Indiana Department of Natural Resources
Division of Forestry

Indiana Department of Natural Resources

Resource Management Guides
Owen-Putnam State Forest
30-day Public Comment Period

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 Owen-Putnam State Forest.

Compartment 1 Tract 4
Compartment 4 Tract 5
Compartment 4 Tract 8
Compartment 8 Tract 13

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.

Owen-Putnam State Forest | Compartment: 01 | Tract: 04
Forester: Bob Lindemuth | Date: 08/16/2021 | Acres: 85
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location:
The tract, also known as 6380104, is located in Putnam County, Indiana. More specifically, the tract is in section 8, township 12 North, Range 4 West of the Cloverdale township. This tract lies directly west of State Road 243, approximately ¼ mile north of the entrance to the Lieber State Recreation Area/Cagles Mill Lake area. The tract lies approximately 3 miles northwest of the small town of Cunot.

General Description:
This tract is dominated by closed canopy mixed hardwoods, with small pockets of the oak-hickory cover type. Approximately 7 acres of this tract are planted non-native eastern white pine. The overall health of this tract is good. Closed canopy conditions occur throughout the tract especially along the edges of the tract. Scattered light conditions within the tract is resulting in abundant amount of regeneration; however, consisting of mostly American beech and sugar maple. An improvement harvest would allow additional light to reach the forest floor allowing regeneration of more shade intolerant species as well as provide more available crown space for future crop trees.

History
- On December 24, 1947, 120 acres were purchased for $26 from Teresa Cohee. 32 acres of this purchase are in compartment 1 tract 4.
- On January 18, 1949, 94 acres were purchased for $1814.78 from Eleanor N. Olson. 53 acres of this purchase are in compartment 1 tract 4.
- On June 20, 1980 a timber sale was conducted to salvage trees damaged by a tornado. An estimated volume of 131,700 board feet in 404 sawtimber trees and 110 culls were sold to John Wilson for $21,250.00.
- On November 18, 2005 a resource management guide was developed, with an estimated volume of 8,819.7 board feet per acre.
- On June 25, 2008 a timber sale was conducted, selling 481 sawtimber trees and 29 culls to Timberland Resources, Inc for $42,500.00. Estimated volume of this sale was 128,600 board feet.

Landscape Context
This tract lies in a rural, primarily forested area with scattered agriculture and residences. The residences are primarily to the northwest of the tract. To the east of this tract lies compartment 1 tract 3 of Owen-Putnam State Forest, extending for approximately 1/4 mile. To the north lies compartment 1 tract 5. Lieber State Recreation Area and US Army Corps of Engineers own much of the forested land to the south of this tract. There are no anticipated land use changes to the surrounding area in the near future.

Topography, Geology, and Hydrology
The topography is flat to gently rolling in the eastern portion of the tract, with much steeper slopes on the western portion of the tract.

The geology of the tract consists of 7 different soil series, predominantly silt loams. Parent materials include loess over loamy till, fine-silty loess over loamy pedisediment over paleosol till, loamy till, loess, and loamy residuum over sandstone and shale.

Fall Creek drains the entire tract and forms the north and west boundaries of the tract. It flows from the northeast to the southwest where it flows into Cagles Mill Lake. Small, ephemeral drainages drain into Fall Creek. During and following management activities best management practices (BMP) will be implemented to protect drainages and other sensitive areas.

Soils

AvB- Ava silt loam, 1 to 6 percent slopes

This gently sloping, deep, moderately well drained is on knolls and narrow ridgetops and on sideslopes along drainage ways in the uplands. It is well suited to trees. This soil has a site index of 75 for white oak and 90 for yellow poplar.

AwB2- Ava silt loam, 3 to 6 percent slopes, eroded

This gently sloping, deep, moderately well drained is on knolls and narrow ridgetops and on sideslopes along drainage ways in the uplands. It is well suited to trees and has a site index of 75 for white oak and 90 for yellow poplar.

AwC2- Ava silt loam, 6 to 12 percent slopes, eroded

This moderately sloping, deep, moderately well drained is on knolls and narrow ridgetops and on sideslopes along drainage ways in the uplands. It is well suited to trees and has a site index of 75 for white oak and 90 for yellow poplar.

CnD2- Cincinnati silt loam, 12 to 18 percent slopes, eroded

This strongly sloping, deep, well-drained soil is on the sides of draws in the uplands and on breaks between the uplands and bottom land. It is well suited to trees. Erosion hazards and equipment limitations are the main management concerns due to slope and should be considered when planning management activities. This soil has a site index of 80 for northern red oak.

HoG- Hickory loam, 25 to 70 percent slopes

This steep to very steep, deep, moderately well drained, and well-drained soil on side slopes in the uplands. It is well suited to trees. Erosion hazards and equipment limitations are management concerns that should be considered during sale planning, layout, and implementation of Best Management Practices for Water Quality. This soil has a site index of 85 for white oak and 95 for yellow poplar.

IvA- Iva silt loam, 0 to 2 percent slopes

This nearly level and gently sloping, deep, somewhat poorly drained soil is on broad, convex ridgetops of the loess covered uplands. It is well suited to trees. Water tolerant species are favored in timber stands. This soil has a site index of 75 for white oak and 85 for yellow poplar.

WeG- Weikert silt loam, 25 to 70 percent slopes

This steep to very steep, shallow, well-drained soil on back slopes and foot slopes of strongly dissected uplands. It is suited to trees. Equipment limitations, erosion hazards, and windthrow hazards 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 64 for northern red oak.

Access
Approximately 3.25 miles North of the intersection of State Road 243 and State Road 42 is a pull off to the existing log yard on the west side of State Road 243. Access within the tract is good, utilizing existing skid trails.

Boundary
The tract is bordered by Army Corps of Engineers property on the north and west sides, with Lieber State Recreation Area to the south and State Road 243 to the east. The state forest boundary line was identified using field evidence such as corner stones or rebar and GPS handheld units when no field evidence was identified. Boundary lines are typically painted with orange paint or flagged when there is a lack of evidence.

Ecological Considerations
A diverse assortment of wildlife resources are found on this tract. This provides habitat for a variety of wildlife species. Habitat includes:

- Scattered Oak-Hickory canopy
- Contiguous Mixed Hardwood canopy
- Fall Creek

Hard mast trees such as oaks, hickories, and American beech provide a food source to both game and non-game species.

Forest wildlife depend on live trees for shelter, escape cover, roosting, and as a direct (e.g., mast, foliage) or indirect (e.g., foraging substrate) food resource. The retention of live trees within various diameter classes is of particular concern to habitat specialists such as the Indiana bat.

The Division of Forestry has developed compartment level guidelines for important wildlife structural habitat features known as 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.

Snags (All Species)	Maintenance Level	Inventory	Available Above Maintenance
Snag 5"+ DBH	340	825	485
Snag 9"+ DBH	255	774	519
Snag 19"+ DBH	43	33	-10

Inventory data for compartment 1 tract 4 shows that snags 5"+ and 9"+ exceed maintenance levels, while snags 19"+ are below target maintenance levels.

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. The prescribed management will maintain or enhance the relative abundance of these features.

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened, or Endangered communities were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Communities
Most of this tract is of the dry-mesic forest community type, with some isolated, more mesic sites located along lower slopes, and some floodplain along the stream. The dry-mesic upland forest community has moderate soil moisture with trees growing well, however the canopy is usually more open than in mesic forests. It is one of the most prevalent forest communities in Indiana. It occurs on slopes throughout the state. The dominant plants in this community are the white oak (*Quercus alba*), northern red oak (*Quercus rubra*), and black oak (*Quercus velutina*). Characteristic plants in this community are the shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), flowering dogwood (*Cornus florida*), hophornbeam (*Ostrya virginiana*), and blackhaw (*Viburnum prunifolium*). Characteristic animals in this community are the broad-headed skink (*Eumeces laticeps*), white-footed mouse (*Peromyscus leucopus*), and eastern chipmunk (*Tamias striatus*).

Exotic/invasive species multiflora rose (*Rosa multiflora*), autumn olive (*Eleagnus umbellata*), and Japanese barberry (*Berberis thunbergii*) are present in and around this tract in patches of light to moderate densities. These species commonly occur throughout the county. Treatment efforts should be taken on a situational approach during preharvest or post-harvest timber stand improvement (TSI).

Recreation
Recreational use of this tract is light. Hunting is popular due to its proximity to Cloverdale and Cunot and access directly off State Highway 243. During any management activity, specifically a timber harvest, access to this tract will be restricted due to safety concerns. Following the management activity, the tract will reopen to public use.

Cultural
Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any activities.

Tract Subdivision Description and Silvicultural Prescription

Forest Condition
A current forest resource inventory was completed on 08/12/2021 by Forester Bob Lindemuth. A summary of the estimated tract inventory results is located in the table below.

Tract Summary Data (trees >14"DBH):

Species	# Sawtimber Trees	Total Bd. Ft
Yellow Poplar	1,085	334,070
Eastern White Pine	446	156,380
White Oak	276	124,970
Pignut Hickory	413	108,210
Black Oak	225	83,370
Northern Red Oak	200	69,600
Red Maple	319	67,310
American Beech	308	42,710
Black Walnut	24	23,430
Sugar Maple	92	19,760
Basswood	29	7,320
Sassafras	20	7,010
TRACT TOTALS	3,437	1,044,140

Mixed Hardwoods (80 acres)

This cover type is characterized by the diverse species composition. This cover type is 94% of the total tract and is ~98% stocked with 152 trees per acre and an average basal area of 112 ft^2 per acre. The dominant species in the overstory is yellow poplar (31%), which contains 3,836 bd. ft. per acre. Other abundant species in the overstory include eastern white pine (15%), white oak (12%), pignut hickory (10%), black oak (8%), northern red oak (7%), red maple (6%), and American beech (4%). The midstory (pole sized timber) consists of primarily sugar maple (22%), yellow poplar (17%), white oak (13%), and red maple (10%). The understory is primarily American beech (47%), sugar maple (19%), and bluebeech (12%).

The recommended management activity is to conduct an improvement harvest, utilizing single tree and group selection. This activity will target poorly formed individuals, trees declining in health, and trees with a small live crown. This will give the healthier trees with good form and larger live crowns more available resources above and below ground. Where conditions warrant, group selection or patch-cut openings may be utilized to regenerate shade intolerant species and create young forest habitat. When possible, selection should favor releasing desired future crop trees.

The top species for removal in this stand are yellow poplar, red maple, and American beech. The harvest volume for this stand is estimated between 2,500 to 3,750 bd. ft. per acre of the total 12,284 bd. ft. per acre. Following the timber harvest, TSI should be conducted to complete the silvicultural prescription. TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Desired Future Condition
The objective for this cover type is to provide for multiple economic and ecological services, specifically a quality hardwood timber cover type dominated by mid- and late-seral species, while providing diverse habitat structure, hard mast, and mid to late-seral habitat for wildlife.

Eastern White Pine (5 acres)
This cover type is planted eastern white pine and comprises 6% of the tract acreage. It currently contains 201 trees per acre, a basal area of 181 ft^2 per acre and is overstocked. This cover type is dominated by sawtimber-sized eastern white pine (83%), containing 20,237 bd. ft. per acre and a small amount of yellow poplar (11%), with a volume of 2,764 bd. ft. per acre. The midstory consists of suppressed eastern white pine. Mixed hardwood regeneration was observed throughout this cover type.

The recommended management activity is to conduct a harvest utilizing group selection or patch-cut openings and single tree selection. Group selection openings will target primarily where the pine areas are thick. There is no native pine to this area of Indiana. Group selection openings help aid in the regeneration of shade intolerant species as well as create young forest habitat, a forest type that is limited in Indiana. Single tree selection may be used as well in areas where a group selection harvest isn't necessary due to the volume of pine. Single tree selection should favor future crop trees with good form, good health, and a good live crown ratio. Some pine will be left for diversity and because of their proximity to State Road 243.

The top species for removal in this stand are eastern white pine and yellow poplar. The harvest volume for this stand is estimated between 9,000 to 11,000 bd. ft. per acre of the total 24,390 bd. ft. Per acre. Following the timber harvest, TSI) should be conducted to complete the silvicultural prescription. TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Summary Tract Silvicultural Prescription and Proposed Activities
The proposed management activity is to conduct an improvement harvest to promote the overall health, vigor, resiliency, and quality of the stand. This improvement harvest will utilize single tree and group selection or patch-cut silviculture. The purpose of single tree selection is to remove trees with poor form and health, drought stressed or wind damaged trees to promote a healthier growing forest. It will also target declining ash from emerald ash borer, mature and over mature trees where present, and other intermediate trees needed to release residual crop trees. Vigorous ash will be retained for possible resistant features.

Within two years of the timber harvest, a TSI operation should follow to release crop trees that were not adequately released during the harvest and complete regeneration openings. Additionally, TSI should be utilized to control targeted invasive species in the stand and deaden a small percentage of low value trees to create snags for wildlife.

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. Oaks are likely to resprout after a fire, whereas thin-barked species like beech and maple are not.

During and after completion of the proposed management activity best management practices (BMP's) will be implemented to minimize soil erosion. This tract should receive another inventory and management guide 20 years following the completion of the timber harvest.

Effect of Prescription on Tract Properties:

Landscape: Landscape forest patterns will remain similar to the current situation due to this tract being kept in a forested condition.

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting, but this should be confined to landings and main skid trails. These areas will be properly closed out according to Indiana's BMPs to minimize the impact of management activities on soils.

Hydrology: Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators and monitored by property foresters.

Wildlife: Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future. Regeneration openings, such as prescribed have been shown to be of less of an issue from nest predators and generalist species as compared to hard edges such as public roadways, utility corridors and crop field edges. Placement of regeneration openings away from hard edges can minimize these potential impacts. The prescribed activity will promote wildlife diversity and enhance habitat structural components.

Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. Creation of regeneration openings will create early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

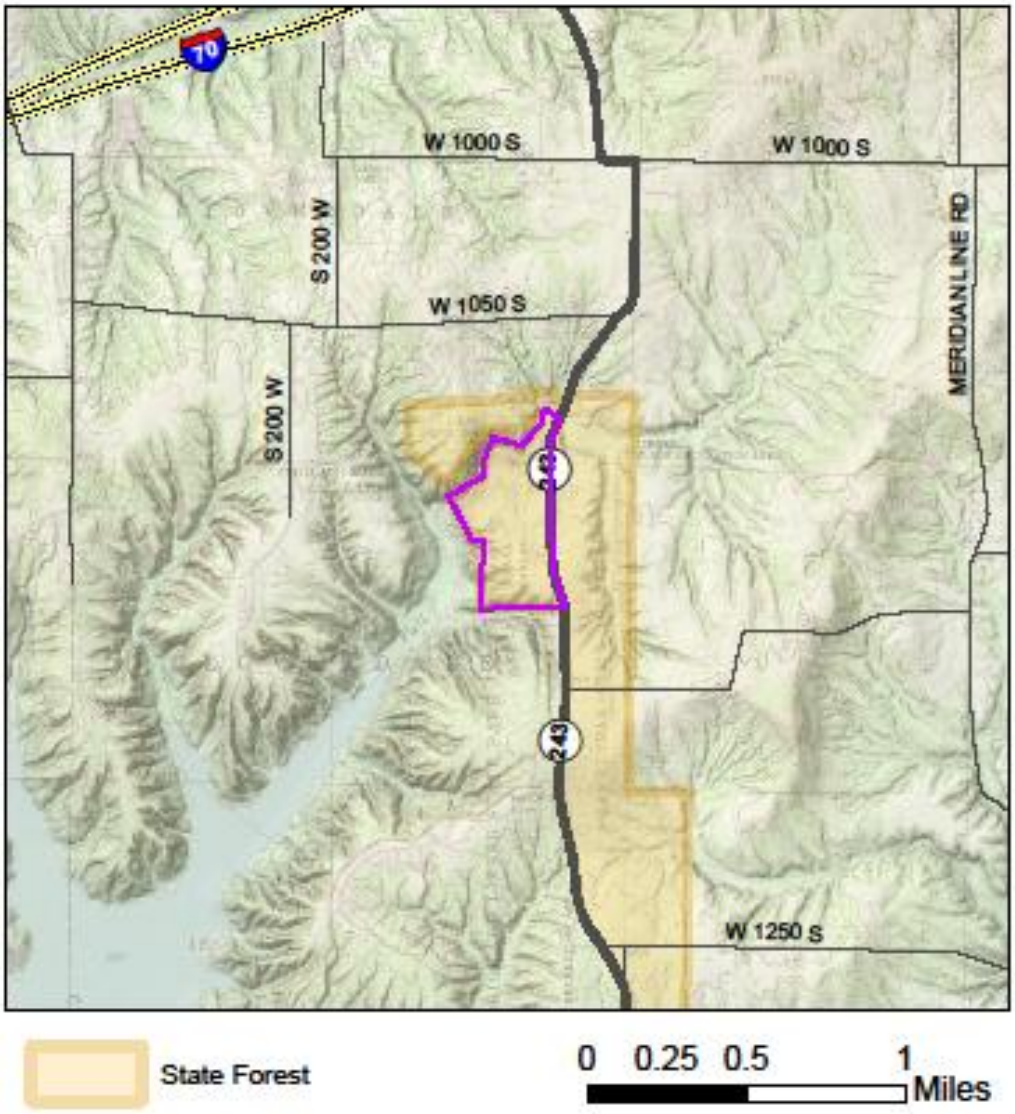
Recreation: Hunting is likely the only form of recreation within this tract. Hunting would benefit from forest management by improving the health of the residual trees thus promoting an increase in hard mast, understory plant diversity, and young forest habitat. For user safety, hunting within this tract will be temporarily suspended during management activities.

Proposed Activities Listing

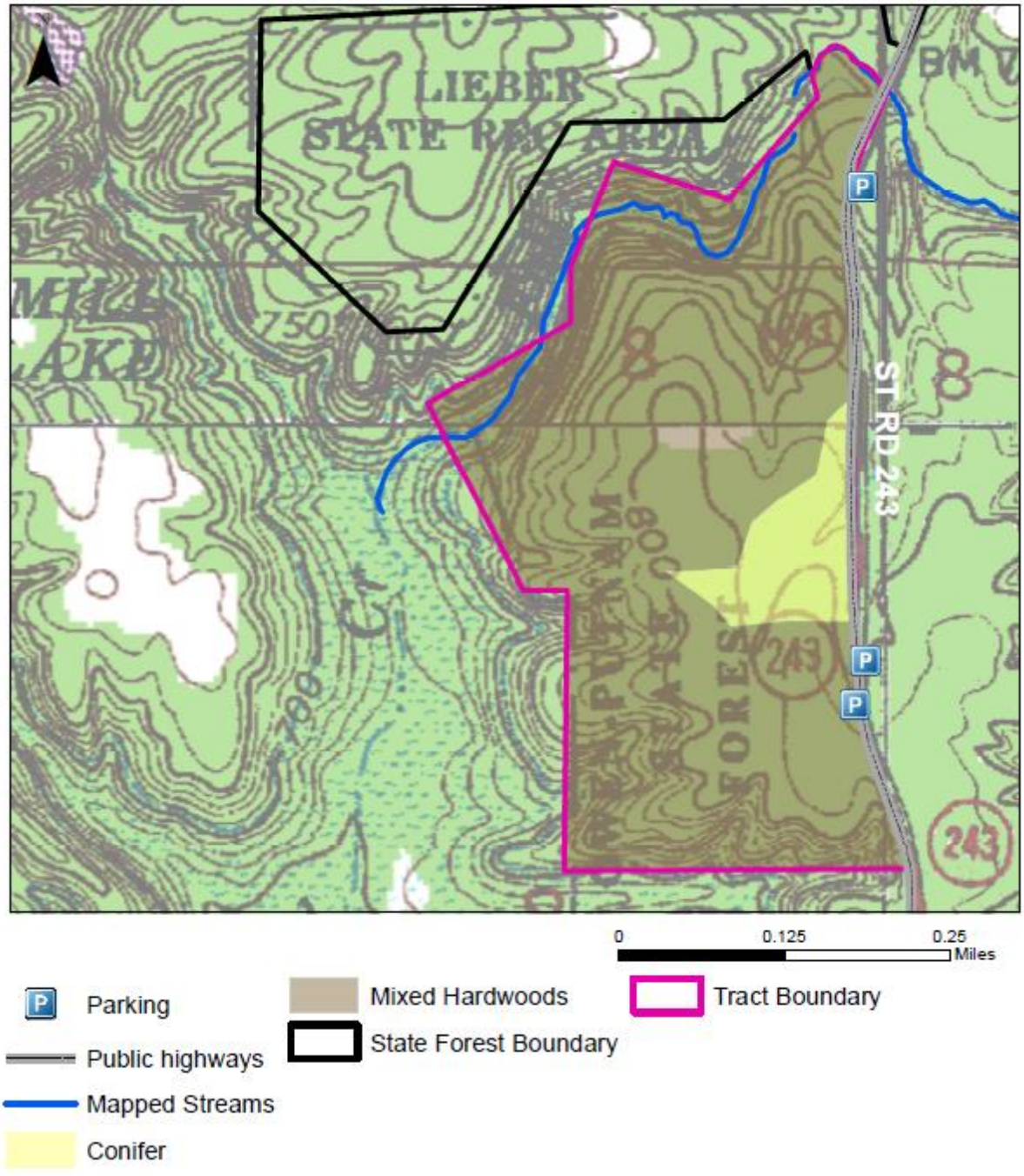
Proposed Management Activity	*Proposed Date*
Management Guide	2021
Treat vines and invasive plants	2021 +
Mark and Sell Timber Sale	2022 +
Post-harvest Timber Stand Improvement	1-2 years after harvest

Forest Growth and Periodic Monitoring	3 years post-harvest - 2041
Inventory and Revise Management Guide	20 years after

Compartment 1 Tract 4



Owen-Putnam State Forest
Compartment 1 Tract 4
Cover Types Map



Owen-Putnam State Forest | Compartment: 04 | Tract: 05
Forester: Taylor Ardisson | Date: 08/16/2021 | Acres: 74
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location

The tract, also known as 6350405, is located in Owen County, Indiana, more specifically, the northeast quarter of section 8 and the northwest quarter of section 9, township 11 north range 4 east within the Jackson Township. This tract is approximately 4.5 northeast of Jordan, IN, 4 miles southwest of Cataract, IN and 18 miles northwest of Spencer, Indiana.

General Description

This tract consists of a mixed hardwoods cover type with pockets of timber consisting of either predominantly oak-hickory, bottomland species or scattered pine. Within the tract there are areas that are declining in health due to crown closure, over-mature timber or diseased trees. There are also areas that need management to help the understory regeneration reach the midstory or to further promote the health of crop trees.

History

On May 9thy, 1959 292 acres was purchased from Charles & Nettie Dale. Approximately 16 acres of this purchase makes up compartment 4 tract 5.

On September 19th, 1963 230 acres was purchased from Clement and Rita Maika. The other 58 acres of compartment 4 tract 5 is within this purchase.

In May of 2005, Rob Duncan conducted an inventory. The data estimated the tract to contain 8,806 bd. Ft. of total sawtimber per acre. The stand was approximately 91% stocked with an estimated 116 trees per acre.

On May 16th of 2007, 671 sawtimber trees and 209 culls were sold to Land of Indiana for $19,947.00 The estimated sawtimber volume was 94,700 bd. Ft.

Landscape Context

Directly to the east, south, and northeast of compartment 4 tract 5 is continuous forested landscape within the Owen-Putnam State Forest.

The surrounding property directly to the west and all other cardinal directions beyond the Owen-Putnam State Forest is forested landscape with fragmented areas consisting of agricultural use. There are no anticipated land use changes to the surrounding area in the near future.

Topography, Geology and Hydrology

The topography of this tract consists of one main ridge coming from the south with northern, western and eastern facing slopes. The terrain may be considered steep in some areas and has scattered ephemeral drainages between small finger ridges.

There is one mapped perennial stream, Jordan Creek, that flows to the west through Owen and Clay County. During and following any management activity best management practices (BMP) would be implemented to protect streams and other sensitive areas.

There is a wildlife pond located on the east side of the horse trail. BMPs will be utilized around this pond.

The geology of the tract consists of 10 different soil series with the majority of the tract within 3 of the 10-soil series which are: Zanesville (soft bedrock substratum), Gallimore-Chetwynx complex and the Tulip-Tipsaw complex. The parent material of these 3 soil series are either a loess loamy residuum over sandstone and shale, coarse-loamy outwash over sandy outwash or a loamy colluvium and/or a clayey residuum.

Soils

GabG- Gallimore-Chetwynd complex, 25 to 70 percent slopes
This is steep and very steep, deep, well drained complex is on dissected outwash plains. It is well suited to trees. Equipment limitations, erosion hazard, and windthrow hazards are management concerns that should be considered during soil planning and implementation of Best Management Practices for Water Quality. Chetwynd has a site index of 88 for northern red oak and 99 for yellow poplar and gallimore has a site index of 98 for northern red oak and yellow poplar.

HleAV- Holton silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, somewhat poorly drained soil in on flood plains. It is well suited to trees. Equipment limitation, seedling mortality, and windthrow hazard are concerns that should be considered when planning management activities. Timing of activities should consider wet times of year. This soil has a site index of 80 for northern red oak and 90 for yellow poplar.

OfaAV- Oldenburg silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, moderately well drained soil in on flood plains. It is well suited to trees. Equipment limitations and windthrow hazards are concerns that should be considered when planning management activities. Timing of activities should consider wet times of year. This soil has a site index of 90 for northern red oak and 94 for yellow poplar.

OfcAV – Approximately 5% of the tract consists of this series. Similar to OfaAV besides that it consists of a fine sandy loam versus a silt loam.

PbbC2- Parke silt loam, 6 to 12 percent slopes, eroded
This moderately sloping, deep, well-drained soil is on the sides of ridges and knolls and along drainageways in the uplands. It is well suited to trees and has a site index of 90 for white oak and 98 for yellow poplar.

PryB- Potawatomi silt loam, 1 to 3 percent slopes
This gently sloping, deep, moderately well drained soil is found on ridgetops in the uplands. It is well suited to trees. Equipment limitations and seedling mortality are concerns that should be

considered when planning management activities. This soil has a site index of 80 for white oak and 93 for yellow poplar.

TtaG- Tulip-Tipsaw complex, 25 to 60 percent slopes
This moderately and very steep, moderately deep to deep, well drained complex is found on sideslopes in the uplands. It is suited to trees. Erosion hazards, equipment limitations, and seedling mortality are management concerns that should be considered when planning sale layout and implementing Best Management Practices for Water Quality. Tulip has a site index of 80 for northern red oak and 95 for yellow poplar and Tipsaw has a site index of 70 for northern red and black oak.

ZamC2- Zanesville silt loam, soft bedrock substratum, 6 to 12 percent slopes, eroded
This moderately sloping, deep, moderately well drained or well-drained soil is on side slopes adjacent to drainage ways in the uplands. It is well suited to trees. This soil has a site index of 69 for white oak and 90 for yellow poplar.

ZamC3- Zanesville silt loam, soft bedrock substratum, 6 to 12 percent slopes, severely eroded
This moderately sloping, deep, moderately well drained or well-drained soil is on side slopes adjacent to drainage ways in the uplands. It is well suited to trees and has a site index of 69 for white oak and 90 for yellow poplar.

ZapD3- Zanesville, soft bedrock substratum-Tulip silt loams, 12 to 18 percent slopes, severely eroded
This strongly sloping, deep, moderately well drained soil is on narrow side slopes in the uplands. It is fairly well suited to trees. A fragipan is present that can limit rooting depth. Erosion hazards and equipment limitations are main concerns that should be considered when planning management activities. This soil has a site index of 69 for white oak and 90 for yellow poplar.

Access
Vehicle access to this tract for management purposes is from a gated fire access road at the back of Rattlesnake campground. The tract is approximately 1.25 miles beyond the gate. To get to Rattlesnake campground from Spencer, IN head 3 miles west on state road 46 to Rattlesnake Road. Turn north on Rattlesnake Road and continue for 6 miles to Surber Road. Upon turning west on Surber Road continue for 3 miles until Rattlesnake Campground.

Access within the tract is good and may only be restricted by steep topography in given areas.

Boundary
The northern and western tract boundary also serve as the property boundary. The state forest boundary line was identified using field evidence such as corner stones or rebar and GPS handheld units when no field evidence was identified. Property lines are typically painted with orange paint or flagged when there is a lack of evidence. The southern boundary heads east up a drainage, across the ridge top and down an eastern facing drainage until it reaches an intermittent stream. The eastern boundary follows the intermittent stream until it reaches Jordan Creek (perennial stream) which then flows to the west meandering through private and state property along the northern tract boundary line.

Ecological Considerations

A diverse assortment of wildlife resources is found on this tract conducive to providing habitat for a variety of wildlife species. Habitat includes:

- Contiguous Mixed hardwood canopy
- Diverse age, size, and species composition throughout the understory and midstory of the canopy.

Hard mast trees such as oaks, hickories, and American beech provide food source to both game and non-game species.

Forest wildlife species depend on live trees for shelter, escape cover, roosting and as a direct (e.g., mast, foliage) or indirect (e.g., foraging substrate) food resource. The retention of live trees within various diameter classes is of particular concern to habitat specialists such as the Indiana bat.

The Division of Forestry has developed compartment level guidelines for 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.

Snags (All Species)	Maintenance Level	Inventory	Available Above Maintenance
Snag 5"+ DBH	296	864	568
Snag 9"+ DBH	222	549	327
Snag 19"+ DBH	37	75	38

Current assessments indicate the abundance of these habitat features meet or exceed recommended maintenance levels in all diameter classes.

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened or Endangered communities were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Communities

This tract consists of the typical plant communities that would be found on northern, eastern, or western facing aspects in Owen County. Plant diversity consists of but not limited to paw paw, spicebush, blackberry, greenbrier, and viburnum species. It is also not uncommon to come across flowering dogwood, eastern redbud or hop hornbeam saplings in the understory. Some invasive species include multiflora rose, scattered autumn olive, and patches of Japanese stiltgrass. Treatment efforts should be taken on a situational approach during preharvest or post-harvest timber stand improvement (TSI).

Recreation

Recreational use of this tract is moderate. The blue loop horse trail runs along the ridge top and down a northeastern facing aspect where it then crosses the intermittent stream exiting the tract. The fire access road from Rattlesnake campground also provides easy direct access to the southern boundary of the tract. These two access points, adjacent private property, and the remote location make this tract an ideal hunting location. During any management activity, specifically a timber harvest, access into this tract will be restricted due to safety concerns. Following the management activity, the tract would reopen to public use. Trail maintenance will be considered during and after a timber harvest.

Cultural

Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources noted will be avoided during any activities.

Tract Subdivision Description and Silvicultural Prescription

Forest Condition

A current forest resource inventory was completed in August of 2020 by Forester Phil Jones. A summary of the estimate tract inventory results are located in the table below.

Tract Summary Data (Trees > 14" DBH)

Species	# Sawtimber Trees	Total Bd. Ft
American Beech	73	9,850
American Sycamore	20	3,450
Basswood	26	2,410
Bitternut Hickory	62	8,550
Black Cherry	26	1,850
Black Oak	252	77,730
Eastern White Pine	48	6,070
Hackberry	13	3,480
Largetooth Aspen	6	3,220
Northern Red Oak	359	105,600
Pignut Hickory	344	74,700
Red Maple	224	25,920
Sassafras	272	40,780
Shagbark Hickory	56	15,240
Sugar Maple	292	41,320
White Ash	26	2,410
White Oak	583	177,720
Yellow Poplar	449	160,310
TRACT TOTALS	3,131	760,610

Mixed Hardwoods (74 Acres)
This cover type is characterized by the diverse species composition. This cover type is 100% of the total tract and is fully stocked. The stocking rate is 94% with ~131 trees per acre and an average basal area of 115. The stand currently is growing an estimated 10,278 bd. ft. per acre. The three dominant species in the dominant and codominant crown position are: white oak (23%), yellow poplar (21%), followed by northern red oak (14%). The midstory (pole sized timber) consists of red maple (21%), sugar maple (18%) and sassafras (15%).

The stand currently is 59% oak and hickory, 9% maple and beech and 21% yellow poplar. Some of the mature and overmature black oak and northern red oak specifically are exhibiting signs of decline. The midstory is primarily maple and beech (46%) and only 20% oak and hickory. Maple and beech make up 78% of the regeneration found within the tract. A prescribed fire rotation would be a useful management activity within this tract to promote oak and hickory regeneration.

The recommended management activity is to conduct an improvement harvest utilizing single tree selection targeting poorly formed individuals, trees declining in health and trees with a small percentage of live crown. In return this will give the diverse healthier trees with good form and larger live crown percentage more available resources above and below ground. Where conditions warrant, group selection or patch-cut silviculture should be utilized to facilitate the regeneration of shade intolerant species as well as a new cohort of young forest habitat. When possible, selection should favor releasing desired future crop trees.

The top species for removal within this stand are yellow poplar, black oak, and northern red oak. The harvest volume for this stand is projected between 2,500-3,500 bd. ft. per acre. Undesirable poles in the midstory should be removed as well to allow more sunlight to reach the forest floor thus promoting oak and hickory regeneration. Following the timber harvest TSI should be conducted to complete the management process. Specifically, TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Desired Future Condition The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by mid- and late-seral species, while providing diverse habitat structure, hard mast and mid to late-seral habitat for wildlife.

Summary Tract Silvicultural Prescription and Proposed Activities

The proposed management activity is to conduct an improvement harvest to promote the overall health, vigor, resiliency, and quality of the stand. This improvement harvest will utilize single tree and group selection or patch-cut silviculture. The purpose of single tree selection is to remove trees with poor form and health, drought stressed or wind damaged trees to promote a healthier growing forest. It will also target declining ash from Emerald ash borer, mature and over mature trees where present, and other intermediate trees needed to release residual crop trees. Vigorous ash will be retained for possible resistant features. Group selection will be used to target groups of trees that fit the above description growing together. Group selection may also be utilized to remove the non-native pine within the tract.

Within two years of the timber harvest, a TSI operation should follow to release crop trees that were not adequately released during the harvest and complete regeneration openings. Additionally, TSI should be utilized to control targeted invasive species in the stand and deaden a small percentage of low value trees to create snags for wildlife, such as the Indiana bat.

During and after completion of the proposed management activity best management practices (BMP's) will be implemented in order to minimize soil erosion. This tract should receive another inventory and management guide 15-20 years following the completion of the timber harvest.

Effect of Prescription on Tract Properties:

Landscape: Landscape forest patterns will remain similar to the current situation due to this tract being kept in a forested condition.

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting, but this should be confined to landings and main skid trails. These areas will be properly closed out according to Indiana's BMPs to minimize the impact of management activities on soils.

Hydrology: Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators and monitored by property foresters.

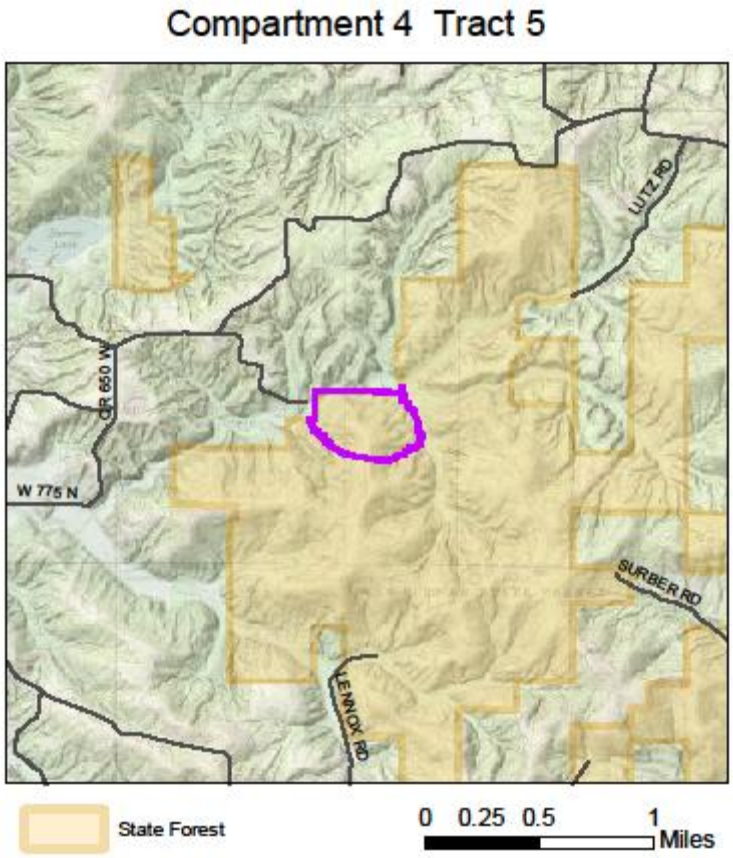
Wildlife: Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future. Regeneration openings, such as prescribed have been shown to be of less of an issue from nest predators and generalist species as compared to hard edges such as public roadways, utility corridors and crop field edges. Placement of regeneration openings away from hard edges can minimize these potential impacts. The prescribed activity will promote wildlife diversity and enhance habitat structural components.

Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. Creation of regeneration openings will create early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

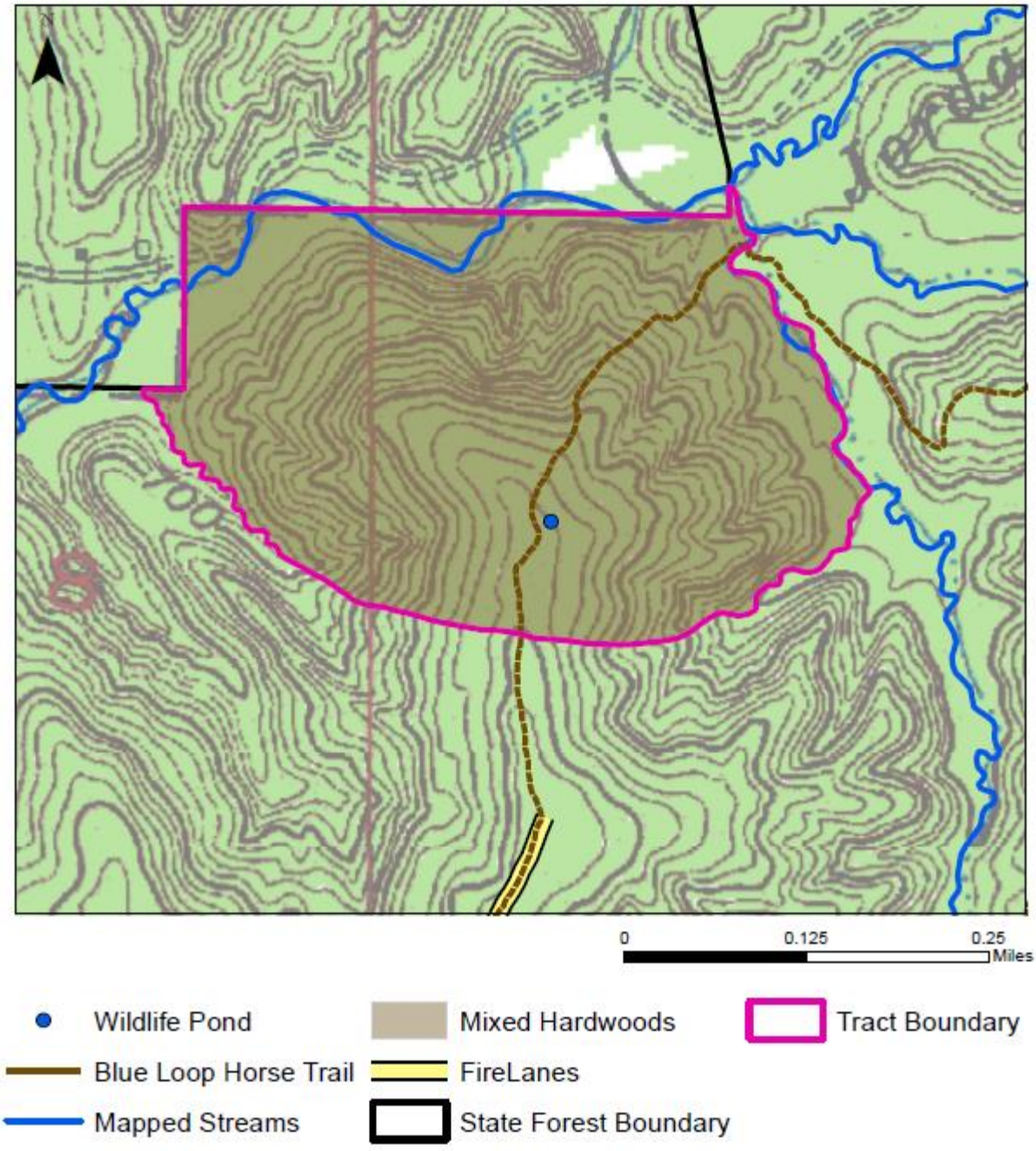
Recreation: Hunting by locals through private property access or state forest access. Hunting would benefit from forest management by improving the health of the residual trees thus promoting an increase in hard mast, understory plant diversity, and young forest habitat. For user safety, tract access will be suspended during management activities.

Proposed Activities Listing

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Treat vines and invasive plants	2021+
Mark and Sell Timber Sale	2022+
Post-harvest Timber Stand Improvement	1-2 years after harvest
Forest Growth and Periodic Monitoring	3 years post-harvest - 2050
Inventory and Revise Management Guide	15-20 years after



Owen-Putnam State Forest
Compartment 4 Tract 5
Cover Types Map



Owen-Putnam State Forest | Compartment: 04 | Tract: 08
Forester: Bob Lindemuth | Date: 09/20/2021 | Acres: 74
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location
This tract, also known as 6380408, is located in Owen County, Indiana. More specifically, the tract is in section 16, Township 11 North, Range 4 West of Morgan township. This tract lies approximately 0.5 miles southwest of the end of Surber Road's terminus in Rattlesnake Campground. This tract lies approximately 9 miles northwest of the town of Spencer.

General Description
This tract is 74 acres and is dominated by closed-canopy mixed hardwoods, with pockets of oak-hickory on the drier slopes. Approximately 8 acres of this tract are a non-native eastern white pine cover type, planted to stabilize the soil following abandonment of marginal farmland. Due to lack of management, the pine stand is overstocked and deteriorating in health. The overall health of this tract is good, although several pockets of oak mortality were observed. The tract is closed canopy with more open conditions existing closer to the fire lane. A diverse overstory exists, with 18 species of sawtimber size recorded in the inventory. Regeneration is abundant and diverse, consisting of 16 species, but mostly shade tolerant American beech, sugar maple, and bluebeech. An improvement harvest would allow additional light to reach the forest floor promoting the regeneration of more shade intolerant species as well as provide more available crown space for future crop trees. It would also capture defective trees that would be susceptible to mortality in the coming years, such as those with rotten butts and crown dieback.

History
- On February 24, 1953 1,332 acres was purchased for $1 from John and Pauline Dowdall. Approximately 38 acres of this purchase eventually became C4T8.
- On May 9, 1959 292 acres was purchased for $5,500 from Charles W & Nettie Dale. Approximately 32 acres of this purchase eventually became C4T8
- On January 25, 1967 110 acres was purchased for $1,833 from Ruthe E Brown. Approximately 4 acres of this purchase eventually became C4T8.
- In 1988, a property wide cruise was done. Data of C4T8 showed there was an estimated 4,296 bd. Ft. per acre and approximately 74% stocked.
- In 2004, an inventory was done and an RMG was developed. Estimated 6,012 bd. Ft./sawtimber per acre. Estimated 2,429 bd. Ft./sawtimber per acre were harvestable.
- In 2005, 622 sawtimber trees and 234 culls were sold to R. Booe & Son Hardwoods for $20,333.00 with an estimated volume of 111,500 bd. Ft. This sale was a salvage sale from a windstorm that occurred in May of 2004. Although the salvage sale was 2 tracts, the data expressed here was only from compartment 4 tract 8.

Landscape Context
This tract lies in a rural, primarily forested area with scattered agriculture and residences. The residences are primarily to the southwest of the tract. To the east of this tract lies compartment 4 tract 12 and compartment 4 tract 13 of Owen-Putnam State Forest, extending for approximately 0.4 miles. To the north lies compartment 4 tract 7 of Owen-Putnam State Forest. To the south of this tract lies compartment 4 tract 9 of Owen-Putnam State Forest. To the west of this tract lies

compartment 4 tract 2 and private property. There are no anticipated land use changes to the surrounding area in the near future.

Topography, Geology, and Hydrology
The topography is gently rolling throughout the tract with various aspects. In the southern portion of the tract is a relatively flat creek bottom.

The geology of the tract consists of 9 different soil series, all silt loams. Parent materials are diverse and include loess over loamy lacustrine deposits, loess over loamy residuum, loess over loamy till, loamy colluvium and/or clayey residuum, thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale, loamy alluvium, and fine-silty loess over clayey residuum weathered from shale over loamy residuum weathered from sandstone and shale.

A mapped intermittent stream drains the entire tract and forms the southern boundary of the tract. It flows from the east to the west where it eventually flows into Jordan Creek. Small, ephemeral drainages drain into this stream. During any management activities tops will be removed from the stream.

Soils
OmkC3- Otwell silt loam, 6 to 12 percent slopes, severely eroded
This moderately sloping, deep, well drained and moderately well drained soil is on side slopes on lacustrine terraces. The soil is fairly well suited to trees. Windthrow hazards and seedling mortality are concerns that should be considered when planning management activities. This soil has a site index of 65 for white oak.

PryB- Potawatomi silt loam, 1 to 3 percent slopes
This gently sloping, deep, moderately well drained soil is found on ridgetops in the uplands. It is well suited to trees. Equipment limitations and seedling mortality are concerns that should be considered when planning management activities. This soil has a site index of 80 for white oak and 93 for yellow poplar.

SneD5- Solsberry silt loam, 12 to 18 percent slopes, gullied
This strongly sloping, deep, moderately well drained soil is on the side slopes of the uplands. It is well suited to trees. Erosion hazards, equipment limitations, and windthrow hazards are management concerns that should be considered during planning and implementation of Best Management Practices for Water Quality. This soil has a site index of 80 for northern red oak.

TtaG- Tulip-Tipsaw complex, 25 to 60 percent slopes
This moderately and very steep, moderately deep to deep, well drained complex is found on sideslopes in the uplands. It is suited to trees. Erosion hazards, equipment limitations, and seedling mortality are management concerns that should be considered when planning sale layout and implementing Best Management Practices for Water Quality. Tulip has a site index of 80 for northern red oak and 95 for yellow poplar and Tipsaw has a site index of 70 for northern red and black oak.

TtcE- Tulip-Wellston-Adyeville silt loams, 18 to 25 percent slopes
This strongly sloping to steep, deep, well drained complex is found on sideslopes in the uplands. It is suited to trees. Erosion hazards, equipment limitations, windthrow hazards, and seedling mortality are management concerns that should be considered when planning sale layout and implementing Best Management Practices for Water Quality. Tulip has a site index of 80 for northern red oak and 95 for yellow poplar, Wellston has a site index of 81 for northern red oak and 90 for yellow poplar, and Adyeville has a site index of 64 for northern red oak.

WhfD2- Wellston silt loam, 12 to 18 percent slopes, eroded
This strongly 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.

WpuAV- Wirt silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, well drained soil is found on natural levees and floodplain steps on flood plains. It is well suited to trees. Equipment limitation and seedling mortality are management concerns that should be considered when planning management activities. This soil has a site index of 105 for yellow poplar.

ZamC3- Zanesville silt loam, soft bedrock substratum, 6 to 12 percent slopes, severely eroded
This moderately sloping, deep, moderately well drained or well drained soil is on side slopes adjacent to drainage ways in the uplands. It is well suited to trees and has a site index of 69 for white oak and 90 for yellow poplar.

ZapD3- Zanesville, soft bedrock substratum-Tulip silt loams, 12 to 18 percent slopes, severely eroded
This strongly sloping, deep, moderately well drained soil is on narrow side slopes in the uplands. It is fairly well suited to trees. A fragipan is present that can limit rooting depth. Erosion hazards and equipment limitations are main concerns that should be considered when planning management activities. This soil has a site index of 69 for white oak and 90 for yellow poplar.

Access
From the end of Surber Road in Rattlesnake Campground, continue west down an unnamed fire lane approximately 0.5 miles to access this tract. The tract is located on the south side of the fire lane. Access within the tract is good, utilizing existing skid trails. An existing log yard and skid trails will be utilized for management activities.

Boundary
The northern boundary of this tract is the previously mentioned fire lane. The eastern boundary of this tract is a ridgeline heading to the southwest. The southern boundary of this tract is a mapped, intermittent stream. The western boundary of this tract is a straight line, following a ridge top on the northern end and serving as the state forest boundary where it borders private property on the southern end. The state forest boundary line was identified using field evidence such as corner stones or rebar and GPS handheld units when no field evidence was identified. Property lines are typically painted with orange paint or flagged when there is a lack of evidence.

Ecological Considerations
A diverse assortment of wildlife resources are found on this tract. This provides habitat for a variety of wildlife species. Habitat includes:

- Scattered Oak-Hickory canopy
- Contiguous Mixed Hardwood canopy
- Closed pine canopy

Hard mast trees such as oaks, hickories, and American beech provide a food source to both game and non-game species.

Forest wildlife species depend on live trees for shelter, escape cover, roosting, and as a direct (e.g. mast, foliage) or indirect (e.g. foraging substrate) food resource. The retention of live trees within various diameter classes is of particular concern to habitat specialists.

The Division of Forestry has developed compartment level guidelines for important wildlife structural habitat features known as 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.

Snags (All Species)	Maintenance Level	Inventory	Available Above Maintenance
Snag 5"+ DBH	296	708	412
Snag 9"+ DBH	222	346	124
Snag 19"+ DBH	37	132	95

Inventory data for compartment 4 tract 8 shows that snags 5"+, 9"+, and 19"+ exceed maintenance levels. The prescribed management will maintain or enhance the relative abundance of these features.

Most of this tract is of the dry-mesic forest community type, with some isolated, more mesic sites located along lower slopes, and some floodplain along the stream. The dry-mesic upland forest community has moderate soil moisture with trees growing well, however the canopy is usually more open than in mesic forests. It is one of the most prevalent forest communities in Indiana. It occurs on slopes throughout the state. The dominant plants in this community are the white oak (*Quercus alba*), northern red oak (*Quercus rubra*), and black oak (*Quercus velutina*). Characteristic plants in this community are the shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), flowering dogwood (*Cornus florida*), hophornbeam (*Ostrya virginiana*), and blackhaw (*Viburnum prunifolium*). Characteristic animals in this community are the broad-headed skink (*Eumeces laticeps*), white-footed mouse (*Peromyscus leucopus*), and eastern chipmunk (*Tamias striatus*).

Exotic/invasive species multiflora rose (*Rosa multiflora*), autumn olive (*Eleagnus umbellata*), Japanese stiltgrass (*Microstegium vimineum*), and Japanese barberry (*Berberis thunbergii*) are

present in and around this tract in patches of light to moderate densities. These species commonly occur throughout the county. Treatment efforts should be taken on a situational approach during preharvest or post-harvest TSI.

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened, or Endangered communities were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Recreation

Recreational use of this tract is light, consisting of hunting, horseback riding, and mountain bike riding. The blue trail (Bridle Loop Trail) runs through this tract, but it is not as heavily used as the southern portions of the trail system, which consists of the orange (Pleasant Grove Trail) and the red (Sandstone Bluff Trail). The Bridle Loop trail is the only multiple use trail because it also allows mountain biking. The blue trail splits in the southern end of the tract and runs to the northeast and northwest. The northeast portion of the trail approximately forms the eastern boundary of the tract, while the northwest portion of the trail runs up a ridge, approximating the western boundary of the tract in the northwest corner.

During any management activity, specifically a timber harvest, access to this tract will be restricted due to safety concerns. The trail will be closed during weekdays Monday morning through Friday night. Signs will be posted at the horse campground, all three locations where the trail enters the tract, trailheads, as well as advertised on Owen-Putnam State Forest advisories located on the Division of Forestry webpage. The horse trail will only be used as a skid trail as a last resort and crossings will be minimized. During active management operations tops will be removed from the horse trail daily. Following the management activity, the tract will be reopened to public use.

Cultural

Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any activities.

Tract Subdivision Description and Silvicultural Prescription

Forest Condition

A current forest resource inventory was completed on 08/12/2021 by Forester Bob Lindemuth. A summary of the estimated tract inventory results are located in the table below.

Tract Summary Data (trees >14"DBH):

Species	# Sawtimber Trees	Total Bd. Ft
Yellow Poplar	962	361,110
Eastern White Pine	659	159,400
Northern Red Oak	265	90,960
White Oak	136	62,890
Black Oak	229	54,230
Pignut Hickory	100	34,700
Red Maple	255	33,950
American Sycamore	48	19,490
Sugar Maple	87	18,610
Shagbark Hickory	57	18,200
Basswood	76	15,160
Blackgum	91	13,120
Black Walnut	70	12,070
White Ash	15	8,300
Chinkapin Oak	23	7,200
Sassafras	51	4,820
Red Elm	45	3,170
Black Locust	28	2,700
TRACT TOTALS	3,197	920,080

Mixed Hardwoods (67 acres)

This cover type is characterized by the diverse species composition. This stand type is 91% of the total tract and is ~96% stocked with 179 trees per acre and an average basal area of 113.6 ft^2 per acre. The dominant species in the overstory is yellow poplar (44%), which contains 4,722 bd. ft. per acre. Other abundant species in the overstory include northern red oak (12%), white oak (8%), black oak (7%), and red maple (4%). The midstory (pole sized timber) consists of primarily sugar maple (24%), yellow poplar (13%), pignut hickory (9%), red maple (9%), white oak (7%), eastern white pine (7%), and black walnut (6%). The understory is primarily American beech (25%), sugar maple (11%), bluebeech (10%), pawpaw (8%), pignut hickory (8%), black cherry (6%), and yellow poplar (6%).

The recommended management activity is to conduct an improvement harvest, utilizing single tree and group selection or patch cut openings. This activity will target poorly formed individuals, trees declining in health, and trees with a small live crown. This will give the

healthier trees with good form and larger live crowns more available resources above and below ground. Where conditions warrant, group selection may be utilized to regenerate shade intolerant species and create young forest habitat. When possible, selection should favor releasing desired future crop trees.

The top species for removal in this stand are yellow poplar, northern red oak, eastern white pine, and American Sycamore. The harvest volume for this stand is estimated at 3,000 to 4,500 bd. ft. per acre of the total 10,817 bd. ft. per acre. Following the timber harvest, timber stand improvement (TSI) should be conducted to complete the silvicultural prescription. TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Desired Future Condition
The objective for this cover type is to provide for multiple economic and ecological services, specifically a quality hardwood timber stand dominated by mid- and late-seral species, while providing diverse habitat structure, hard mast, and mid to late-seral habitat for wildlife.

Eastern White Pine (7 acres)
This cover type is eastern white pine and comprises 9% of the tract acreage. It currently contains 336 trees per acre, a basal area of 301.5 ft^2 per acre and is overstocked. This stand is dominated by sawtimber-sized eastern white pine (81%), containing 24,815 bd. ft. per acre and a small amount of yellow poplar (16%), with a volume of 4,786 bd. ft. per acre, and red maple (3%), with a volume of 966 bd. ft. per acre. The midstory consists of suppressed eastern white pine and yellow poplar. The understory consists of American beech (25%), eastern white pine (25%), pignut hickory (25%), and sassafras (25%).

The recommended management activity is to conduct a harvest utilizing group selection openings and single tree selection. Group selection openings will target primarily where the pine areas are thick. There is no native pine to this area of Indiana. Group selection openings help aid in the regeneration of shade intolerant species as well as create young forest habitat, a forest type that is not commonly found in Indiana. Single tree selection may be used as well in areas where a group selection harvest isn't necessary due to the volume of pine. Single tree selection should favor future crop trees with good form, good health, and a good live crown ratio.

The top species for removal in this stand are eastern white pine and yellow poplar. The harvest volume for this stand is estimated at 27,000 to 29,000 bd. ft. per acre of the total 30,567 bd. ft. per acre. This harvest volume is rather high but considering the overstocked nature of the large non-native eastern white pine trees, the removal of these large group selections will encourage native hardwood regeneration. Following the timber harvest, timber stand improvement (TSI) should be conducted to complete the silvicultural prescription. TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Desired Future Condition
The objective for this cover type is to transition from non-native pine to high-quality native hardwoods. This will provide for early successional habitat, a habitat type that is sorely lacking in Indiana.

Summary Tract Silvicultural Prescription and Proposed Activities
The proposed management activity is to conduct an improvement harvest to promote the overall health, vigor, resiliency, and quality of the stand. This improvement harvest will utilize single tree and group selection or patch-cut silviculture. The purpose of single tree selection is to remove trees with poor form and health, drought stressed or wind damaged trees to promote a healthier growing forest. It will also target declining ash from emerald ash borer, mature and over mature trees where present, and other intermediate trees needed to release residual crop trees. Young, vigorous ash will be retained for possible resistant features. Group selection will be used to target groups of trees that fit the above description growing together.

Within two years of the timber harvest, a TSI operation should follow to release crop trees that were not adequately released during the harvest and complete regeneration openings. Additionally, TSI should be utilized to control targeted invasive species in the stand and deaden a small percentage of low value trees to create snags for wildlife.

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. Oaks are likely to resprout after a fire, whereas thin-barked species like beech and maple are not.

During and after completion of the proposed management activity best management practices (BMP's) will be implemented to minimize soil erosion. This tract should receive another inventory and management guide 20 years following the completion of the timber harvest.

Effect of Prescription on Tract Properties:
Landscape: Landscape forest patterns will remain similar to the current situation due to this tract being kept in a forested condition.

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting, but this should be confined to landings and main skid trails. These areas will be properly closed out according to Indiana's BMPs to minimize the impact of management activities on soils.

Hydrology: Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators and monitored by property foresters.

Wildlife: Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future. Regeneration openings, such as prescribed have been shown to be of less of an issue from nest predators and generalist species as compared to hard edges such as public roadways, utility corridors and crop field edges. Placement of regeneration openings away from hard edges can minimize these potential impacts. The prescribed activity will promote wildlife diversity and enhance habitat structural components.

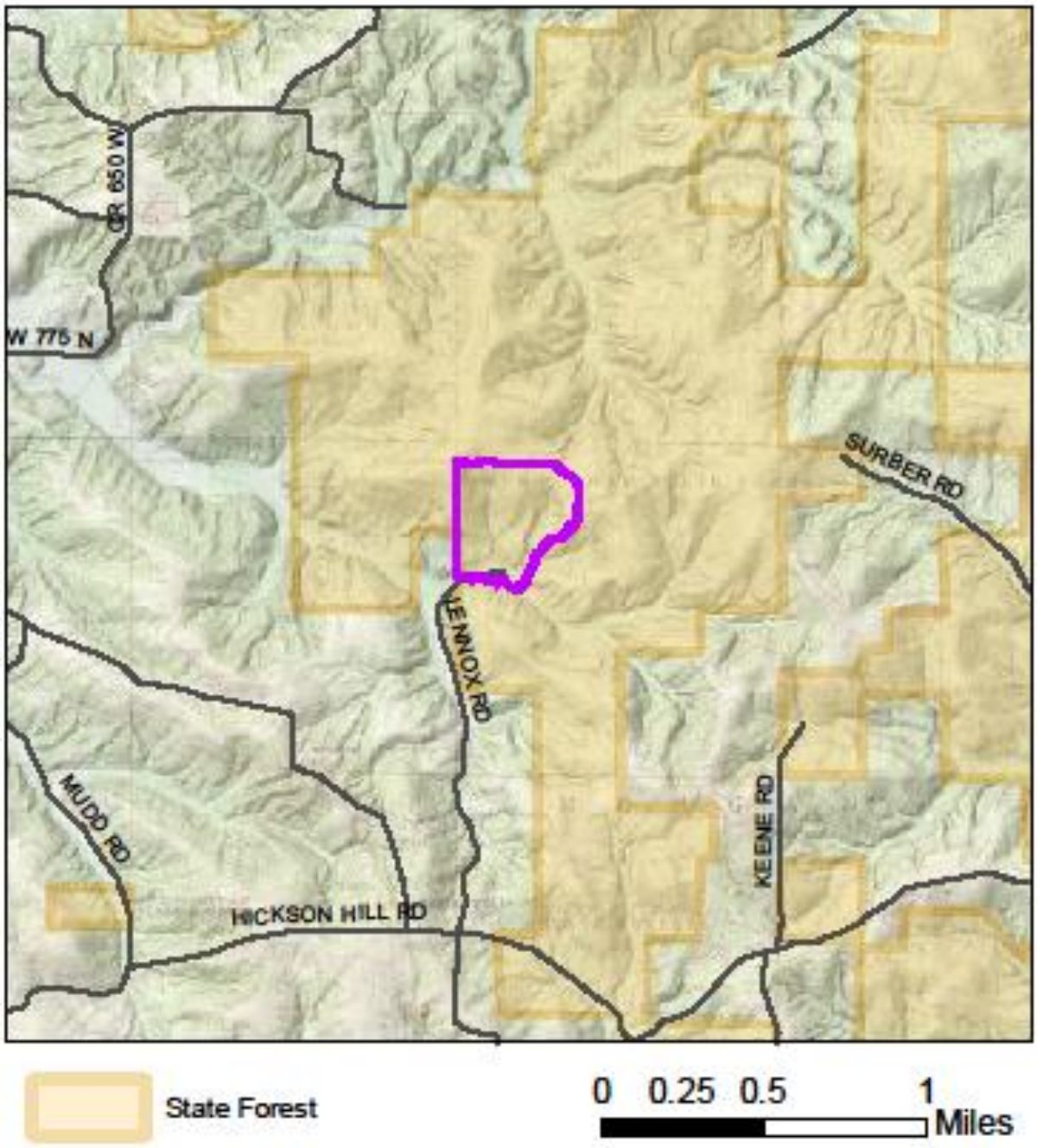
Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. Creation of regeneration openings will create early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

Recreation: Hunting and horseback riding are likely the only forms of recreation within this tract. Hunting would benefit from forest management by improving the health of the residual trees thus promoting an increase in hard mast, understory plant diversity, and young forest habitat. For user safety, hunting and horseback riding within this tract will be temporarily suspended during management activities.

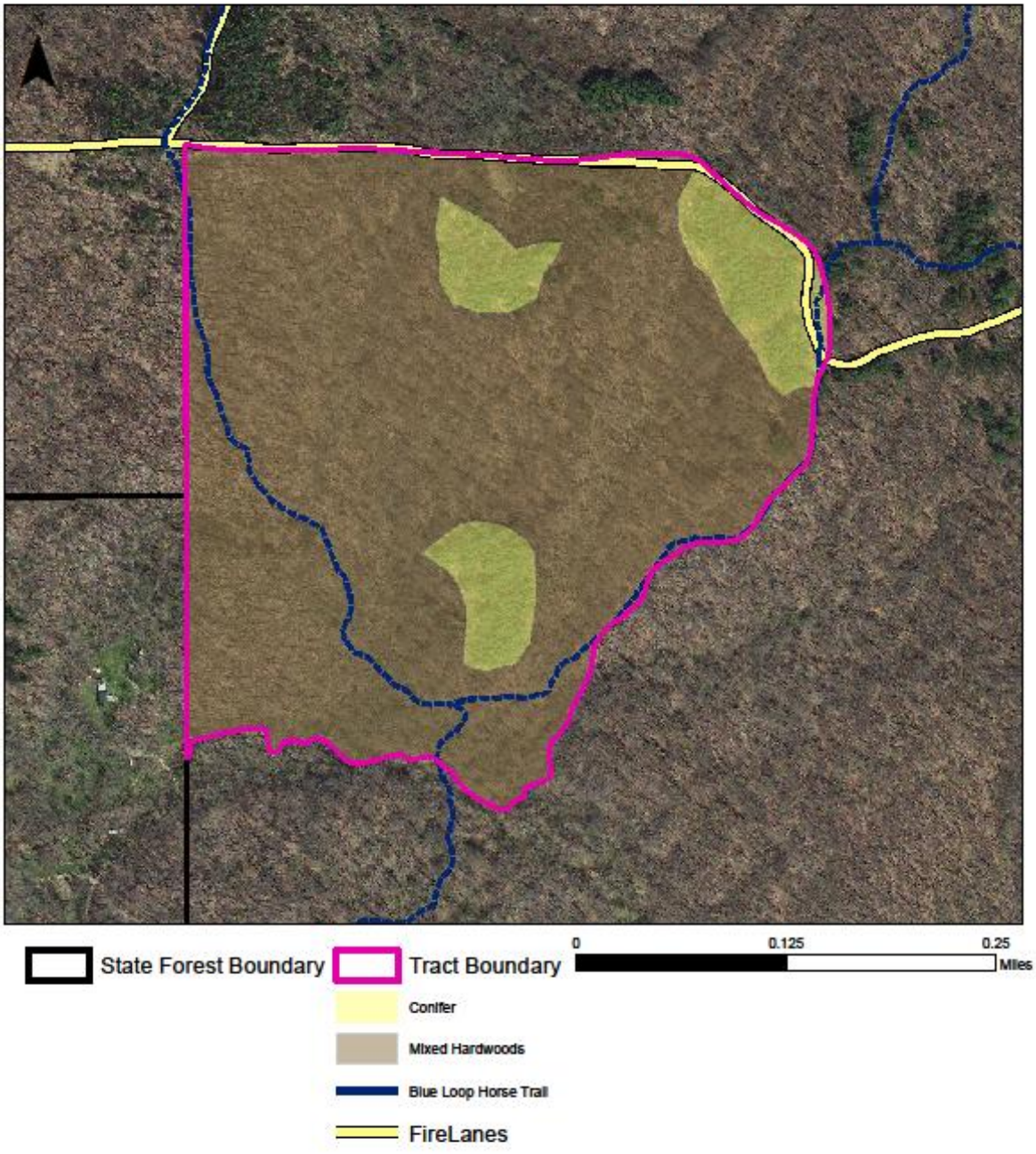
Proposed Activities Listing

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Treat vines and invasive species	2021 - 2022
Mark and Sell Timber Sale	2022 - 2024
Post-harvest Timber Stand Improvement	1-2 years following harvest
Forest Growth and Periodic Monitoring	3 years post-harvest - 2041
Inventory and Revise Management Guide	20 years following harvest

Compartment 4 Tract 8



Owen-Putnam State Forest
Compartment 4 Tract 8
Cover Type Map



Owen-Putnam State Forest | Compartment: 08 | Tract: 13
Forester: Taylor Ardisson | Date: 10/15/2021 | Acres: 88
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location
The tract, also known as 6380813, is in Owen County, Indiana, more specifically, the northwest quarter of section 35, township 11 north, range 4 west within the Montgomery Township. This tract is approximately 7 miles northwest of Spencer, Indiana.

General Description
This tract consists of a mixed hardwoods forest type as well as a small 4 acre stand of planted hardwoods. Within the tract there are areas of mature or overmature timber with closed canopy conditions. This type of canopy conditions minimizes light reaching the forest floor resulting in reduced regeneration of shade intolerant species.

History
On July 5th, 2007, 91 acres was purchased from Minnie Jo Chapman. 86 acres of the purchase became compartment 8 tract 13.

There is some evidence of past management activity (i.e., old skid trails), but no record of state management activities since the acquisition.

Landscape Context
Directly to the west are several other tracts within compartment 8, all contiguous and forested.

Private property lies to the north, south and west. The surrounding landscape is mostly forested with fragmented areas consisting of agricultural use and rural residences.

There are no anticipated land use changes to the surrounding area in the near future.

Topography, Geology and Hydrology
The topography of this tract varies significantly. The eastern portion of the tract consists of a relatively flat hilltop with several eastern sloping ridges with moderate to steep drainages between. The western portion of the tract is gently rolling topography on a southern aspect, as well with some ephemeral drainages.

There is one mapped perennial stream on the eastern edge of the tract, Rattlesnake Creek, that flows to the south through Owen County and drains into the White River. During any management activities tops would be removed from the stream and best management practices would be followed.

There is a mapped intermittent stream located on the western boundary of the tract. During any management activities tops would be removed from the stream and best management practices would be followed.

The geology of the tract consists of 12 different soil series. No select few soil series make up a majority. The parent material of the 12 soil series consists of a loess over a type of till, a loamy till, or a loamy alluvium.

Soils

AloB2- Ava silt loam, 2 to 6 percent slopes, eroded
This gently sloping, deep, moderately well drained is on knolls and narrow ridgetops and on sideslopes along drainage ways in the uplands. It is well suited to trees and has a site index of 75 for white oak and 90 for yellow poplar.

HepG- Hickory-Adyeville complex, 35 to 60 percent slopes
This very steep, deep, well-drained soil is on dissected till plains over interbedded shale, siltstone, and sandstone. It is well suited to trees. Erosion hazards and equipment limitations are main management concerns due to slopes. Consideration should be given during sale planning and implementation of Best Management Practices for Water Quality This soil has a site index of 85 for white oak and 95 for yellow poplar.

HesG- Hickory-Chetwynd loams, 35 to 70 percent slopes
This very steep, deep, well-drained soil is on dissected till plains. It is well suited to trees. Erosion hazards and equipment limitations are main management concerns due to slopes. Consideration should be given during sale planning and implementation of Best Management Practices for Water Quality This soil has a site index of 85 for white oak and 95 for yellow poplar.

HleAV- Holton silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, somewhat poorly drained soil in on flood plains. It is well suited to trees. Equipment limitation, seedling mortality, and windthrow hazard are concerns that should be considered when planning management activities. Timing of activities should consider wet times of year. This soil has a site index of 80 for northern red oak and 90 for yellow poplar.

OfaAV- Oldenburg silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, moderately well drained soil in on flood plains. It is well suited to trees. Equipment limitations and windthrow hazards are concerns that should be considered when planning management activities. Timing of activities should consider wet times of year. This soil has a site index of 90 for northern red oak and 94 for yellow poplar.

OmkC3- Otwell silt loam, 6 to 12 percent slopes, severely eroded
This moderately sloping, deep, well drained, and moderately well drained soil is on side slopes on lacustrine terraces. The soil is well suited to trees. Windthrow hazards and seedling mortality are concerns that should be considered when planning management activities. This soil has a site index of 65 for white oak.

PbbC2- Parke silt loam, 6 to 12 percent slopes, eroded
This moderately sloping, deep, well-drained soil is on the sides of ridges and knolls and along drainageways in the uplands. It is well suited to trees and has a site index of 90 for white oak and 98 for yellow poplar.

SfoA- Shakamak silt loam, 1 to 3 percent slopes
This very gently sloping, deep, somewhat poorly drained, and moderately well drained soil is on ridgetops and along drainageways. A fragipan is present and restricts root development. This soil is well suited to trees and has a site index of 75 for white oak and 90 for yellow poplar.

SneC2- Solsberry silt loam, 6 to 12 percent slopes, eroded
This moderately sloping, deep, moderately well drained soil is on the side slopes of the uplands. It is well suited to trees. Windthrow hazards are a concern that should be considered during management planning. This soil has a site index of 80 for northern red oak.

WpuAV- Wirt silt loam, 0 to 2 percent slopes, frequently flooded, very brief duration
This nearly level, deep, well-drained soil is found on natural levees and floodplain steps on flood plains. It is well suited to trees. Equipment limitation and seedling mortality are management concerns that should be considered when planning management activities. This soil has a site index of 105 for yellow poplar.

ZamD2- Zanesville silt loam, soft bedrock substratum, 12 to 18 percent slopes, eroded
This strongly sloping, deep, moderately well drained soil is on narrow side slopes in the uplands. It is well suited to trees. A fragipan is present that can limit rooting depth. Erosion hazards and equipment limitations are main concerns that should be considered when planning management activities. It has a site index of 69 for white oak and 90 for yellow poplar.

ZapD3- Zanesville, soft bedrock substratum-Tulip silt loams, 12 to 18 percent slopes, severely eroded
This strongly sloping, deep, moderately well drained soil is on narrow side slopes in the uplands. It is well suited to trees. A fragipan is present that can limit rooting depth. Erosion hazards and equipment limitations are main concerns that should be considered when planning management activities. This soil has a site index of 69 for white oak and 90 for yellow poplar.

Access

Management access to this tract utilizes a private residence driveway off Rattlesnake Road. This access is for management activities only. A fire access road is located beyond the residence driveway extending into the tract providing direct access to the main ridge. There is a spur road creating a northern fire access road, but its less pronounced and would not be used. At the top of the ridge, the fire access road continues to the northwest boundary. The road conditions are poor in many areas.

Directions to this management access point consist of turning north off State Road 46 onto Rattlesnake Road traveling for approximately 4 miles. Rattlesnake Road is about 3 miles west of Spencer, Indiana.

Access within the tract is good and may only be restricted by steep topography in given areas.

Boundary

All tract boundaries besides the west serve as the property boundary. Due to the tract boundary acting as the property boundary, the boundary does not follow any defined ridges, drainages, or creeks. The state forest boundary line was identified using field evidence such as corner stones or survey rebar and GPS handheld units when no field evidence was identified. Property lines are typically painted with orange paint or flagged when there is a lack of evidence. The western boundary of the sale follows a drainage that heads to the south, of which some is an intermittent stream.

Ecological Considerations

A diverse assortment of wildlife resources is found on this tract conducive to providing habitat for a variety of wildlife species. Habitat includes:

- Contiguous Mixed hardwood canopy
- Diverse age, size, and species composition throughout the understory and midstory of the canopy.
- Close proximity of a perennial stream.

Hard mast trees such as oaks, hickories, and American beech provide food source to both game and non-game species.

Forest wildlife species depend on live trees for shelter, escape cover, roosting and as a direct (e.g., mast, foliage) or indirect (e.g., foraging substrate) food resource. The retention of live trees within various diameter classes is of particular concern to habitat specialists such as the Indiana bat.

The Division of Forestry has developed compartment level guidelines for 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.

Snags (All Species)	Maintenance Level	Inventory	Available Above Maintenance
Snag 5"+ DBH	280	700	420
Snag 9"+ DBH	210	288	78
Snag 19"+ DBH	35	8	-27

Inventory data for Compartment 8 Tract 13 shows that snags 5” + and 9” + exceed maintenance levels, while snags 19” + are below target maintenance levels.

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. The prescribed management will maintain or enhance the relative abundance of these features.

This tract consists of the typical plant communities that would be found on various aspects in Owen County. Plant diversity consists of but not limited to paw paw, spicebush, blackberry,

greenbrier, and viburnum species. It is also not uncommon to come across flowering dogwood, eastern redbud or hop hornbeam saplings in the understory. Some invasive species include multiflora rose, scattered autumn olive, and patches of Japanese stiltgrass. Treatment efforts should be taken on a situational approach during preharvest or post-harvest TSI.

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened or Endangered communities were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Recreation

Recreational use of this tract is low due to the limited public access. Public access to this tract is from a parking lot at the end of Powell Lane (also known as Hodge Road) which heads south off Weilhamer Road. The tract begins approximately a third of a mile to the east of the parking lot. Any recreational use of this tract would be hunting and primarily by adjacent landowners. During any management activity, specifically a timber harvest, access into this tract will be restricted due to safety concerns. Following the prescribed management activities, the tract would reopen for public use.

Cultural

Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources noted will be avoided during any activities.

Tract Subdivision Description and Silvicultural Prescription

Forest Condition

A current forest resource inventory was completed in October 2021 by Forester Bob Lindemuth. A summary of the estimate tract inventory results is located in the table below.

Tract Summary Data (Trees > 14" DBH)

Species	# Sawtimber Trees	Total Bd. Ft
Yellow Poplar	767	230,390
Northern Red Oak	426	121,260
Pignut Hickory	406	96,200
American Beech	351	75,890
Sugar Maple	332	54,940
White Oak	115	42,190
Largetooth Aspen	152	37,420
Red Maple	73	18,410
Shagbark Hickory	70	13,510
White Ash	14	8,860
Blackgum	49	3,490
TRACT TOTALS	2,755	702,560

Property Residential (14 acres)
These 14 acres consists of two state residences, storage buildings, and yard area. Additional area was included due to limited management access due to residences/structures. A small portion of the northern section may be included in the scheduled timber harvest.

Tree Planting (4 Acres)
This cover type is in the lower southeast corner of the tract. The tree planting age is unknown, however appears to be 20-35 years old. The species composition consists of white oak, bur oak, black walnut, red oak, white ash, bald cypress and scattered white pine. Most of the oak species within this stand are 4-6 inches DBH (diameter at breast height – 4.5' from ground level) and directly competing with each other. There is scattered invasive species within this stand as well. There is yellow poplar and American sycamore which have naturally regenerated and directly competing with the planted species.

Recommended management for this cover type is to treat the invasive species and conduct timber stand improvement (TSI). TSI should focus on removing trees with poor form, releasing oak and walnut species, and pruning, where applicable. This will promote upward growth, improve crown spacing, and release competition with oak and walnut species. Other planted species of quality should be retained for diversity, where applicable.

Mixed Hardwoods (70 Acres)
This cover type is characterized by the diverse species composition. This stand type is 80% of the total tract and is fully stocked. The stocking rate is 84% with ~98 trees per acre and an average basal area of 106. The cover type contains an estimated 10,036 bd. ft. per acre. The three dominant species in the dominant and codominant crown position are: yellow poplar (33%), northern red oak (17%), followed by pignut hickory (14%). The midstory (pole sized timber) consists of red maple (25%), sugar maple (22%) and yellow poplar (14%).

The stand currently is 39% oak and hickory, 22% maple and beech and 33% yellow poplar. There was a significant amount of sugar borer damage observed. Additionally, crown dieback was observed within the codominant and dominant position trees where competition is a factor. A prescribed fire rotation would be a useful management activity within this tract to assist with understory control and promoting oak and hickory regeneration.

The recommended management activity is to conduct an improvement harvest utilizing single tree selection targeting poorly formed individuals, trees declining in health and trees with a small percentage of live crown. In return, this will give the diverse healthier trees with good form and larger live crown percentage more available resources above and below ground. Where conditions warrant, group selection or patch-cut silviculture should be utilized to facilitate the regeneration of shade intolerant species as well as a new cohort of young forest habitat. When possible, selection should favor releasing desired future crop trees.

The top species for removal within this stand are yellow poplar, laregetooth aspen, and American beech. The harvest volume for this stand is projected at 3,000-4,000 bd. ft. per acre. Undesirable poles in the midstory should be minimized as well to allow more sunlight to reach the forest floor thus promoting oak and hickory regeneration. Following the timber harvest, TSI should be

conducted to complete the management process. Specifically, TSI will concentrate on completion of regeneration openings, crop tree release, and reduction of problematic vines.

Desired Future Condition
The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by mid- and late-seral species, while providing diverse habitat structure, hard mast and mid to late-seral habitat for wildlife.

Summary Tract Silvicultural Prescription and Proposed Activities

The proposed management activity is to conduct an improvement harvest to promote the overall health, vigor, resiliency, and quality of the stand. This improvement harvest will utilize single tree and group selection or patch-cut silviculture. The purpose of single tree selection is to remove trees with poor form and health, drought stressed or wind damaged trees to promote a healthier growing forest. It will also target declining ash from Emerald ash borer, mature and over mature trees where present, and other intermediate trees needed to release residual crop trees. Young, vigorous ash will be retained for possible resistant features. Group selection will be used to target groups of trees that fit the above description growing together.

Within two years following the timber harvest, a TSI operation should follow to release crop trees that were not adequately released during the harvest and complete regeneration openings. Additionally, TSI should be utilized to control targeted invasive species in the tract and deaden a small percentage of low value trees to create snags for wildlife, such as the Indiana bat.

During and after completion of the proposed management activity best management practices (BMP's) will be implemented to minimize soil erosion. This tract should receive another inventory and management guide 15-20 years following the completion of the timber harvest.

Effect of Prescription on Tract Properties:
Landscape: Landscape forest patterns will remain similar to the current situation due to this tract being kept in a forested condition.

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting, but this should be confined to landings and main skid trails. These areas will be properly closed out according to Indiana's BMPs to minimize the impact of management activities on soils.

Hydrology: Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators and monitored by property foresters.

Wildlife: Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future. Regeneration openings, such as prescribed have been shown to be of less of an issue from nest predators and generalist species as compared to hard edges such as public roadways, utility corridors and crop field edges. Placement of regeneration openings away from hard edges can

minimize these potential impacts. The prescribed activity will promote wildlife diversity and enhance habitat structural components.

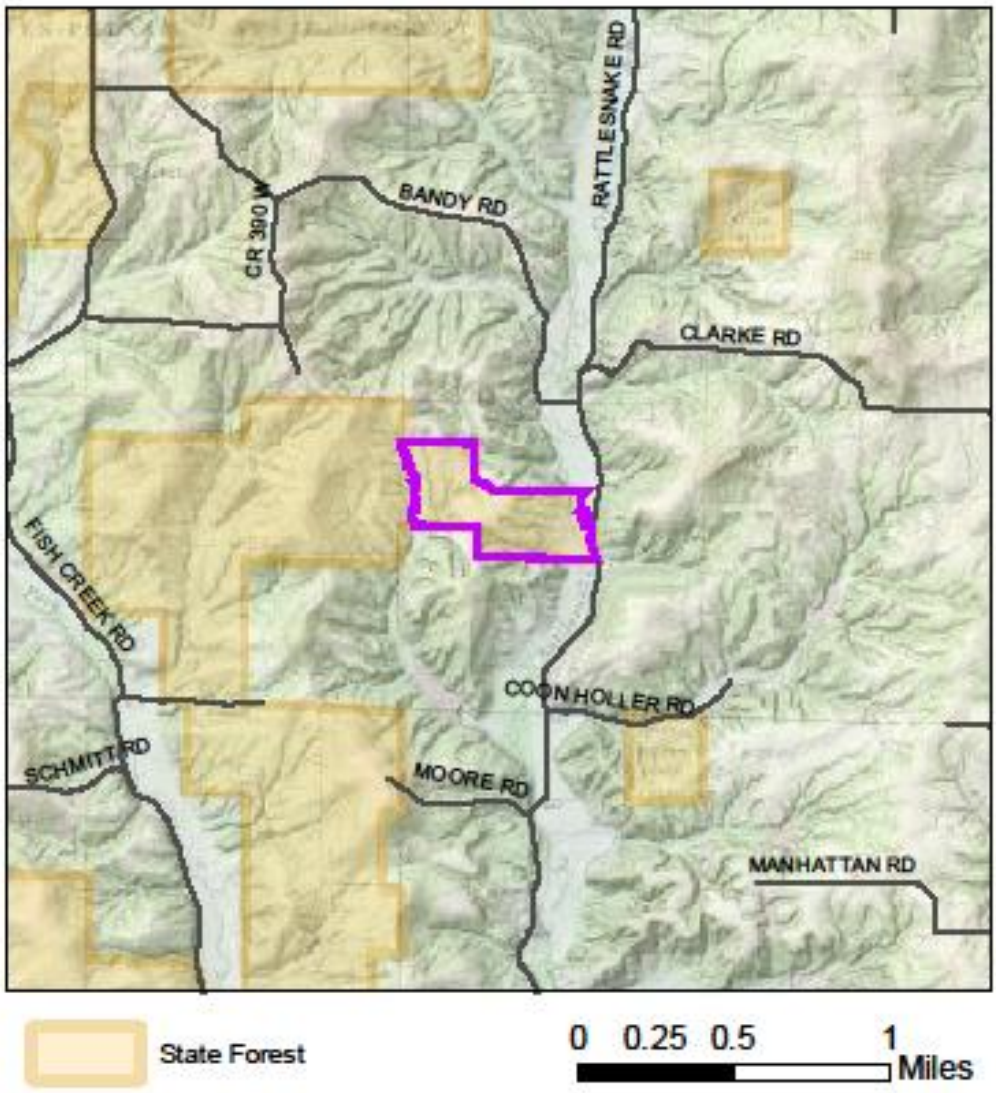
Additionally, management activities involving a timber harvest should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. Creation of regeneration openings will create early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

Recreation: Hunters through private property access or through Owen-Putnam state forest access would benefit from forest management by improving the health of the residual trees thus promoting an increase in hard mast, understory plant diversity, and young forest habitat. For user safety, all access will be suspended during management activities.

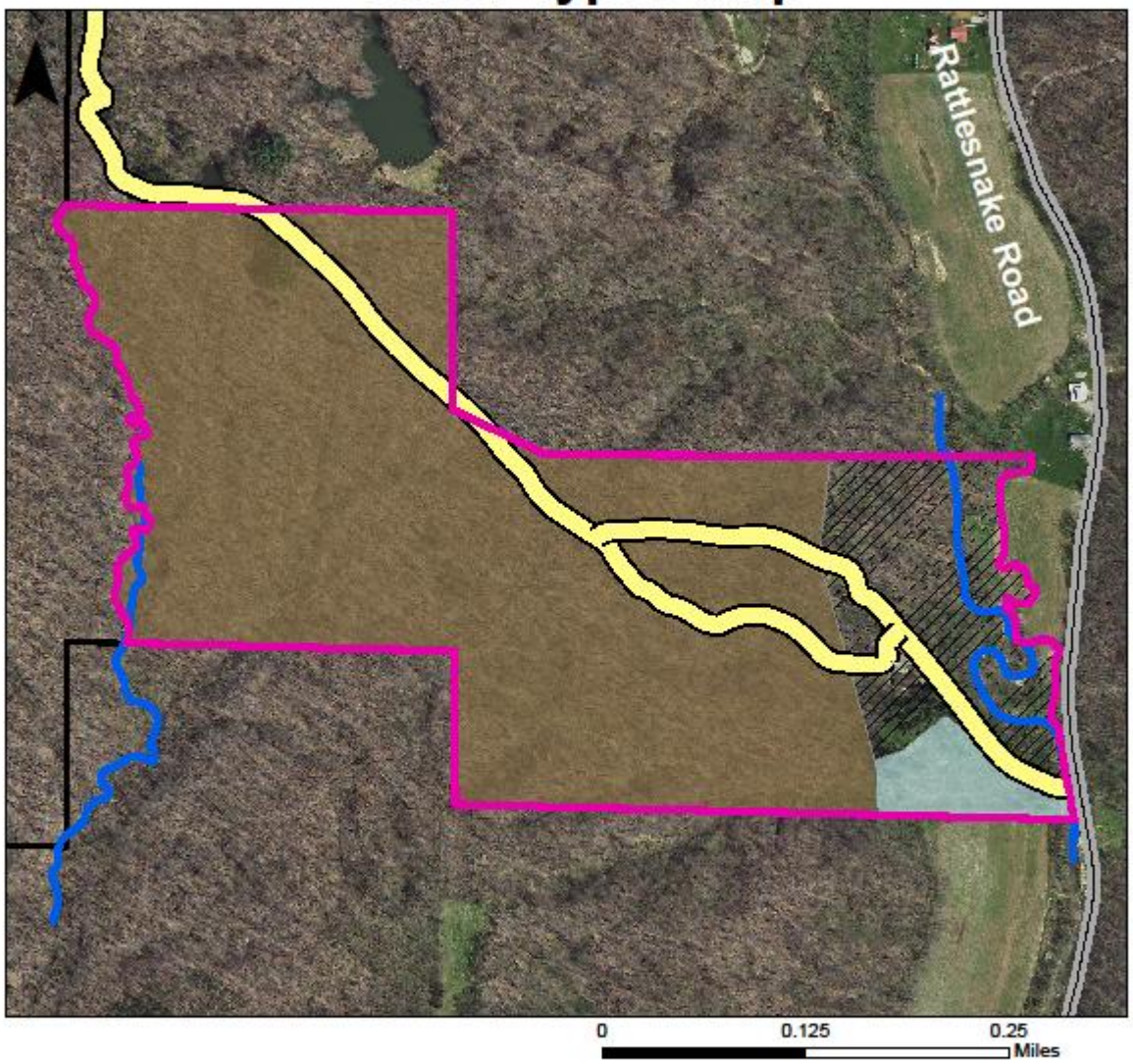
Proposed Activities Listing

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Treat vines and invasive plants	2021 – 2022
Mark and Sell Timber Sale	2022 – 2023
Post-harvest Timber Stand Improvement	1-2 years following harvest
Forest Growth and Periodic Monitoring	3 years post-harvest - 2050
Inventory and Revise Management Guide	15-20 years following harvest

Compartment 8 Tract 13



Owen-Putnam State Forest
Compartment 8 Tract 13
Cover Types Map



Public highways
Tract Boundary
FireLanes
Mixed Hardwoods
Tree Planting
State Forest Boundary
Property Residential
Mapped Streams