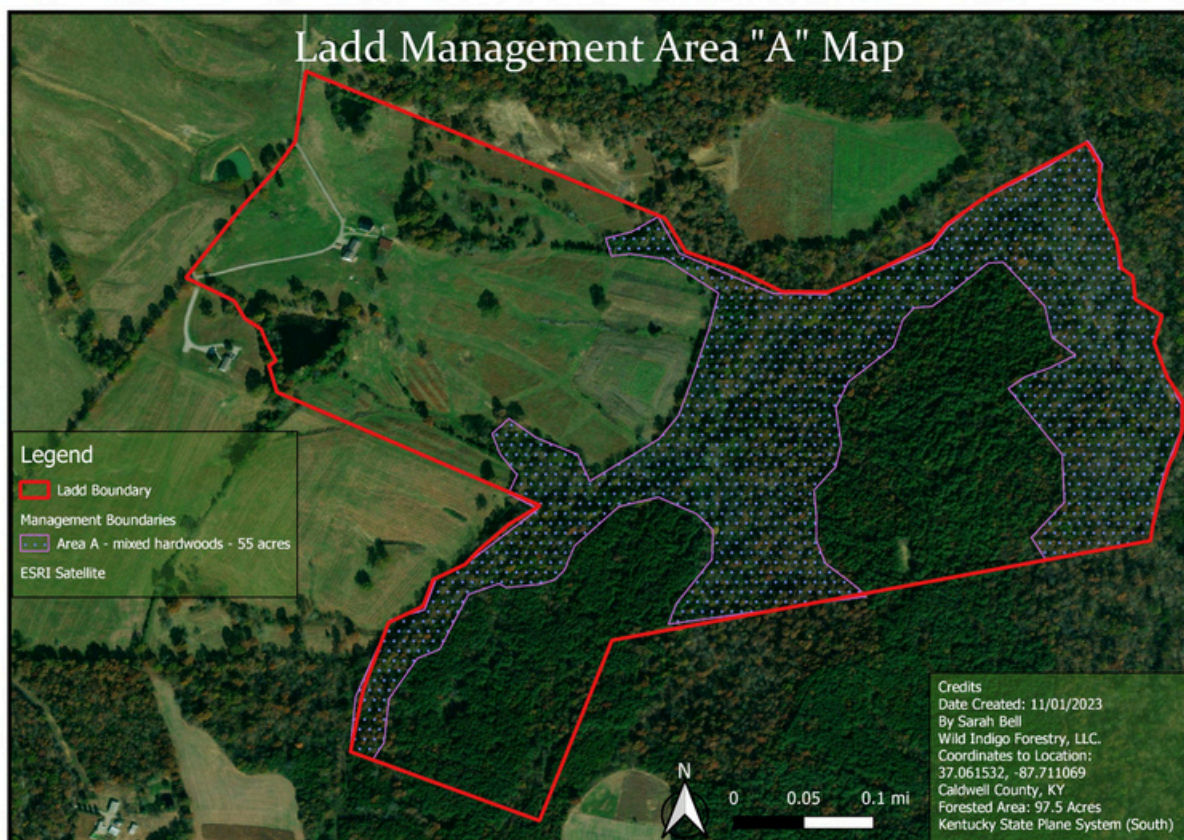
<https://www.treefarmssystem.org/>

Management Unit-Level Description





Area A - Mixed Hardwoods
55 Forested Acres



NRCS Practice Recommended for Area A (55 Forested Acres):

666 - Forest Stand Improvement

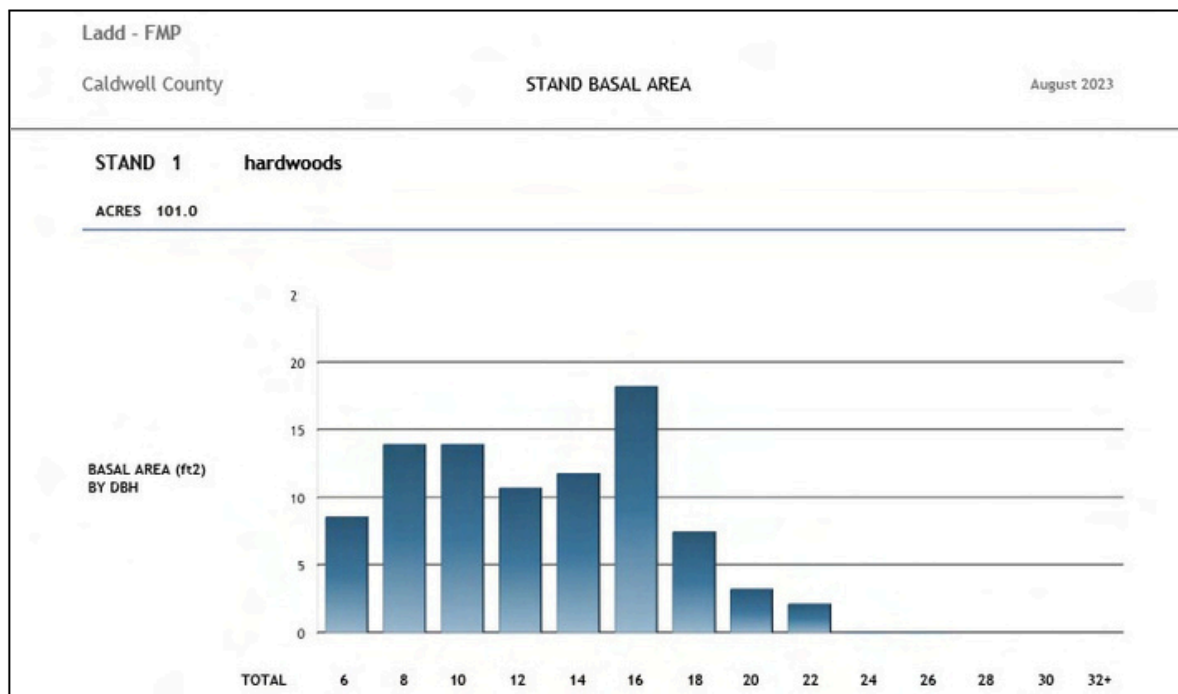
338 - Prescribed Fire (must have a Prescribed Fire Burn Plan)

Forest Type: - Mixed Upland Hardwoods (Stocking % by Species graph to follow)

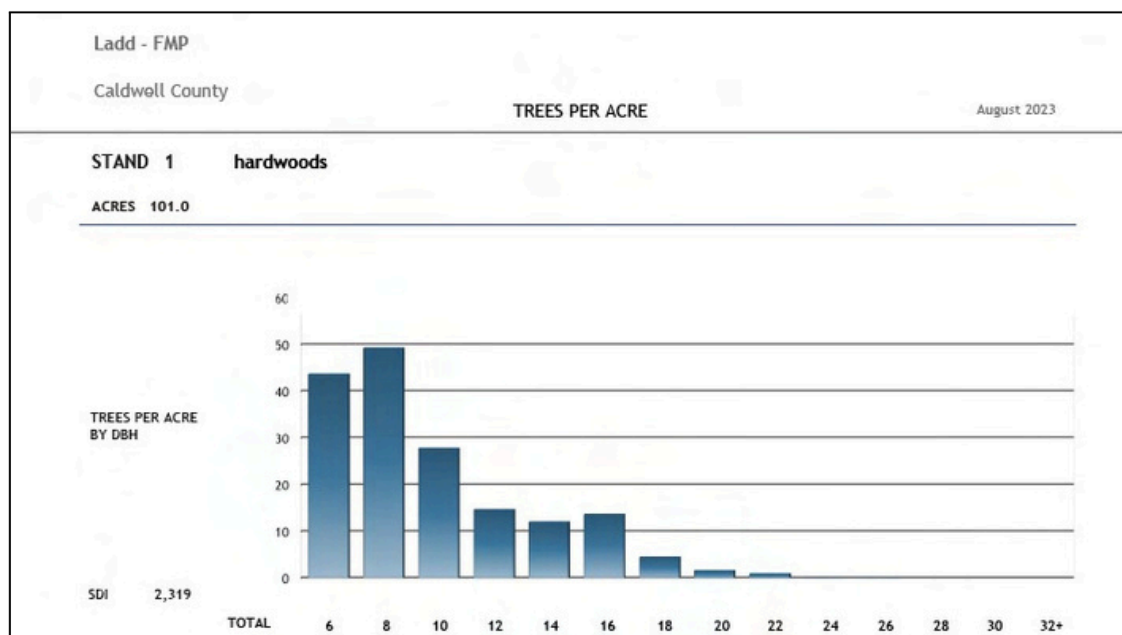
- Diversity: good diversity
- Uneven aged stand
- Age class: pulp into small-grade saw timber
- Canopy height: averages 40' - 60' tall
- Dominant size class: pulp size (6" - 12" DBH)

Basal Area: 90

Note: 6" DBH size includes all measured trees 6" and below

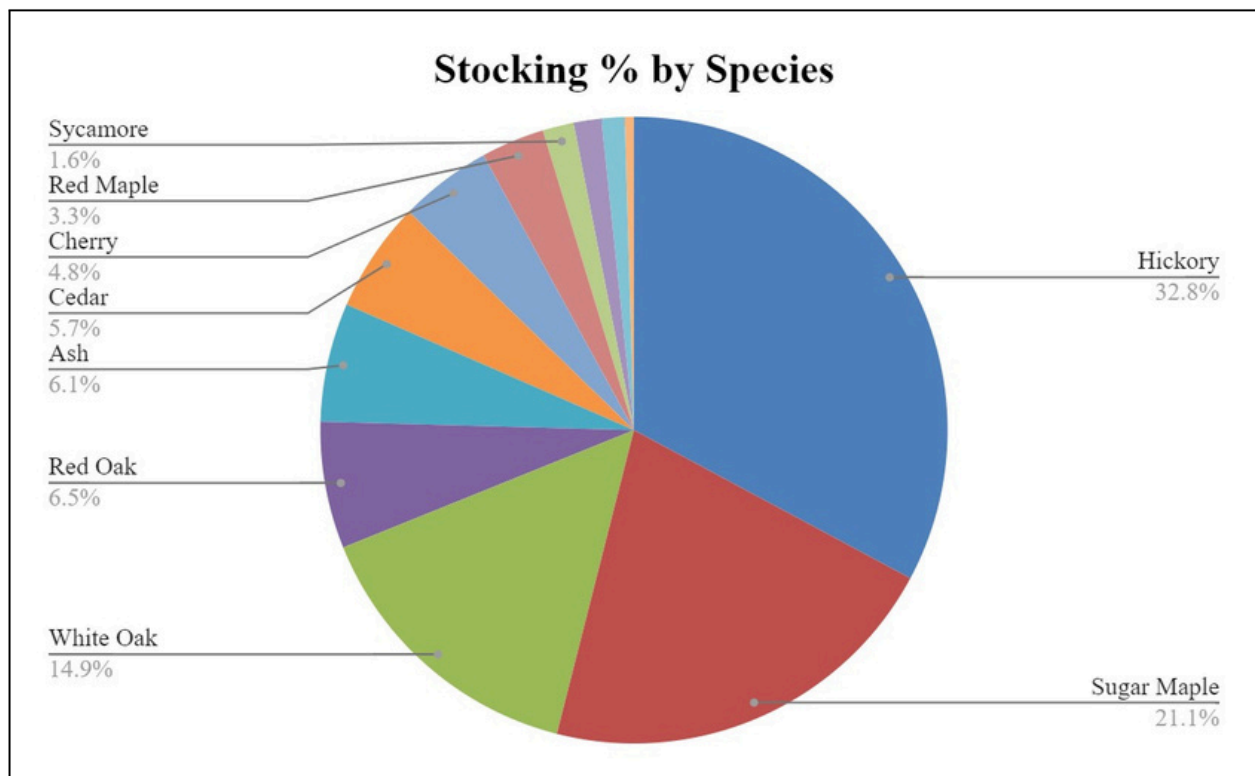


Trees per Acre: 168



Stocking:

- Stocking: 80%
- Area A is considered fully stocked
- Needs to be thinned to the under and fully stocked cusp
- In the absence of thinning, trees in these stands will have increasing competition, reduced growth, and be stressed and more susceptible to the effects of drought, insect and disease activity
- Eventually, these stands may stagnate. Leaving these stands un-thinned will have long-term consequences in terms of the health, growth, and fuel loading of the forest landscape.



Description of Stand Health:

Stand Health is good. No pests or diseases were found.

Regeneration:

Regeneration species:

Ash, Cedar, Cherry, Chinkapin Oak, Elm, Hickory, Red Oak, Sugar Maple, Virginia Pine, Walnut, and White Oak

Site Index:

This site is considered to be a medium to high quality site with a site index of 80 for Red Oak.

The site index number refers to the expected height that a given species can reach with 50 years growing time.

The site is well suited for timber and will continually yield a high volume timber crop given time and proper forest management

Stand Age with Estimated Canopy Height:

Estimated to be 35 years old with the canopy height of 40' - 60' tall

Reforestation and Afforestation Opportunities

No reforestation or afforestation necessary

Soils Information:

Well drained soils

Physiography, Slope, Topography, and Aspect:

Physiography: Area A has diversity with upland ridges with drains into narrow bottoms with creeks

Slope: diverse areas - flat bottoms / 15% - 60% slopes

Topography: highest elevation is estimated to be 650' above sea level

Aspect: N and NE

Prescribed Burning Opportunities:

Yes

A slow burn will help top kill the regeneration such as the elms, hophornbeams, and ash that are taking up resources for the oaks and hickory to come in

Noxious and Invasive Plant Species:

~~Multiflora Rose~~ found along forest and field edges

Resource Concerns (Soil, Water, Air, Earth, Animals):

None

Desired Future Conditions:

Species: understory will consist of a higher amount of oaks and hickory

BA: get it to 70 BA

Stocking: get it to 60% stocked

DBH Distribution will shift to small saw timber (13" - 16" DBH)

This will bring the stand to a bottom line of fully stocked with lots of room to grow

If no actions are taken the projected conditions in 10 years:

- The stand is projected to be stagnant with the midstory and regeneration full of low quality and very few mast species present.

- There will be very little to no underbrush bedding or browse for the wildlife.

If no actions are taken in 10 years the stand is projected to be stagnant with the midstory and regeneration full of low quality and very few mast species present.

There will be very little to no underbrush bedding or browse for the wildlife.

Alternatives to Achieve the Desired Forest Condition:

None

★ NRCS Practice Implementation Information for Area A:

666 - Forest Stand Improvement

Silviculture Prescriptions Recommended:

- Pre-commercial Thinning (Timber Production Emphasis): Concentrates growth on trees with better form and higher potential value as a timber product, and also improving the health and vigor of the residual stand. Conducted in stands with primarily DBH of 4" - 12" DBH

- Cull Tree Removal: Purpose of cull tree removal is to provide room for the main crop trees to continue their development. Considered when the timber production is the primary objective.

- Crop Tree Release: Focuses on releasing individual trees that have been selected to produce benefits consistent with stand-specific objectives.

- Midstory Removal: To increase the size and amount of desirable natural reproduction such as oak seedlings that require additional sunlight to grow. A timber harvest can be planned for within 5-10 years after this practice.

- Combination Improvement and Free Thinning: Combines the silvicultural treatments such as cull tree removal, grapevine removal, and free thinning in one stand when no one individual treatment is dominant.

Implementation of Silviculture Practices:

(Detailed Implementation Information under Practice Implementation Information to follow)

- Treatment Planned: Any time of year besides during spring sap flow (herbicide will be pushed up and out of injury)

- Objectives:

E666D: Reduce density to promote understory vegetation for erosion and allow herbaceous plants to grow for the benefit of wildlife

E666F: Reduce Density - Forest Management

E666I: Crop trees released for mast production: WHO/RO/Hickory

E666J: Oak Regeneration

- Treatment Methods Recommended:

Hack-N-Squirt on trees ranging in size from 2" to 12" DBH

Girdling trees above 5" DBH

- Target species removed: Sugar Maple, Hickory, and Red Maple

- Target species retained: Red Oak, White Oak, and Hickory

- Crop Tree Type: good form

- Basal area: BA 90 down to 70 BA, removing an estimated 20 BA

- Stocking percent: 80% down to 60%

- Tree Marking: done by Wild Indigo Forestry

Schedule of Implementation:

Timing of applications:

- Hack-N-Squirt: not recommended during heavy sap flow in spring (February-May) as sap flow from the wound will prevent adequate absorption of the herbicide.

Best applied June 1 – November 1.

- Basal Bark: can be applied any time during the year as long as snow or water do not prevent the applicator from spraying the root crown.

- Cut stump: Best applied from June 1 – November 1. Do not apply during heavy sap flow (February – May).

- Girdling: Girdling without herbicides is more effective after full leaf out.

When using herbicide it is best applied from June 1 - November 1.

Future Implementation in 5 years: Forest Stand Improvement practices are best when followed up every 5 years to prepare the forest for the stage of its development. Future implementation will include: - Crop tree release - Cull tree removal

Herbicide Recommendations:

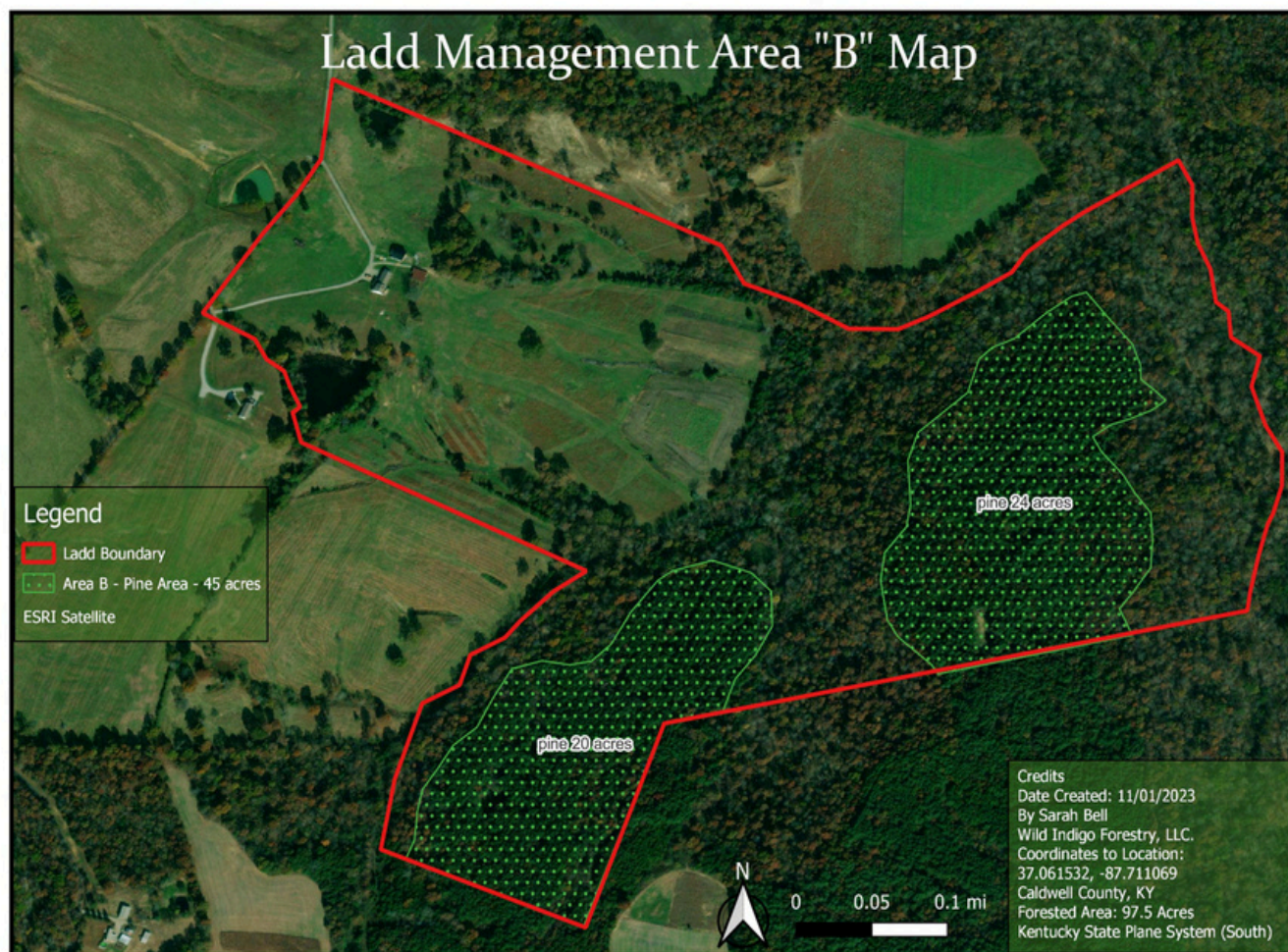
Mix of glyphosate and triclopyr

- The herbicide recommendation to meet the FSI objective is a mix of glyphosate and triclopyr.

- These can be found at many farm supply, agriculture supply, and hardware stores.

- Be sure to read the label and make sure it contains both ingredients.

AREA B
45 Forested Acres



NRCS - Practice Name and Code for Area B (45 Forested Acres):

666 - Forest Stand Improvement

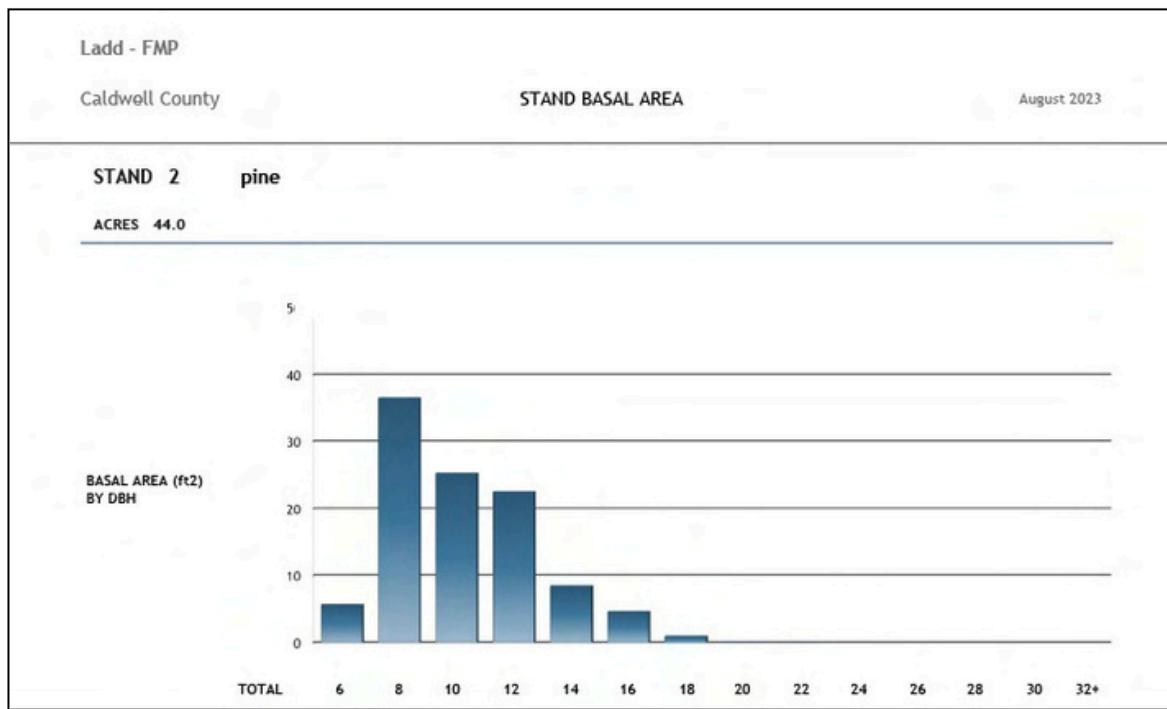
338 - Prescribed Fire (must have a Prescribed Fire Burn Plan)

Forest Type:

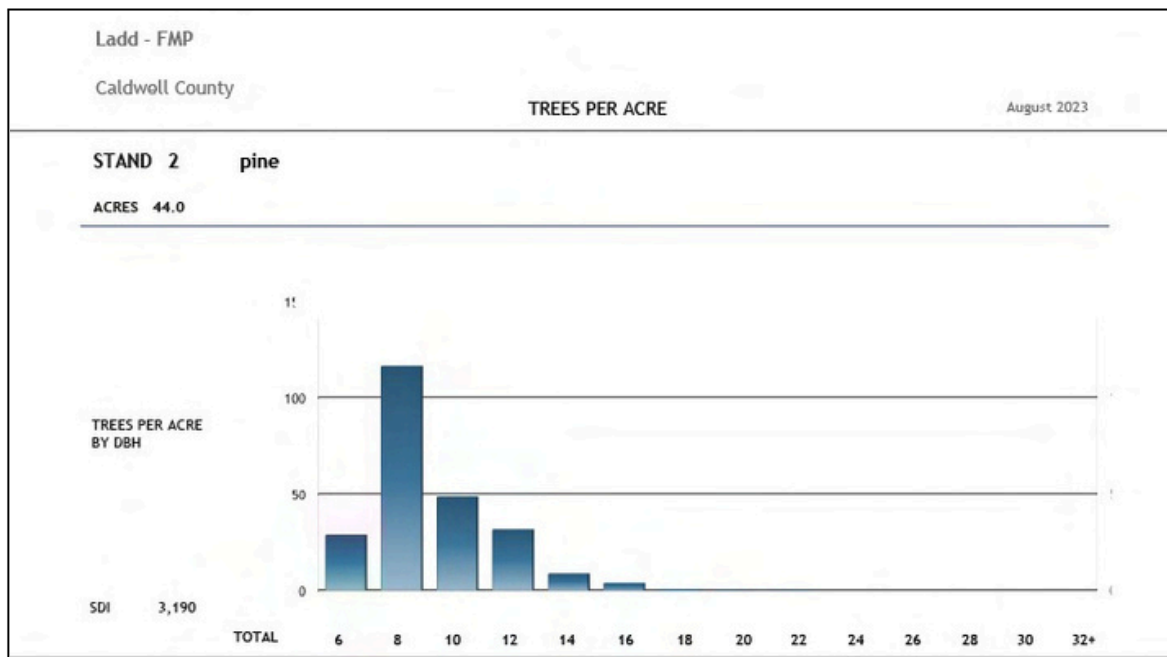
Pine

Basal Area per Acre: 104 (entire stand) / 95 (pine only)

Note: 6" DBH size includes all measured trees 6" and below

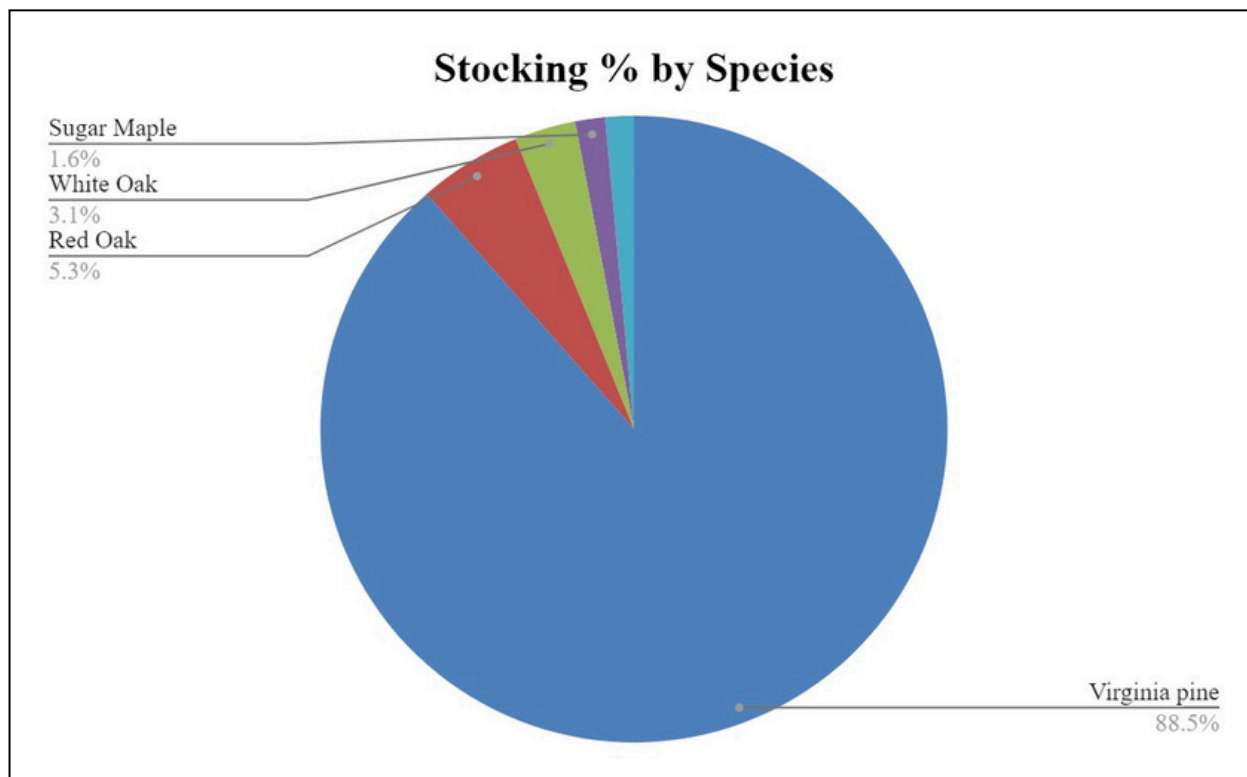


Trees per Acre: 238 (includes pine and hardwoods) / 211 (pine only)



Stocking:

- Fully stocked at 90%



Description of Stand Health:

Stand health is good. No pests or diseases were found.

Regeneration:

- Regeneration:

Ash, Elm, Hickory, Persimmon, Red Oak, Sugar Maple, Virginia Pine, and White Oak

- Area B is a planted stand.
- The understory of the property is lacking in regeneration.
- The midstory has very little diversity and is dominated by Loblolly Pine
- Even-aged stand with no midstory
- Good amount of Red and White Oak above 4' tall

Site Index: This site is considered to be a medium quality site with a site index of 70 for Red Oak. The site index number refers to the expected height that a given species can reach with 50 years growing time. The site is well suited for timber and will continually yield a high volume timber crop given time and proper forest management

Stand Age with Estimated Canopy Height:

- Age: estimated 30 years old
- Clearcut happened in the 1990's then Westvaco came in and planted the Loblolly Pine
- Canopy Height: estimated to be 30' tall

Reforestation and Afforestation Opportunities

No reforestation or afforestation opportunities

Soils Information:

- Well-drained soils

Physiography, Slope, Topography, and Aspect:

Physiography: along ridge tops where it is flat

Slope: ranges from 5% to 15%

Topography:

- the highest area is estimated to be 650' above sea level
- very little change in topography

Aspect: primarily North

Prescribed Burning Opportunities:

Yes

can help with the stocking issues of the pine vs the hardwoods

~~Landowner wants to keep the pine component and fire will allow for a mixed pine / hardwood stand to thrive~~

Noxious and Invasive Plant Species:

(Brush Management Practice Recommendation to follow)

- Japanese Stiltgrass
-

Resource Concerns:

None

Desired Future Conditions:

After practice:

- Species: mixed pine and hardwood stand
- BA: take it right above the understocked level to 65 BA
- Stocking: 65% down from 90%

In 10 years the forest will have more oaks in the canopy

- DBH Distribution: more uneven-aged with a higher amount of 2" - 6" DBH because of sunlight on the forest floor allowing for regeneration
- The forest will still be dominantly Loblolly Pine with more of a hardwood component

Alternatives to Achieve Alternative Desired Future Conditions:

None

Projectioned Conditions in 10 years:

No actions taken in 10 years:

- The oaks will have stagnated in the midstory and been outcompeted completely by the pine
- The pine will be dense, not allowing any sunlight to reach the forest floor.
- No regeneration or browse or bedding
- The timber quality of the pine will have diminished because they did not get thinned

★ **NRCS Practice Implementation Information for Area B:**

666 - Forest Stand Improvement

Silviculture Prescriptions Recommended:

- Pre-commercial Thinning (Timber Production Emphasis): Concentrates growth on trees with better form and higher potential value as a timber product, and also improving the health and vigor of the residual stand. Conducted in stands with primarily DBH of 4" - 12" DBH
- Cull Tree Removal: Purpose of cull tree removal is to provide room for the main crop trees to continue their development. Considered when the timber production is the primary objective.
- Crop Tree Release: Focuses on releasing individual trees that have been selected to produce benefits consistent with stand-specific objectives.

Implementation of Silviculture Practices:

(Detailed Implementation Information under Practice Implementation Information to follow)

- Treatment Planned: Any time of year besides during spring sap flow (herbicide will be pushed up and out of injury)

- Objectives:

E666D: Reduce density to promote understory vegetation for erosion and allow herbaceous plants to grow for the benefit of wildlife

E666F: Reduce Density - Forest Management

E666I: Crop trees released for mast production: WHO/RO/Hickory

E666J: Oak Regeneration

- Treatment Methods Recommended:

Hack-N-Squirt on trees ranging in size from 2" to 12" DBH

Girdling trees above 5" DBH

- Target species removed: Loblolly Pine

- Target species retained: Red Oak and White Oak

- Crop Tree Type: good form

- Basal area: BA 104 down to 60 BA, removing an estimated 44 BA

- Stocking percent: 90% down to 55%

- Tree Marking: done by Wild Indigo Forestry

Schedule of Implementation:

Timing of applications:

- Hack-N-Squirt: not recommended during heavy sap flow in spring (February-May) as sap flow from the wound will prevent adequate absorption of the herbicide.

Best applied June 1 – November 1.

- Basal Bark: can be applied any time during the year as long as snow or water do not prevent the applicator from spraying the root crown.

- Cut stump: Best applied from June 1 – November 1. Do not apply during heavy sap flow (February – May).

- Girdling: Girdling without herbicides is more effective after full leaf out.

When using herbicide it is best applied from June 1 - November 1.

Future Implementation in 5 years: Forest Stand Improvement practices are best when followed up every 5 years to prepare the forest for the stage of its development. Future implementation will include: - Crop tree release - Cull tree removal

Herbicide Recommendations:

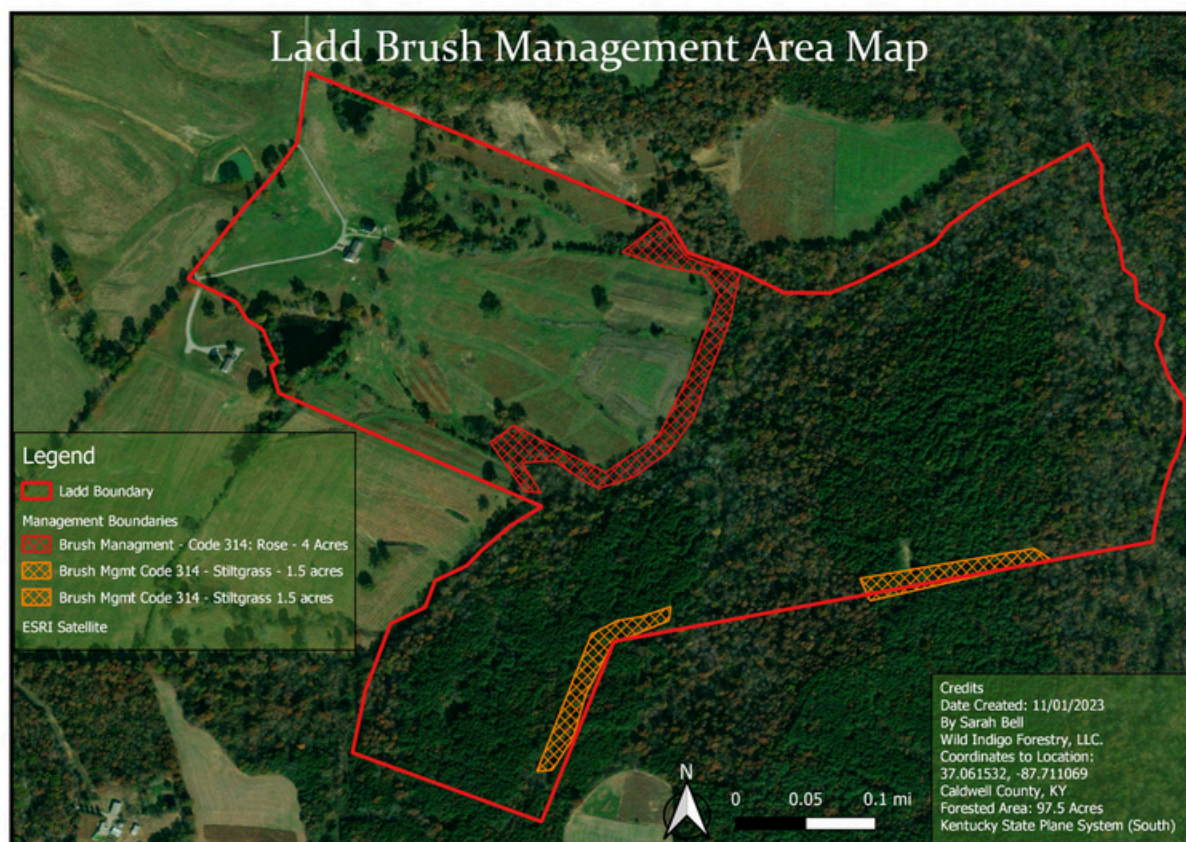
Mix of glyphosate and triclopyr

- The herbicide recommendation to meet the FSI objective is a mix of glyphosate and triclopyr.

- These can be found at many farm supply, agriculture supply, and hardware stores.

- Be sure to read the label and make sure it contains both ingredients.

AREA C
7 Forested Acres



NRCS - Practice Name and Code for Area C (7 Forested Acres):
314 -Brush Management

★ **NRCS Practice Implementation Information for Area C:**

Purpose:
- Chemical control

Plants:
- Multiflora Rose
- Japanese Stiltgrass

Schedule of Implementation:

Multiflora Rose

- located along field edges

Japanese Stiltgrass

- located in and on the edge of the woods roads (old skid trails) in the pine areas

Recommendations:

- Foliar Spray - use the same mix as with the FSI treatments

- Timing:

Rose: best to spray when flowering or in bud

Stiltgrass: March - August

More information below in the Practice Implementations Information attached

Control:

- Soil Type: generally well drained, eroded soils at 12% - 20% slopes

Zanesville and Westmoreland complex

- Landuse: Forest

- Application Dates: March - November

- Initial Chemical Control Treatment: Foliar

- Follow-up Application Date: monitor yearly

- Follow-up Treatment: Foliar

PRACTICE IMPLEMENTATION INFORMATION

Best Management Practices (BMP) Guidelines:

Follow the state regulations of BMP, Best Management Practices. BMPs focus on water quality. For more information go to the Resource Section near the end of this FMP.

Implement forest stand improvement activities in ways that avoid or minimize soil erosion, compaction, rutting, and damage to remaining vegetation, and that maintain hydrologic conditions. Protect site resources by selecting the method, felling direction and timing of tree felling, and heavy equipment operation.

Safety Information:

Before using any herbicide, read and follow the product label. Labeled pesticides undergo rigorous testing in a variety of site conditions. Following recommendations on the manufacturer's label prevents many potential problems that may arise from incorrect product use.

The label contains complete instructions for use, along with other valuable information such as personal and environmental safety considerations and application procedures.

Operation and Maintenance Agreements and Procedures:

- The manufacturer's label will also list information about the effectiveness of the herbicide in controlling different species of trees, shrubs, and vines. All herbicides are not equally effective in controlling different species.
- Prior to operating machinery or felling trees in and around forestland, check for any utilities (underground or overhead). Re-evaluate after an appropriate amount of time. Maintenance involving tree removal may be subject to restrictions due to impacts on various bats or other federally listed species.
- Operation-Periodically inspect the stand to ensure that objectives are achieved and identified resource concerns have been met.
- Maintenance-Inspect the stand periodically for insect damage, disease problems, and encroachment by invasive species.
- Protect from wildfire, destructive grazing and other potential damages.

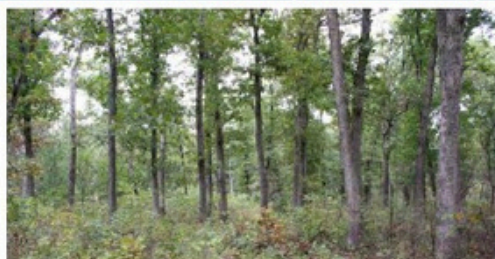


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Natural Resources Conservation Service

Forest Stand Improvement

KY Conservation Practice Implementation Requirements

666



PURPOSE

Forest stand improvement involves felling or deadening selected trees or understory vegetation to manipulate tree stocking/spacing and to control competition from over-story, mid-story and under-story species. It is most commonly accomplished by hand (using a number of different tools/implements) for a wide variety of management objectives including: increasing the quantity and quality of non-timber forest products, initiating or improving stand regeneration,

reducing wildfire risk, improving forest health, improving wildlife habitat and others. These techniques may be utilized for stand treatments such as crop tree release, shelterwood cuts, mid story removal, regeneration release, areawide thinning for timber and wildlife purposes and cull tree removal.

FOREST STAND IMPROVEMENT TECHNIQUES

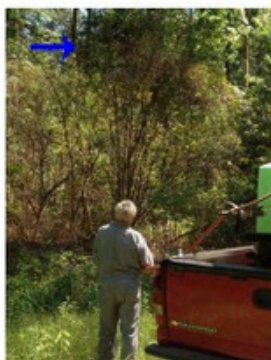
In most instances marking trees for either retention or removal is required as part of this practice. Marking trees should be done by NRCS foresters, the KY Division of Forestry (KDF) or other professional forester.

The most effective non-removal methods for deadening standing trees, shrubs, and vines typically involves the use of herbicides. Foliar sprays, stem injection (hack and squirt or frilling), basal bark spray, cut stump and girdling are effective techniques. Mechanical methods such as girdling, felling or pulling can be done without herbicides, but are generally less dependable (particularly with hard-to-kill species such as beech, maple, hickories, dogwoods and invasive species, such as tree-of-heaven) and require more time to be effective than those techniques that incorporate the addition of herbicides in the treatment.

When using herbicides, it is essential that the entire product label be read before use. The label contains complete instructions for use, along with other valuable information such as personal and environmental safety considerations and application procedures. The manufacturer's label will also list information about the effectiveness of the herbicide in controlling different species of trees, shrubs, and vines. All herbicides are not equally effective in controlling different species.

READ AND FOLLOW ALL LABEL INSTRUCTIONS WHEN USING HERBICIDES.

☐ Foliar Sprays



Foliar applications are treatments in which herbicides are sprayed directly on the leaves. These can be successfully used on shrubs or small trees up to 15 feet in height. It is best on target stems less 6 feet tall. More powerful sprayers can be used to spray the leaves of taller saplings, but doing so may damage adjacent, non-target plants. In most cases on private farms and woodlands, foliar applications are best suited for the smaller trees with leaves that can be reached by a hand-held spray nozzle. This application type is limited to periods when the leaves are fully expanded and accessible for treatment. Foliar applications can be applied from early summer to late September. Best results are obtained in late summer while leaves are still green.

Foliar treatments are least effective during very hot weather or when plants are under stress from drought. The best time is shortly following a rainfall,



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after the leaves have dried. When spraying the herbicide be sure to completely wet the leaves but avoid any drips. If herbicide drips from the leaves, this is too much. To decrease the amount of herbicide falling from the leaves, move the spray nozzle farther away from the leaves or move the wand more quickly.

When mixing, use clean water so the performance of the herbicide won't be hindered. Adding a surfactant improves the performance of most foliar herbicides, especially on plants that have a waxy leaf surface (e.g. rhododendron and mountain laurel). Drift control additives are also available to reduce the number of fine droplets produced. DO NOT use diesel fuel as an additive when applying herbicides to foliage. Diesel fuel can kill the leaves before the herbicide can be translocated by the plant. Use minimum sprayer pressure to control drift. Apply during rain-free periods. To prevent over spraying or forgetting which plants have been treated, a marker dye can be added to the herbicide.

There is some degree of incidental damage that can occur to other plants when applying foliar applications. Careful attention to adjacent plants should be taken to minimize damage.

☐ **Stem Injection (Frilling or Hack and Squirt)**

Stem injection involves delivering herbicide directly into the stem through the bark of the tree. This treatment is recommended for periods when the leaves are fully expanded, and the trees are actively growing. There are several methods for doing this, but the most common and least costly is the hack-and-squirt or frilling method. This method can be used on stems one inch in diameter or larger at breast height but is best suited to trees at least 4 to 5 inches in diameter. Bark on large trees is often too thick for most water-soluble sprays to penetrate, so it is necessary to cut a direct pathway for the herbicide to enter into the plant's vascular system.

A lightweight hatchet is used to cut an opening through the bark and into the vascular (fluid conducting) tissue of the tree. A quick downward strike to the stem of the tree results in a small cuplike notch (hack or frill) that penetrates the bark. Herbicide is then immediately squirted from a hand-held spray bottle into the notch. Spray directly onto the blade to deliver herbicide to the cut. If the herbicide runs out of the cut, you are probably applying too much herbicide.

Many herbicide labels recommend the number of hacks to make around each tree in relation to the diameter of the tree, for example, one hack per 2 to 3 inches of tree diameter. For most species, it takes about one cut for every 1-2 inches of trunk diameter. A simple rule of thumb is to leave about a thumb width (3/4") between hacks. The amount of herbicide applied for each squirt is generally 1/2 to 1 milliliter (ml). A single squirt from most spray bottles is between 1-2 ml. To determine how much is emitted from a given spray bottle, count the number of squirts it takes to fill a graduated cylinder or other liquid measuring device to a known value then divide the total volume by the number of squirts.



This method is not recommended during heavy sap flow in spring (February-May) as sap flow from the wound will prevent adequate absorption of the herbicide. This method is best applied June 1 – November 1.

☐ **Basal Bark Spray**

Basal bark spraying, sometimes called a basal bark application, is a technique used to deaden small trees, shrubs, and occasionally vines. This method is applicable to stems < 6 inches in diameter at breast height and treatments involving < 1,000 stems per acre. It can be applied any time of the year when stems are dry. Herbicide and an oil-based carrier is sprayed on stems 12 to 18 inches above the ground line. As the



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spray solution penetrates the bark, the active herbicide ingredient is carried to all parts of the plant.

To apply this technique, use a low-pressure backpack sprayer. Thoroughly wet the lower 12 to 18 inches of the stem, completely encircling the root collar area with the herbicide solution. Be cautious not to overspray to the point of runoff into surrounding soil. Follow manufacturer's label directions specifically for basal bark application. Basal spraying is extremely useful because it can be applied any time during the year as long as snow or water do not prevent the applicator from spraying the root crown.



Herbicides labeled for basal bark application are designed to be mixed with oil, diesel fuel, kerosene or another suitable carrier. These carriers move through the bark bringing with it the active ingredient that eventually enters the sap stream, disrupts the plant's normal functioning, and leads to plant death. Applying herbicide to the bark of the stem has some advantages. It is relatively easy to walk around and spray the trees if the terrain is favorable; there is no need to cut the tree in any way and risk personal safety with chainsaws or other sharp tools; and the treatment can be very effective in eliminating a high proportion of the unwanted woody plants. The disadvantage is that once the tree gets too big, the bark gets too thick and this treatment loses some of its effectiveness. When the basal part of the tree trunk is greater than 6 inches in

diameter (about 18 inches in circumference), it is better to use a stem injection method (described above) to assure better control. Another disadvantage of basal spraying is that it requires carrying large volumes of herbicide, therefore treating large numbers of small stems is generally not recommended.

A thin line application is like basal bark treatment. A thin stream of undiluted herbicide is sprayed horizontally to all sides of the lower plant stem to form a narrow band around each stem or clump. Specialized equipment calibrated to deliver small amounts of herbicide is needed to make such an application.

☐ Cut Stump Treatment

Where felling of the undesirable tree is the chosen technique, there is often a high probability that the stump will resprout. Sprouting can be eliminated by treating the stump with herbicide. Leave a tree stump 8 to 12 inches above the ground and cut the top of the stump level to allow uniform herbicide coverage. Brush the sawdust from the stump and thoroughly wet the cambium layer next to the bark (see photo) so the conducting tissue carries the herbicide to the roots.



Spray or paint the cambial area (outer wood next to bark) of the freshly cut stumps immediately, or within 30 minutes, unless specifically directed otherwise by the herbicide label. Using a marker dye to enhance coloration makes it easier to keep track of treated stumps. If an oil-soluble mix is used, spray the sides of the stump to the root collar and the cambial area until thoroughly wetted. For stumps less than 3 inches in diameter, the entire stump face should be treated with herbicide. On larger trees, treat only the outer 2 to 3 inches of the stump. The active vascular tissue is just inside the bark and in the cut stump application this tissue will transport herbicide into the roots. If herbicide application is delayed after cutting, recut the stump and apply the herbicide to the live tissue. Delaying herbicide application to freshly cut trees can result in prolific sprouting from the tree collar and roots. Do not use this method when stumps and nearby desirable trees are the same species. The cut stump treatment is best applied from June 1 – November 1. Do not apply during heavy sap flow (February – May).



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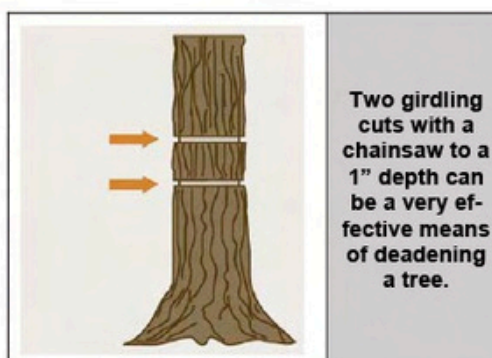
☐ Hand – Pulling

Some plants may be controlled by hand pulling or removal tool. When plants are small seedlings, they may be easily pulled by hand. For smaller populations and individual trees that have not fully established their root systems, hand pulling or digging up the entire plant can be effective as long as all parts of the roots are removed. As the tree grows into a sapling that is over 6 feet tall, it takes a lot of effort to pull the roots out; roots must be removed because if left in the soil, they will frequently re-sprout. Pulled materials must be disposed of properly.

☐ Girdling

Girdling involves “ringing” the tree by using a chainsaw. Make a cut 1” deep all the way around the tree at waist height. Be sure the cut is continuous, making a complete ring around the tree. This method is generally used to control trees larger than 5 inches in diameter.

Apply herbicide to the fresh cut within 30 minutes. Two rings cut approximately six inches apart is also effective without herbicide. However, young fast-growing trees can bridge the girdles with new vascular tissue and recover. Girdling without herbicides is more effective after full leaf out.



☐ Mechanical – Felling



Tree species may also be controlled mechanically by felling. Mechanical control treatments are most effective when used in combination with herbicides, but sometimes successful control can be achieved by cutting or girdling without using herbicides.

As the tree grows larger, loppers, brush saws or chainsaws are needed to cut the stems. Cutting is not recommended for larger trees and dense stands unless the property owner or land manager is trained in tree felling, chainsaw safety and first aid. Protective gear must be worn.

The method, felling direction and timing of tree cutting should provide a safe work environment and protect sensitive areas such as vernal pools, riparian zones, cultural resources and structures. Slash and debris left on the site after treatment should not present an unacceptable fire, safety, environmental, or pest hazard. Such remaining material should not interfere with the intended purpose or other management activities. Potential landowner and operator liability should be assessed before forest stand improvement activities begin. **Mechanical tree removal may be restricted between March 31 and November 15 due to the potential to affect federally endangered species. Consult your NRCS planner for more information.**



Brush Management

Control of Woody Invasive Species

Conservation Practice Job Sheet

Code 314



Purpose

Landowners should use this practice to completely remove or significantly reduce invasive woody shrub species such as bush honeysuckle (*Lonicera spp.*) or Tree-of-Heaven (*Ailanthus altissima*) to improve wildlife habitat and biodiversity.

Conditions Where Practice Applies

Methods described in this jobsheet may also be utilized to control bush honeysuckle or other invasive shrub and woody species such as autumn olive, multiflora rose, or Japanese barberry.

This practice may be utilized to facilitate future silvicultural activities and/or restore and enhance wildlife habitat; and should not be utilized for removal of vegetation where a landuse change is desired or for removal of native woody or herbaceous species.

This jobsheet focuses on the removal of invasives in forested settings. However other woody species in other settings may be suitably treated using these general methods.

General

Invasive species (including bush honeysuckle) refer to several species of exotic woody species that have become established in KY. These species are usually spread by seed dispersal from wind, birds or other wildlife and are extremely difficult to eradicate without landowner diligence. These species are usually one of the first plants to have leaves in the

spring and retains its leaves longer in the fall which helps it to out-compete native species. Some plants can produce millions of seeds per plant and may even produce chemicals that prohibit the growth of native species around the invasive plant.

In a forested setting, invasives will envelop and smother the native species that wildlife depend on for food and cover. Early intervention is important to success when fighting any invasive species.

Prescribed treatments may be either:

- mechanical,
- biological; or
- chemical

These treatments may be used alone or in combination with one another. In most situations they are more effective if they are used in combination or concurrently with one another. For example, a combination of mechanical and chemical treatment (cut-stump method) is often recommended for stands of bush honeysuckle.

The best control treatments take into account the amount, age and size of the stand. Bush honeysuckle and some other species can sprout vigorously from the stump once it is cut, so any control measure must kill or remove the stump of the plant.



Control Methods

A. Mechanical Treatment

Mechanical control is an option for clients that do not wish to utilize chemicals for a variety of reasons. However, this option is very labor intensive and time consuming. Mechanical control involves the physical removal of bush honeysuckle plants by hand-pulling small plants; and removing larger plants with weed wrenches or loppers on larger plants (approximately plants up to 8 feet in height). Plants that are larger or denser may require the use of Weed Eater™ (or similar type equipment) with metal blade, forestry mulcher attachment on skid-steer implements, shears/loppers or similar equipment. Follow up treatment will be required to control re-sprouting.



B. Biologic Control

NRCS cannot develop biological treatment recommendations except for biological control utilizing grazing animals. Since bush honeysuckle occurs mainly in forest settings, grazing is generally not recommended and the treatment effectiveness is questionable. However if utilized, any grazing recommendation should utilize flash grazing and designed to protect the established native vegetation and other resources. Continual treatment will be required to control re-sprouting.

C. Chemical Control

The most effective way to control bush honeysuckle and most other invasive species is with herbicides that are applied during the growing season. In most instances treatment requires two herbicide applications.

NRCS does not provide specific chemical recommendations. However, they may be provided by the KY Department of Fish and Wildlife Resources (KDFWR) biologists and/or the KY Division of Forestry (KDF) or the UK Cooperative Extension Service. In addition, NRCS pesticide screening information entitled *Windows Pesticide Screening Tool* (Win-PST) may be provided with this jobsheet if chemical application is planned. If provided, this document assesses the environmental risks associated with pesticides. In certain instances additional practices may be planned to mitigate for high risk pesticides.

If chemicals are used, follow all label requirements including mixing/loading setbacks from wells, intermittent streams and rivers, natural or impounded ponds and lakes, and reservoirs, etc.



Stumps that are not chemically treated, deadened or otherwise removed will re-sprout quickly.

Select a chemical that will be effective in the first application. Often times, mechanical treatment

must occur concurrently with chemical application in the initial treatment.

Following the initial application, some regrowth, re-sprouting, or reoccurrence of brush is to be expected. Spot treatment of individual plants or a follow-up foliar treatment should be performed while it is small (< 2 ft. in height) and most vulnerable to the treatment procedures.

OPERATION AND MAINTENANCE

Safety: Operations must always comply with all local, state, and federal laws and ordinances. Always dispose of herbicides and herbicide containers in accordance with the label directions and comply with all federal, state and local regulations.

SAFETY INFORMATION	
National Pesticide Information Center (NPIC) (Non-Emergency)	1-800-858-7384
Chemical Transportation Emergency Center (CHEMTRAC)	1-800-424-9300

Read and follow label directions and maintain appropriate Material Safety Data Sheets (MSDS). MSDS and pesticide labels may be accessed on the Internet at: <http://www.greenbook.net/> or <http://www.cdms.net>.

Maintenance: Landowners should maintain records of brush control for at least two years. Herbicide application records must be in accordance with USDA Agricultural Marketing Service's Pesticide Recordkeeping Program and state-specific requirements.

Follow-up treatments and continual monitoring are always necessary. The success of this practice is determined by evaluating post-treatment regrowth after sufficient time has passed.

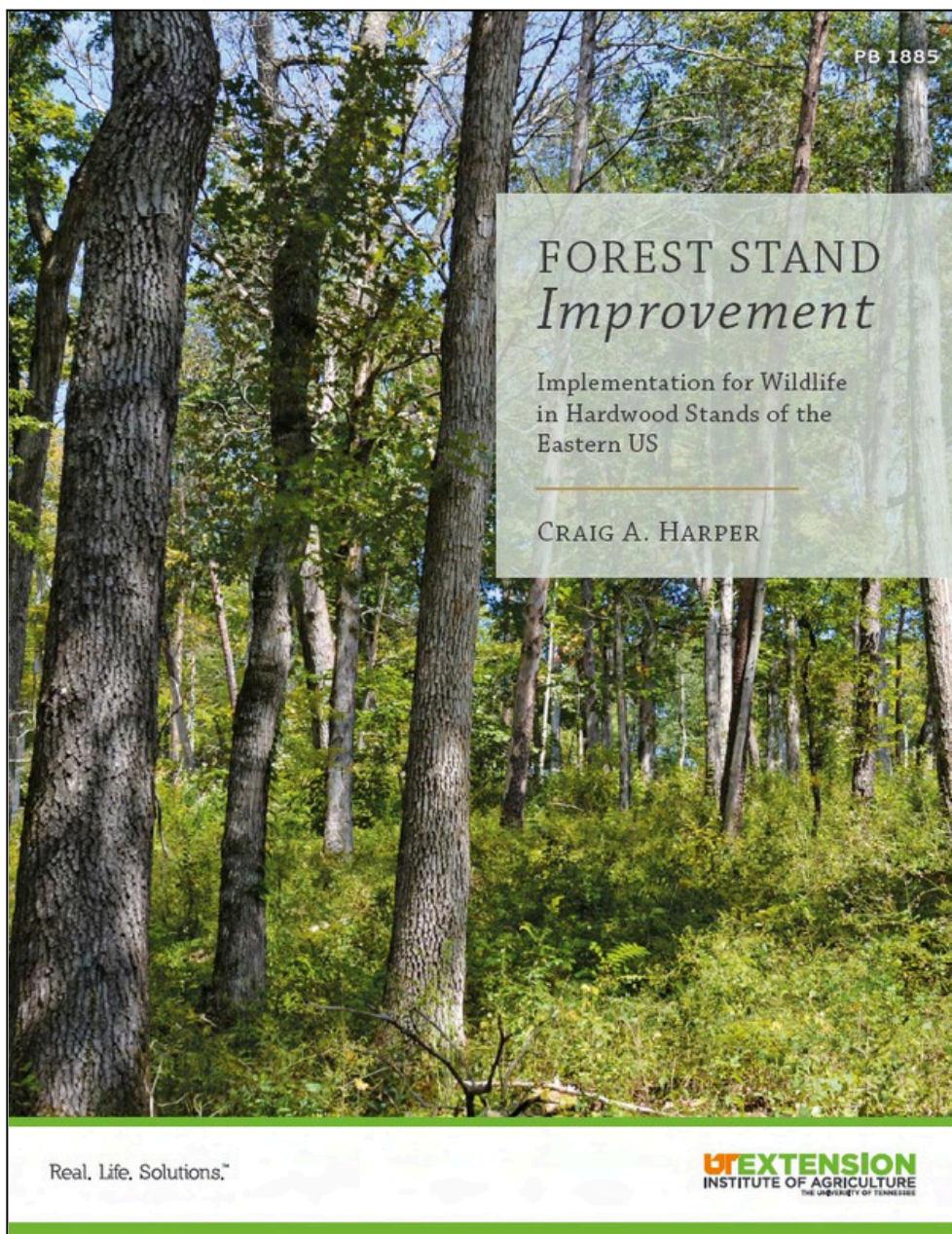
Also refer to:

USDA Agricultural Marketing Service, Science and laboratories, Pesticide Recordkeeping Program (PRP) available at: <http://www.ams.usda.gov/>

National Pesticide Information Center - NPIC is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency available at: <http://npic.orst.edu/index.html>

The Greenbook Group - Chemical Data Delivery Solutions available at: <http://www.greenbook.net/>

Publication Recommendation



Forest Management Timetable (Also For Landowner's Use)

List below the primary management activities that are performed on the property

Year	Season	Stand	Acres	Management Activity
2023	Summer	All	100	Forester Visit 2023
2023	Summer	All	100	CAP 106/DIA 165 Forest Management plan written
2028	-----	All	100	Forester Visit to see if time for a follow-up treatment E666J to continue working towards releasing young oaks in understory
2033	-----	All	100	Forester Visit: Update Forest Management Plan

Forestry Resources

Reference	Location
A Forest Landowner's Guide to Internet Resources: States of the Northeast	http://www.na.fs.fed.us/pubs/misc/ir/index.htm
Fire Effects Information System, Information about fire effects on plants and animals, USFS	http://www.fs.fed.us/database/feis/welcome.htm
KY Division of Forestry	http://www.environment.ky.gov/nrepc/dnr/forestry/index.asp
Indiana Department of Natural Resources	http://www.wildlife.IN.gov
UK Department of Forestry	http://www.uky.edu/Ag/Forestry/
USDA Forest Service	http://www.fs.fed.us/
USDA National Agroforestry Center	http://www.unl.edu/nac/
USFS Forest Products Laboratory	http://www.fpl.fs.fed.us/
Woody Plant Seed Manual	http://www.na.fs.fed.us/pubs/misc/ir/index.htm
Forest Steward Program	https://www.stateforesters.org/districts/kentucky/
American Tree Farm System	https://www.treefarmssystem.org/kentucky
NRCS Incentive Program	http://offices.sc.egov.usda.gov/locator/app
Woodland Owner Resources	https://www.treefarmssystem.org/woodland-resources?state=ky
Watershed Information	http://cfpub.epa.gov/surf/locate/index.cfm
National Timber Tax	http://www.timbertax.org

Glossary

Acceptable Growing Stock: Saleable trees that are of good form, species and quality and would be satisfactory as crop trees.

Aspect: The direction that a slope faces (north, south, etc.)

Assistance Programs: State and federal agencies will offer landowners the opportunity to apply for assistance programs that will provide support and financial assistance to implement forestry and agroforestry related practices through conservation programs. Assistance can also be provided for multi- year and permanent easements to conserve forest land to meet program goals.

Basal Area: The cross-sectional area of a tree, in square feet, at 4.5 feet from the ground (at breast height). When the basal area of all the trees in a stand are added together, the result is expressed as square feet of basal area per acre, which is a measure of a stand's density.

Board Feet: A unit for measuring wood volumes. It is commonly used to express the amount of wood in a tree, sawlog, or individual piece of lumber. A piece of wood 1 foot long, 1 foot wide, and 1 inch thick (144 cubic inches).

Canopy: The more or less continuous cover of branches and foliage formed collectively by the tops, or crowns of adjacent trees.

Chip: a small piece of wood used to make pulp or wood composite or fuel. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Clearcut: 1. a stand in which essentially all trees have been removed in one operation – note depending on management objectives, a clearcut may or may not have reserve trees left to attain goals other than regeneration. 2. a regeneration or harvest method that removes essentially all trees in a stand. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Crop Tree: A tree identified to be grown to maturity for the final harvest cut, usually on the basis of its location with respect to other trees and its timber quality.

Cull: A tree, log, lumber or seedling that is rejected because it does not meet certain specifications for usability or grade. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Culvert: a device used to channel water. It may be used to allow water to pass underneath a road, railway, or embankment for example. Culverts can be made of many different materials; steel, polyvinyl chloride (PVC) and concrete are the most common. Formerly, construction of stone culverts was common.

Den Tree: A living tree with a cavity large enough to shelter wildlife.

Desired species: Those species of flora and fauna designated in the management plan and not known to cause negative impacts on the local environment.

Diameter Breast Height (DBH): The diameter of a tree at 4.5 feet above the ground.

Even-Aged Management: Forest management with periodic harvest of all trees on part of the forest at one time or over a short period to produce stands containing trees all the same or nearly the same age or size.

Forest type: A category of forest usually defined by its trees, particularly its dominant tree species as based on percentage cover of trees, e.g. spruce fir, longleaf-slash pine, Douglas fir.

Girdling: Completely encircling the trunk of a tree with a cut that severs the bark and cambium of the tree. Herbicide is sometimes injected into the cut to ensure death of the tree.

Hack-n-squirt: A tree treatment method where an axe or hatchet is used to make "hacks" (injections) into the tree's cambium layer. A plastic "squirt" bottle is used to spray a specific amount of herbicide into the cuts placed around the tree.

Harvesting: the felling, skidding, on-site processing, and loading of trees or logs onto trucks. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

High-grading: Cutting only the high-value trees from a forest property, leaving a stand of poor quality with decreased future timber productivity.

Intermediate Cut: Removing immature trees from the forest sometime between establishment and stand harvest to improve the quality of the remaining forest stand. Contrast this technique with a harvest cut.

Invasive Species: is a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., insects, microbes, etc.). Human actions are the primary means of invasive species introductions.

Landings: a cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Management plan: Documents that guide actions and that change in response to feedback and changed conditions, goals, objectives and policies. Management plans may incorporate several documents including, but not limited to, harvest plans, activity implementation schedules, permits, research, etc. For the purposes of the American Tree Farm System® eligible management plans, plan amendments may include letters, notes, and other forms of informal updates in addition to formal plan revisions.

Mast: Nuts of trees, such as oak, walnut, and hickory, that serve as food for many species of wildlife.

Mature Tree: A tree that has reached the desired size or age for its intended use

Overstocked: A forest stand condition where too many trees are present for optimum tree growth.

Overstory: That portion of the trees in a stand forming the upper crown cover.

Pole Timber: Trees from 6 inches to 12 inches in diameter at breast height.

Pruning: Removing live or dead branches from standing trees to improve wood quality.

Pulpwood: Wood cut primarily for manufacture of paper, fiberboard, or other wood fiber products.

Qualified natural resource professional: A person who by training and experience can make forest management recommendations. Examples include foresters, soil scientists, hydrologists, forest engineers, forest ecologists, fishery and wildlife biologists or technically trained specialists in such fields. **Qualified Tree Farm inspector:** A natural resource professional who has completed ATFS required training for certifying forested properties and is eligible to inspect properties on behalf of ATFS. ATFS requires all trained inspectors meet approved eligibility requirements.

Regeneration: The number of seedlings or saplings existing in a stand. The process by which a forest is renewed by direct seeding, planting, or naturally by self-sown seeds and sprouts.

Regeneration Cut: Any removal of trees intended to assist regeneration already present or to make regeneration possible.

Release: To free trees from competition by cutting, removing, or killing nearby vegetation.

Riparian: related to, living or located in conjunction with a wetland, on the bank of a river or stream but also at the edge of a lake or tidewater – note the riparian community significantly influences and is significantly influenced by, the neighboring body of water. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Riparian Zone: The area adjacent to or on the bank of rivers and streams.

Sapling: Trees from 2 inches to 6 inches in diameter at breast height.

Sawtimber: Trees at least 12 inches in diameter at breast height from which a sawed product can be produced.

Seedling: a young plant.

Seed-tree Harvest: A harvest and regeneration method where nearly all trees are removed at one time except for scattered trees to provide seed for a new forest.

Selection Harvest: Harvesting trees to regenerate and maintain a multi-aged structure by removing some trees in all size classes either singly or in small groups.

Shelterwood Harvest: A harvesting and regeneration method that entails a series of partial cuttings over a period of years in the mature stand. Early cuttings improve the vigor and seed production of the remaining trees. The trees that are retained produce seed and also shelter the young seedlings. Subsequent cuttings harvest shelterwood trees and allow the regeneration to develop as an even-aged stand. **Single Tree Selection:** Individual trees of all size classes are removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **Site Index:** An expression of forest site quality based on the height of a free-growing dominant or co- dominant tree at age 50 (or age 100 in the western United States). **Skid:** 1. to haul a log from the stump to a collection point (landing) by a skidder. 2. A load pulled by a skidder. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **Skid Trail:** A road or trail over which equipment or horses drag logs from the stump to a landing. **Skidding:** Pulling logs from where they are cut to a landing or mill. **Slash:** the residue, e.g., treetops and branches, left on the ground after logging or accumulating as a result of storm, fire, girdling, or delimbing. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **Snag:** a standing, generally un-merchantable dead tree from which the leaves and most of the branches have fallen – note for wildlife habitat purposes, a snag is sometimes regarded as being at least 10 inches in diameter at breast height and at least 6 feet tall; a hard snag is composed primarily of sound wood, generally merchantable, and a soft snag is composed primarily of wood in advanced stages of decay and deterioration. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **Soil map:** A map showing the distribution of soils or other soil map units in relation to prominent physical and cultural features of the earth's surface. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **Special sites:** Those areas offering unique historical, archeological, cultural, geological, biological or ecological value. Special Sites include: A. Historical, archaeological, cultural and ceremonial sites or features of importance to the forest owner; B. Sites of importance to wildlife such as rookeries, refuges, fish spawning grounds, vernal ponds and shelters of hibernating animals; C. Unique ecological communities like relic old-growth, springs, glades, savannas, fens and bogs; and D. Geological features such as terminal moraines, cliffs and caves **Stand:** A group of trees with similar characteristics, such as species, age, or condition that can be distinguished from adjacent groups. A stand is usually treated as a single unit in a management plan. **Stand Density:** A measure of the stocking of a stand of trees based on the number of trees per area and diameter at breast height of the tree of average basal area. **Stand Management Recommendations:** The recommended management activities that should be done in that stand, based on landowner goals and objectives. **Stand Structure:** The horizontal and vertical distribution of plants in the forest, including the height, diameter, crown layers, and stems of trees, shrubs, understory plants, snags and down woody debris. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998) **State forestry best management practice(s) (BMPs):** Forestry BMPs are generally accepted forest management guidelines that have been developed by state forestry agencies with broad public stakeholder input. **Stocking:** An indication of the number of trees in a stand in relation to the desirable number of trees for best growth and management.

Sustainability: The capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity and overall integrity, in the long run, in the context of human activity (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).

Timber Stand Improvement (TSI): A thinning made in immature stands to improve the composition, structure, condition, health, and growth of the remaining trees.

Undesirable Growing Stock: Trees of low quality or less valuable species that should be removed in a thinning.

Understocked: Insufficiently stocked with trees.

Understory: all forest vegetation growing under an overstory. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Uneven-Aged Management or Stand: A stand of trees containing at least three age classes intermingled on the same area.

Volume: The amount of wood in a tree, stand of trees, or log according to some unit of measurement, such as board foot, cubic foot, etc.

Watershed: the area of land where all of the water that is under it or drains off of it goes into the same place. For example, the Mississippi River watershed includes all the land that drains into the Mississippi River. This watershed is the fourth largest in the world and includes water from 31 states.

Wetland: A transitional area between water and land that is inundated for periods long enough to produce wet soil and support plants adapted to that environment. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)

Wolf Tree: A very large, overmature tree that is or was open grown. These trees tend to have large full crowns and numerous branches.

Woody Debris: Any piece(s) of dead woody material (e.g. dead tree trunk, limbs, large root ball) on the ground in the forest or in streams. (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998)