Indiana Department of Natural Resources
Division of Forestry

Indiana Department of Natural Resources

Resource Management Guides
Clark State Forest
30-day Public Comment Period: July 8, 2020 – August 6, 2020

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 300-1,000 acres in size and their subunits (tracts) are 10 - 300 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 1,600 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 listed below and contained in this document are part of the properties annually scheduled forest inventories under review for Clark State Forest.

Compartment 6 Tract 3
Compartment 6 Tract 4
Compartment 11 Tract 11
Compartment 10 Tract 11 (amendment to original draft RMG)

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.

Clark State Forest **Compartment 6** **Tract:** 3
Tract Acreage: 132 **Forested Acreage:** 132
Forester: Bartlett **Date of Inventory:** June 2018
Management Cycle End Year: 2038 **Management Cycle Length:** 20 years

Location
Compartment 6 tract 3, also known as 6300603, is approximately 3 miles northwest of Henryville, IN and is located in both Clark and Scott County. More specifically the tract is within Sections 25, 26, 35, and 36 of T2N and R6E.

General Description
Half of this tract's area is covered with dry oak-hickory. The other half with mixed hardwoods. The dry oak-hickory cover type occupies the slopes and ridges, while the mixed hardwoods occur in the ravines and on the flat portion of the tract. Chestnut oaks dominate in the oak-hickory cover type while yellow poplar has the most volume in the mixed hardwoods.

History
1903 – Land acquired from the Kline family
1929 – Land acquired from the Dean family
1982 – Inventory completed by Ballintyn
1986 – Resource Management Guide by Ballintyn
2018 – Inventory completed by Steffek
2019 – Resource Management Guide by Bartlett

Landscape Context
The area to the east, south and west is forested tracts of Clark State Forest. There are some scattered residential homes to the north with small agricultural fields. The land use of the surrounding area is expected to remain the same.

Topography, Geology and Hydrology
The northern portion of this tract is relatively flat. There is one ridge that runs north from the southern border. This ridge tapers into the flat portion of the tract. Traversing this ridge is the only route to access the oak-hickory portion of the tract. A multipurpose trail runs along the majority of this ridge. The eastern portion of the tract is a steep, west-facing slope.

There are two mapped intermittent streams within this tract. One stream is the tract's western boundary. The second intermittent stream flows between the tract's main ridge and the steep slope on the east side of the tract. These intermittent streams flow into Pigeon Roost Creek. This tract is entirely within the Pigeon Roost Creek watershed.

Soils
BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 1.8 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.

BvoG-Brownstown-Gilwood silt loams, 25 to 75 percent slopes, 27.4 acres
This moderate to very steep, deep, well-drained soil is found on 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, 3.9 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.

ComC3- Coolville silt loam, 6 to 12 percent slopes, severely eroded, 3.4 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, 4.4 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.

GgfD- Gilwood-Wrays silt loams, 6 to 18 percent slopes, 4.4 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, 54.2 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.

PcrB2- Pekin silt loam, 2 to 6 percent slopes, eroded, 5 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.

PcrC3- Pekin silt loam, 6 to 12 percent slopes, severely eroded, 2.9 acres
This moderately sloping, deep, well-drained soil is found on side slopes adjacent to drainage ways on alluvial terraces. It is well suited to trees and has a site index of 70 for white oak and 85 for yellow poplar.

SoaB- Spickert silt loam, 2 to 6 percent slopes, 4.8 acres
This gently sloping, deep, moderately well-drained soil is found on ridgetops and side slopes in the uplands. It is well suited to trees. A fragipan is present at 20 to 36 inches below soil surface that inhibits drainage. This soil has a site index of 100 for yellow poplar and 60 for white oak.

StaAQ- Steff silt loam, 0 to 2 percent slopes, rarely flooded, 20.2
This nearly level, deep, moderately well-drained soil is on bottom land. It is flooded for brief periods, mainly in winter and spring. It is well suited to trees and has a site index of 88 for black oak and 107 for yellow poplar.

Access
Access by foot is easy, but vehicle access is limited. A multipurpose trail extends from the northern boundary all the way to the south. There is a horse day ride parking area north of Brownstown Road that provides access to this multipurpose trail.

Boundaries

The entire northern boundary of this tract is bordered by Brownstown Road. The remainder of the tract is surrounded by Clark State Forest property. The bordering tracts are C6 T2 (6300602) and C6 T4 (6300604).

Recreation
The primary recreational use for this tract is horseback riding. The parking area north of this tract connects to the multipurpose trail system, and is popular for day use parking by horse riders. Hunting and hiking are likely other recreational uses of this tract. It is likely that all or a portion of the recreational trails located in this tract will be temporarily closed or rerouted for public safety during any active management. These trail disruptions will be short and normal use will resume following completion of the management activities

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.

Ecological Considerations
This tract contains diverse vegetation and wildlife resources (age, type, structure) conducive to providing habitat for a variety of wildlife species. Habitat types include: dry oak-hickory canopy, mixed hardwood canopy, 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.

Invasive species observed include Japanese stiltgrass along the multipurpose trail and pockets of multiflora rose within the mixed hardwood stand. Along Brownstown Road there is commonly: Japanese honeysuckle, Asian bush honey suckle, and oriental bittersweet. There is a possibility for these species to be found in this tract near the road, although they were not observed during the inventory.

The Division of Forestry has developed compartment level guidelines for an important wildlife structural habitat features: snags.

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	528	924	427	-101	-497
Snag 9"+ DBH	396	792	427	31	-365
Snag 19"+ DBH	66	132	39	-27	-93

Snag densities in this tract did not meet maintenance levels in two of the three size classes. Prescribed management will increase the number of snags. It is important to note that these are compartment guidelines and that even though the estimated tract data does not quite meet all target levels, it is likely that suitable levels are present for these habitat features in the surrounding landscape.

Tract Subdivision Descriptions and Silvicultural Prescription

The current forest resource inventory was completed summer 2018 by inventory intern Gary Steffek. A summary of the estimated tract inventory results are located in the table below.

Total trees per acre	99
Basal area per acre (square feet)	95.6
Present volume (bd. ft.)	8,342
Overall % stocking	77% (fully stocked)

Species	**Total Volume (bd. ft.)**
Chestnut oak	381,472
Yellow poplar	367,586
Virginia pine	109,909
White oak	56,985
Sugar maple	44,278
Black oak	35,763
Scarlet oak	22,008
American beech	19,126
Red maple	12,183
White ash	8,777
Eastern white pine	8,122
Sweetgum	7,991
Northern red oak	6,812
Largetooth aspen	6,288
Pignut hickory	1,965
Blackgum	1,703
Black walnut	917
Red elm	917
Tract Totals (bd. ft.)	**1,092,802**
Per acre totals (bd. ft.)	**8,342**

Compartment 6 tract 3 is divided into two management subdivision (i.e., cover types) based on overstory species composition. These two subdivisions are described below.

Dry Oak-Hickory

The dominant species within this tract is chestnut oak. These trees occur at a high stocking and crown dieback is present in most of the chestnut oaks. The average diameter of merchantable chestnut oaks is 16.5" DBH (diameter at breast height). Virginia pine is scattered throughout this subdivision. The regeneration is variable, with areas dominated by American beech and others with a greater presence of oak.

Trees per acre	107
Basal area per acre	103.6ft^2
Stocking	83% (fully stocked)

Species	Bd. Ft. per acre
Chestnut oak	5,227
White oak	831
Virginia pine	599
Black oak	363
Scarlet oak	224
Yellow poplar	165
Sweetgum	116
Northern red oak	99
White ash	88
Sugar maple	52
Red maple	48
Pignut hickory	28
Total	7,840

This subdivision is fully stocked and a timber harvest is recommended.

A single tree selection harvest is recommended in areas where chestnut oak dieback was observed due to high stocking. The goal of this harvesting method is to release the more vigorous, higher quality trees by removing low quality competitors. The majority of the trees to be removed are chestnut oak. There is not a high density of red oak group species within this stand, so they should be released when possible. Their density should be taken into consideration throughout the marking process. The goal of promoting red oak group species is to increase the diversity in forage for wildlife.

Group selection and patch-cut openings are recommended in areas that have widespread overstory dieback. The overstory trees that surround the border of these openings should be of higher quality. The goal of these openings is to capture mortality and provide space for the regeneration of desirable hardwood species. These openings will provide early successional wildlife habitat while improving vigor and health of the area.

Mixed hardwoods

The mixed hardwood subdivision is primarily yellow poplar and Virginia pine. There are a few large yellow poplar within the ravines, but the average yellow poplar DBH in this subdivision is 19" and the average Virginia pine is 18". There are small, uniform pockets of Virginia pine near Brownstown Road,

and scattered pine occurring throughout the remainder of the tract. Regeneration in the mixed hardwoods is mainly American beech, but there are some stems of yellow poplar, sweetgum, red maple, and Virginia pine as well.

Trees per acre	90
Basal area per acre	86.8ft^2
Stocking	69% (fully stocked)

Species	**Bd. Ft. per acre**
Yellow poplar	5,712
Virginia pine	1,103
Sugar maple	653
Chestnut oak	367
American beech	306
Black oak	175
Red maple	142
Eastern white pine	130
Scarlet oak	106
Largetooth aspen	102
White ash	44
Blackgum	28
Black walnut	15
Red elm	15
Total	**8,898**

This subdivision is fully stocked and a timber harvest is recommended.

The small patches of Virginia pine are prescribed to be harvested. These patches contain mature trees, and blowdown can be expected from experience with similar stands of aging pine. The goal with the removal of these Virginia pine is to convert the area to native hardwoods. The expected species to regenerate in this area are sweetgum, red maples, and yellow poplar. Regeneration evaluations need to be performed following the harvest to ensure the openings are not regenerated with Virginia pine.

A single tree selection harvest is recommended for the remainder of this stand. The objective of this harvest method is to remove suppressed and stressed trees. This method shall aim to release more vigorous select crop trees from low quality competitors. Crop trees will be selected based on quality, health, and vigor. Crop trees should be released on at least two sides, where applicable.

Other considerations

Invasive species management

Invasive species management should be performed in the flat portion of the tract. If areas of pine are converted into native hardwoods, invasive species management needs to be performed to minimize the advancement of these species.

Post-harvest timber stand improvement (TSI)

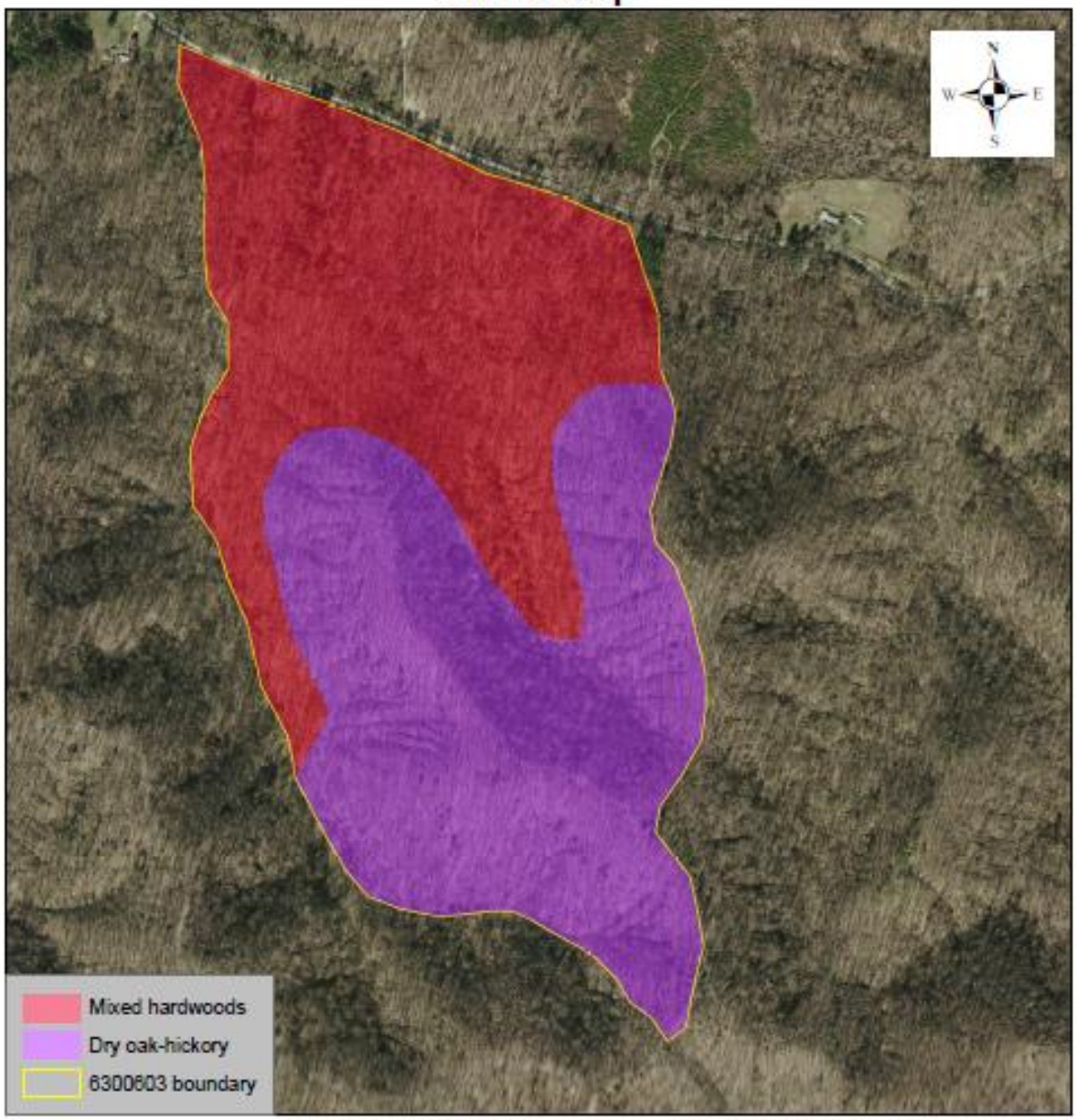
After the harvest, regeneration opening completion needs to be performed. The goal of this management is to complete the openings to ensure sufficient sunlight is available to stimulate the regenerate of native hardwood species.

Crop tree release and a midstory treatment should also be performed. The trees to be targeted for a midstory treatment are shade tolerant species in the knob oak stand. In the mixed hardwood stand there is less need for a midstory removal, but American beech should be targeted.

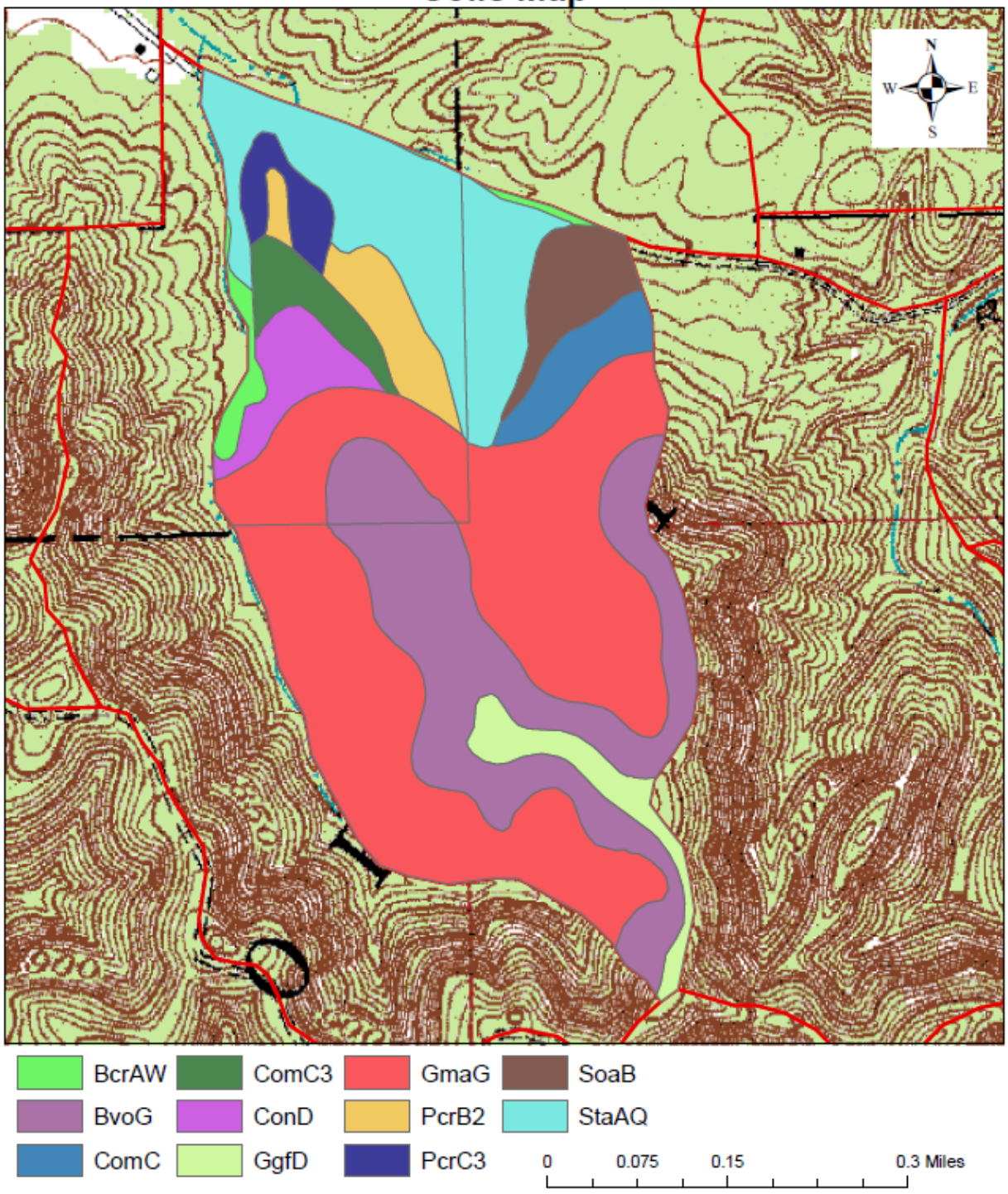
Schedule:

Proposed Activities Listing	*Proposed Date*
Invasive species management	2020-2021
Timber marking and sale	2021-2022
Timber harvest	2022-2024
Post-harvest TSI	2024-2026
Regeneration evaluation	2027-2029
Inventory and management guide	2039

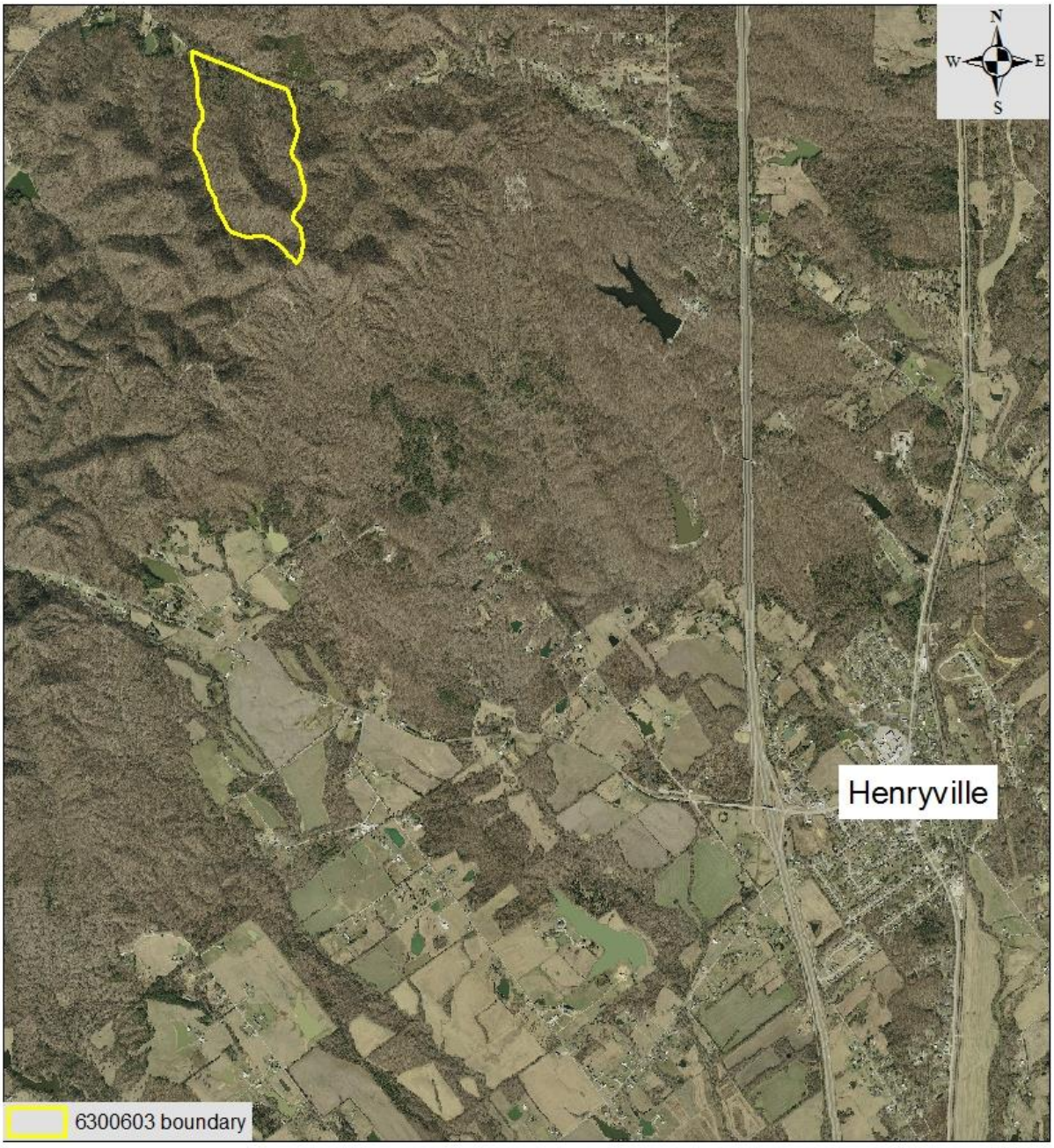
Clark State Forest
Compartment 6 Tract 3
Stand Map



Clark State Forest
Compartment 6 Tract 3
Soils Map



Clark State Forest
Compartment 6 Tract 3
Location Map



Clark State Forest **Compartment**: 6 **Tract** 4
Tract Acreage: 126 **Forested Acreage:** 126
Forester: Alwine/Bartlett **Date**: February 2019
Management Cycle End Year: 2034 **Management Cycle Length**: 15 years

Location
Compartment 6 tract 4, also known as 6300604, is located in Clark County approximately 2.5 miles northwest of Henryville, Indiana. More specifically, it is located within Sections 25/36 of Township 2N, Range 6E.

General Description
Half of this tract's area is covered with a dry oak-hickory component and the other half with mixed hardwoods. The dry oak-hickory cover type occupies the southern slopes and ridgetops, while the mixed hardwoods occur in the ravines and the flat portion of the tract. The majority of the volume in the dry oak-hickory stand is chestnut oak, and the majority of volume in the mixed hardwoods is Virginia pine, sugar maple, and white oak.

History
- Land purchased from the Kline family in 1903
- Land purchased from Marcus & Mary Brown in 1903
- Land purchased from James & Lolie Dean in 1929
- Land purchased from William & Anna Waterbury in 1939
- Inventory completed in 1986 for State Forest Inventory Program
- Inventory completed in 2018 by Inventory forester Gary Steffek
- Resource management guide completed in 2019 by foresters Bartlett/Alwine

Landscape Context
The area to the east, south and west is forested tracts of Clark State Forest. There are some scattered residential homes to the north with small agricultural fields. The land use of the surrounding area is expected to remain the same.

Topography, Geology and Hydrology
The topography of this tract varies from extreme slopes to knobs to gentle slopes relatively flat towards Brownstown Road.

Tract 6300604 is located within the Silver Creek watershed. There is a mapped intermittent stream that runs along the eastern side of the tract. This intermittent stream runs to a perennial stream called Miller Fork Creek. Miller Fork Creek flows into Silver Creek south of Henryville.

Soils
<u>BvoG-Brownstown-Gilwood silt loams, 25 to 75 percent slopes, 33.5 acres</u>
This moderate to very steep, deep, well-drained soil is found on 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.

<u>ComC- Coolville silt loam, 6 to 12 percent slopes, 2.7 acres</u>

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.

GgbG- Gilwood-Brownstown silt loams, 25 to 75 percent slopes, 4.9 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.

GgfD- Gilwood-Wrays silt loams, 6 to 18 percent slopes, 4.8 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, 75.7 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.

SoaB- Spickert silt loam, 2 to 6 percent slopes, 4.9 acres
This gently sloping, deep, moderately well-drained soil is found on ridgetops and side slopes in the uplands. It is well suited to trees. A fragipan is present at 20 to 36 inches below soil surface that inhibits drainage. This soil has a site index of 100 for yellow poplar and 60 for white oak.

Access
Access to this tract is from Brownstown Road. There is a spot to pull off along the road where the multipurpose trail enters the neighboring State Forest tract 6300603. Foot access to the tract is easy using the multipurpose trails. Foot access to the southern portion of the tract can be gained from the red multipurpose trail that runs from Switchback Road.

Boundary
Tract 6300604 is almost completely bordered by other State Forest tracts. The north border along Brownstown Road has a private residence on the north side of the road. Other tracts that share a border with tract 6300604 are as following: tracts 6300605/6300607 to the east, 6300608 to the south, 6300603 to the west, and 6300507 to the north.

Ecological Considerations
This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: dry oak-hickory and mixed hardwoods with a pine component forest.

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.

Invasive species were observed, but mainly along the multipurpose trails, and the areas of Virginia pine in the bottoms. The species observed were Japanese stiltgrass on the multipurpose trails, and multiflora rose within the pine. Due to the location by Brownstown Road there are other species to be expected such as: oriental bittersweet, Japanese honeysuckle, and Asian bush honeysuckle.

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	Inventory	Above Maintenance	Above Optimal
Snag 5"+ DBH	506	885	464	-42	-421
Snag 9"+ DBH	379	758	464	84	-295
Snag 19"+ DBH	63	126	194	131	68

Snag inventory data shows that snags meet maintenance levels for snags above 9” but not 5”+. Prescribed management activities will aim to increase snag levels in this tract.

Recreation

The main recreational activity in this tract is horseback riding the multipurpose trails which trek through the northern, southern, and eastern edge as well as a small portion of the southwest corner. The tracts close vicinity to a day use horse parking/unloading area likely increases the number of riders in the area. Other recreational opportunities present in this tract include hunting, foraging, hiking, and wildlife viewing.

During the proposed management activities portions of the multipurpose trail within tract 4 will be temporarily closed or rerouted for safety concerns. However, it is possible that trail closures within this area are limited to week days resulting in less impact to weekend activities within this 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 Subdivision Descriptions and Silvicultural Prescriptions

The current forest resource inventory was completed in summer by inventory intern Gary Steffek. A summary of the estimated tract inventory results are located in the table below.

Trees per acre	111
Basal area per acre (square feet)	101
Stocking	81% (fully stocked)

Species	**Bd. Ft. per acre**
Chestnut oak	3,496
White oak	905
Virginia pine	738
Yellow poplar	492
Sugar maple	461
Pignut hickory	352
Black oak	348
Scarlet oak	305
Northern red oak	211
Red maple	166
White ash	60
American beech	49
Shagbark hickory	34
Black walnut	29
Total	7,646

This tract is divided into two management subdivisions based on overstory composition. The subdivisions are described below.

Descriptions and prescriptions:

<u>Dry oak-hickory</u>

The dry oak-hickory occurs on the southern portion of the tract. This tract is primarily chestnut oak. This stand is heavily stocked and considerable dieback was observed. The main regenerating species is American beech, but there are areas where oak species are regenerating. On the north sides of slopes and toward the ravines, there is a higher density of mixed hardwood species. Although these species are present, there are not enough of them to consider the overstory a mixed hardwood stand. The average DBH for overstory chestnut oak is approximately 17”.

Trees per acre	114
Basal area per acre (square feet)	108
Stocking	87% (fully stocked)

Species	**Bd. Ft. per acre**
Chestnut oak	5,094
White oak	833
Pignut hickory	454
Scarlet oak	395
Black oak	371
Northern red oak	330
Virginia pine	245
Yellow poplar	229
American beech	58
Shagbark hickory	53
Black walnut	45
Sugar maple	24
White ash	18
Total	8,149

This stand is fully stocked and a timber harvest is recommended.

A single tree selection is recommended. The goal of this harvest system is to remove suppressed trees while providing room for select trees to grow. These selected crop trees should be selected based on health, form, and vigor. The majority of the trees being selected for removal will be overstocked chestnut oak.

Group selection and patch-cut harvests are recommended in areas where there is considerable overstory dieback. The goal of these openings is to provide space for the regeneration of hardwood species. These patches should be targeted in areas where the border of the opening is made up of high quality trees. These openings will also provide early successional wildlife habitat.

<u>Mixed hardwoods</u>

The mixed hardwoods occurs on the flat near Brownstown Road. The majority of standing volume is Virginia pine, sugar maple, and white oak. The Virginia pine congregates in pockets and is mostly uniform. Regenerating species in the stand are American beech, red maple, sweetgum, and yellow poplar. Average DBH of the Virginia pine is approximately 17”.

Trees per acre	106
Basal area per acre (square feet)	89
Stocking	73% (fully stocked)

Species	**Bd. Ft. per acre**
Virginia pine	1,615
Sugar maple	1,237
White oak	1,034
Yellow poplar	960
Chestnut oak	655
Red maple	461
Black oak	308
Pignut hickory	171
Scarlet oak	144
White ash	135
American beech	33
Total	6,753

This stand is fully stocked and a timber harvest is recommended.

A single tree selection harvest is recommended for the remainder of this stand. The objective of this harvest method is to remove suppressed and stressed trees. This method shall aim to release select crop trees from low quality competitors. Crop trees will be selected based on quality, health, and vigor. Crop trees should be released on at least two sides, where applicable.

A conversion of the Virginia pine pockets is also recommended. Areas dominated by pine are mature and blowdown can be expected from experience with similar stands of aging pine. The goal of these conversions is to regenerate the area in native hardwoods. The goal species to be regenerated are red maple, sweetgum, and tulip poplar.

Other considerations

Invasive species management

Invasive species should be managed in areas near Brownstown Road before any disturbance is made to the overstory. Any openings will require special attention. Target species include Japanese honeysuckle, multiflora rose, Japanese stiltgrass, Asian bush honeysuckle, and oriental bittersweet.

Post-harvest timber stand improvement (TSI)

After the harvest, regeneration opening completion needs to be performed. The goal of this management is to complete the openings to ensure sufficient sunlight is available to stimulate the regenerate of native hardwood species.

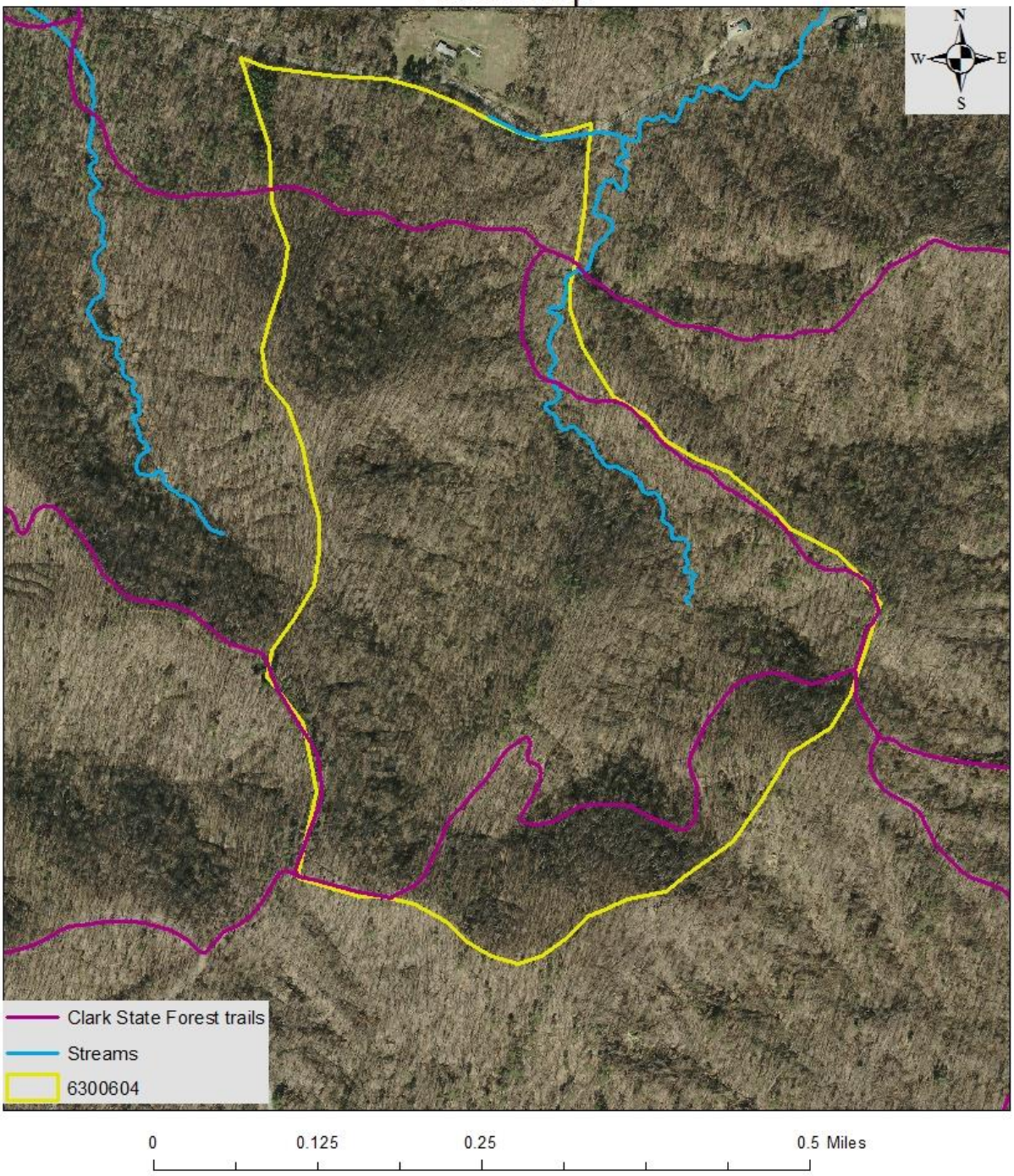
Crop tree release and a midstory treatment should also be performed. The trees to be targeted for a midstory treatment are shade tolerant species in the dry oak-hickory stand. In the mixed hardwood stand there is less need for a midstory removal, but American beech should be targeted.

Multipurpose trail maintenance
Routine inspection of the multipurpose trails shall be completed.

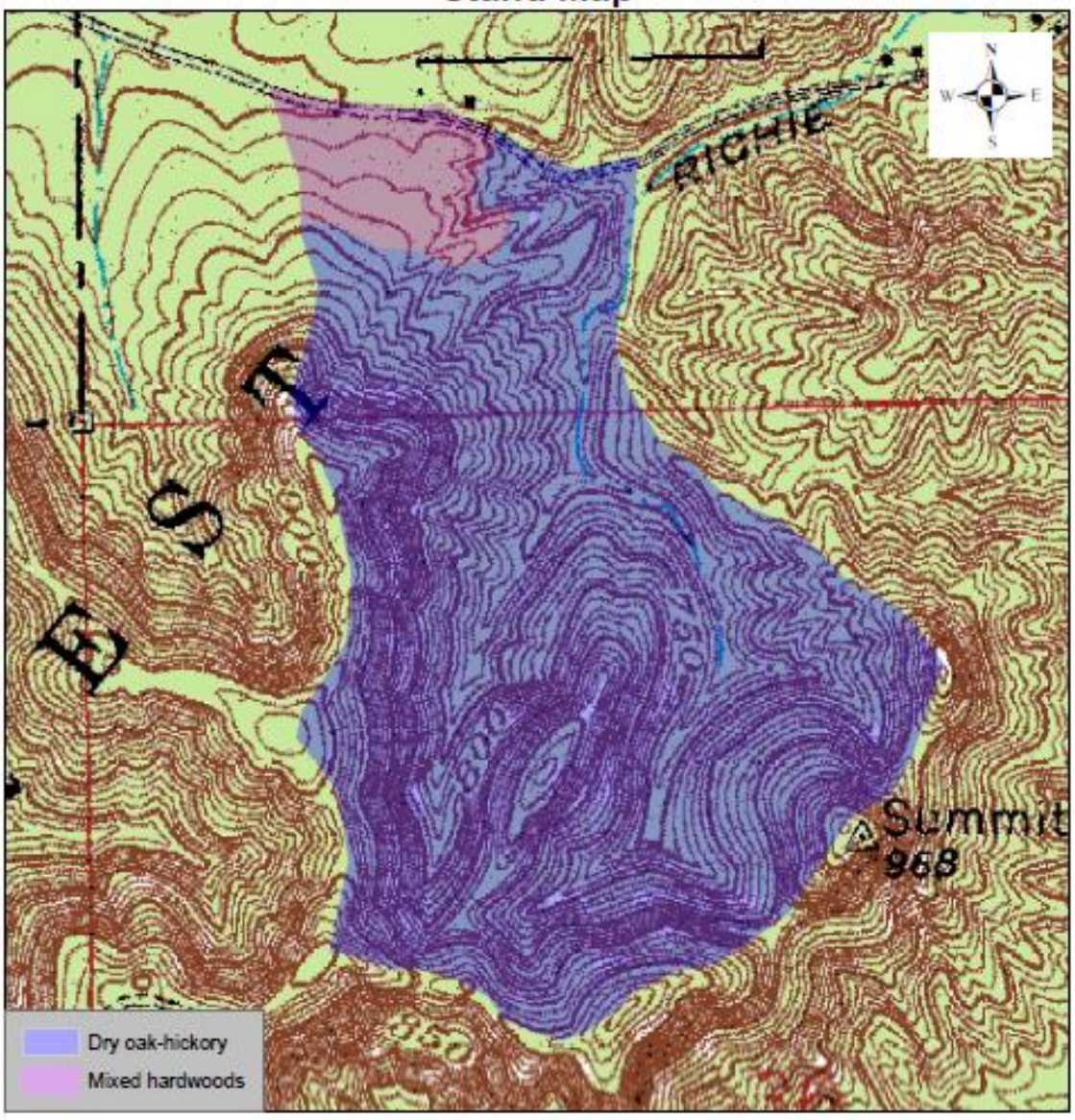
Schedule:

Proposed Activities Listing	*Proposed Date*
Marking and timber sale	2021-2022
Invasive species management	2022-2023
Timber harvest	2023-2025
Post-harvest FSI	2025-2027
Regeneration evaluation	2027-2028
Inventory and management guide	2034

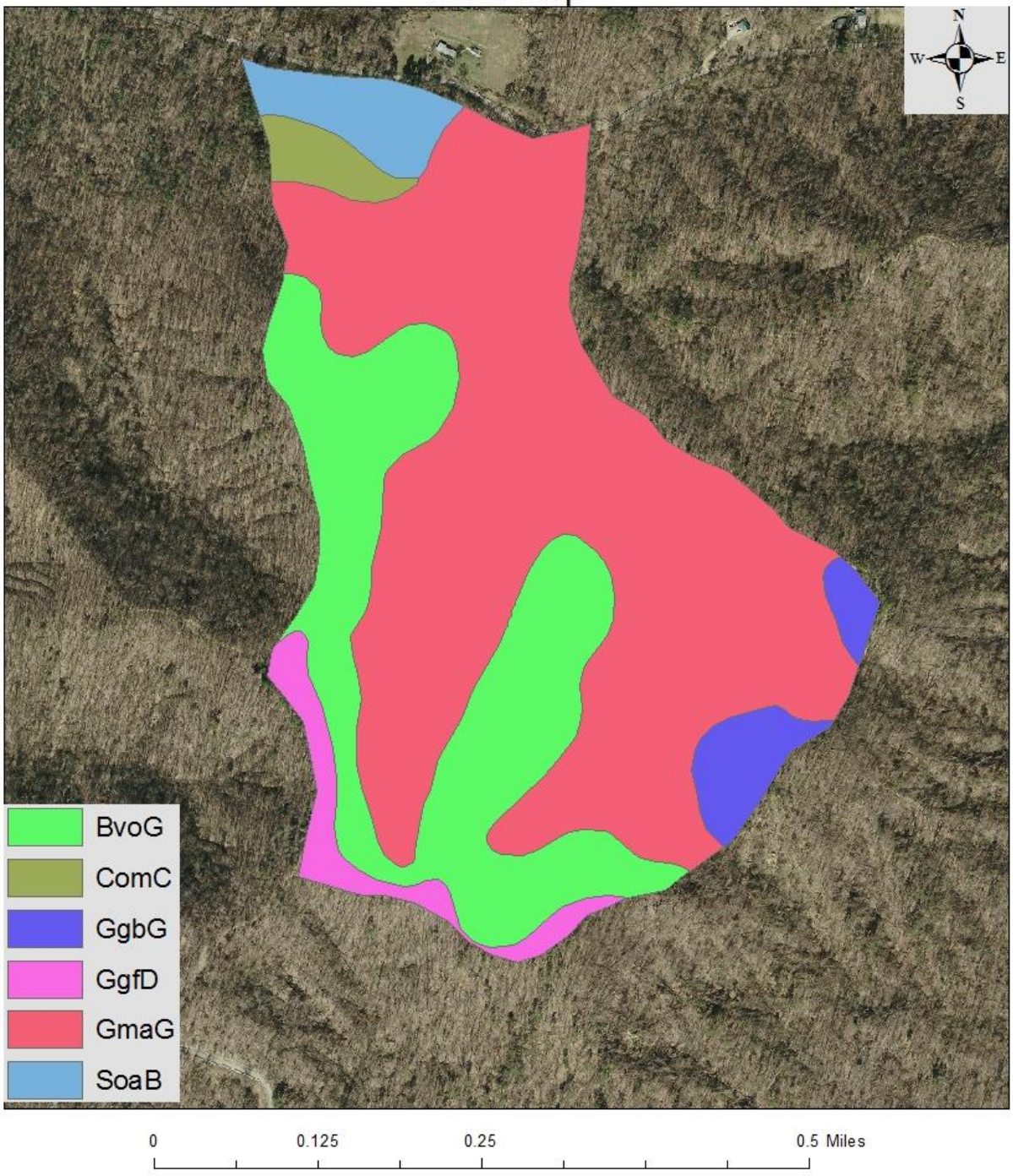
Clark State Forest
Compartment 6 Tract 4
Aerial Map



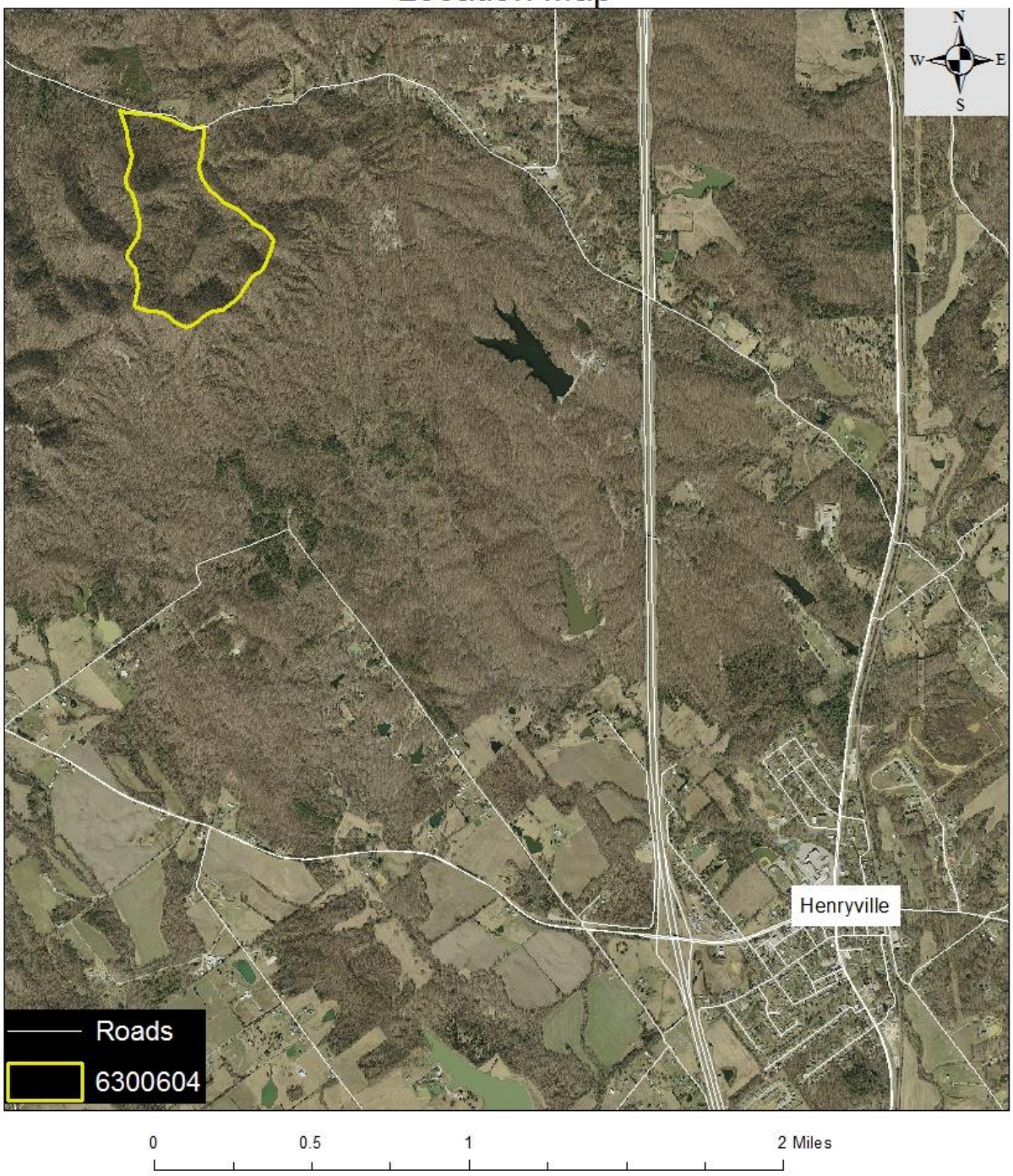
Clark State Forest
Compartment 6 Tract 4
Stand Map



Clark State Forest
Compartment 6 Tract 4
Soils Map



Clark State Forest
Compartment 6 Tract 4
Location Map



Clark State Forest **Compartment:** 11 **Tract:** 11
Tract Acreage: 78 **Forest Acreage:** 78
Forester: Bartlett **Date:** August 2019
Management Cycle End Year: 2039 **Management Cycle Length**: 20 years

Location
Compartment 11 tract 11, also known as 6301111, is located in Washington County, Indiana. This tract is located in Section 24, Township 1 north, Range 5 east. This tract is approximately 4 miles northwest of Deam Lake State Recreation Area.

General Description
There are two delineated subdivision within this tract: oak-hickory and mixed hardwoods. The majority of volume in the oak hickory subdivision is white and chestnut oak. American beech, sugar maple, and yellow-poplar make up the most volume in the mixed hardwoods. In both subdivisions there were pockets of oak regeneration, but the majority of regeneration is beech and maple. This tract is fully stocked.

History
1950 – Land purchased from the Lewis family
1983 – Boundary marked
1983 – Resource management guide completed by Ballintyne
1984 – Sold 28,262 bd. ft. to Gross Logging
1986 – Forest inventory completed for State Forest Inventory Program
1988 – Corner stones located on west side
1989 – Northern boundary flagged due to adjacent private timber sale
2016 – Northern boundary flagged due to adjacent private timber sale
2019 – Forest inventory completed by Alwine and Bartlett
2019 – Resource management guide completed by Bartlett

Landscape Context
The area surround this tract is primarily private forestland. There are scatted residential homes to the north and south. Agricultural fields are primarily to the north.

Topography, Geology and Hydrology
The majority of this tract is moderately sloped. The tract is split down the middle by a large, flat ridge that can provide management access to a large portion of the tract.

The underlying bedrock is siltstone with a sub-lithology of shale, sandstone, and limestone.

This entire tract is within the Springle Creek-South Fork Blue River watershed. There is one mapped intermittent stream on the eastern boundary of this tract. This intermittent and all other drainages empty into Whiskey Run before flowing into the South Fork Blue River. Best Management Practices (BMPs) will be a part of any proposed management activity. Learn more about BMPs at https://www.in.gov/dnr/forestry/files/BMP.pdf.

Access
South William Knob Road runs through the eastern portion of the tract. There is no access to get into the tract off of this road because of topography. Once you get into the tract, there is good access with past skid trails.

Boundary
The entire tract is surrounded by private land. There is an inholding off of South William Knob Road that is approximately 1.5 acres.

Soils
BhF- Berks-Weikert complex, 25 to 75 percent slopes, 10.8 acres
This steep and very steep, well-drained soils are on side slopes in the uplands. The Berks soil is moderately deep and the Weikert soil is shallow. It is suited to trees. Erosion, equipment limitations, seedling mortality, and wind throw hazards are concerns. Slope should be considered during timing of management activities, planning sale layout, and implementing Best Management practices for Water Quality. Northern red oak has a sited index of 70 on Berks and 64 on Weikert.

CoC2- Crider silt loam, 6 to 12 percent slopes, eroded, 0.5 acres
This moderately sloping, deep, well-drained soil is on uplands. It is well suited to trees. This soil has a site index of 87 for black oak and 98 for yellow-poplar.

Cu- Cuba silt loam, frequently flooded, 7.4 acres
This nearly level, deep, well-drained soil is on bottom land. It is well suited to trees. Management activities should consider wet times of year. This soil has a site index of 100 for yellow-poplar.

GlD2- Gilpin silt loam, 12 to 18 percent slopes, eroded, 2.2 acres
This strongly sloping, moderately deep, well-drained soil is on side slopes in the uplands. It is fairly well suited to trees. The hazard of erosion and equipment limitations are main management concerns which should be considered when planning management activities and implementing Best Management Practices for Water Quality. This soil has a site index of 80 for Northern red oak and 95 for yellow-poplar.

GnF- Gilpin-Berks loams, 18 to 50 percent slopes, 41.2 acres
These moderately steep to very steep, moderately deep, well-drained soils are on side lopes in the uplands. Erosion hazards, equipment limitations, and plant competition are the main management concerns. These should be considered when during sale planning, layout, and implementation of Best Management Practices for Water Quality. This soil has a site index of 80 for northern red oak and 95 for yellow-poplar.

WeC2- Wellston silt loam, 6 to 12 percent slopes, eroded, 12.5 acres
This moderately sloping, well-drained soil is on narrow ridgetops and on side slopes of the uplands. It is well suited to trees. This soil has a site index of 71 for northern red oak and 90 for yellow-poplar.

WeD- Wellston silt loam, 12 to 18 percent slopes, 3.8 acres
This strongly sloping, deep, well-drained soil is on side slopes adjacent to drainage ways in the uplands. This soil is fairly well suited to trees. Erosion hazards and equipment limitations are management concerns that should be considered when planning sale layout and implementing Best Management Practices for Water Quality. This soil has a site index of 71 for northern red oak and 90 for yellow-poplar.

Exotics
Invasive species observed were scattered multiflora rose bushes along the intermittent stream on the east side and Japanese stiltgrass on old skid trails. The location of ailanthus was recorded during the forest inventory. These shall be treated before canopy management.

Recreation
There are no dedicated recreation features within this tract. The main uses for recreation are: hunting, foraging, and wildlife viewing. Since there is no parking for this tract, the amount of recreational use is greatly limited.

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.

Ecological Considerations
This tract contains diverse vegetation and wildlife resources (age, type, structure) conducive to providing habitat for a variety of wildlife species. Habitat types include: oak-hickory canopy, mixed hardwood canopy, 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 Division of Forestry has developed compartment level guidelines for an important wildlife structural habitat features: snags.

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	312	546	210	-102	-336
Snag 9"+ DBH	234	468	210	-24	-258
Snag 19"+ DBH	39	78	58	19	-20
*Selected Tree Species:	AME, BIH, BLL, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO				

Inventory data for compartment 11 tract 11 shows that maintenance levels are only met for snags with a DBH of 19"+. The prescribed management will increase the abundance of snags within the 5"+ and 9"+ size classes.

Tract Subdivision Description and Silvicultural Prescription

Tract Summary

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

Basal area per acre (square feet)	95
Trees per acre (>11" DBH)	93
Approximate stocking	76% (fully stocked)

Species	**Bd. ft. per acre**
Chestnut oak	2,347
White oak	1,080
Sugar maple	628
American beech	586
Black oak	462
Pignut hickory	368
Yellow-poplar	356
Shagbark hickory	224
Scarlet oak	152
American sycamore	143
Black cherry	119
Red elm	76
White ash	59
Blackgum	45
Hackberry	30
Bitternut hickory	28
Red maple	13
Total	**6,716**

For the purpose of this guide, this tract is divided into two subdivisions. Below are general descriptions and silvicultural prescriptions.

<u>Mixed hardwoods</u>

This cover type occurs on the side slopes and bottoms. The average sawtimber tree has an average diameter at breast height (DBH) of 18 inches. The regeneration present in this stand is a mix of ironwood, American beech, red maple, sugar maple, and the occasional oak.

Basal area per acre (square feet)	81
Trees per acre (>11" DBH)	91
Approximate stocking	67% (fully stocked)

Species	**Bd. ft. per acre**
American beech	925
Sugar maple	865
Yellow-poplar	562
Chestnut oak	464
White oak	445
Black oak	378
Shagbark hickory	232
American sycamore	226
Scarlet oak	199
Black cherry	188
Pignut hickory	169
Red elm	120
Blackgum	72
Hackberry	48
Bitternut hickory	45
White ash	28
Red maple	20
Total	**4,986**

A single tree selection harvest method is prescribed for this subdivision. The goal of this management strategy is to release and promote the growth of vigorous sugar maple, yellow-poplar, oak, and hickory crop trees. Crop tree release should occur on at least two sides, where applicable.

Group selection and patch-cut openings are prescribed in areas that possess desirable regeneration. These openings will provide wildlife habitat in the form of young forest while promoting the regeneration of shade intolerant hardwood species. Areas with an overstory of low quality trees should also be targeted for this management strategy.

Dry Oak-hickory

This stand type occurs on the ridgetops. Although there are some areas with oak seedlings, the majority of this stand is regenerating with beech and maple. This stand is fully stocked and a timber harvest is prescribed.

Basal area per acre (square feet)	119
Trees per acre (>11" DBH)	96
Approximate stocking	92% (fully stocked)

Species	**Bd. ft. per acre**
Chestnut oak	5601
White oak	2177
Pignut hickory	714
Black oak	608
Sugar maple	219
Shagbark hickory	211
White ash	112
Scarlet oak	72
Total	**9,714**

A single tree selection harvest method is prescribed for this stand. The goal of this management strategy is to promote the growth of crop trees by means of harvesting poorer quality competitors. Crop trees should be selected based on vigor, health, quality, and form. It should be attempted to release trees on at least two sides.

Group selection and patch-cut openings are also prescribed for this tract. Group selection should be used in areas that are dominated by poor growing stock. The goal of these selection openings is to promote the regeneration of shade intolerant species. There are areas within this stand that have sufficient oak regeneration, and these areas should be considered for a group selection harvest, as well. The overstory trees surrounding the opening shall be of high quality. Regeneration opening evaluations shall be completed within three years of the openings' creation to ensure satisfactory regeneration and growth of regeneration has occurred.

In areas with a quality overstory but undesirable regeneration, an oak shelterwood cut may be implemented. The goal of an oak shelterwood is to create partial shade to promote the regeneration and advancement of oak species. In a shelterwood, the first step (preparatory cut) is to remove the shade tolerant understory. This midstory management, can be accomplished by chemical, mechanical, and/or a cultural method. As sufficient regeneration develops an establishment cut is performed to improve sun penetration. Once oak regeneration is established, the remaining overstory shall be removed to release the new cohort.

Other considerations:

Prescribed fire regime: A prescribed fire regime is a cost effective way to reduce the abundance of shade tolerant species in the midstory while promoting the regeneration of oak and hickory species. With any prescribed fire management, there would be planning consideration for the adjacent home owners. Such planning would include, but not be limited to, smoke management and under what wind directions the prescribed fire could be performed.

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

Vine management: The areas with a heavy vine presence should be treated before other forest management takes place. In areas that a harvest is prescribed, vines should be chemically treated after being cut.

Guide revision: This tract should receive another inventory and management guide after 20 years.

Schedule:

Proposed Activities Listing	*Proposed Date*
Invasive species management	2020-2021
Preparatory cut (if implemented)	2020-2022
Timber marking and sale	2020-2022
Post-harvest timber stand improvement	2023-2024
Prescribed fire regime	2023+
Regeneration evaluation	2026-2028
Inventory and management guide	2039

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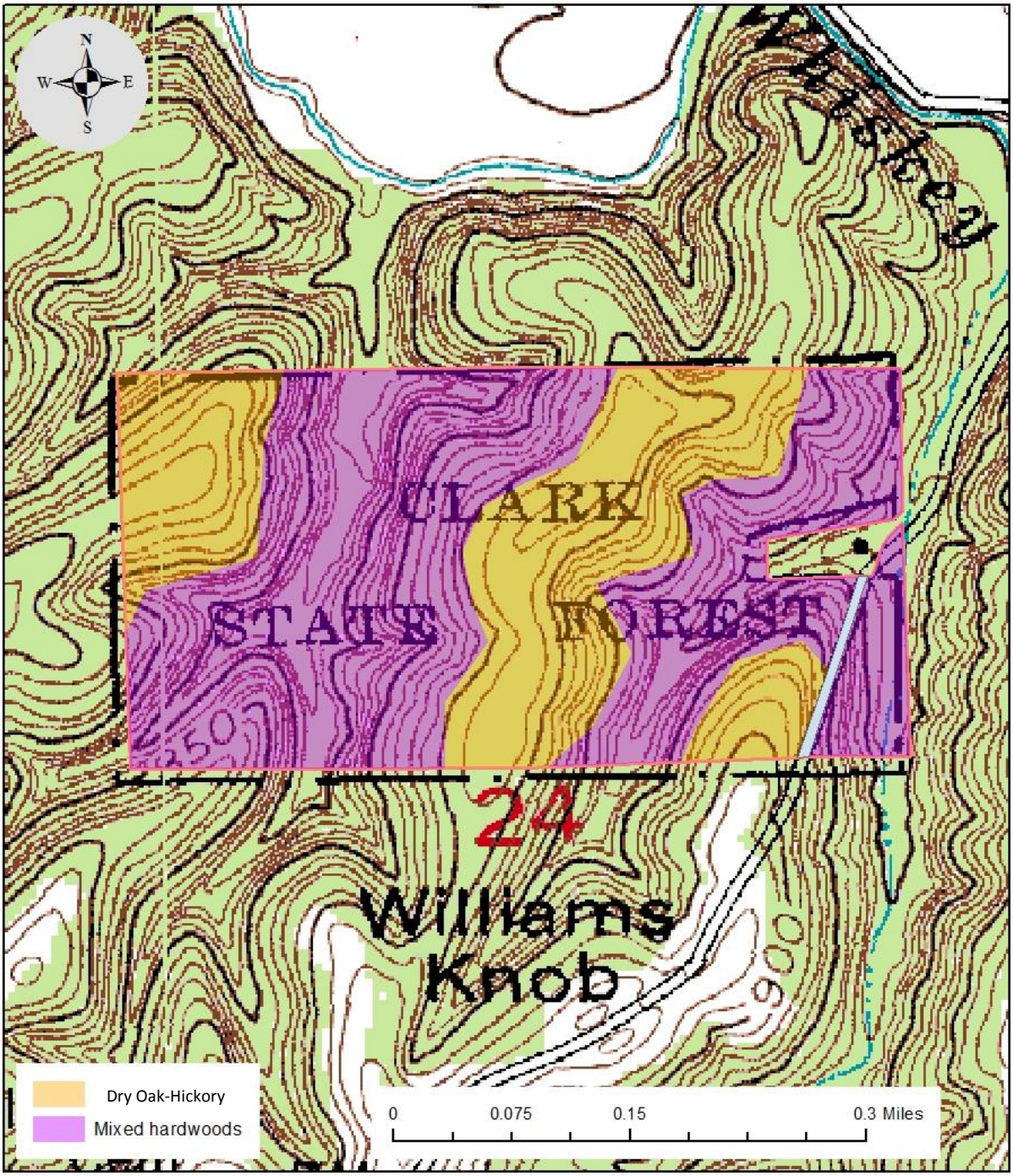
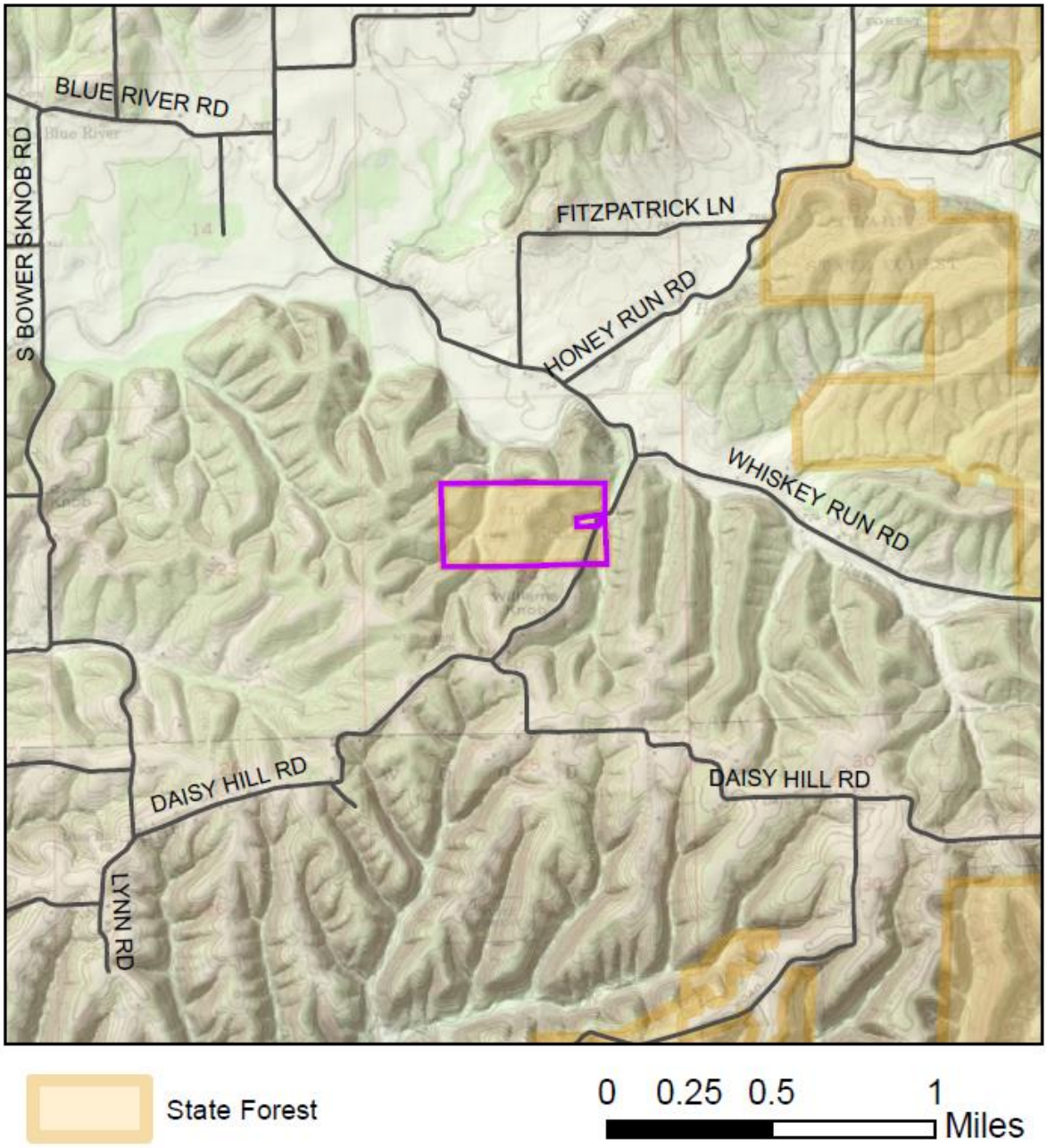
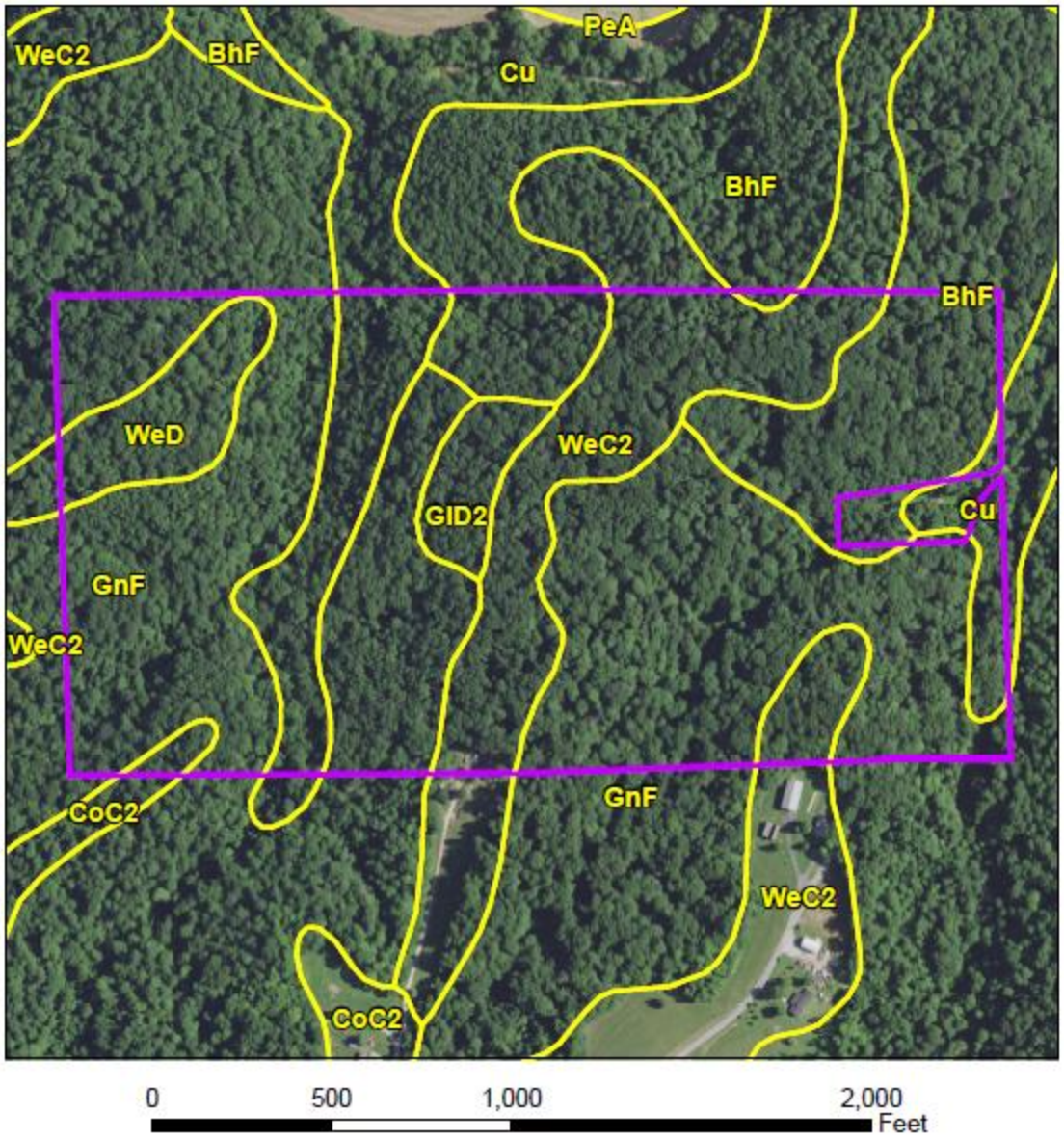
Compartment 11 Tract 11
Stand Map



Compartment 11 Tract 11



Clark State Forest
Compartment 11 Tract 11
Soils Map



Clark State Forest
Compartment 10 Tract 11
Management Guide Amendment
May 8, 2020

This amendment is written to adjust the silvicultural prescription for the oak-hickory component of compartment 10 tract 11. The original prescription and this amendment share the same goal – ensure that the future cohort maintains its composition of primarily oak and hickory. The original resource management guide prescribed the use of single tree selection to improve the growth of the highest quality overstory trees. This amendment prescribes that an oak shelterwood be implemented over portions of the tract that are dominated by a mature oak overstory with present oak regeneration. The goal is to promote the regeneration and advancement of oak seedlings and saplings to make up the future cohort. This will be accomplished by first removing the prominent, shade tolerant midstory through a timber stand improvement (TSI) operation. Prominent species include American beech and sugar maple. After non-oak species are removed from the midstory, and desirable regeneration is present, the oak overstory will be reduced to a stocking of approximately 40-60 percent. The best dominant and codominant oaks should be left as equally spaced as possible. This release provides adequate room and sunlight for the regeneration of desired species. The seedling regeneration shall be monitored, and additional understory control should be implemented to prevent the hindrance of oak regeneration. This could include the use of prescribed fire. When the oak regeneration is adequate to replace the stand, the remainder of the overstory will be removed. Reserves may be left for the purpose of: wildlife habitat, seed and mast production, or immature good growing stock.