

**Resource Management Guides
Harrison-Crawford State Forest
30-day Public Comment Period (August 15 – September 13, 2023)**

The Indiana State Forest system consists of approximately 160,251 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 compartment or 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 18 Tract 5
Compartment 18 Tract 6
Compartment 29 Tract 19
Compartment 29 Tract 20

To submit a comment on this document, go to:

<https://www.in.gov/dnr/forestry/state-forest-management/public-comment/submit/>

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:

<https://www.in.gov/dnr/forestry/state-forest-management/public-comment/>

Note: Some graphics may distort due to compression.

Harrison-Crawford State Forest
Forester: Daniel Martin
Management Cycle End Year: 2043

Compartment: 18
Date: 5/24/23
Management Cycle Length: 20 years

Tract: 05
Acres: 121

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 $\frac{1}{4}$ of Section 4, T4S R2E, and SW $\frac{1}{4}$ 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 borders 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.

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.

Tract Summary Data (trees >11”DBH):

Species	Total Bd. Ft.	# 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

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.

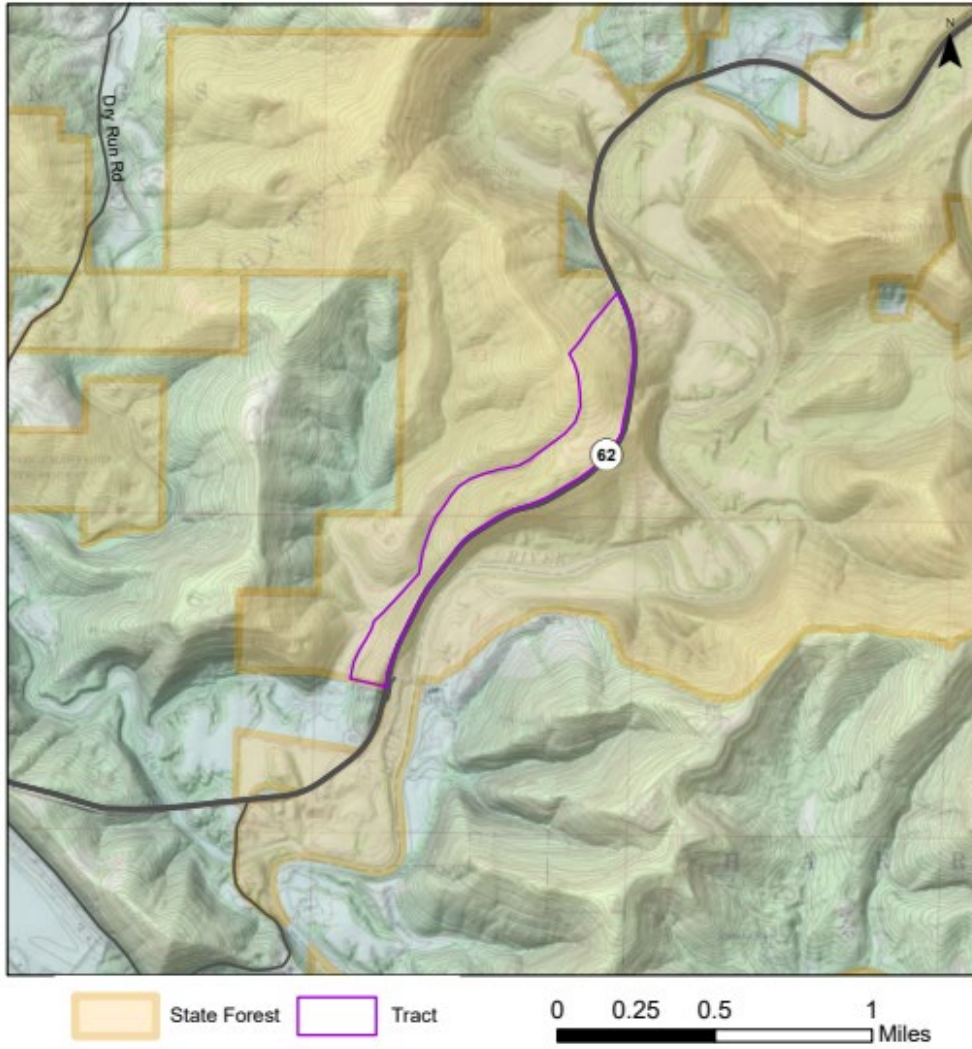
During active management a portion of the Wyandotte Cave horse trail would be temporarily close for public safety. However, under current restrictions, this closure would only occur from November 16th to April 1st and would not affect most of the spring, summer and fall recreation. Hunting opportunities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

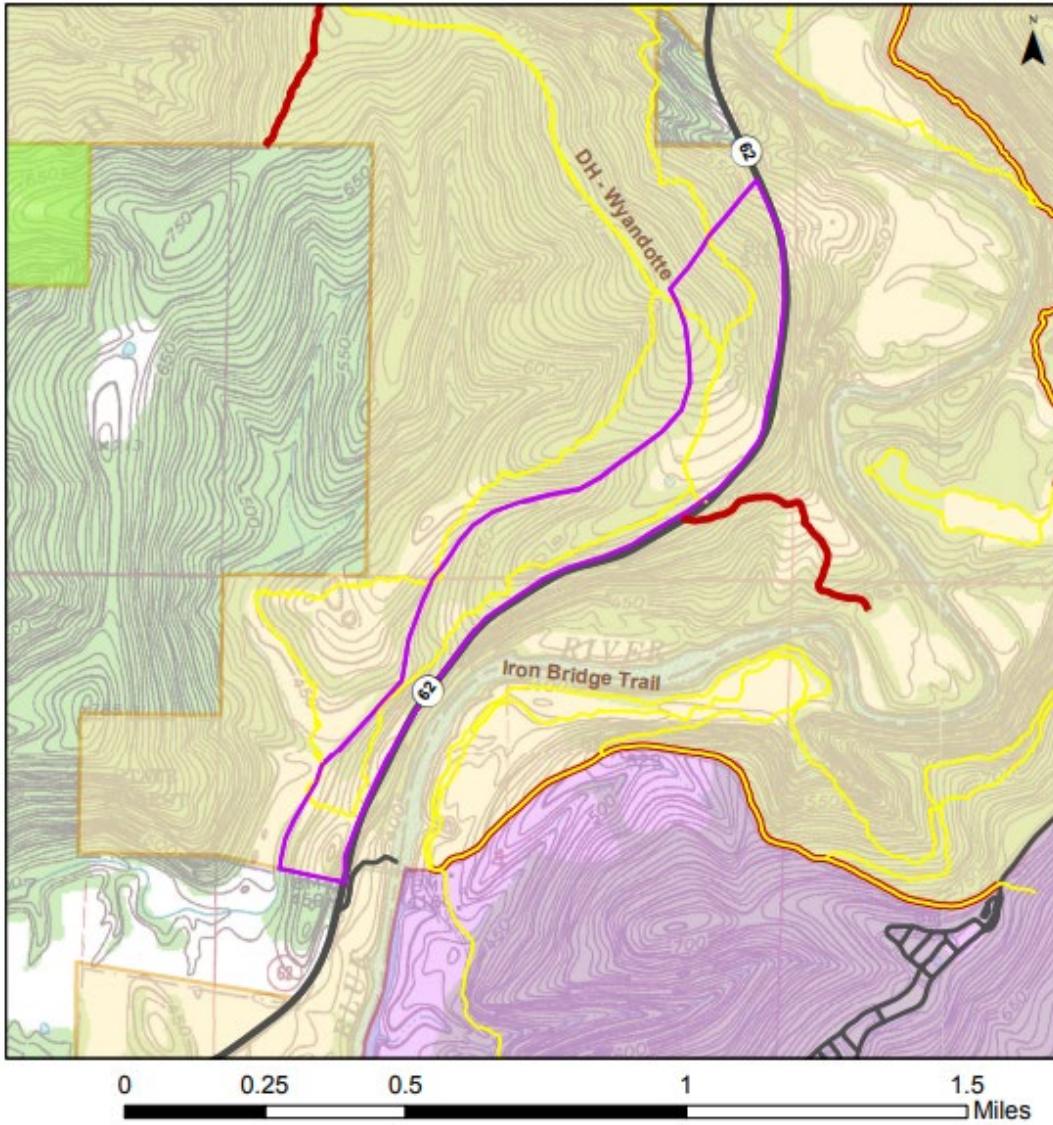
Proposed Activities Listing

<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
Location Map
Compartment 18 Tract 5

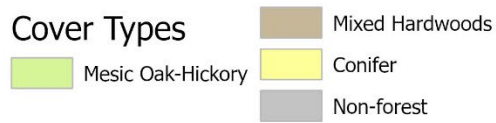
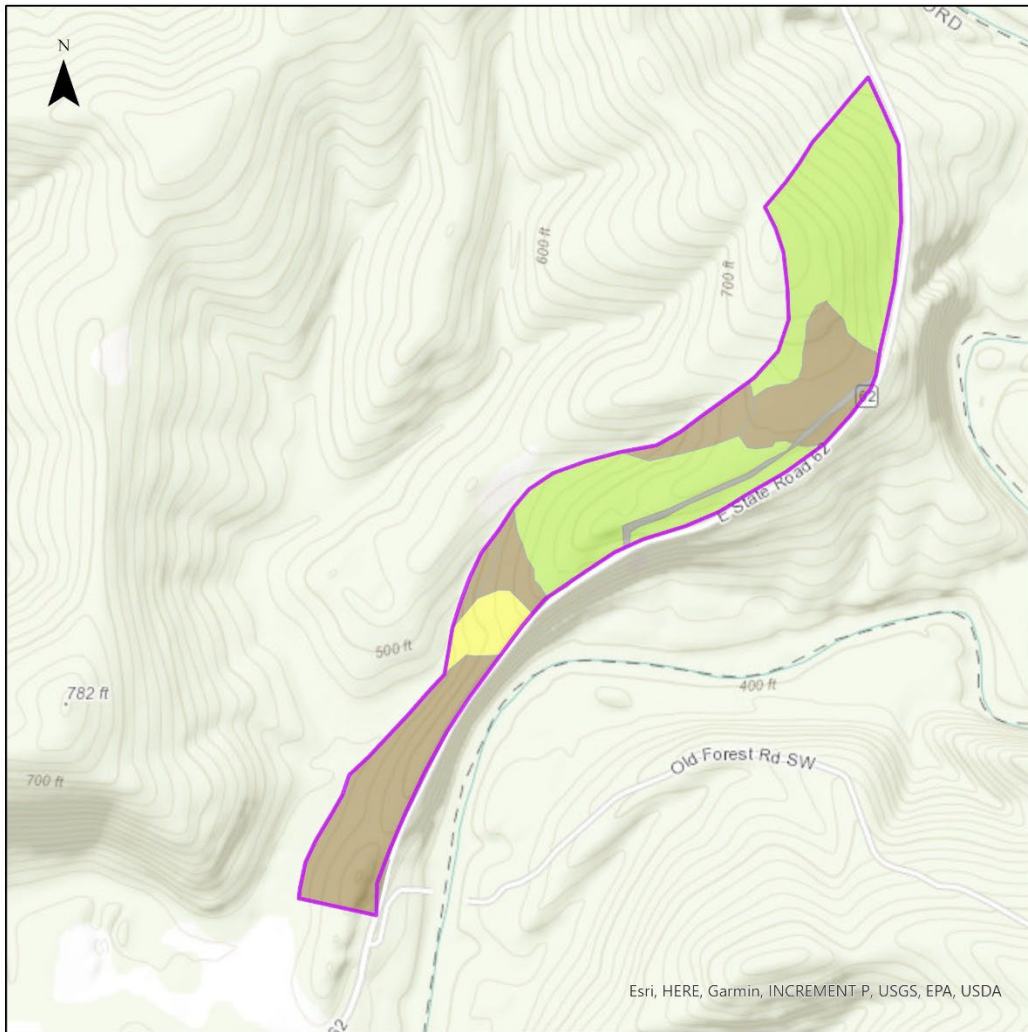


Harrison-Crawford State Forest
Compartment 18 Tract 5
Tract Map



- | | |
|------------------|-----------------|
| Recreation Trail | Nature Preserve |
| Fire Lane | State Park |
| Tract boundary | State Forest |

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



Harrison-Crawford State Forest
Forester: Daniel Martin
Management Cycle End Year 2043

Compartment: 18
Date 6/5/2023
Management Cycle Length 20 years

Tract: 06
Acres: 120

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 ¼, Section 4, T4S, R2E and SW ¼ 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.

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.

Tract Summary Data (trees >11” DBH):

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
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.

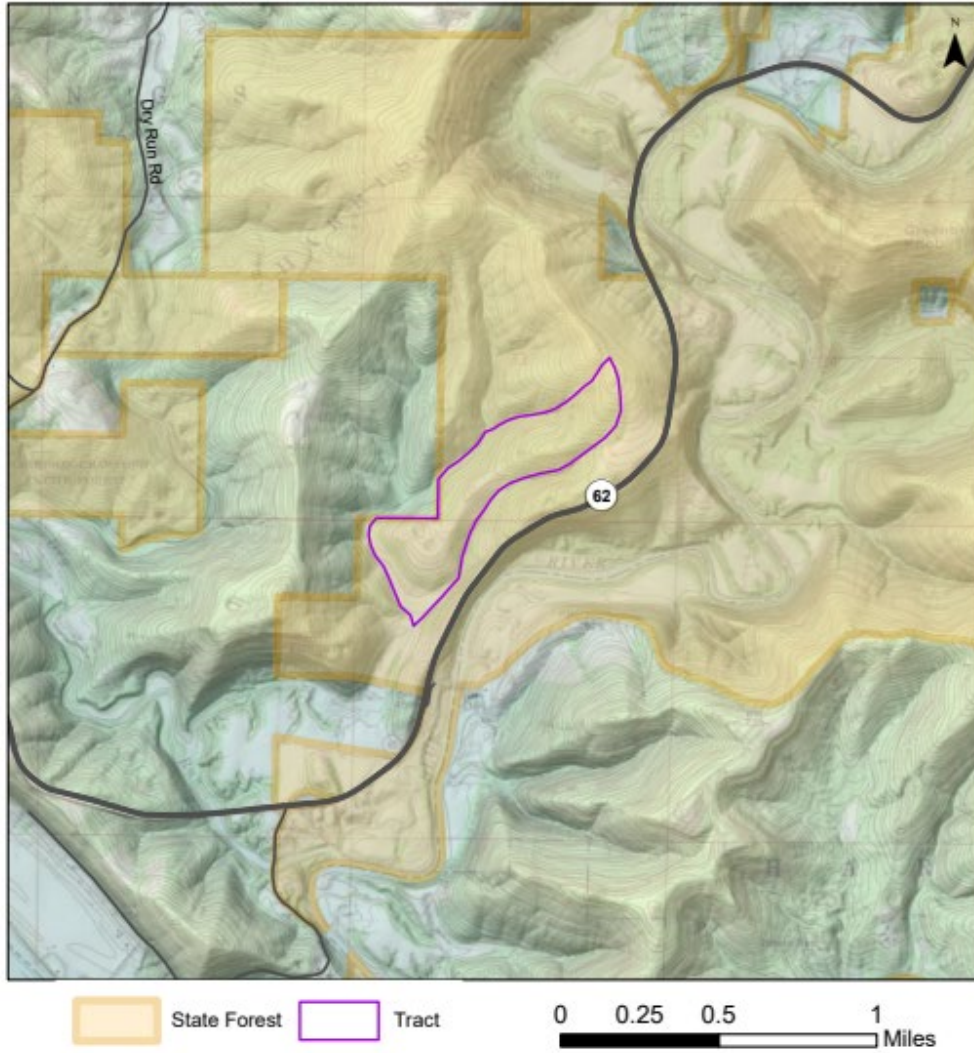
During active management a portion of the Wyandotte Cave horse trail would be temporarily close for public safety. However, under current restrictions, this closure would only occur from November 16th to April 1st and would not affect most of the spring, summer and fall recreation. Hunting opportunities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

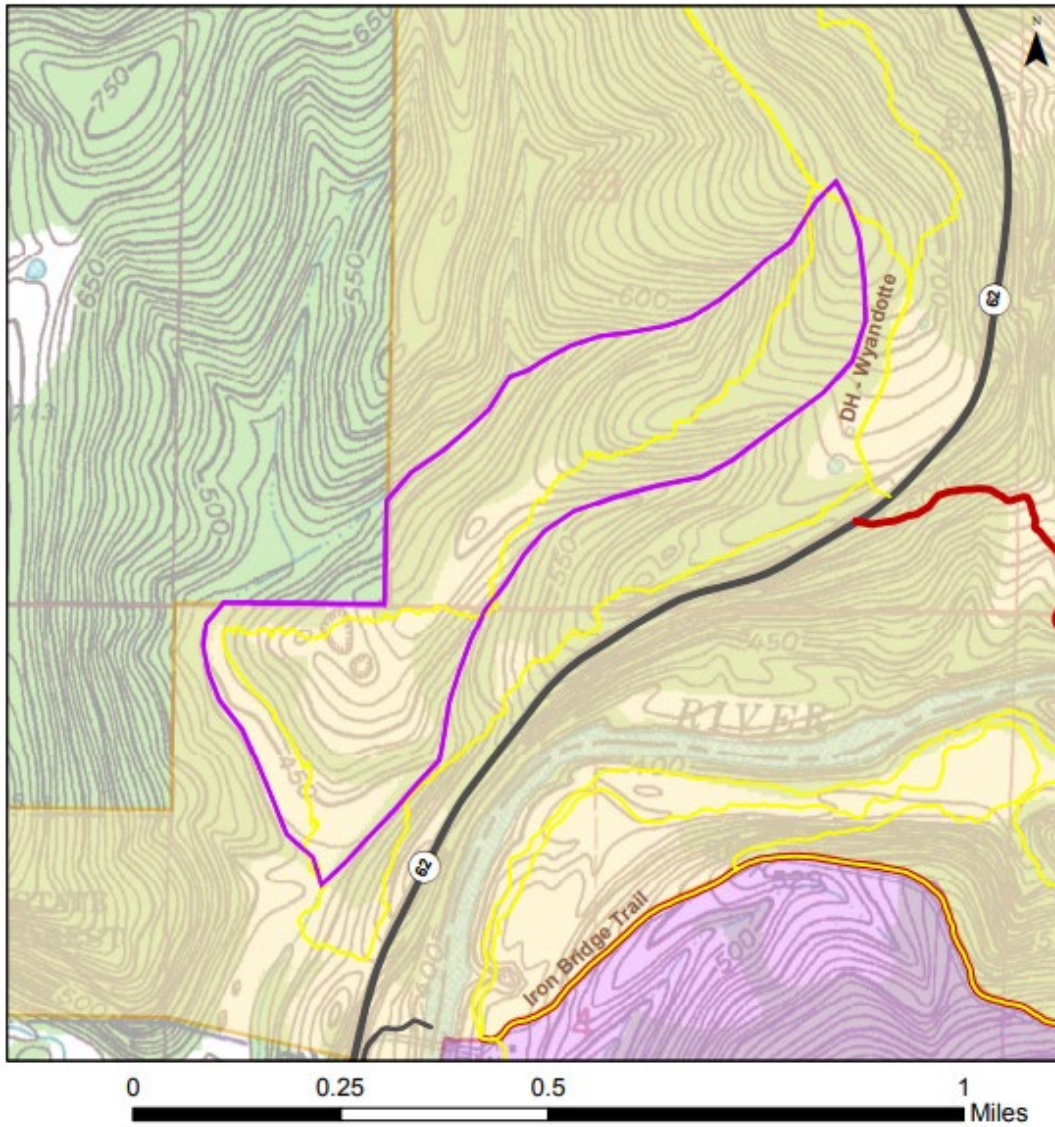
Proposed Activities Listing

<u><i>Proposed Management Activity</i></u>	<u><i>Proposed Date</i></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
Location Map
Compartment 18 Tract 6

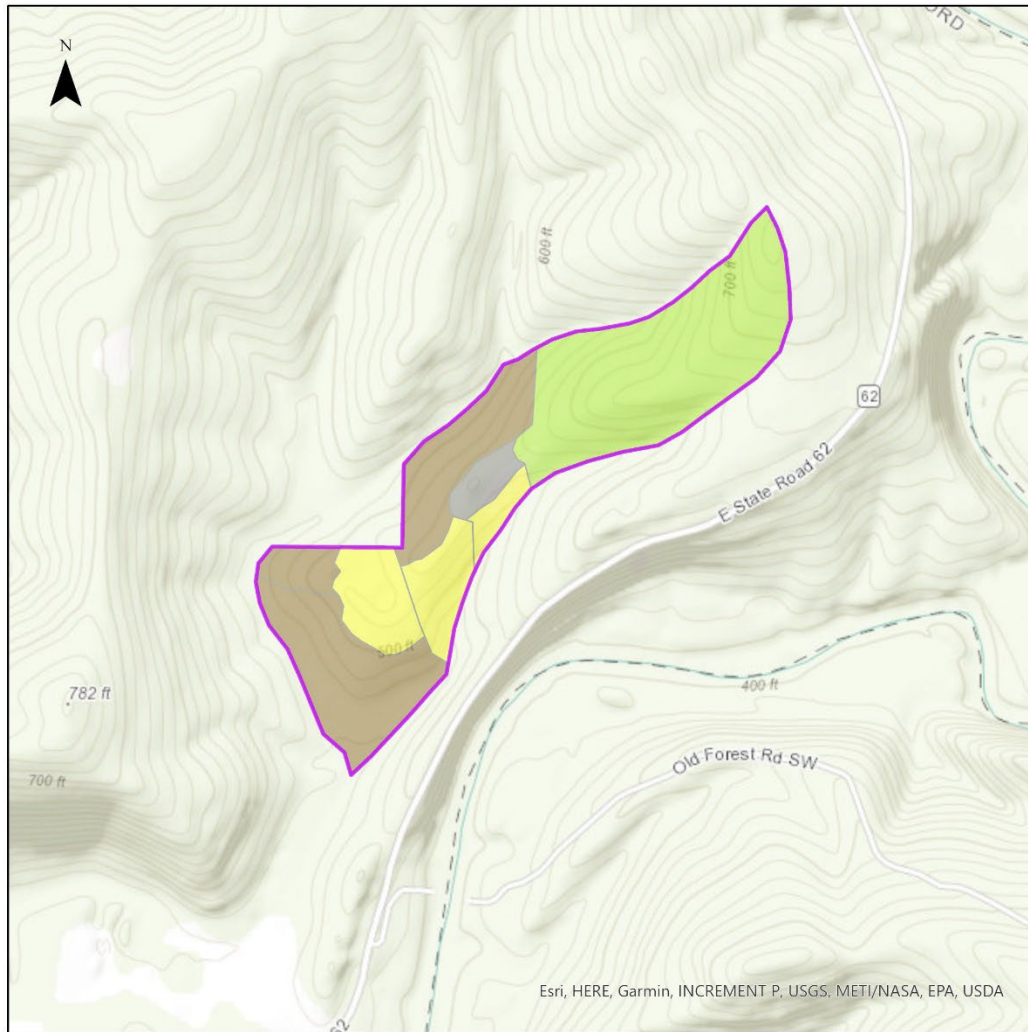


Harrison-Crawford State Forest Compartment 18 Tract 6 Tract Map

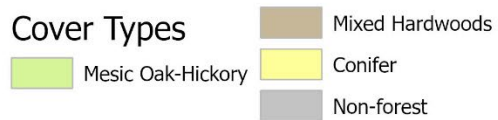


- Recreation Trail
- Fire Lane
- Tract boundary
- State Park
- State Forest

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



0 0.13 0.25
Miles



Harrison-Crawford State Forest
Daniel Martin
Management Cycle End Year: 2043

Compartment: 29
Date: 05/17/2023
Management Cycle Length: 20 Years

Tract: 19
Acres: 73

Location

Tract 19, also known as 6342919, is in Section 13, T4S, R2E, in Harrison County, approximately 7.5 miles southwest of Corydon, IN. The tract can be accessed from Cold Friday Road.

General Description

The tract consists of mesic oak-hickory, mixed hardwoods, and dry oak hickory cover types with most of the acreage being mesic oak-hickory. The tract is located on a slope with the flat ridge top being the northern border of the tract. There are several drainages located throughout the tract.

History

- 1934 Two separate land acquisitions.
 - The west side of the tract was purchased from Kintner.
 - The southeast and northern parcel was purchased from Brewster.
- The southwest corner of this tract was planted to pine. There is no record of when the planting occurred, likely dating circa 1930's.
- 1957 The eastern portion of the tract was purchased from Doolittle.
- 2002 Forest inventory completed, and management guide written.
- 2002 Timber harvest conducted with tract 6342920.
- 2023 Forest inventory completed, and management guide written.

Landscape Context

The surrounding landscape is primarily managed forests owned and managed by the Indiana Department of Natural Resources (IDNR). To the east The Nature Conservancy owns a 114.5-acre parcel that is managed by the IDNR Division of Nature Preserves.

Topography, Geology and Hydrology

This tract primarily consists of a southward facing slope leading to a perennial stream named Cold Friday Hollow. Cold Friday Hollow eventually drains into the Ohio River. Located in the tract are various karst features which will be buffered according to the 2022 Best Management Practices (BMP) field guide.

Soils

This tract consists of seven (7) different soil types.

- 21 acres of Caneyville-Haggatt-Knobs creek silt loams, karst, hilly, eroded.
- 1 acre Deuchars-Apalona-Wellston silt loams, 6 to 12 percent slopes, severely eroded
- 2 acres Deuchars-Apalona-Wellston silt loams, 6 to 12 percent slopes, eroded.
- 22 acres Gilpin-Tipsaw-Ebal complex, 18 to 35 percent slopes, stony
- 23 acres Caneyville-Rock outcrop complex, 25 to 60 percent slopes
- 2 Vertrees-Crider-Caneyville complex, karst, rolling, severely eroded.
- 2 Kintner loam, 1 to 3 percent slopes, occasionally flooded, very brief duration.

The Caneyville-Rock outcrop contains the dry oak-hickory cover type which will mainly be avoided during management activities.

Access

A gravel fire lane off Cold Friday Road provides direct access to the tract. Additional gravel may be warranted depending on the nature of the management activity and time of year. There is an unmaintained fire lane in the southern portion of the tract that could be improved but should be considered an old roadbed rather than a fire lane at present.

Boundary

This tract is surrounded by IDNR property. Natural features (i.e., drainages), fire lanes, or trails serve as boundaries to delineate this tract from neighboring tracts.

Ecological Considerations

This tract is a typical south facing slope with oak habitat. There are small areas of mixed hardwoods and dry oak-hickory which provide different habitat needs for both game and non-game species. During the inventory squirrels (*Sciurus spp.*), white-tailed deer (*Odocoileus virginianus*) and eastern wild turkey (*Meleagris gallopavo*) were observed, and various signs of reptiles, amphibians and birds were present.

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	292	465	173
9" + DBH	219	465	246
19" + DBH	36.5	121	84

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

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

Recreation

A small section of the Cypress Bog horse trail serves as the northern tract boundary, slightly dipping into the tract. Sections of the fire lane along the northern tract boundary serves as the Cypress Bog horse trail as well. There is a small section of the Turkey Ridge horse trail that

touches the southernmost corner of the tract. Hunting also occurs in this tract. During the collection of field data for the forest inventory hunters were observed. During management activities this tract and portions of the trails within the tract will be temporarily closed for public safety. They will reopen following the management activity.

Cultural

Cultural resources may be present, but their location(s) 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 – 52 acres.

This cover type makes up most of the tract acreage and is fully stocked. White oak is the dominate tree species making up 59% of the total volume, the next most abundant species is pignut hickory which only accounts for 10% of the total volume within this cover type. Mortality of white ash and red oak were noted throughout the cover type, there were varying degrees of mortality in black oak and white oak as well. Oak regeneration was observed throughout the stand.

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

Given the mortality observed, oak regeneration, and current stocking level an improvement harvest is recommended to capture mortality and remove low quality trees to release the oak regeneration in the understory and other future crop trees. The harvest would not change the composition of the cover type and the majority of the volume would remain in white oak. Many declining ash trees would be removed while those not exhibiting signs of decline and possibly having resistant to the Emerald ash borer would be retained.

In areas with particularly vigorous oak regeneration or an inadequate quality overstory a group selection opening may be applied. These openings would provide early successional habitat (i.e., young forest habitat) in addition to the release of the 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 these 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 shade tolerant species and favor oak as to not alter the composition of the cover type. TSI can include cutting, girdling, and herbicide application to low value trees. Herbicide use would follow forest certification standards as well as herbicide labels. During post-harvest TSI any invasive species, if not already treated prior to the harvest, can also be treated.

Another silviculture tool often used to reduce understory competition and improve germination of oak and hickory is prescribed fire. Prescribed fire could be used during the dormant season to

reduce shade tolerant species and improve conditions more favorable for oak and hickory establishment or advancement.

Stand 2: Mixed Hardwoods – 13 acres.

This cover type is fully stocked and is the second largest cover type in the tract. Predominantly located in the southern portion of the tract in the lower slope area near Cold Friday Hollow stream. This cover type is varied with the most abundant species being red oak making up only 18% of the total volume in the cover type. This area appears to be stagnant and growing in the remnants of a pine plantation that has mostly declined.

A harvest is recommended to liquidate the remaining pine converting composition of the cover type to a more native mixed hardwood cover type. The remaining cover type would be harvested to remove the low quality and stagnant trees. This effort would keep the mixed hardwoods composition unchanged.

TSI is also recommended to address any unwanted stems not removed during the harvest and address any invasive species.

Stand 3: Dry Oak Hickory – 8 acres.

This cover type occupies the least area of the tract. It consists of thin soils, exposed rock and generally poor growing conditions. Eastern red cedar and American sycamore are the two predominate tree species. Due to the slow and poor growing sawtimber present tree removal would be limited. Some removal of stagnant or dying trees may occur but given the cover type is already on the low end of being fully stocked, the composition would remain the same.

TSI is also recommended but would largely be limited to invasive species and vine control.

The current forest resource inventory was completed on 5/17/2023 by Forester Daniel Martin. A summary of the estimated tract inventory results is in the table below.

Tract Summary Data (trees >11” DBH):

Species	# Sawtimber Trees	Total Bd. Ft.
American Elm	19	1,180
American Sycamore	89	17,750
Bitternut Hickory	15	2,290
Black cherry	62	6,390
Black Oak	66	22,300
Black Walnut	57	10,100
Chestnut Oak	40	6,700
Chinkapin Oak	139	6,100
Eastern Red cedar	288	25,730
Northern Red Oak	128	41,260
Pignut Hickory	377	37,880
Post Oak	19	5,970
Shagbark Hickory	69	9,720

Sugar Maple	526	44,360
Virginia Pine	61	6,530
White Ash	95	13,740
White Oak	1,028	230,560
Yellow Poplar	106	18,180
Total:	3,184	506,740

Summary Tract Silvicultural Prescription and Proposed Activities

Due to the current condition of the tract, an improvement harvest is recommended. This harvest could be undertaken as early as 2023. Overall, the tract volume would be reduced an estimated 25-45%. Most of this reduction would occur utilizing a single tree selection harvest with larger regeneration openings being created by group selection/patch cuts. TSI is recommended before the harvest to address invasive species. TSI following the harvest would focus on completion of established openings, unmerchantable trees not removed through the harvest and remaining invasive species. Due to the proximity and similar cover types, this harvest should occur at the same time as compartment 29 tract 20 (6342920). This would minimize entry into the area for management activities while reducing impacts on recreation, wildlife, hydrology, and other concerns mentioned in this management guide.

This harvest will not change the overall composition of the tract. Non-native low-quality pine would be the only tree species greatly reduced and the tract will remain forested.

BMPs are contractual and will be administered throughout any management activity (i.e., timber harvesting) to ensure activities have minimal impacts to the soils. Soil disturbance will largely be confined to the log yard and main skid trails. BMPs will ensure water quality is not permanently affected, like Cold Friday Hollow. Snags and coarse woody debris will remain at viable levels for wildlife after harvest and the harvest will not adversely affect the wildlife. If group selection is used the openings would create early successional habitat for various wildlife present in the tract.

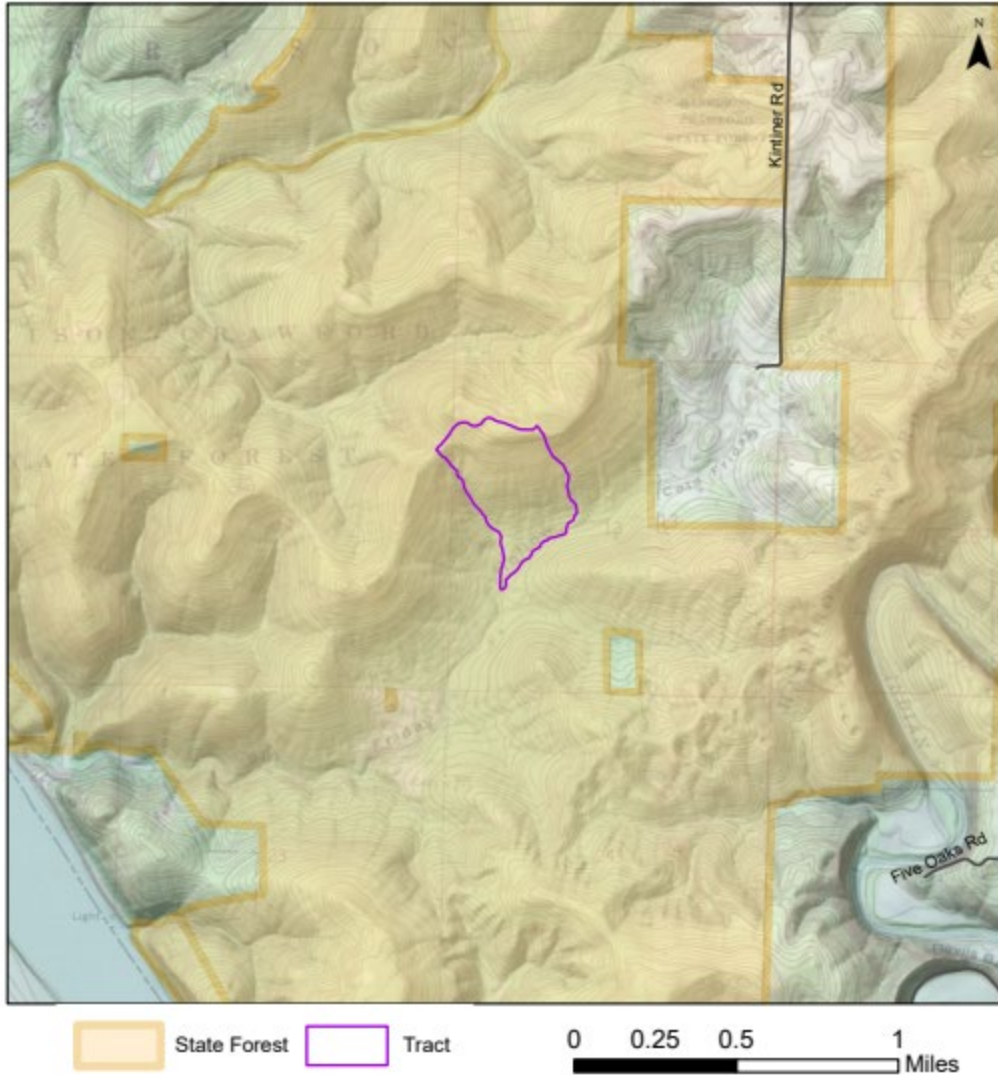
During the harvest, a section of the Cypress Bog horse trail would be temporarily closed. However, this closure would only occur from November 16th to April 1st and would not affect most of the spring, summer and fall recreation. Hunting opportunities should be improved by the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer, turkey, and small mammal browse.

Following the harvest, post-harvest TSI should be completed, and the tract monitored to ensure proper regeneration and growth is occurring. In 20 years the tract should be visited for another forest inventory and new management guide.

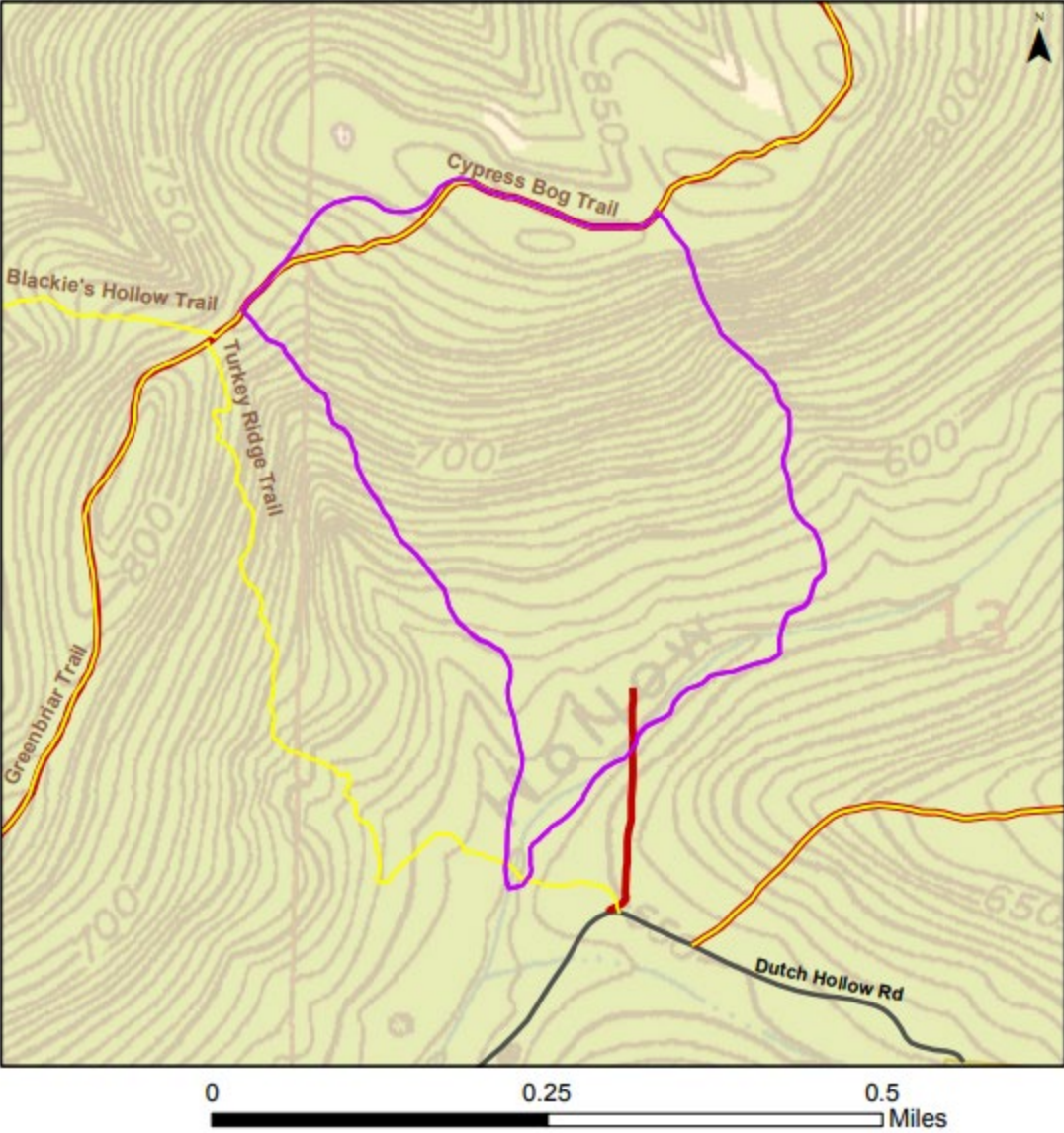
Proposed Activities Listing

<u>Proposed Management Activity</u>	<u>Proposed Date</u>
Management Guide	2023
Access Improvements	2023 - 2024
Treat Invasive Species	2023-2025
Mark Harvest	2023-2028
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
Location Map
Compartment 29 Tract 19

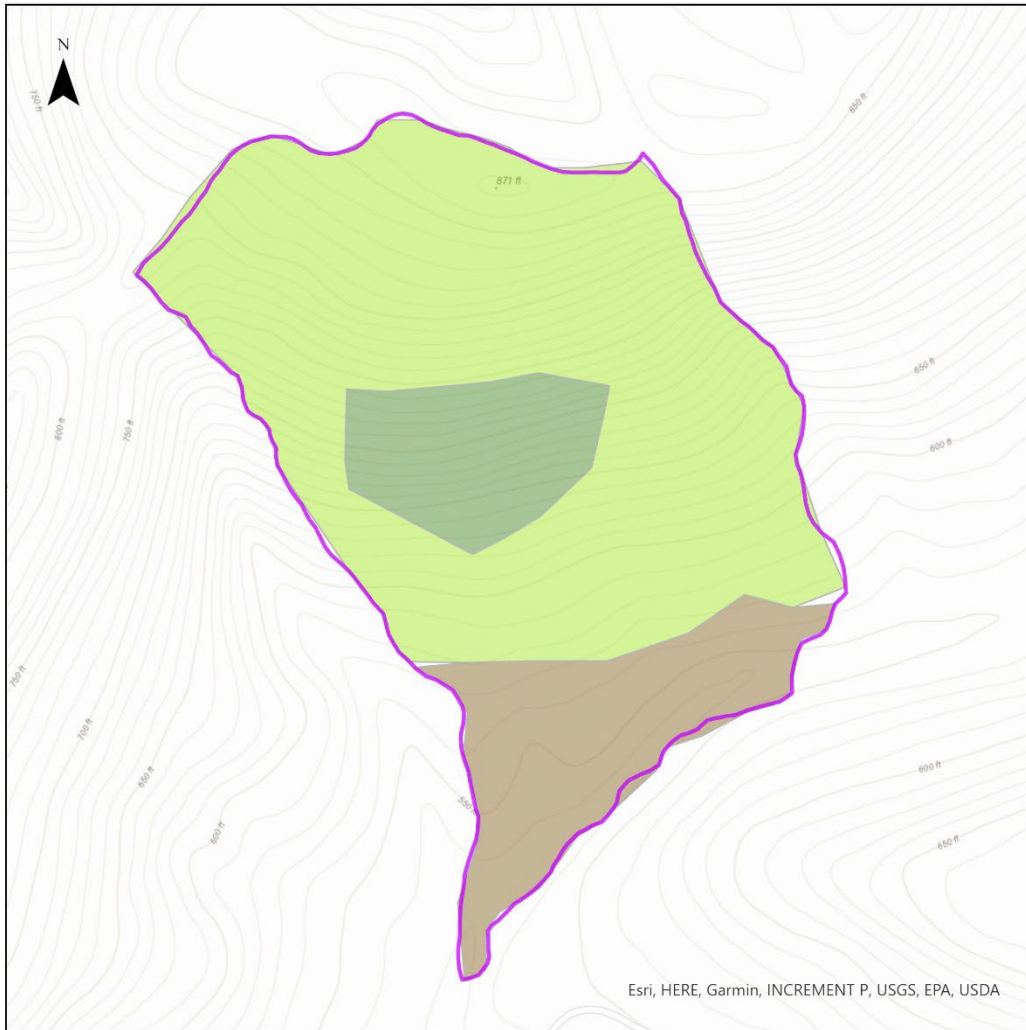


Harrison-Crawford State Forest
Compartment 29 Tract 19
Tract Map






- Recreation Trail
- Fire Lane
- Tract boundary
- State Forest

Harrison-Crawford State Forest Compartment 29 Tract 19 Cover Types Map



Cover Types

-  Dry Oak-Hickory
-  Mesic Oak-Hickory
-  Mixed Hardwoods

Harrison-Crawford State Forest
Forester: Daniel Martin
Management Cycle End Year: 2043

Compartment: 29
Date: 05/19/2023
Management Cycle Length: 20 Years

Tract: 20
Acres: 96

Location

Tract 20, also known as 6342920, is in Section 13, T4S, R2E, in Harrison County, approximately 7.5 miles southwest of Corydon, IN. It can be accessed from Cold Friday Road.

General Description

The tract consists of mesic oak-hickory, mixed hardwoods, and shortleaf pine cover types with most of the acreage being mesic oak-hickory. The tract is primarily located on a southeastern aspect with a flat ridge top area being the northern border of the tract. There are several ephemeral drainages located throughout the tract.

History

- 1934 The west and southernmost tip was purchased from Brewster.
- 1936 The east portion of tract was purchased from King.
- 1950 The northern most portion of the tract was purchased from Kintner.
- 1951 The northern area was planted with shortleaf pine, jack pine, scotch pine, pitch pine and black locust.
- 2002 Forest inventory completed, and management guide written.
- 2002 Timber harvest conducted along with tract 6342919.
- 2023 Forest inventory completed, and management guide written.

Landscape Context

The surrounding landscape is primarily managed forests owned and managed by the Indiana Department of Natural Resources (IDNR). Directly bordering the tract to the east, The Nature Conservancy owns a 114.5-acre parcel that is managed by the IDNR Division of Nature Preserves.

Topography, Geology and Hydrology

The northern area of the tract consists of a flat area where the pine was planted. Following the tract south there is southward facing slope leading to a perennial stream named Cold Friday Hollow that eventually flow into the Ohio River. Located in the tract are various karst features and a small water body which will be buffered according to the 2022 Best Management Practices (BMP) field guide.

Soils

There are eight (8) unique soil types in this tract.

9 acres of Apalona-Zanesville silt loams, 2 to 6 percent slopes
17 acres Deuchars-Apalona-Wellston silt loams, 6 to 12 percent slopes, severely eroded
5 acres of Ebal-Gilpin-Wellston silt loams, 10 to 22 percent slopes, eroded
33 acres of Gilpin-Tipsaw-Ebal complex, 18 to 35 percent slopes, stony
19 acres Caneyville-Rock outcrop complex, 25 to 60 percent slopes
6 acres of Caneyville-Haggatt-Knobcreek silt loams, karst, hilly, eroded

5 acres Caneyville-Haggatt-Knobcreek complex, karst, hilly, severely eroded
2 acres Kintner loam, 1 to 3 percent slopes, occasionally flooded, very brief duration

Access

A gravel fire lane from Cold Friday Road provides access to the tract. Additional gravel may be warranted depending on the nature of the management activity.

Boundary

The eastern border of this tract borders The Nature Conservancy property. There was a Division of Forestry survey completed in the 1980’s to determine this property line. At that time, monumentation at either end of this line and wood fence posts were installed along the southern part of the line. All other tract borders are interior to the state and defined by natural features (e.g., drain ravines, streams, trails, etc.).

Ecological Considerations

The majority of the tract consists of typical south facing slope oak habitat. There are small areas of mixed hardwoods and pine. Some features resemble that of a forest glade but limited. These habitat features provide different habitat needs for both game and non-game species. During the inventory squirrels (*Sciurus spp.*), white-tailed deer (*Odocoileus virginianus*), and eastern wild turkey (*Meleagris gallopavo*) were observed, and various signs of reptiles, amphibians, and birds were present. The ridge top that was planted to pine would provide both physical and thermal cover for bedding areas particularly in the winter.

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	384	1268	884
9”+ DBH	288	993	705
19”+ DBH	48	102	54

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

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

Recreation

A small section of the Cypress Bog horse trail serves as the northern tract boundary. This trail is

also a fire lane. Hunting occurs in this tract. This inventory was taken during the spring turkey hunting season and hunters were seen in the tract. During management activities this tract and portions of the trail within the tract will be temporarily closed for public safety. They will reopen following the management activity.

Cultural

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

Tract Subdivision Description and Silvicultural Prescription

Mesic Oak Hickory – 73 acres.

This cover type makes up most of the tract acreage and is fully stocked. White oak makes up 51% of the available volume, black oak is the next most abundant species accounting for 11% of the volume in this cover type. Mortality of white ash, red oak and black oak were noted throughout the stand. Oak regeneration was seen throughout the stand.

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

Given the mortality observed, oak regeneration, and current stocking level an improvement harvest is recommended to capture some of the mortality and remove low quality trees to release the oak regeneration in the understory and other future crop trees. The harvest would not change the composition of the site and the majority of the volume would remain in white oak. Many declining ash trees would be removed from the overstory. Healthy ash with no signs of decline would remain for possible resistance.

In areas with particularly vigorous oak regeneration or an inadequate quality overstory a group selection opening may be applied. These openings would provide early successional habitat (i.e., young forest habitat) in addition to the release of the 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 these trees to become part of the canopy.

Not all low quality or understory trees will be removed during the timber harvest. For this reason, post-harvest timber stand improvement (TSI) is recommended to reduce shade tolerant species and favor oak as to not alter the composition of the cover type. TSI can include cutting, girdling, and herbicide application to low value trees. During post-harvest TSI any invasive species, if not already treated prior to harvest, can also be treated. Herbicide use would follow forest certification standards as well as herbicide labels.

Another silviculture tool often used to reduce understory competition and improve germination of oak and hickory is prescribed fire. Prescribed fire could be used during the dormant season to reduce shade tolerant species and improve conditions more favorable for oak and hickory

establishment or advancement.

Mixed Hardwoods – 16 acres.

This cover type is fully stocked and is the second largest cover type in the tract. The total acreage of this cover type is from three similar areas within the tract, two areas in the northern half surrounding the pine and a third area along the stream in the far southern portion of the tract. This cover type is dominated by yellow poplar which makes up 66% of the volume and has eastern red cedar as the second most abundant species by volume at 15% of the available volume.

A harvest in this cover type would not change the species composition and would remain mixed hardwoods. The field grown, and stagnant yellow poplar would largely be the target for removal to improve the overall health and vigor of the cover type. Due to the natural understory present, yellow poplar, maple, and beech are expected to regenerate naturally.

TSI is also recommended in this cover type to remove any unwanted stems not removed during the harvest and control any invasives present.

Conifer – 7 acres.

This stand is highly over stocked with non-native shortleaf pine. The pine will most likely not be liquidated and instead thinned to bring stocking down. Where oak and other hardwood regeneration is present (mainly in the transition zone from pine to another cover type) single tree and group selective cutting will be used to release the native hardwoods. TSI will also be conducted throughout the cover type to promote native species where possible.

Water – < 1 acre

This is a small drainage pond that will be buffered following 2022 BMP field guide.

The current forest resource inventory was completed on 5/19/2023 by Forester Daniel Martin. A summary of the estimated tract inventory results is in the table below.

Tract Summary Data (trees >11”DBH):

Species	# Sawtimber Trees	Total Bd. Ft.
Black cherry	32	6,680
Blackgum	48	5,900
Black oak	253	71,500
Blue ash	60	4,670
Chestnut oak	183	42,160
Chinkapin oak	142	11,870
Eastern redcedar	137	14,350
Northern red oak	164	27,080
Persimmon	48	4,980
Pignut hickory	463	55,600
Post oak	48	7,830
Red maple	18	1,520

Scarlet oak	53	15,900
Shagbark hickory	53	10,070
Shortleaf pine	338	39,590
Sugar maple	530	44,810
White ash	86	10,340
White oak	1,473	327,320
Yellow Poplar	379	99,440
Total:	4,508	801,610

Summary Tract Silvicultural Prescription and Proposed Activities

Due to the current condition of the tract, an improvement harvest is recommended. This harvest could be undertaken as early as 2023 or 2024. Overall, the tract volume would be reduced 35-55%. Most of this volume would come from a single tree selection harvest with larger regeneration openings created by group selection/patch cuts. TSI is recommended before the harvest to address invasive species. TSI following the harvest would focus on completion of established openings, unmerchantable trees not removed through the harvest and remaining invasive species. Due to the proximity and similar cover types, this harvest should occur at the same time as compartment 29 tract 19. This would minimize entry into the area for management activities while reducing impacts on recreation, wildlife, hydrology, and other concerns mentioned in this plan.

This harvest will not change the overall composition of the tract. The entire tract will remain forested with what cover types are currently present.

BMPs are contractual and will be administered throughout any management activity (i.e., timber harvesting) to ensure activities have minimal impacts to the soils. Soil disturbance will largely be confined to the log yard and main skid trails. BMPs will ensure water quality is not permanently affected, like Cold Friday Hollow.

Snags and coarse woody debris will remain at viable levels for wildlife after harvest and the harvest will not adversely affect the wildlife. If group selection is used the openings would create early successional habitat for various wildlife present in the tract.

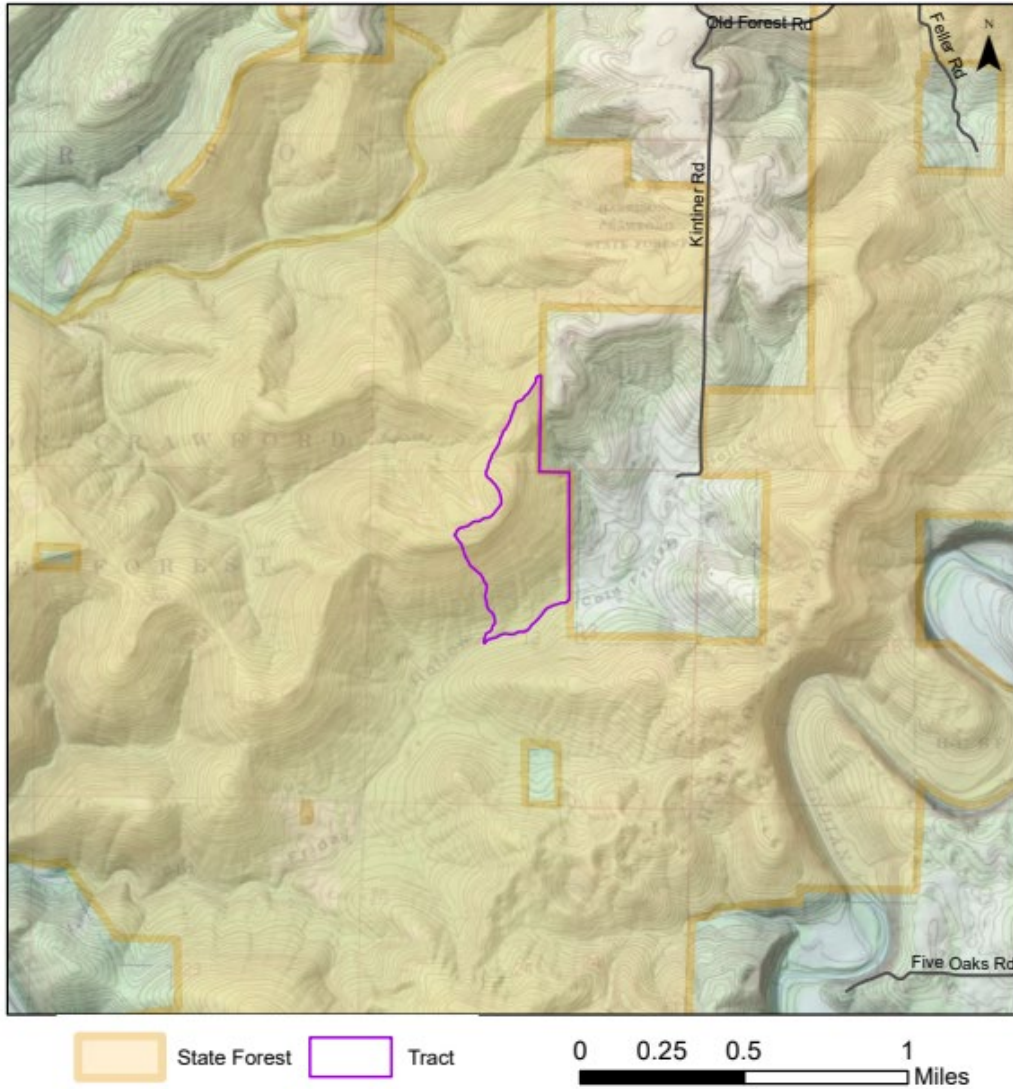
During a timber harvest, a section of the Cypress Bog horse trail would be temporarily closed. However, this closure would only occur from November 16th to April 1st and would not affect most of the spring, summer and fall recreation. Hunting opportunities should be improved by the maintenance of early 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 should be conducted, and the tract revisited for regeneration opening and post-harvest checks in 3-5 years to ensure proper regeneration and growth is occurring. In about 20 years, the tract should be revisited for another inventory and a new management guide can be created.

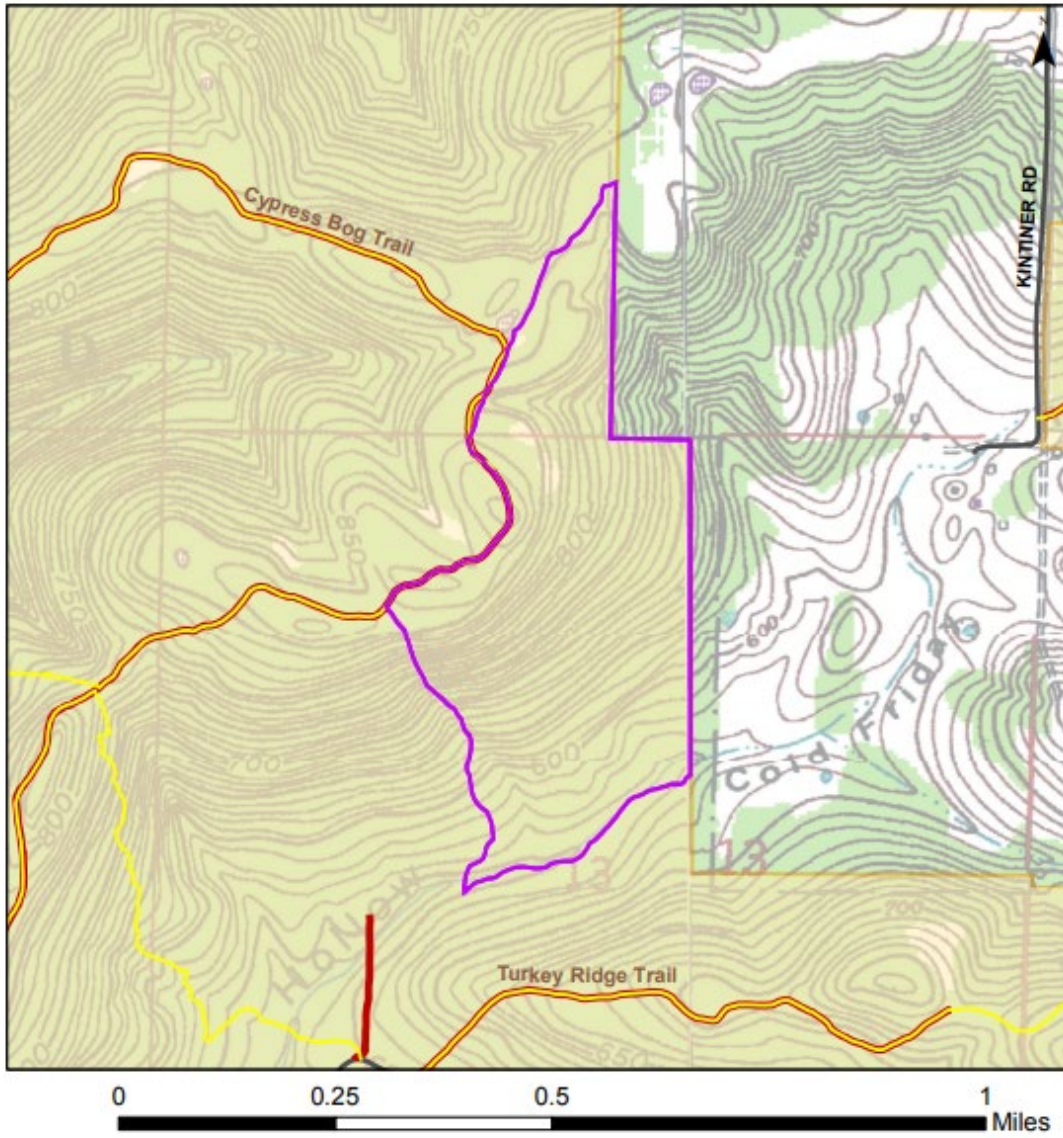
Proposed Activities Listing

<u>Proposed Management Activity</u>	<u>Proposed Date</u>
Management Guide	2023
Access Improvements	2023 - 2024
Treat Invasive Species	2023-2025
Mark Harvest	2023-2028
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
Location Map
Compartment 29 Tract 20

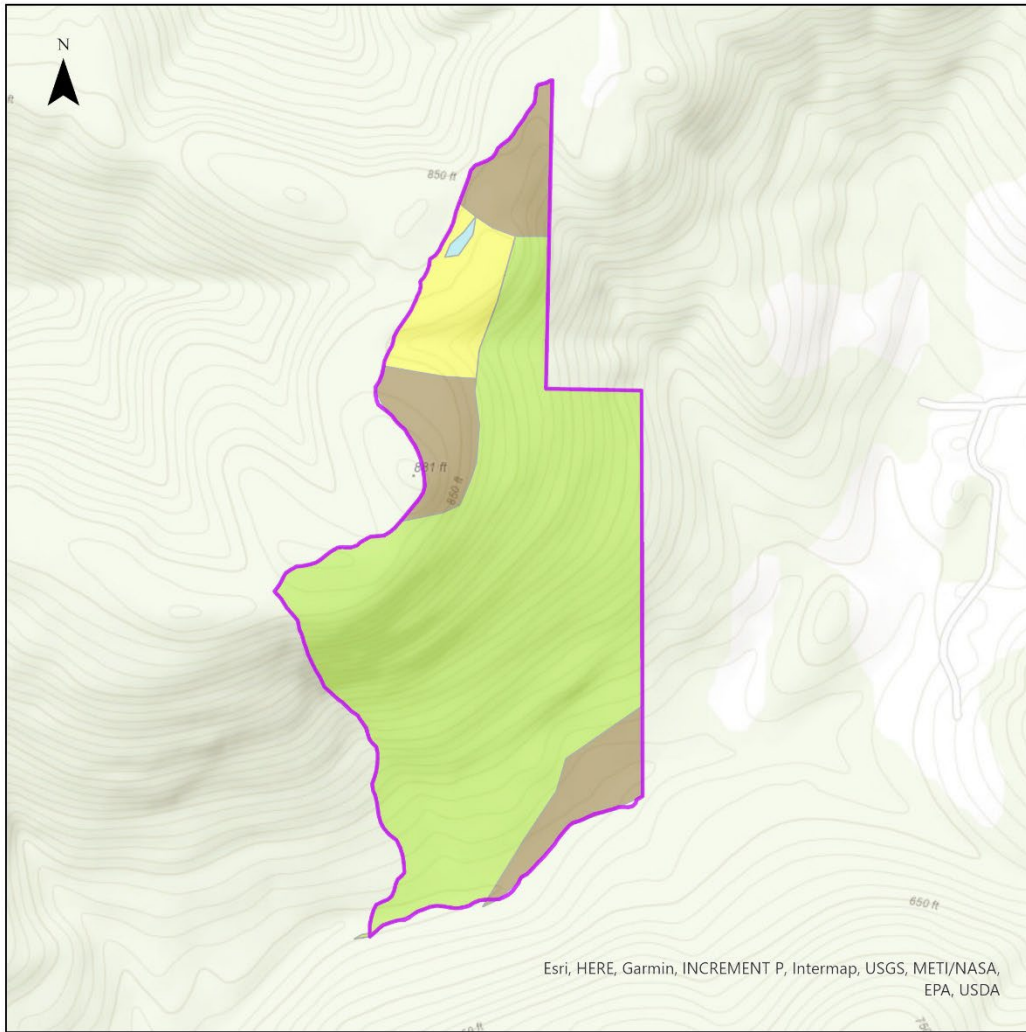


Harrison-Crawford State Forest Compartment 29 Tract 20 Tract Map



- Recreation Trail
- Fire Lane
- Tract boundary
- State Forest

Harrison-Crawford State Forest Compartment 29 Tract 20 Cover Types Map



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Miles

