Indiana Department of Natural Resources - Division of Forestry

RESOURCE MANAGEMENT GUIDE - DRAFT

STATE FOREST: Harrison Crawford **COMPARTMENT**: 7 **TRACT**: 05

Date: January 11, 2011 **Forester: Wayne Werne**
(Inventory – December, 2010)

INVENTORY SUMMARY

NUMBER OF STANDS: **4** **Est. growth: 186 bd. ft/ac/yr****
PERMANENT OPENINGS: **0.0 ac** **Est. cutting cycle: 13-15 yrs**
TOTAL ACREAGE: **84.1 ac** (*or 87 – see description in boundary section*)
AVERAGE SITE INDEX: **75-85** (for upland oaks)
AVERAGE BASAL AREA: **130 sq. ft/ac**

****Growth** was calculated by using 2010 volume, subtracting the volume of 5872 bd ft/ac from the 1985 inventory and the 103,000 bd. ft. from the 1990 sale, and dividing by 25 years of growth.

TRACT 705 TOTAL VOLUME (bd ft)

	CUT		LEAVE		TOTAL	
SPECIES	per acre	total	per acre	total	per acre	total
American beech	241	20,250	129	10,870	370	31,120
American elm	-		35	2,930	35	2,930
Bitternut hickory	46	3,880	62	5,220	108	9,100
Black cherry	13	1,130	12	1,040	26	2,170
Blackgum	205	17,270	-		205	17,270
Black oak	361	30,390	203	17,110	565	47,500
Black walnut	35	2,930	127	10,710	162	13,640
Chinkapin oak	-		42	3,570	42	3,570
Eastern white pine	88	7,360	252	21,220	340	28,580
Mockernut hickory	-		12	1,020	12	1,020
Northern red oak	326	27,450	597	50,200	923	77,650
Pignut hickory	160	13,420	316	26,570	476	39,990
Shagbark hickory	-		214	17,970	214	17,970
Sugar maple	427	35,880	1,002	84,310	1,429	120,190
Sweetgum	26	2,190	-		26	2,190
White ash	621	52,240	40	3,380	661	55,620
White oak	398	33,450	2,099	176,560	2,497	210,010
Yellow-poplar	498	41,890	713	59,950	1,211	101,840
TTOTAL	3,445	289,730	5,858	492,630	9,303	782,360

STAND 1 – Mixed mesophytic **ACREAGE: 31.0**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	4,455	6,692	11,147	
TOTAL VOLUME:	138,100	207,500	345,600	
BASAL AREA/ACRE:	58.5	76.7	135.2	
# TREES/ACRE:	75	173	248	

STAND 2 – Oak hickory **ACREAGE: 42.7**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	3,252	5,397	8,649	
TOTAL VOLUME:	138,900	230,500	369,300	
BASAL AREA/ACRE:	50.6	72.5	123.1	
# TREES/ACRE:	101	173	274	

STAND 3 – Old field - advanced **ACREAGE: 7.1**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	308	4,512	4,820	
TOTAL VOLUME:	2,200	32,000	34,200	
BASAL AREA/ACRE:	42.5	96.2	138.7	
# TREES/ACRE:	333	275	608	

STAND 4 – Eastern white pine **ACREAGE: 3.3**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	3,223	6,876	10,099	
TOTAL VOLUME:	10,600	22,700	33,300	
BASAL AREA/ACRE:	72.5	75.6	148.1	
# TREES/ACRE:	139	114	253	

Note: Please reference the appendix for tables and graphs of various stand statistics

TRACT BOUNDARIES: This tract is completely surrounded by private property, and has a few boundary issues. These are described in detail as follows.

On the northeast corner of the tract, where it meets the road, is located a sandstone cornerstone (presumed) with a cross scribed into the top. Next to it is a metal axle or marker driven into the ground. Some years previous, a state carsonite boundary marker was driven in here as well.

About 560 feet to the west is another sandstone cornerstone with a cross scribed into the top of it. According to a survey done by Fewell, Pettitt, Bender, Hauersperger & Assoc. (FPBH) done in 2001, this stone is not due west on what should be the property line. The bearing between these stones is South 80 degrees, 29 minutes, 42 seconds East. FPBH

set a rebar about 85 feet southwest of this stone on what would make a much straighter line between the stone by the road and the northwest corner of the property a quarter mile to the west. This rebar is about 585 feet west of the stone by the road at a bearing of South 88 degrees, 40 minutes East. It is currently not known why there is an offset between two clearly marked cornerstones from what should be an east west line.

Toward the west from here about 1301 feet, FPBH set a Bernsten mounument at what should be the northwest corner of the property, and there appears to be no other evidence of a corner here, and no fencelines were noted in the area either.

South of here about 1274 feet, FPBH set a DNR carsonite close to a sandstone rock which had flagging tied around it. This rock was not set firmly in the ground and had no noticeable scribings on it, and appeared to be broken into actually two rocks. It was noted as a cornerstone in the survey notes, but from examining it and comparing it to other cornerstones in this area, it appeared to be a random rock that was coincidentally in the approximate correct location for a quarter quarter corner on the line between sections 30 and 31.

South of this, approximately a quarter mile, was found an upright limestone set firmly into the ground, which has been used and noted in the past as a cornerstone. It also had a rebar driven in next to it, and there was an old state forest boundary sign located in this vicinity as well. There was no fence noted along this entire western boundary between these stones or south to Lickford Bridge Road.

At the south end of this west line, there was, and apparently still is, an encroachment from the neighbor who has a yard barn and concrete pad located on state property. When this had been found originally some years ago, I believe they made that neighbor tear down the garage that had been built on that concrete pad, and there is a copy of the Primavera survey noting this encroachment in the file. The driveway is also located on state property.

Lickford Bridge Road forms the south boundary of the tract. There were no corners noted on this south boundary, but the Primavera survey just mentioned did indicate a rebar located somewhere slightly north of the road at the southwest corner. It is possible there might be some reference set in the paved road, though none was found at the southeast corner.

North of the southeast corner, the boundary is somewhere between the planted pine on the state property and the fields on the private property to the east. There were some insulators and wire noted north along this line, but some of the insulators were in the pine trees, which I assume should clearly be on the state side of the line.

Farther to the north along this east line, there were some steel fence posts noted close to the line, but by shooting the line from the north where more evidence exists, it appears these fence posts are probably on the state side of the line, and do not line up north south

like they should. In this vicinity, the neighbor has numerous junk cars and tractors, and it appears some of this junk is on the state side of the line.

Farther to the north from here, as the line goes down into the creek valley, there started to be noted old fenceline in the trees, and these appeared to be on the line or close. The next neighbor north of the one with the junk, showed me a rebar driven into the ground which should mark the corner of his property, his sister's property to the north, and state property to the west. He had an insulated wire tied around a tree immediately adjacent to this rebar. He said his father had told him that was the property corner, but he was not sure if indeed it was exactly accurate. This rebar seems to line up with the fenceline to the south.

Farther to the north where the state property corners and goes back east to the road, there is no indication of any kind of corner, but there is additional fencing running north from this general location interior to state property. There is also some old fence following the east west line to the road in the vicinity of the neighbor's house, where the line is delineated by the pine on the state side of the line versus the field on the neighbor's side. The corner could be approximated by intersecting these two fencelines. On the southeast corner on Dixie Road, FPBH set a Bernsten monument marking the corner, and Dixie Road forms the remainder of the boundary back to the point of beginning.

Several years ago, Dwayne Sieg ran the boundary between the state and the last mentioned neighbor which is the first neighbor south of state property on Dixie Road. At the time, he did not know about the rebar representing the property corner farther to the south, and his flagged line seemed to be located to the west of the line between that rebar and the fencing found in the woods. The result of this appears to be that the line was flagged to the west of where it actually is, and the neighbor for which he flagged the line had her timber cut up to the flagged line. It seems that some of the trees that were cut may indeed have been on the state side of the line.

Also, the deed calls for a square 40 acres, a rectangular 40 acres, and the remainder of a quarter quarter section of 7 acres, totaling 87 acres. The GIS tract boundary comes out to 85 acres as drawn, while the acreage using lines drawn from on the ground corner evidence comes out to 84.1 acres without the offset northern stone, and 87.6 acres including the offset northern stone in the polygon.

ACCESS: This tract has direct access off of Dixie Road to the east for about ¼ mile of length, and there is an old access road and gate near the southern end of the portion that borders the road. The tract also borders Lickford Bridge Road on the south.

ACQUISITION HISTORY: The land that makes up this tract was acquired from only one previous landowner – Herbert and Nellie Hibbs – in 1958 for an undisclosed sum of money (deed #131.200). Although the deeded acreage is given as 87 acres, see the explanation in the above Tract Boundary section, as it may vary from this number.

TRACT DESCRIPTION: This tract was divided into four stands based on cover type and past management. These stands include: mixed mesophytic, oak hickory, old field – advanced, and eastern white pine. These stands will be described in detail below.

Stand 1 – Mixed mesophytic

This 31-acre stand was intermingled with the oak hickory stand and was found primarily on the lower slopes of the tract. But it was also dominant where there were sinkholes that allowed for more mesic species to punctuate the oak hickory stand that covered most of the tract. Usually the mixed mesophytic stands are dominated with a mixture of yellow-poplar, white ash, and sugar maple, but this stand on this tract had a fairly high component of sugar maple and also beech, so it might actually qualify as a true beech-maple stand in places.

The total volume of the stand (11,150 bd. ft/ac) is composed primarily of sugar maple (2860 bd. ft/ac), yellow-poplar (2300 bd. ft/ac), northern red oak (1120 bd. ft/ac), white oak (1100 bd. ft/ac), and American beech (960 bd. ft/ac). The remaining 37% of the volume consists of white ash, black oak, black walnut, and various other species.

Stand 2 - Oak hickory

This 43-acre stand covers the majority of the tract - primarily in the northern half of the tract, with the exception of the lower areas along the drainage. In portions of the northern section, this stand gradated into the mixed mesophytic dominated stand, which also contained lesser quantities of the oak component.

Almost half the total volume of the stand (8650 bd. ft/ac) is composed of white oak (4080 bd. ft/ac). Other major components include northern red oak (827 bd. ft/ac), pignut hickory (780 bd. ft/ac), sugar maple (740 bd. ft/ac), black oak (740 bd. ft/ac), and white ash (630 bd. ft/ac). The remaining 10% of the volume consists of shagbark hickory, blackgum, and various other species.

Stand 3 - Old field – advanced

This 7-acre stand is found primarily on the hillside in the southern portion of the tract, but also on the lower slopes near the drainage in the north, and represents former agricultural fields that have succeeded back to a hardwood mixture of poplar, sassafras, sweetgum, and other species. Multiflora rose was a problem in portions of this stand, as were grapevines in other areas. There was more of this agricultural land on the tract at one time, but some of it was planted to pine years ago, and now makes up stand 4.

The total stand volume (4820 bd. ft/acre) is composed overwhelmingly of yellow-poplar (3140 bd. ft/acre), but also northern red oak (970 bd. ft/acre), black walnut (390 bd.

ft/ac), and sweetgum (310 bd. ft/ac). Smaller sassafras was a noticeable component as well.

Stand 4 – Eastern white pine

This small 3-acre stand is found in the southeastern portion of the southern half of the tract and also a pocket in the southeastern portion of the northern half of the tract. As is the case with the previous stand, these areas were historically cleared and farmed, and then were converted back into forest again. In this case pine was planted in these areas – mostly eastern white pine, but also some red pine. This stand has suffered some noticeable wind damage in the last few years, and some trees were uprooted, while others had their tops broken out.

The total stand volume (10,100 bd. ft/acre) is composed overwhelmingly of eastern white pine (7640 bd. ft/acre) and yellow-poplar (1430 bd. ft/acre). The remaining 10% of the volume consists of white oak, black oak, and northern red oak.

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

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.

HaD2 Hagerstown silt loam, 12-18% slopes, eroded Upland oak SI is 85-95, Yellow-poplar SI is 90-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 335-450 bd. ft/ac/yr. for yellow-poplar.

HgD3 Hagerstown silty clay loam, 12-18% slopes, eroded Upland oak SI is 85-95, Yellow-poplar SI is 90-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 335-450 bd./ ft/ac/yr. for yellow-poplar.

WeC2 Wellston silt loam, 6-12% 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.

CtC3 Crider soils, 6-12% slopes, severely eroded Upland oak SI is 85-95, Yellow-poplar SI is 90-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 335-450 bd. ft/ac/yr. for yellow-poplar.

WeD2 Wellston silt loam, 12-18% slopes, severely 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.

BpD3 Baxter cherty silty clay loam, 12-18% slopes, severely 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.

Hm Haymond silt loam Yellow-poplar SI is 95-105, est. growth is 375-450 bd. ft/ac/yr. for yellow-poplar.

RECREATION: This tract of state forest is an outlier surrounded by private land, and is not adjoining the main block of the forest. As such, it has no official hiking or horse trails, and probably only receives use for hunting purposes – one deer stand was located next to private property, as was a feeding station and trail camera. Historically it seems there has been illegal ATV use of the old roads in this tract, and some firewood cutting. Numerous open sinkholes were noted in this tract, so it may receive some use by cavers, but no large well-known official "caves" are present within the tract.

WILDLIFE: This tract represents typical upland forest habitat, in addition to a small component of old field with smaller hardwoods, as well as a small area of pine. 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, but another habitat component would come from the pine stand. This area provides cover and bedding areas, especially during the winter months. Likely turkeys and owls may roost in the pines.

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. The categories of optimal and maintenance guideline numbers were broken down by size class subcategory, but are inclusive of size classes above that. In other words, the maintenance guideline for number of snags in the 6" class and larger was 4 per acre, but of that number 0.5 per acre should be 20"+ and 3 should be 10'-18" or greater. This was done because larger trees are more valuable and less common, and were given the greater importance when calculating total guideline numbers.

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

# of live trees per acre	Guidelines maintenance	Tract 705 actual present – harvest = residual
12"-18" DBH class	**6**	**44.9 – 16.5 = 28.4**
20" DBH and greater	**3**	**15.4 - 6.0 = 9.4**
Total	**9**	**60.3 – 22.5 = 37.8**

# snags per acre	Guidelines maintenance	Guidelines optimal	Tract 705 actual
6" - 8" DBH class	**1**	**1**	**6.8**
10"-18" DBH class	**2.5**	**5**	**4.7**
20" DBH and greater	**0.5**	**1**	**0.5**

Total	**4**	**7**	**12.0**

These numbers show that both live tree densities as well as snag densities meet guidelines on this tract. The result for large snags is consistent with several other recently completed inventories on other tracts of the forest, where large snag densities are below one per acre, though the density here is higher than on other tracts where densities seem to hover at about 0.3 per acre. The vast majority of snags are in the smaller size classes, 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 the timber sale will not negatively impact that component significantly. Creation of more snags in the larger size classes 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 and/or conversion of the pine areas 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.

However, Indian Creek (which is a perennial stream) is located between 1/8 to ¼ mile to the west, and it is likely that this corridor on a larger scale is utilized for travelling and dispersion by wildlife in general. It is also likely that wildlife that would utilize Indian Creek directly would perhaps spend a portion of their life inhabiting this tract. Hawks or eagles or herons that might hunt for fish in the creek could likely roost or nest in this tract because of its proximity to the water source. Animals more dependent on permanent water sources might also be more likely to inhabit this tract due to its proximity to water. This tract might have a higher number of herptiles as well, due to the nearby availability of water for breeding or daily water needs. Since any forest management activities would not permanently deforest this tract or provide for long term or constant disturbance or disruption, it is presumed that the long term effect on any of the wildlife mentioned above would only be for a short term and temporary timeframe only.

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. However, due to the geometry of this tract (long and skinny), it is unlikely that it represents much in the way of isolated interior forest habitat that might be preferred by some species of wildlife. In the context of the surrounding landscape, this tract represents a moderate chunk of forest in a matrix of surrounding forest-agricultural (open) land mix.

WATERSHED / HYDROLOGY: The majority of the tract contains flat ground to gentle or moderately steep slopes that drain into an intermittent drainage that then drains down Rocky Hollow to Indian Creek about a quarter mile to the west, which eventually drains into the Ohio River. This area lies within a karst landscape with underground drainage, and there are numerous sinkholes and some "caves" scattered within the tract. There were at least 9 karst features that might be classified as caves found in the northern portion of the tract – one of which was just off on private property, but looked like the most promising cave. There was also a rockshelter feature near the ridgetop as well.

HISTORICAL AND CULTURAL: Cultural resources may be present on the tract but their location is protected. Adverse impacts to significant cultural resources will be avoided during any management or construction projects.

RARE, THREATENED, OR ENDANGERED SPECIES: The natural heritage database check did not show any rare, threatened, or endangered plant or animal species documented within this tract or nearby. There are several cave species found about a half mile to the north in a larger cave located on private property that were on the list.

EXOTICS: There were several pockets of ailanthus found primarily in the northern half of this tract (but also a pocket on Lickford Bridge Road at the south end) during inventory. There are very likely more occurrences of this species throughout the tract. Ailanthus seems to pop up wherever there is any kind of opening – even with one windthrown tree – and its prolific seed production usually ensures that there will be seedlings or saplings present in these openings wherever they happen to be. Several of these trees were painted with pink bands with the idea that spot treatment in the near future will be done, and the trees will be more identifiable with the paint.

The old field and pine stands contained areas of multiflora rose as well, which made getting through them difficult. These areas were limited in their extent, but still represent undesirable invasive presence in the stand. These stands also contained infestations of Japanese honeysuckle as well, and it was forming mats in places where windthrown trees had allowed light in. This species should also probably be controlled to limit interference with tree growth, but it is widespread enough in thick cover, that control would be difficult.

SILVICULTURAL HISTORY AND PRESCRIPTION:

General: Utilizing records of the past history of this tract, an inventory done in 1985 indicated a total standing volume of 5872 board feet per acre. The management plan for this inventory was written in 1990. Shortly thereafter, there was a timber sale marked and sold in 1990, which removed 103,100 board feet – mostly sugar maple, black oak, red oak, white oak, and beech. There is no indication in the file if post harvest TSI was performed.

The 2010 inventory shows 9303 board feet per acre, and this figures out to a growth rate of 186 board feet per acre per year, after taking into account the volume removed in the 1990 sale and 25 years of growth since then.

The growth figures are respectable 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 stands 1 and 2 are overstocked at between 110% to 120%. Stands 3 and 4 are off the charts at near 130-145%. Removal of trees tallied as "cut" either via a timber sale or TSI would reduce the stocking levels to about 65-90% stocking. Stocking levels would be reduced to a level considered fully stocked above the B-line for all stands.

Due to the amount of volume being carried on the majority of the tract (9300 bd. ft/ac), the length of time since the last managed sale (20 years back to 1990), and the general size and condition of the overstory trees in the majority of the tract, the initial impression was that a medium level thinning/improvement harvest could be undertaken in this tract at any time. This would produce a sale volume of about 290,000 board feet or about 3450 board feet per acre and leave about 493,000 board feet, or about 5860 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. 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. Vines did not seem to be a big problem in this tract, but were present in some areas, and 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 small pockets of ailanthus noted at the time of inventory – mostly in the northern half of the tract. All ailanthus should be killed pre-harvest.

Stand 1: Mixed mespophytic

This 31-acre stand contains a very high volume of 11,150 board feet per acre of which 4460 was classified as harvestable and 6690 was classified as residual. This would remove 59 square feet of basal area, which would leave the residual stand with 77 sq. ft. Stocking would drop from about 120% to about 70% with the indicated management (fully stocked above the B-line).

Since the last harvest in this tract was 20 years ago, and because it currently contains a high volume of harvestable material and a high volume of residual growing stock, the recommendation would be to rank this stand as a medium to high priority for conducting a harvest. Any timber sale would primarily include this entire stand as well as all of stand 2, with some trees from stands 3 and 4. The majority (80%) of the harvest volume for stand 1 (4460 bd. ft/ac) would be contained in yellow-poplar (1170 bd. ft/ac), sugar maple (890 bd. ft/ac), white ash (860 bd. ft/ac) and American beech (610 bd. ft/ac). The remainder would be contained in black oak, blackgum, northern red oak, and others.

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 kill grapevines where present. A fair amount of understory control may be necessary to limit the amount of beech that is coming in in places and to prevent too much shade in the stand. As always, any ailanthus present should also be treated and eliminated. There were some nice larger walnuts scattered throughout this stand in places.

Stand 2: Oak hickory

This 43-acre stand covers over half of the tract, and contains a high volume of 8650 board feet per acre of which 3250 was classified as harvestable and 5400 was classified as residual. This would remove 51 square feet of basal area, which would leave the residual stand with 73 sq. ft. Stocking would drop from 110% to about 65% with the indicated management (fully stocked above the B-line).

Since the last harvest in this tract was 20 years ago, and because it also currently contains a high volume of harvestable material and a moderately high volume of residual growing stock, it should be included with stand 1 as a medium to high priority for conducting a harvest. The majority (75%) of the harvest volume for stand 2 (3250 bd. ft/ac) would be contained in white oak (760 bd. ft/ac), white ash (600 bd. ft/ac), northern red oak (550 bd. ft/ac), and black oak (520 bd. ft/ac), with pignut hickory, blackgum, sugar maple, and various other species making up of the remainder of the harvest volume.

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 multiple large trees growing together. However, the last harvest seems to have removed most of the obvious lower grade material. When possible, selection should also favor releasing future crop

trees. The residual stand should be heavier to white oak, with a lesser component of other oak species, as well as mesophytic species. This stand as a whole contains a good quality stand of white oak stems of medium to large size. The residual stand should continue to maintain a high number of quality white oak stems. In 1985, the inventory showed there to be 70,000 bd. ft of white oak, 11,000 bd. ft were cut in the sale, and the current inventory shows there to be over 200,000 bd. ft present now. This species is the dominant one in this tract as a whole, seems to be growing well and putting on volume, and will continue to be the primary crop tree for management into the future.

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 present should also be treated and eliminated.

Stand 3: Old field - advanced

This 7-acre stand contains a volume of 4820 board feet per acre of which only 310 was classified as harvestable and 4510 was classified as residual. This would remove 43 square feet of basal area, which would leave the residual stand with 96 sq. ft. Stocking would drop from 145% to about 90% with the indicated management (fully stocked above the B-line).

Since this stand intermingles with the more merchantable hardwood stands, there would likely be some trees included from here along with any timber sale taking place in stands 1 and 2. Sweetgum and yellow-poplar would represent most of any stems included in a harvest.

Control of invasive exotic honeysuckle and rose would be the primary management needed in this stand, as well as TSI of the undesirable components such as sassafras and sweetgum. There seems to be some good yellow-poplar and a few oaks coming up in this area. Where there are sapling oaks present, these should be released from surrounding competition to establish an oak component in this stand. The area should also be monitored and treated for ailanthus that might have popped up.

Stand 4: Eastern white pine

This small 3-acre stand contains a volume of 10,100 board feet per acre of which 3220 was classified as harvestable and 6880 was classified as residual. This would remove 73 square feet of basal area, which would leave the residual stand with 76 sq. ft. Stocking would drop from 130% to about 65% with the indicated management (fully stocked above the B-line).

The majority (70%) of the harvest volume for stand 4 (3220 bd. ft/ac) would be contained in eastern white pine (2230 bd. ft/ac) marked for thinning and improvement. There might also be some yellow-poplar and white oak marked to make up the remainder of the harvest volume. Likely a few hardwood trees would be marked to be included with the hardwood sale across the rest of the tract, but the pine would be largely left alone. Since the areas of pine are so small, it would not be feasible to thin them with a harvest. Either TSI could be used to thin the poorer ones from the better ones, or the whole stand would be cut to regenerate hardwoods. Wind has already damaged a lot of the trees in this stand. Likely, the pine will be left uncut to provide for some habitat diversity for wildlife and an aesthetic component in this tract.

PROPOSED ACTIVITIES LISTING

Winter 2010	Field inventory
Winter 2010 – Spring 2011	Write mgmt plan
Spring 2011 - Fall 2011	Basal bark treat ailanthus
Fall 2011 – Winter 2011	Mark timber sale
Spring 2012 - Summer 2012	Sell timber sale
2012 / 2013	Post harvest TSI
2017	Recon & monitor for exotics
2025-2027	Inventory for next mgmt cycle

To submit a comment on this document, click on the following link:
http://www.in.gov/surveytool/public/survey.php?name=dnr_forestry

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.

APPENDIX

(Various tables and graphs describing tract 705)

A SUMMARY OF VARIOUS STATISTICS FOR TRACT 705

Summary of basal area (sq ft per acre)

STAND	LEAVE	CUT	(SNAG)	TOTAL (live)
Mixed mesophytic	76.7	58.5	??	135.2
Oak hickory	72.5	50.6	??	123.1
Old field - advanced	96.2	42.5	??	138.7
White pine	75.6	72.5	??	148.1

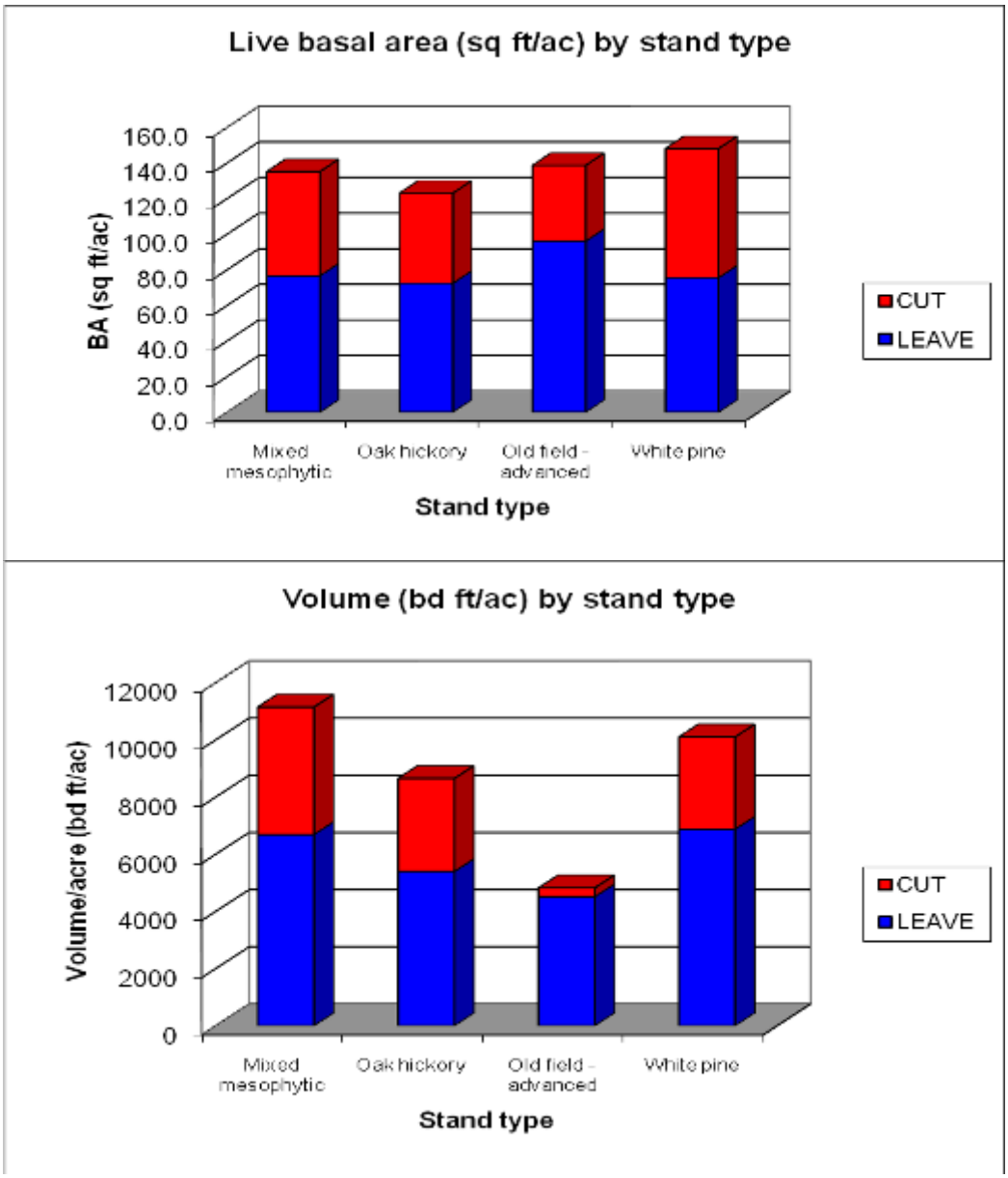
Summary of volume (bd ft per acre)

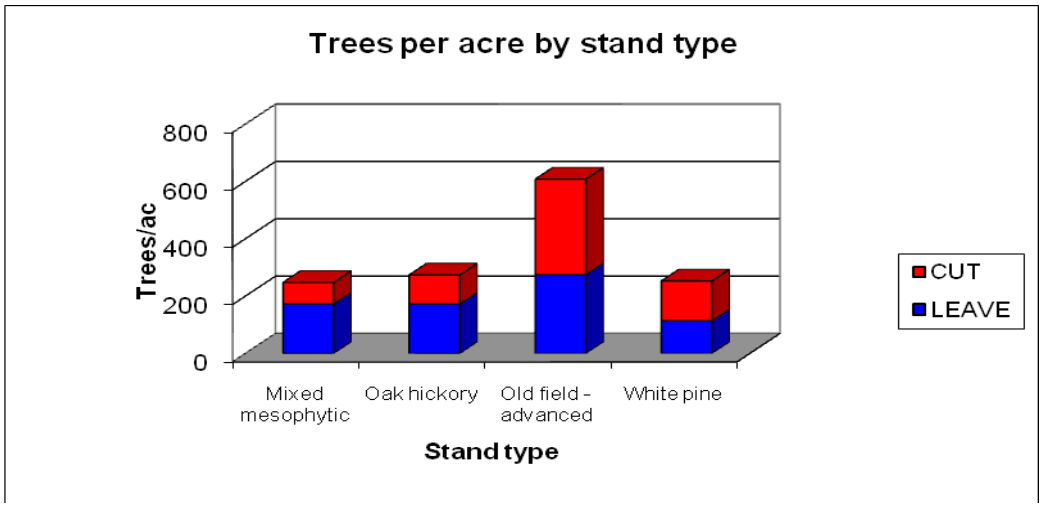
STAND	LEAVE	CUT	TOTAL (live)
Mixed mesophytic	6692	4455	11147
Oak hickory	5397	3252	8649
Old field - advanced	4512	308	4820
White pine	6876	3223	10099

Summary of number of trees per acre

STAND	LEAVE	CUT	(SNAG)*	TOTAL (live)
Mixed mesophytic	173	75	?	248
Oak hickory	173	101	?	274
Old field - advanced	275	333	?	608
White pine	114	139	?	253

*snags/acre >= 9" DBH = 5.2/acre across entire tract


Live basal area (sq ft/ac) by stand type
BA (sq ft/ac)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Mixed mesophytic
Oak hickory
Old field - advanced
White pine
Stand type
CUT
LEAVE
Volume (bd ft/ac) by stand type
Volume/acre (bd ft/ac)
12000
10000
8000
6000
4000
2000
0
Mixed mesophytic
Oak hickory
Old field - advanced
White pine
Stand type
CUT
LEAVE



A SUMMARY OF VOLUME PER ACRE (bd ft/ac) BY SPECIES FOR TRACT 705

Stand 1: Mixed mesophytic

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
AMB	612	350	962
AME		95	95
BIH	125	90	215
BLC	37	34	71
BLG	274		274
BLO	261	230	491
BLW		255	255
ZCO		47	47
EWP		109	109
NRO	128	989	1117
PIH	104	112	216
SHH		111	111
SUM	891	1968	2859
WHA	858	63	921
WHO		1100	1100
YEP	1165	1139	2304
TOTAL	4455	6692	11147

Stand 2: Oak hickory

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
AMB	30		30
BIH		57	57
BLG	206		206
BLO	523	213	736
BLW	69		69
ZCO		49	49
MOH		24	24
NRO	550	277	827
PIH	239	541	780
SHH		340	340
SUM	193	546	739
WHA	601	33	634
WHO	762	3317	4079
YEP	79		79
TOTAL	3252	5397	8649

Stand 3: Old field - advanced

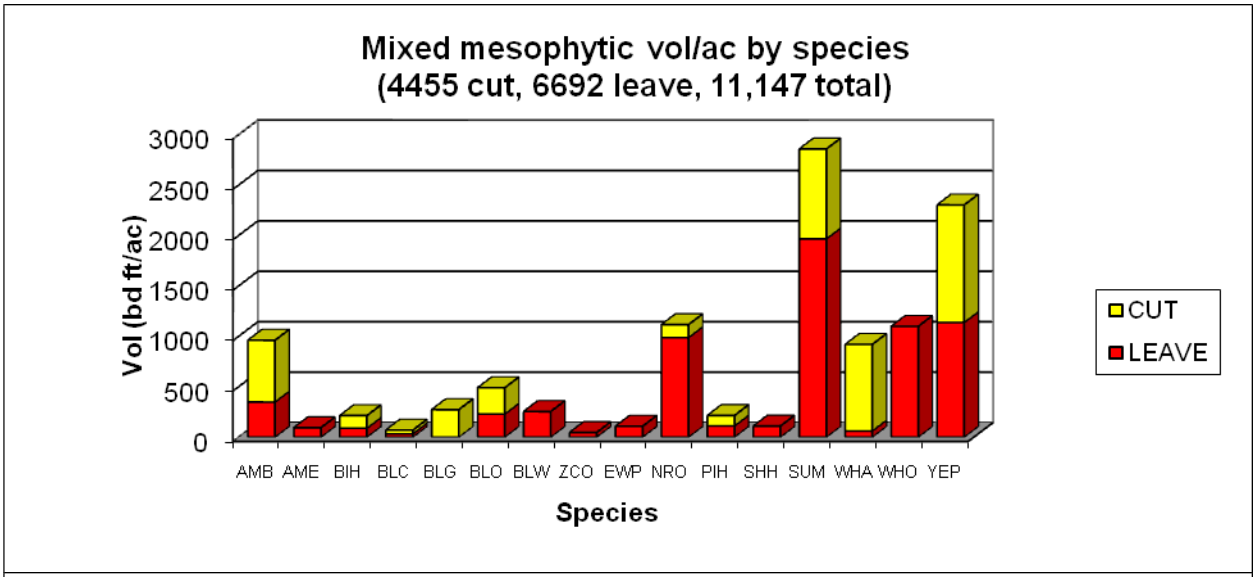
Volume (bd ft/ac)

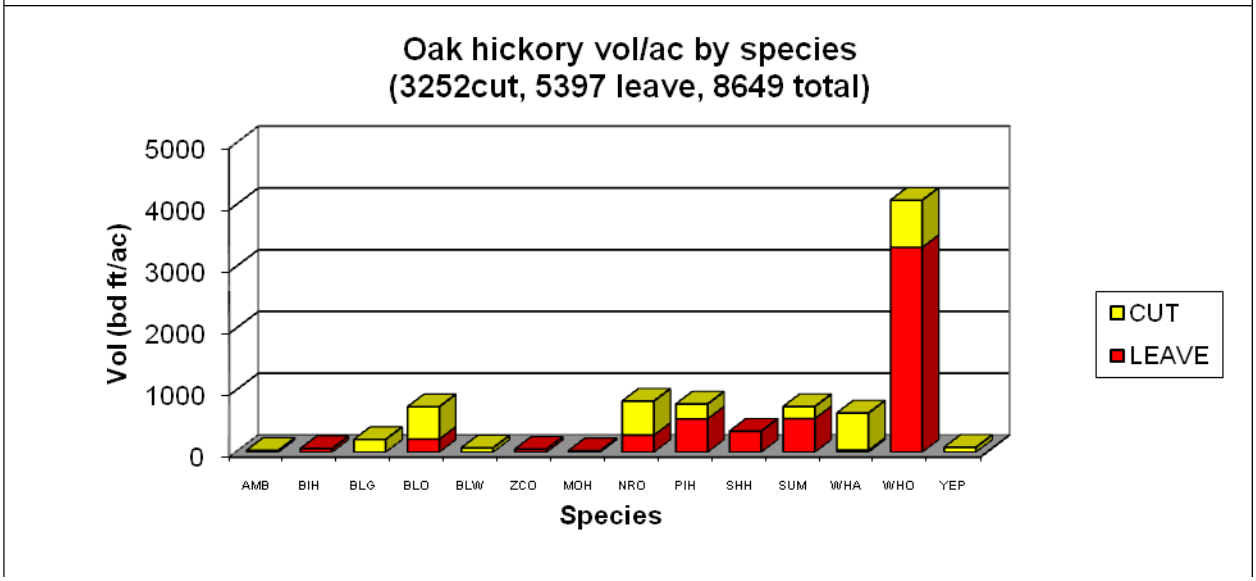
Species	CUT	LEAVE	TOTAL
BLW		394	394
NRO		974	974
SWG	308		308
YEP		3144	3144
TOTAL	308	4512	4820

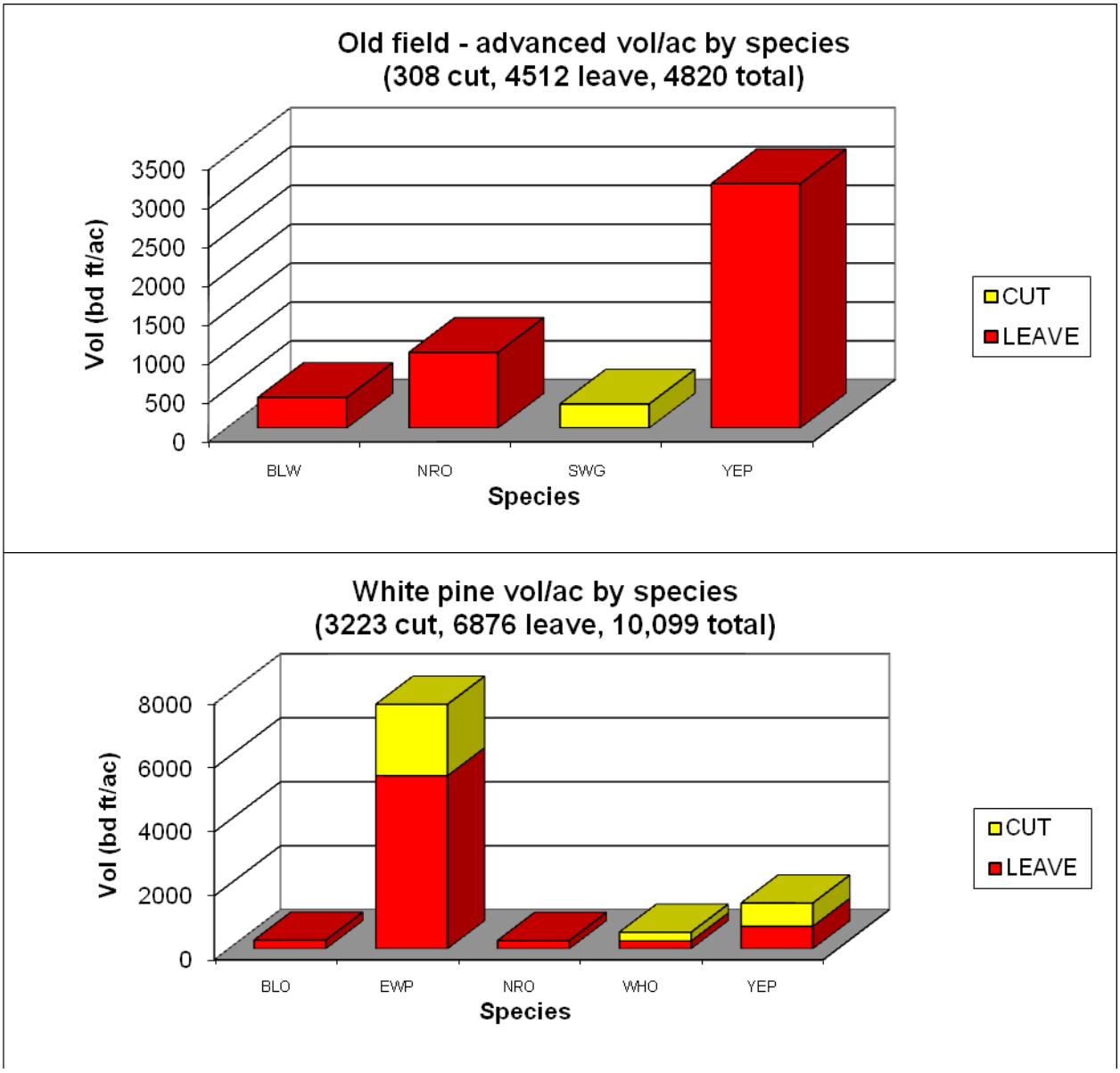
Stand 4: White pine

Volume (bd ft/ac)

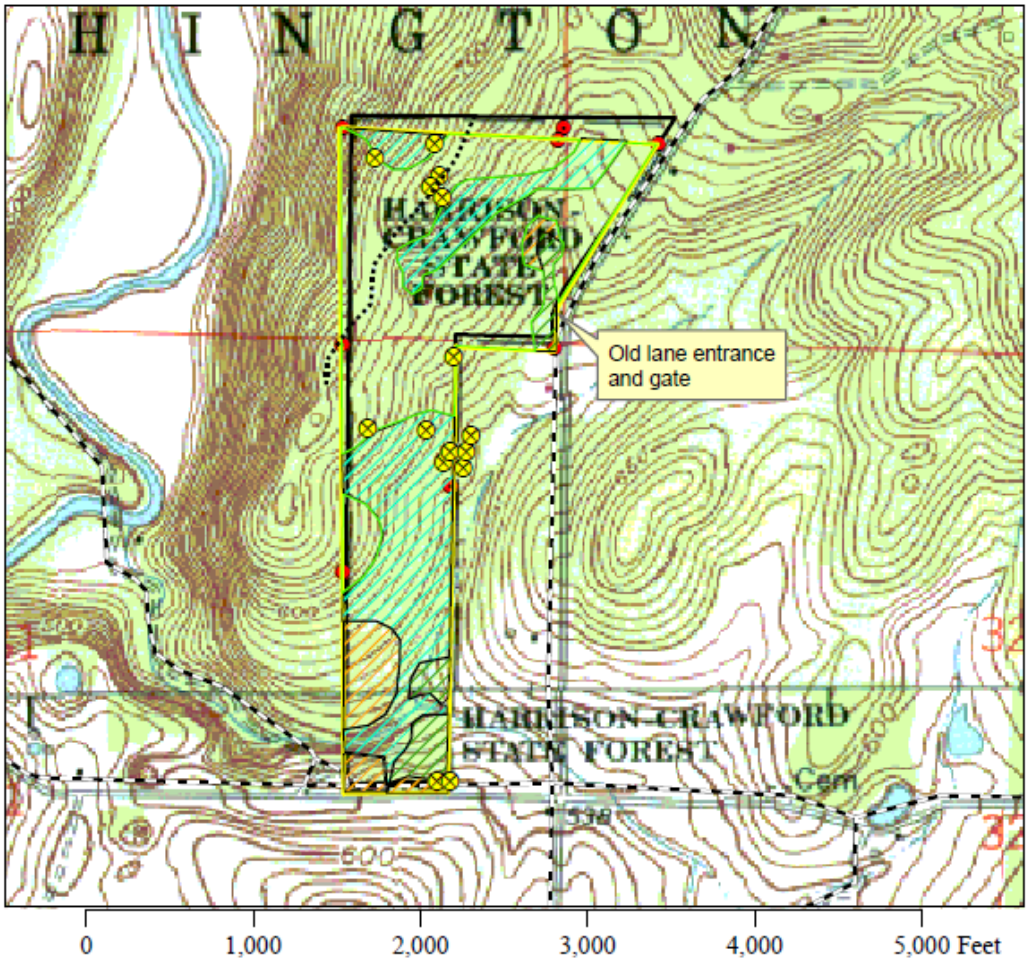
Species	CUT	LEAVE	TOTAL
BLO		267	267
EWP	2229	5410	7639
NRO		255	255
WHO	271	241	512
YEP	723	703	1426
TOTAL	3223	6876	10099


Mixed mesophytic vol/ac by species
(4455 cut, 6692 leave, 11,147 total)
Vol (bd ft/ac)
3000
2500
2000
1500
1000
500
0
AMB AME BIH BLC BLG BLO BLW ZCO EWP NRO PIH SHH SUM WHA WHO YEP
Species
CUT
LEAVE


Oak hickory vol/ac by species
(3252cut, 5397 leave, 8649 total)
Vol (bd ft/ac)
5000
4000
3000
2000
1000
0
AMB BIH BLG BLO BLW ZCO MOH NRO PIH SHH SUM WHA WHO YEP
Species
CUT
LEAVE


Old field - advanced vol/ac by species
(308 cut, 4512 leave, 4820 total)
Vol (bd ft/ac)
3500
3000
2500
2000
1500
1000
500
0
BLW
NRO
SWG
YEP
Species
CUT
LEAVE
White pine vol/ac by species
(3223 cut, 6876 leave, 10,099 total)
Vol (bd ft/ac)
8000
6000
4000
2000
0
BLO
EWP
NRO
WHO
YEP
Species
CUT
LEAVE

Tract 705



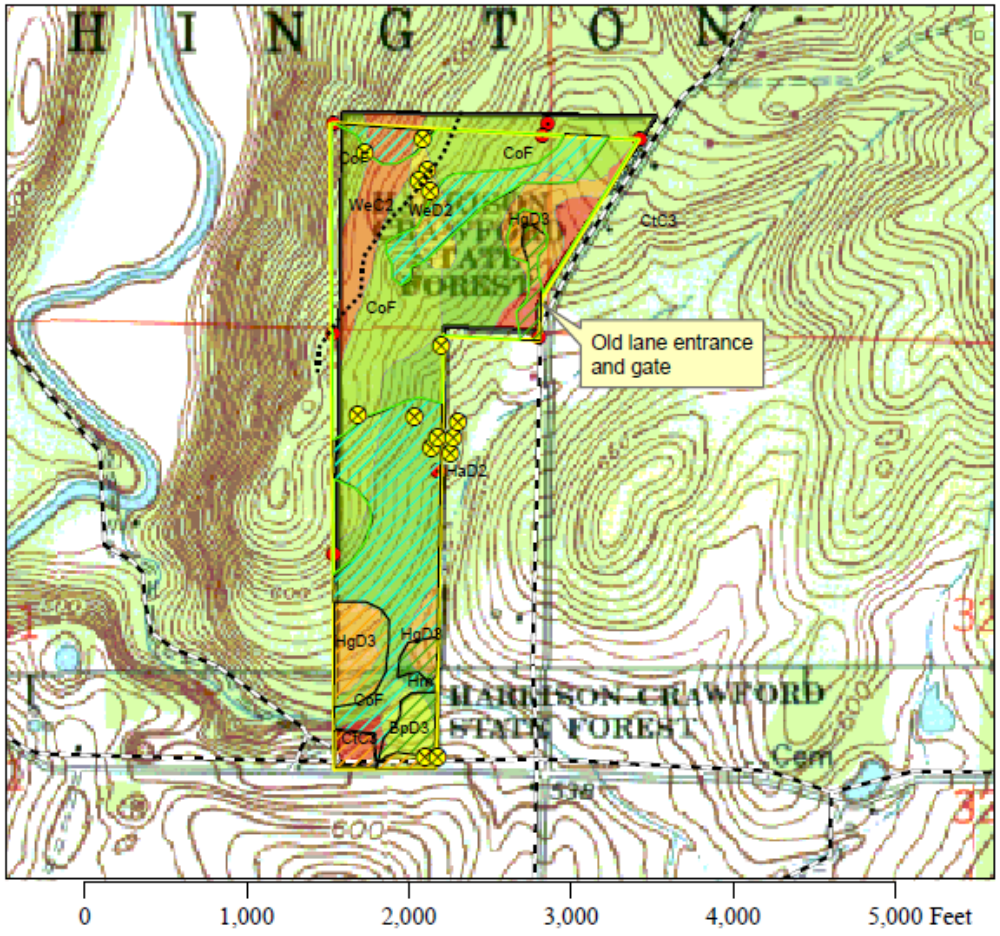
Legend

- Boundary corners
- Rockshelter
- Caves / open sinks
- Roads
- Tract 705 (GIS layer)
- Tract lines drawn to connect survey evidence
- Ailanthus locations - numerous stems
- Old road

- Stand 1: Mixed mesophytic (31.0 ac)
- Stand 2: Oak hickory (42.7 ac)
- Stand 3: Old field - advanced (7.1 ac)
- Stand 4: Eastern white pine (3.3ac)

N W E S

Tract 705 Soils



Legend

- Boundary corners
- Rockshelter
- Caves / open sinks
- Roads
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