Indiana Department of Natural Resources - Division of Forestry

RESOURCE MANAGEMENT GUIDE

STATE FOREST: Harrison Crawford **COMPARTMENT**: 31 **TRACT**: 05

Date: January 13, 2011 **Forester: Wayne Werne**
(Inventory - October, 2010)

INVENTORY SUMMARY

NUMBER OF STANDS: **5** **Est. growth: 133-145 bd. ft/ac/yr****
PERMANENT OPENINGS: **0.3 ac** **Est. cutting cycle: 17-19 yrs**
TOTAL ACREAGE: **236.0 ac**
AVERAGE SITE INDEX: **70-80** (for upland oaks)
AVERAGE BASAL AREA: **125 sq. ft/ac**

****Growth** was calculated by using 2010 volume **MINUS cedar**, subtracting the volume of 4400 bd ft/ac from the 1996 inventory and dividing by 14 years of growth. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1996.

TRACT 3105 TOTAL VOLUME (bd ft)

	CUT		LEAVE		TOTAL	
SPECIES	per acre	total	per acre	total	per acre	total
American beech	11	2,596		-	11	2,596
Bitternut hickory		-	12	2,832	12	2,832
Black cherry		-	8	1,888	8	1,888
Blackgum	5	1,180		-	5	1,180
Black oak	562	132,632	473	111,628	1,035	244,260
Black walnut		-	27	6,372	27	6,372
Chestnut oak	533	125,788	375	88,500	908	214,288
Chinkapin oak	21	4,956	81	19,116	102	24,072
*Eastern redcedar**	*179*	*42,244*		-	*179*	*42,244*
Northern red oak	168	39,648	336	79,296	504	118,944
Persimmon		-	39	9,204	39	9,204
Pignut hickory	111	26,196	78	18,408	189	44,604
Post oak	15	3,540	56	13,216	71	16,756
Red elm		-	5	1,180	5	1,180
Red maple		-	6	1,416	6	1,416
Sassafras	52	12,272		-	52	12,272
Scarlet oak		-	8	1,888	8	1,888
Shagbark hickory	47	11,092	310	73,160	357	84,252
Sugar maple	113	26,668	184	43,424	297	70,092
Sycamore	5	1,180		-	5	1,180
White ash	336	79,296	223	52,628	559	131,924
White oak	324	76,464	1,046	246,856	1,370	323,320
Yellow-poplar	317	74,812	367	86,612	684	161,424
TTOTAL	2,799	660,564	3,634	857,624	6,433	1,518,188

**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.*

STAND 1 – Oak hickory **ACREAGE: 139.4**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	3,049	4,476	7,525	
TOTAL VOLUME:	425,000	624,000	1,049,000	
BASAL AREA/ACRE:	50.6	77.9	128.5	
# TREES/ACRE:	72	217	289	

STAND 2 – Old field - advanced **ACREAGE: 60.6**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	1,483	1,978	3,461	
TOTAL VOLUME:	89,900	119,900	209,800	
BASAL AREA/ACRE:	43.5	70.0	113.5	
# TREES/ACRE:	95	259	354	

STAND 3 – Mixed mesophytic **ACREAGE: 16.2**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	4,621	5,672	10,293	
TOTAL VOLUME:	74,900	91,900	166,800	
BASAL AREA/ACRE:	56.0	80.5	136.5	
# TREES/ACRE:	49	263	312	

STAND 4 – Chestnut oak **ACREAGE: 10.5**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	5,170	3,497	8,667	
TOTAL VOLUME:	54,300	36,700	91,000	
BASAL AREA/ACRE:	87.1	58.7	145.8	
# TREES/ACRE:	141	183	324	

STAND 5 – Rocky south slope **ACREAGE: 9.3**

	CUT	LEAVE	TOTAL	SNAG
VOLUME/ACRE:	1,587	1,808	3,395	
TOTAL VOLUME:	14,800	16,800	31,600	
BASAL AREA/ACRE:	38.0	75.0	113.0	
# TREES/ACRE:	68	353	421	

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

TRACT BOUNDARIES: This tract is in the main chunk of the state forest, and is surrounded by other state forest tracts with the exception of the eastern edge, which has a small portion that borders private property. The northeastern boundary is formed by a fire trail / horse trail (308) that follows a ridge that divides this tract from tract 3011 to the north. The northwestern boundary is formed by an intermittent drainage that divides it from tract 3102. The western boundary is formed by a fire trail / horse trail (Voyle's pass) which divides it from tract 3104 to the west. The southwestern boundary is formed by another intermittent drainage up until it meets the fire trail that wraps around to the northeast. This line divides it from tract 3106 to the southwest. There is a little bit of private property bordering this tract on the eastern tip.

ACCESS: This tract is accessed via fire trail 308 coming off of Cold Friday Road past Cold Friday cemetery. This trail eventually diverges into a network of trails farther back. One of these borders the northeastern boundary of this tract, and offers the most direct and best access. The trail that diverges and goes past Greenbrier cemetery which eventually becomes Voyle's Pass (an old county road) forms the western boundary and provides fair access to the western portion of this tract. These two trails loop back and join each other in two places on the eastern side of the tract after they meander through the center of the tract. Although these routes do give access to the interior portions, the condition of the road is such that it is not good access for larger vehicles, and very limited in wet weather.

ACQUISITION HISTORY: The land that makes up this tract encompasses 7 separate acquisitions from different landowners. These include the following: Jerry and Beulah Binkley – 1936 (deed #131.44), Fleetie and Ford Smith – 1935 (deed #131.38) and 1939 (deed #131.57), Roy and Gail Enlow – 1963 (deed #131.96), William and Fannie Pease – 1940 (deed #131.109), Brittie and Robert Mowrer – 1936 (deed #131.33), and James Brewster – 1934 (deed #131.37). The only amount given for the transaction price was on the Brewster acquisition (which was larger in totality) and it came out to about $5.20 per acre.

TRACT DESCRIPTION: This tract was divided into five stands based on cover type and past management. These stands include: oak hickory, old field – advanced, mixed mesophytic, chestnut oak, and rocky south slope. These different stands gradated into each other in places where it was hard to tell which type was the more appropriate qualifier. Obviously, much of this area was previously used for farming, and has succeeded back to various forms of hardwood and cedar, which sometimes is distinctly different and sometimes blends in with the surrounding natural hardwoods. These stands will be described in detail below.

Stand 1 - Oak hickory

This 139-acre stand was the majority of the coverage, and occupied the more sloping ground across all portions of the tract that had not been cleared for farming. Mostly, this consisted of the east, south, and west facing slopes.

The total volume of the stand (7525 bd. ft/ac) is composed primarily of white oak (2317 bd. ft/ac), black oak (1471 bd. ft/ac), northern red oak (743 bd. ft/ac), and chestnut oak (725 bd. ft/ac). The remaining 30% of the volume consists of hickory, white ash, yellow-poplar, and various other species.

Stand 2 - Old field – advanced

This 61-acre stand is found primarily on the flat ridgetops in the north central portion of the tract, and represents former agricultural fields that have succeeded back to a stand of mostly hardwoods with some eastern redcedar mixed in. There were a few smaller areas of this type along the drainages as well. This stand did represent quite a hodgepodge, with some being primarily a sassafras thicket, some having a better stand of poplar, some having a high number of sugar maple saplings, while some had a distinct cedar component.

The total stand volume (3461 bd. ft/acre) is composed primarily of yellow-poplar (1225 bd. ft/acre), black oak (615 bd. ft/acre), white ash (487 bd. ft/acre), and eastern redcedar (354 bd. ft/acre). The remaining 25% of the volume consists of sugar maple, northern red oak, persimmon, and various other species. It should be noted that the volume of cedar is figured using a cedar log scale that results in a higher than Doyle volume, and includes trees down to 6" DBH as sawtimber volume.

Stand 3 – Mixed mesophytic

This 16-acre stand was found in several places on the north and west facing slopes in the western portion of the tract where the ridge sloped down into several coves bordering the valley. These areas clearly had higher site productivity than a lot of the tract.

The total volume of the stand (10,293 bd. ft/ac) is composed primarily of yellow-poplar (3602 bd. ft/ac), sugar maple (1815 bd. ft/ac), and black oak (1520 bd. ft/ac). The remaining 33% of the volume consists of white oak, white ash, sassafras, and various other species.

Stand 4 – Chestnut oak

This 11-acre stand was found in a couple of locations on the upper slopes in the northern portion of the tract. The 1996 management plan had originally designated a larger area as this stand type, but the portion that represented a dominant chestnut oak stand was noted

to be smaller than this. Chestnut oak does form a component of the oak hickory stand, but not to the level that it did on this 11 acre stand.

The total volume of the stand (8667 bd. ft/ac) is composed overwhelmingly of chestnut oak (6346 bd. ft/ac), and white oak (1146 bd. ft/ac). The remaining 15% of the volume consists of pignut hickory, northern red oak, and shagbark hickory.

Stand 5 – Rocky south slope

This small 9-acre stand is found in several locations on south facing slopes in the southern portion of the tract and occupies an area of shallow soils and exposed rock. It is a typical stand of this type and is dominated with small cedar, ash, and oak.

The total stand volume (3395 bd. ft/acre) is composed primarily of eastern redcedar (1302 bd. ft/acre), chinkapin oak (587 bd. ft/acre), and white ash (551 bd. ft/acre). The remaining 30% of the volume consists of white oak, sugar maple, yellow-poplar, and various other species. It should be noted that the high volume of cedar is due to using a cedar log scale that results in a higher than Doyle volume, and includes trees down to 6" DBH as sawtimber volume.

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.

ZaC3 Zanesville silt loam, 6-12% slopes, severely 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.

HaE2 Hagerstown silt loam, 18-25% slopes, eroded Upland oak SI is 85-95, Yellow-poplar SI is 95-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 375-450 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.

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.

WbF Weikert-Berks channery silt loams, 35-60% slopes Virginia pine SI is 45-53, est. growth is 75-100 bd. ft/ac/yr.

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, 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.

GlD2 Gilpin silt loam, 12-12% 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.

TlB2Tilsit silt loam, 2-6% 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.

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.

RECREATION: This tract, in conjunction with the area surrounding it, forms the largest contiguous portion of state owned land that makes up the forest, and as such, it probably receives a high level of recreational use. The fire trail that forms the north boundary of this tract is a direct access to a large part of the property from Cold Friday Road. This fire trail also serves as a horse trail. The trail that forms the western boundary of the tract is also a fire/horse trail, and would receive ample use as well. The trail that goes through the middle of the tract is also a horse trail.

Additionally, the adventure hiking trail skirts through the eastern portion of this tract, and would consequently receive backpacking and other hiking use. It is likely that a fair amount of hunting use is also received by this tract as well due to the large numbers of trails accessing it. And the presence of Birthday Plunge – a major recreational wild cave – also ensures that this tract is used recreationally by cavers as well.

WILDLIFE: This tract represents typical upland forest 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 oak hickory stand, but another habitat component would come from the advanced old field stand. This stand provides denser cover for bedding areas, especially during the winter months.

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 3105 actual present – harvest = residual
12"-18" DBH class	**6**	**40.2 – 14.2 = 26.0**
20" DBH and greater	**3**	**13.8 - 7.0 = 6.8**
Total	**9**	**54.0 - 21.2 = 32.8**

# snags per acre	Guidelines maintenance	Guidelines optimal	Tract 3105 actual
6" - 8" DBH class	**1**	**1**	**29.2**
10"-18" DBH class	**2.5**	**5**	**13.4**
20" DBH and greater	**0.5**	**1**	**0.4**
Total	**4**	**7**	**43.0**

These numbers show that both live tree densities as well as snag densities meet guidelines on this tract – except for the category of large snags. 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 slightly 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 below target component significantly. Creation of more snags in this size class could be undertaken by girdling large cull trees in a post-harvest TSI operation. Overall, large snags will be lacking for a long time due to the amount of acreage being taken up by smaller trees in the old field stand type.

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. There may be some conversion of cedar or the old field area to temporarily open areas that will be allowed to succeed into native hardwoods, and this would change the character of the tract over time, but will not change it into a permanently nonforested cover type. Creation of regeneration openings and/or

conversion of portions of the old field area into 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.

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. The small pond found in the north central portion of the tract would provide a valuable water source for wildlife during dry periods, and also represents good habitat for reptiles and especially amphibians.

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 large chunk of forest in a matrix of surrounding forest land.

WATERSHED / HYDROLOGY: The majority of the tract contains flat ridgetops, as well as gentle to moderately steep slopes that drain into intermittent drainages that eventually drain into Indian Creek about ½ a mile to the south. This area lies within a karst landscape with underground drainage, and one major cave is located here, as well as several smaller short caves and open sinks. The ridgetop portion may be high enough in elevation that a sandstone caprock layer overlies the limestone over much of the tract.

The major cave that exists here is Birthday Plunge – located in the southwest portion of the tract. This is a popular cave amongst cavers, as it offers some sporting challenges that require multiple ropes to negotiate. The entrance pit is 67 feet deep, and adjacent to this is an 18 foot climbdown to a tight horizontal crawl that opens into a two stage drop of 35 feet and 30 feet with a waterfall off to the side. Until recently, the top drop had to be precariously and dangerously rigged to an overhanging boulder, and the bottom drop had a loose rusty hanger to rig off of. Much better stainless steel hanger bolts were put in place at the top and halfway down to reduce the risk.

Beyond this are three other pits along a crawlway – 22 feet, 36 feet, and 37 feet – which can be rigged separately.

Also noteworthy is the fact that a skilled caver named Kenny Carigan suffered a fall into one of the last pits back in the '80's or 90's and it required a large number of people over the course of more than 24 hours to rescue him. The tight crawl at the beginning of the

cave had to be enlarged with an air chisel using SCUBA tanks for an air source, while ultimately he had to be removed on a backboard through the whole length of the cave because he suffered a broken pelvis.

Beyond this well known cave, there were several other smaller features located and mapped. Most noteworthy was a cave that I had not known about off the western ridgetop as it transitions into more sloping older natural hardwoods. It was located where the drainage off the flat old field dropped over a sandstone escarpment and formed a short small waterfall. Back underneath this ledge was a short passage that went downward somewhat and would qualify as a cave. There were several other smaller open sinks and short "caves" besides this noted on the tract.

Also, there was a scenic sandstone valley in the northern portion of the tract that included a short waterfall feeding into it as it dropped over the sandstone bedrock. This valley included some rockshelters, as well as crevices into the rocks. There was a moderate length of a rockface / cliffline in the eastern portion of the tract that also represented several shallow rockshelters on the underneath side.

There was also a small wildlife pond located in the north central portion of the tract that still held water, even in the severe drought of 2010.

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. The closest species nearby were several plant species between a half mile to a mile in both the east and west directions from this tract.

EXOTICS: There are numerous pockets of ailanthus scattered throughout this tract in various places where any openings have allowed it to get established. There is some growing in the old field areas, but more so where the 1996 tornado and subsequent windstorms have blown down trees. These were painted with pink when found, so pre-harvest treatment should be easier, and needs to be done to eliminate the established seed source.

There are also some spreading areas of stilt grass within the tract along the horse trails. The stilt grass along the trails could be sprayed easily enough, but it is hard to eliminate, and it is likely that the seed has spread out into the woods in places, and this would be less feasible to control. There are also some areas of multiflora rose in places – especially in the old field stand – and this would be difficult to eradicate by spraying. If

any of the old field areas were bulldozed for planting, this might be the only easy way to eliminate the rosebush.

There were also areas of Japanese honeysuckle growing primarily in the old field areas, but this would also be very difficult to treat or eliminate due to its pervasiveness and scattered nature in areas hard to access due to rosebush.

SILVICULTURAL HISTORY AND PRESCRIPTION:

General: Utilizing records of the past history of this tract, an inventory done in 1996 indicated a total standing volume of 4400 board feet per acre. There was also an inventory apparently done in 1972 as well, but the records in the file are sketchy and the tracts were defined differently back then. Consequently, it becomes hard to determine what portions of which tracts' cruise data pertains to what is now defined as tract 3105.

In 1979, there was a timber sale marked and sold that encompassed the western portion of this tract, as well as the southern portion of tract 3102. This removed 103,200 board feet – mostly yellow-poplar, black oak, hickory, and red oak. The files did not break down how much volume came from each tract. There is a note in the file that TSI was performed the following year. There were also 4 trees totaling 960 board feet taken out of this tract in the salvage sale that encompassed several tracts in this area following the wind damage from Hurricane Ike in 2009.

The 2010 inventory shows between 6254 (no cedar) and 6433 board feet per acre, and this figures out to a growth rate of between 133 to 145 board feet per acre per year, after dividing the difference by 14 years of growth since the last inventory. Cedar volume was figured using a different cedar log scale (much more volume from small trees), which was not used in 1996, and this is why cedar volume is being excluded from growth calculations, as it was probably given marginal volume in 1996.

The growth figures are respectable considering about one fourth of this tract is quite degraded. 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, and long-term conversion of the low grade hardwood occupying the old field areas to a better crop of hardwood trees.

Number of trees per acre and basal area per acre figures indicate that all stands are overstocked at between 108% to 130%. Removal of trees tallied as "cut" either via a timber sale or TSI would reduce the stocking levels to about 70-80% stocking with the exception of stand 4 that would be reduced to less than 55% stocking due to heavy thinning of the chestnut oak. Stocking levels would be reduced to a level considered fully stocked above the B-line for four of the stands and understocked between the B and C-lines for stand 4.

Due to the amount of volume being carried on the majority of the tract (6254 bd. ft/ac – not including cedar), the length of time since the last managed sale on only a portion of the tract (31 years back to 1979), and the general condition of the overstory trees in the older hardwood portions of the tract, the initial impression was that a medium level improvement harvest could be undertaken in this tract at any time. This would produce a sale volume of between 550,000 to 600,000 board feet (not including cedar) or about 2330 to 2540 board feet per acre and leave between 875,000 to 925,000 board feet plus 40,000 board feet of cedar, or between 3700 to 3900 board feet per acre of hardwood and 180 board feet per acre of cedar (according to the cedar log scale).

It should also be noted that a tornado followed a path through this tract in the spring of 1996 which resulted in intermittent windthrow in places. There were several pockets of trees that were blown down, and these areas are 15 years into natural regeneration – which unfortunately includes groups of ailanthus in places – though not extensive beyond reasonable control efforts.

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 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. Most of the TSI will probably be targeted at the old field areas where the composition and stocking could be improved from what currently occupies most of this area. Ailanthus needs to be monitored and eliminated when found to be present or establishing itself. All ailanthus should be killed pre-harvest. There were several areas of ailanthus found to be establishing themselves in different places throughout the tract – usually where windthrow has opened up patches of sunlight to the ground.

Stand 1: Oak hickory

This 139-acre stand covers about 60% of the tract, and occupied the more sloping ground across all portions of the tract that had not been cleared for farming. Mostly, this consisted of the east, south, and west facing slopes. The better timber was located in the series of coves in the western portion of the tract – some containing an excellent white oak stand. It contains a high volume of 7525 board feet per acre of which 3049 was classified as harvestable and 4476 was classified as residual. This would remove 51 square feet of basal area, which would leave the residual stand with 78 sq. ft. Stocking would drop from 115% to about 70% with the indicated management (fully stocked above the B-line).

Since the last harvest in a portion of this stand was 31 years ago, and because it also currently contains a high volume of both harvestable material and 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 stands 3 and 4, with some trees from stands 2 and 5. The majority (60%) of the harvest volume for stand 1 (3049 bd. ft/ac) would be contained in black oak (851 bd. ft/ac), white oak (525 bd. ft/ac), and white ash (511 bd. ft/ac), with chestnut oak, northern red oak, yellow-poplar, 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. 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.

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. There are several pockets of ailanthus that should be treated pre-harvest.

Stand 2: Old field - advanced

This 61-acre stand covers about one quarter of the tract, and contains a volume of 3461 board feet per acre of which 1483 was classified as harvestable and 1978 was classified as residual. This would remove 44 square feet of basal area, which would leave the residual stand with 70 sq. ft. Stocking would drop from 108% to about 70% with the indicated management (fully stocked above the B-line). These figures DO include cedar as figured according to the cedar log scale.

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, 3 and 4. The majority (88%) of the harvest volume for stand 2 (1483 bd. ft/ac) would be contained in yellow-poplar (491 bd. ft/ac), eastern redcedar (354 bd. ft/ac), white ash (251 bd. ft/ac), and black oak (207 bd. ft/ac), with sugar maple, northern red oak, and various other species making up of the remainder of the harvest volume. Much of the harvest volume tallied in this stand is represented by eastern redcedar due to use of the cedar scale. A separate cedar sale would probably have to be undertaken to achieve optimal management, as most of these cedar would be removed to encourage poplar and the oak regeneration that is usually found in the understory of such stands. Ultimately, this site should be completely converted to hardwoods due to recovery of the site from former agricultural activities and erosion.

Much of this stand is dominated with sassafras, white ash, yellow-poplar, and cedar in the submerchantable to merchantable size classes. In scattered places, there is some oak

regeneration in the understory. Timber harvest and post harvest TSI should concentrate on releasing this oak regeneration – mostly with follow-up TSI.

Likely, a separate hardwood sale would be conducted from an exclusive cedar sale, and there probably would not be enough concentrated cedar to justify a separate cedar sale. The hardwood component would be marked in conjunction with stands 1, 3, and 4 first. Subsequently, a cedar sale might be conducted to help release the oak regeneration that is present in places in this stand. Finally, TSI would remove any leftover competing trees and allow a new stand of poplar and oak to establish itself and grow here.

It is noteworthy to mention that in one place, Fish and Wildlife had done some habitat work years ago, and apparently bulldozed a portion of this old field area to open it up from encroaching trees. This small area had a good stand of young poplar growing in it while the neighboring areas had low grade, low quality trees such as crooked sassafras growing in them. It might be logical to attempt the same thing again to bulldoze small areas of this undesirable stand to eliminate the rosebush, honeysuckle, sassafras, and other low grade trees, with the hope that a better stand of poplar might also be more likely to grow in more favorable conditions (better soil with exposure to sun). Creating some grassy/brushy habitat would also benefit the wildlife, and not remove any older forest in order to do so.

Stand 3: Mixed mespophytic

This 16-acre stand contains a very high volume of 10,293 board feet per acre of which 4621 was classified as harvestable and 5672 was classified as residual. This would remove 56 square feet of basal area, which would leave the residual stand with 81 sq. ft. Stocking would drop from about 120% to about 78% with the indicated management (fully stocked above the B-line).

Since the last harvest in portions of this stand was 31 years ago, and because it currently contains a high volume of both harvestable material and 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 stands 1 and 4, with some trees from stands 2 and 5. The majority (68%) of the harvest volume for stand 1 (4621 bd. ft/ac) would be contained in yellow-poplar (1492 bd. ft/ac) black oak (932 bd. ft/ac), and sugar maple (716 bd. ft/ac). The remainder would be contained in sassafras, white oak, and chestnut oak.

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. As always, any ailanthus present should also be treated and eliminated. There are several pockets of ailanthus that should be treated pre-harvest.

Stand 4: Chestnut oak

This 11-acre stand was designated as a separate stand because it was clearly dominated with chestnut oak, and as is the case with many such stands, the stems were overstocked with several multiple stemmed trees and others needing to be thinned out. It contains a high volume of 8667 board feet per acre of which 5170 was classified as harvestable and 3497 was classified as residual. This would remove 87 square feet of basal area, which would leave the residual stand with 59 sq. ft. Stocking would drop from 130% to about 55% with the indicated management (slightly understocked below the B-line).

Since the last harvest in a small portion of this stand was 31 years ago, and because it also currently contains a high volume of both harvestable material and residual growing stock, it should be included with stands 1 and 3 as a medium to high priority for conducting a harvest. The overwhelming majority (86%) of the harvest volume for stand 4 (5170 bd. ft/ac) would be contained in chestnut oak (4459 bd. ft/ac), with pignut hickory and white oak 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. When possible, selection should also favor releasing future crop trees. As cruised, this stand would be heavily thinned, and the residual stand would be primarily still chestnut oak as well as white oak.

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.

Stand 5: Rocky south slope

This 9-acre stand contains a volume of 3395 board feet per acre of which 1587 was classified as harvestable and 1808 was classified as residual. This would remove 38 square feet of basal area, which would leave the residual stand with 75 sq. ft. Stocking would drop from 110% to about 80% with the indicated management (fully stocked above the B-line). These figures DO include cedar as figured according to the cedar log scale.

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, 3, and 4. If this stand had any harvesting done, the majority of the volume would be represented by cedar, with some chinkapin and white oak as well. Most of the harvest volume tallied in this stand is represented by eastern redcedar (1302 bd. ft/ac) due to use of the cedar scale. Most all of the cedar was tallied for removal to open this area up to more sunlight for hardwood regeneration, and a separate cedar sale would probably have to be undertaken to achieve optimal management. It is probable that little harvesting will

be done in this stand which starts to approximate a barrens type ecosystem in places, as well as the fact that a low priority cedar sale would have some level of access issues for equipment.

PROPOSED ACTIVITIES LISTING

Fall 2010	Field inventory
Winter 2010	Write mgmt plan
Summer 2011 - Fall 2011	Basal bark treat ailanthus
Fall 2011 – Spring 2012	Mark timber sale
Spring 2012 - Spring 2013	Sell timber sale
2013 / 2014	Post harvest TSI
2018	Recon & monitor for exotics
2025-2030	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 3105)

A SUMMARY OF VARIOUS STATISTICS FOR TRACT 3105

Summary of basal area (sq ft per acre)

STAND	LEAVE	CUT	(SNAG)	TOTAL (live)
Oak hickory	77.9	50.6	??	128.5
Old field - advanced	70.0	43.5	??	113.5
Mixed mesophytic	80.5	56.0	??	136.5
Chestnut oak	58.7	87.1	??	145.8
Rocky south slope	75.0	38.0	??	113.0

Summary of volume (bd ft per acre)

STAND	LEAVE	CUT	TOTAL (live)
Oak hickory	4476	3049	7525
Old field - advanced	1978	1483	3461
Mixed mesophytic	5672	4621	10293
Chestnut oak	3497	5170	8667
Rocky south slope	1808	1587	3395

Summary of number of trees per acre

STAND	LEAVE	CUT	(SNAG)*	TOTAL (live)
Oak hickory	217	72	?	289
Old field - advanced	259	95	?	354
Mixed mesophytic	263	49	?	312
Chestnut oak	183	141	?	324
Rocky south slope	353	68	?	421

*snags/acre >= 9" DBH = 13.8/acre across entire tract

A SUMMARY OF VOLUME PER ACRE (bd ft/ac) BY SPECIES FOR TRACT 3105

Stand 1: Oak hickory

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
AMB	21		21
BLG	9		9
BLO	851	620	1471
CHO	322	406	728
ZCO	21	103	124
NRO	289	454	743
PIH	121	123	244
POO	28	106	134
REE		9	9
SAS	19		19
SCO		15	15
SHH	75	546	621
SUM	88	107	195
WHA	511	151	662
WHO	525	1792	2317
YEP	169	44	213
TOTAL	3049	4476	7525

Stand 2: Old field - advanced

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
BIH		43	43
BLC		29	29
BLO	207	408	615
BLW		40	40
ERC	354		354
NRO	58	104	162
PER		144	144
PIH		49	49
REM		23	23
SHH	27		27
SUM	77	168	245
SYC	18		18
WHA	251	236	487
YEP	491	734	1225

Stand 3: Mixed mesophytic

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
BLO	932	588	1520
BLW		254	254
CHO	325	182	507
NRO		522	522
SAS	653		653
SUM	716	1099	1815
WHA		699	699
WHO	503	218	721
YEP	1492	2110	3602
TOTAL	4621	5672	10293

Stand 4: Chestnut oak

Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
CHO	4459	1887	6346
NRO		360	360
PIH	610		610
SHH		205	205
WHO	101	1045	1146
TOTAL	5170	3497	8667

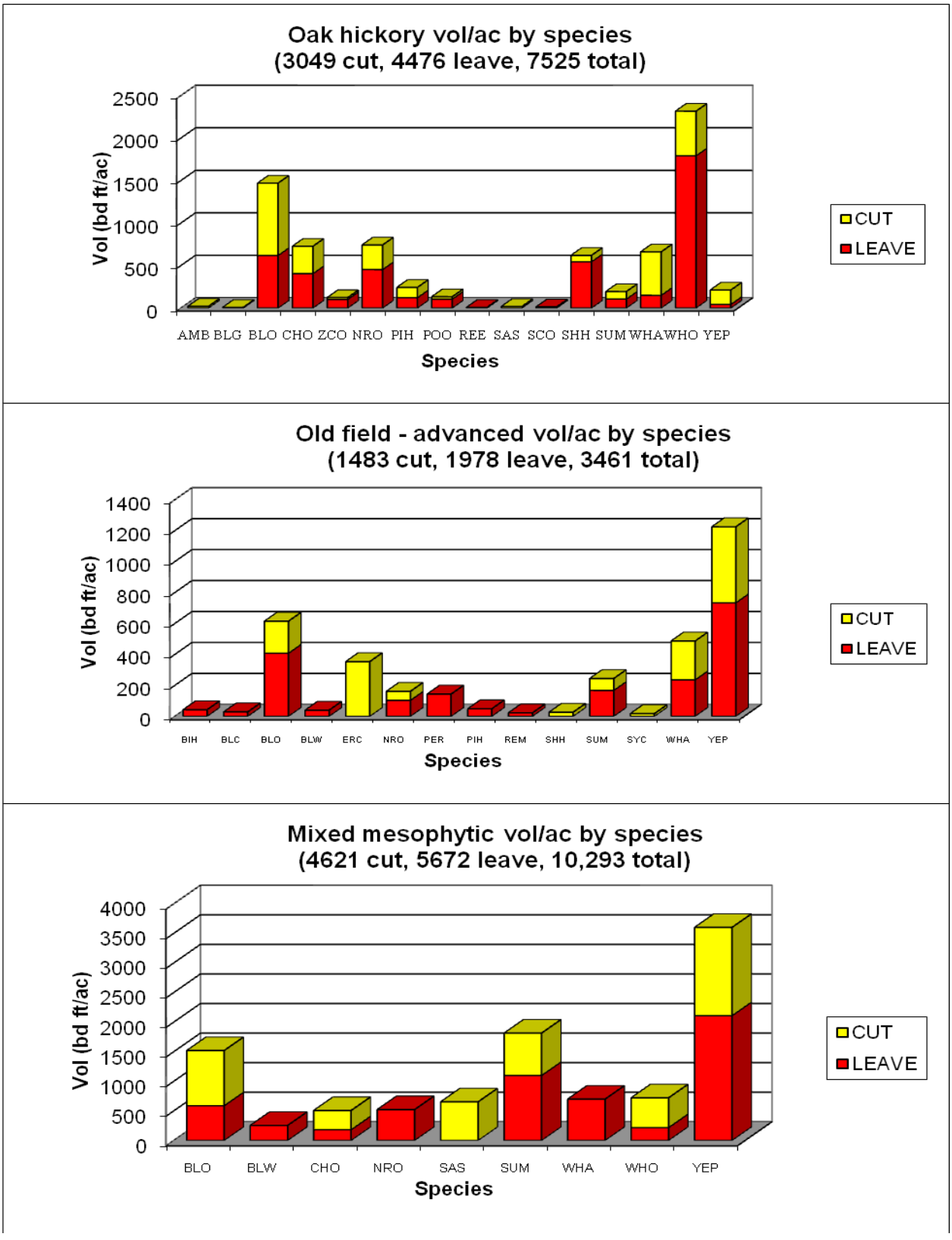
Stand 5: Rocky south slope

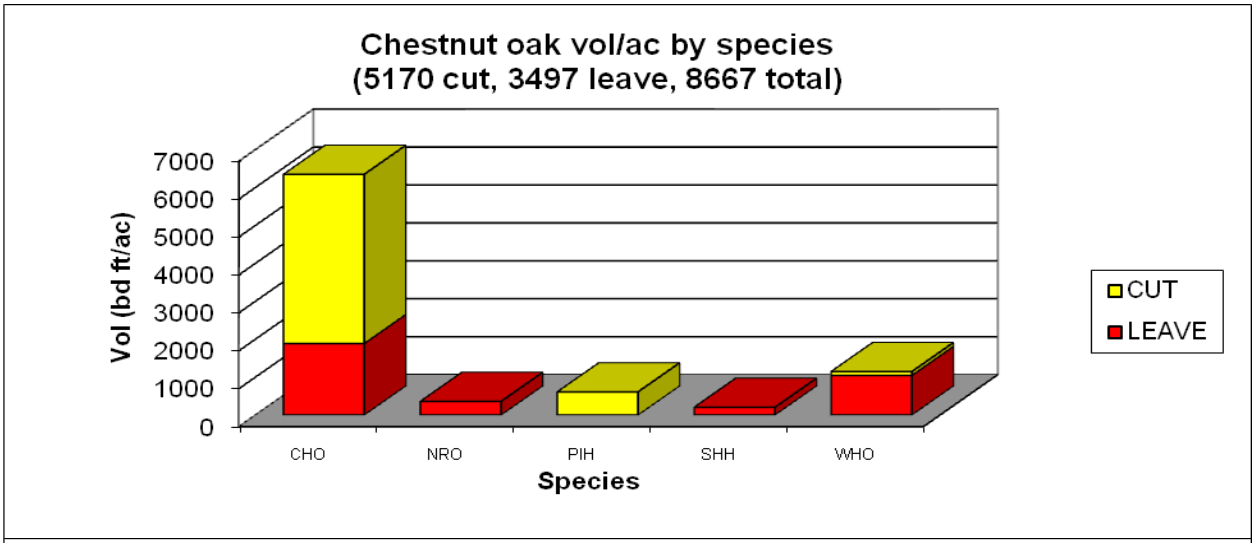
Volume (bd ft/ac)

Species	CUT	LEAVE	TOTAL
CHO		77	77
ZCO	164	423	587
ERC	1302		1302
NRO		135	135
SHH		123	123
SUM		183	183
WHA		551	551
WHO	121	158	279
YEP		158	158

TOTAL	1483	1978	3461

TOTAL	1587	1808	3395




Chestnut oak vol/ac by species
(5170 cut, 3497 leave, 8667 total)
Vol (bd ft/ac)
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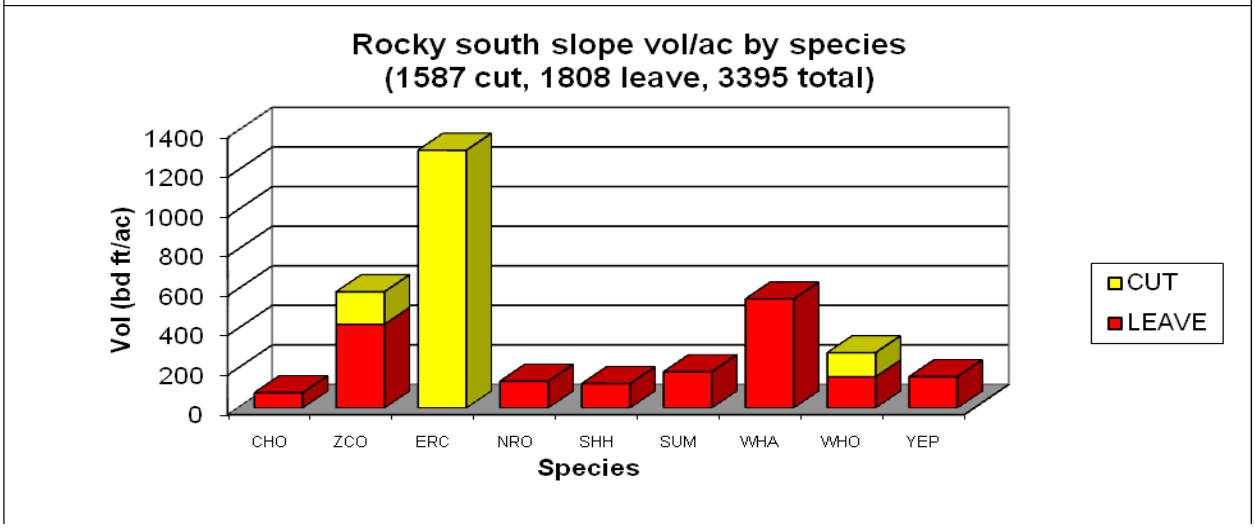
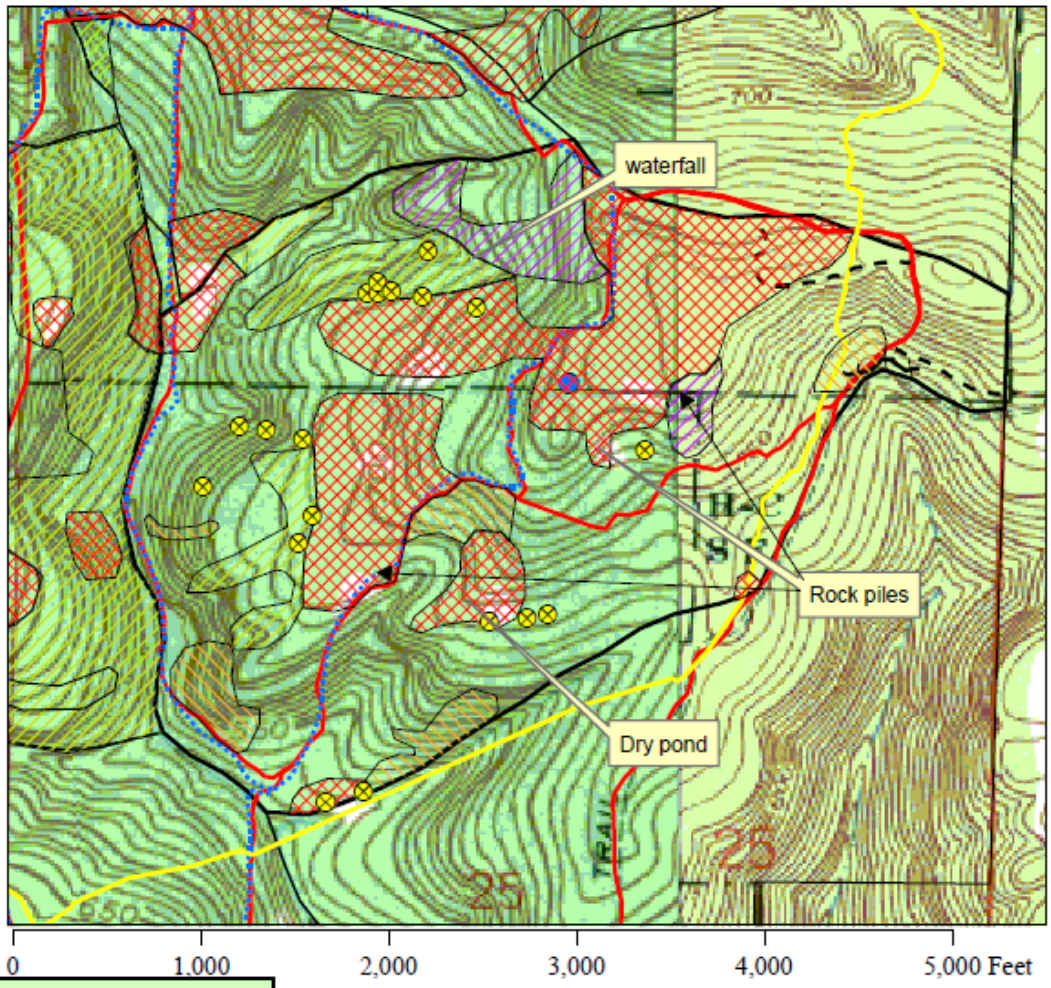
6000
5000
4000
3000
2000
1000
0
CHO
NRO
PIH
SHH
WHO
Species
CUT
LEAVE


Rocky south slope vol/ac by species
(1587 cut, 1808 leave, 3395 total)
Vol (bd ft/ac)
1400
1200
1000
800
600
400
200
0
CHO
ZCO
ERC
NRO
SHH
SUM
WHA
WHO
YEP
Species
CUT
LEAVE

Tract 3105



0 1,000 2,000 3,000 4,000 5,000 Feet

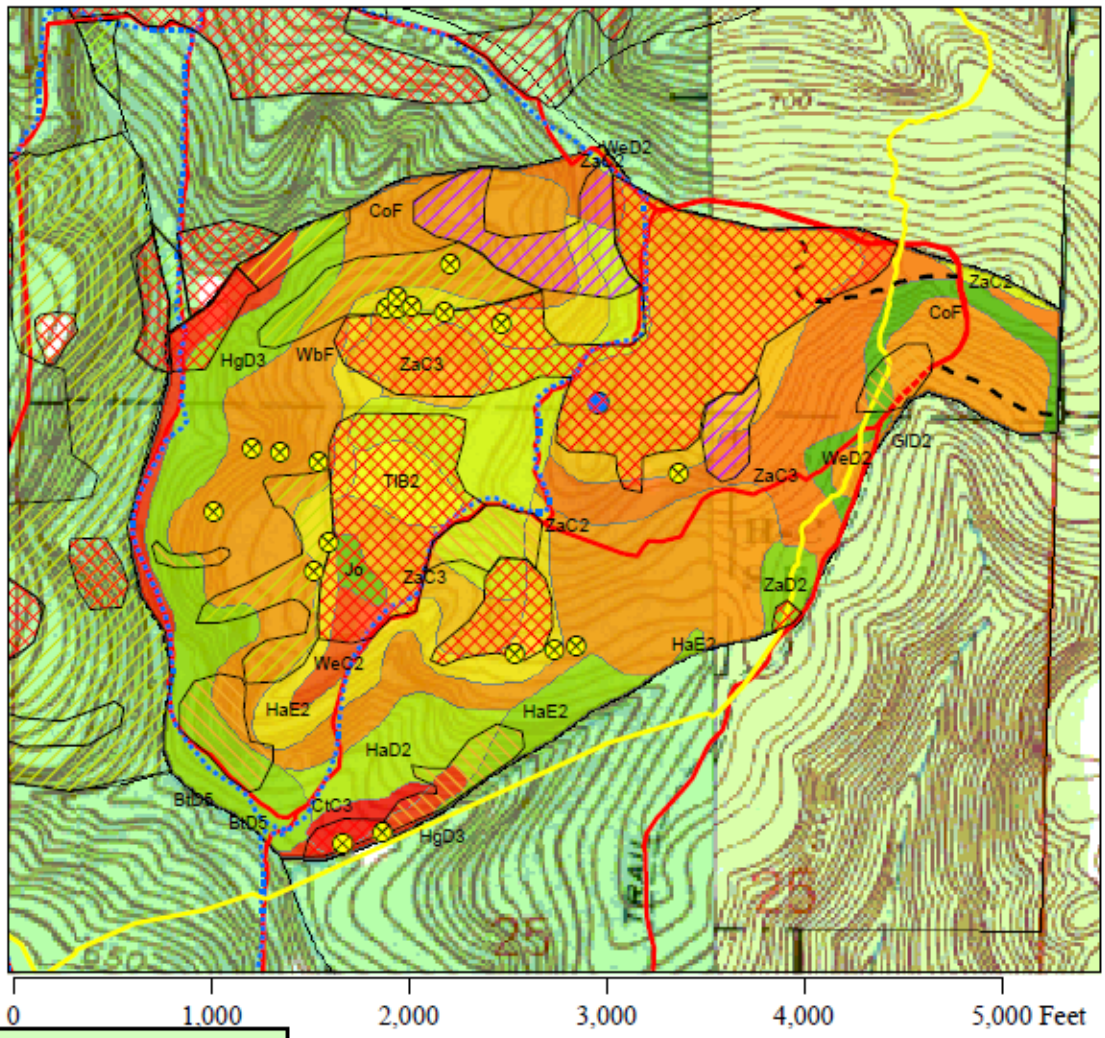
Legend

- Large caves
- 3105 cliffline
- 3105 pond
- 3105 historical sites
- 3105 caves / sinks
- 3105 old road
- Adv Hiking Trail
- Horse trails
- Firelanes
- tract 3105
- Ailanthus - numerous stems

- Stand 1: Oak-hickory (139 ac)
- Stand 2: Old field - advanced (61 ac)
- Stand 3: Mixed mesophytic (16 ac)
- Stand 4: Chestnut oak (11 ac)
- Stand 5: Rocky south slope (9 ac)

N W E S

Tract 3105 Soils



Legend

- Large caves
- 3105 cliffline
- 3105 pond
- 3105 historical sites
- 3105 caves / sinks
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