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: March 24, 2020 – April 22, 2020

The Indiana State Forest system consists of approximately 158,000 acres of primarily forested land. These lands are managed under the principle of multiple use-multiple benefit to provide forest conservation, goods and services for current and future generations. The management is guided by scientific principles, guiding legislation and comprehensive forest certification standards which are independently audited to help insure long term forest health, resiliency and sustainability.

For management and planning purposes each State Forest is divided into a system of compartments and tracts. In general terms compartments are 300-1,000 acres in size and their subunits (tracts) are 10 - 300 acres in size. Resource Management Guides (RMGs) are then developed for each tract to guide their management through a 15-25 year management period. There are approximately 1,600 tracts in the State Forest system. During annual planning efforts 50-100 tracts are reviewed and RMGs developed based on current conditions, inventories and assessments.

The RMGs listed below and contained in this document are part of the properties annually scheduled forest inventories under review for Harrison-Crawford State Forest.

Compartment 18 Tract 7
Compartment 22 Tract 7
Compartment 26 Tract 1
Compartment 27 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.

Harrison Crawford **Tract:** 6341807 (Comp 18 Tract 7)
Forester: Wayne Werne **Date:** February, 2018
Tract Acreage: 151.8
Management cycle end year: 2038 **Management cycle length:** 20 yr

Location
This tract is located in Crawford County - Section 33, Township 3S, Range 2E, and is approximately 2-3 miles east of the town of Leavenworth.

General Description
This tract was divided into one large stand and one minor stand based on cover type and past management. These stands include: oak hickory and a young regeneration opening. These stands will be described in detail below.

History
The land that makes up this tract was primarily acquired from 2 previous landowners with a little bit coming from a third acquisition. The northern portion was acquired from Bertha Cole and Leona Dean in 1969 (deed 131.217) for an unknown sum. The southwestern portion was acquired from Anna Lee Hockman in 1968 for a sum of $145 per acre (deed 131.218). A small part of the southern portion was acquired in 1972 (deed 131.227) from Clyde and Viola Engleman for $307 per acre.

Landscape Context
This tract is a moderate chunk of forest surrounded by a mostly forested landscape with portions of some of the nearest private landholdings consisting of pasture and agricultural fields along with minimal housing development. Forest is the dominant land cover in the region.

Topography, Geology and Hydrology
The majority of the tract contains gentle to moderately steep slopes that drain into intermittent drainages that then drain into Blue River about a quarter to half mile to the east, which eventually drains into the Ohio River.

Soils
The following soils are found on the tract in approximate order of importance.

GlE2 Gilpin silt loam, 18-25% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 90-100, est. growth is 185-260 bd. ft/ac/yr. for oaks and 335-415 bd. ft/ac/yr. for yellow-poplar.

BgF Berks-Gilpin-Weikert complex, 25-75% slopes Upland oak SI is 70-80, Yellow-poplar SI is 70-80, est. growth is 185-260 bd. ft/ac/yr. for oaks and for yellow-poplar.

WeD2 Wellston silt loam, 12-18% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 90-100, est. growth is 185-260 bd. ft/ac/yr. for oaks and 335-415 bd. ft/ac/yr. for yellow-poplar.

CoF Corydon stony silt loam, 20-60% slopes Upland oak SI is 65-75, Yellow-poplar SI is 80-90, est. growth is 155-220 bd. ft/ac/yr. for oaks and 260-335 bd. ft/ac/yr. for yellow-poplar.

ZaC2 Zanesville silt loam, 6-12% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 85-95, est. growth is 185-260 bd. ft/ac/yr. for oaks and 300-375 bd./ ft/ac/yr. for yellow-poplar

Access
This tract has good access via fire lane 603 that comes off of SR 62 and goes along the ridgeline through the center of this tract and beyond. This road is drive able and has been improved for truck usage in recent times.

Boundary
This tract is surrounded by other tracts of state owned land with the exception of a small piece of private property on the northeastern side. The western boundary is formed by a drainage that divides it from tract 1802. The southwestern boundary is formed by another drainage that divides this tract from tract 1806. The southeastern portion of the tract is formed by a less distinctive drainage that divides it from tract 1805 on the eastern side of the fire trail. The northern boundary is also formed by a less distinctive line down the hill, with compartment 14 tract 12 to the north. The privately owned Stephenson property borders on the northeast with old fence fragments in places, but the line is ill defined on the ground. The tract also touches SR 62 for a short length in the northeastern portion.

Ecological Considerations
This tract represents typical upland forest habitat dominated mostly with an overstory of mature oak trees. 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 oak hickory stand, and the noted presence of fire damage has allowed for a likely higher than normal density of trees with interior cavities due to decay.

Snags were tallied in this inventory for potential uses by wildlife. The following tables summarize guidelines and actual data with regard to the new strategy for consideration of the Indiana bat.

Guidelines for preferred density of live and dead trees for use by Indiana bat:

# of live trees per acre	**Guidelines maintenance**	**Tract 1807 actual present – harvest = residual**
12”-18” DBH class	**6**	**36.5 – 16.7 = 19.8**
20” DBH and greater	**3**	**15.4 - 5.8 = 9.6**
Total	**9**	**51.9 - 22.5 = 29.4**

# snags per acre	**Guidelines maintenance**	**Guidelines optimal**	**Tract 1807 actual**
6” - 8” DBH class	**1**	**1**	**6.1**
10”-18” DBH class	**2.5**	**5**	**7.4**
20” DBH and greater	**0.5**	**1**	**1.5**
Total	**4**	**7**	**15.0**

These numbers show that both live tree densities as well as snag densities meet guidelines on this tract. The result for large snags deviates from several other recently completed inventories on other tracts of the forest, where large snag densities are below one per acre and densities seem to hover at about 0.3 per acre. It is likely that the pockets of mortality of larger trees that has been noted in this plan led to an elevated density of large snags. The vast majority of snags are in the smaller size classes, though, which makes them unsuitable for most nesting or roosting purposes, but some feeding use might be gained from them.

Management activities will not intentionally remove snags, with a few exceptions of large recently dead trees or storm damage when possible, so any timber sale will not negatively impact that component significantly. Creation of more snags in this size class could be undertaken by girdling large cull trees in a post-harvest TSI operation.

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 openings will create early successional forest 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.

Since this tract does not border a major stream, there should be no disruption of any potential travel corridors by forest management activities. The habitat on this tract in the context of the surrounding landscape does not represent any special component that would be used more preferentially or exclusively by wildlife for traveling or dispersion, as riparian habitat might be, or as forest in a non-forested landscape might be.

Since this tract represents a component of contiguous forest, it is possible that forest management activities might disrupt any forest interior species by creating edge habitat for generalist species to "invade" the area. This would possibly occur if regeneration openings were put in place that offered a habitat preferred by such generalist species which might move in and start using such habitat. In the context of the surrounding landscape, this tract represents a moderate chunk of forest in a matrix of surrounding forest land.
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.

There were a few scattered occurrences of ailanthus and paulownia found primarily along the ridge near the fire trail in the central portion of this tract during inventory. There are likely more scattered occurrences of these species throughout the tract.

There are zones of Japanese stilt grass invasion – primarily along the fire and horse trails – as well, and there may also be some of this invasive found interior to the tract wherever there has been disturbance that has opened up the canopy to sunlight and exposed the mineral soil. The main fire trail has been sprayed for stiltgrass in the past in an attempt to contain and limit the spread of this invasive.

Pretreatment of the scattered ailanthus and paulownia prior to any harvest and continued spraying of stilt grass along the fire lane will help ensure the control of these invasive species over time.

Recreation
This tract, in conjunction with the area surrounding it, forms the main contiguous portion of state owned land that makes up the forest, and as such, it probably receives a medium to high level of recreational use. The fire lane that traverses the ridge in the central portion of the tract also serves as a horse trail as well as a disabled hunter trail, and between such disabled hunter use along with normal hunting and horse riding use, this tract almost certainly has a fair amount of recreational use throughout the year. Additionally, it is fairly close to SR 62 and has relatively easy access for the public.

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

General: Utilizing records of the past history of this tract, an inventory done in 1979 indicated a total standing volume of 3,556 board feet per acre, and another inventory done in 1993 indicated this volume had increased to 6,257 board feet per acre. Subsequent to the 1993 inventory, there was a timber sale marked in 1995 that included 137,400 board feet in 957 trees and 284 culls. This sale was primarily white oak (72,000 bf), black oak (25,000 bf), and scarlet oak (23,000 bf). This sale was sold to Wayne Ransome with Hi Grade Veneer for $25,680 ($0.19/ft), but he later decided to back out of the sale and subsequently lost his deposit. Additional volume was marked in neighboring compartment 14 tract 12 which increased the total sale volume to 251,000 board feet in 1469 trees and 443 culls, and this sale was purchased and cut in 1996 by Bradford Forest Products for $62,290 ($0.25/ft).

The 2017 inventory shows 8209 board feet per acre, and this figures out to a growth rate of 118 board feet per acre per year, after taking into account the volume removed in the 1996 sale and 24 years of growth since the last inventory. This growth figure increases to 146 board feet per acre per year if one uses the 1979 inventory data as the starting point and the growth is figured over a longer period of time.

The growth figures are reasonable, but seem to have slowed in more recent times and may have higher potential if more frequent management is applied to the tract, since it may be suffering from slowed or stagnated growth with 20 years since the last harvest. It is hoped and assumed that this growth rate can be increased into the future with the continued management and encouragement of vigorous and healthy crop trees.

Number of trees per acre and basal area per acre figures indicate that this tract is stocked at about 92%. Removal of trees tallied as “cut” either via a timber sale or TSI would reduce the stocking level, but most of this is reflective of removing the mid and understory trees that mostly seem to

be more mesic or nonmerchantable trees that are interfering with oak regeneration, while only removing about 25-40% of the overstory volume.

Notes from both the 1979 and 1993 inventories indicate that there was widespread butt damage in the larger trees from probable grazing into the 1960's and also burning. Some of this was noted in more recent times, and stood out because white oak was showing fire damage and hollow butts, and white oak is usually less likely to show this kind of damage than other species. A lot of these damaged trees were removed in the 1996 sale, and the residual stand is in much better shape, but still shows some levels of past abuse. It can also be assumed that if white oak was showing widespread damage previous to the timber sale, the remaining trees probably have some level of lesser damage as well.

Additionally, during the inventory, there were pockets of mortality of numerous overstory trees noted. This was observed in two locations – in the southwest corner of the tract and on another south facing slope to the north. These areas probably already had thinner soils and poor growing conditions compared to the rest of the tract, but the fact that a number of white oak trees (usually very drought tolerant) were dying or dead indicated that there could be some kind of chronic insect/disease/stress issue going on in this stand. There was an outbreak of two lined chestnut borer several years ago that was showing widespread impact on the white oak that was observed in the region, and the current mortality here may be the result of stresses induced by that and the poorer growing sites here, as well as the periodic severe droughts the area has experienced over the last 20 years.

Due to the amount of volume being carried on the majority of the tract (8,209 bd. ft/ac), the length of time since the last managed sale (22 years back to 1996), and the general size and condition of the overstory trees in the majority of the tract (noted mortality), the initial impression was that a thinning/improvement harvest could be undertaken in this tract at any time. This would produce a sale volume of approximately 350,000 – 500,000 board feet or about 2700 board feet per acre average and leave approximately 750,000 – 900,000 board feet, or 5,475 board feet per acre average.

It is recommended that Timber Stand Improvement (TSI) be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings. TSI of pole-size trees may be required for thinning in places, and to open up the understory for potential oak regeneration to take hold or be released in the less mesic sites. Vines did not seem to be present in this tract beyond the regeneration opening, but need to be kept at bay with TSI activities as well. Extensive understory treatment of shade tolerant species will be necessary to encourage oak regeneration where present. Ailanthus needs to be monitored and eliminated when found to be present or establishing itself. There were several ailanthus noted at the time of inventory, and there are probably several more scattered throughout the tract. Ideally, all the ailanthus should be treated pre-harvest, and then follow-up should be done to treat any new seedlings and sprouts that come up in newly opened up parts of the tract. Long term monitoring will be necessary to keep this exotic at bay.

Stand 1 - Oak hickory
This is what basically makes up and describes almost all of the tract. There are pockets of drier areas with post oak and cedar and some exposed rock in places and a young regeneration opening in the north (which was delineated as a separate stand), but as a whole, oak-hickory describes the whole tract very aptly. In that sense, this tract is more homogeneous than most larger tracts on the forest.

The high total volume of this stand (8,321 bd. ft/ac) is composed overwhelmingly of white oak (5,342 bd. ft/ac), black oak (793 bd. ft/ac), pignut hickory (548 bd. ft/ac), and northern red oak (504 bd. ft/ac). The remaining 16% of the volume consists of scarlet oak, sugar maple, and various other species.

Stand 2 – Young regeneration opening
This 2.5-acre stand is located in the northern tip of the tract and is part of a larger regeneration opening that was created in the last timber sale in 1995. It was formerly an area of fire damaged low grade oak hickory that was removed and subsequently regenerated into a stand of yellow-poplar and sassafras, with some residual larger white oak trees and some invasive paulownia and ailanthus that has popped up. The oak regeneration present has mostly been out competed by the faster growing poplar. It contains 2,381 bd. ft/ac of residual white oak and no other merchantable timber. It also contains a presence of vines.

Stand 1: Oak hickory - Prescription
This delineation basically describes the vast majority of the tract acreage – with a couple of exceptions of part of a previous regeneration opening from the 1996 harvest and some dry site areas with more post oak and cedar. It is very heavily dominated with white oak as the major species component. This stand contains a high volume of 8,321 board feet per acre of which 25-40% was classified as harvestable and 60-75% was classified as residual.

Since the last harvest in this tract was 22 years ago, and because it also currently contains a moderate volume of harvestable material and a high volume of residual growing stock, it could be ranked as a medium priority for conducting a harvest. The majority of the harvest volume would be contained in white oak, black oak, and pignut hickory, with northern red oak, sugar maple, scarlet oak, and various other species making up of the remainder of the harvest volume.

Potentially a standard thinning improvement harvest could be undertaken in this tract to release the better trees while removing the lower quality or damaged trees. As an alternative, this tract could be put into an oak shelterwood management system to utilize the dominant white oak overstory to ensure regeneration of a future oak stand. There was a noticeable presence of oak regeneration in the western half of the tract already, but encouragement of this existing regeneration by doing a midstory removal of mesic species and possibly administering a prescribed burn would help ensure that oak would be present as the future replacement stand. If an oak shelterwood system would be chosen, there would need to be preparatory work done to remove the midstory before a heavier overstory treatment would be implemented. Additionally, prescribed burning would likely have to be instituted on a periodic basis to help minimize the presence of beech and other mesic competitors and help the oak seedlings and saplings to reach a more competitive size. Both mechanical midstory removal and prescribed burning would be

tools to achieve the same purpose of removing the competing undesirable mid and understory species in favor of more fire tolerant and shade intolerant oak species.

If an oak shelterwood system is not utilized, most of the stand would probably be harvested under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or declining trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should continue to be dominated with white oak as the primary species under a thinning regime.

Pre harvest TSI would be required to prep the tract for an oak shelterwood if instituted. Post-harvest TSI should be performed to eliminate any residual cull or small pole-sized trees not cut during the harvest, as well as thin where necessary, complete any regeneration openings, and treat the understory to eliminate shade tolerant species in favor of oaks and other more desirable species. As always, any ailanthus and paulownia present should also be treated.

Stand 2: Young regeneration opening - Prescription

This 2.5-acre stand is part of a larger regeneration opening from the 1996 harvest and is located in the northern tip of the tract. It contains some residual overstory white oak, but mostly consists of small yellow-poplar and sassafras saplings and some ailanthus and paulownia as well. There are also vines present here. This area basically needs to have the invasive exotics treated and some TSI performed to favor and release the future crop trees and control the vines. Poplar will likely be the dominant future stand here.

INVENTORY SUMMARY

NUMBER OF STANDS: **2** **Est. growth: 118 bd. ft/ac/yr****
PERMANENT OPENINGS: **0.0 acEst. cutting cycle: 15-20 yrs**
AVERAGE SITE INDEX: **75-80** - for upland oaks, **90-100** – for yellow-poplar
AVERAGE BASAL AREA: **110 sq. ft/ac**

****Growth** was calculated by using 2017 volume, subtracting the volume of 6257 bd ft/ac from the 1993 inventory and the 137,000 bd. ft. from the 1996 sale, and dividing by 24 years of growth.

TRACT 1807 TOTAL VOLUME (bd ft)

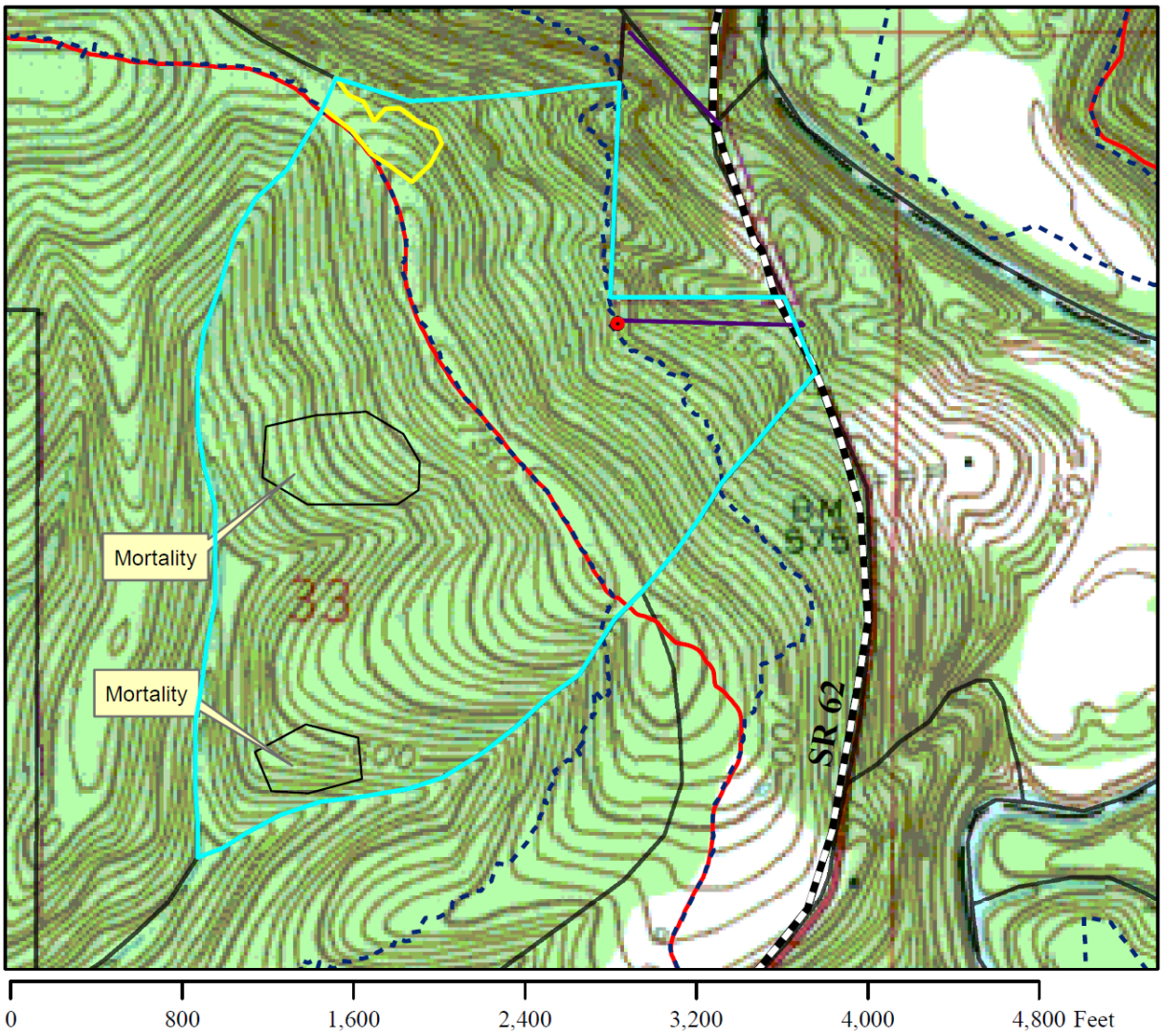
	TOTAL	
SPECIES	per acre	total
American elm	10	1,520
Bitternut hickory	20	3,040
Blackgum	42	6,384
Black oak	779	118,408
Chinkapin oak	81	12,312
*Eastern redcedar**	*16*	*2,432*
Mockernut hickory	30	4,560
Northern red oak	495	75,240
Ohio buckeye	14	2,128
Pignut hickory	537	81,624
Post oak	80	12,160
Red elm	12	1,824
Scarlet oak	234	35,568
Shagbark hickory	118	17,936
Sugar maple	227	34,504
White ash	94	14,288
White oak	5,285	803,320
Yellow-poplar	135	20,520
TTOTAL	8,209	1,247,768

**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.*

PROPOSED ACTIVITIES LISTING

2020	Basal bark treat ailanthus
2020 / 2021	Preparatory cut if oak shelterwood implemented
2020 / 2021	Mark timber sale
2021 / 2022	Sell timber sale (delayed with oak shelterwood)
2022 / 2023	Post harvest TSI
2024-2026	Recon & monitor for exotics
2037-2038	Inventory for next management cycle

6341807 (Compartment 18 Tract 7)



Stand 1: Oak hickory - 149 ac

Stand 2: Young regeneration opening - 2.5 ac

Tract 1807 boundary

Legend

- 1807 corner
- 1807-stephsn-compass
- 1807-stephsn-compass-n line
- Horse trails
- Fire trails
- Roads

N
W E
S

Harrison Crawford
Forester: E. Crosier
Tract Acres: 41
Management Cycle End Year: 2040

Tract: 6342207 (Comp 22 Tract 7)
Date: January 2, 2020
Forested Acres: 39
Management Cycle Length: 20 years

Location

The tract is located in Harrison County, Indiana. The tract is located in the SE ¼ of section 25 of T3S R2E. The tract is located approximately 5 miles northeast of the town of Leavenworth, Indiana, 6 miles southeast of Carefree, Indiana, and 6 miles west of Corydon, Indiana. The tract is made up of two parcels the northern parcel is bordered to the west by SR-462 and on all the other sides by private property. The southern parcel is bordered to the west by SR-462, to the south by Feller Road, and on all other sides by private property. Rock Creek runs along the northern edge of the tract.

General Description

The acreage of this tract is approximately 41 acres consisting of a northern parcel (13 acres) and a southern parcel (28 acres). There are four distinct cover types on this tract: Mesic Oak-Hickory, Old Field, Tree Plantings, and Non-Forest.

6342207 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume	Percent of Volume
Mesic Oak-Hickory	6	15%	43,590	35%
Old Field	7	18%	11,180	9%
Tree Plantings	25	61%	70,240	56%
Non-Forest (Road)	2	6%	0	0%
Total	41	100%	125,010	100%

Values are rounded approximates

History

Acquisition 1968 to 1978

The tract was acquired in 2 parcels. November 12, 1968 the southwestern corner of the southern parcel was purchased as part of a 167 acre parcel, predominately located on the west side of SR-462, from William and Elsie Smoots. May 12, 1978 almost all of the tract was acquired from Blanche Mauck. At the time of acquisition, the majority of the tract's acreage was open farm ground. Thus, some of the acreage was put into the farm lease program and cropped until after the 1985 season.

Plantations 1980s – 1990s

During the 1980s several plantations were planted across the tract. The first of these plantings was near the north end of the northern parcel of the tract. Approximately 1.5 acres of Chinese chestnuts were planted with 1,000 trees on a 10' x 6' spacing in 1980 by a Young Adult Conservation Corp (YACC) crew. Records indicate the field had been disked and sprayed with Amazine and Dowpon prior to planting and the weather was clear and sunny with a temperature of 75°. A plantation of 115 Japanese Larch on 8' x 5' spacing was planted at the south end of the northern parcel. Most of these died out before 1990. Finally, a plantation of 200 Fryesville Hybrid Poplar were planted

in March 1983 at a spacing of 12' x 12'. It is mentioned in the planting report the hybrid poplar, "have grown a lot better than anything else we have planted with the possible exception of black locust." The hybrid poplar died out starting around the late 1980s and completely by the mid 1990s.

- Energy Acres. 1979(?) Experimental planting to test performance of black locust verses other species for performance for sustained firewood production. By the mid-late 1980s, locust leaf miners and locust borers had pretty much eliminated the black locust. By that time, the Division of Forestry had abandoned the concept, because of the effect of these insects on black locust.

- 1986 planting (4 acres). This area was row cropped until 1985. After which, a mixed planting of Northern red oak and white ash was hand planted. Most of the planted seedlings failed, although some Northern red oak remains. Black walnut came in naturally at the southern end of the planting. In the late fall of 2018, some control work was done on scattered bush honeysuckle.

- 1986 planting (1.4 acres). This planting is adjacent to Feller Road it was row cropped until 1985 after which it was hand planted. There was concern that the site was too degraded from farming for a tree plantation. A design of two rows of Northern red oak and then one row of black locust was tried. The latter was to serve as a nitrogen fixing nurse crop, provide side competition, provide light shade, and finally when the Northern red oak was established, the locust could be removed for firewood or posts or deadened. During the first 2-3 years, an effort was made to mow and do chemical weed control. Unfortunately, the locust grew much faster than the oak, which appeared to have largely failed, with just a handful of trees showing up. Probably as a result of the borers and/or leaf miners, the locust also root suckered badly. During this phase, management stopped and the planting was on the verge of being declared a failure. After the first 10-15 years, the locust suffered heavy mortality and the planted Northern red oaks had responded enough that the rows could be made out. Ca. 2003-4, many of the remaining locust were girdled and killed to release the Northern red oak.

- 1998 planting (3.8 acres). A mixed planting of black oak, white ash, and chinkapin oak was machine planted on three sides of the 1986 Northern red oak/black locust planting. For the first 2-3 years the plantation was mowed and weeds were chemically controlled. Survival and performance was somewhat mixed. Bush honeysuckle was treated during late fall 2018. Japanese honeysuckle is present over a fair amount of the north end. A few individuals of autumn olive and multiflora rose are within the planting.

Landscape Context

The dominant land uses within a 5 mile radius of the tract are agricultural and forestlands. There is more development, along SR-462 (eastern boundary of the tract), along SR-62 (0.5 miles north of the tract), and near I-64 (1 mile north of the tract). Additionally, within 5 miles the town of Leavenworth, 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 northern parcel of this tract is relatively flat as is the southern parcel of the tract which is crossed by Rock Creek. The tract is characterized by gently sloping hills which meet Rock Creek. Rock Creek, which crosses the southern parcel of the tract, flows roughly northwest for one mile at which point it meets the Blue River. A secondary drainage, flows from the south side of the tract into Rock Creek. This tract has karst hydrology typical of much of the area, with springs being common. These features will be avoided, buffered, or otherwise treated to minimize adverse impacts during management activities.

Soils

The tract has 14 acres (34% of the tract) covered in the Vertrees-Crider-Caneyville complex. It covers majority of the northern parcel and the northern tip of the southern parcel of the tract. These soils are described as well drained, karst, rolling, and severely eroded. Another 12 acres of the tract (29%) is covered in the Caneyville-Haggatt-Knobcreek complex. These soils are described as well drained, karst, hilly, and severly eroded. Bedford Silt Loam, Crider Silt Loam, Haymond Silt Loam, and Knobcreek-Haggatt-Caneyville complex are also present across the tract.

Access

The northern and southern parcel of the tract are bordered to the west by SR-462. Additionally, the southern parcel of the tract is bordered to the south by Feller Road.

Boundary

The northern parcel of the tract is bordered on all sides by private property except the west side, which is bordered by SR-462. The southern parcel of the tract is also bordered by private property on all sides except the west side which again is bordered by SR-462. Compartment 20 tract 3 is situated across SR-462 from the tract.

Ecological Considerations

Part of this tract represents typical oak-hickory with 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 two important wildlife structural habitat features: snags and legacy trees. 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. Legacy trees are specific tree species that are preferred by the Indiana bat for roost trees.*

	Maintenance Level	Inventory	Available Above Maintenance
*Legacy Trees 11"+ DBH	369	444	75
*Legacy Trees 20"+ DBH	123	34	-89
Snag 5"+ DBH	164	695	531
Snag 9"+ DBH	123	306	183
Snag 19"+ DBH	20.5	23	3

*Selected Tree Species: AIL, AMB, AME, SYC, BAC, BAF, BAP, BAS, BIH, BLA, BLC, BLL, BLO, BLS, BLW, ZBW, BLG, BJO, ZBA, BLB, BOX, BUO, BUT, CAT, CBO, CHO, ZCO, CUC, DOG, COT, EAH, ERC, WHP, EUA, GRA, HAC, HAW, HOL, IRO, JAP, COF, LAA, LOP, MOH, NPO, REO, NWC, NOS, OHB, OSO, OTC, OTH, OTP, ORO, OWO, OVO, PAB, PAU,PAP, PEC, PER, PIH, PIO, PIP, POO, QUA, REE, REM, ZRM, REP, REB, RIB, ROE, SAS, SCO, SCP, SHH, ZSH, SHO, SHP, ZSO, SIM, SRO, SUM, XSO, SWO, SWG, TAM, VIP, WHA, WHO, WHS, WIE, YEB, ZYB, YEP, YEL

Inventory data for Compartment 22 Tract 7 shows that legacy trees and snags exceed recommended maintenance levels in all diameter classes with the exception of 20"+ legacy trees.

It is important to note that these are compartment guidelines and that even though the estimated tract data does not quite meet all target levels, it is likely that suitable levels are present for these habitat features in the surrounding landscape. The prescribed management will maintain or enhance the relative abundance of these features.

Autumn olive, multiflora rose, Japanese honeysuckle, and garlic mustard are heavily infested throughout the northern and southern parcel. Bush honeysuckle was also noted in the northern parcel although it was significantly less prevalent. Privet and periwinkle were noted densely in a localized area in the southern portion of the northern parcel. Japanese Chaff Flower was noted in abundance along the field edge and in the woods on the northern edge and the eastern edge of the northern parcel. Within the southern parcel, periwinkle, garlic mustard, beefsteak, and Japanese stilt grass were all noted.

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

There are no designated recreational trails running through this tract. The Rock Creek Day Use Parking Lot, is located adjacent to the northwest corner of the northern parcel of the tract across SR-462. Majority of the recreation occurring in the tract is most likely hunting. Several deer stands were found at the time of the inventory.

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 – 6 acres
This cover type is found across 18% of the tract acreage all in the southern parcel. This stand covers the hillside on the northeast side of Rock Creek. 35% of the volume found on the tract is located within this cover type. 47% of the volume within this cover type is made up of oak and hickory species. The most abundant species is Northern red oak which comprises 28% of the volume (12,020 board feet) within the cover type, sugar maple is the second most common species making up 22% of the volume (9,740 board feet), and yellow poplar is third with 15% of the volume (6,570 board feet). Other less common oak and hickory species included scarlet oak, mockernut hickory and pignut hickory. 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 is prescribed over the next 2-5 years. An improvement harvest could remove between 10,000 – 20,000 board feet from this cover type. Most of this would be removed under a single tree selection routine. When possible, selection should also favor releasing future crop trees of timber and wildlife value. 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. 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.

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 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 could also be used to control invasive species present.

Stand 2 – Old Field – 7 acres
This cover type is found across 21% of the tract acreage. This stand covers the north end and the south end of the northern parcel. This cover type holds 9% of the volume found on the tract. The most abundant species is Virginia Pine which comprises 34% of the volume (3,230 board feet) within the cover type, Eastern White Pine is the second most common species making up 31% of the volume (2,910 board feet), and American Sycamore is third with 15% of the volume (1,470 board feet). The mid-story (pole sized timber) is dominated by Red Maple and Virginia Pine.

The desired future condition for this stand is an improved one with better form trees, better species composition, or better diversity. This could be done with invasive species management, a small scale timber harvest, timber stand improvement, by putting in a plantation, or by doing an oak enrichment planting.

Invasive species are prevalent in this area of the tract. Concentrating on a particular species, such as ailanthus, or a particular area could be a good starting point with invasive species management. A small scale timber harvest could be implemented to effectively start the stand over. This harvest could be a boundary harvest removing everything or perhaps the harvest could concentrate on removing the pine component and leaving the hardwoods component. Timber stand improvement could be utilized to control vines and invasive species or to remove less desirable trees in the midstory and overstory.

Stand 3 – Tree Plantings – 25 acres

This cover type is found across 72% of the tract acreage. This stand covers the center of the northern parcel, a bit along the northern edge of the northern parcel, and the portion of the southern parcel south of Rock Creek. The most abundant species is yellow poplar which comprises 19% of the volume (13,330 board feet) within the cover type, Virginia pine is the second most common species making up 14% of the volume (9,790 board feet), and sugar maple is third with 14% of the volume (9,750 board feet). The mid-story (pole sized timber) is dominated by black walnut, although Virigina pine, yellow poplar, and black cherry were common too.

- 1986 planting (4.0 acres). As of January 2020, the site needs thinning/weeding to favor walnut and other preferred hardwoods.

- 1986 planting (1.4 acres). There are several locusts that persist with spreading crowns. They could be girdled and killed to release the Northern red oak. If this is done, there are some other naturally occurring trees with poor form that could be deadened too.

- 1998 planting (3.8 acres). As of January 2020, much of the black oak is looking vigorous, but could use side pruning. Because of the emerald ash borer invading this area in the past 5 years, no further concern for the white ash should be made. Chinkapin oak was noted, its performance was mediocre to fair. Several naturally occurring black walnut trees came in to the two south ends of the site. They look to be doing well and should be favored in any TSI work done there.

The desired future condition for this stand is an improved one with better form trees, better species composition, or better diversity. This could be done with invasive species management, a small scale timber harvest, timber stand improvement, by putting in a plantation, or by doing an oak enrichment planting.

Invasive species are prevalent in this area of the tract. Concentrating on a particular species, such as ailanthus, or a particular area, such as the walnut plantations, could be a good starting point with invasive species management. A small scale timber harvest could be held to effectively start the stand over. This harvest could be a boundary harvest removing everything or perhaps the harvest could concentrate on removing the pine and cedar component and leaving the hardwoods

component. Timber stand improvement could be utilized to control vines and invasive species or to remove less desirable trees in the midstory and overstory. Plantation management could also be performed in this area.

Stand 4 – Non-Forest – 2 acres

There are several open areas within this tract, they include SR-462, Feller Road, a powerline right-of-way, and Rock Creek.

The current forest resource inventory was completed on 1/7/19 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= 41	Gingrich stocking= 75%
Total trees per acre= 200	Present volume per acre= 3,074 bd. ft.
Basal area per acre= 82.7	Projected harvest volume per acre= 1,250-1,750 bd. ft.

Species	**# Sawtimber Trees**	**Total Bd. Ft.**
Yellow Poplar	86	21,680
Sugar Maple	102	18,410
Virginia Pine	115	14,700
Northern Red Oak	21	13,690
American Sycamore	31	12,170
Black Walnut	48	11,480
Red Maple	51	8,090
Pignut Hickory	21	4,930
Mockernut Hickory	23	4,780
Scarlet Oak	17	4,610
Eastern White Pine	24	4,450
Chinkapin Oak	5	2,980
Black Cherry	13	1,400
Hackberry	19	1,370
Honeylocust	15	1,310
Total	591	**126,050**

Summary Tract Silvicultural Prescription and Proposed Activities

To improve the current condition of the tract, invasive species management, a small scale timber harvest, timber stand improvement, or plantation management could be undertaken at any time. The timber harvest could be followed by timber stand improvement. Timber stand improvement could accomplish a variety of tasks, including completion of any marked openings, snag recruitment and control of the 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.

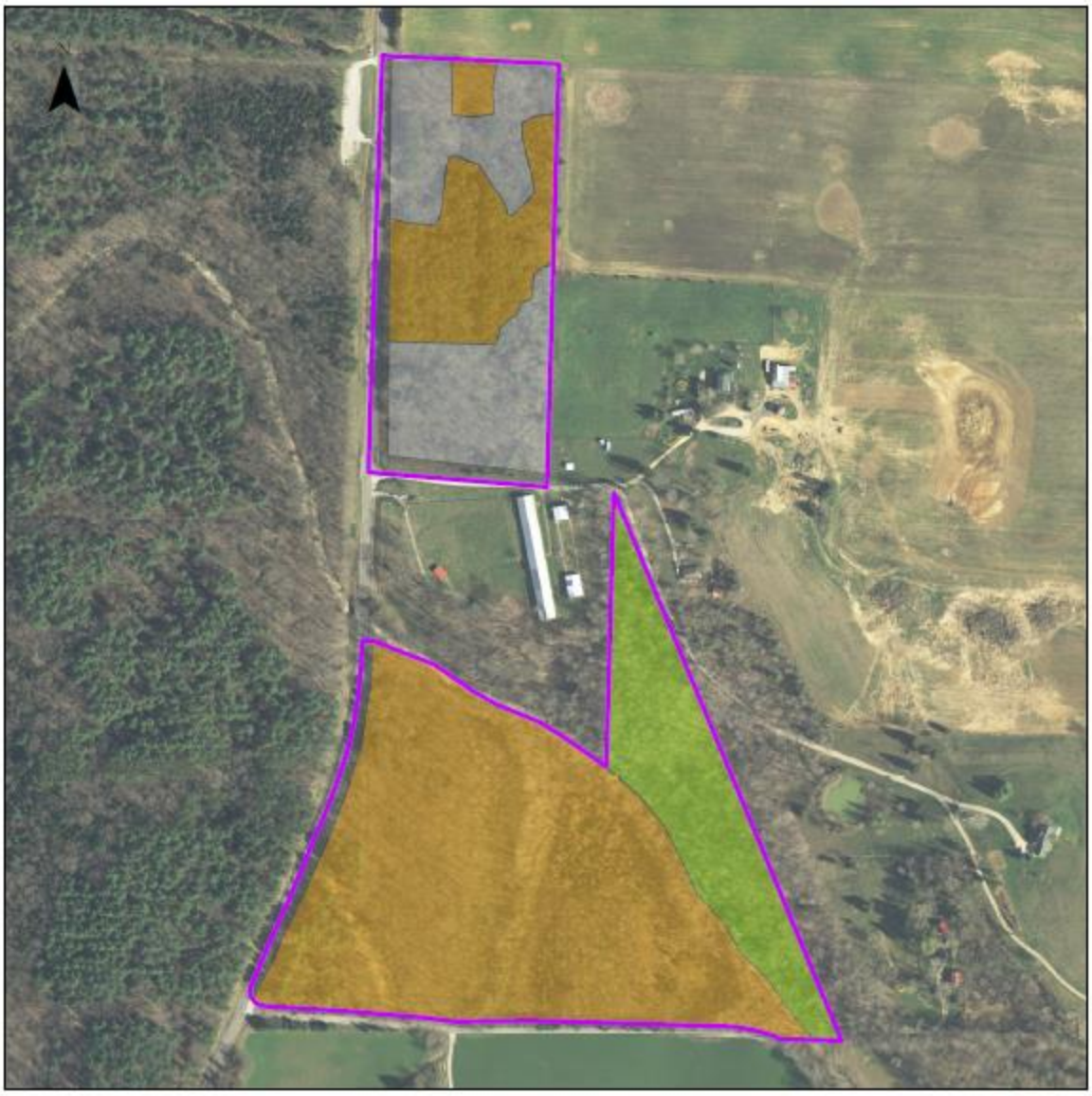
Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators.

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 limited amount of recreation in this tract, the majority of which is hunting, recreation 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 Management Activity	*Proposed Date*
Management Guide	2020
Plantation Management	2020-2022
Improve Access	2020-2022
Treat Invasive Species	2020-2022
Mark Harvest	2020-2022
Sell Timber	2021-2024
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	2040
Write new Management Plan	2040

Harrison-Crawford State Forest
Compartment 22 Tract 7
Cover Types Map



Harrison Crawford
Forester: E. Crosier
Tract Acres: 70
Management Cycle End Year: 2040

Tract: 6342601 (Comp 26 Tract 1)
Date: January 14, 2020
Forested Acres: 41
Management Cycle Length: 20 years

Location

The tract is located in Harrison County, Indiana. The tract is located predominantly in the N ½ of section 4 of T4S R2E and partially in the N ½ of section 3 of T4S R2E. The tract is located approximately 2 miles east of the town of Leavenworth, Indiana, 4 miles southeast of Carefree, Indiana, and 9 miles west of Corydon, Indiana.

General Description

The acreage of this tract is approximately 70 acres. There is a single cover type across the tract: bottomland hardwoods. Although there is also a component of Non-Forest in the form of Blue River.

2601 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume	Percent of Volume
Bottomland Hardwoods	41	59%	738,840	100%
Non-Forest (Blue River)	29	41%	0	0%
Total	70	100%	738,840	100%

Values are rounded approximates

History

Acquisition 1967 to 1968

The tract was acquired in 3 parcels. December 26, 1968 the western parcel was purchased as part of a 291 acre parcel, predominately located on the northwest side of SR-62, from Anna Lee Hockman (deed number 13-0057-30). May 29, 1967 the central parcel was purchased from Betty Jo Sharp (deed number 13-0122-30). May 20, 1967 the eastern parcel was purchased from Clyde and Viola Engleman (deed number 13-0121-30). At the time of acquisition, the majority of the tract's acreage was open from agricultural use. During the early 1990s, prescribed burning was used to try to maintain a partially open condition. By that time, natural succession had advanced sufficiently to make such burning efforts marginally effective, thus further burning was discontinued.

Landscape Context

The dominant land uses within a 5 mile radius of the tract are agricultural and forestlands. There is more development along SR-62 (just west of the tract) and near Leavenworth. Additionally, within 5 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

This tract, which is bordered on the north and west sides by the Blue River, is a bottomland site. A large portion of the tract was farmed and the area was devoid of trees as recently as the mid 1960s. This area has karst hydrology typical of much of the area, 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 26 acres (46% of the land area) covered in Haymond Silt Loam, it covers the bottomlands immediately adjacent to Blue River. There are 12 acres (21% of the land area) covered in Pekin Silt Loam slightly uphill from the Blue River. Additionally, Brussels-Rock outcrop complex, Caneyville-Haggat-Knobcreek Silt Loams, Markland Silty Clay Loam, McGary Silt Loam, Newark Silt Loam, and Percall Silt Loam are also present in smaller areas.

Haymond Silt Loam (HcgAH)

The Haymond series consists of very deep, well drained, soils that formed in silty alluvium. These soils are on flood plains and flood-plain steps. Slope ranges from 0 to 3 percent. Mean annual air temperature is about 55 degrees F, and mean annual precipitation is about 42 inches. The surface horizon is a brown silt loam plow layer that extends approximately 10 inches. The first subsurface horizon is a dark yellowish brown silt loam that extends to 25 inches. The second subsurface horizon is a yellowish brown silt loam that extends until 44 inches. The stratum is a massive yellowish brown fine sandy loam.

Pekin Silt Loam (PcrB2)

Contains 2 to 6 percent slopes and is typically eroded. It is located on dissected stream terraces and is very deep, being more than 80 inches to the bedrock. This soil type is moderately well drained.

Access

The tract can be accessed from the southwestern corner by the Iron Bridge Fire Lane. This fire lane is prone to washing in several places but is generally navigable. Mid tract, along this lane, there is an old farm lane that allowed access to the eastern portion of the tract and was used until the late 1980s.

Boundary

The tract is bordered along the north and west sides by the Blue River. The Old Iron Bridge is located in the southwestern corner of the tract. The southern boundary of the tract, a short edge, is the Iron Bridge Fire Lane, which is also the boundary between Harrison-Crawford State Forest and O'Bannon Woods State Park. The eastern boundary of the tract, a long edge, is the slopes of compartment 26 tract 3.

Ecological Considerations

This tract represents typical bottomlands habitat. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as beaver, otters, waterfowl, and others.

The Division of Forestry has developed compartment level guidelines for two important wildlife structural habitat features: snags and legacy trees. 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. Legacy trees are specific tree species that are preferred by the Indiana bat for roost trees.

	Maintenance Level	Inventory	Available Above Maintenance
*Legacy Trees 11"+ DBH	720	1,474	754
*Legacy Trees 20"+ DBH	240	268	28
Snag 5"+ DBH	320	2,583	2,263
Snag 9"+ DBH	240	1,139	899
Snag 19"+ DBH	40	83	43

*Selected Tree Species: AIL, AMB, AME, SYC, BAC, BAF, BAP, BAS, BIH, BLA, BLC, BLL, BLO, BLS, BLW, ZBW, BLG, BJO, ZBA, BLB, BOX, BUO, BUT, CAT, CBO, CHO, ZCO, CUC, DOG, COT, EAH, ERC, WHP, EUA, GRA, HAC, HAW, HOL, IRO, JAP, COF, LAA, LOP, MOH, NPO, REO, NWC, NOS, OHB, OSO, OTC, OTH, OTP, ORO, OWO, OVO, PAB, PAU,PAP, PEC, PER, PIH, PIO, PIP, POO, QUA, REE, REM, ZRM, REP, REB, RIB, ROE, SAS, SCO, SCP, SHH, ZSH, SHO, SHP, ZSO, SIM, SRO, SUM, XSO, SWO, SWG, TAM, VIP, WHA, WHO, WHS, WIE, YEB, ZYB, YEP, YEL

Inventory data for Compartment 26 Tract 1 shows that legacy trees and snags exceed recommended maintenance levels in all diameter classes.

It is important to note that these are compartment guidelines and that even though the estimated tract data does not quite meet all target levels, it is likely that suitable levels are present for these habitat features in the surrounding landscape. The prescribed management will maintain or enhance the relative abundance of these features.

Autumn olive, multiflora rose, Japanese honeysuckle, and garlic mustard are heavily infested throughout the tract. Several bush honeysuckle were noted at the time of the inventory. Additionally, multiple parent (10"+) ailanthus were seen and GPSed.

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 tract is currently transected by two recreational trails, the Iron Bridge Horse Trail and the Adventure Trail. Because this area is prone to flooding, the Adventure Trail is imminently going to be relocated to higher ground in this section of the trail. Additionally, on the opposite bank of the Blue River (compartment 18 tract 3 and compartment 27 tract 1) the Old Iron Bridge is a popular Blue River public access site for bird watchers, fishermen, and boaters.

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 – Bottomland Hardwoods – 41 acres
This cover type is found across 59% of the tract acreage. This stand covers all of the tract which is forested. 75% of the volume within this cover type is made up of American sycamore and silver maple. The most abundant species is American sycamore which comprises 46% of the volume (342,880 board feet) within the cover type, silver maple is the second most common species making up 29% of the volume (214,270 board feet), and yellow poplar is third with 17% of the volume (128,190 board feet). Other species present include: black walnut, boxelder, Eastern cottonwood, hackberry, and pignut hickory. The mid-story (pole sized timber) and understory are dominated by boxelder and silver maple.

The desired future condition of this cover type is to provide for multiple economic and ecological services including a diverse hardwood timber stand, wildlife habitat, and a buffer to Blue River.

Given current stand conditions and stocking, a light improvement harvest could be undertaken at any time, as well as invasive species management, or Timber Stand Improvement (TSI). An improvement harvest could remove between 200,000 – 300,000 board feet from this cover type. Most of this would be removed under a single tree selection routine.

Stand 2 – Non-Forest – 28 acres
There are several open areas within this tract, they include Blue River and a powerline right-of-way.

The current forest resource inventory was completed on 1/14/2020 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= 70	Gingrich stocking= 84%
Total trees per acre= 149	Present volume per acre= 9,235 bd. ft.
Basal area per acre= 101.5	Projected harvest volume per acre= 2,500-3,000 bd. ft.

Species	# Sawtimber Trees	Total Bd. Ft.
American Sycamore	656	342,880
Silver Maple	689	214,270
Yellow Poplar	545	128,190
Black Walnut	100	14,250
Boxelder	40	8,020
Eastern Cottonwood	7	6,770
Hackberry	28	6,100
Pignut Hickory	55	5,320
American Elm	12	4,680
Mockernut Hickory	21	4,480
Ailanthus	27	3,880
Total	2,180	**738,840**

Summary Tract Silvicultural Prescription and Proposed Activities

Given current stand conditions and stocking, a light improvement harvest using single tree selection could be undertaken at any time, with invasive species management occurring prior to a harvest. Overall tract volume would be reduced 20-40%. Most of this would occur under a single tree selection. This would produce an estimated harvest volume between 200,000 – 300,000 board feet. If a harvest occurs, it is recommended that TSI be undertaken afterwards to accomplish a variety of tasks, including 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.

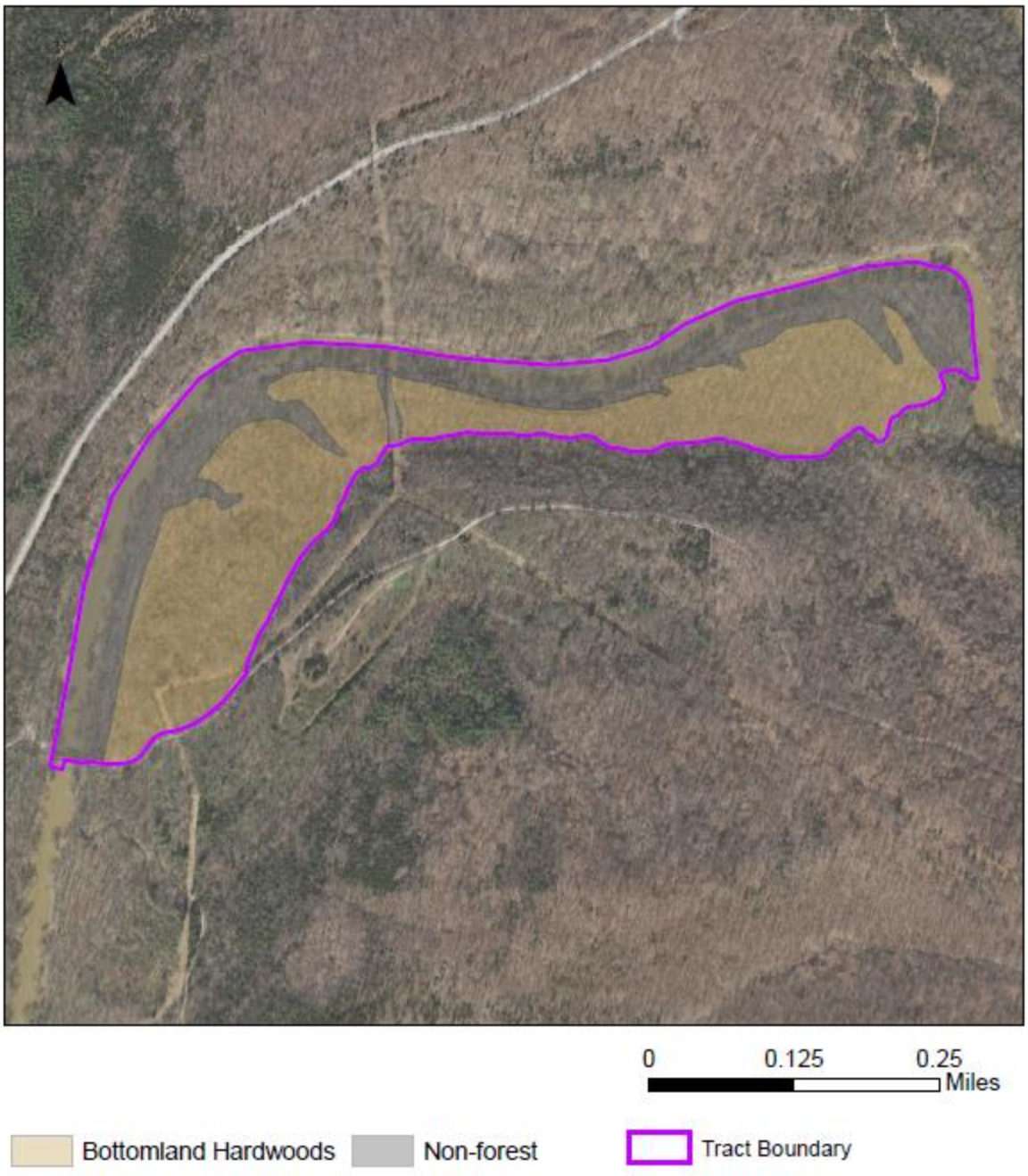
Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest. BMP use will be contractually required of management operators.

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, this resource will be temporarily affected. The horse trails may be temporarily closed and the Adventure Trail may be temporarily closed if it has not been relocated before the harvest. 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	2020
Improve Access	2020-2022
Treat Invasive Species	2020-2022
Mark Harvest	2020-2022
Sell Timber	2021-2024
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	2040
Write new Management Plan	2040

Harrison-Crawford State Forest
Compartment 26 Tract 1
Cover Types Map



Harrison Crawford
Forester: E. Crosier
Tract Acres: 151
Management Cycle End Year: 2039

Tract: 6343701 (Comp 27 Tract 1)
Date: July 3, 2019
Forested Acres: 130
Management Cycle Length: 20 years

Location

The tract is located in Crawford County, Indiana. The tract is located in sections 4, 5, 8, and 9 of T4S R2E. The tract is located approximately 1 mile east of the town of Leavenworth, Indiana, 4 miles southeast of Carefree, Indiana, and 10 miles west of Corydon, Indiana. The tract is bordered on its east side by the Blue River and Dry Run runs into the Blue River in the southern portion of the tract. Additionally, the tract is bisected by SR-62 and Wyandotte Avenue runs along the tract's western boundary.

General Description

The acreage of this tract is approximately 151 acres. There are three distinct cover types on this tract: Old Field, Mixed Hardwoods, and Open. There are a total of 130 acres of forest (86% of the tract acreage) and a total of 21 open acres (14% of the tract acreage) within the tract.

Stand	Acres	Percent of Acreage	Volume	Percent of Volume
Old Field	32	21%	54,500	11%
Mixed Hardwoods	98	65%	447,100	89%
Open	21	14%	-	-
Total	**151**	**100%**	**501,600**	**100%**

Values are rounded approximates

History

The tract was acquired in 4 parcels. June 25, 1968 the northern 15 acres of the tract was acquired from Tom D. Tower. September 9, 1968 majority of the tract (120 acres) was acquired from Clarence and Anita Voyles. October 16, 1973 a single acre along SR-62 at the western edge of the tract was purchased from Carl and Grace K. Voyles. September 18, 1978 the southern 12 acres of the tract was acquired from Joseph and Viola Juncker. In 1986 two areas, one area just south of the old iron bridge and the north of SR-62, were planted to black walnut. These areas are characterized by small (6-10 inch) walnuts now.

Landscape Context

The dominant land uses within a 5 mile radius of the tract are agricultural and forestlands. There is more development near I-64 (14 miles north of the tract), along SR-66 (west of the tract), and along SR-62 (runs through the tract). Additionally, within 5 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. Additionally, the tract is bordered on its east side by the Blue River and Dry Run runs into the Blue River in the southern portion of the tract.

Topography, Geology, and Hydrology
The tract is made up largely of bottomlands surrounding the Blue River and Dry Run. There are several short hills, a more notable feature is the 7 acre knob north of SR-62. The Blue River, which makes relatively sharp bends in two places, flows along the east and southern boundary of the tract. Just south of the Old Iron Bridge the river widens considerably and is presumably shallower. 1 mile south of the Old Iron Bridge, Dry Run flows into the Blue River. The Blue River meets the Ohio River after meandering 2.1 miles southeast from Dry Run. There are several small drainages along SR-62 which predominantly run south into Dry Run. A good portion of the southeastern part of the tract is prone to flooding. This area has karst hydrology typical of much of the area, with springs, sinkholes, and caves being common. There are two wildlife ponds located in the northwestern part of the tract as well. These features will be avoided, buffered or otherwise treated to minimize adverse impacts during management activities.

Soils
The tract has 49 acres (33%) covered in Huntington Silt Loam, it covers what used to be a field in the northwest corner of the tract and the bottomlands in the southern portion of the tract along the Blue River and Dry Run. There are 28 acres (19%) covered in Millstone Loam, majority of which is located near the Blue River in the northern portion of the tract. There are 15 acres (10%) covered in Alford Silt Loam, it covers the upper slopes along SR-62. Additionally, Haymond Silt Loam, Markland Silty Clay, and Corydon Stony Silt are also present.

Huntington Silt Loam (Hu) Deep, nearly level, well-drained soils on bottom lands.
Formed in recent mixed alluvium. Surface layer is silt loam about 22 inches thick.
Subsoil is dark-brown about 40 inches thick. High in content of organic matter.
Available water capacity is high, and permeability is moderate. Runoff is slow.
Degree Slope: 0%
Woodland Suitability Group: 1o8
Site Index: 95-105 (Yellow Poplar, no rating for Upland Oaks)
Growth range potential (Tulip poplar): 375-450 bd.ft./acre/year
Management Concerns: Flooding

Millstone Loam (MsC2) The Millstone series consists of very deep, well drained soils on stream terraces and flood-plain steps. They formed in loamy alluvium. Mean annual precipitation is about 43 inches, and mean annual temperature is about 12 degrees Celsius or 54 degrees F. The surface horizon consists of a plowed A horizon. This horizon is a light yellowish brown loam. The next eight mapped horizons are argillic. These all are a strong brown loam. The profile description extends to 80 inches and does not stop at the substratum.
Degree Slope: 0-40%
Site Index: 80
Growth Range Potential: 342

Alford Silt Loam (AfB, AfC2, AfF2) Deep, gentlysloping to steep, well-drained soils that formed in silty material on uplands near the Ohio River. Surface layer is about 8 inches thick. Subsoil is about 42 inches thick. Underlying material is silt loam. Moderate in organic matter. Available water capacity is high and permeability is moderate. Runoff is medium to very rapid.
Degree Slope: 2-35 %
Woodland Suitability Group: 1o1 or 1r2
Site Index: 85-95
Growth range potential (Upland oaks) : 300-375 bd.ft./acre/year
Management Concerns: Runoff and erosion

Access
The tract is bisected by SR-62 which runs from the northeast corner of the north tip of the tract in a southwest sweeping arc. Additionally, Wyandotte Avenue runs south from SR-62 along the tract's western boundary.

Boundary
The tract extends south from the Old Iron Bridge and is bounded to the east and the south by the Blue River. Wyandotte Avenue bounds the south half of the tract on the west side and private property bounds the north half of the tract on the west side. There is a ~2 acre inholding on the north side of SR-62 at the western end of the tract.

Ecological Considerations
This tract represents typical old field 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.

The Division of Forestry has developed compartment level guidelines for two important wildlife structural habitat features: snags and legacy trees. 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. Legacy trees are specific tree species that are preferred by the Indiana bat for roost trees.

	Maintenance Level	Inventory	Available Above Maintenance
*Legacy Trees 11"+ DBH	1,170	1,820	650
*Legacy Trees 20"+ DBH	390	243	-147
Snag 5"+ DBH	520	3,931	3,411
Snag 9"+ DBH	390	1,639	1,249
Snag 19"+ DBH	65	67	2

*Selected Tree Species: AME, BIH, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO

Inventory data for Compartment 27 Tract 1 shows that 11"+ legacy trees and snags exceed maintenance levels, while 20"+ legacy trees are below target maintenance levels.

It is important to note that these are compartment guidelines and that even though the estimated tract data does not quite meet all target levels, it is likely that suitable levels are present for these habitat features in the surrounding landscape. The prescribed management will maintain or enhance the relative abundance of these features.

Ailanthus, was noted in several locations across the tract. Paulownia and mimosa were both observed at the Junkard Homesite and mimosa was noted along the edges of the roads and right-of-ways on the south side of SR-62. Measures to control these species should be taken while they are still in a manageable stage in this area. Multiflora rose, autumn olive, and burning bush were common across the tract. Bush honeysuckle was seen near the right-of-way south of SR-62 towards the center of the tract. Additionally, on the north side of SR-62 Japanese stilt grass and Japanese honeysuckle were extremely prevalent and English ivy and garlic mustard were also seen at the time of the inventory. On the south side of SR-62, Japanese stilt grass, Japanese honeysuckle, English ivy, garlic mustard, beefsteak, and wineberry were seen. These are common species prevalent throughout the county and will be managed in a situational manner.

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

Although there are no designated recreational trails running through this tract, on the eastern bank of the Blue River within O'Bannon Woods State Park there are several horse trails, the Adventure Hiking Trail, and a wagon trail within close proximity of the tract. Because the area is so accessible from SR-62 as well as Wyandotte Avenue the tract likely receives use by a variety of hunters. The Old Iron Bridge is a popular Blue River public access site (located at the north end of the tract) for bird watchers, fishermen, swimmers, and boaters. Boaters heading south from the Old Iron Bridge travel along 3.1 miles of the Blue River bordered on the north/west side by the 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 – Old Field – 32 acres

This cover type is found across 21% of the tract acreage, it covers the part of the tract north of SR-62. 11% of the volume found on the tract is located within this cover type. 33% of the volume within this cover type is made up of oak and hickory species. The most abundant species is yellow poplar which comprises 32% of the volume (17,570 board feet) within the cover type, pignut hickory is the second most common species making up 13% of the volume (7,060 board feet), and black cherry is third with 11% of the volume (5,760 board feet). Other less common species included scarlet oak, black oak, hackberry, black walnut, and white ash. In general, the timber here is low grade. The mid-story (pole sized timber) is dominated by yellow poplar, black cherry, and

Eastern red cedar. The understory is dominated by Eastern red cedar although black walnut and yellow poplar were also prevalent.

The desired future condition for this stand is an improved one with better form trees, better species composition, or better diversity. This could be accomplished with any combination of the following: invasive species management, a small scale timber harvest, timber stand improvement, or an oak enrichment planting. Establishment of a plantation for seed production or research is another option, the plantation could be walnut or other bottomland species.

This area of the tract is riddled with a plethora of invasive species. Concentrating on a particular species, such as ailanthus, or a particular area, such as the walnut plantations, could be a good starting point with invasive species management. A small scale timber harvest could be an effective management tool to start the stand over. This harvest could be a boundary harvest removing everything or perhaps the harvest could concentrate on removing the poplar component and leaving the oak and hickory component. Timber stand improvement could be utilized to control vines and invasive species or to remove less desirable trees in the midstory and overstory.

Stand 2 – Mixed Hardwoods – 98 acres

This cover type is found across 65% of the tract acreage, it is found across the portion of the tract located south of SR-62. This area includes areas of relatively unsuccessful walnut plantations, flood plain along Blue River and Dry Run, and areas of young growth. In general, the timber is poor quality. This cover type holds 89% of the volume found on the tract. The most abundant species is silver maple which comprises 33% of the volume (146,150 board feet) within the cover type, American sycamore is the second most common species making up 27% of the volume (121,640 board feet), and yellow poplar is third with 13% of the volume (57,120 board feet). Other less common species included Eastern cottonwood, hackberry, black walnut, black cherry, chinkapin oak, scarlet oak, shumard oak, American elm, black oak, basswood, mockernut hickory, honeylocust, sugar maple, and shagbark hickory. The mid-story (pole sized timber) is dominated by silver maple, American elm, black walnut, and boxelder. The understory is dominated by boxelder and American elm.

The desired future condition of this cover type is to provide for multiple economic and ecological services including a diverse hardwood timber stand, wildlife habitat, and a buffer to Blue River.

Given current stand conditions and to facilitate the desired future condition an improvement harvest could be conducted over the next 2-5 years. An improvement harvest could remove between 125,000 – 200,000 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 and bottomland species.

Stand 3 – Open – 21 acres

There are several open areas within this tract, they include SR-62, several powerline right-of-ways, Dry Run, and Blue River.

The current forest resource inventory was completed on 7/3/19 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= 151	Gingrich stocking= 78%
Total trees per acre= 211	Present volume per acre= 4,027 bd. ft.
Basal area per acre= 86	Projected harvest volume per acre= 1,000-1,300 bd. ft.

Species	# Sawtimber Trees	Total Bd. Ft.
Silver Maple	549	159,070
American Sycamore	256	132,390
Yellow Poplar	255	74,350
Hackberry	117	25,290
Eastern Cottonwood	21	22,410
Black Walnut	102	20,700
Black Cherry	109	15,420
Scarlet Oak	57	12,700
Black Oak	19	11,270
Chinkapin Oak	36	9,800
Shumard Oak	24	7,900
American Elm	34	7,640
Basswood	11	5,420
Pignut Hickory	19	5,150
Mockernut Hickory	21	4,480
Honey Locust	27	3,560
Sugar Maple	12	3,340
Shagbark Hickory	14	2,670
Total	**1,683**	**523,560**

Summary Tract Silvicultural Prescription and Proposed Activities

To improve the current condition of the tract, invasive species management, a small scale timber harvest, timber stand improvement, and possibly the creation of a plantation could be undertaken at any time. The timber harvest could be followed by timber stand improvement. Timber stand improvement could accomplish a variety of tasks, including completion of any marked openings, snag recruitment and control of the 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 limited amount of recreation which is carried out on this tract, majority of which is hunting, recreation 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 Management Activity	*Proposed Date*
Management Guide	2019
Improve Access	2019-2021
Treat Invasive Species	2019-2021
Mark Harvest	2019-2021
Sell Timber	2020-2023
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	2039
Write new Management Plan	2039

Harrison-Crawford State Forest
Compartment 27 Tract 1
Cover Types Map