Indiana Department of Natural Resources
Division of Forestry
DRAFT
RESOURCE MANAGEMENT GUIDE

State Forest: Harrison Crawford
Inventorying Forester: E. Wilcoxson

Date: October 13, 2017
Compartment: 13 Tract: 5

INVENTORY SUMMARY

Tract Acreage: 132 acres
Number of Stands: 7 stands
Permanent Openings: 0 acres
Average Basal Area: 106.5

Est. Annual Growth: 272 bd ft/ac/yr
Est. Cutting Cycle: ~20 years
Site Index: 70-80 (upland oaks)

Table 1. Tract 1305 Inventory Summary

	HARVEST		LEAVE		TOTAL	
SPECIES	Per acre	Total	Per acre	Total	Per acre	Total
White oak	1,181	155,892	1,311	173,052	2,492	328,944
Black oak	663	87,516	738	97,416	1,401	184,932
Northern red oak	201	26,532	778	102,696	979	129,228
Yellow poplar	678	89,496	248	32,736	926	122,232
Pignut hickory	311	41,052	266	35,112	577	76,164
*Eastern red cedar**	*455*	*60,060*	*64*	*8,448*	*519*	*68,508*
Chinkapin oak	34	4,488	206	27,192	240	31,680
Sugar maple	59	7,788	50	6,600	109	14,388
White ash	83	10,956	-	-	83	10,956
Aspen	71	9,372	-	-	71	9,372
Shumard oak	-	-	69	9,108	69	9,108
Red maple	58	7,656	-	-	58	7,656
Black walnut	-	-	33	4,356	33	4,356
Scarlet oak	29	3,828	-	-	29	3,828
Blue ash	21	2,772	-	-	21	2,772
Black cherry	21	2,772	-	-	21	2,772
Shagbark hickory	-	-	18	2,376	18	2,376
Post oak	-	-	14	1,848	14	1,848
Total	**3,865**	**510,180**	**3,795**	**500,940**	**7,660**	**1,011,120**

** 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.*

PART 1 - TRACT INFORMATION

Location

Tract 1305 is located in Harrison County, Indiana. The northern half of the tract is located in section 23, T3S, R2E and the southern half of the tract is located in section 26, T3S, R2E. The tract is located approximately 5 miles northeast of the town of Leavenworth, Indiana and 5 miles southeast of Carefree, Indiana. The tract is 0.5 miles south of I-64 and bisected by SR-62.

General Description

The acreage of this tract is approximately 132 acres. There are five distinct cover types on this tract: Oak Hickory, Mixed Mesic Hardwoods, Old Field, Rocky Steep, and Other. The cover types were further divided into merchantable or non-merchantable stands. There are a total of 83.6 merchantable acres (64% of the tract acreage) and a total of 48.0 non-merchantable acres (36% of the tract acreage) within the tract. See map of cover type (stand) locations.

Table 2. Tract 1305 Stand Acreages and Volumes

Stand	Acres	Percent of Acreage	Volume	Percent of Volume
Oak Hickory (Merchantable)	49.7	38%	526,090	51%
Oak Hickory (Non-merchantable)	10.9	8%	52,540	5%
Mixed Mesic Hardwoods (Merchantable)	16.0	12%	166,820	16%
Mixed Mesic Hardwoods (Non-merchantable)	12.4	9%	53,550	5%
Old Field (Merchantable)	18.0	14%	192,930	19%
Rocky Steep (Non-merchantable)	16.0	12%	32,030	3%
Other Non-merchantable	8.7	7%	0	0%
Merchantable Stands	**83.6**	**64%**	**885,840**	**87%**
Non-Merchantable Stands	**48.0**	**36%**	**138,120**	**13%**
Total	**131.6**	**100%**	**1,023,960***	**100%**

*The total volume in Tables 1 and 2 differ because Table 1 extrapolates per acre volumes across the entire 132 acres of the tract without taking open places (such as road or water) into account. Volumes given in Table 2 are probably more accurate.

History

Acquisition 1938 to 1976

The tract was acquired in 3 parcels. The northern ⅔ of the tract was purchased December 3, 1938 from the Lentz, Lynch, Landers, and Harvey families as part of a 479 acre purchase. The south eastern portion of the tract was purchased January 2, 1973 from William Dale and Laura S. Leffler for $102,800. The south western portion of the tract was purchased March 20, 1976 from James A. McClintock and the DBA Arrowhead Company for $45,000.

Management Plan 2000
In 2000, forester Wayne Werne wrote a management guide for tract 1305. At that time white oak, yellow poplar, black oak, and Northern red oak were the most dominant on the tract. This is still true.

Harvest 2001
May 24, 2001, a sale with 135,435 board feet in tract 1305 was sold to Doyle Etienne Logging for $43,500. Dwayne Sieg was the marking forester. 74 acres of the tract were marked.

Salvage Harvest 2007
In May of 2006, a straight-line wind event occurred that damaged or blew down a large number of tree in the vicinity of Wyandotte Cave Road and the area to the east (and possibly to the west). As a result of this, an effort was undertaken to capture the volume from this damaged and down material in a timber sale. A salvage sale was conducted on January 18, 2007 (sale number 6340704). 148,284 board feet of timber from tracts 1301, 1303, 1304, 1305, 1306, 1307, and 1308 was sold. 31,898 board feet of the total came from tract 1305.

Salvage Harvest 2008
November 21, 2008 a second savage sale was conducted in the area of 1305. Majority of the sale (6340901) covered tract 1602, but a small tongue stretched into 1305. A total of 2,648 board feet were removed from the tract at that time. Most of the volume came from black oak and scarlet oak.

Landscape Context

The dominant land uses within a 5 mile radius of the tract are agricultural and forestlands. There is some development near the interstate (to the north of the tract) and along SR-66 (west of the tract) and SR-62. Interstate 64 is less than a mile north of the tract. Additionally, with 5 miles the towns of Leavenworth and Carefree, the Ohio River, the Blue River, O'Bannon Woods State Park (2,000 acres), and numerous Nature Preserves (1,800 acres) can all be found.

Topography

The northern portion of the tract is made up of an east facing ridge and the southern portion of the tract is made up of a south facing bluff. The southernmost portion of the tract includes a small amount of bottomlands along the Blue River.

Soils

Almost half of tract 1305 has soils in the Corydon Stony Silt Loam series (62 acres, 47%) which cover majority of the slopes. The tract also contains Gilpin Silt Loam (13 acres, 10%), Hagerstown Silt Loam (11 acres, 8%), Wellston Silt Loam (11 acres, 8%), Zanesville Silt Loam (6 acres, 5%), Markland Silt Loam (7 acres, 5%), Crider Silt Loam (5 acres, 4%), Gullied Land (5 acres, 4%), Haymond Silt Loam (5 acres, 4%), and Corydon Silty Loam (2 acres, 2%), amongst others.

Corydon Stony Silt Loam (CoF) Shallow, moderately steep to very steep, well-drained, stony soils on uplands. Surface layer is about 3 inches. Subsurface is about 6 inches thick. Subsoil about 9 inches thick. The depth to hard limestone bedrock is about 18 inches. High in organic matter and low in natural fertility. Runoff is rapid or very rapid. Soil type is characterized by limestone outcrops, with as much as 15% on benches which are deeper than 20 inches to bedrock.
Degree Slope: 20-60 %
Woodland Suitability Group: 3d7
Site Index: 65-75 (Upland oaks)
Growth range potential (Upland oaks): 155-220
Management concerns: Runoff and erosion
The Corydon series consists of shallow, well drained soils that formed in as much as 20 cm (8 inches) of loess and in the underlying limestone residuum. The Corydon soils are on hills underlain with limestone. Slope ranges from 6 to 70 percent.

Gilpin Silt Loam (GlD2, GlD3, GlE2, GpF) Moderately deep, strongly sloping to steep, well-drained soils. Surface layer is very dark grayish-brown silt loam about 3 inches thick. Subsurface layer is pale brown silt loam about 9 inches thick. Subsoil is about 17 inches thick. Depth to hard sandstone and shale bedrock is about 29 inches. Moderate in organic matter. Available water capacity is low and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 12-30 %
Woodland Suitability Group: 3o10 or 3r12
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Site Index: 70-80
Management Concerns: Runoff and erosion

Hagerstown Silt Loam (HaC2, HaD2, HgC3, HgD3, HgE3) Deep, moderately sloping to moderately steep, well-drained soils on uplands. Surface layer is dark yellowish brown silt loam about 6 inches thick. The subsoil is about 46 inches thick. The depth to limestone is about 52 inches. Characteristically, this soil is eroded to severely eroded. Moderate in content of organic matter and medium in natural fertility. Available water capacity is moderate or high, and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 6-25 %
Woodland Suitability Group: 1o1 or 1r2
Site Index: 85-95 (Upland Oaks)
Growth range potential (Upland oaks): 300-375 bd.ft. /acre/year
Management Concerns: Runoff and erosion

Hydrology

The tract has several small drainages running down the east facing slope none of which are very large. This area also has karst hydrology typical of much of the area, with springs, sinkholes, and caves being common. The tract is bounded on its' south boundary by the Blue River which is a well-known and popular recreation waterway and ecological resource. These features will be avoided, buffered or otherwise treated to minimize adverse impacts during management activities.

Access

This tract is accessed via Fire Trail 607 which makes a 3.5 mile loop from the Day Use Parking Lot (Little Italy) off of SR-62 back to SR-62. At this time the fire trail is in decent condition and would require only minor improvements to be used for a timber harvest or other management activities.

Boundaries

The tract is bounded to the west by Fire Trail 607, to the south by the Blue River, and to the east by a meandering drainage. SR-62 runs through the southern end of the tract, but it is not the boundary.

Wildlife

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

In concert with various agencies and organizations, the Division of Forestry has developed compartment level guidelines for two important wildlife structural habitat features: Forest Snag Density, Preferred Live Roost Trees. Snags and preferred live roost trees were tallied in this inventory and summarized in the following tables.

Guidelines for preferred live roost trees (trees/acre)

Tree Size	Guidelines Maintenance	Tract 1305 Pre Harvest	Tract 1305 Post Harvest
12-18” DBH class	6	37	18
20” + DBH class	3	9	4
Total	**9**	**46**	**22**

Guidelines for snag tree levels (trees/acre)

Tree Size	Guidelines Maintenance	Guidelines optimal	Tract 1305 actual
6-8” DBH class	1	1	17.8
10-18” DBH class	2.5	5	7.3
20” + DBH class	0.5	1	0.8
Total	**4**	**7**	**25.9**

These numbers indicate that live and snag tree densities (pre and post-harvest) meet or exceed recommended maintenance level guidelines on this tract. It is likely that additional snags will be created during resource management operations, such as post-harvest TSI. Management activities will not intentionally remove snags, with a few exceptions, including when a snag poses a physical hazard to field personnel.

Rare, Threatened, and Endangered Species (Public Use)

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

Exotic Species

Ailanthus altissima, Tree of Heaven or Ailanthus, was found scattered across the tract mainly midslope on the east facing slope. Measures to control this species should be taken while the species is still in a manageable stage in the area. An abundance of Japanese honeysuckle has taken root around the perimeter of the pull off in the southeast corner of the tract. Two Bush Honeysuckle plants were noted along the fire trail, one of which was manually removed. Multiflora Rose and Autumn Olive, of the two the Multiflora Rose was by far the more common, were also noted within the tract. Additionally, a monoculture of Garlic Mustard is colonizing the banks of the drainage in the southeast corner of the tract. It should be noted that these species are common throughout the region and management efforts are aimed at controlling impacts rather than eradication of the species- which is neither feasible nor practicable.

Recreation

This tract is crossed by a portion of the Wyandotte Cave Horse Trail (locally known as the Interstate Loop. This trail likely receives a good deal of use by horse riders due to its proximity to the SR-62 Day Use Parking Lot and also to the privately owned Come Again Horse Camp. Because the area is so accessible from SR-62 as well as Fire Trail 607 the tract likely receives use by numerous hunters. Although there is no developed public access to the Blue River from this tract, there is a gravel pull-off in the eastern corner of the tract on the north side of SR-62.

Cultural Resources (Public)

This tract is reviewed for cultural sites during the forest resource inventory and planning process. Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during management or construction activities. A review was done by the IDNR archeologist just prior to the harvest conducted in 2001.

PART 2 – STAND DESCRIPTIONS AND MANAGEMENT PRESCRIPTION

Stand 1 – Oak Hickory (merchantable) – 49.7 acres

Current condition:

This cover type is found across 38% of the tract acreage on the east facing slope at the north end of the tract. It holds 51% of the volume found on the tract. 90% of the volume within this cover type is made up of oak and hickory species. The most abundant species is white oak which comprises 51% of the volume (266,470 board feet) within the cover type, black oak is the second most common species making up 25% of the volume (130,930 board feet), and yellow poplar is third with 9% of the volume (45,920 board feet). Other less common sawtimber sized oak and

hickory species included Northern red oak, scarlet oak, shumard oak, and pignut hickory. The mid-story (pole sized timber) is dominated by sugar maple, white oak, and white ash. The understory is dominated by sugar maple. Beech, elm, dogwood, pignut hickory, sassafras, and white oak are also present. The inventory is summarized in Table 6 with sawtimber species composition detailed in table 7. Currently, the cover type is 85% stocked.

Table 6. Oak Hickory Inventory Summary

STRATUM: Oak Hickory		**ACREAGE: 49.7**	
	HARVEST (bd ft)	**LEAVE** (bd ft)	**TOTAL** (bd ft)
Volume per acre	4,918	5,673	10,952
Volume total	244,300	281,780	526,080
Pole Volume per Acre	1,856	1,279	3,134
Pole Volume Total	92,240	63,550	155,790
Basal Area per Acre	54.8	47.7	102.5
Trees per Acre	88	38	126

Table 7. Oak Hickory Type Volume by Species

Species	HARVEST (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
White Oak	2,330	3,031	5,362
Black Oak	1,402	1,232	2,634
Yellow Poplar	579	345	924
Pignut Hickory	387	343	731
Northern Red Oak	143	547	690
Shumard Oak	-	171	171
Scarlet Oak	73	-	73
Total	**4,916**	**5,670**	**10,585**

Desired future condition:

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

Silvicultural Prescription:

In order to meet the desired future condition, an improvement harvest is prescribed. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this stand. According to the inventory data, the prescribed harvest would remove approximately 244,300 board feet (4,918 board feet per acre) from this cover type. Most of this would be removed under a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When

possible, selection should also favor releasing future crop trees, with preference towards long lived species.. The residual stand should be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more oak management options into the future. Openings created by group selection areas will promote oak regeneration as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. Overall stocking in this cover type may be reduced from the current 85% to approximately 35%. This is attributed to the creation of regeneration openings/early seral habitats - as well as the projected removal of less desirable species such as beech, ash suffering from the effects of Emerald Ash Borer, yellow poplar suffering from drought stress, and the removal of oaks (predominantly black oak) which are reaching their end of their natural lifespan. Stocking between regeneration openings is expected to remain above the fully stocked level (65%).

Post-harvest TSI is prescribed to ensure that poorly-formed, low-quality trees are removed and the understory is treated to eliminate shade tolerant species in favor of oaks and other more desirable species. The girdling of small to large cull trees will also help to recruit snags as well as increase the downed woody material present and provide invertebrate and small vertebrate habitat. TSI will also be needed to control ailanthus and other invasives that are present on the tract.

Stand 2 –Oak Hickory (non-merchantable) – 10.9 acres

The southern portion of the Oak-Hickory cover type was categorized as non-merchantable at this time primary due terrain steepness and accessibility. This cover type is found across 8% of the tract acreage on a steep south facing slope in the southern portion of the tract. It holds 5% of the volume found on the tract. The most abundant species is white oak which comprises 29% of the volume (15,390 board feet) within the cover type, chinkapin oak is the second most common species making up 16% of the volume (8,500 board feet), and Northern red oak is third with 13% of the volume (7,050 board feet). Other less species include black oak, post oak, shagbark hickory, sugar maple, red maple, white ash, and Eastern red cedar.

Desired Future Condition:
The objective here is to provide for multiple ecological services, primarily by providing cover and hard mast and mid to late-seral habitat for wildlife, watershed services, and potentially periodic production of high quality hardwoods.

Silvicultural Prescription:
Light timber stand improvement is recommended, but not of high priority for large snag creation and release higher value timber and wildlife crop trees from completion with less desirable or vigorous neighboring trees. Attention is also needed to control ailanthus and other problem invasives that may be present.

Stand 3 – Mixed Mesic Hardwoods (merchantable) – 16.0 acres

Current Condition:
This cover type is found across 12% of the tract acreage on the east facing slope in the center of the tract. It holds 16% of the volume found on the tract. The most abundant species is Northern red oak which comprises 29% of the volume (49,120 board feet) within the cover type, yellow poplar is the second most common species making up 27% of the volume (45,720 board feet), and black oak is third with 15% of the volume (25,080 board feet). Other less species include black oak, pignut hickory, and white ash. The mid-story (pole sized timber) is dominated by sugar maple, pignut hickory, white ash, and chinkapin oak. The understory is dominated by sugar maple and white ash. The inventory is summarized in Table 8 with species composition detailed in Table 9. Currently the cover type is around 90% stocked.

Table 8. Mixed Mesic Hardwoods Inventory Summary

STRATUM: Mixed Mesic-Hardwoods		**ACREAGE: 16.0**	
	HARVEST (bd ft)	**LEAVE** (bd ft)	**TOTAL** (bd ft)
Volume per acre	5,204	5,255	10,459
Volume total	83,010	83,810	166,820
Pole Volume per Acre	3,334	1,516	4,850
Pole Volume Total	53,350	24,250	77,600
Basal Area per Acre	67.4	46.3	113.7
Trees per Acre	123	66	189

Table 9. Mixed Mesic Hardwoods Volume by Species

Species	HARVEST (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
Northern Red Oak	814	2,256	3,070
Yellow Poplar	2,052	806	2,858
Black Oak	334	1,234	1,568
Pignut Hickory	598	944	1,541
White Oak	1,050	-	1,050
White Ash	340	-	340
Total	**5,188**	**5,239**	**10,426**

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

Silvicultural Prescription:
In order to meet the desired future condition, the tract could use an improvement harvest. According to the inventory data, approximately 83,010 board feet (5,204 board feet per acre)

should be removed from this cover type. Most of this would be removed under a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should maintain a variety of mesic species. Stocking in this cover type would be reduced from the current 90% to approximately 40%. Similarly to the oak hickory cover type, this seemingly drastic drop in stocking reflects the removal of a large amount of yellow poplar suffering from drought stress. 40% of the proposed harvest volume, within this cover type, would be yellow poplar.

Stand 4 –Mixed Mesic Hardwoods (non-merchantable) – 12.4 acres

The southern portion of the Mixed Mesic Hardwoods cover type was categorized as non-merchantable at this time primarily due terrain steepness and accessibility. This cover type is found across 9% of the tract acreage on a south facing slope and holds 5% of the volume found on the tract. The most abundant species is Northern red oak which comprises 42% of the volume (22,720 board feet) within the cover type, chinkapin oak is the second most common species making up 26% of the volume (14,000 board feet), and Eastern red cedar is third with 10% of the volume (5,250 board feet). Other less species include blue ash, black walnut, and sugar maple.

Desired Future Condition:

The objective here is to provide for multiple ecological services, primarily by providing cover and hard mast and mid to late-seral habitat for wildlife, watershed services, and potentially periodic production of high quality hardwoods.

Silvicultural Prescription:

Light timber stand improvement is recommended, but not of high priority for large snag creation and release higher value timber and wildlife crop trees from competition with less desirable or vigorous neighboring trees. Attention is also needed to control ailanthus and other problem invasives that may be present.

Stand 5 – Old Field (merchantable) – 18.0 acres

Current Condition:

This cover type is found in two pockets, one on the flat ridge top that makes up the western tract boundary and another along the drainage that is the eastern tract boundary. It covers 14% of the tract acreage and holds 19% of the volume found on the tract. The most abundant species is Eastern red cedar which comprises 44% of the volume (85,250 board feet) within the cover type, yellow poplar is the second most common species making up 19% of the volume (37,150 board feet), and black oak is third with 12% of the volume (23,470 board feet). Other less species include Northern red oak, pignut hickory, black cherry, and aspen. The mid-story (pole sized timber) is dominated by Eastern red cedar. Sugar maple, pignut hickory, Northern red oak, and yellow poplar are also common. The understory is dominated by American beech, sugar maple and Northern red oak. The inventory is summarized in Table 10 with species composition detailed in Table 11. Currently the cover type is around 105% stocked.

Table 10. Old Field Inventory Summary

STAND: Old Field		**ACREAGE: 18.0**	
	HARVEST (bd ft)	**LEAVE** (bd ft)	**TOTAL** (bd ft)
Volume per acre	9,502	1,229	10,730
Volume total	170,840	22,090	192,930
Pole Volume per Acre	3,664	533	4,197
Pole Volume Total	65,950	9,600	75,550
Basal Area per Acre	111.5	13.5	125.0
Trees per Acre	183	17	200

Table 11. Old Field Volume by Species

Species	HARVEST (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
Eastern Red Cedar	5,328	-	5,328
Yellow Poplar	2,322	-	2,322
Black Oak	727	740	1,467
Pignut Hickory	1,024	-	1,024
Quaking Aspen	982	-	982
Northern Red Oak	-	641	641
Black Cherry	294	-	294
Total	**10,678**	**1,381**	**12,058**

Desired Future Condition:
The objective of this cover type is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by mid- and late-seral species, while providing hard mast and mid to late-seral habitat for wildlife. Maintaining an Eastern red cedar component is also desired for habitat diversity.

Silvicultural Prescription:
In order to meet the desired future condition, this cover type should be regenerated. The use of single tree selection or a regeneration opening may be used in order to remove much of the cedar and less desirable hardwoods. Attention is also needed to control ailanthus and other problem invasives that may be present.

Stand 6 –Rocky Steep (non-merchantable) – 16.0 acres

This cover type is found across 9% of the tract acreage and is comprised of a south facing bluff with SR-62 and the Blue River at the bottom. This cover type holds 3% of the volume found on the tract. The most abundant species are Eastern red cedar which comprises 62% of the volume (19,770 board feet) within the cover type and chinkapin oak which makes up the remaining 38% of the volume (12,260 board feet).

Desired Future Condition:

The objective here is to provide for multiple ecological services, primarily by providing cover and hard mast and mid to late-seral habitat for wildlife and watershed services.

Silvicultural Prescription:
Monitor for management and control of ailanthus and other problem invasives.

Stand 7 – Other (non-merchantable) – 8.7 acres

This cover type encompasses 7% of the tract acreage. It includes SR-62, bottomlands, and part of the Blue River all in the southern-most portion of the tract. It is dominated by bottomland hardwood species typical of the Blue River corridor, including yellow poplar and American sycamore.

Desired Future Condition:
The objective here is to provide for multiple ecological services, primarily by providing cover and hard mast and mid to late-seral habitat for wildlife, riparian and watershed services, and potentially periodic production of high quality hardwoods.

Silvicultural Prescription:
Monitor for management and control of ailanthus and other problem invasives.

PART 3 - TRACT SUMMARY

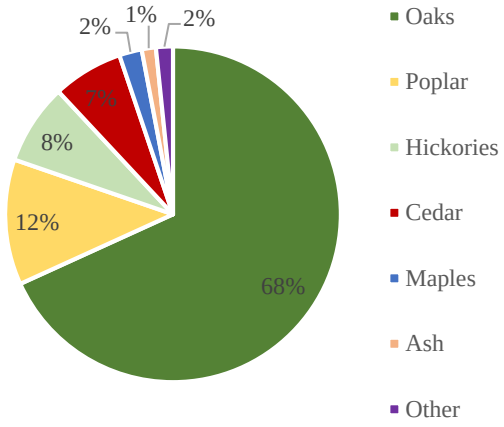
Tract Summary – 132 acres

The acreage of this tract is approximately 132 acres. There are five distinct cover types on this tract: Oak Hickory, Mixed Mesic Hardwoods, Old Field, Rocky Steep, and Other. The cover types were further divided into merchantable or non-merchantable stands. There are a total of 83.6 merchantable acres (64% of the tract acreage) and a total of 48.0 non-merchantable acres (36% of the tract acreage) within the tract. There is a total of 885,840 board feet (87% of the volume within the tract) within the merchantable stands and 138,120 board feet (13% of the volume within the tract) within the non-merchantable stands. See map of cover type (stand) locations. Table 5 details the harvest, leave, and total volume per acre, total volume, basal area, and trees per acre for the entire tract.

Table 5. Inventory Summary

	HARVEST (bd ft)	**LEAVE** (bd ft)	**TOTAL** (bd ft)
Volume per acre	3,865	3,794	7,659
Volume total	510,190	500,830	1,011,020
Basal area/acre	50.2	44.8	95.0
Trees/acre	84	65	149

Graph 1. Volume Distribution by Species



Summary of Tract Silviculture:

Due to the current condition of the stand, a medium level improvement harvest could be undertaken in this tract at any time. The prescribed managed harvest would reduce overall stocking from the current ~80% to ~65% (combined stocking for merchantable and non-merchantable stands). Most of this would be harvested under a single tree selection routine with group selection regeneration openings targeting groups of low-grade trees or multiple large trees growing together. This would produce a harvest volume of approximately 510,180 board feet or about 3,865 board feet per acre and leave about 500,940 board feet or 3,795 board feet per acre. 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, snag creation and control of invasives.

Tables 12, 13, and 14 detail the harvest, leave, and total Volume, Basal Area, and Trees per Acre for oak and hickory species combined and all other species combined. Looking at these tables helps explain why the stocking level would drop as low as it would after the recommended harvest. The tables show that only 33% of the trees on the tract are oak or hickory, but they contribute 76% of the volume on the tract, an amount that is quite large. Thus when the other species, which contribute more to the number of trees per acre and less to the volume on the tract, are removed by the harvest it leads to a corresponding decrease in the tract's stocking.

Table 12. Summary of Volume (bd ft per acre)

Stand	Harvest	Leave	Total
Oak and Hickory Species	2,419	3,400	5,819
Other Species	1,446	395	1,841
TOTAL	**3,865**	**3,795**	**7,660**

Table 13. Summary of Basal Area (sq ft per acre)

Stand	Harvest	Leave	Total
Oak and Hickory Species	19.1	36.1	55.2
Other Species	31.1	8.7	39.8
TOTAL	**50.2**	**44.8**	**95.0**

Table 14. Summary of Number of Trees per Acre

Stand	Harvest	Leave	Total
Oak and Hickory Species	10	39	49
Other Species	74	26	100
TOTAL	**84**	**65**	**149**

Effect of Prescription on Tract Properties:

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

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting but this should be confined to landings and main skid trails. These areas should be properly closed out according to Indiana's BMPs to minimize the impact of management on soils. The steeper (non-merchantable) slope areas are not prescribed for harvesting at this time.

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

Wildlife: Wildlife in this tract should not be adversely affected by the scale of operations. Snags and coarse woody debris should remain at viable levels in the stratum and should continue to provide habitat for the Indiana bat. The main effect on wildlife will be the reduction of the coniferous component of the stratum as cedar areas transition to native hardwoods. This currently provides a limited amount of thermal cover in the winter for deer and small mammals. While not eliminated, this type of cover will be reduced in the tract. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future. Regeneration openings, such as prescribed have been shown to be of less an issue from nest predators and generalist species as compared to hard edges such as public roadways, utility corridors and crop field edges. Placement of regeneration openings away from hard edges can minimize these potential impacts. The prescribed activity will promote wildlife diversity and enhance habitat structural components.

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

Recreation: Disturbance to the horse trail within the tract should be minimized during management operations. A temporary closure may be needed due to user and operator safety concerns. Any debris should be removed after the completion of any harvest operation. 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.

PART 4 - PROPOSED ACTIVITIES LISTING

Proposed Activity	**Proposed Date**
Assemble Management Guide	2017
Improve Access	2017-2019
Treat Invasives	2017-2019
Mark Timber Harvest	2017-2019
Sell Timber	2018-2020
Post Harvest TSI	One to two years after harvest
Treat Invasives	1-3 years after harvest
Monitor regeneration openings	3-4 years after timber harvest
Re-Inventory	2037
Write new Management Plan	2037

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Tract Cover Types