## **Indiana Department of Natural Resources Division of Forestry** RESOURCE MANAGEMENT GUIDE

Harrison-Crawford State Forest Forester: Daniel Martin Management Cycle End Year 2043 Compartment: 18Tract: 06Date 6/5/2023Acres: 120Management Cycle Length 20 years

## Location

Tract 6, also known as 6341806, is located west of State Road 62, approximately 3 miles east from Leavenworth in Crawford County. The tract is in the NW <sup>1</sup>/<sub>4</sub>, Section 4, T4S, R2E and SW <sup>1</sup>/<sub>4</sub> Section 33, T3S, R2E.

## **General Description**

This tract is located a quarter of a mile west from State Road 62. There are four cover types: cedar/conifer, mixed hardwoods, mesic oak-hickory, and non-forested.

# History

- 1968 The majority of the tract was established through the land purchase from Hockman.
- 1972 Eastern portion of the tract was purchased from Engleman.
- 1973 Black walnut was planted in the southern portion of tract.
- 1975 Yellow poplar was planted next to the 1973 black walnut planting and black walnut planting reinforced.
- 1970's Pine species planted.
- 1986 Timber harvest completed with tract 1805.
- 1987 Timber stand improvement completed with tract 1805.
- 1988 Resource management guide written by Dwayne Sieg.
- 2009 Forest inventory and resource management guide written by Dieter Rudolph.
- 2023 Forest inventory and resource management guide written by Dan Martin.

At the time of state acquisition, 68 acres or 57% of tract 6 had been agricultural fields/pasture. By 2016, the tract was 99% forest cover.

#### Landscape Context

Nearly the entire tract is surrounded by Harrison-Crawford State Forest. A small section of the southwest boundary adjoins private forestland. Located near the tract are scattered agricultural and residential areas.

#### **Topography, Geology and Hydrology**

The tract has various gentle slopes throughout. The western, southern, and eastern edge of the tract are made up of drainages that flow to Dry Run Creek and eventually the Blue River. Various karst features are present and will be buffered in accordance with the 2022 Best Management Practices (BMP) field guide.

# Soils

1-acre Adyeville silt loam, 18 to 25 percent slopes, eroded
5 acres Apalona silt loam, 6 to 12 percent slopes, eroded.
15 acres Tipsaw-Adyeville complex, 25 to 75 percent slopes
22 acres Wellston silt loam, 12 to 18 percent slopes, eroded.
4 acres Gatchel loam, 1 to 3 percent slopes, occasionally flooded, very brief duration.
12 acres Corydon stony silt loam, 20 to 60 percent slopes
40 acres Haggatt silty clay loam, 12 to 18 percent slopes, severely eroded
11 acres Crider silt loam, 6 to 12 percent slopes, eroded.
10 acres Haymond silt loam, 0 to 2 percent slopes, frequently flooded, brief duration.

## Access

There is a fire lane directly off State Road 62. This fire lane has received improvements over the years and suitable for management activities.

## Boundary

Most of the tract is bordered by other state forest tracts. A small portion of the western tract edge also serves a state forest boundary with private ownership. There is a fence line that roughly denotes the boundary as well as corner evidence in compartment 18 tract 01, an adjacent tract. The property boundary will be buffered to minimize the chance of encroachment where the line is not clear.

## **Ecological Considerations**

Most of this tract consists of an oak-hickory cover type which will provide hard mast for various wildlife. The three conifer stands located in the tract may also provide thermal cover for wildlife. The open area and areas transitioning from an old field would be early successional habitat for beneficial to a broad range of wildlife.

The Division of Forestry has developed compartment level guidelines for important wildlife structural habitat features such 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	Maintenance Level	Inventory	Available Above Maintenance
5" + DBH	476	1394	918
9" + DBH	357	799	442
19" + DBH	59	71	11

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

There are various invasive species present such as ailanthus, multiflora rose and Japanese stilt grass. Pre- and post-harvest invasive species control should take place to remove or minimize the

impact of these species.

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 Wyandotte Cave horse trail runs through the tract. The fire lane is utilized as a disabled hunters trail. For public safety, these activities would be altered or temporarily altered within the tract during active management.

## Cultural

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

#### \*\* Office use only\*\*

No evidence of homesites were found on the tract and in historical aerial photos no buildings could be seen. There was a rock pile near the center of the tract that likely denoted an old field edge.

# Tract Subdivision Description and Silvicultural Prescription

#### General

This tract consists of four cover types. These cover types have varying degrees of maturity and harvest history, with the southwest portion of the tract having not been harvested.

Throughout the tract, group selection may be an option for multiple reasons, such as the overstory suffering from mortality, vigorous natural regeneration, or poor-quality trees. These openings will provide early successional habitat. Between 5-15% of the tract would have these openings as they would need to be large enough to achieve the desired effect of both habitat and regeneration with adequate sunlight for long enough to allow regenerating trees to become part of the canopy.

Not all low quality or understory trees will be removed during a timber harvest. For this reason, post-harvest timber stand improvement (TSI) is recommended to reduce poor quality or competing trees and favor oak or other desired species.

TSI can include cutting, girdling, and herbicide application to low value trees. Herbicide use would follow forest certification standards as well as herbicide labels. If a prescribed fire were used as a silvicultural tool, burning would occur during the dormant season. Smoke management would be a consideration as well due to the various rural homes and proximity to State Road 62. During post-harvest TSI any invasive species, if not treated prior to the harvest, can also be treated.

# Mesic Oak Hickory – 50 acres

Oak-hickory is the dominate cover type within the tract making up almost half the volume. It is

fully stocked with 50% of its volume in white oak and 20% in black oak. The understory mostly consists of shade tolerant species with pockets of vigorous oak regeneration. Both red and scarlet oak are facing increased mortality throughout this cover type.

With the higher stocking and increased mortality throughout the stand, an improvement harvest would benefit the health of the stand. This harvest would remove mature, low quality and dying trees and encourage natural oak regeneration. Post harvest TSI would allow for the additional release of oak seedlings and saplings, ensuring the oak dominated overstory remains.

# Mixed Hardwoods - 45 acres

This cover type is a diverse mix of species that regenerated from an old field. The most abundant species in this cover type is yellow poplar which makes up 35% of the volume and the second most abundant species is shumard oak at 21%. Yellow poplar varies in age throughout the cover type with some areas full of young yellow poplar and others with large open grown/stagnant yellow poplar. Shumard oak is facing mortality and dieback throughout the stand. The cover type is fully stocked.

Due to the stocking and stagnant yellow poplar and declining shumard oak a harvest is recommended for the health of the stand. During the harvest, including these low quality or declining trees would improve the forest health and natural regeneration of yellow poplar along with other mixed hardwoods. During the harvest, removal of the poor-quality cedar would likely shift the cover type to oak-hickory or mixed hardwoods.

According to historical records this cover type also included the black walnut and yellow poplar plantations. There was no evidence of rows from these plantings or areas with an abundance of similar size black walnut or yellow poplar. Both these plantings likely failed, and these areas regenerated naturally.

A small area within this cover type consisting of 21 acres was considered over stocked. Mostly eastern red cedar which made up 61% of the volume and yellow poplar constituted 15%. The management recommendation for this area is like the rest of the cover type. The removal of poor health cedar will be a larger cover type shift. Stagnant yellow poplars along with other stagnant or dying trees can be removed for the overall health of the cover type and natural regeneration would take place to keep the cover type mixed hardwoods.

#### Conifer – 21 acres

There are three distinct conifer stands within this cover type, 10 acres is dominated by loblolly pine, 8 acres is primarily white pine, and the last 3 acres consists of mostly cedar.

This cover type is extremely over stocked. Thinning is recommended to improve spacing and health of the stand. Since this is a plantation and the trees have grown so close to one another, a row thinning would be the best way to harvest this area. Rows are clear within the stand once past the transition areas. This would allow uniform release of trees and the maneuverability of harvest equipment so there is less of a risk of damaging unmarked compared to a single tree selection. It is recommended that every third row be removed so as not to drastically open the stand and create concern for windthrow.

Loblolly makes up the bulk of the volume within this cover type. White pine second with some eastern red cedar and hardwoods mixed in as well. Most of the hardwoods are in the transition areas between cover types.

A small cedar dominated area did have some black oak mixed in, but minimal. Because of the abundance of cedar in the tract this it is recommended that it be targeted for removal to release and promote native hardwoods to expand from neighboring cover types. The overall health of the cedars is poor so a complete removal of cedar on this relatively small area will benefit the tract.

#### Non-Forested – 4 acres

This stand is an open area near the center of the tract. It is currently understocked and would largely be avoided during any harvest operations. However, some trees may still be cut during TSI or harvest but that would mostly be the transition from this area to the neighboring forested land. Cedar was the most abundant species in this area, making up 83% of the total volume and Virginia pine made up another 12%.

The current forest resource inventory was completed on 6/5/23 by Forester Daniel Martin. A summary of the estimated tract inventory results is located in the table below.

Species	# Sawtimber trees	Total Bd. Ft.
American beech	18	7,020
American Elm	27	1,910
Black Cherry	145	8,550
Blackgum	72	1,660
Black Oak	537	114,470
Black Walnut	29	5,500
Chinkapin Oak	87	12,760
Eastern red cedar	3,043	179,170
Eastern White pine	493	60,360
Honey Locust	27	1,910
Loblolly Pine	399	42,150
Mockernut Hickory	27	1,510
Northern Red Oak	39	15,960
Pignut Hickory	429	63,360
Post Oak	43	3,920
Red Maple	20	2,230
Scarlet Oak	217	32,640
Shingle Oak	11	3,850
Shumard Oak	128	32,530
Sugar Maple	125	14,510
Virginia Pine	108	2,490

#### Tract Summary Data (trees >11" DBH):

White ash	13	3,090
White Oak	1,327	272,850
Yellow Poplar	783	80,790
Total	8,147	965,190

#### **Summary Tract Silvicultural Prescription and Proposed Activities:**

Due to the current stocking and overall condition of the tract an improvement harvest is recommended and could be as early as 2023 or 2024. Overall, the tract volume would be reduced 30-50%. This would largely be accomplished by single tree selection; however, a row thinning would likely be best for the pine areas in the tract as well as a large portion of cedar in the conifer cover type. Some group selection openings may occur in the remaining cover types where openings would be beneficial to the stand. TSI would be recommended both before and after the harvest to pretreat invasives present and then return to the tract to remove unmerchantable trees and continue removing any invasives. Due to the proximity and similar cover types, a timber harvest in tract 6 could occur at the same time as tract 5. Topography and natural features would also make it possible for portions of tract 5 and 6 to be included with a timber harvest in tract 1.

This harvest will largely not change the composition of the tract. The forested areas will remain forested however the cedar area would be removed from the tract to promote native hardwoods present and expanding neighboring cover types.

BMPs will be followed throughout the harvest to minimize impacts to the area. Soil disturbance will largely be confined to the log yard and main skid trails. The BMPs will also ensure water quality is not permanently affected. The following of these BMPs will be contractually required of management operators.

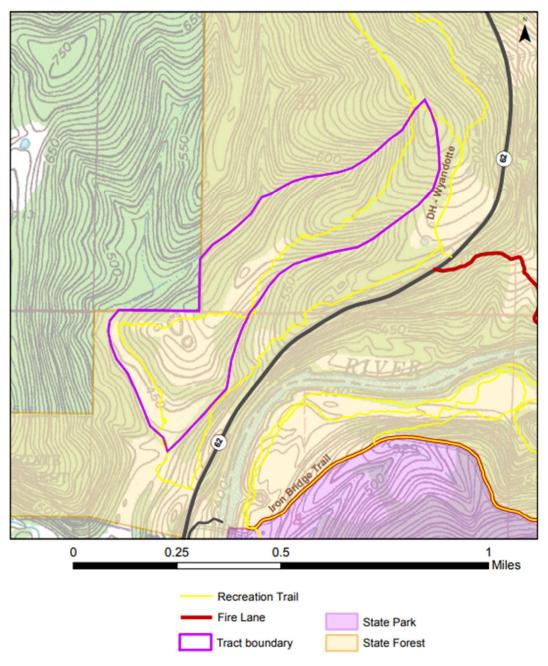
During active management a portion of the Wyandotte Cave horse trail would be temporarily close for public safety. However, under current restrictions, this closure would only occur from November 16<sup>th</sup> to April 1<sup>st</sup> and would not affect most of the spring, summer and fall recreation. 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.

Once the harvest is complete post-harvest TSI is recommended to complete any openings, address low quality trees not removed during the harvests, and follow up on invasive species. The tract should be revisited for regeneration opening monitoring and post-harvest checks in 3-5 years to ensure regeneration and growth are occurring as planned. In 20 years, the stand should be re-inventoried, and a new management guide written.

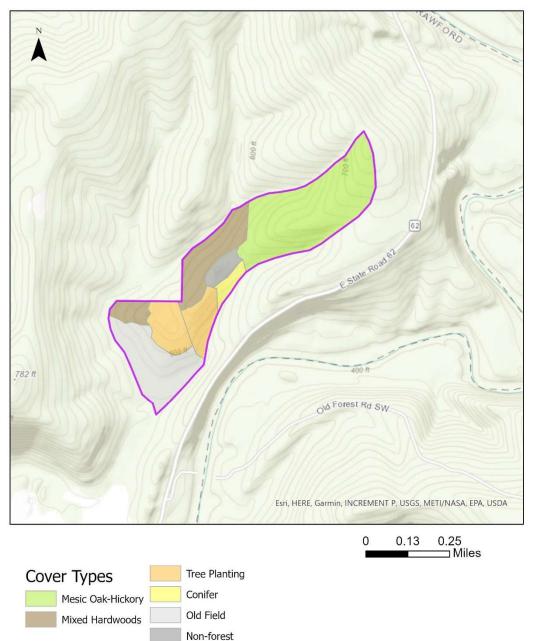
# **Proposed Activities Listing**

<u>Proposed Management Activity</u>	<u>Proposed Date</u>
Management Guide	2023
Improve Access	2023-2025
Treat Invasive Species	2023-2025
Mark Harvest	2023-2025
Sell Timber	2024-2028
Post-Harvest FSI	One to two years after harvest
Monitor regeneration openings	Three to five years after harvest
Re-Inventory	2043
Write new Management Plan	2043

Harrison-Crawford State Forest Compartment 18 Tract 6 Tract Map



Harrison-Crawford State Forest Compartment 18 Tract 6 Cover Types Map



## **Indiana Department of Natural Resources Division of Forestry** RESOURCE MANAGEMENT GUIDE

Harrison-Crawford State Forest Forester: Daniel Martin Management Cycle End Year: 2043 Compartment: 18Tract: 05Date: 5/24/23Acres: 121Management Cycle Length: 20 years

## Location

Tract 5, also known as 6341805, is located directly off State Road 62, approximately 3 miles east from Leavenworth in Crawford County. The tract is in the NW ¼ of Section 4, T4S R2E, and SW ¼ of Section 33, T3S R2E.

## **General Description**

This thin but long tract parallels State Road 62. It consists of primarily oak-hickory with mixed hardwoods, conifer, and non-forested areas. An overhead power line right-of-way runs through the tract keeping some cover permanently non-forested.

## History

- 1967 Small section in the middle of the tract was purchased from Sharp.
- 1968 Southern area of tract was purchased from Hockman.
- 1969 Northern section of the tract was purchased from Cole.
- 1972 Final middle section of the tract purchased from Engleman.
- 1986 Timber harvest was completed with tract 1806.
- 1987 Timber stand improvement (TSI) was completed with tract 1806.
- 1988 Resource management guide written by Dwayne Sieg.
- 2009 Forest inventory and resource management guide written by Dieter Rudolph.
- 2023 Forest inventory and resource management guide written.

#### Landscape Context

Most of the tract is surrounded by Harrison Crawford State Forest. Active forest management has occurred on Harrison-Crawford State Forest since its establishment. The southernmost portion of the tract borders private land with residential, agriculture and forests with unknown management history.

# Topography, Geology and Hydrology

The tract has various slopes throughout. The northern edge of the tract is a drainage that leads to Dry Run Creek. The other slopes in the tract generally lead to State Road 62. Various karst features are present in the tract and will be buffered in accordance with the 2022 Best Management Practices (BMP) field guide.

#### Soils

There are eight (8) different soil types.

16 acres Adyeville silt loam, 18 to 25 percent slopes, eroded.
46 acres Wellston silt loam, 12 to 18 percent slopes, eroded.
9 acres Apalona silt loam, 6 to 12 percent slopes, eroded.
19 acres Apalona silt loam, 2 to 6 percent slopes.
5 acres Tipsaw-Adyeville complex, 25 to 75 percent slopes.
3 acres Haggatt silty clay loam, 12 to 18 percent slopes, severely eroded.
16 acres Corydon stony silt loam, 20 to 60 percent slopes.
7 acres Haymond silt loam, 0 to 2 percent slopes, frequently flooded, brief duration.

#### Access

There is a fire lane directly off State Road 62. There are two parking areas off State Road 62 located along the length of the tract. The fire lane has received improvements over the years and considered suitable for management activities.

#### Boundary

State Road 62 serves as the eastern boundary and private land on the southern tip. Natural features (e.g., ravines, drainages, etc.) serve as the western and northern boundaries where the tract boarders additional state forest tracts.

#### **Ecological Considerations**

Most of this tract consists of oak-hickory cover type which provides hard mast for various wildlife. The cedar located in the tract may also provide thermal cover for wildlife. The areas that are transitioning from old field is early successional habitat that can be used by a plethora of bird and mammal species.

The Division of Forestry has developed compartment level guidelines for important wildlife structural habitat features such 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	Maintenance Level	Inventory	Available Above Maintenance
5"+ DBH	480	3021	2541
9"+ DBH	360	957	597
19"+ DBH	60	99	39

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

There are various invasive species present such as ailanthus, multiflora rose and Japanese stilt grass. Pre and post-harvest invasive species control should take place to remove or minimize the impact of these species.

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 Wyandotte Cave horse trail runs through the tract and the fire lane is utilized as a disabled hunter trail. For public safety, these activities would be altered or temporarily altered within the tract during active management.

# Cultural

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

### \*\* Office use only\*\*

There are likely three homesites on this tract. Two are close to the fire lane with various buildings that were located. An old wash tub was found significantly north of one of these sites and it's unsure if this is a part of the same homesite or not. There were also building remains found in the southern portion of the tract close to the horse trail.

## Tract Subdivision Description and Silvicultural Prescription

#### General

There are four cover types in this tract consisting of oak-hickory, mixed hardwoods, conifer/cedar, and non-forested. These stands have varying degrees of maturity and harvest history, with certain areas not included in previous management harvests.

Throughout the tract group selection may be an option for several reasons, such as the overstory suffering from mortality, vigorous natural regeneration, or poor-quality trees. These openings will provide early successional habitat in addition to the release of desired trees. Between 5-15% of the tract would have these openings as they would need to be large enough to achieve the desired effect of both habitat and regeneration with adequate sunlight long enough to allow regenerating trees to become part of the canopy.

Not all low quality or understory trees will be removed during a timber harvest. For this reason, post-harvest TSI is recommended to reduce poor quality or competing trees and favor oak or other desired species.

TSI can include cutting, girdling, and herbicide application to low value trees. Herbicide use would follow forest certification standards as well as herbicide labels. If a prescribed fire were used as a silvicultural tool, burning would occur during the dormant season. Smoke management would be a concern due to State Road 62 and nearby rural residences. During post-harvest TSI any invasive species, if not already treated prior to the harvest, can also be treated.

#### Mesic Oak Hickory - 66 acres

Oak-hickory cover type makes up most of the tract acreage. This cover type is overstocked, with white oak having 48% of the volume. The second most abundant species, black oak, constitutes

22% of the volume in this cover type. Many black oaks seem to be mature and declining in health. Maple regeneration was abundant throughout the cover type and is outcompeting oak within the shaded areas.

Given the current stocking level and conditions an improvement harvest is recommended to remove some of the overstory and low quality and declining trees to encourage oak regeneration. Post harvest TSI is recommended to reduce the abundance of sapling maples present. The composition of the overstory would not be changed by this harvest, white oak would still be the most abundant species allowing for their ample regeneration.

## Mixed Hardwoods - 47 acres

This cover type consists of three distinct areas with various degrees of stand age. The first is a diverse mix of species that have regenerated from a fallow field. The proximity to the conifer cover type makes it difficult to distinguish between the two. In this area 17% of the volume is eastern red cedar with the second most abundant species being black walnut at 15%. This portion of the cover type is fully stocked consisting of approximately 27 acres. Most of the hardwood stems in this area are open grown, sprawling, and stagnant trees which could be removed during a timber harvest. There are also many invasive species in this cover type such as autumn olive and honey suckle. Because of the invasive species and low-quality trees, TSI is recommended to promote the regeneration of native hardwoods.

The second area is 14 acres and like the fallow field mentioned above but younger. In this area 80% of the volume is yellow poplar and most of that volume is from 14-inch diameter trees. Because this area is relatively young and still advancing trees were generally not stagnant. Very little, if any, sawtimber trees require removal. TSI is recommended for this area within the cover type.

The last area consists of 6 acres and more mature and fully stocked with primarily yellow poplar, at 41% of the volume. White oak is the second most abundant constituting 17% of the volume. In this area poplar is much more mature than in the younger areas of the cover type. A light harvest would be beneficial. This area would largely remain the same with most of the volume in yellow poplar. However, a timber harvest would release the white oaks present and promote their growth and advancement within the tract.

#### Conifer – 6 acres

This cover type is fully stocked and dominated by eastern red cedar, which makes up 71% of the volume present. Because of the cedars condition, a harvest could result in a transition to another cover type. The removal of cedar would promote the advancement of other native hardwoods transitioning to a mixed hardwood or oak hickory cover type.

#### Non-forested – 2 acres

This area represents the overhead power line right-of-way that runs through the tract. It is routinely maintained by the power company.

The current forest resource inventory was completed on 5/24/23 by forester Dan Martin. A summary of the estimated tract inventory results are located in the table below.

Species	Total bdft	# Sawtimber Trees
American Beech	5,040	40
American Sycamore	11,590	126
Black Cherry	8,180	130
Blackgum	6,840	40
Black Oak	140,720	585
Black Walnut	12,090	87
Chestnut Oak	9,130	45
Chinkapin Oak	6,700	39
Eastern Red cedar	75,910	1,611
Honey locust	4,130	40
Northern Red Oak	58,920	248
Ohio Buckeye	1,100	27
Pignut Hickory	43,830	411
Post Oak	4,060	26
Red Elm	1,520	27
Red maple	4,770	63
Sassafras	1,920	27
Scarlet Oak	16,400	67
Shagbark hickory	22,140	112
Shortleaf pine	4,470	13
Sugar maple	23,020	162
White Oak	322,490	1,272
Yellow Poplar	118,370	930
Total	903,340	6,128

#### Tract Summary Data (trees >11"DBH):

#### **Summary Tract Silvicultural Prescription and Proposed Activities**

Due to the current condition of the tract, an improvement harvest is recommended and could be undertaken as early as 2023 or 2024. The overall tract volume would be reduced 30-50%. Most of this would occur under a single tree selection harvest with larger regeneration openings or patch cuts being created. TSI is recommended both before and after the timber harvest to treat invasive species and to remove unmerchantable trees not removed through the harvest. Due to the proximity and similar cover types, a timber harvest in tract 5 could occur at the same time as tract 6. Topography and natural features would also make it possible for portions of tract 5 and 6 to be included with a timber harvest in tract 1.

This is not expected to change the composition of the tract. The entire tract will remain forested however a large amount of cedar would be removed from the tract to release and promote native

hardwoods while expanding neighboring cover types.

BMPs will be followed throughout the harvest to minimize impacts to the area. Soil disturbance will largely be confined to the log yard and main skid trails. The BMPs will also ensure water quality is not permanently affected. The following of these BMPs will be contractually required of management operators.

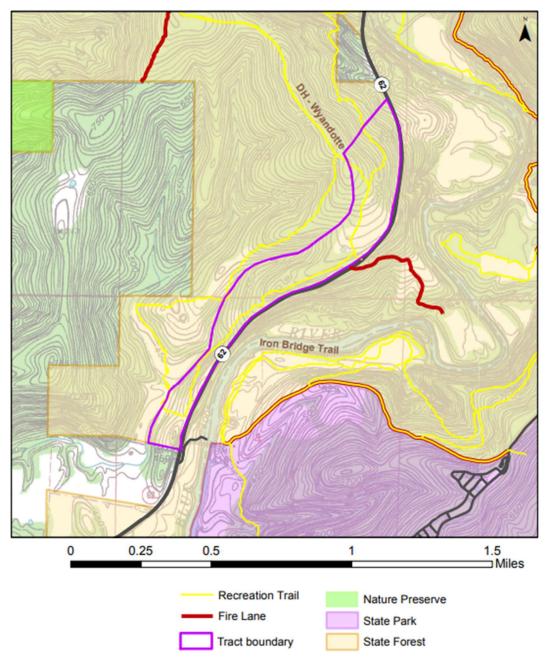
During active management a portion of the Wyandotte Cave horse trail would be temporarily close for public safety. However, under current restrictions, this closure would only occur from November 16<sup>th</sup> to April 1<sup>st</sup> and would not affect most of the spring, summer and fall recreation. 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.

Once the harvest is complete post-harvest TSI is recommended to complete any openings, address low quality trees not removed during the harvests, and follow up on invasive species. The tract should be revisited for regeneration opening monitoring and post-harvest checks in 3-5 years to ensure regeneration and growth are occurring as planned. In 20 years, the stand should be re-inventoried, and a new management guide written.

## **Proposed Activities Listing**

<u>Proposed Management Activity</u>	<u>Proposed Date</u>
Management Guide	2023
Improve Access, if needed	2023 - 2025
Treat Invasive Species	2023-2025
Mark Harvest	2023-2025
Sell Timber	2023-2028
Post-Harvest TSI	One to two years after harvest
Monitor regeneration openings	Three to five years after harvest
Re-Inventory	2043
Write new management guide	2043

Harrison-Crawford State Forest Compartment 18 Tract 5 Tract Map



Harrison-Crawford State Forest Compartment 18 Tract 5 Cover Types Map

