Indiana Department of Natural Resources
Division of Forestry

Resource Management Guides
Clark State Forest
30-day Public Comment Period: February 5, 2020 – March 5, 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 this year's tracts under review for Clark State Forest.

Compartment 7 Tract 3
Compartment 18 Tract 3
Compartment 18 Tract 5

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:** 6300703 (Comp 7 Tract 3)
Forester: Alwine **Date:** August 2019
Tract Acreage: 63.5 **Forested Acreage:** 54
Management Cycle End Year: 2039 **Management Cycle Length:** 20

Location

Tract 6300703 is located in Clark County on Winding Road approximately 1 ¾ miles north of Henryville, Indiana. More specifically, it is located with the Henryville quadrangle in Military Grant #283, Township 99, Range 99.

General Description

This is a fully stocked tract with an interesting history. Once home to Purdue University's Forestry Summer Camp, this tract was divided into three stands for management purposes: oak-hickory, mixed hardwoods, and non-forest. The oak-hickory stand is dominated by high quality, large sawtimber white oaks while the midstory is mostly beech and maple. The mixed hardwoods stand has smaller trees and the overstory has greater diversity than the oak-hickory stand. Amur cork tree and oriental bittersweet, both invasive species, are found throughout this tract, but are more abundant in the mixed hardwoods stand. The non-forest stand includes the White Oak Center and a recreational area in the southern part of the tract. The White Oak Center is used for meetings, reunions, etc. and can be rented. The recreational area offers a shelter, playground and picnicking opportunities. Forested portions of this stand would benefit from invasive plant treatments and harvesting focused on oak regeneration.

History

- Land acquisition from Theresa & James Staton in 1903
- Land acquisition from Theresa Staton in 1926
- From 1915 to 1958, Purdue University's Forestry Summer Camp was located in this tract
- In 1933, the Civilian Conservation Corps constructed a new mess hall, study hall, bed bunks, and bathrooms for the Purdue Forestry Camp
- In 1960's, the Purdue Forestry Camp study hall was reconstructed. It is now known as the White Oak Center
- Inventory completed in 1987 for State Forest Inventory Program
- Timber harvest conducted in 1989 by Bohlke Veneer
- Lines ran and marked with fence posts by Frank Ballintyn in 1989
- White Oak Center restored in 1991
- Inventory completed by Alwine in 2019
- Resource Management Guide written by Alwine in 2019

Topography, Geology and Hydrology

The terrain in this tract ranges from flat to moderately sloping hills. There is a small drainage that runs through the center of the tract northwest to southeast. The bedrock in this area is mostly siltstone with a sub lithology of shale, sandstone, and limestone.

Tract 6300703 is located within the Silver Creek Watershed. There is a mapped intermittent stream that flows through the center of this tract. Overflow from Schlamm Lake feeds the stream. This intermittent stream then flows under I-65 to Miller Fork. Miller Fork eventually flows into Silver Creek south of Henryville. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the Indiana Logging and Forestry Best Management Practices.

Soils

BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration, 2.2 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, 11.3 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, 19.3 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, 20.6

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.

WedB2- Weddel silt loam, 2 to 6 percent slopes, eroded, 10.2 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

Tract access is good. The tracts western boundary is Winding Road and the road leading to Schlamm Lake dam also serves as part of the tract boundary. The tract is located northeast of the White Oak Nature preserve. There are multiple parking lots located in this tract off Winding Road.

Boundary

This tract's boundary was marked with T-posts by the division surveyor (Ballintyn) in 1991. Winding Road is the border to this tract on the west side. Indiana Conversation Officer's District 8 office building shares a border with this tract in the northwest. The old correctional facility and grounds are located northwest of the tract as well. A short portion of the northern border shares line with privately owned land. The entire east side of the tract is bordered by I-65.

Wildlife

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

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 Level	Above Maintenance	Above Optimal
Snags 5"+	347	95	-94
Snags 9"+	194	5	-184
Snags 19"+	75	43.5	12

The snag inventory data shows that sang densities meet the maintenance levels for all three size classes. While optimal levels in the smaller two size classes were below suggested levels, management efforts seek to sustain and improve snag density.

Recreation

This tract is commonly utilized for its recreational features. On the south end of the tract, there is a non-forested area that has been converted into a recreational use area. There is a shelter, swing set, slide and open field area. It is a popular place for people to park to eat lunch and park their vehicle to walk the road system. The White Oak Center is also located within this tract. Located at the end of a gated lane, it can be rented for a day to host events such as birthdays, reunions, weddings, meetings or other gatherings. This tract is located within a no

hunting zone due to the recreational activity and Law Enforcement office. Prescribed management activities are not likely to impact the recreational use areas within this tract.

Exotics and Invasive Species

Invasive species were identified in this tract. Scattered stems of Amur cork tree and ailanthus were found throughout the tract, especially south of the intermittent stream. Oriental bittersweet is relatively common on the forest edge and in a few small interior pockets. Japanese stilt grass is common along the drainages and near the old correctional facility. Other invasive species noted but not as common include Japanese honeysuckle, periwinkle, barberry, and Asian bush honeysuckle. Invasive plants within this tract should be treated prior to a management harvest. Amur cork tree, ailanthus, oriental bittersweet, and Asian bush honeysuckle should receive priority.

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

Tract 6300703 was inventoried in July 2019 by Forest Resource Specialist Bartlett/Alwine. The following table provides a summary of the data for this tract.

Trees per acre (6"+)	77	Percent Stocking	75%
Basal Area per acre (square feet)	97	Quadratic Mean Diameter (inches)	15.3
Volume per acre (board feet)	8,984		

For the purposes of this guide, this tract has been divided into three stands: oak-hickory, mixed hardwoods, and non-forest. The descriptions and prescriptions for these stands are below.

Stand Descriptions:

Oak-hickory, 40 acres

This is a fully stocked stand consisting mainly of white oak. Stocking is currently at 85% with a Quadratic Mean Diameter (QMD) a little over 16 inches. The average merchantable volume for overstory white oaks in this stand is almost 300 board feet per tree. Many of the trees were over 20 inches in diameter with multiple logs in merchantable height and of high quality. The high stocking in this stand has caused crown dieback and mortality. The understory

regeneration is mostly shade tolerant species including red maple, sugar maple, American beech and ironwood. There were limited pockets of oak and hickory saplings.

	Trees per acre	**Basal area per acre (square feet)**	**Volume per acre (board feet)**
White oak	40	87.4	9925
Black oak	1	3.3	435
Yellow-poplar	1	2.7	318
Pignut hickory	5	4.7	303
Scarlet oak	1	1.3	181
Chestnut	1	0.7	73
Red maple	12	5.3	69
American beech	4	1.3	0
Blackgum	4	1.3	0
Post oak	1	0.7	0
Sugar maple	8	3.3	0
Stand Totals	78	112	11,304

Mixed Hardwoods, 13 acres

This is a fully stocked stand with greater pole size trees than the oak-hickory stand. The percent stocking in this stand is 74 % with a QMD of 12.4 inches. The average sawtimber sized tree has a merchantable volume of 200 board feet. The understory regeneration in is mostly beech, maple and hickory. This stand has the greatest presence of invasive species within the tract, especially near high public traffic areas.

	Trees per acre	Basal area per acre (square feet)	Volume per acre (board feet)
White oak	13	20	1855
Pignut hickory	8	12.5	926
Yellow-poplar	17	12.5	642
American beech	20	15	592
Black oak	1	2.5	255
Scarlet oak	14	5	179
Red maple	29	10	168
Black cherry	2	2.5	154
Black walnut	2	2.5	0
Eastern redbud	1	2.5	0
Shagbark hickory	2	2.5	0
Virginia pine	2	2.5	0
Stand Totals	111	90	4,771

Stand Prescriptions

Oak-hickory, 40 acres

This stand would benefit from a timber harvest. The harvest should lower the density of trees present and aim to promote oak regeneration. In areas with mostly maple/beech mid-stories and large, high quality overstory white oaks, an oak shelterwood harvest is recommended. This harvest would be completed in three main stages: preparatory cut, establishment cut, and overstory removal. The preparatory cut would remove the shade tolerant saplings, pole midstory to allow advancement in seedlings and promote oak regeneration. Following the midstory removal an establishment cut would be conducted to improve diffused light for continued development of the cohort. This partial shade, open mid-story will provide the necessary growing conditions for oak seedling advancement. Once the cohort has developed, within ten years, the overstory would be removed to release the new cohort. With this harvest, it is pertinent to treat invasive species prior and during the development of the stand.

A secondary harvest strategy for lower quality areas or areas with quality oak regeneration would be an improvement harvest to remove the lower quality trees. In this harvest crop trees will be chosen and released on 2 to 3 sides to promote growth. This harvest technique will be more aesthetically pleasing in the first few years of the cycle and may be used in higher traffic areas. Following any timber harvest, Forest Stand Improvement (FSI) should be conducted. This FSI will deaden culls, release additional crop trees if needed, and treat invasive species. A prescribed fire regime, while a suitable option, is not practical in this tract due to its close proximity to I-65 and office buildings.

Mixed hardwoods, 13 acres

This stand is closer to recreational areas within the tract, especially the southern portion of the tract. The main goals of management in this stand is to treat invasive plants. Some areas north of the playground area are infested with invasives.

No timber management is recommended in this stand until the invasive plants are treated. Any harvesting should be light utilizing single tree selection. If and when conducted, the harvest should be a light handed improvement cut with the same strategies as described in the oak-hickory prescriptions.

Other considerations

Regeneration evaluation – Three to five years following the completion of the timber harvest, a regeneration evaluation will be performed to ensure that desired regeneration is occurring within the harvest area. If deemed unsatisfactory, mitigation options will be considered.

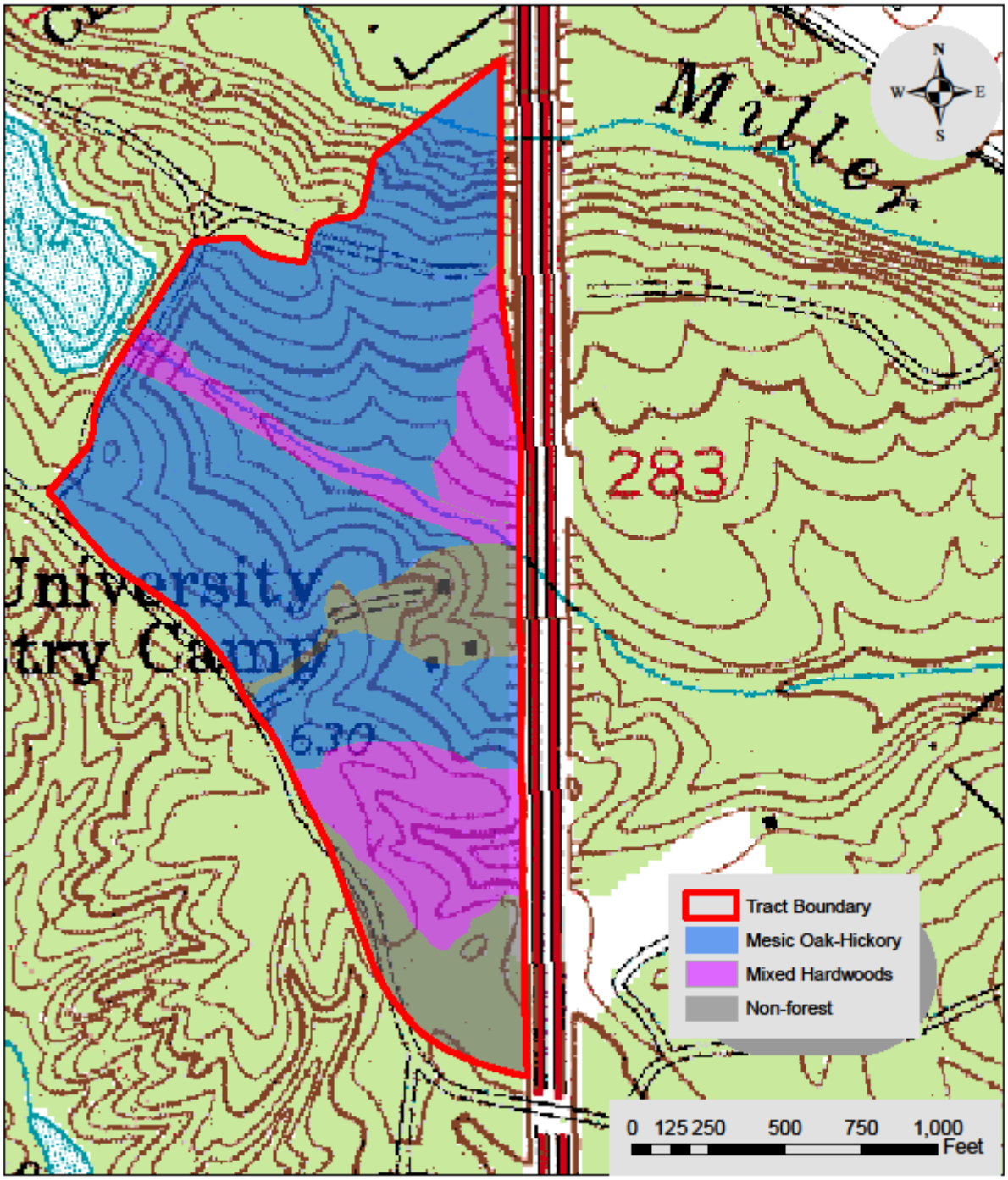
Forest stand improvement (FSI) – FSI shall be performed within two years following the timber harvest completion. FSI will complete regeneration openings, remove species inhibiting desirable regeneration, and address additional invasive species.

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

Proposed Management Activity	***Proposed Date***
Preparatory cut and invasive work	**2020-2021**
Establishment & Improvement harvest	**2022-2023**
Post-harvest FSI	**2023-2025**
Overstory removal of shelterwood	**2032-2033**
Post-harvest FSI within shelterwood	**2033-2034**
Tract reevaluation	**2039**

Clark State Forest
Compartment 7 Tract 3
Stand Map



Clark State Forest **Tract:** 6301803 (Comp 18 Tract 3)
Forester: Alwine/Bartlett **Date:** May 2019
Tract Acreage: 99 **Forested Acreage:** 96
Management Cycle End Year: 2039 **Management Cycle Length:** 20

Location

This tract is located in Clark County approximately 4 miles east of Borden, Indiana in the vicinity of Deam Lake State Recreation Area's office and residence. More specifically, this tract in located within Speed Quadrangle, Section 5, T 1S, R 6E.

General Description

This is a variable 99 acre tract that ranges from relatively flat to moderate slopes. Deam Lake State Recreation Area's (DLSRA) office and maintenance shop are located on the east side. There is also a property staff residence in this tract. The forest overstory is mostly poorly stocked oaks with a majority of the tract having scattered Virginia pine blowdown. The Deam Lake Loop or Yellow multipurpose trail runs through this tract. This tract would benefit from a light timber harvest, Forest Stand Improvement, and invasive species control.

History

- Land acquisition from Addie May Sneed in 1964
- Land acquisition from Robert & Elizabeth Durning in 1964
- Land acquisition from Alvin & Mary Durning in 1964
- Land acquisition from Robert & Kathryn Dunbar in 1964
- Forest inventory completed by Philip Wagner in 1975
- Resource Management Guide completed by Philip Wagner in 1975
- Inventory completed in 1987 by summer students
- Inventory completed in 2019 by Alwine/Bartlett
- Resource Management Guide completed in 2019 by Alwine/Bartlett

Topography, Geology and Hydrology

The topography in this tract is slight to moderate slopes all sloping towards Deam Lake. The northwest corner of the tract has the highest elevation. The general aspect is south and east toward Deam Lake. The bedrock in this area is siltstone with a sub lithology of shale, limestone, and sandstone.

Tract 6301803 is located within the Big Run-Muddy Fork watershed. There is one mapped intermittent stream that runs the western border of the tract that drains into Deam Lake. There are multiple ephemeral drains that run between the larger ridges. General riparian management zone (RMZ) guidelines will be implemented in these areas in accordance with the Indiana Logging and Forestry Best Management Practices.

Soils

ConD- Coolville-Rarden complex, 12 to 18 percent slopes – 44.1 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.

ComC- Coolville silt loam, 6 to 12 percent slopes – 27 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.

DbrG- Deam silty clay loam, 20 to 55 percent slopes – 12.2 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.

GmaG- Gnawbone-Kurtz silt loams, 20 to 60 percent slopes – 10 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 – 3.9 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.

BcrAW- Beanblossom silt loam, 1 to 3 percent slopes, occasionally flooded, very brief duration – 1.5 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.

Access

Access to this tract is good. Access can be gained from Deam Lake Road. Parking is available at the office. There is a graveled management lane that runs from the office to the Yellow multipurpose trail. Deam Lake Road also serves as the entire eastern tract boundary and part of the northern.

Boundary

Tract 6301803 is completely interior to Clark State Forest and DLSRA. The eastern and northern border of the tract is Deam Lake Road while the western and southern edges are a combination of drainages, streams and Deam Lake.

Wildlife

This tract contains diverse vegetation and wildlife resources conducive to providing habitat for a variety of wildlife species. Habitat types include: Oak-hickory forest, pine forest, young forest and riparian zone.

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.

	Snag Count	**Above Maintenance Snag Levels**	**Above Optimal Snag Levels**
Snags 5"+	1,586	1,191	894
Snags 9"+	1,312	1,015	719
Snags 19"+	129	80	30

Current snag densities are above optimal levels in all three size classes. Future management should promote the retention of these snags when possible.

Recreation

The main recreational activity in this tract is horseback riding and hiking. The yellow multipurpose trail or Deam Lake Loop runs through the tract. Other recreational opportunities include bicycle riding, wildlife viewing, foraging, fishing, and trapping. Due to the close proximity to DLSRA's office, this tract is in a no hunting zone. For safety reason trails may be closed or rerouted for a short period of time during any proposed management activities. Following proposed management activities all trails closed or rerouted will reopen in a preexisting or improved condition.

Exotics and Invasive Species

Invasive species are present within this tract. The most common invasive found is Japanese honeysuckle. It is present mostly in the pine blowdown areas and along the road. Other invasive species noted include Japanese stilt grass, burning bush, autumn olive, multiflora rose, ailanthus, bush honeysuckle, periwinkle and oriental bittersweet. It's recommended that invasive treatments occur before greater advancement occurs, especially in the blowdown areas.

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

This tract as a whole is extremely variable, ranging from understocked Virginia pine blowdown to fully stocked oak hickory stands. Due to the variability of the tract, it will be broken into three stands for management purposes: oak-hickory, Virginia pine, and mixed hardwoods.

Descriptions:

Oak-hickory, 81 acres

This is a fully stocked stand where over half the trees and volume present are white oak. The stocking is around 63% and the average overstory tree has a volume of 152 board feet. Other common overstory trees include Virginia pine, chestnut oak and scarlet oak. The regeneration is variable with Sugar maple and American beech being the majority with pockets of good oak regeneration. Invasive species were not common, but some Japanese stilt grass and Japanese honeysuckle were found. The Virginia pine in this stand is declining with many blown down.

	Trees per acre (>6")	**Basal area per acre**	**Volume per acre**
White oak	54	49.3	3,437
Virginia pine	7	8.4	832
Scarlet oak	4	7	456
Chestnut oak	7	7.3	449
Black oak	1	0.8	47
Pignut hickory	6	1.5	15

American beech	8	1.1	0
Blackgum	2	0.4	0
Red maple	1	0.1	0
Stand Totals	90	75.9	5,236

Virginia pine, 6 acres

This is a fully stocked stand comprised almost entirely of Virginia pine. The stocking is around 65% and the average overstory tree has a volume of 147 board feet. Regeneration is shade tolerant species including American beech and ironwood. The pine is declining and will likely die out in the near future. Invasive plants found in this stand included multiflora rose, Japanese honeysuckle, and Japanese stilt grass.

	Trees per acre	**Basal area per acre**	**Volume per acre**
Virginia pine	53	60	5,865
White oak	31	15	1,010
Chestnut oak	5	5	192
Stand totals	89	80	7,067

Mixed hardwoods, 9 acres

This stand is understocked due to the large volume of Virginia pine blowdown. The percent stocking is this stand is around 35% with the average overstory tree having a volume of 222 board feet. The overstory is mostly open. The midstory in this stand is brushy due to the large amount of pine blowdown. This makes this stand hard to traverse. Sugar maple and American beech make up a majority of the regeneration. There are a few pockets of advanced oak regeneration but they are mostly overtopped by beech and maple.

	Trees per acre	**Basal area per acre**	**Volume per acre**
Yellow-poplar	8	13.3	1,824
White oak	3	6.7	877

Virginia pine	2	3.3	566
Sweetgum	1	3.3	385
Red maple	30	11.7	128
Black cherry	4	3.3	0
Sugar maple	17	3.3	0
Stand Totals	65	44.9	3,780

Prescriptions

Oak-hickory, 81 acres

This stand would benefit from an improvement harvest. This harvest would aim towards releasing high quality oaks while removing lower quality stems including the declining Virginia pine. Invasive species should be treated prior to a harvest. Currently, invasive species are not a major issue within the stand, but in surrounding areas they are. Preventative management will keep the invasive plants from becoming further established. A fire regime in this stand is also recommended. A prescribed fire would reduce fuel loads, discourage shade tolerant species like beech and maple, and promote oak regeneration.

Virginia pine, 6 acres

These two stands should be harvested before the remaining Virginia pine becomes part of the exiting blowdown issue. Regeneration openings should be installed to allow for a new cohort of trees to become established. Due to parts of this stands being in close proximity to the Deam Lake Road, it is recommended that educational signage be installed. Following the harvest, Forest Stand Improvement (FSI) should be prescribed. This would include completing any regeneration opening, treating invasive species, deadening culls and releasing crop trees not released by the harvest.

Mixed hardwoods, 9 acres

Due to the low stocking a timber harvest is not recommended for this stand. Instead, FSI should be implemented with the same goals as post-harvest FSI. Invasive species need to be treated as well. Japanese honeysuckle and ailanthus should be the main targets in the pine blowdown areas.

Other considerations

Regeneration evaluation – Three to five years following the completion of the timber harvest, a regeneration evaluation will be performed to ensure that desired regeneration is occurring within the harvest area. If deemed unsatisfactory, mitigation options will be considered.

Forest stand improvement (FSI) – FSI shall be performed within two years following the timber harvest completion. FSI is prescribed to complete regeneration openings, remove species inhibiting desirable regeneration, and address problem occurrences of invasive species.

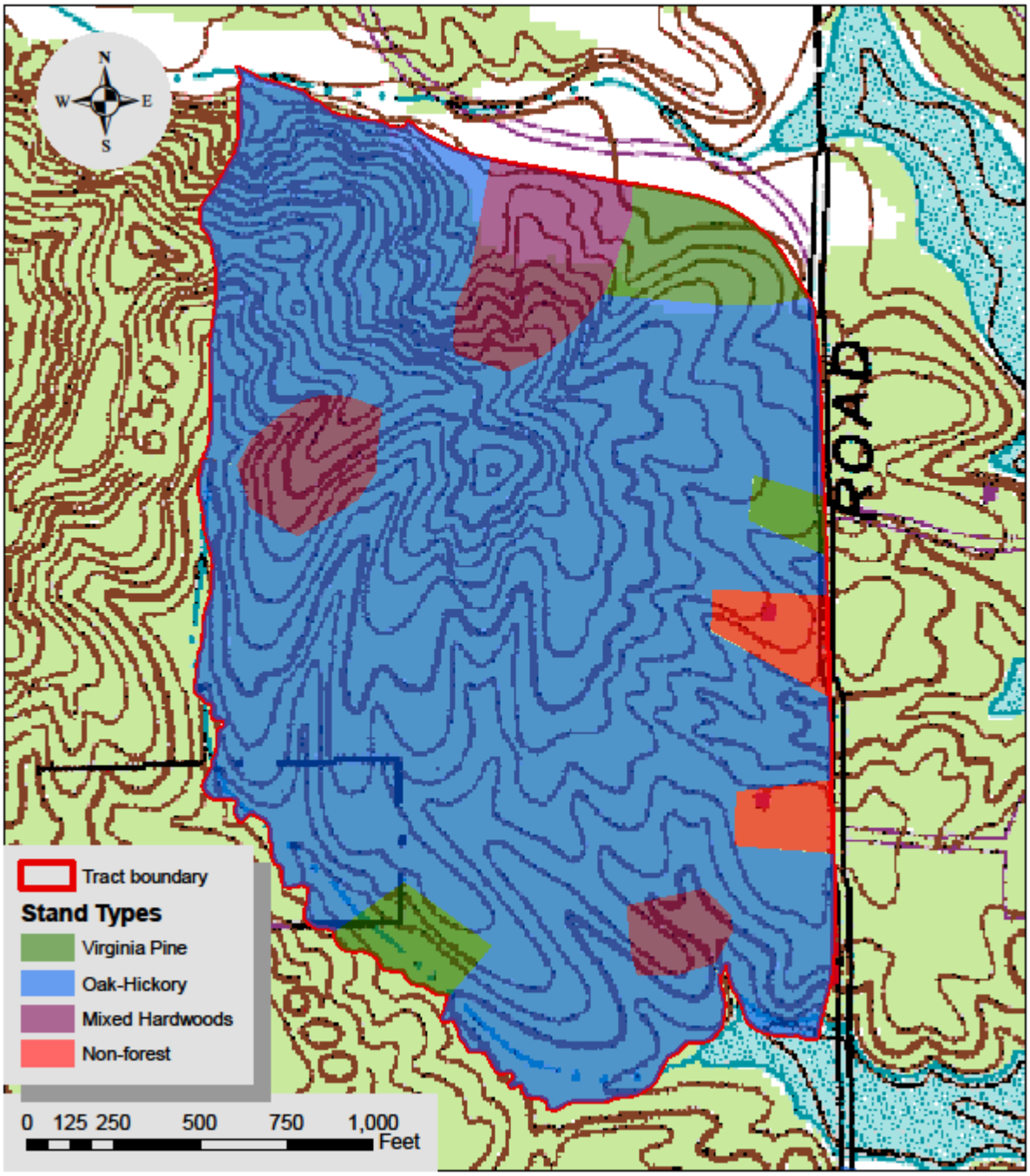
Best management practices (BMP) – During and after completion of the proposed management activity, BMPs will be implemented in order to minimize soil erosion.

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

Prescribed fire – A regime of prescribed burns may be started within this tract to reduce the abundance of the shade tolerant species in the midstory and to help control invasive species.

Proposed Management Activity	***Proposed Date***
Preharvest invasive species management	**2020-2021**
Timber harvest	**2021-2023**
Post-harvest FSI	**2023-2025**
Fire regime (Oak-hickory)	**2023+**
Reassess tract	**2039**

Clark State Forest
Compartment 18 Tract 3
Stand Map



Clark State Forest **Tract:** 6301805 (Comp 18 Tract 5)
Forester: Bartlett **Date:** August 2019
Tract Acreage: 79 **Forested Acreage:** 60
Management Cycle End Year: 2039 **Management Cycle Length:** 20

Location
Compartment 18 tract 5 is located in Clark County, Indiana. More specifically, Section 4, Township 1 South, Range 6 East. This tract is approximately 5 miles west of Memphis, IN, north off of Wilson Switch Road.

General Description
The tract is approximately 60 forested acres and 19 non-forested areas that contains four delineated stands. The south corner of the tract is primarily Virginia and loblolly pine. Blowdown is starting to occur in this stand and will continue. A horse trail parallels the tracts southern boundary. There is a small amount of mixed hardwoods that occur within the tract. This stand occupies the space immediately south of the Knobstone Trail. The remainder of the forested area is made up of an oak-hickory overstory, with the majority of standing volume in white oak. The eastern part of the tract makes up the Deam Lake dam encompassing approximately 18 acres. This area is routinely mowed and contains the properties waste water treatment plant.

History
Land acquired – 1964 from Cranley, Crawley, Hedrick, Lee, Lee, and Waterfill
Inventory – 1987
Inventory – Completed by Alwine and Bartlett in 2019
Resource Management Guide – 2019

Topography, Geology and Hydrology
The topography present is made up of gently sloping ridges. There are two main ravines through the tract, but neither move a significant amount of water throughout the year. There is a perennial stream that flows out of the Deam Lake dam on the eastern side. This stream flows into the Muddy Fork River. A small intermittent stream flows from the west boundary of the tract, and also empties into the Muddy Fork River.

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

Riparian features (lake, intermittent streams, and ephemeral drains) are directly adjacent to 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.

Access
Access is provided by Deam Lake Road. This road provides good access to the northern portion of the tract. A horse trail parallels Wilson Switch Road providing access to the southern half of the tract.

Boundary
This tract is bordered by other Division of Forestry land on all sides except for the south. The southern boundary is Wilson Switch Road and a small parcel of private land owned by Miller's Cemetery of Carr Township.

Soils
ComC- Coolville silt loam, 6 to 12 percent slopes, 21.4 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, .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, 32.1 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, 4.6 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, 3.7 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.

StdAQ- Stendal silt loam, 0 to 2 percent slopes, rarely flooded, 2.1 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.

Uaa- Udorthents, cut and filled, 9.4 acres
These nearly level, deep, poorly drained and somewhat poorly drained soils are found in variable areas. These soils generally consist of mixed loamy or clayey soil in areas that have borrowed for fill materials or in areas of the fill material itself. Onsite investigation is needed to determine specific soil properties affecting land use. This soil has not been evaluated for site index.

WokAW- Wilbur silt loam, 0 to 2 percent slopes, occasionally flooded, very brief duration, 6.1 acres
This nearly level, deep, moderately well-drained soil is on bottom land. It is well suited to trees. Timing of management activities should consider wet times of year. This soil has a site index of 100 for yellow-poplar.

Exotic and Invasive Species
Invasive species are present within the tract along drives, paths, and trails. The main species observed were Japanese stiltgrass, Japanese honeysuckle, multiflora rose, oriental bittersweet, Chinese privet, Amur honeysuckle, and autumn olive. Due to their location along trails, treatment applications will utilize a UTV with sprayer. Invasive species within the forested stands were observed, but in less frequency.

Recreation
Hiking and horse riding are the primary recreational activities within this tract. There is a shelter house with a pit toilet near the Knobstone Trailhead. It is unlikely that any recommended management activity will close the Knobstone Trail within this tract. However, there may be periods (e.g., ½ day, day or two) where a closure is necessary for public safety. The horse trail could experience periods of closure or rerouting due to recommended management activities. However, they will be avoided where possible and duration minimized the best way while maintaining public safety. Any trail closed or rerouted during management activities will reopen immediately following the activity in a like or improved condition.

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.

Wildlife
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	317	555	771	454	216
Snag 9"+ DBH	238	476	771	533	295
Snag 19"+ DBH	40	79	57	17	-22
*Selected Tree Species:	AME, BIH, BLL, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO				

Snag data for compartment 18 tract 5 shows that all maintenance levels for snags are met. Optimal levels are met for all but the snag 19”+ category. Prescribed management will maintain the abundance of snags within this tract.

Tract Prescription and Proposed Activities

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

Total trees per acre = 110	Overall % stocking = 87% (fully stocked)
Basal area per acre = 108.7	Present volume per acre = 8,145 bd. ft.

Species	**# of Sawtimber Trees per acre**	**Total Bd. Ft. per acre**
White oak	22	4,757
Loblolly pine	8	1,495
Virginia pine	5	897
Black oak	2	319
Red maple	2	179
Northern red oak	2	170
Scarlet oak	0	84
American sycamore	0	72
Black walnut	0	65
Shagbark hickory	0	65
American elm	1	21
Blackgum	1	21
Total	43	8,145

For the purpose of this guide, this tract is divided into four management stratum based on the overstory composition. Below is a general tract description and silvicultural prescription.

Descriptions:

Mixed Hardwoods

The mixed hardwood stand is directly south of the Knobstone Trail and occupies approximately 1 acre. It is a small stand that occurred within a ravine and on the top of a ridge. It was a fairly open area with multiple American elms and black walnuts. The average diameter for trees was 14 inches.

Basal area per acre (square feet)	63
Trees per acre (>10" DBH)	55
Approximate Stocking	49% (understocked)

Species	**# of Sawtimber Trees per acre**	**Total Bd. Ft. per acre**
Red maple	8	948
White oak	3	749
Virginia pine	5	545

American sycamore	2	432
Black walnut	2	390
Black oak	2	340
American elm	3	128
Blackgum	3	128
Total	28	3,660

This small area does not have the stocking to maintain a harvest. Invasive species management should be performed in this stand.

Oak-hickory

Approximately 45 acres of this tract has an oak-hickory overstory. The vast majority of the standing volume is white oak. There are approximately 110 trees per acre, with the quadratic mean diameter of 14 inches. There are pockets of really good oak regeneration, but the most common regenerating species are beech and maple.

Basal area per acre (square feet)	111
Trees per acre (>10" DBH)	110
Approximate Stocking	88% (fully stocked)

Species	**# of Sawtimber Trees per acre**	**Total Bd. Ft. per acre**
White oak	35	7,579
Virginia pine	3	649
Black oak	3	429
Northern red oak	3	277
Scarlet oak	0	138
Shagbark hickory	1	106
Total	45	9,178

A single tree selection improvement harvest is prescribed in this stand. The goal of this harvest method is to release high quality crop trees, while removing lesser quality competitors. Crop trees to be released will be selected based on: form, vigor, health, and species.

In areas with desirable regeneration, a group selection harvest method may be implemented. The goal of this management strategy is to promote the growth of the existing regeneration. Areas with a declining overstory are preferred for these group selections. These openings will provide wildlife habitat in the form of young forest.

A shelterwood may be implemented in areas that have an overstory of high quality trees and undesirable regeneration. The goal of a shelterwood is to create partial shade that will be beneficial to regenerate oak and hickory. In a shelterwood, the shade tolerant midstory needs to be removed. This removal may be done by either a chemical, mechanical, and/or a cultural method. Once oak regeneration is established, the remaining overstory will be removed to release the advanced regeneration.

A prescribed fire is a cost effective way to reduce the abundance of shade tolerant midstory trees while promoting the regeneration of oak and hickory species. Prescribed fire is cost effective option for this tract to reduce understory competition and promote advancement of oak and hickory.

Conifer

There are two locations of pine within the tract totaling 9 acres. A larger block is located in the southern corner and a smaller block just south of the paved road that bisect the tract leading to the Knobstone Trailhead to the north. There are approximately 152 trees per acre, and the average tree diameter in this stand is 12 inches. There is little regeneration within the pine, but what regeneration is present was mainly oaks with scattered beech and maple. Pine blowdown is occurring and will likely continue.

Basal area per acre (square feet)	135
Trees per acre (>10" DBH)	152
Approximate Stocking	109% (overstocked)

Species	**# of Sawtimber Trees per acre**	**Total Bd. Ft. per acre**
Loblolly pine	35	6,727
Virginia pine	11	1,840
Red maple	2	96
Total	48	8,663

Group and patch selection cuts are prescribed for this stand. The goal of this management is to convert the stand to native hardwoods. These openings will provide early successional wildlife habitat in the form of young forest. The desired outcome of this management is to release the present oak regeneration and to recruit oak and hickory regeneration from surrounding seed sources.

Old Field

The young stand is located on the west portion of the forested tract and is approximately 5 acres. This stand is too young to have an informative inventory completed. This stand is heavily infested with invasive species. Invasive species management is recommended for this area.

Other considerations

Invasive species management: The areas that are easily accessible by UTV shall be the main focus of initial invasive species treatments. This is where the vast majority of the invasive species were identified within the tract.

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

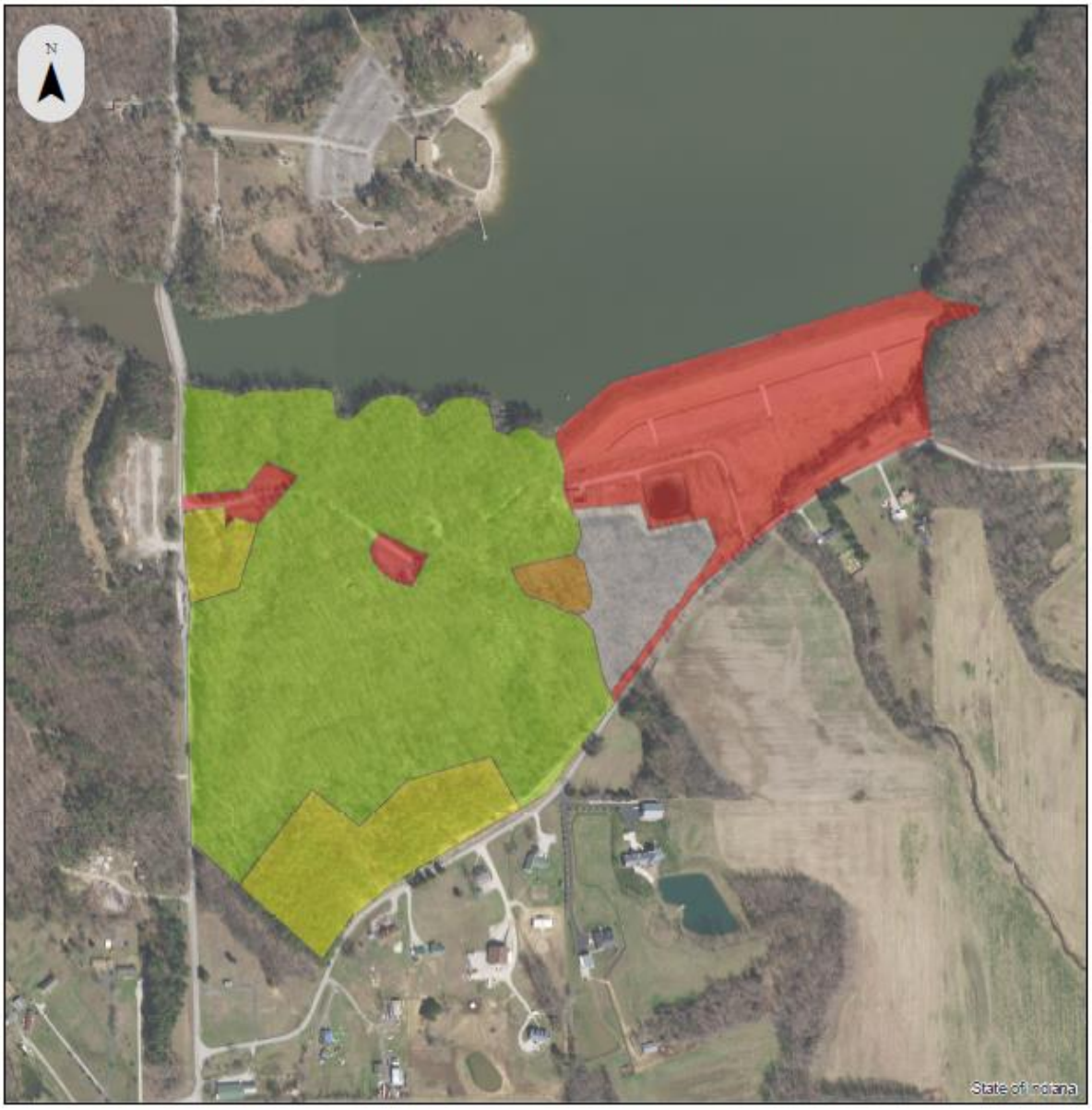
Regeneration evaluation: Three to five years after the harvest, openings will be evaluated to ensure that desirable regeneration has become established.

Guide revision: This tract should receive another inventory and management guide 15 years following the completion of the timber harvest.

Schedule:

Proposed Activities Listing	***Proposed Date***
Possible start of Fire Regime	**2020 - 2021**
Invasive species management	**2020 – 2021**
Marking and timber harvest	**2020 – 2023**
Post harvest FSI	**2023 – 2025**
Prescribed fire regime	**2023+**
Regeneration evaluation	**2025 – 2027**
Inventory and resource management guide	**2034 – 2035**

Clark State Forest
Compartment 18 Tract 5
Cover Types Map



Mesic Oak-Hickory
Mixed Hardwoods
Conifer
Old Field
Non-forest

0 0.125 0.25 Miles