DNR
Indiana Department
of Natural Resources

Indiana Department of Natural Resources – Division of Forestry

-Draft-

Resource Management Guides

Clark State Forest

The Indiana State Forest system consists of approximately 158,000 acres of primarily forested land. These lands are managed under the principle of multiple use-multiple benefit to provide forest conservation, goods and services for current and future generations. The management is guided by scientific principles, guiding legislation and comprehensive forest certification standards which are independently audited to help insure long term forest health, resiliency and sustainability.

For management and planning purposes each State Forest is divided into a system of compartments and tracts. In general terms compartments are 500-1,000 acres in size and their subunits (tracts) are 50-200 acres in size. Resource Management Guides (RMGs) are then developed for each tract to guide their management through a 15-25 year management period. There are approximately 1,700 tracts in the State Forest system. During annual planning efforts 50-100 tracts are reviewed and RMGs developed based on current conditions, inventories and assessments.

The RMGs for Compartment 6, Tracts 6, 7, and 8 contained in this document are part of this year's tracts under review for Clark State Forest.

To submit a comment on this document, go to:
www.in.gov/dnr/forestry/8122.htm

You must indicate the State Forest Name, Compartment number and Tract number in the "subject or file reference" line to ensure that your comment receives appropriate consideration. Comments received within 30 days of posting will be considered and review posted at http://www.in.gov/dnr/forestry/3634.htm.

Note: Some graphics may distort due to compression.

Clark State Forest | **Tract:** 6300606 (Comp 6 Tract 6)
Forester: Bartlett/Alwine | **Date:** August 2019
Tract Acreage: 78 | **Forested Acreage:** 70
Management Cycle End Year: 2039 | **Management Cycle Length:** 20

Location
This tract is located in Clark County approximately 2 miles northwest of Henryville, Indiana. More specifically, it is located in the Henryville Quadrangle in Sections 31 & 36, Township 2N, Range 6&7 E.

General Description
This is a mostly forested tract that is comprised of Oak-hickory and mixed hardwoods forest type. The Clark State Forest Horse Campground is located in the north end of the tract.

History
- Land acquisition from Augustus & Barbara Schlamm in 1903
- Land acquisition from Fredrick & Nettie Kolb in 1903
- Point sample survey completed in 1972 by Ratts & Zac
- Forest Inventory completed in 1986 for State Forest Inventory Program
- Forest Inventory completed in 2019 by Ryan Bartlett
- Resource Management Guide completed in 2019 by Ryan Bartlett & Dustin Alwine

Topography, Geology and Hydrology
This tract ranges from relatively flat to some moderate slopes. The tract lies on a west facing slope where it gradually descends from the road on the eastern boundary to Sheep Branch Creek on the western boundary. The northern portion of the tract is the flattest portion. The lithology in this tract is siltstone. The sub lithology is sandstone and shale.

This tract is located within the Silver Creek Watershed. Sheep Branch Creek flows south along the western edge of the tract, and runs into Wolf Run Creek which flows into Miller Fork Creek in Henryville. Miller Fork eventually flows in Silver Creek.

Riparian features (e.g., perennial, intermittent, and ephemeral streams) are present on portions of the tract. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the Indiana Logging and Forestry Best Management Practices Field Guide.

Soils
BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 10.1 acres
This nearly level, deep, well-drained soil is found along alluvial fans and flood plain. It is well suited to trees. Management planning should consider wet months when scheduling work. This soil has not been evaluated for site index.

ComC- Coolville silt loam, 6 to 12 percent slopes, 15.9 acres
This moderately sloping, deep, moderately well-drained soil is on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. This soil has a site index of 66 for northern red oak.

ConD- Coolville-Rarden complex, 12 to 18 percent slopes, 6.4 acres
These strongly sloping, deep, moderately well-drained soils are found on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. Coolville has a site index of 66 for northern red oak and Rarden has a site index of 71 for black oak.

DbrG- Deam silty clay loam, 20 to 55 percent slopes, 37.4 acres
This moderately to very steep, deep, well-drained soil is on side slopes in the uplands. It is suited to trees. Equipment limitations and erosion hazards are concerns that should be considered during sale layout and implementation of Best Management Practices for Water Quality. This soil has not been evaluated for site index.

GmaG- Gnawbone-Kurtz silt loams, 20 to 60 percent slopes, 1.7 acres
This moderately to very steep, moderately deep, well-drained complex is found on side. It is well suited to trees. The hazard of erosion and equipment limitations are main management concerns. These should be considered when planning management activities and implementing Best Management Practices for Water Quality. Kurtz has a site index of 60 for northern red oak and Gnawbone has not been evaluated.

WedB2- Weddel silt loam, 2 to 6 percent slopes, eroded, 6.5 acres
This gently sloping, deep, moderately well-drained soil is found on shoulders and summits in the till plains. It is well suited to trees and has a site index of 65 for white oak and 75 for yellow poplar.

Access
Access to this tract is good. Winding Road runs the eastern and southern borders of the tract with multiple pull off spots. The Clark State Forest Horse Campground is located in the northern part of the tract as well. The majority of the Horse Camp Loop multipurpose trails convene in the horse camp as well.

Boundary
This tract has well defined borders. To the east and south the border is Winding Road. To the west the border is Sheep Branch Creek. The northern border is a ridge and the northern line of the horse campground.

Wildlife
This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: Oak-hickory and mixed hardwoods forest type.

A Natural Heritage Database Review was completed for this tract. If Rare, Threatened or Endangered species (RTE's) were identified for this tract, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

The Indiana DNR Forestry Division has constructed a set of division level standards for snag tree retention, an important wildlife feature. Snags are standing dead or dying trees. Snags provide value in a forest in the form of habitat features for foraging activity, den sites, decomposers, bird perching, bat roosts, squirrel caches, and stores a wide variety of invertebrates. As time passes, these snags fall down and then contribute to the nutrient cycling as downed woody debris (DWD). DWD decomposes providing nutrients for remaining and new vegetative growth as well contributing to the complexity of the forest floor.

	Inventory Levels	Above Maintenance	Above Optimal
Snags 5"+	797	485	251
Snags 9"+	561	327	93
Snags 19"+	133	94	45

Inventory snag data for Tract 6300606 shows snag levels to be above the optimal levels for snags in all three size classes. Prescribed management should work to maintain these levels.

Recreation

This is a highly utilized tract for recreational activities. The Clark State Forest Horse Campground offers camping, picnicking, and horseback riding and hiking on the multipurpose trails, which start and end in the horse campground. Once the new family campground is complete, it is expected that a larger portion of the users of the multipurpose trail will be on foot. Other recreational activities include hunting, foraging, and wildlife viewing.

Exotics and Invasive Species

The main invasive plant species identified in this tract was Japanese stilt grass. It is located on the multipurpose trails and drainages in the forest. There are some pockets of multiflora rose near the stream as well as pockets of grapevines and Japanese honeysuckle. Although not noted during the inventory, Amur cork tree has been identified in surrounding tracts. While many of these invasive species are found throughout the county some can be easily controlled with minimal amounts of chemical use. Others, such as Japanese stilt grass, require more intensive measures in an effort to reduce them to more manageable levels within the tract.

Cultural

This tract was reviewed for cultural sites during the forest resource inventory. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Tract Prescription and Proposed Activities

The current forest resource inventory was conducted in July 2019 by Bartlett/Moore. The table below provides volume estimates associated with each tree species.

Tree Summary Data

Total trees per acre (>4" DBH)	104
Basal area per acre (square feet)	95.4
Present volume	7,052 bd. ft.
Overall % stocking	78 % (fully stocked)

Species (>11"DBH)	Total Volume (Bd. ft.)
White oak	294,210
Chestnut oak	116,900
Pignut hickory	18,200
Scarlet oak	16,100
Sweetgum	15,470

Black oak	13,930
Virginia pine	9,170
Eastern white pine	7,700
Post oak	1,960
Tract Totals (bd. ft.)	493,640
Per acre totals (bd. ft./acre)	7,052

For the purpose of this guide, this tract is divided into two cover types. Below is a general tract description and silvicultural prescription.

Mixed hardwoods

This stand was on the far southern portion of the tract. It consists of mainly sweetgum and Virginia pine with and average overstory DBH of 15 inches. Several of the Virginia pine had poor form and were tallied as poles. The regeneration in this stand was mainly spicebush, but there were also beech and maple saplings.

Basal area per acre (square feet)	80
Trees per acre (>4" DBH)	111
Approximate stocking	67% (fully stocked)

Species (>11”DBH)	**Bd. ft. per acre**
Sweetgum	2,492
Virginia pine	2,488
Total	4,980

The prescription for this stand is a single tree selection harvest. The goal of this prescription is to remove the Virginia pine that have poor form or are interfering with the growth of sweetgum and other quality tree species. Crop trees should be selected based on form, vigor, and health.

The surrounding overstory would provide ample seed to install a regeneration opening within this stand. This opening would provide wildlife habitat in the form of early successional forest habitat while regenerating desirable hardwood species. The shade tolerant midstory would need to be addressed with this management strategy. The midstory may be treated with either a chemical, mechanical, and/or cultural method. Management efforts are to promote the regenerate of oak and hickory.

Oak-hickory

The vast majority of this tract is classified as an oak-hickory forest type. The average sawtimber tree in this stand had an average DBH of 19 inches. The majority of volume in this stand is white and chestnut oak. There are areas where oak regeneration is represented in the understory, but shade tolerant species such as beech and maple dominate.

Basal area per acre (square feet)	96.3
Trees per acre (>4" DBH)	103

Approximate stocking	77% (fully stocked)

Species (>11" DBH)	Bd. ft. per acre
White oak	4,436
Chestnut oak	1,763
Pignut hickory	275
Scarlet oak	243
Black oak	210
Sweetgum	95
Eastern white pine	58
Post oak	30
Total	7,110

A single tree selection harvest is prescribed in this tract. The goal of this management strategy is to promote the growth of quality crop trees while removing poor quality competitors. These crop trees shall be selected based on form, vigor, and health.

Group selection or patch-cut openings are recommended in areas where groups of trees exhibit significant damage from past events, poor form and vigor, or declining overstory. The goal of this strategy is to encourage the growth of desirable regeneration.

Areas that have high quality seed trees and non-desirable regeneration are ideal locations to install a shelterwood. The goal of this management is to create areas with partial shade to promote the regeneration of oak species. A treatment of the shade tolerant midstory is required for this management strategy. The midstory may be treated with either a chemical, mechanical, and/or cultural method.

A prescribed fire is a cost effective way to decrease the abundance of beech and maple and other shade tolerant species in the midstory. Winding Road along the eastern border and the mapped intermittent on the western border provide excellent firebreaks to assist with this management option.

Best Management Practices (BMP's):
BMP's will be implemented during and after completion of the proposed management activities in order to minimize soil erosion.

Regeneration opening evaluation

An evaluation of regeneration openings will be performed 3 years following the harvest.

Prescribed fire

A prescribed fire would be a suitable option in this tract as a form of mid and understory management targeting shade tolerant species such as beech and maple. The goal of this management option is to reduce the abundance of shade tolerant species while encouraging the regeneration of oak and hickory species.

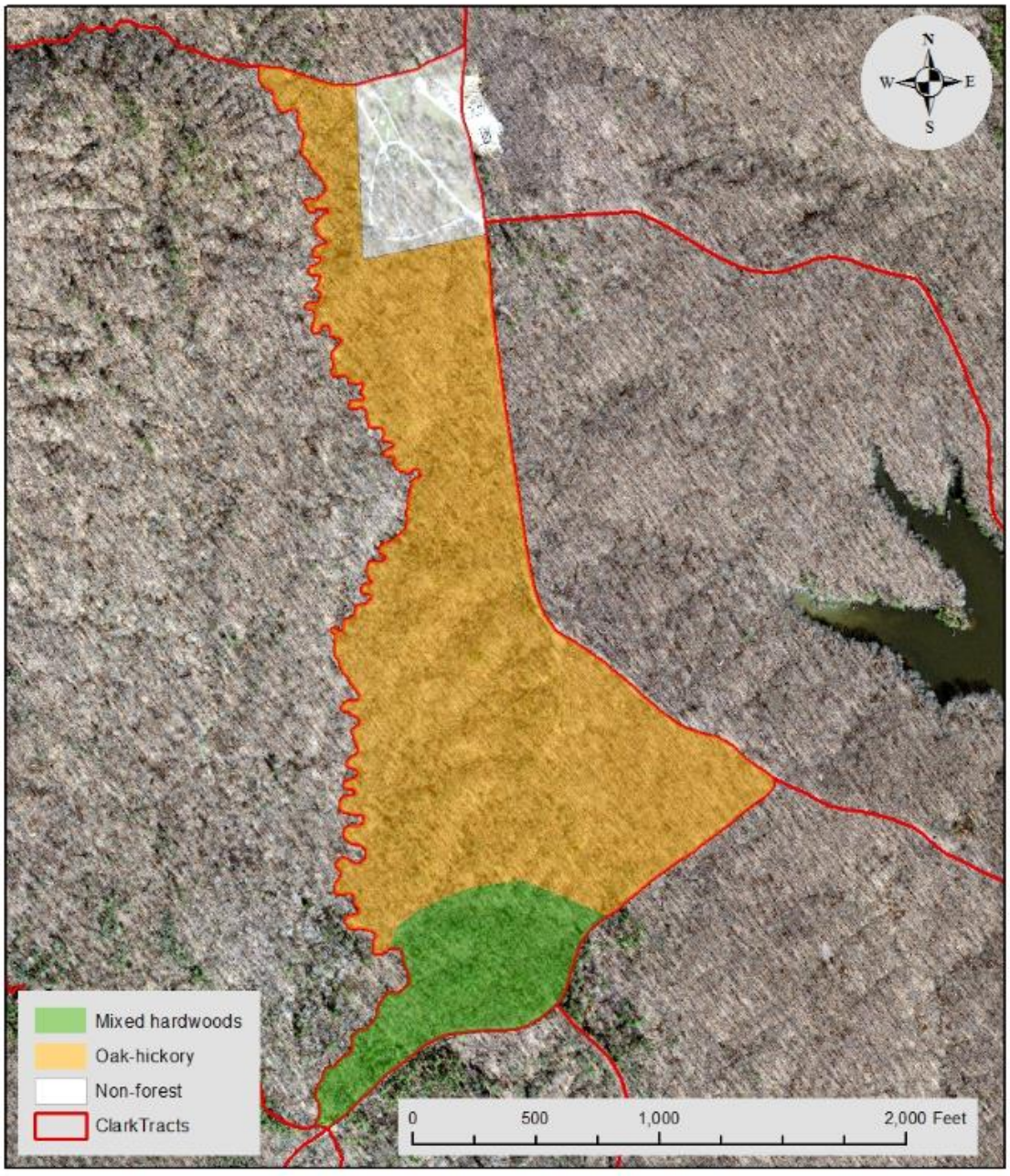
Invasive species management

The area along the multipurpose trail is prescribed to have invasive species management performed. Invasive species do not occur very far into the forest, but Japanese stiltgrass is established along the multipurpose trail and drainages. While their presence is not numerous: multiflora rose, grapevine, and Japanese honeysuckle will be targeted as well.

Schedule:

Proposed Management Activity	*Proposed Date*
Invasive species management	2019-2020
Timber marking and sale	2019-2020
Prescribed fire regime	2021+
Post-harvest regeneration opening evaluation/treatment	2025-2026
Inventory and resource management guide	2039

Clark State Forest
Compartment 6 Tract 6
Stand Map



Clark State Forest
Tract Acres: 183
Forester: Alwine
Management Cycle End Year: 2039
Tract: 6300607 (Comp 6 Tract 7)
Forested Acreage: 183
Date: January 2019
Management Cycle Length: 20 years

Location

This tract is located in Clark County approximately 2 miles northwest of Henryville, Indiana. This tract is located within Section 36, Township 2N, and Range 6E.

General Description

The acreage for this tract is 183. The terrain is variable ranging from gentle slopes to extremely steep slopes on the knobs. A majority of this tract is in oak hickory type forest. The dominant overstory species are white and chestnut oak.

History

1903- Land purchased
1986- Inventory completed
1995- Resource Management Guide completed by David Pyle
2001- Forest Resource Management Wildlife Review completed by David Pyle
2002- Timber harvest conducted, sold to Good UEarth, 82,819 bd. Ft
2002- Timber harvest conducted, sold to Worley Lumber, 24,374 bd. Ft
2008- Resource Management Guide completed by Dieter Rudolph
2019- Inventory completed by Bartlett and Alwine
2019- Resource Management Guide completed by Dustin Alwine

Other management activities and events have occurred within this tract but lack specific dates. The southern portion of this tract near the gated lane was once the location of the original horse campground at Clark State Forest. It was decommissioned when the current horse campground was constructed. This area was also utilized as tree plantations for the former Clark State Forest nursery. Even though documentation is limited with many of these past events field evidence is present. Plantation markers were observed in this tract and surrounding tracts along with eastern white pine, black spruce, and shortleaf pine. These species were commonly used in tree plantings across southern Indiana during the conservation movement beginning in the 1930's.

Topography, Geology and Hydrology

This tracts topography changes drastically as you travel south to north through the forest. The southern half of the tract's terrain ranges from relatively flat to gently rolling hills. As you move north the hills become more extreme with the slopes in the northeast section of the tract being almost vertical as it enters the knobs. The underlying bedrock is siltstone.

This tract is located in the Silver Creek Watershed. There are two mapped intermittent streams located on the eastern and western boundaries of the tract. They flow from the knobs south. These two streams then unite outside of the tract and merge into the perennial stream Wolfrun Creek. Wolfrun Creek then runs to Miller Creek, which flows into Silver Creek.

Riparian features (e.g., perennial, intermittent, and ephemeral streams) are present on portions of the tract. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the Indiana Logging and Forestry Best Management Practices Field Guide.

Soils

BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 24.5 acres

This nearly level, deep, well drained soil is found along alluvial fans and flood plain. It is well suited to trees. Management planning should consider wet times of year. This soil has not been evaluated for site index.

BfbC2- Blocher, soft bedrock substratum-Weddel silt loams, 6 to 12 percent slopes, eroded, 17.4 acres

This moderately sloping, deep, moderately well drained soil is found on side slopes in the till plains. It is well suited to trees. Erosion hazards are a management concern that should be considered during implementation of Best Management Practices for Water Quality. Blocher has a site index of 76 for northern red oak and 90 for yellow poplar and Weddel has a site index of 70 for northern red oak and 75 for yellow poplar.

BvoG-Brownstown-Gilwood silt loams, 25 to 75 percent slopes 1.9 acres

This moderate to very steep, deep, well drained soil is found side slopes in the uplands. It is well suited to trees. Equipment limitations and erosion hazards are main management concerns that should be considered during sale layout and implementation of Best Management Practices for Water Quality. Brownstown has a site index of 50 for black oak and gilwood has not been rated.

ComC- Coolville silt loam, 6 to 12 percent slopes, 11.2 acres

This moderately sloping, deep, moderately well drained soil is on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. This soil has a site index of 66 for northern red oak.

ConD- Coolville-Rarden complex, 12 to 18 percent slopes, 22.6 acres

These strongly sloping, deep, moderately well drained soils are found on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. Coolville has a site index of 66 for northern red oak and Rarden has a site index of 71 for black oak.

DbrG- Deam silty clay loam, 20 to 55 percent slopes, 16.7 acres

This moderately to very steep, deep, well drained soil is on side slopes in the uplands. It is suited to trees. Equipment limitations and erosion hazards are concerns that should be considered during sale layout and implementation of Best Management Practices for Water Quality. This soil has not been evaluated for site index.

GgbG- Gilwood-Brownstown silt loams, 25 to 75 percent slopes, 4.4 acres

This moderately to very steep, moderately deep, well drained complex is on side slopes in the knobs. It is suited to trees. The hazard of erosion is main management concerns that should be considered when implementing Best Management Practices for Water Quality. Brownstown has a site index of 50 for black oak and Gilwood has not been evaluated.

GmaG- Gnawbone-Kurtz silt loams, 20 to 60 percent slopes, 75.1 acres

This moderately to very steep, moderately deep, well drained complex is found on side. It is well suited to trees. The hazard of erosion and equipment limitations are main management concerns. These should be

considered when planning management activities and implementing Best Management Practices for Water Quality. Kurtz has a site index of 60 for northern red oak and Gnawbone has not been evaluated.

StdAQ- Stendal silt loam, 0 to 2 percent slopes, rarely flooded, 3.4 acres
This nearly level, deep, somewhat poorly drained soil is on bottom land along small streams. It is well suited to trees. Seasonal wetness limits equipment and should be considered when planning management activities. This soil has a site index of 90 for pin oak and yellow poplar.

WedB2- Weddel silt loam, 2 to 6 percent slopes, eroded, 5.2 acres
This gently sloping, deep, moderately well drained soil is found on shoulders and summits in the till plains. It is well suited to trees and has a site index of 65 for white oak and 75 for yellow poplar.

Access
Access to this tract is from a gated lane off of Frontage Road on the south portion of the tract. The gate restricts vehicular traffic on the lane that runs to the old decommissioned Clark State Forest horse campground. There are several multiple-use trails (e.g., red, blue, and yellow) that run through this tract providing foot access west of the old horse campground.

Boundary
Tract 6300607 is completely surrounded by other state forest tracts including 6300608 to the west, 6300606 to the east, 6300605 to the northeast, and 6300604 to the northwest. The blue and yellow multipurpose trails run on the northwest border for a brief distance. Topographically, a major ridge is the north-northwest boundary. Two intermittent streams flow off this ridge on the eastern and western boundary. They eventually flow together to make the southern boundary.

Wildlife
This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: oak-hickory, mixed hardwoods, and riparian areas.

A Natural Heritage Database Review was completed for this tract. If Rare, Threatened or Endangered species (RTE's) were identified for this tract, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

The Indiana DNR Forestry Division has constructed a set of division level standards for snag tree retention, an important wildlife feature. Snags are standing dead or dying trees. Snags provide value in a forest in the form of habitat features for foraging activity, den sites, decomposers, bird perching, bat roosts, squirrel caches, and stores a wide variety of invertebrates. As time passes, these snags fall down and then contribute to the nutrient cycling as downed woody debris (DWD). DWD decomposes providing nutrients for remaining and new vegetative growth as well contributing to the complexity of the forest floor.

	Maintenance level	Optimal Level	Snag Density/acre	Above Maintenance	Above Optimal
Snags 5"+ DBH	644	1127	1263	619	136
Snags 9"+ DBH	483	966	1007	524	41
Snags 19"+ DBH	81	161	375	294	214

Inventory data for Tract 6300607 shows that snag densities exceeds optimal levels in all size classes. Prescribed management should work to maintain these levels of snag densities.

Recreation

Due to the tracts close proximity to the Clark State Forest horse campground, there are many recreational opportunities. The red, blue, and yellow multipurpose trails run through this tract. Other recreational opportunities include hunting, foraging, and wildlife viewing. Currently, the multipurpose trails are used mainly by horse riders. With the construction of the new campground next to the current horse campground, it should be expected that different user groups will start using the trails more often due to their close proximity to the campground.

Exotics and Invasive Species

Invasive plants were at low densities throughout the tract. There is some scattered multiflora rose found on the slopes and some privet and Japanese honeysuckle located on the south side near the old horse campground as well as Japanese stilt grass located in the old horse campground and on portions of some of the trails. Since their prevalence is low, they should be considered for chemical treatment prior to the timber harvest to prevent further expansion.

Cultural

This tract was reviewed for cultural sites during the forest resource inventory. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Tract Prescription and Proposed Activities

The current forest resource inventory was completed on January 2019 by Foresters Alwine/Bartlett. A summary of the estimated tract inventory results are located in the table below.

Tree Summary Data

Basal area per acre (square feet)	100.1
Trees per acre (>4" DBH)	104.4
Approximate stocking	80%

Species (>11” DBH)	Volume per acre
White oak	2,875
Chestnut oak	2,306
Black oak	658
Virginia pine	333
Pignut hickory	226
Yellow poplar	135
Sweetgum	109
Red maple	93
Northern red oak	87
Shagbark hickory	52

American beech	31
Shortleaf pine	30
American sycamore	26
Black spruce	19
Blackgum	17
Sugar maple	9
Black cherry	7
Total	7,013

For forest management purposes, this tract will be divided into three management sections. Below is a general tract description and prescription plan.

Descriptions:

Oak Hickory- 69 acres

This stand is fully stocked and dominated by medium to large white oak trees. The percent stocking of this stand is approximately 78 percent. The DBH of the white oak trees averaged 16 to 20 inches with some of the larger oaks being 30"+. Oak trees account for more than 90 percent of the merchantable volume. The midstory species present are more shade tolerant species like red maple, American beech, and pignut hickory. A majority of the white oaks present are over mature and the crowns are in decline.

Basal area per acre (square feet)	97.7
Trees per acre (>4" DBH)	96
Approximate stocking	78%

Species (>11" DBH)	**Volume per acre**
White oak	4,915
Chestnut oak	1,495
Black oak	990
Pignut hickory	157
Northern red oak	145
Red maple	119
American beech	56
Shagbark hickory	55
Blackgum	40
Sweetgum	29
Yellow poplar	29
Total	8,030

Mixed Hardwoods- 19 acres

This is a fully stocked stand that is located on the southern flat portion of the tract close to the intermittent stream. The species composition of this stand is diverse due to the old nursery plantations

and old horse campground found in this stand. A majority of this area is younger than the rest of the tract with overstory trees that average 14 to 18 inches in DBH. The percent stocking in this stand is approximately 89. Due to the age of this stand, it does not have a well-developed midstory yet but some species present included ironwood and American beech.

Basal area per acre (square feet)	107.4
Trees per acre (>4" DBH)	150
Approximate stocking	89%

Species (>11" DBH)	**Volume per acre**
White oak	1,566
Yellow poplar	892
Sweetgum	743
Virginia pine	440
Black oak	289
Red maple	271
Pignut hickory	265
Shortleaf pine	228
Shagbark hickory	219
American Sycamore	202
Northern red oak	194
Black spruce	146
American beech	55
Blackgum	55
Total	5,565

Upland Oaks- 95 acres

This is a fully stocked stand located on some extreme slopes. The percent stocking is approximately 79 percent. This is the start of the knobs that cover multiple tracts to the north. The dominant overstory tree is chestnut oak followed by white oak. Chestnut oak alone accounts for almost 60 percent of the merchantable volume while all the oaks account for an estimated 85 percent of the merchantable volume. A majority of the non-oak volume is in Virginia pine, which is common on the knobs. Many of the overstory trees exhibit crown dieback and butt damage. The mid and understory in this stand once again consists mostly of American beech and ironwood. Pignut hickory is a common midstory tree as well. The dominant herbaceous plant on these knobs is green brier.

Basal area per acre (square feet)	99.7
Trees per acre (>4" DBH)	95.1
Approximate stocking	79%

Species (>11" DBH)	**Volume per acre**
Chestnut oak	3,756

White oak	1,301
Virginia pine	621
Black oak	447
Pignut hickory	282
Sugar maple	20
Red maple	16
Yellow poplar	16
American beech	0
Eastern white pine	0
Scarlet oak	0
Total	6,459

Prescription:

Oak Hickory- 69 acres

This stand has some quality individual stems due to past timber management. Current management should focus on removing declining stems while promoting oak and hickory regeneration. To accomplish this, midstory work is recommended. Forest Stand Improvement (FSI) should be utilized to remove/cull shade tolerant midstory species including American beech, ironwood, and red maple. An alternate strategy would be to start a fire regime to reduce shade tolerant species while also working to lower fuel loads and invasive species. Along with the FSI, a timber harvest is recommended. This harvest should use a mixture of thinning and improvement marking to remove declining stems and release better, more vigorous trees. The harvest would utilize singletree and group selection removal. A shelterwood harvest is another removal method option to help promote oak regeneration. Following the recommended harvest, post-harvest FSI should be conducted to complete openings and shelterwoods, remove cull trees not taken during the harvest, and treat invasive species.

Mixed Hardwoods- 19 acres

This stand is nearing the end of the stem exclusion stage in its succession and could use a crown thinning. The purpose of this thinning would be to release the desired crop trees providing ample space for growth. The top species in this stand include oaks, yellow poplar, hickories, and well-formed sweetgums. In lower quality areas with an undesirable growing stock, regeneration openings should be considered. After the harvest, post-harvest FSI should be completed, where applicable.

Invasive species control is recommended as well. Multiflora rose, privet, and Japanese honeysuckle are present in this stand and should be treated prior to the harvest. Japanese stilt grass covers a majority of the old horse campground and the horse trails present, a species prevalent throughout the county. While eradiation is not feasible, chemical treatments can assist maintaining the species at manageable levels.

Upland Oaks- 95 acres

This stand is fully stocked and the overstory trees have signs of decline. A timber harvest is recommended on the milder slopes within this forest type. The harvest would have the same goals as

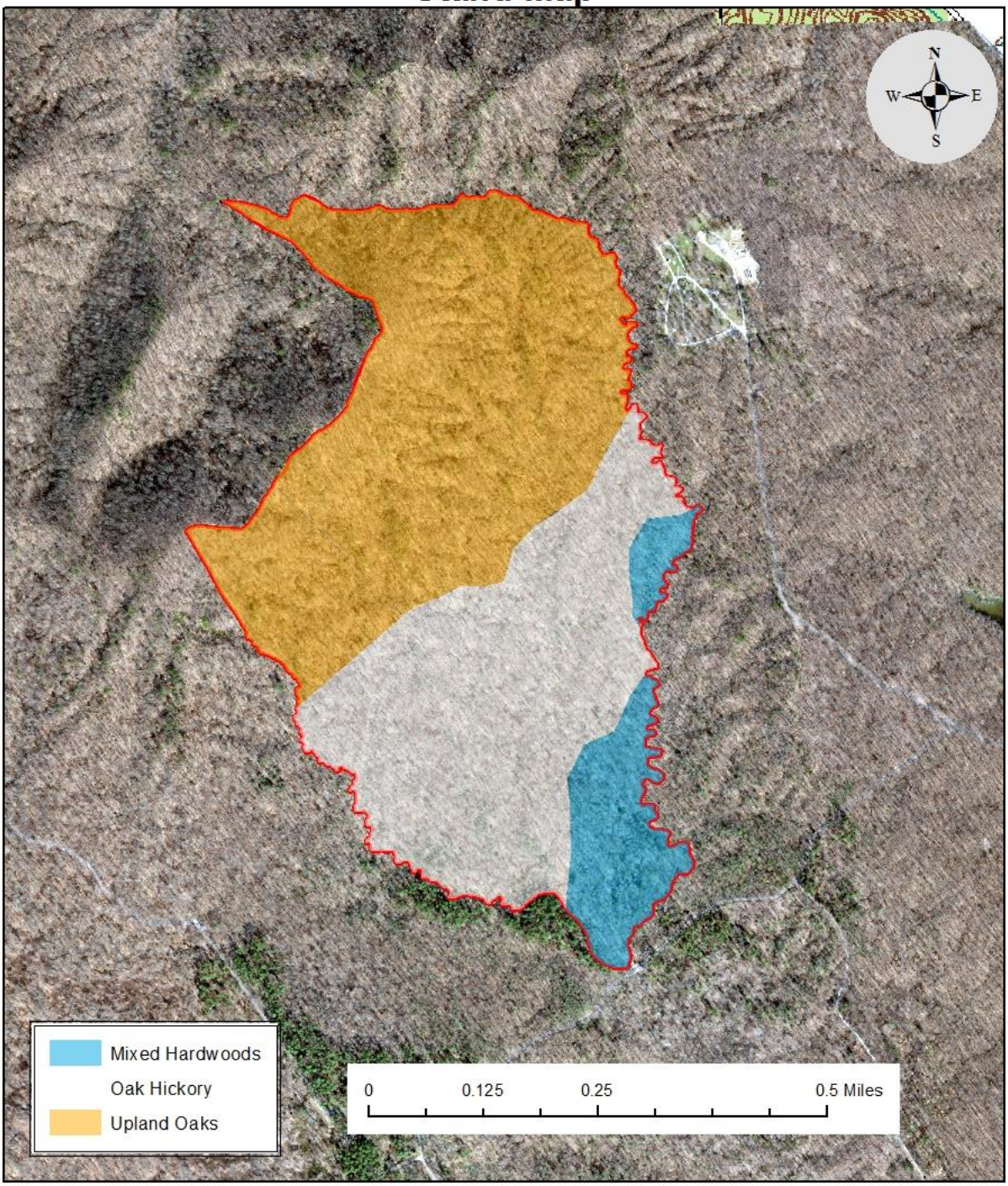
listed for the other forest types. Where slopes become too steep to feasibly harvest focus would remain promoting a new cohort of oaks and hickories. FSI and fire are possible options. Prescribed fire once established should be on a cycle based on results of initial burn. It would work to remove debris, scarify the soil promoting oaks and hickories, discourage invasive species, and lower the density of the midstory American beech and maple present.

Best Management Practices (BMP):
BMP's will be implemented during and after completion of the proposed management in order to minimize soil erosion.

Schedule:

Proposed Management Activity	*Proposed Date*
• Invasive species control	2019-2020
• Forest Stand Improvement	2019-2020
• Timber Harvest	2019-2020
• Post-Harvest FSI	1-2 years after harvest
• Prescribed Fire Regime	2021+
• Inventory and Management Guide	2039

Clark State Forest
Compartment 6 Tract 7
Stand Map



Clark State Forest
Forester: Alwine/Bartlett
Tract Acreage: 143
Management Cycle End Year: 2038

Tract: 6300608 (Comp. 6 Tract 8)
Date: August 2019
Forested Acreage: 143
Management Cycle Length: 20 years

Location

Compartment 6 Tract 8 is located in Clark County, Indiana. More specifically, Section 36 of Township 2 North, Range 6 East; Section 1 of Township 1 North, Range 6 East of Monroe Township. This tract is approximately 2.5 miles northwest of Henryville, IN.

General Description

The tract is approximately 143 forested acres. There are three stand types present within the tract. The overstory cover types are composed of an oak-hickory forest, the slopes are occupied by oaks, and there is a planted pine stand. The oak-hickory forest is made up of primarily black, white, and chestnut oaks. The majority of volume in the pine planting is eastern white pine, yellow poplar, and sweetgum. The slopes are dominated by poor quality chestnut oaks.

A harvest conducted in 1999 focused on releasing crop trees. While high quality stems are abundant within this tract, oak and hickory regeneration is lacking.

History:

1903 – Land purchased from Freeman
1903 – Land purchased from Kolb
1996 – Resource Management Guide completed
1997 – Timber harvest (71,108 bf sold)
1999 – Timber harvest (86,997 bf sold)
2008 – Forest Inventory and Resource Management Guide completed
2018 – Forest Inventory and Resource Management Guide completed

Topography, Geology, and Hydrology

The topography varies drastically within this tract. The southern half of the tract is very flat while the northern half is very steep. The slope has a southeast aspect.

The underlying bedrock for this tract is siltstone with sub lithology of shale, sandstone, and limestone.

There is a mapped intermittent stream on the east boundary of the tract. This intermittent stream flows into Calf Run Creek. Calf run flows into Guernsey Creek before contributing to Silver Creek. This entire tract is within the Miller Fork watershed.

Riparian features (e.g., perennial, intermittent, and ephemeral streams) are present on portions of the tract. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the Indiana Logging and Forestry Best Management Practices Field Guide.

Soils

BcrAW - Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 5.9 acres

This nearly level, deep, well-drained soil is found along alluvial fans and flood plain. It is well suited to trees. Management planning should consider wet times of year. This soil has not been evaluated for site index.

BfbC2 - Blocher, soft bedrock substratum-Weddel silt loams, 6 to 12 percent slopes, eroded, 1.8 acres
This moderately sloping, deep, moderately well drained soil is found on side slopes in the till plains. It is well suited to trees. Erosion hazards are a management concern that should be considered during implementation of Best Management Practices for Water Quality. Blocher has a site index of 76 for northern red oak and 90 for yellow poplar and Weddel has a site index of 70 for northern red oak and 75 for yellow poplar.

BvoG -Brownstown-Gilwood silt loams, 25 to 75 percent slopes, 14.7 acres
This moderate to very steep, deep, well-drained soil is found side slopes in the uplands. It is well suited to trees. Equipment limitations and erosion hazards are main management concerns that should be considered during sale layout and implementation of Best Management Practices for Water Quality. Brownstown has a site index of 50 for black oak and gilwood has not been rated.

ComC - Coolville silt loam, 6 to 12 percent slopes, 32.5 acres
This moderately sloping, deep, moderately well drained soil is on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. This soil has a site index of 66 for northern red oak.

ConD - Coolville-Rarden complex, 12 to 18 percent slopes, 26.4 acres
These strongly sloping, deep, moderately well drained soils are found on side slopes in the uplands. It is well suited to trees. Erosion hazards are concerns that should be considered during implementation of Best Management Practices for Water Quality. Coolville has a site index of 66 for northern red oak and Rarden has a site index of 71 for black oak.

DbrG - Deam silty clay loam, 20 to 55 percent slopes, .8 acre
This moderately to very steep, deep, well-drained soil is on side slopes in the uplands. It is suited to trees. Equipment limitations and erosion hazards are concerns that should be considered during sale layout and implementation of Best Management Practices for Water Quality. This soil has not been evaluated for site index.

GgfD - Gilwood-Wrays silt loams, 6 to 18 percent slopes, 3.7 acres
This gently to moderately sloping, moderately deep, well drained complex is found on side slopes of the uplands knobs. The hazard of erosion is main management concerns that should be considered when implementing Best Management Practices for Water Quality. Wrays has a site index of 70 for white oak and 90 for yellow poplar and Gilwood has not been evaluated.

GmaG - Gnawbone-Kurtz silt loams, 20 to 60 percent slopes, 44.5 acres
This moderately to very steep, moderately deep, well drained complex is found on side. It is well suited to trees. The hazard of erosion and equipment limitations are main management concerns. These should be considered when planning management activities and implementing Best Management Practices for Water Quality. Kurtz has a site index of 60 for northern red oak and Gnawbone has not been evaluated.

StdAQ - Stendal silt loam, 0 to 2 percent slopes, rarely flooded, 12.4 acres

This nearly level, deep, somewhat poorly drained soil is on bottom land along small streams. It is well suited to trees. Seasonal wetness limits equipment and should be considered when planning management activities. This soil has a site index of 90 for pin oak and yellow poplar.

Access
There is good access to the tract. Winding Road crosses through the southern corner of the tract and runs along the southeastern edge of the tract. Switchback Road provides access to the northwest corner of the tract. Within the tract there is no designated access.

Boundary
The tract is internal to Clark State Forest roads and trails on three sides. The tract is bordered on the eastern side by tract 6300607.

Wildlife
This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: oak-hickory canopy, mixed hardwood canopy, and two eastern white pine stands.

A Natural Heritage Database Review was completed for this tract. If Rare, Threatened or Endangered species (RTE's) were identified for this tract, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

The Division of Forestry has developed compartment level guidelines for snags which are an important structural component. Snags are standing dead or dying trees. Snags provide value to a stand in the form of habitat features for foraging activity, den sites, decomposers, bird perching, and bat roosting. Snags eventually contribute to the future pool of downed woody material. Downed woody debris provides habitat for many species and contributes to healthy soils.

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance	Available Above Optimal
Snag 5"+ DBH	668	1,169	1,816	1,148	647
Snag 9"+ DBH	501	1,002	1,560	1,059	558
Snag 19"+ DBH	84	167	268	185	101

Inventory data for Compartment 6 Tract 8 shows that maintenance levels for all size classes of snags exceed recommendations. The prescribed management should maintain the relative abundance of these features.

Exotics
There was very little invasive species noted within the tract. A 0.5 acre area containing ailanthus was located and recorded. These stems are to be chemically treated before a management harvest takes place. There are occasional occurrences of multiflora rose through the southern portion of the tract. Japanese stiltgrass is also present along the horse trails on the north portion of the tract. These should be managed with a situational approach, and their location relative to riparian areas shall be considered when planning their management. These species are common throughout the county.

Recreation

Hunting is permitted within this tract. There are multiple parking areas that provide foot access into the tract. The Cross Country Trail runs along the northern border of this tract. This tract provides recreation uses through hunting, foraging, hiking, and horseback riding.

Cultural

This tract was reviewed for cultural sites during the forest resource inventory. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Tract Prescription and Proposed Activities

The current forest resource inventory was completed on December 2018 by Foresters Alwine and Bartlett. A summary of the estimated tract inventory results are located in the table below.

Tract Summary Data:

Total trees per acre (>4"DBH)	96
Basal area per acre	100 (square feet)
Approximate stocking	79%

Species (>11" DBH)	Board feet per acre
Eastern white pine	2,613
White oak	1,805
Chestnut oak	1,686
Black oak	1,012
Yellow-poplar	406
Northern red oak	264
Virginia pine	211
Sweetgum	201
Pignut hickory	158
Sugar maple	57
Red maple	46
Shagbark hickory	28
American beech	8
Total	8,495

For the purpose of this guide, this tract is divided into three management sections. Below is a general tract description and silvicultural prescription.

Descriptions:

Upland oaks – 81 acres

This stand type occurs on the slopes that occupy the north side of the tract. The stocking of quality trees is low in this stand. Regeneration within this stand is made up of Virginia pine, American beech, chestnut

oak, and pignut hickory. The overstory is fully stocked with trees having an average DBH of approximately 14 inches.

Basal area per acre (square feet)	77.8
Trees per acre (>4" DBH)	84
Approximate stocking	62%

Species (>11" DBH)	Bd. Ft. per acre
Chestnut oak	2,673
White oak	1,136
Black oak	359
Virginia pine	326
Pignut hickory	201
Northern red oak	66
Sugar maple	33
Red maple	29
American beech	16
Total	4,839

Recommendation is to reduce the shade tolerant species in midstory to promote regeneration and advancement of shade intolerant species such as oak and hickory. Timber stand improvement (TSI) or a prescribed fire may be the best option for much of the upper slopes to push the stand to the next stage. The lower portions of these slopes should be harvested in conjunction with the remaining tract.

Oak Hickory – 40 acres

This stand occurs on the southern half of the tract. The trees present are of much higher quality than the upland oaks. Oak regeneration can be found in this strata, but the majority of the regeneration is of shade tolerant species. Stocking currently is within the fully stocked B level category with overstory trees ranging predominately in the 14"-22" DBH range.

Basal area per acre (square feet)	103.5
Trees per acre (>4" DBH)	93
Approximate stocking	82%

Species (>11"DBH)	**Bd. Ft. per acre**
White oak	3,147
Black oak	2,135
Chestnut oak	1,011
Northern red oak	548
Yellow poplar	344

Sweetgum	155
Pignut hickory	154
Sugar maple	105
Red maple	82
Shagbark hickory	71
Virginia pine	53
Eastern white pine	50
Total	7,855

A single tree selection harvest method is recommended for this stand. Single tree selection should be used to release crop trees. Crop trees should be selected based on vigor, health, quality, and form.

Group selections openings should be installed to promote the regeneration of desirable hardwood species. These openings should be considered where the overstory exhibits decline or undesirable growing stock is present. In areas that possess undesirable regeneration and good seed trees, a shelterwood may be implemented to create partial shade. The goal of these shelterwood harvests is to promote the regeneration of oak species. In a shelterwood, it is required for the midstory to be removed. The midstory removal can be done mechanically, chemically, or culturally.

A prescribed fire regime in this stand would be an efficient method to promote the regeneration of oak species while reducing the abundance of shade tolerant species. The road and the mapped intermittent streams would provide good firebreaks for a prescribed burn.

White Pine – 22 acres

This planted overstory type occurs on the southwestern corner of the tract and around the intermittent stream that flows through the southeastern corner. This stand's overstory trees are ranging predominately in the 20"-28" DBH range.

Basal area per acre (square feet)	182.2
Trees per acre (>4"DBH)	154

Species (>11" DBH)	**Bd. Ft. per acre**
Eastern white pine	20,746
Yellow poplar	2,169
Sweetgum	1,117
Virginia pine	264
White oak	167
Northern red oak	138
Total	24,601

A stand conversion is recommended for this stratum. A complete removal of overstory trees will be followed with an enrichment planting of oak and hickory. This management will provide early successional habitat while converting the stand to native hardwoods.

Invasive species management: The area containing ailanthus should be treated before a management harvest takes place before canopy disturbance to prevent the spread and establishment of this species. A basal bark application is recommended. The small areas with multiflora rose should be treated before timber harvest activity begins. Their location relative to riparian areas shall be considered.

Timber stand improvement (TSI): Within two years following the timber harvest, TSI should be implemented to complete openings, remove understory and overstory trees that are inhibiting oak, hickory, and other desired native species regeneration. TSI operations should also release crop trees that were not adequately released during the harvest. Additionally, TSI should address invasive species.

Best Management Practices (BMP):
BMP's will be implemented during and after completion of the proposed management in order to minimize soil erosion.

Guide revision: This tract should receive another inventory and management guide 20 years following the completion of the timber harvest.

Schedule:

Proposed Activities Listing	*Proposed Date*
Invasive species management	2019-2020
Timber marking and sale	2019-2020
Post-harvest timber stand improvement	2022-2023
Site preparation in white pine conversion area	2022-2023
Prescribed fire regime	2022+
Enrichment planting	2024-2025
3 year regeneration opening evaluation	2025-2027
Evaluate planting for thinning	2037-2038
Inventory and management guide	2039

Clark State Forest
Compartment 6 Tract 8
Stand Map