Clark State Forest	Compartment: 7	Tract: 10
Forester: Dustin Alwine	Date: September 2022	Acres: 59
Management Cycle End Year: 2042	Management Cycle Length: 20 years	

Location
Compartment 7, Tract 10, also known as 6300710, is located in Clark County, Indiana. It is located primarily in Military Grant 281. A small portion in the northwest part of the tract is in Section 1, Township 1N, Range 6E. 6300710 is just shy of two miles northwest of the intersection of US-31 and SR-160 in Henryville, Indiana and one mile west of I-65.

General Description
This tract has been divided into three cover types: mesic oak-hickory, mixed hardwoods, and conifer. The dominant overstory tree species are white oak, eastern white pine, and yellow-poplar. The hardwood forests have high stocking and large higher quality trees. Where large drainages pass through the tract, invasive species are prevalent. Across each cover type regeneration is mostly beech and maple. Management in this tract will aim to remove invasive plants, lower the stocking to promote forest growth, and provide the residual structure needed to regenerate desired forest types. White oak in the mesic oak-hickory, yellow-poplar in the mixed hardwoods and converting the conifers to native hardwoods is the primary objectives.

History
- 1903 - Land acquisition from Rainey & Emma Freeman
- 1930's - Eastern white pine planted
- 1973 - Forest inventory completed
- 1981 - Timber harvest removing 53,925 bdft
- 1987 - Forest inventory completed
- 2008 - Forest inventory and management guide completed by Rudolph
- 2022 - Forest inventory and management guide completed by Dustin Alwine
- 2023 - Management guide written by Dustin Alwine

Landscape Context
This tract is surrounded by both public and private lands. North of the tract there is thousands of acres of Clark State Forest. Agricultural lands including crop fields and pastures are located south of the tract. Approximately 75% of the land within a mile of the tract is forested, about 20% is agricultural, and about 5% is residential areas west of Henryville, Indiana. Two public lakes at Clark State Forest, Schalmm Lake and Franke Lake, are located within a mile of the tract. There are several small ponds within a mile of the tract on private lands.

Topography, Geology, and Hydrology
The topography of this tract is very mild for the area. It ranges from flat to lightly sloped. There is a total of approximately 70 feet of elevation change from the lowest to the highest points in the tract. There is a small knob in the southwestern corner of the tract that slopes east/northeast towards the main drainage that passes through the tract. There is a second smaller, gently west/southwest sloping hill that goes from Forestry Road towards the main drainage.

Tract 6300710 is located in the Silver Creek watershed. There are two mapped intermittent streams

that flow through this tract: Guernsey Creek and Calf Run. Guernsey Creek flows from the northwest. It flows into the tract from the western corner southeast flowing south into private lands. The second mapped intermittent stream, Calf Run, flows down from the north. It flows into Guernsey Creek about halfway through the tract. There are two unnamed smaller ephemeral streams that drain into Guernsey Creek within the tract area. Guernsey Creek flows south a few miles until it drains into Lodge Creek. Lodge Creek flows east across I-65 into Miller Fork. Miller Fork continues south until it reaches Silver Creek. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the 2022 Indiana Logging and Forestry Best Management Practices Field Guide.

Soils

BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 21 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.

ComC- Coolville silt loam, 6 to 12 percent slopes, 4 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, 19.1 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, 0.2 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.

PcrB2- Pekin silt loam, 2 to 6 percent slopes, eroded, 3.9 acres

This gently sloping, deep, moderately well-drained soil is on alluvial terraces. It is well suited to trees and has a site index of 70 for white oak and 85 for yellow poplar.

PcrC2- Pekin silt loam, 6 to 12 percent slopes, eroded, 10.5 acres

This moderately sloping, deep, well-drained soil is found on side slopes adjacent o drainageways on alluvial terraces. It is well suited to trees and has a site index of 70 for white oak and 85 for yellow poplar.

RblD3- Rarden silty clay loam, 12 to 18 percent slopes, severely eroded, 0.4 acres
This strongly sloping and moderately steep, moderately deep, well-drained and moderately well-drained soil is on side slopes in the uplands. This soil is fairly well suited to trees. Erosion hazards, equipment limitations, and windthrow hazards are management concerns. These should be considered during planning and implementation of Best Management Practices for Water Quality. This soil has a site index of 67 for northern red oak.

StdAQ- Stendal silt loam, 0 to 2 percent slopes, rarely flooded, 0.4 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
Forestry Road borders 6300710 on its northern and eastern sides. There is one gated pull off located on the northern boundary of 6300710. There are several parking locations located on the opposite side of Forestry Road in the neighboring tracts. There are no fire lanes within 6300710.

Boundary
Forestry Road borders the tract on the northern and eastern sides. The southern and western boundaries are bordered by private property. 6300811, 6300810 and 6300709 border 6300710 on the other side of Forestry Road.

Ecological Considerations
This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: mesic oak-hickory, mixed hardwoods, conifer stands, and riparian areas. Evidence of several types of wildlife were noted at the time of inventory including deer sign, turkey feathers, eastern box turtles, spring peepers, and a variety of woodpeckers and songbirds.

The Division of Forestry has developed compartment level guidelines for important wildlife structural habitat features such as snags and legacy trees. Snags are standing dead or nearly dead 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, which provides habitat for many ground-dwelling species and contributes to healthy soils. Legacy trees are live trees of a certain species and diameter class, that have potential future value to various wildlife species, if retained in the stand. Current assessments indicate the abundance of these habitat features meet or exceed recommended maintenance levels.

Being a more mesic tract with a large intermittent stream, there were a significant amount of invasive plants, especially within 100 feet of the stream. The invasive plants noted at the time of inventory included oriental privet, Japanese honeysuckle, autumn olive, multiflora rose, Japanese stiltgrass, Amur cork tree, oriental bittersweet, Japanese barberry, ailanthus, creeping jenny, and bush honeysuckle. A majority of the invasive plants were located near the streams, thus invasive management could focus on keeping these invasive species from spreading to new areas. Seed producing woody species and vines should be treated prior to any harvest to help minimize spread. Also, post-harvest invasive species monitoring, and treatment should occur to control the more

common invasives which will be prevalent in the seed bank. There is one area on the southeast side of the tract that is heavily infested with oriental privet. This could be a priority area to control. The invasive trees, ailanthus and Amur cork tree, are currently in low densities. Treating them could also be a priority to keep them from becoming more widely established.

A formal Ecological Review process, which includes a search of Indiana's Natural Heritage Database, is part of the management planning process. If Rare, Threatened, or Endangered species were found to be associated with this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the population viability of those species or communities.

Recreation
Recreational opportunities within this tract are limited due to the lack of recreational trails. Hunting, foraging, and wildlife viewing opportunities are available within this tract. During the inventory, evidence of hunting was noted.

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

Tract Subdivision Description and Silvicultural Prescription
The current forest inventory was completed in the late summer of 2022 by forester D. Alwine. An overview of the inventory results are located in the table below. Trees larger than 11 inches in DBH and of merchantable quality are included in volume summaries and are considered "sawtimber trees."

Species	# Sawtimber Trees	Total Bd. Ft.
Eastern white pine	761	382,140
Yellow poplar	699	203,530
White oak	351	114,830
Pignut hickory	186	35,340
Sweetgum	144	31,220
Northern red oak	81	20,250
Virginia pine	111	19,450
Black oak	59	19,300
Red maple	96	19,240
Sugar maple	103	15,950
American sycamore	54	11,270
Shagbark hickory	66	10,250
Loblolly pine	27	6,690
Scarlet oak	15	5,600
Chestnut oak	6	3,190
American beech	35	2,720

Species	# Sawtimber Trees	Total Bd. Ft.
Black cherry	15	1,300
Red elm	8	1,190
Sassafras	15	920
Black gum	20	810
Black walnut	20	810
Totals	**2,872**	**906,000**

For the purposes of this resource management guide, this tract is being divided into three management cover types based on forest composition: mesic oak-hickory, mixed hardwoods, and conifers.

Descriptions:

Mesic Oak-Hickory, 13 acres

This cover type is located in the southwestern portion of the tract on the main ridge. It encompasses approximately 20% of the tract acreage. It is dominated by larger white oaks growing very well on the mesic lower slopes. Percent stocking is estimated at 105% making it slightly overstocked. White oak makes up ~65% of the merchantable volume. Other dominant overstory species included pignut hickory and black oak. There were a lot of 20"+ DBH trees in this tract due to the higher site index including a few 30"+ DBH stems. Overstory mortality in this cover type is low and the trees are in overall good health. There is some crown decline likely due to the high stocking. As CFI data suggests across the state forest system, the regeneration of this cover type is not occurring. The dominant regeneration is maple and American beech. Other understory trees noted were sweetgum, ironwood, white ash, pignut hickory, and unadvanced oaks. Spicebush was noted on some of the lower slopes closer to the stream and coralberry, hillside blueberry, and green brier were observed on the upper slopes. The oaks being regenerated were small and had been outcompeted by the maple and beech regeneration. This cover type had the lowest density of invasive plants, found occasionally, and scattered.

Trees per acre: 129 Percent stocking: ~105%
Basal area: 131.7 square feet Volume per acre: 12,959 bdft

Species	Volume per acre
White oak	8,452
Pignut hickory	1,693
Black oak	1,286
Yellow-poplar	625
Chestnut oak	252
Virginia pine	237
Scarlet oak	182
Shagbark hickory	131
Sugar maple	101
Total	12,959

Mixed Hardwoods, 31 acres

The mixed hardwoods cover type was the most diverse in overstory tree species in the tract. Yellow-poplar was the overstory dominant tree species making up almost half of the merchantable volume. The mortality in this tract was low. Majority of the mortality in this stand was Virginia pine blowdown. The overall quality of the trees in this stand was above average for the area and there were many overstory trees 20"+ DBH. The regeneration in this cover type was shade tolerant species similar to those in the mesic oak-hickory cover type, but the area was more dominated by American beech. There was also a greater diversity of regeneration, with everything found in the oak hickory stand as well as pawpaw, yellow-poplar, shagbark hickory, black cherry, and a heavier presence of spicebush, especially near the stream. A majority of the invasive species were found in this cover type including the infestation of privet and creeping jenny. Common native herbaceous plants observed included ferns, spring beauty, snakeroot, violets, green brier, and even a few cardinal flowers in a drain.

Trees per acre: 135 Percent stocking: ~98%
Basal area: 122 ft^2 Volume per acre: 9,244 bdft

Species	**Volume per acre**
Yellow-poplar	4,165
Sweetgum	797
Northern red oak	641
Red maple	609
Virginia pine	521
Eastern white pine	516
Sugar maple	464
Pignut hickory	371
American sycamore	275
White oak	252
Shagbark hickory	187
Scarlet oak	104
Black oak	96
American beech	86
Black cherry	41
Red elm	38
Sassafras	29
Black gum	26
Black walnut	26
Total	9,244

Conifer, 15 acres

This cover type is planted pines, mainly eastern white pine. There is a small pocket of loblolly pine planted along Forestry Road on the east side of the tract. The rest of the overstory tree species present were most likely natural regeneration within the original plantings or were found on the edge. Using a USFS Eastern white pine stocking chart, the percent stocking of these trees was

estimated at 75%, making it fully stocked above the B-line. The overstory trees in this stand were large and mature, with many being over two feet in diameter and over 100 feet tall in total height. These large, tall pine trees are the reason the volume per acre is high compared to the volume per acre in the other cover types. Looking at historical maps from the 1940s, the tree planting can be seen as already established. It can be inferred these trees are 80-90 years old. The mortality in this stand is moderate and composed almost entirely of pine. There is a fair amount of Virginia pine not noted in the inventory that is currently laying on the ground from windthrow. The rest of the mortality was eastern white pine that is being thinned and aged out of the stand. The regeneration in this stand was similar to that in the mixed hardwoods cover type except it was more open and less dense here. With the higher mortality, invasive species like oriental bittersweet that commonly enter small canopy gaps, were more common in this cover type.

Trees per acre: 137 Percent stocking: ~75%
Basal area: 193 ft^2 Volume per acre: 30,510 bdft

Species	**Volume per acre**
Eastern white pine	24,803
Yellow-poplar	4,338
Loblolly pine	453
Sweetgum	410
Shagbark Hickory	181
American sycamore	176
Pignut hickory	149
Total	30,510

Silvicultural Prescriptions:

Mesic Oak-Hickory, 13 acres

This cover type is dominated by high quality white oak. With the higher site index yielding nicer trees, there is more understory competition from mesic shade tolerant tree species. The goal in this cover type is to retain the oak-hickory. To do this, the shade tolerant midstory and understory species need to be removed to give a competitive advantage to the oak regeneration. A midstory removal is recommended. This can be done either chemically, mechanically, or with prescribed fire. Prescribed fire administered periodically over the course of 3-5 years would aid in the reduction of shade tolerant species.

Along with the understory work, overstory disturbance is also needed. The mesic oak-hickory cover type is overstocked and the biggest sign of stress observed was from competition. A light shelterwood harvest could be used to release trees from the stress of overcrowding and lower the stocking to a more sustainable level, closer to a basal area of 50-70 to promote forest growth. Since it is a mesic site, care should be taken to avoid creating large canopy gaps where full light species like yellow-poplar will outcompete the desired regeneration. Diffuse lighting from a well-spaced remaining canopy is the goal to provide the most ideal growing conditions for the oak regeneration.

Mixed Hardwoods, 31 acres

A combination of selection harvest and regeneration openings is recommended for this cover type. With the stocking being at almost 100%, the forest growth will begin to stagnate. It should be thinned to help promote growth. Single tree selection should be used to release crop trees. Crop trees should be selected based on species, vigor, health, quality, and form. Common crop trees will include oaks or hickories, other mast producing species, sugar maple, and yellow-poplars. Regeneration openings could be used to create canopy gaps to allow yellow-poplar and other early successional species to regenerate as well as to provide young forest habitat. Prior to any overstory disturbance in this tract, the invasive species such as oriental bittersweet, ailanthus, Amur cork tree, autumn olive, privet and bush honeysuckle should be treated as well as any large Japanese honeysuckle vines. Controlling these species will likely require multiple treatments.

Conifer, 15 acres

The eastern white pine in this tract were planted during the Civilian Conservation Corp (CCC) era to help with erosion control. The pines have served their purpose reaching maturity and showing signs of decline. A complete removal of the pine overstory to promote native hardwood regeneration is recommended. An enrichment planting of oak and hickory species is another possibility. This management could provide early successional habitat while converting the cover type to native hardwoods. A With an abundance of large yellow-poplar trees in and around this cover type, the dominant species expected to regenerate naturally would be yellow poplar. Control of invasive species in this area could be done in conjunction with the other cover types.

Summary Tract Silvicultural Prescription and Proposed Activities

Management recommendations in this tract begin with preharvest invasive species control focusing on controlling seed producing populations and eliminating less pervasive species or pockets prior to any overstory disturbance. Preharvest timber stand improvement (TSI) could be utilized to help promote oak regeneration. A harvest is recommended to lower stocking and provide better regeneration conditions for our desirable forest types. The harvest is estimated to remove 100,000 – 150,000 board feet. If the pine is completely removed board feet removed will be considerably higher due to the stocking and volume in the 15-acre conifer cover type. Post-harvest TSI is recommend to complete openings created through the harvest and address understory beech and maple. Post-harvest invasive species control could be utilized to keep them from expanding after the disturbance. Planting and regeneration checks will be done periodically for the first 3-10 years to make sure they are successful. The tract should be reevaluated in 20 years.

Other considerations

Regeneration evaluation – Three to five years after the completion of the timber harvest, a regeneration inspection will be performed to ensure that desired regeneration is occurring within the harvest area. If deemed unsatisfactory, mitigations will be made.

Timber stand improvement (TSI) – TSI could be performed within two years of timber harvest completion. TSI is prescribed to complete regeneration openings, remove species inhibiting desirable regeneration, and address problem occurrences of invasive species.

Best management practices (BMP) – During and after completion of the proposed management activity, BMPs will be implemented and monitored to minimize soil erosion.

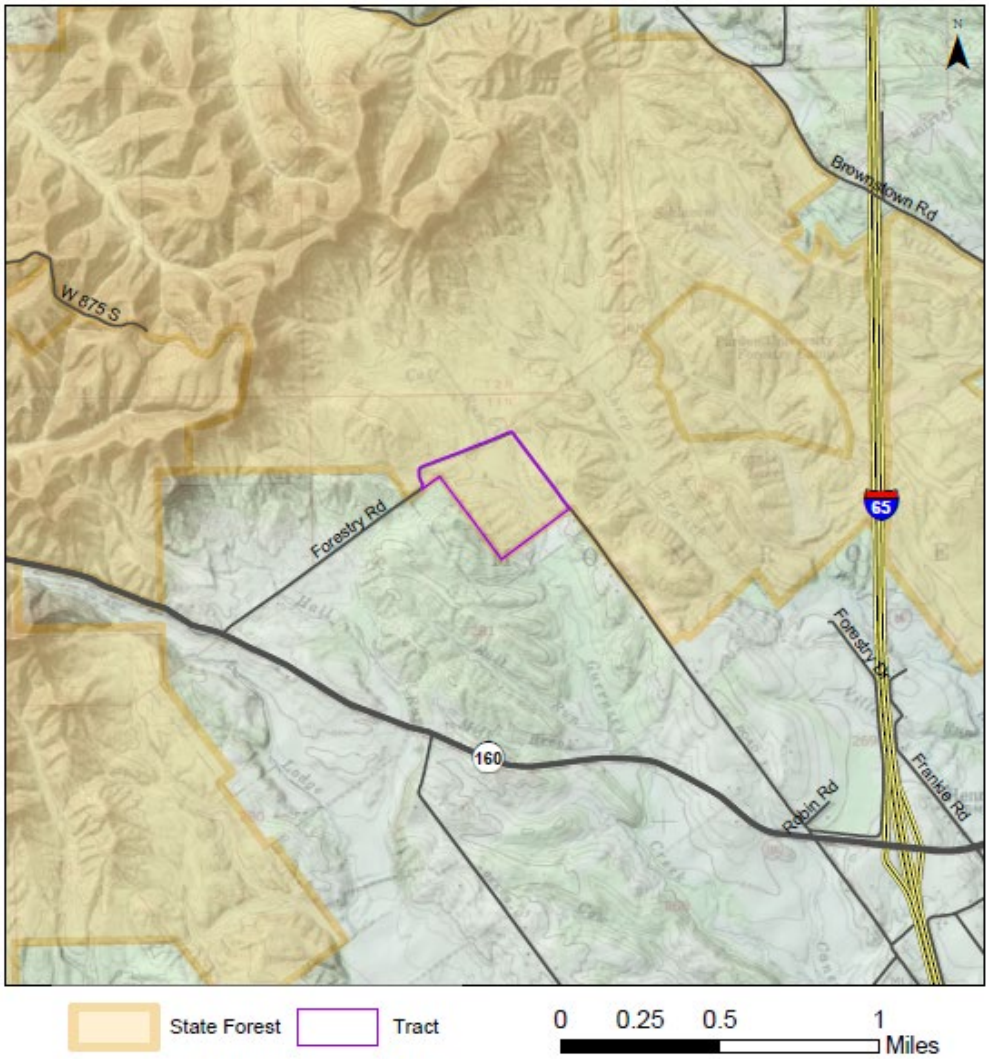
Guide revision – This tract should receive another inventory and management guide approximately 20 years following the completion of this inventory.

Prescribed fire – A regime of prescribed fire may be started within this tract to reduce the abundance of shade tolerant species in the midstory and to help control invasive species as well as promote a more open forest structure.

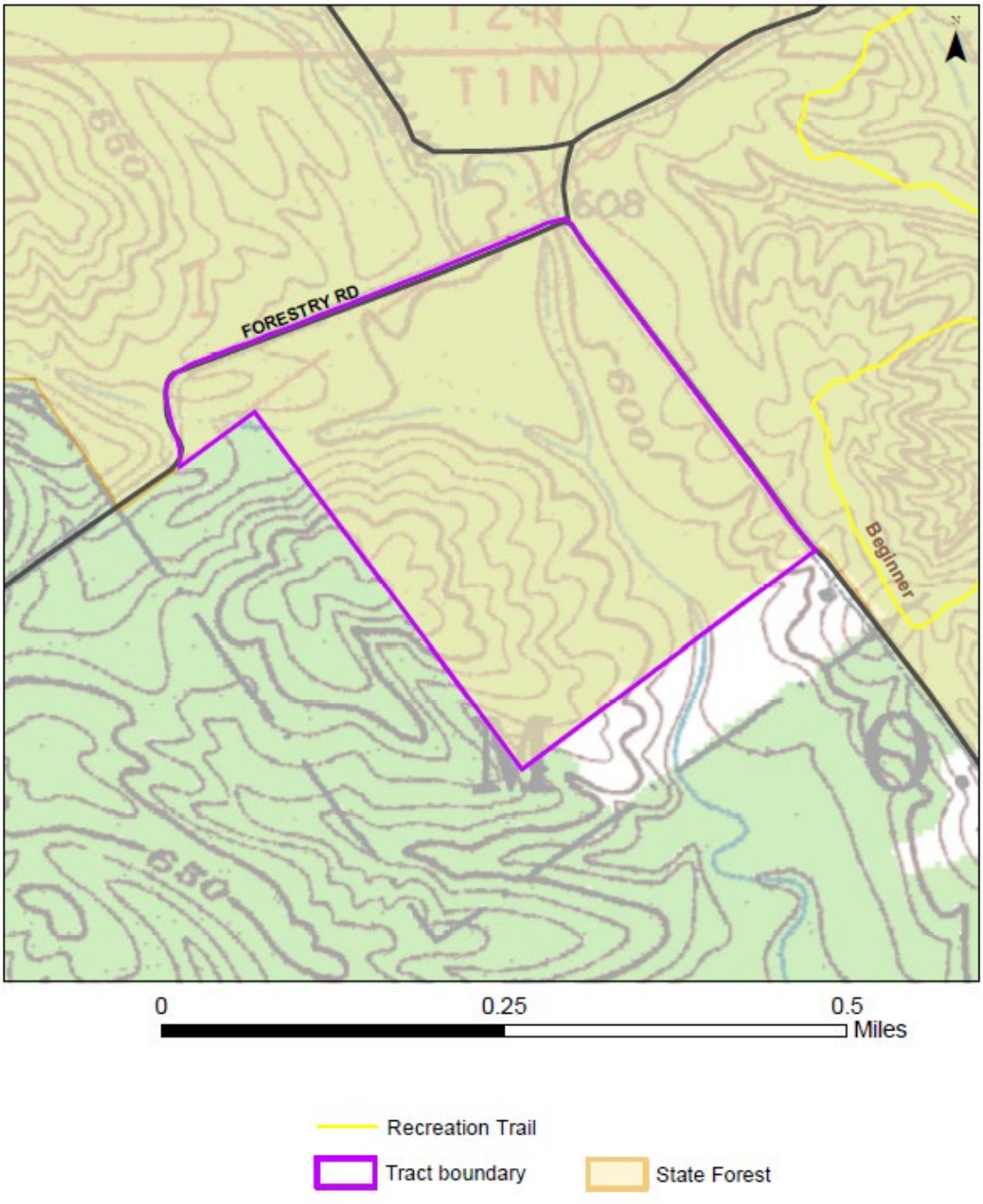
Proposed Activities Listing

Proposed Management Activity	*Proposed Date*
Invasive species control/preharvest TSI	2023-2024
Timber Harvest	2024-2026
Postharvest TSI/invasive species control	Within 2 year of harvest
Postharvest regeneration/planting inspections	First 3-10 years postharvest
Prescribed fire regime	2024+
Re-evaluate tract	2043

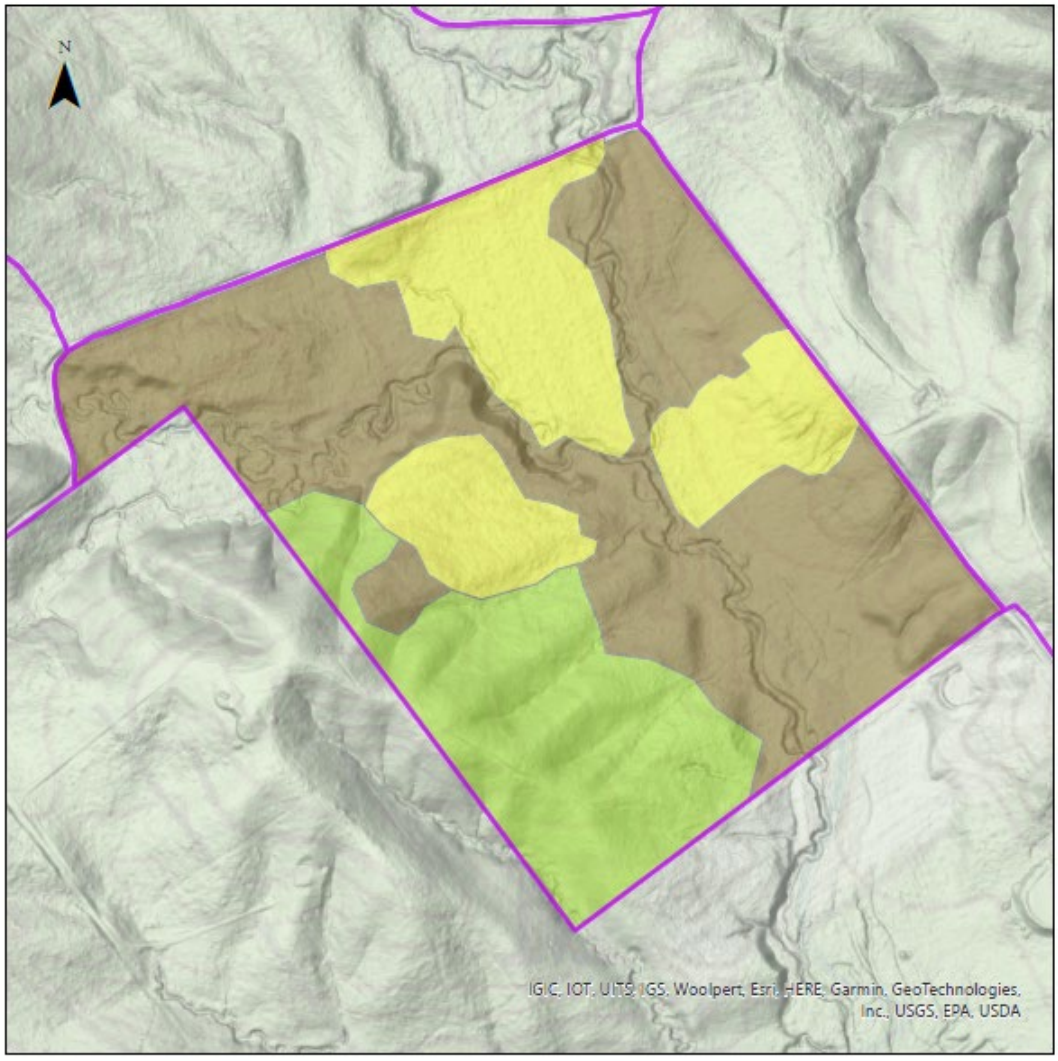
Clark State Forest
Location Map
Compartment 7 Tract 10



Clark State Forest
Compartment 7 Tract 10
Tract Map



Clark State Forest
Compartment 7 Tract 10
Cover Types Map



0 0.13 0.25
Miles

- Mesic Oak-Hickory
- Mixed Hardwoods
- Conifer