Indiana Department of Natural Resources
Division of Forestry

Indiana Department of Natural Resources

Resource Management Guides
Harrison-Crawford 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 Harrison-Crawford State Forest.

Compartment 5 Tract 8
Compartment 8 Tract 5
Compartment 23 Tract 2
Compartment 30 Tract 1

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.

Harrison Crawford State Forest | Compartment: 5 Tract: 8
Inventorying Forester: E. Wilcoxson | Date: April 1, 2018 Acres: 74
Management Cycle End Year 2038 | Management Cycle Length: 20 years

Location

Tract 8, also known as 6340508, is in Whiskey Run Township in Crawford County, Indiana on the Blue River. The tract comprises the west half of the southeast quarter of section 3 T3S R2E, with a small exception which is on the east side of the Blue River which is part of tract 6340604. Tract 8 is located approximately 4 miles south of Milltown, Indiana, 5 miles northeast of Carefree, Indiana, 7 miles northeast of the town of Leavenworth, Indiana, and 10 miles northwest of Corydon, Indiana. The tract is 2 miles north of I-64 and 4 miles east of SR-66.

General Description

The tract is approximately 74 acres. Within the tract, there are four distinct cover types on this tract: Oak Hickory, Mixed Mesic Hardwoods, Rocky Steep, and Open. Table 1 details the acreage and volume of a given cover type. See Appendix 1 for a map of cover type locations.

Table 1. Tract 8 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume	Percent of Volume
Oak Hickory	36.7	50%	414,890	55%
Mixed Mesic Hardwoods	26.0	35%	271,810	36%
Rocky Steep	9.9	13%	61,580	8%
Open	1.2	2%	0	0%
Total	**73.8**	**100%**	**748,280**	**100%**

History

Acquisition 1944 to 1987

The southern half of the tract (40 acres) was acquired from Rea M. Rothrock June 1, of 1944 for a price of $500. The northern half of tract 8 and the tip of neighboring tract compartment 6 tract 4 (40 acres) was acquired from Willie J. Dubois March 5, 1987 for a price of $18,000.

Aerial Photography 1940 to 1960

Aerial photography from 1940 to 1960 shows a large portion of the tract, approximately 25 acres, is a field which is in places reverting back to forest cover.

Field Notes 1979

“On this date [1979] I ran a quick recon of this tract. Access into the tract is very easy from the “Jeep Trail” that forms the north boundary but some work would have to be done to make it passable to vehicles.

This timber was harvested prior to acquisition by the State and the remaining timber is only now getting to sawtimber size. TSI should be performed to remove cull beech scattered throughout

the stand. There is a high percentage of black walnut trees along the stream bottoms and lower slopes. No harvest is feasible for at least 15 years and this area should be cruised prior to that."

Hardly any evidence (stumps or water bars) was noted from the last harvest. One skid trail was noted.

Landscape Context

The dominant land uses within a 5-mile radius of the tract are agricultural and forestlands. There is some development along SR-66, west of the tract, near I-64, south of the tract, and in the towns of Milltown and Carefree. The tract is bordered to the east by the Blue River. Additionally, northeast of the tract, along the west bank of the Blue River, lies the 75-acre Blue River Gravel Wash Barrens Nature Preserve.

Topography, Geology and Hydrology

Tract 8 is comprised of one major ridge with the ridge top located in the south-central portion of the tract. Much of the ridge slope east and meets Blue River. The north portion of these slopes would be better characterized as bluffs. The entire area is crossed by small drainages although there is one larger drainage crossing the northwest corner of the tract.

This tract is crossed by numerous small drainages, the largest of which crosses the northwest corner of the tract. These drainages ultimately flow into the Blue River which is situated in the northeast corner of the tract. This area also has karst hydrology typical of much of the area, with springs, sinkholes, and caves being common. These features will be avoided, buffered, or otherwise managed to minimize adverse impacts during management activities.

Soils

Tract 8 has 28 acres (37%), across most of the ridge top, covered in Apalonia Silt Loam this is the most prevalent soil type. There are 24 acres (32%) covered in Tipsaw Very Fine Sandy Loam predominately on the slopes immediately adjacent to the ridge tops above the bluffs. There are 10 acres (13%) covered in Corydon Stony Silt on the bluffs in the northeast corner of the tract. Additionally, Udorthents Soils and Wellston Silt Loam are also present.

<u>Apalonia Silt Loam (AgrA. AgrB, AgrC2, AgrC3)</u>

The Apalonia series consists of very deep, moderately well drained soils forms in loess and the underlying residuum from shale with limestone and siltstone. They are moderately deep or shallow to a fragipan. The surface horizon is a silt loam 8 inches thick. The first 8 inches of the subsoil is a silty clay loam. The next 33 inches is a silt loam. The next 11 inches is clay then it turns into a clay loam for 9 inches. The last 21 inches of the subsoil is a loam. The bedrock is weakly cemented shale with moderately and strongly cemented sandstone. The mean annual precipitation is about 43 inches and the mean annual temperature is about 54 degrees F.
Degree Slope: 0-12%
Woodland suitability group: 3d9
Site Index: 60
Growth Range potential: 258

Management Concerns: runoff and erosion

Tipsaw Very Fine Sandy Loam (TbIG)

The Tipsaw series consists of moderately deep, somewhat excessively drained soils. They formed in loamy residuum from sandstone with shale and siltstone. The surface is a dark grey very fine sandy loam about 2 inches thick. The subsurface horizon is also a very fine sandy loam about 3 inches thick. The subsoil is 15 inches is a fine sand loam and the last 20 inches is a loam. The bedrock consist of a weakly cemented and moderately cemented sandstone with shale, siltstone. The mean annual precipitation is about 43 inches, and mean annual temperature is about 54 degrees F. Permeability is moderate or moderately rapid
Degree Slope: 20-70%
Woodland Suitability: 3r12
Site Index: 70
Growth Range potential: 342
Management Concerns: runoff and erosion

Corydon Stony Silt (CqyG)

The Corydon series consists of shallow, well drained soils that formed in as much as 8 inches of loess and in the underlying limestone residuum. The Corydon soils are on hills underlain with limestone. The surface horizon is 8 inches of a silt loam. The subsoil is 9 inches of clay. The bottom of the profile is unweathered bedrock. Mean annual precipitation is about 44 inches, and mean annual air temperature is about 54 degrees F.
Degree Slope: 20-60%
Woodland suitability group: 1o8
Site Index: 64
Growth Range potential: 258
Management Concerns: runoff and erosion

Access

Currently there is no developed access into this part of the State Forest.

Boundaries

The tract comprises the west half of the southeast quarter of section 3 T3S R2E, with a small exception which is on the east side of the Blue River which is part of tract 6340604. The tract is bounded to the south, west, and north by the quarter section lines of the southeast quarter of section 3 T3S R2E. To the east the tract is bounded by the Blue River for a short distance and by the quarter quarter section line.

Ecological Considerations

This tract represents typical oak hickory and mixed mesic habitat, in addition to a component of old field successional habitat, with cedar and smaller hardwoods. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. Hard mast food sources are provided by the abundant oaks and hickories in the tract.

In concert with various agencies and organizations, the Division of Forestry has developed compartment level guidelines for features: snag. Snags were tallied in this inventory and summarized in the following tables.

Guidelines for snag tree levels (trees/acre)

Number of snags per acre	Guidelines Maintenance	Guidelines Optimal	Tract 8 actual	
6-8" DBH class	1.0	1.0	9.4	above optimal
10-18" DBH class	2.5	5.0	7.0	above optimal
20" + DBH class	0.5	1.0	0.7	above maintenance
Total	**4.0**	**7.0**	**17.1**	

This data shows that all snag densities are above the maintenance level guidelines on this tract. It is likely that additional snags will be created by harvest operations and post-harvest TSI. Management activities will not intentionally remove snags, with a few exceptions, including when a snag poses a physical hazard to field personnel.

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

Multiflora rose was observed at the time of the inventory scattered across the tract with the heaviest infestation occurring on the flat ridgetop in the south-central part of the tract. Garlic mustard was prolific across the bluffs above Blue River. A very limited number of autumn olive and bush honeysuckle were observed at the time of the inventory. Measures to control these species should be on a situational bases based on their presence within the county.

Recreation

This tract does not have established recreational trails, facilities, or amenities. The area is likely used for hunting by local residents. Several deer stands were observed at the time of the inventory. Due to the limited accessibility the tract has very limited potential for developed recreation.

Cultural

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

Tract Subdivision Description and Silvicultural Prescription

Oak Hickory – 36.7 acres

This cover type is found across 50% of the tract acreage, it covers majority of the slopes with the exception of the areas around the drainages. 55% of the volume found on the tract is located within this cover type. 82% of the volume within this cover type is made up of oak and hickory species. The most abundant species is white oak which comprises 25% of the volume (103,090 board feet) within the cover type, black oak is the second most common species making up 23% of the volume (94,240 board feet), and pignut hickory is third with 14% of the volume (56,230 board feet). Other less common oak and hickory species included shagbark hickory, scarlet oak, chestnut oak, Northern red oak, mockernut hickory, and post oak.

Mixed Mesic Hardwoods – 26.0 acres

This cover type is found across 35% of the tract acreage, it covers the flat ridge top and the areas around the drainages. This cover type holds 35% of the volume found on the tract. The most abundant species is yellow poplar which comprises 45% of the volume (123,090 board feet) within the cover type, sugar maple is the second most common species making up 16% of the volume (44,220 board feet), and red maple is third with 8% of the volume (22,970 board feet). Other less common species include pignut hickory, chestnut oak, American beech, Eastern red cedar, sassafras, scarlet oak, shagbark hickory, white ash, blackgum, Shumard oak, and black oak.

Rocky Steep – 9.9 acres

This cover type is found in the northeast corner of the tract on the bluffs above the Blue River and includes 13% of the tract acreage and holds 8% of the volume found on the tract. The most abundant species inventoried was chinkapin oak which comprises 21% of the volume (12,670 board feet) within the cover type, white ash is the second most common species making up 16% of the volume (9,550 board feet), and yellow poplar is third with 15% of the volume (9,000 board feet). Other less common species include sugar maple, pignut hickory, scarlet oak, mockernut hickory, white oak, Northern red oak, and black walnut.

Open – 1.2 acres

This cover type includes 1.2 acres of the Blue River, 2% of the tract acreage, in the northeast corner of the tract.

Tract Summary Data

The acreage of this tract is approximately 74 acres. There are four distinct cover types on this tract: Oak Hickory, Mixed Mesic Hardwoods, Rocky Steep, and Open. There is a total of 755,100 board feet within tract 8. Figure 1. shows the volume distribution by species across the tract.

Table 2. Inventory Summary

	TOTAL (bd ft)
Volume per acre	10,204
Volume total	755,100
Pole Volume per Acre	3,486
Pole Volume Total	258,000
Basal area/acre	110.6
Trees/acre	137

Figure 1. Volume Distribution by Species

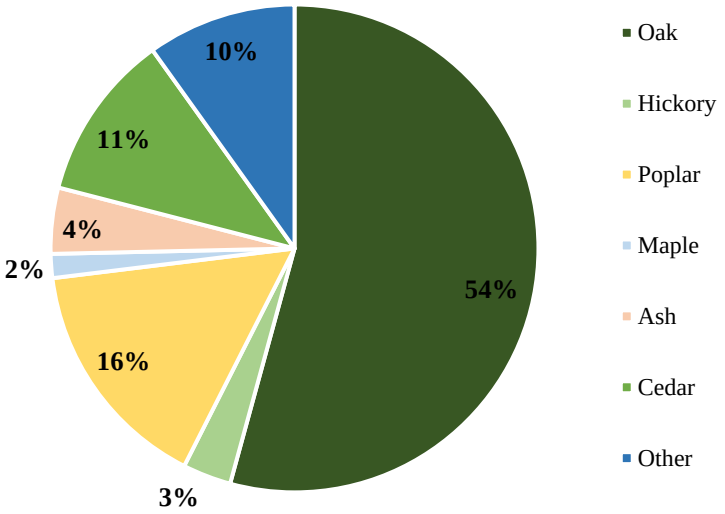


Table 3. Tract 8 Inventory Summary

SPECIES	TOTAL	
	Per acre	Total
Yellow Poplar	2,214	163,830
White Oak	1,590	117,680
Black Oak	1,448	107,140
Pignut Hickory	1,131	83,730
Sugar Maple	928	68,650
Shagbark Hickory	716	53,020
Red Maple	392	29,020
Scarlet Oak	360	26,640
Chestnut Oak	344	25,440
American Beech	169	12,510
White Ash	162	12,000
Chinkapin Oak	157	11,650
Northern Red Oak	140	10,340
*Eastern Red Cedar**	*118*	*8,730*
Mockernut Hickory	103	7,610
*Miscellaneous***	*231*	*17,110*
Total	10,204	755,100

** Cedar volume was calculated using a special cedar scale that counts volume in trees 6" DBH and larger, which results in high volumes for stands of small trees.*

***Miscellaneous includes those species which had a total volume less than 5,000 board feet including sassafras, persimmon, blackgum, Shumard oak, black walnut, and post oak.*

Summary Tract Silvicultural Prescription and Proposed Activities

Oak Hickory

Current condition:

This cover type is found across 50% of the tract acreage, it covers majority of the slopes with the exception of the areas around the drainages. 55% of the volume found on the tract is located within this cover type. 82% of the volume within this cover type is made up of oak and hickory species. The most abundant species is white oak which comprises 25% of the volume (103,090 board feet) within the cover type, black oak is the second most common species making up 23% of the volume (94,240 board feet), and pignut hickory is third with 14% of the volume (56,230 board feet). Other less common oak and hickory species included shagbark hickory, scarlet oak, chestnut oak, Northern red oak, mockernut hickory, and post oak. The mid-story (pole sized timber) is dominated by sugar maple, pignut hickory, black oak, and red maple. The understory is dominated by sugar maple and American beech. Currently, the cover type is 97% stocked, see Appendix 6. The inventory is summarized in Table 4 with sawtimber species composition detailed in Table 5.

Table 4. Oak Hickory Inventory Summary

	TOTAL (bd ft)
Volume per acre	11,305
Volume total	414,890
Pole Volume per Acre	3,590
Pole Volume Total	131,750
Basal Area per Acre	118.3
Trees per Acre	144

Table 5. Oak Hickory Volume by Species

Species	**TOTAL (bd ft)**
White Oak	103,090
Black Oak	94,240
Pignut Hickory	56,230
Shagbark Hickory	44,290
Yellow Poplar	43,280
Sugar Maple	19,680
Scarlet Oak	17,160
Chestnut Oak	10,970
Red Maple	8,070
Northern Red Oak	6,710
*Miscellaneous**	*11,170*
Total	**414,890**

**Miscellaneous includes those species which had a total volume less than 5,000 board feet including mockernut hickory, American beech, persimmon, and post oak.*

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 oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Silvicultural Prescription:

In order to meet the desired future condition, the tract could use an improvement harvest. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. According to the inventory data an estimated 20-40% of the volume would be removed from this cover type. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic

species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to ensure the supply of oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. Stocking in this cover type would be reduced from the current 97% to approximately 47%. This seemingly drastic drop in stocking would result from the removal of less desirable species such as sugar maple, the removal of yellow poplar suffering from drought stress, and the removal of oaks (predominantly black oak) which are reaching their end of their natural lifespan.

Uneven aged management requires that trees in all size classes be removed during harvesting to ensure regeneration. Given that many of these will be un-merchantable, post-harvest TSI will be needed to ensure that poorly-formed, low-quality trees are removed and the understory is treated to eliminate shade tolerant species in favor of oaks and other more desirable species. The girdling of large cull trees will also help to replace any large snags that are accidentally felled during harvest operations as well as increase the downed woody material present and provide invertebrate and small vertebrate habitat. TSI will also be needed to control invasives that are present on the tract.

Mixed Mesic Hardwoods

Current Condition:

This cover type is found across 35% of the tract acreage, it covers the flat ridge top and the areas around the drainages. This cover type holds 35% of the volume found on the tract. The most abundant species is yellow poplar which comprises 45% of the volume (123,090 board feet) within the cover type, sugar maple is the second most common species making up 16% of the volume (44,220 board feet), and red maple is third with 8% of the volume (22,970 board feet). Other less common species include pignut hickory, chestnut oak, American beech, Eastern red cedar, sassafras, scarlet oak, shagbark hickory, white ash, blackgum, Shumard oak, and black oak. The mid-story (pole sized timber) is dominated by red maple, sugar maple, and yellow poplar. Pignut hickory, blackgum, and American beech are also present in the mid-story of the Mixed Mesic Hardwoods cover type. The understory is dominated by American beech although sugar maple and red maple are also present. Currently the cover type is around 88% stocked, see Appendix 6. The inventory is summarized in Table 6 with species composition detailed in Table 7.

Table 6. Mixed Mesic Hardwoods Inventory Summary

	TOTAL (bd ft)
Volume per acre	10,454
Volume total	271,810
Pole Volume per Acre	3,337
Pole Volume Total	86,750
Basal Area per Acre	109.3
Trees per Acre	124

Table 7. Mixed Mesic Hardwoods Volume by Species

Species	TOTAL (bd ft)
Yellow Poplar	123,090
Sugar Maple	44,220
Red Maple	22,970
Pignut Hickory	19,610
Chestnut Oak	15,180
American Beech	10,580
*Eastern Red Cedar**	*10,010*
*Miscellaneous***	*26,150*
Total	271,810

** Cedar volume was calculated using a special cedar scale that counts volume in trees 6" DBH and larger, which results in high volumes for stands of small trees.*
***Miscellaneous includes those species which had a total volume less than 5,000 board feet including sassafras, scarlet oak, shagbark hickory, white ash, blackgum, Shumard oak, and black oak.*

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 hard mast and mid to late-seral habitat for wildlife.

Silvicultural Prescription:
In order to meet the desired future condition, the tract could use an improvement harvest. According to the inventory data between 30 – 55% of the volume should be removed from this cover type. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should maintain a variety of mesic species. Stocking in this cover type would be reduced from the current 88% to approximately 32%. Similarly to the oak hickory cover type, this seemingly drastic drop in stocking would result from the removal of yellow poplar suffering from drought stress and the removal of less desirable species such as sugar maple and red maple.

Rocky Steep

No silvicultural prescription.

Open

No silvicultural prescription.

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 harvest, but this should be confined to landings and main skid trails. These areas should be properly closed out according to Indiana's BMPs to minimize the impact of management 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.

Wildlife: Wildlife in this tract should not be adversely affected. No rare threatened or endangered species will be adversely affected during the planning period. Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat for the Indiana bat. The main effect on wildlife will be the reduction of the coniferous component of the stratum. This currently provides a limited amount of thermal cover in the winter for deer and small mammals. This type of cover will be permanently reduced from the tract. 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 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.

Wildlife Discussion from Ecological Resource Review: Additionally, management activities involving a timber sale 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: Given the limited amount of recreation (majority of which is hunting) that is carried out on this tract, it will only be minimally and temporarily affected. Hunting opportunities should be improved by the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer and small mammal browse.

PROPOSED ACTIVITIES LISTING

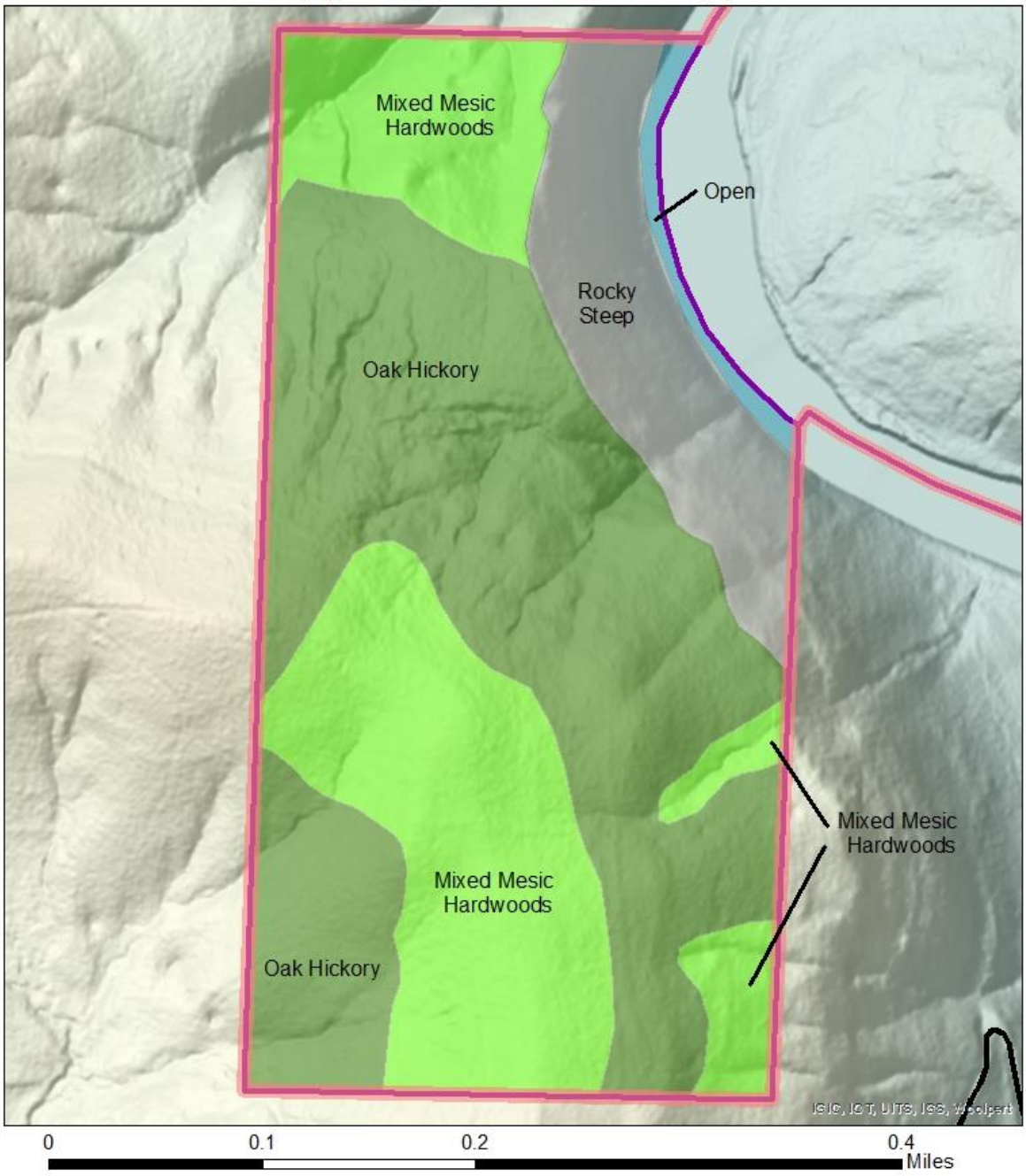
Proposed Activity	Proposed Date
Management Guide	2018
Improve Access	2018 - 2020
Treat Invasive species	2018 - 2020
Mark Timber Harvest	2018 - 2020
Sell Timber	2019 - 2021
Post Harvest TSI	One to two years after harvest
Treat Invasive species	One to three years after harvest
Monitor regeneration openings	Three to four years after harvest
Re-Inventory	2038
Write new Management Plan	2038

Harrison-Crawford State Forest

Indiana Department of Natural Resources

Division of Forestry

Appendix 1 - Cover Types



Harrison Crawford State Forest | Compartment: 8 Tract: 5
Forester: Elena Crosier | Date: January 20, 2021 Acres: 109
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location

The tract, also known as 6340804, is located 9 miles southwest of Corydon in Washington Township in Harrison County, Indiana. The tract is in the southwest quarter of section 6 in T5S R3E.

General Description

The acreage of this tract is approximately 109 acres. There are four distinct cover types on this tract: Mixed Hardwoods, Conifer (called Old Field here), Mesic Oak-Hickory, and Tree Planting.

805 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume (board feet)	Percent of Volume
Mixed Hardwoods	43	53%	270,000	46%
Old Field	32	39%	62,000	19%
Mesic Oak-Hickory	20	24%	89,000	34%
Tree Planting	14	18%	0	0%
Total	**109**	**100%**	**421,000**	**100%**

Values are rounded approximates

History

Acquisition 1946-1951

The tract was acquired in several parcels. In April 1946, the northern portion of the tract was acquired from Ewing and Esther Finn. In August 1951, the southwestern corner of the tract was purchased from Frank and Bessie M. Daily. This area was likely not included in the tract until later.

Resource Management Guide 1973

The resource management guide dated February 20, 1973 describes the tract, which was only 34 acres at the time, as, “comprised of a south facing cover near the center of wolf pen ridge. The timber in this cove is very poor due to poor form, cull trees, and inferior species. The poor condition of this stand is due largely to poor site condition and fire. Timber stand improvement work is needed, however, return from this work would be low due to the poor site and timber conditions.” The inventory shows sugar maple and yellow poplar were the most prevalent overstory species although American beech, American elm, black oak, black walnut, white ash, and white oak were also present.

Timber Harvest 1986

A timber harvest within tract 5 and 8 was marked by Alexandra McQuade and sold to Coffman and Crosier in 1986. Sugar maple was the most prevalent species (26,462 bdft), yellow poplar was second (25,378 bdft), and American beech was third (7,860 bdft). The timber harvest was marked using group selection silvicultural system to remove vast quantities of mature American beech and sugar maple to encourage the regeneration of shade intolerant species. It is mentioned in the SF200, "There was a fair quantity (more than usual) of red oak advanced regeneration in tract 5, TSI in these openings will be very high priority."

Timber Stand Improvement 1987

On April 15, 1987, B. Carr reported the costs for timber stand improvement on 33.5 acres of tract 5 with a focus on the regeneration openings. Predominantly smaller trees were treated as were almost 400 vines. The average diameter of the treated trees was 12 inches.

Tree Planting 1996

Prior to the state's acquisition of the property in 2006, Norman Wooten planted 71 acres of what would become tract 5 and 13. This included 18.3 acres within tract 5 (the tree planting cover type) which records indicate were to be planted to white ash, yellow poplar, northern red oak, and white oak in the spring of 1996 after prep-work, including herbicide applications and stump removals, were completed in 1995.

Acquisition 2006

In November 2006, the majority of the tract (the central portion) was purchased from Stock Yards Bank & Trust Company. This increased the tract acreage from 34 acres to 81 acres.

Salvage Timber Harvest 2009

A salvage timber harvest was marked by Wayne Werne and sold to David Morgan Logging in 2009. Within the tract white oak was the most prevalent species (2,510 bdft), black oak was second (1,720 bdft), and Northern red oak was third (1,000 bdft). The SF200 notes, "Marking objective was solely to recover stumpage damaged by Hurricane Ike on September 14, 2008. These trees were either uprooted (completely down), top damage, or leaning into other trees."

Landscape Context

The dominant land uses within a 5 mile radius of the tract are agricultural and forestlands. There is more development near Corydon (9 miles northeast of the tract). Within 6 miles the towns of New Amsterdam and Mauckport, the Ohio River, O'Bannon Woods State Park (2,000 acres), and numerous Nature Preserves can all be found.

Topography, Geology, and Hydrology

The tract consists of a southwest facing hillside with several decent sized drainages. Blue Spring Hollow runs along the southern boundary of the tract. This area has karst hydrology typical of much of the area, potentially with springs, sinkholes, and caves being common. These features will be avoided, buffered or otherwise treated to minimize adverse impacts during management activities.

Soils
The tract has 63 acres (58%) across the lower and mid slopes covered in Caneyville complex. These soils are described as well drained, hilly with slopes of 25%-60%, and eroded. There are 19 acres (%) covered in Knobcreek-Haggatt-Caneyville complex they cover several pockets primarily in the lower flatter areas of the tract. These soils are described as well drained, karst, rolling, and severely eroded. Additionally, Apalona-Zanesville silt loams, Deuchars-Apalona-Wellston silt loams, Gilpin-Tipsaw-Ebal complex, and Kintner loam are also present in lesser quantities across the tract.

Boundary
The tract is bounded on the northeast and north sides by fire lanes. The tract is bounded on the west side by the drainage with neighboring tract 4. The tract is bounded to the south by Blue Spring Hollow, private property lies on the opposite bank. The southeast side of the tract is bounded by a ridge separating the tract from tract 13.

Access
The tract is accessed from a fire lane off of Weber Lane. The fire lane runs northwest to the tract's eastern side, turns north along the tract boundary, the fire lane then intersects another fire lane, and a turn west would continue along the tract's boundary on the north side. The first 0.3 miles of the fire lane off Weber Lane were drivable at the time of the inventory, however, encroachment of roadside woody vegetation is occurring.

Ecological Considerations
This tract represents typical oak-hickory and mixed mesic habitat, in addition to a component of old field successional habitat, with cedar and smaller hardwoods. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. Hard mast food sources are provided by the abundant oaks and hickories in the tract.

> *The Division of Forestry has developed compartment level guidelines for an important wildlife structural habitat feature: 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	Inventory	Available Above Maintenance
Snag 5"+ DBH	436	1,697	1,261
Snag 9"+ DBH	327	403	76
Snag 19"+ DBH	54.5	82	28

Inventory data for Compartment 8 Tract 5 shows that snags exceed recommended maintenance levels in all diameter classes.

Ailanthus was very prevalent across the tract, with the exception of the tree planting. It ranges from large seed bearing parents to understory sprouts. Multiflora rose was noted scattered across the tract, but was more prevalent in the southern portion. Autumn olive was noted in the southern portion of the tract as well. Additionally, Japanese honeysuckle and Japanese stilt grass were also noted. These are common species prevalent throughout the county.

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

Recreation on this tract is currently limited due to access. The most prominent recreational activity occurring is likely hunting. There are no recreational trails within this tract.

Cultural

Cultural resources may be present but their location is protected. Adverse impacts to significant cultural resources will be avoided during any activities.

Tract Subdivision Description and Silvicultural Prescription

Stand 1 – Mixed Hardwoods – 43 acres

This cover type includes 43 acres and is found across 39% of the tract acreage. This stand covers the upper and mid-slopes in the northeast corner of the tract. This cover type holds 46% of the volume found on the tract. The most abundant species is yellow poplar which comprises 47% of the volume (125,600 board feet) within the cover type, American beech is the second most common species making up 9% of the volume (23,350 board feet), and sugar maple is third with 7% of the volume (19,600 board feet). Other less common species include American elm, American sycamore, black oak, black walnut, chinkapin oak, persimmon, pignut hickory, red maple, sassafras, and white ash. The mid-story (pole sized timber) is dominated by sugar maple. The understory is dominated by red maple, sassafras, and sugar maple.

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 hard mast and mid to late-seral habitat for wildlife.

Given current stand conditions and stocking, to facilitate the desired future condition an improvement harvest could be used over the next 2-5 years. A harvest could remove between 130,000 – 170,000 board feet from this cover type. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. It is estimated that 5-15% of the stand acreage may have

regeneration opening treatments. When possible, selection would also favor releasing future crop trees of timber and wildlife value. The residual stand will maintain a variety of mesic species.

Stand 2 – Old Field – 32 acres

This cover type is found across 32 acres encompassing 29% of the tract acreage. This stand covers the mid to lower slopes across the central and southern portion of the tract. This stand includes 19% of the volume found on the tract. The most abundant species is yellow poplar which comprises 54% of the volume (61,780 board feet) within the cover type, black walnut is the second most common species making up 19% of the volume (21,710 board feet), and Eastern redcedar is the third most common species making up 15% of the volume (17,470 board feet). The mid-story (pole sized timber) and understory are dominated by Eastern redcedar, although honeylocust, sugar maple, and yellow poplar are also prevalent. The understory is dominated by sugar maple.

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 hard mast and mid to late-seral habitat for wildlife.

In order to meet the desired future condition, the Eastern red cedar and the lower grade hardwoods should be removed from this cover type to release existing mid-story oaks and hickories. The use of single tree selection or a regeneration opening may be used in order to remove the cedar and less desirable hardwoods.

Stand 3 – Mesic Oak-Hickory – 20 acres

This cover type includes 20 acres and is found across 18% of the tract acreage. This stand covers the mid to upper slopes in the northwest corner of the tract. 34% of the volume found on the tract is located within this cover type. The most abundant species is sugar maple which comprises 33% of the volume (65,810 board feet) within the cover type, white ash is the second most common species making up 22% of the volume (43,780 board feet), and scarlet oak is third with 19% of the volume (38,460 board feet). Other less common oak and hickory species included chinkapin oak, Northern red oak, and white oak. The mid-story (pole sized timber) and understory are dominated by sugar maple.

The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Given current stand conditions and stocking, and to facilitate the desired future condition an improvement harvest and/or an oak shelterwood could be used over the next 2-5 years. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. A harvest could remove between 100,000 – 150,000 board feet from this cover type.

If an improvement harvest is used, most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees of timber and wildlife value. The residual stand is expected to be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to help recruit oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. It is estimated that 5-15% of the stand acreage may have regeneration opening treatments. Under uneven aged management trees in all size classes are thinned during management operations to promote stand development and regeneration. Given that many of these will be un-merchantable, post-harvest timber stand improvement (TSI) is prescribed to thin poor formed, low-quality trees, and treat the understory to reduce shade tolerant species where appropriate in favor of oaks and other more desirable species. The select girdling of medium to large low value trees may also be undertaken to recruit larger snags and provide habitat. TSI will also be needed to control invasive species that are present on the tract.

In areas with a quality overstory but mostly maple/beech mid-stories and undesirable regeneration, an oak shelterwood cut may be implemented. The goal of an oak shelterwood is to create partial shade to promote the regeneration and advancement of oak species. 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 from the pole midstory to allow advancement in seedlings and promote oak regeneration. Following the mid-story 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 should be removed to release the new cohort.

<u>Stand 4 – Tree Planting – 14 acres</u>

This cover type is found across 13% of the tract acreage in the bottoms on the western half of the tract. The area of tree plantings is dominated by pole sized Eastern red cedar and yellow poplar. Chinkapin oak is also common and some black walnut, northern red oak, and persimmon were also observed.

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 hard mast and mid to late-seral habitat for wildlife.

In order to meet the desired future condition, the area could be thinned using an improvement harvest. The harvest should target cedar and lower grade hardwoods. Removing them from this cover type should release existing mid-story oaks. The use of single tree selection or a regeneration opening may be used in order to remove the cedar and less desirable hardwoods.

The current forest resource inventory was completed on 1/20/2021 by Forester Elena Crosier. A summary of the estimated tract inventory results are located in the table below.

Tract Summary Data (trees >11"DBH):

Total acres= 109	Gingrich stocking= 81%
Total trees per acre= 197	Present volume per acre= 4,972 bd. ft.
Basal area per acre= 91	Projected harvest volume per acre= 2,500-3,000 bd. ft.

Species	# Sawtimber Trees	Total Bd. Ft.
Yellow Poplar	422	202,440
Sugar Maple	205	69,700
White Ash	140	52,140
Black Walnut	190	38,740
Scarlet Oak	46	34,440
American Beech	33	21,990
Eastern Red Cedar	96	20,410
Black Oak	33	14,700
White Oak	43	12,130
Pignut Hickory	33	11,750
Sassafras	24	9,020
American Sycamore	24	8,700
Northern Red Oak	36	8,480
Chinkapin Oak	36	7,640
Black Spruce	7	6,140
Hackberry	11	4,910
Honeylocust	11	4,370
Persimmon	20	4,190
Red Maple	18	3,650
Shagbarh Hickory	25	3,630
American Elm	16	2,750
Total	**1,469**	**541,920**

Summary Tract Silvicultural Prescription and Proposed Activities

Due to the current condition of the stand, an improvement harvest is recommended and could be undertaken in this tract at any time. Overall tract volume would be reduced 40-60%. Most of this would occur under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple matured trees growing together. It is recommended that

TSI be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings, snag recruitment and control of invasive species.

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

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

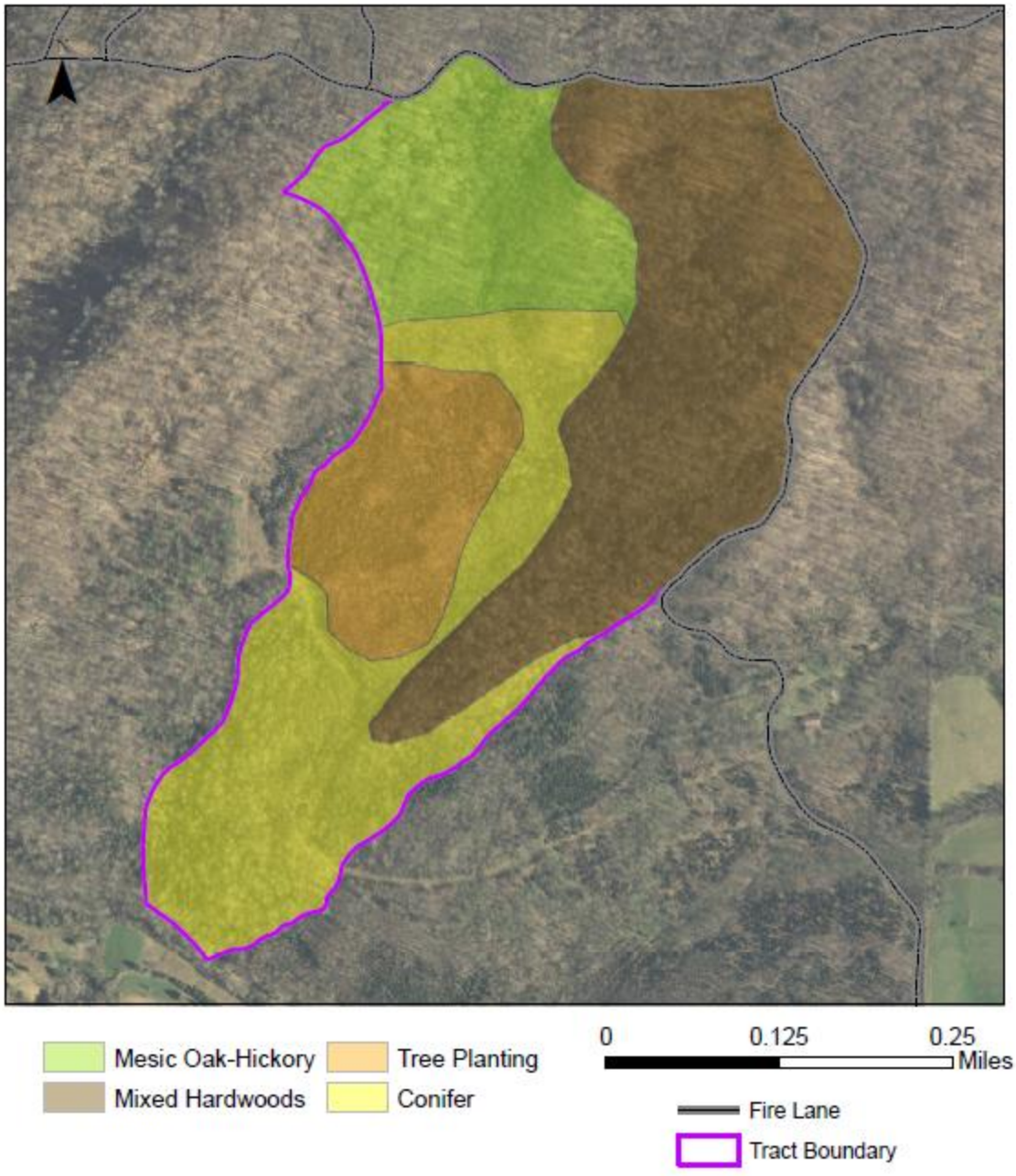
Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators.

Wildlife in this tract should not be adversely affected. Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat for the Indiana bat and other species.

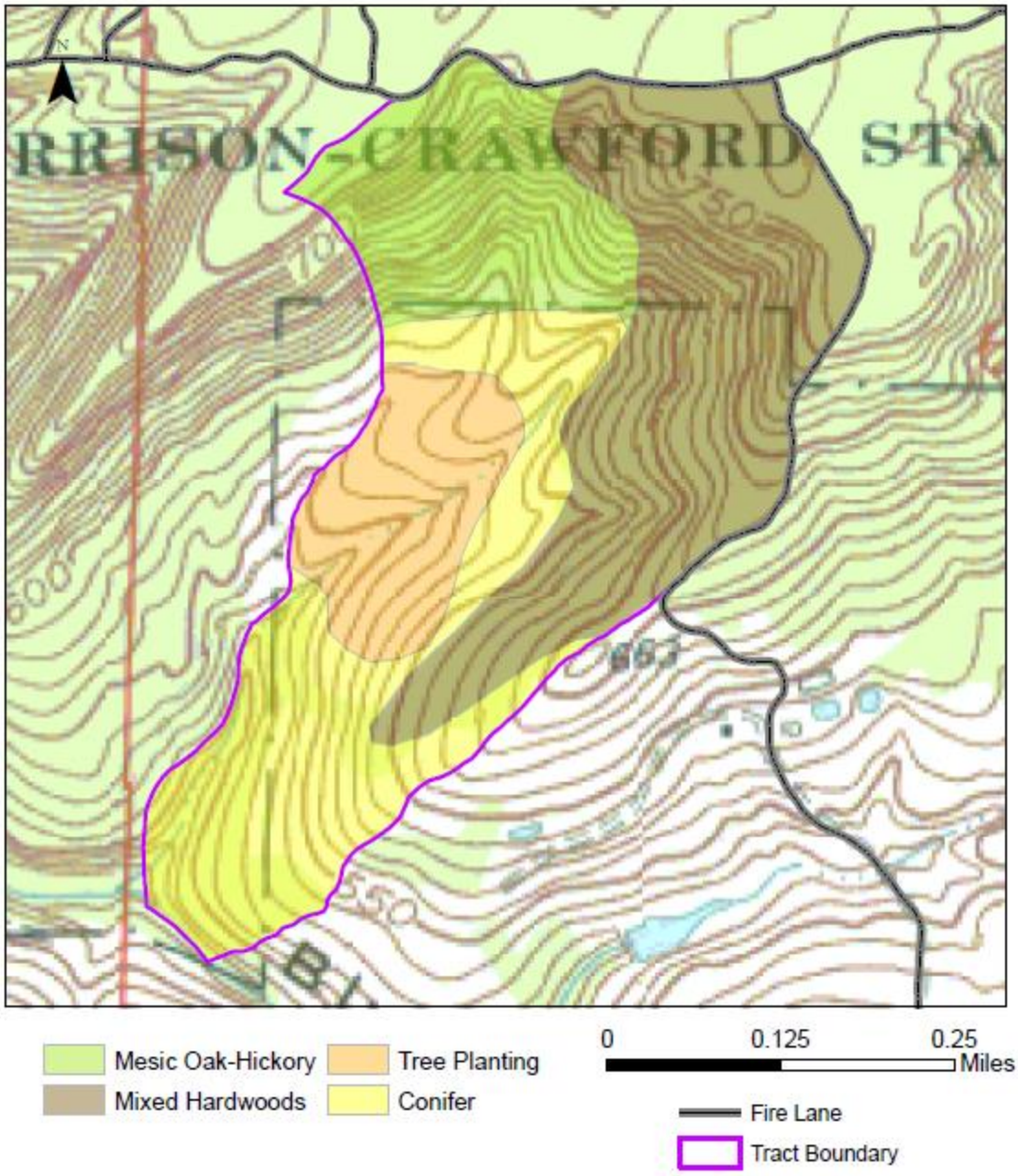
Given the type and amount of recreation that is carried out on this tract, impacts will be minimal. Hunting opportunities should be improved by the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer and small mammal browse.

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Gain Access	2021-2023
Treat Invasive Species	2021-2023
Mark Harvest	2021-2023
Sell Timber	2022-2025
Post Harvest FSI	One to two years after harvest
Treat Invasive Species	One to three years after harvest
Monitor regeneration openings	Three to four years after harvest
Re-Inventory	2041
Write new Management Plan	2041

Harrison-Crawford State Forest
Compartment 8 Tract 5
Cover Types Map



Harrison-Crawford State Forest
Compartment 8 Tract 5
Cover Types Map



State Forest: Harrison Crawford | Compartment: 23 Tract: 2
Forester: E. Crosier | Date: January 1, 2021 Acres: 90
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location

Tract 2 is located 5 miles west of Corydon in Harrison Township in Harrison County, Indiana. The tract encompasses a lot of the southeast quarter of section 6 in T4S R3E. Old Forest Road is located on the north side of the tract and Feller Road is located on the west side of the tract.

General Description

The acreage of this tract is approximately 90 acres. There are four distinct cover types on this tract: Mesic Oak-Hickory, Dry Oak-Hickory, Mixed Hardwoods, and Non-Forest (open areas).

2302 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume (board feet)	Percent of Volume
Mesic Oak-Hickory	64	71%	570,000	73%
Dry Oak-Hickory	13	14%	100,000	13%
Mixed Hardwoods	11	12%	100,000	13%
Non-Forest	2	3%	0	0%
Total	**90**	**100%**	**770,000**	**100%**

Values are rounded approximates

History

Acquisition 1934-1944

The tract was acquired in two parcels, majority of which was purchased from James B. Brewster November 28, 1934. Four acres along Old Forest Road in the northeast corner of the tract were purchased from Willard and Florence Snapp November 6, 1944.

Resource Management Guide 1973

An inventory and subsequent management plan were done in May 1973 by Steve Winicker. There was a total of 2,057 bd.ft. per acre present at that time. White oak was the most common species, followed closely by black oak, with the hickory species shown as third.

Timber Harvest 1986

Around 15 acres of the southeastern corner of tract 2 was included in a harvest, marked by Alexandra McQuade, with tracts 4 and 6, immediately to the south. This area contained an 1 acre regeneration opening. No information has been located to determine how many trees or volume tract 2 contributed to the sale.

Timber Stand Improvement (TSI) 1987

In December 1987, a contract to do TSI in tract 2, along with several others, was awarded to Phil Reid, a consultant forester.

Resource Management Guide 2000

An inventory was done by Dwayne Sieg in November 2000. The total volume per acre total at that time was 3,931 bd.ft. This inventory shows white oak is the most common species by far (183,433 bdft), Northern red oak is second, black oak is third, and sugar maple is fourth. The guide notes, "The hardwood stands show the typical high-graded condition that much of the property exhibits that took place prior to state acquisition."

Timber Harvest 2001

A timber harvest was marked by Dwayne Sieg and sold to Dallas Coffman Logging in 2001. White oak was the most prevalent species (30,430 bdft), black oak was second, and sugar maple was third.

Timber Stand Improvement ca. 2002

Post-harvest, this tract received light TSI work.

Landscape Context

The dominant land uses within a 5-mile radius of the tract are agricultural and forestlands. There is more development near Corydon (5 miles east of the tract). Within 8 miles the towns of Leavenworth and Carefree, the Ohio River, O'Bannon Woods State Park (2,000 acres), and numerous Nature Preserves (1,800 acres) can all be found.

Topography, Geology, and Hydrology

The tract is made up of a south facing slope crossed by two drainages. These drainages run south downhill into a blue line stream which is the southern tract boundary. This area has karst hydrology typical of much of the area, potentially with springs, sinkholes, and caves being common. These features will be avoided, buffered or otherwise treated to minimize adverse impacts during management activities.

Soils

The tract has 38 acres (42%) across the lower slopes covered in Caneyville complex. These soils are described as karst, hilly, eroded, and well drained. There are 34 acres (38%) covered in Gilpin-Tipsaw-Ebal silt loams, they cover the upper slopes. These soils are characterized by 18 to 35 percent slopes and are described as stony. Additionally, Deuchars-Apalona-Wellston silt loams, Ebal-Gilpin-Wellston complex, and Knobcreek-Haggatt-Caneyville silt loams are also present in lesser quantities across the tract.

Boundary

The tract is bounded to the southeast by a blue line stream which separates tract 2 from tract 4. The tract is bounded to the southwestern by private property. The tract is bounded to the west by Feller Road. The tract is bounded on the north side by Old Forest Road. The tract is bounded on the east side by private property. The eastern boundary was run in December 2019. It was found to be well marked by the neighbor with metal T-posts. The line was painted in orange at that time.

Access
The tract is bounded to the west by Feller Road and to the north by Old Forest Road. There is a fire lane running 0.4 miles south from Old Forest Road through the tract. There are two existing log yards situated on the fire lane.

Ecological Considerations
This tract represents typical oak-hickory and mixed mesic habitat, in addition to a component of old field successional habitat, with cedar and smaller hardwoods. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. Hard mast food sources are provided by the abundant oaks and hickories in the tract.

The Division of Forestry has developed compartment level guidelines for an important wildlife structural habitat feature: 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	Inventory	Available Above Maintenance
Snag 5"+ DBH	360	1,682	1,322
Snag 9"+ DBH	270	800	530
Snag 19"+ DBH	45	46	1

Inventory data for Compartment 23 Tract 2 shows that snags exceed recommended maintenance levels in all diameter classes.

Ailanthus was noted in several locations at the time of the inventory, including predominately the eastern half of the tract along the drainages. Many of these ailanthus were treated. Autumn olive, multiflora rose, and burning bush were observed scattered across the tract, although they seemed to occur predominately on the mid and upper slopes. Japanese stilt grass was observed in abundance throughout the western half of the tract and along the fire lane. Additionally, Japanese honeysuckle, privet, and wineberry were also observed. These are common species prevalent throughout the county.

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
Recreation on this tract is currently limited because there are no developed trails or recreational facilities. The most prominent recreational activity occurring is likely hunting.

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

Tract Subdivision Description and Silvicultural Prescription
Stand 1 – Mesic Oak-Hickory – 54 acres
This cover type includes 54 acres and is found across 60% of the tract acreage. This stand covers the mid to lower slopes across the tract. 73% of the volume found on the tract is located within this cover type. The most abundant species is white oak which comprises 52% of the volume (298,050 board feet) within the cover type, black oak is the second most common species making up 15% of the volume (86,920 board feet), and yellow poplar is third with 13% of the volume (71,840 board feet). Other less common oak and hickory species included chestnut oak, Northern red oak, pignut hickory, post oak, scarlet oak, and shagbark hickory. The mid-story (pole sized timber) is dominated by sugar maple although white oaks are also common. The understory is dominated by sugar maple.

The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Given current stand conditions and stocking, and to facilitate the desired future condition an improvement harvest and/or an oak shelterwood could be used over the next 2-5 years. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. A harvest could remove between 300,000 – 400,000 board feet from this cover type.

If an improvement harvest is used, most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees of timber and wildlife value. The residual stand is expected to be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to help recruit oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. It is estimated that 5-15% of the stand acreage may have regeneration opening treatments. Under uneven aged management trees in all size classes are thinned during management operations to promote stand development and regeneration. Given that many of these will be un-merchantable, post-harvest TSI is prescribed to thin poorly formed, low-quality trees, and treat the understory to reduce shade tolerant species where appropriate in favor of oaks and other more desirable species. The select girdling of medium to large low value trees may also be undertaken to recruit larger snags and provide habitat. TSI will also be needed to control invasive species that are present on the tract.

In areas with a quality overstory but mostly maple/beech mid-stories and undesirable regeneration, an oak shelterwood cut may be implemented. The goal of an oak shelterwood is to create partial

shade to promote the regeneration and advancement of oak species. 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 from the pole midstory to allow advancement in seedlings and promote oak regeneration. Following the mid-story 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 should be removed to release the new cohort.

Stand 2 – Dry Oak-Hickory – 13 acres

This cover type includes 13 acres and is found across 14% of the tract acreage. This stand covers the upper slopes along Old Forest Road on the northern edge of the tract. 13% of the volume found on the tract is located within this cover type. The most abundant species is white oak which comprises 73% of the volume (73,550 board feet) within the cover type, post oak is the second most common species making up 8% of the volume (7,600 board feet), and pignut hickory is third with 6% of the volume (6,170 board feet). Other less common oak and hickory species included black oak and shagbark hickory. The mid-story (pole sized timber) is dominated by white oak and sugar maple. The understory is dominated by sugar maple.

The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Given current stand conditions and stocking, and to facilitate the desired future condition an improvement harvest and/or an oak shelterwood could be used over the next 2-5 years. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. A harvest could remove between 30,000 – 60,000 board feet from this cover type.

If an improvement harvest is used, most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees of timber and wildlife value. The residual stand is expected to be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to help recruit oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. It is estimated that 5-15% of the stand acreage may have regeneration opening treatments. Under uneven aged management trees in all size classes are thinned during management operations to promote stand development and regeneration. Given that many of these will be un-merchantable, post-harvest TSI is prescribed to thin poorly formed, low-quality trees, and treat the understory to reduce shade tolerant species where appropriate in favor of oaks and other more desirable species. The select girdling of medium to large low value trees may also be undertaken to recruit larger snags and provide habitat. TSI will also be needed to control invasive species that are present on the tract.

In areas with a quality overstory but mostly maple/beech mid-stories and undesirable regeneration, an oak shelterwood cut may be implemented. The goal of an oak shelterwood is to create partial shade to promote the regeneration and advancement of oak species. 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 from the pole midstory to allow advancement in seedlings and promote oak regeneration. Following the mid-story 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 should be removed to release the new cohort.

Stand 3 – Mixed Hardwoods – 21 acres

This cover type includes 21 acres and is found across 23% of the tract acreage. This stand covers the upper and mid-slopes in several pockets in the northwestern corner of the tract. This cover type holds 13% of the volume found on the tract. The most abundant species is sugar maple which comprises 27% of the volume (28,710 board feet) within the cover type, white oak is the second most common species making up 24% of the volume (25,180 board feet), and black oak is third with 13% of the volume (13,730 board feet). Other less common species include American beech, black walnut, Eastern red cedar, honey locust, pignut hickory, scarlet oak, white ash, and yellow poplar. The mid-story (pole sized timber) and understory is dominated by sugar maple.

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 hard mast and mid to late-seral habitat for wildlife.

Given current stand conditions and stocking, to facilitate the desired future condition an improvement harvest could be used over the next 2-5 years. A harvest could remove between 50,000 – 90,000 board feet from this cover type. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection would also favor releasing future crop trees of timber and wildlife value. The residual stand will maintain a variety of mesic species. Similar to the oak hickory stand, regeneration openings may occur on 5-15% of the mixed hardwoods stand acreage. 64% of the proposed harvest volume, within this cover type, would come from non-oak and hickory species, such as sugar maple and white ash.

Stand 4 – Non-Forest – 2 acres

There are several open areas within this tract, they include the edge of several roads, two log yards, and a powerline right-of-way.

The current forest resource inventory was completed on 1/1/2021 by Forester Elena Crosier. A summary of the estimated tract inventory results are located in the table below.

Tract Summary Data (trees >11"DBH):

Total acres= 90	Gingrich stocking= 90%
Total trees per acre= 162	Present volume per acre= 8,793 bd. ft.
Basal area per acre= 107	Projected harvest volume per acre= 4,500-5,000 bd. ft.

Species	**# Sawtimber Trees**	**Total Bd. Ft.**
White Oak	1,425	414,410
Black Oak	271	100,930
Sugar Maple	228	40,680
Pignut Hickory	167	38,980
Eastern Red Cedar	151	20,960
Yellow Poplar	133	72,580
Post Oak	131	16,960
Northern Red Oak	90	16,860
Black Walnut	52	5,510
Scarlet Oak	45	10,450
Shagbarh Hickory	44	10,270
White Ash	42	11,330
American Beech	33	11,300
Honeylocust	18	2,320
Blackgum	12	4,130
American Elm	10	5,380
Chestnut Oak	10	3,950
Total	**2,862**	**787,000**

Summary Tract Silvicultural Prescription and Proposed Activities

Due to the current condition of the stand, an improvement harvest is recommended and could be undertaken in this tract at any time. Overall tract volume would be reduced 40-60%. Most of this would occur under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple matured trees growing together. It is recommended that TSI be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings, snag recruitment and control of invasive species.

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

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 should be properly closed out according to Indiana's BMPs to minimize the impact of management on soils.

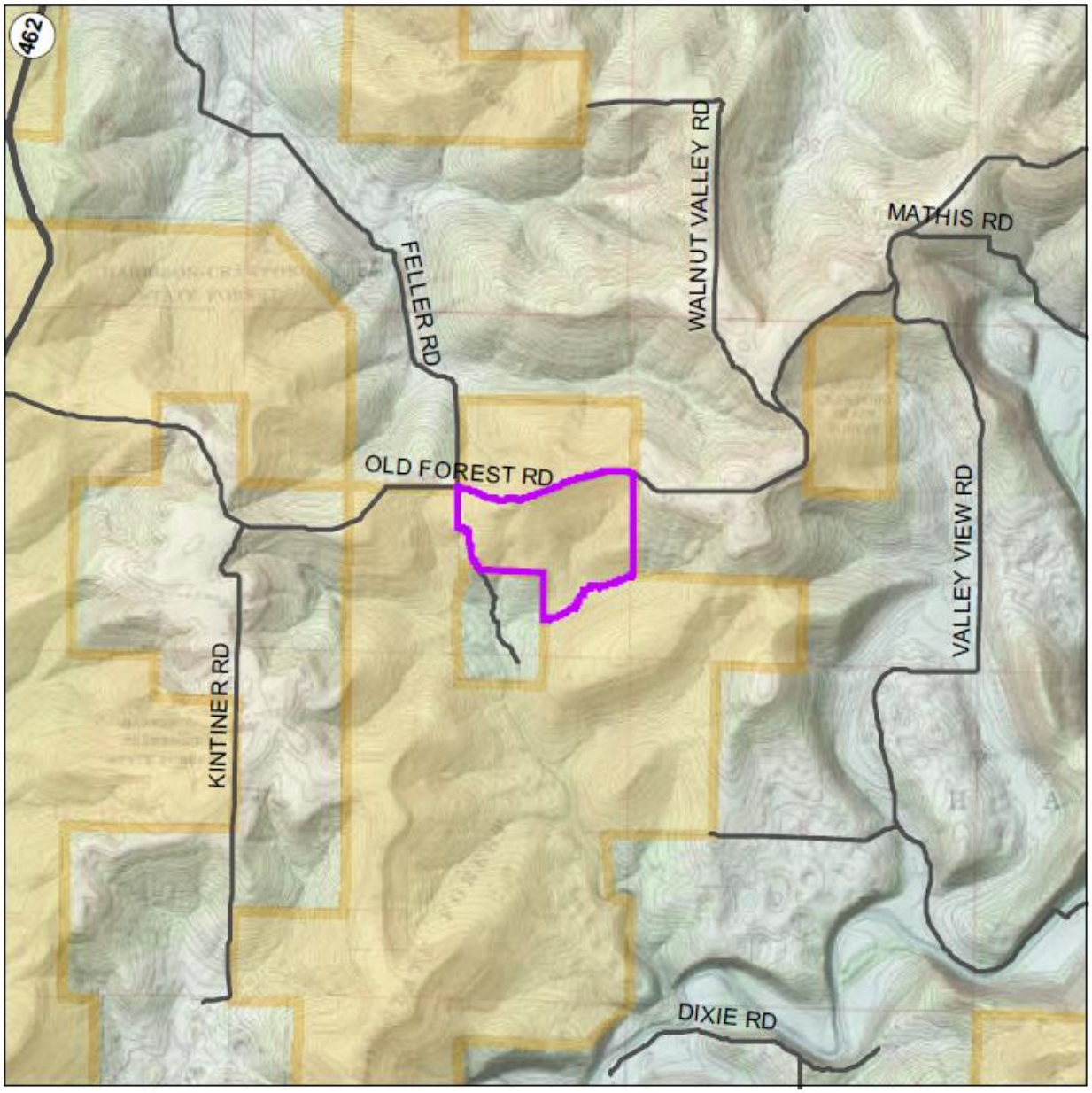
Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators.

Wildlife in this tract should not be adversely affected. Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat for the Indiana bat and other species.

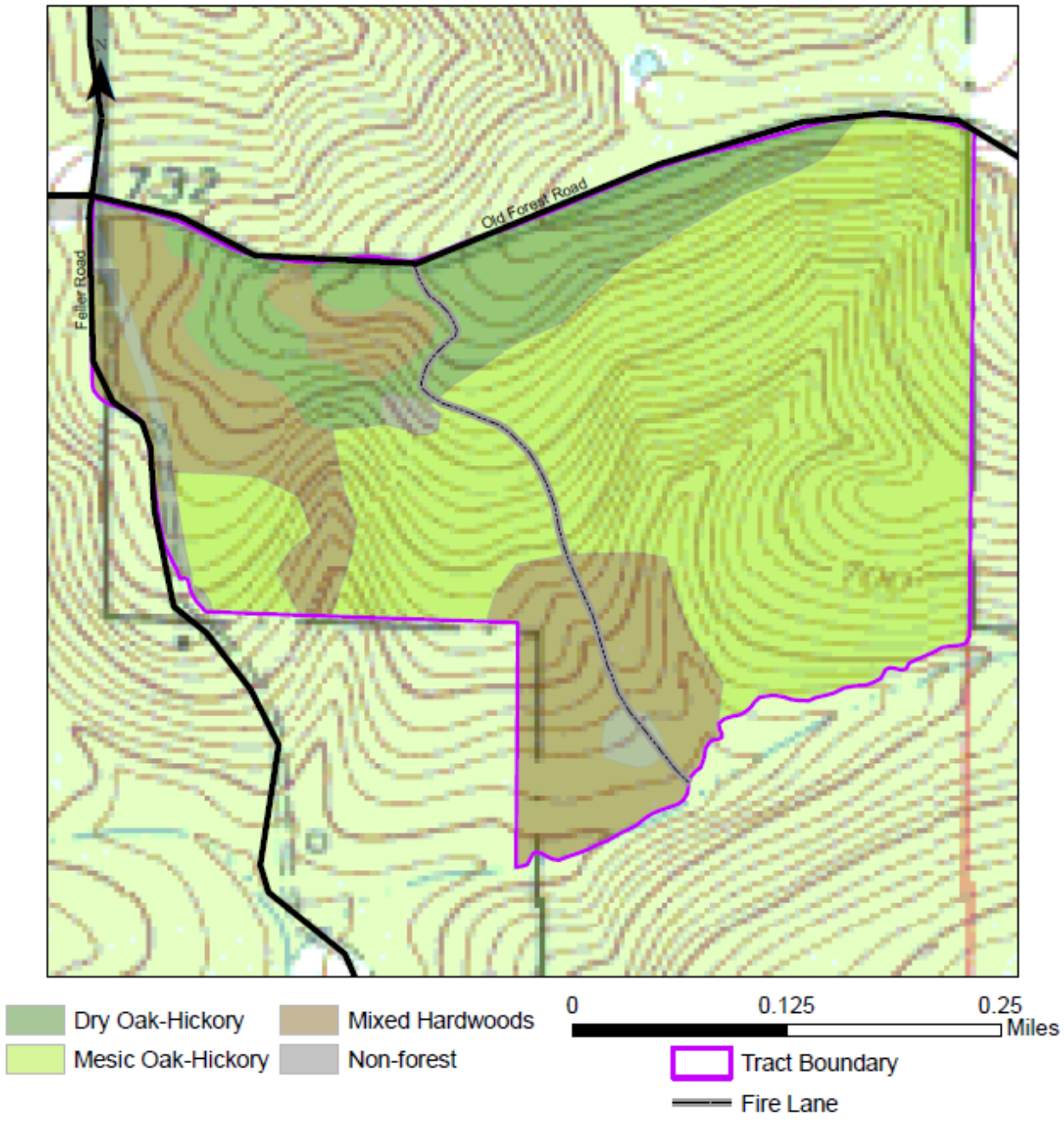
Given the type and amount of recreation that is carried out on this tract, impacts will be minimal. Hunting opportunities should be improved by the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer and small mammal browse.

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Gain Access	2021-2023
Treat Invasive Species	2021-2023
Mark Harvest	2021-2023
Sell Timber	2022-2025
Post Harvest TSI	One to two years after harvest
Treat Invasive Species	One to three years after harvest
Monitor regeneration openings	Three to four years after harvest
Re-Inventory	2041
Write new Management Plan	2041

Compartment 23 Tract 2



Harrison-Crawford State Forest
Compartment 23 Tract 2
Cover Types Map



State Forest: Harrison Crawford | Compartment: 30 Tract: 1
Forester: E. Crosier | Date: January 1, 2021 Acres: 81
Management Cycle End Year: 2041 | Management Cycle Length: 20 years

Location

Tract 1 is located 6 miles west of Corydon in Harrison Township in Harrison County, Indiana. The tract is in the southwest quarter of section 7 in T4S R3E. The tract is bordered by Kintner Road on the west side.

General Description

The acreage of this tract is approximately 81 acres. There are two distinct cover types on this tract: Mesic Oak-Hickory and Mixed Hardwoods.

3001 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume (board feet)	Percent of Volume
Mesic Oak-Hickory	75	92%	680,000	95%
Mixed Hardwoods	6	8%	35,000	5%
Total	**81**	**100%**	**715,000**	**100**%

Values are rounded approximates

History

Acquisition 1934-2007

The tract was acquired in five parcels. In November 1934, majority of the northeastern portion of the tract was purchased from James B. Brewster. In December 1935, the northern tip of the tract was purchased from James and Isabell Whitworth. In June 1936, majority of the southeastern portion of the tract was purchased from F.G. and Lizzie Godfrey. In April 1941, the southwestern portion of the tract was purchased from William U. Roberts. In August 2007, a portion of the center of the tract on the east side was purchased from Thomas L. Shields. III.

Resource Management Guide 1973

An inventory was done by Steve Winicker in August 2000. The guide notes, “The area is mainly occupied by oak hickory type forest with the exceptions of a semi-open patch of Red cedar in the southwest corner and several strips of Virginia pine along the ridge top.” The guide also notes, “Some timber stand improvement work would benefit individual tress on this tract, however due to poor site conditions it would not be worthwhile at this time.”

Timber Harvest 1985

A timber harvest within 3001 and 3002 was marked by Alexandra McQuade and sold to Jerry Sanders in 1985. 25 acres at the SE end of tract 1 was involved in this management. Black oak was the most prevalent species (31,773 bdft), chestnut oak was second, and Northern red oak was third. The timber harvest was marked using single tree selection and included several openings. A small portion of a 3.5-acre opening was located in 3001, the opening was implemented in an area where the stand was predominantly American beech, chestnut oak, and black oak.

Timber Stand Improvement 1986
On March 18 and 19, 1986, Dan Ernst and Alexandra McQuade marked 660 trees within the openings on 3001 and 3002 for Timber Stand Improvement (TSI). The trees ranged in size from 2 inches to 28 inches, more than 60% of the trees were between 8 and 16 inches. The TSI was performed April 1 and 2, 1986 by a labor line using chainsaws, axes, tordon, and garlon.

Road Construction Ca. 1996
A road segment of about 1,300' was constructed to circumvent the (at that time) private property and allow access to the main ridge along the tract's east side.

Resource Management Guide 2000
An inventory was done by Dwayne Sieg in 2000. This inventory shows white oak is the most common species by far (181,300 bdft), black oak is second, pignut hickory is third, yellow poplar is fourth, and Northern red oak is fifth. The guide notes, "Overall, Tract 1 has good management potential and for at least the next cutting cycle which is estimated to be in 2025. The tract, in general, is a maturing oak-hickory forest, with typical evidence of past abuses (high grading, fire, pasturing) prior to state ownership."

Timber Harvest 2000
A timber harvest was marked by Dwayne Sieg and sold to Dallas Coffman Logging in 2000. Black oak was the most prevalent species (24,982 bdft), white oak was second, and Northern red oak was third. The SF200 notes, "The main action on the SW portion was thinning predominantly white oak medium sawtimber." It also notes, "On the NE portion, conventional improvement selections were made to remove mature and overmature trees, defective, and poorly formed trees."

Road Construction 2012
An access road segment of around 850' was constructed to provide a more gentle grade access to the ridge along the east side of the tract.

Landscape Context
The dominant land uses within a 5-mile radius of the tract are agricultural and forestlands. There is more development near Corydon (6 miles east of the tract). Within 8 miles the towns of Leavenworth and Carefree, the Ohio River, O'Bannon Woods State Park (2,000 acres), and numerous Nature Preserves can all be found.

Topography, Geology, and Hydrology
The tract consists of a small southeast facing hillside and a larger west facing hillside which slope down to the same drainage. The terrain is moderately sloping, with a change in elevation of just over 220 ft. This area has karst hydrology typical of much of the area, potentially with springs, sinkholes, and caves being common. These features will be avoided, buffered or otherwise treated to minimize adverse impacts during management activities.

Soils
The tract has 29 acres (36%) across the mid slopes covered in Caneyville-Rock Outcrop complex. These soils are described as well drained with slopes of 25%-60%. There are 19 acres (23%) covered in Gilpin-Tipsaw-Ebal complex, they cover the upper slopes on the east side of the tract.

These soils are characterized by 18 to 35 percent slopes and are described as stony and well drained. Additionally, Apalona-Zanesville silt loams, Caneyville-Haggatt-Knobcreek complex, Ebal-Gilpin-Wellston silt loams, Deuchars-Apalona-Wellston silt loams, and Kintner loam are also present in lesser quantities across the tract.

Boundary

The tract is bounded on the ridgetop on the east side by a fire lane. The tract is bounded on the south side by a drainage. The tract is bounded on the southern half of the west side by Kintner Road. The tract is bounded on the northern side by private property. This line was run at the time of the inventory and was found to be well marked by the neighbor with signs and T-posts, scraps of old fence were also noted. The tract is bounded on the northern half on the east side by private property as well. The southern half of this line was found to be marked by the neighbor in the same manner as the other portion and was also run at the time of the inventory.

Access

The tract is accessed near its southwest corner from Kintner Road. A fire lane runs from Kintner Road roughly east through the tract before cresting the hill and turning south to continue into compartment 30 tract 2 and compartment 23 tract 12. This road is graveled and is likely to be passable most of the year. As mentioned in the History section, another segment intersects with this road and runs to the northern part of the tract. A dirt surfaced road runs along the ridge at the east side of the tract, its full length. These last described road segments are not graveled at this time.

Ecological Considerations

This tract represents typical oak-hickory and mixed mesic habitat. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. Hard mast food sources are provided by the abundant oaks and hickories in the tract.

The Division of Forestry has developed compartment level guidelines for an important wildlife structural habitat feature: 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	Inventory	Available Above Maintenance
Snag 5"+ DBH	324	1,453	1,129
Snag 9"+ DBH	243	785	542
Snag 19"+ DBH	40.5	117	77

Inventory data for Compartment 30 Tract 1 shows that snags exceed recommended maintenance levels in all diameter classes.

Ailanthus was observed in several locations at the time of the inventory, including predominately along old fire lanes. Paulownia, multiflora rose, wineberry, and burning bush were noted scattered across the tract, although they seemed to occur predominately on the mid and upper slopes. Japanese stilt grass was noted as were beefsteak and Japanese honeysuckle scattered throughout the tract and along the fire lane. These are common invasive species prevalent throughout the county.

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
The Turkey Ridge Horse Trail treks through the southern portion of the tract. During management activities portions of the trail may be closed or rerouted for public safety. The area is also used by hunters. Following any management activity within this tract public access would resume.

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

Tract Subdivision Description and Silvicultural Prescription
Stand 1 – Mesic Oak-Hickory – 75 acres
This cover type includes 75 acres and is found across 92% of the tract acreage. This stand covers the mid to upper slopes across the tract. 95% of the volume found on the tract is located within this cover type. The most abundant species is white oak which comprises 62% of the volume (424,060 board feet) within the cover type, pignut hickory is the second most common species making up 12% of the volume (83,030 board feet), and black oak is third with 9% of the volume (63,300 board feet). Other less common oak and hickory species included Northern red oak, post oak, scarlet oak, and shagbark hickory. The mid-story (pole sized timber) is dominated by sugar maple although white oaks are also common. The understory is dominated by sugar maple although American beech is also common.

The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Given current stand conditions and stocking, and to facilitate the desired future condition an improvement harvest and/or an oak shelterwood could be used over the next 2-5 years. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. A harvest could remove between 250,000 – 350,000 board feet from this cover type.

If an improvement harvest is used, most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees of timber and wildlife value. The residual stand is expected to be slightly heavier to white oak, with

a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to help recruit oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. It is estimated that 5-15% of the stand acreage may have regeneration opening treatments. Under uneven aged management trees in all size classes are thinned during management operations to promote stand development and regeneration. Given that many of these will be un-merchantable, post-harvest TSI is prescribed to thin poorly formed, low-quality trees, and treat the understory to reduce shade tolerant species where appropriate in favor of oaks and other more desirable species. The select girdling of medium to large low value trees may also be undertaken to recruit larger snags and provide habitat. TSI will also be needed to control invasive species that are present on the tract.

In areas with a quality overstory but mostly maple/beech mid-stories and undesirable regeneration, an oak shelterwood cut may be implemented. The goal of an oak shelterwood is to create partial shade to promote the regeneration and advancement of oak species. 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 from the pole midstory to allow advancement in seedlings and promote oak regeneration. Following the mid-story 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 should be removed to release the new cohort.

Stand 2 – Mixed Hardwoods – 6 acres

This cover type includes 6 acres and is found across 8% of the tract acreage. This stand covers the low area of the tract near the stream on the western side. This cover type holds 5% of the volume found on the tract. The most abundant species is yellow poplar which comprises 41% of the volume (14,820 board feet) within the cover type, white oak is the second most common species making up 17% of the volume (5,950 board feet), and Northern red oak is third with 10% of the volume (3,620 board feet). Other less common species include American beech, black oak, black walnut, pignut hickory, shagbark hickory, and sugar maple. The mid-story (pole sized timber) and understory is dominated by sugar maple. American beech is also prevalent in the understory.

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 hard mast and mid to late-seral habitat for wildlife.

Given current stand conditions and stocking, to facilitate the desired future condition an improvement harvest could be used over the next 2-5 years. A harvest could remove between 15,000 – 20,000 board feet from this cover type. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection would also favor releasing future crop trees of timber and wildlife value. The residual stand will maintain a variety of mesic species.

Similar to the oak hickory stand, regeneration openings may occur on 5-15% of the mixed hardwoods stand acreage.

The current forest resource inventory was completed on 2/5/2021 by Forester Elena Crosier. A summary of the estimated tract inventory results are located in the table below.

Tract Summary Data (trees >11"DBH):

Total acres= 81	Gingrich stocking= 87%
Total trees per acre= 147	Present volume per acre= 8,551 bd. ft.
Basal area per acre= 105	Projected harvest volume per acre= 3,750-4,250 bd. ft.

Species	**# Sawtimber Trees**	**Total Bd. Ft.**
White Oak	1,329	391,340
Pignut Hickory	296	78,410
Black Oak	199	63,160
Yellow Poplar	162	47,920
Sugar Maple	151	33,030
Northern Red Oak	70	31,700
Shagbarh Hickory	129	24,550
Scarlet Oak	27	10,630
American Beech	46	7,030
Post Oak	17	3,000
Black Walnut	26	1,840
Total	**2,452**	**692,610**

Summary Tract Silvicultural Prescription and Proposed Activities

Due to the current condition of the stand, an improvement harvest is recommended and could be undertaken in this tract at any time. Overall tract volume would be reduced 30-50%. Most of this would occur under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple matured trees growing together. It is recommended that TSI be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings, snag recruitment and control of invasive species.

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

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 should be properly closed out according to Indiana's BMPs to minimize the impact of management on soils.

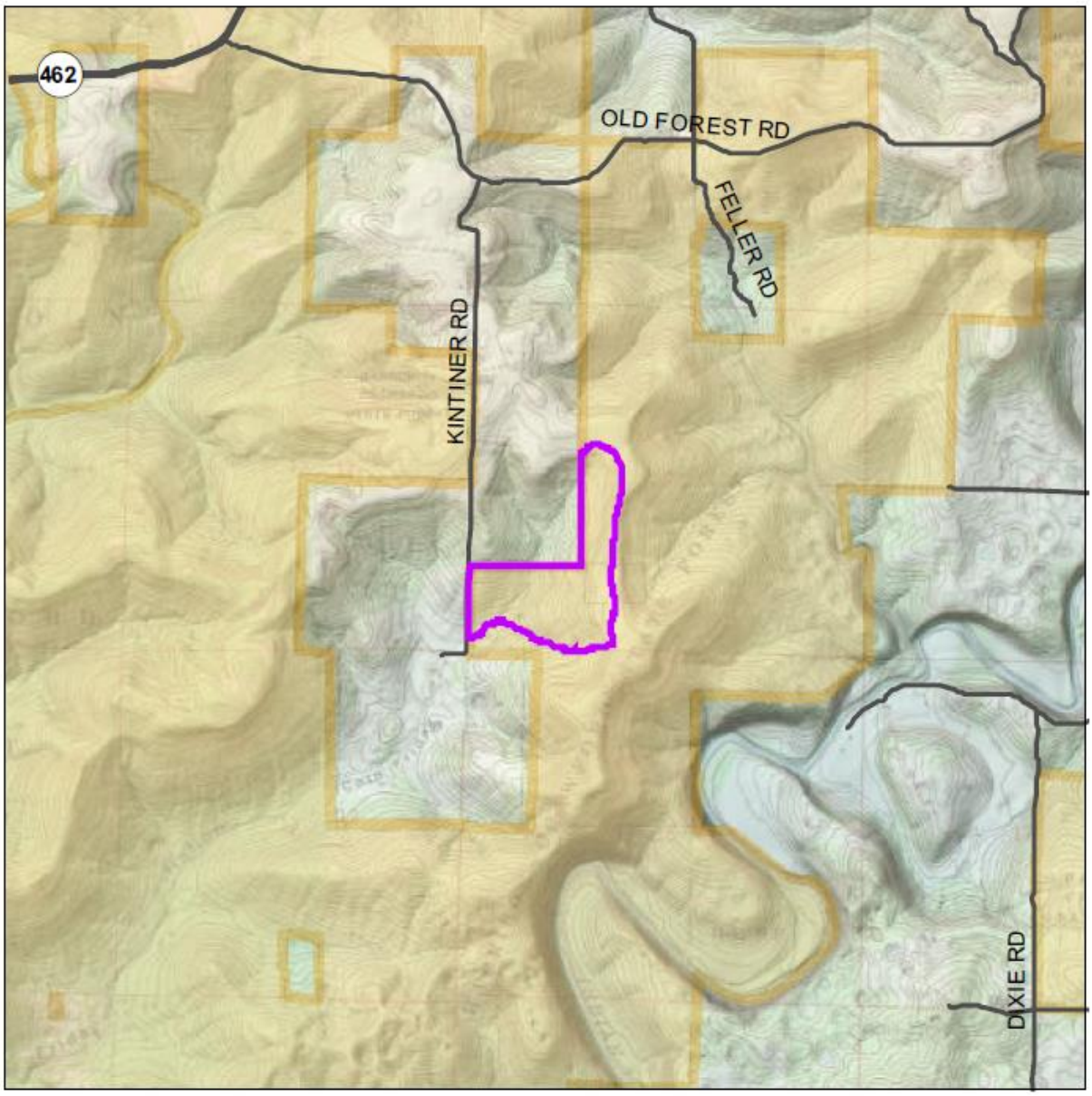
Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators.

Wildlife in this tract should not be adversely affected. Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat for the Indiana bat and other species.

Given the type and amount of recreation that is carried out on this tract, impacts will be minimal. Hunting opportunities should be improved by the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer and small mammal browse.

Proposed Management Activity	*Proposed Date*
Management Guide	2021
Gain Access	2021-2023
Treat Invasive Species	2021-2023
Mark Harvest	2021-2023
Sell Timber	2022-2025
Post Harvest TSI	One to two years after harvest
Treat Invasive Species	One to three years after harvest
Monitor regeneration openings	Three to four years after harvest
Re-Inventory	2041
Write new Management Plan	2041

Compartment 30 Tract 1



State Forest

0 0.25 0.5 1 Miles

Harrison-Crawford State Forest
Compartment 30 Tract 1
Cover Types Map